Sustainable Urban Development

The Case Of Hammarby Sjöstad

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February 2006

Paper for Kulturgeografiska Institutionen
Advanced Course in Human Geography
Fall Semester 2005
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Contents

Introduction 4
Chapter 1 | Urban developments and sustainability 6
Chapter 2 | The planning context of Hammarby Sjöstad 10
Chapter 3 | History of the area 14
Chapter 4 | Plans for Hammarby Sjöstad 16
Chapter 5 | Hammarby Sjöstad’s environmental strategies 20
Chapter 6 | Evaluations of the project 24
Conclusion 28

Literature 31
Introduction

For the first time in history, more people live now in urban areas than in rural areas. This indicates that the level of urbanisation never has been this high – and it is still increasing. The relative recent rise and growth of cities globally has caused an increase of the importance of urban planning. Urban developments are dynamic and different all over the world. This requires thorough research and strategies to guide developments in the right direction. New strategies and ways to secure the long term sustainability of areas are being developed today. This paper examines this development in general and focuses on a case study.

With the growth and development of Stockholm, the capital of Sweden, city planners always keep an eye on areas for future development. Whether redevelopment of old parts of the city or developing new areas outside the current city boundaries, opportunities are always available. Space, though, is restricted in this city where the geographical landscape of islands and water limit possibilities to a certain extend. However, city planners have the job to find the right location and try to find a sustainable and long term solution what is best for the city and it’s current and future citizens. In some cases they come to truly extraordinary solutions.

Building opportunities and new plans arise from time to time but never before – not in Stockholm and not even in the whole of Sweden – a project of this size had been undertaken. In the 1990s a project kicked off which preparation and realisation would take over 20 years: the Hammarby Sjöstad project.

With an eye on the development of the city as well as high environmental goals, it was eventually decided to change the old industrial and harbour district around the Hammarby lake (“Hammarby Sjö” in Swedish) into a futuristic and unique residential area. The project had to be special in many aspects and because of that, it has been in the spotlight for international urban geographers and city planners for years.

In this paper I will take a closer look on this remarkable project. Although the project is not completely realised yet, I will try to take evaluations of the project into account as well. To do so I will raise a general research question for this paper, which is formulated as follows:
What is sustainable urban development and how does it work in practice, regarding the case of Hammarby Sjöstad

This paper is written for a Bachelor Human Geography education programme on the University of Stockholm. The research and information is mainly based on literature. I will try to use my sources as objective as possible and try to interpret information accordingly in a scientific way.

I will start with shaping the general context of urban developments and the role of sustainability in this. Then, attention will shift to the case study Hammarby Sjöstad. After a general introduction of the history of the area and some previous plans, I will focus on the eventually chosen plan and describe the most important aspects and features. After that I will move the attention to the planning side of the story to peak behind the scenes of the organisation and planning context of the project. Eventually I will look at recent evaluations of the project, in order to try and make a judgement about the problems and solutions faced so far. Hopefully, this will improve the understanding about the project. It might also be important for the further development of the project, as well as other similar large-scale environmental sustainable building projects in the future. Whether this is fiction or truth will be discussed in this paper.
Cities, although depending on the definition used, have been present for quite a while. It is the twentieth century, however, that is linked with major urban developments. Impressive urban landscapes of skyscrapers, cities with over 10 million inhabitants and an immense spread of urban areas are fairly new phenomena. Along with these rapid developments go many urban problems, like segregation, traffic congestion, pollution and degradation of the environment. In the international debate about city planning, strategies to develop cities in the future are likely to change. This is because a relatively new term has appeared among planners: sustainable development.

The term sustainable development, which is growing in popularity, is defined differently by various authors. The most used definition came from the Brundtland Commission in 1987. They defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987). Another definition, by the World Conservation Union in 1991, is: “improving the quality of human life while living within the carrying capacity of supporting ecosystems” (World Conservation Union, 1991). Problems, though, arise when one looks closer at the definitions. Terms like “needs” and “carrying capacity” are rather vague and can’t possibly be clearly defined. However, the general idea of sustainable development is clear: live today in such a way that the environment is preserved for future life in the long term.

This long term vision is crucial for the notion of sustainable urban development, according to Stephen Wheeler, assistant professor in city and regional planning at the University of New Mexico (USA) (Wheeler, 1998). The tradition to make plans that optimize life for the short term, Wheeler argues, should change towards plans that comprise at least several decennia.
Although the concept of sustainability is only used in urban planning for roughly three decades, and because of that still in early stages, it’s persistence and spread indicate that it is a notion of lasting importance (Wheeler, 1998). The increasing pressure by urban developments on the environment is causing city planners to change their strategies and to try and safeguard quality of life for future generations, it is now often argued. To do so, Stephen Wheeler has outlined nine directions that should be taken to achieve sustainable urban development. These are:

- Compact, efficient land use
- Less automobile use, better access
- Efficient resource use, less pollution and waste
- Restoration of natural systems
- Good housing and living environments
- A healthy social ecology
- A sustainable economics
- Community participation and involvement
- Preservation of local culture and wisdom


These nine directions from the core of approaches that, according to Wheeler, should lead to more sustainable cities. This transition, however, is far from easy and it will take time to come about (Wheeler, 1998).

Views on sustainable urban development and how to achieve it vary among various authors, of course. Another interesting approach to the concept is given by Scott Campbell, coordinator of Doctoral Studies in Urban Planning at the College of Architecture and Urban Planning at the University of Michigan (USA). He has designed a model that he calls “The Planner’s Triangle”, to analyse the different goals of planning and it’s related conflicts.
In Campbell’s Planners Triangle, the three main goals for city planners are shown. These are social justice, overall economic growth & efficiency and environmental protection. The objectives all represent different perspectives on the city: from the different viewpoints the city is regarded respectively as a location of conflict over the distribution of resources / services / opportunities, a location of production / consumption / distribution / innovation, and a location where resources are used and waste is produced (Campbell, 1996).

The planner of today and of the future should, in the eyes of Campbell, strive to achieve all three goals and thereby achieve sustainable development (positioned in the middle of the Planners Triangle). But several obstacles are on the way. Campbell indicates three main conflicts associated with his Planners Triangle (Campbell, 1996). The first is the property conflict. This is in fact a clash between social justice and overall economic growth & efficiency (see figure 1). Here, “competing claims on and uses of property” form the cause of conflict. Another conflict is the resource conflict: a clash between overall economic growth & efficiency and environmental protection. The core of conflict is, in this case, the natural resource base. While (large) resource consumption is needed for economic growth, the goal of environmental protection advocates conservation of resources for future requirements. The third and last conflict in the Planners Triangle is the development conflict. This is caused because of a clash between the planning objectives social justice and environmental protection. It is very difficult to achieve both goals as moderate economic growth, which is required for environmental protection, makes it hard for the poorer people in society to become more prosperous (Campbell, 1996).
These arising conflicts between the planning goals make achieving sustainable urban development a tough task. In fact, it requires a reorganisation of society to get there, according to Campbell (Campbell, 1996). It may seem impossible to achieve sustainability, but to strive for it can, in my view, only lead city planners into the right direction.

I have demonstrated what sustainable urban development actually is or should be, and also tried to show how difficult it is to achieve in reality. Now this general issue in today’s city planning is shown, it is time to focus on a case study to see how a sustainable housing project is developed in practise. The case study dealt with in this paper is Hammarby Sjöstad in Stockholm, Sweden. Because every continent, country and city is different, I will first describe the planning context of the case study area before I will focus on the project itself.
Now the general concept of sustainability in the urban planning process is discussed, attention will shift to the planning context of Hammarby Sjöstad in Stockholm, Sweden. To understand the Hammarby Sjöstad housing project itself, one has to keep the history of and planning issues in the specific area into account. These will be discussed in this chapter.

The development of the area around the Hammarby lake did not suddenly come out of the blue. Ever since planning arose in the now rapidly urbanising world, planning strategies were applied to guide the planning process. This has in general been the case, and so in Stockholm, too. Together with other factors this forms the planning context in which the development takes place. The circumstances can influence the outcome of a planning project to a large extent.

**Figure 2 | The location of Hammarby Sjöstad in Stockholm, Sweden**

Source: edit of CIA, 2006 & Visit Stockholm, undated
When the economic boom in 1992 propelled new housing demands, a new challenge for city planners in Stockholm was provided. To deal with this challenge properly, a new strategy for the city was designed: the Stockholm City Plan 99 (Pemer, 2001). The plan was, after several years of preparation, adopted by the City Council in 1999 and therefore features the number “99” in its title.

The central motto of the Stockholm City Plan 99 is to “build the city inwards” (Andersson, 1998). This means that for new development the city rather not looks for unused land but, on the contrary, (re)develop already used land. With this strategy, a “wild” or uncontrolled expansion of the city in terms or area is prevented. A lot of land use within the city is currently considered not optimal and for that reason the Stockholm City Plan 99 has come into force. An important goal of the strategy is to achieve “sustainable urban development in accordance with the commitments of the international community reflected in the Habitat Agenda (in particular in its paragraph 43)” (Pemer, 2001).

This Habitat Agenda was produced by the United Nations Human Settlements Programme (UN-HABITAT) on the United Nations Conference on human settlements, held in 1996 in Turkey. It sets universal goals in ensuring and improving human settlements. Officially, the two major themes were formulated as “adequate shelter for all and sustainable human settlements development in an urbanizing world” (UN-HABITAT, 1996). Paragraph 43, part of a section on sustainable human settlements, sets long term environmental goals.

When I switch back to the local situation in Stockholm again, it is important to understand some of the background of planning and the strategies involved. Therefore, it is essential to take a look at the political situation. Planning, after all, can only be carried out successfully when the political framework is right and the basis for development is provided. In the Stockholm City Council there are two big, two medium sized and several smaller political parties. The big parties are the Social-Democrats and the Moderates, and the medium sized ones are the Liberals and the Left Party. There are also several smaller parties; among them is the Green Party (Vestbro, 2004). The coalition has in recent years been shifting from left-green (1994-1998) to right-green (1998-2002), and to left-green (2002-2006) again (Dastur, 2005).
The current coalition in the Stockholm City Council exists of the Social-Democrats, the Left Party and the Green Party. A left-green coalition, like at this moment (2006), is argued to be best for sustainability.

Sustainable development has since recently become more and more important in Stockholm. The Local Investment Program (1998-2002) by the Swedish government provided subsidies to projects that were aimed at “energy and resource efficient technologies” (Bylund, 2003). Of the 635 million Swedish Crowns allocated to Stockholm, Hammarby Sjöstad shared the money with two other projects (Dastur, 2005). Money is, especially since new (and so costly) technologies had to be developed, vital for sustainable development projects.

Sustainable development is highly linked with environmental issues. The Hammarby Model, which will be discussed in chapter 5, forms the core of the environmental program in Hammarby Sjöstad and with it’s environmental objectives it is central to the goal to create a sustainable region. In general, the Hammarby Sjöstad project is, as demonstrated, in line with the relatively new environmental goals of the City of Stockholm. Kerstin Blix, Manager of Environmental Affairs in Hammarby Sjöstad, thinks that “the steps of the environmental program form the basis for the environmental perspective taken by the city” (Nattrass & Altomare, undated).

These ambitious environmental goals can only be achieved by new and advanced technologies. Sweden has long maintained an international top position in Research and Development (R&D) regarding the latest environmental solutions (Stockholm Business Region, undated). These include solutions for drinking water, sewage, waste management, energy and heating. Not only well coordinated development programmes are taking place; also the high education level of the Stockholm region is important to make these developments possible. In some studies, like the yearly “European Cities Monitor” and a study by the United Nations Conference on Trade and Development, Stockholm and Sweden are listed among the best places in the world relating to environmental terms (Stockholm Business Region, undated).

Mats Hellström, a Stockholm County Governor, has in his speech “Urban Sustainable Development in Stockholm” (held in March 2004 at the initiative “Swedish Style in Australia 2005”) stressed that the “interaction between legislation, public agencies and business” is vital for success in developing sustainable urban areas (Hellström, 2004).
Hellström has also given several other factors that are of key importance for sustainable development. These are:

- Sustainable development must be built on cooperation between many different actors
- There is a need for alertness and a willingness to try out new solutions, as well as new technology and new forms of cooperation between different actors
- A high level of know-how and skills across many areas is essential for success
- Sustainable urban development requires dynamism and change
- Robustness is a significant factor. This means being able to recover from the strains the city may be subjected to
- All new solutions must be tailored to the local situation

Source: Hellström, 2004

The view of Hellström about sustainable development stresses good guidance and preparation for a project. The importance of knowledge and new technologies is also key to the success for a project. Hellström argues, in his last point, that these new solutions must be adapted to the local situation. In other words, no real best solution can be given in general, but the solutions must be focused on the context of the project area (Hellström, 2004).

The attention in the paper will now shift to the Hammarby Sjöstad project in particular. The area history will now be discussed.
History of the area

Stockholm is the capital of Sweden – the biggest country of Scandinavia (northern Europe) – and is located in the south eastern part of the country along the Baltic Sea. The coastal area is formed of a unique landscape where thousands of bigger and smaller islands arise from the water. A bit land inwards from this archipelago one of the most beautiful national capitals of the world, so it is often said, can be found. Built on a total of 14 islands, Stockholm has always been very connected to water.

The Hammarby lake (“Hammarby Sjö” in Swedish) is located in the south-eastern part of the city and separates the Södermalm island from the Nacka area and the area south of Södermalm. The lake has long been a separation between the edge of the city and the green area adjoining it, nowadays Nacka Nature Reserve. The lake has been connected to Saltsjö in 1914 (Ericson & Bodén, 2002).

Figure 2 | Aerial photograph of the area around Hammarby Sjö before redevelopment

Source: Stockholms Stadsbyggnadskontor, 2006
After World War I the area south of the Hammarby Lake started to become an industrial district. Because the small canal at Danviken now had opened the connection to Saltsjö and further to the Baltic Sea, the area emerged as a good spot for harbour activities as well (Ericson & Bodén, 2002). Some buildings appeared, like the Danvik hospital and some houses. Business activities increased when a General Motors sales office and a Luma light bulb factory were established (Vestbro, 2004). The industry and harbour activities produced toxic waste which heavily polluted the area. This pollution, in fact, was one of the stimulating factors for radical change in the area. City planners wanted to redevelop the area, which was messy and contained many illegal buildings (Ericson & Bodén, 2002). The soil was treated and the toxic materials removed (Vestbro, 2004). Note that this only happened when new plans for the area were made in the 1990’s.

The reasons for thoughts about redevelopment of the area were heavy car traffic and noise, as well as the previously mentioned pollution. Also the need for residential housing rose after 1992 and the location was considered very suitable, because of it’s position close to the city centre (Vestbro, 2004). The area fitted well into new planning strategies for the city too, but this will be mentioned later in the paper.

Soon after the decision was made to redevelop the old industrial and harbour area around the Hammarby lake, the City of Stockholm needed to clear the way for it’s plans. Most companies were forced to leave the area as it was now classified as a development area and expropriation decisions were made. The city paid a high compensation to several companies to make sure their new plans could go ahead (Vestbro, 2004). These plans will be discussed in the next chapter.
Although several plans for the area were already made during the period before 1991, I will only mention the plans from that year onwards. I do so because these plans proved of a bigger influence on the plan that eventually was developed. Though, it must be noted, that probably no plan is ever made without having any influence on following plans or the eventual developed plan.

Several plans appeared soon after the negotiations with settled companies to leave the development area. In the year 1991, a plan was presented for a city expansion in the area around the Hammarby lake. The new city part – a town in itself – called Hammarby Sjöstad, was planned for the 250 ha of space available around the lake. There, roughly 8500 apartments were planned and around 350,000 m² for commercial use (Inghe-Hagström, 2002). Other sources, it must be noted, mention 250,000 m² for commercial premises (Stockholm Business Region, undated).

These plans were changed in 1996 and further developed in 1997. A radical and very ambitious plan for the area was presented: Stockholm decided to bid for the Olympic summer Games of 2004 and had chosen to develop the Hammarby Sjöstad area into the Olympic village (Inghe-Hagström, 2002). Impressive maps and models were designed with several stadiums and the Olympic village around the Hammarby lake. The city of Stockholm appointed a special project organisation and also attracted investors and developers like building companies JM, Skanska en HSB (Inghe-Hagström, 2002). Even an international competition for architects was held, to design the possible 30,000 spectator stadium on the hill south east of the Hammarby lake. The goal was to build the entire area in an environmental friendly way. With this strategy, called “dubbelt så bra” (“double as good”) (Hammarby Sjöstad, 1998), the city hoped to impress the Olympic Committee enough to obtain the Olympics. Although the plan reached the competition finals with some other cities in 1997, it was not to be: the Olympic Committee appointed Athens to host the Olympic Games of 2004.
After the unsuccessful attempt to attract the Olympic Games, the environmental objectives were retained. The decision about what exactly to do with the area was a bit more relaxed. But after some reorganisations of for example The Project Team (a team that guides the development of the project and keeps an eye on realisation of the environmental objectives), a new plan was soon on the tables (Svane, 2005).
With the decision that the Olympics were not appointed to Stockholm, an alternative for the Hammarby Sjö area had to be designed. It was decided that the environmental goals and its “double as good” strategy were maintained, and that the space that was meant for sporting facilities was to be developed into residential buildings like originally planned. The housing project was, however, not like any other project. The scale of the project, as well as the special environmental strategies, were unique to Stockholm and to Sweden. The City of Stockholm decided to turn the area around the Hammarby lake into “a leading showcase of urban sustainability” (Dastur, 2005).

The new plan involved an area of about 250 ha between Skanstull and Danvikstull and concerned both areas north and south of the Hammarby lake. A new city for 25,000 citizens had to be build. This meant the planning of around 8500 apartments as well as a stunning 350,000 m² for commercial use (although some sources mention 250,000 m² for commercial use). The plan kicked off in 1995 and should be realised in 2012. It was projected to cost around 20 billion Swedish Crowns (Inghe-Hagström, 2002) of which the City has paid 4 billion Swedish Crowns (Wastesson, 2002). The total investment is by others estimated at approximately 15 billion Swedish Crowns (Nattrass & Altomare, undated).

The ideas behind the project were that in this new residential district, 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. The search for the right balance between comfortable living and environmental sustainability started. By thorough research, that desired optimal “balance point” would have to be found. Also, the entire project had to be built in a way that it suited in the environment. The common city structure, for example the street width and the maximum building height (preferably not higher than five storeys), were designed to continue in Hammarby Sjöstad. Although it was desired to fit well in it’s surroundings, a special touch would be given by modern architecture (influenced by the ideals of neo-modernism) and state of the art design (Vestbro, 2004). Probably the most special aspect of the project, however, is it’s sharp focus on the environment. This environmental focus will be discussed in the next chapter.
Figure 4 | Plan for the area around Hammarby Sjö (version November 2003)

Source: Stockholms Stad, 2003a
Hammarby Sjöstad’s environmental strategies

The Hammarby Sjöstad project involves high environmental standards. The general strategy has been, as previously mentioned, formulated as “dubbelt så bra” (“double as good”). This means that emissions and energy use should be only half of the environmental load that is used for “normal construction”. Literally it is described as follows:

"Stadsdelens miljöprestanda skall bli “dubbelt så bra” i förhållande till vad som gäller för bästa tillämpade teknik i nyproduktionen idag. I det fortsatta arbetet krävs både förändringar av livsstil och utveckling av tekniska lösningar och medveten planering”

Source: Hammarby Sjöstad, 1998

It has been summarized in a study by ‘The Natural Step’ as: “Twice as good in relation to what goes for the best applied technology in today’s new building design” (Nattrass & Altomare, undated). Because the environmental program serves as a planning tool as well as a guideline for development, the environmental standards are integrated in all aspects of the project.

Figure 5 | Non-domestic storm water filter system

Photo: Cas Poldermans
The key goals in Hammarby Sjöstad’s environmental program are:

- The natural cycle must be at a local level
- Minimum consumption of resources
- Reduce energy consumption and increase energy use
- Reduce clean water consumption
- Utilize sewage for energy extraction
- Building materials are to be renewable or recyclable
- Total soil decontamination
- Restore the lake
- Reduce transport needs
- Stimulate community feeling and ecological responsibility for residents
- Implementation is to be used as a lever for development of new solutions
- Solutions used will not increase costs
- Knowledge, experience and technology generated to contribute to sustainable development in other areas

*Source: Hammarby Sjöstad, 1998*

Although these goals are not all very specified, they do show a direction of the desired environmental actions that had to be taken. To make sure these key goals are indeed achieved, special strategies for implementation had to be designed.

In order to achieve the high set environmental goals a strict environmental policy has been designed for Hammarby Sjöstad. An important part of this policy is a model designed to arrange things like the treatment of waste water, recycling, energy use etc. This model, which was specially developed for this project, is now known as the Hammarby Model.
The Hammarby Model, which represents “the core of the environmental and infrastructural planning”, was developed by the Stockholm Water Company, Fortum (energy company) and the City of Stockholm Waste Management Administration (Hammarby Sjöstad, undated). It shows sewage processing, energy cycles, refuse and the stations and plants were treatment takes place. The complex model also shows the importance of biogas for citizens: it is used in the kitchens and as fuel for cars and busses as well. This is an environmental friendly solution which reduces emissions. The strong point of the model has been described as “its holistic approach to infrastructure service provision and its integration of otherwise separate systems in order to accomplish the environmental objectives set forth by the local parliament” (Dastur, 2005).

The model is, in my view, in line with the thoughts of Stephen Wheeler about sustainability, mentioned in chapter 1 of this paper. Wheeler had outlined several directions that have to be taken to achieve urban sustainable development and one of these directions was “efficient resource use, less pollution and waste” (Wheeler, 1998).
For energy consumption in Hammarby Sjöstad, fixed levels were determined. The desired energy use was set at an ambitious 60 kWh/m²/year (in comparison with the Swedish standard at about 270 kWh/m²/year (Persson & Kjellgren, 2000)) (Dastur, 2005). Although this goal is, for some buildings in the project, “achievable”, the total costs to accomplish this is too high, according to Erik Freudenthal, Information Officer in Hammarby Sjöstad’s environmental information centre GlashusEtt. He also mentioned the fact that the level of energy use would probably be adjusted to a limit of 105 kWh/m²/year (Freudenthal, 2006). Although his measure will be less advantageous for the environment, the set goal in the environmental program “solutions used will not increase costs” will be attained.

Except for energy use, there are some other important aspects within the Hammarby Model. The most important, in my view, are water, waste and transportation. While drinking water comes from Lake Mälaren and the drinking water plant, waste water is treated locally in the special Sjöstadens and Henrikdals waste water treatment plant. The purified waste water goes to the Hammarby thermal powerstation, which serves as a heat- and powerplant, and then into the sea. Water use is projected to be 50% reduced compared to new inner city projects (Hammarby Sjöstad, 1998). A reduction of 20% is proposed for waste. Waste is, in most places in the area, gathered in recycling centres. Waste is treated and recycled as much as possible. For transport, environmental goals are important too. A “Tvärbanan” tramline, connected to the metro network of Stockholm, runs through Hammarby Sjöstad. Busses and ferries are available as public transport too, and run on biogas. Special attention is given to pedestrian and cycling paths, to reduce motorized transportation even more. Private car usage is discouraged and a car pooling system is developed for the area (Pemer, 2001). So far, with about 10% of the citizens in the current (2006) +/- 3500 apartments being member of the car pool system, it can be considered a success (Freudenthal, 2006).

Although it is difficult to set up and close all the cycles of the Hammarby Model, that is unique to the Hammarby Sjöstad project, it appears that the Stockholm Water Company, Fortum and the City of Stockholm Waste Management Administration have designed a good model that was implemented successfully.
Evaluations of the project

Although the entire Hammarby Sjöstad project will only be finished in 2012, several evaluations have already been made so far. In these, some good and bad aspects of the first half of the project have been discovered and discussed. The goal is to learn from mistakes and problems, and try to improve or change things to prevent them from occurring again in the yet-to-be-built part of the project. In this chapter, specific problems as well as general and major conflicts in the projects strategy and development will be discussed.

In 1997, city authorities had established a special Project Team for Hammarby Sjöstad (Johansson & Svane, 2002). This team was originally outside other organisations and was meant to keep an eye on realisation of the environmental objectives in particular, and also for neutral evaluations. However, when the political coalition shifted from left-green to right-green in 1998 (Dastur, 2005), the Project Team became part of the City’s Streets and Real Estate Administration (“Gatu- och fastighetskontoret” in Swedish). This meant that politicians gained more direct influence over the team (Johansson & Svane, 2002). A powerful and extensively used environmental evaluation tool (MBP or “Miljöbelastningsprofilen” in Swedish) was developed to calculate the environmental impacts for Hammarby Sjöstad. It uses a so called life cycle assessment approach and “comprises the quantification of environmental parameters for the time stages of production, operation and decommissioning” (Brick, Erlandsson & Levin, 2005).

Although positive aspects of the Hammarby Sjöstad project are numerous, I will now try to give an overview of some problems and goals conflicts. The planners wanted to achieve ambitious environmental goals but also integrate the housing area into the natural surroundings. Many green spaces and parks were planned (Hammarby Sjöstad, 2004) and a good view on the Hammarby lake was important for the design of many buildings. Many windows are therefore facing the lake and by that receiving much light and energy. Although this might give a good view on the lake, it also has the negative effect that it can affect the temperature in the apartments a lot. Especially in summer, temperatures can reach high levels because of poor air circulation in some of the buildings (Freudenthal, 2006). And while some windows receive plenty of light, some others hardly receive any. An even more important issue concerning the apartment windows is their sheer size. The use of glass in modern apartments is common (it is one of the main materials used in the neo-
modernism influenced architecture) and large windows are often desired by the inhabitants. However, in an environmentally sustainable housing project, the large windows do not fit into the strategy to reduce energy use. The windows may be up to four layers thick for isolation, a wall still is up to five times better for conserving heat (Svane, 2005). The size of the windows has been discussed and building company JM pleads for smaller windows for the buildings that have yet to be built (Freudenthal, 2006). As previously mentioned in this paper, the energy level for apartments will probably be changed from 60kWh/m²/year till 105kWh/m²/year (Freudenthal, 2006).

An other important part of the evaluation of the project has to do with transportation. In the environmental program the goal was set that, in 2005, 80% of the travel to and from work would be by public transport, bicycle or by foot. In 2015, the desired percentage was even put on 90% (Hammarby Sjöstad, 1998). So far, that number has not been reached but it is argued that planners are happy with the current percentage, that lies around 70% (Freudenthal, 2006). Another important change in the remainder of the project concerns car parking spaces. There have been ample discussions about the number of parking spaces as well as their location. The matter is, in fact, highly connected with the political situation. With the environmental goals, the car mobility was intended to be severely reduced in Hammarby Sjöstad. The initial car parking standards were very stringent: a number of 0,25 places per apartment was planned (and 0,4 if guest and workplace parking were included) (Vestbro, 2004). Other sources, it must be noted, mention a number of 0,55 (Stockholms Stad, 2003b). In comparison it can be said that the number of parking places is 0,5 in the Stockholm city centre. When the right-green coalition took over in 1998, it was soon decided to raise the number of parking places in Hammarby Sjöstad to 0,7 per apartment (Vestbro, 2004). This measure was in conflict with the environmental goals to reduce emissions and could also form an obstacle to raise the commuter travel percentage for public transport.

Another issue related to the environmental goals are the modern and special techniques that are used in Hammarby Sjöstad’s buildings, for example in order to generate power. It has been suggested that installations, like PV (photovoltaic) systems, do not (yet) reach optimal performances (Brogren & Green, 2003).
These systems are considered important for aesthetic appearance but research shows that the systems are not optimal. Also, the costs to implement them are high and there is relatively few knowledge about the systems, because use in residential buildings is still relatively new (Brogren & Green, 2003). The conflict threatens between the environmental goals, where energy is of vital importance, and the costs of the project. But without these modern techniques, the futuristic appearance of Hammarby Sjöstad would be at stake; something city planners, in my view, would not like to lose.

A small problem occurred with the use of a mobile waste systems in parts of the centre of Hammarby Sjöstad. Because of technical problems with a filter, it took mobile waste trucks, for example, up to three hours to collect old newspapers, instead of the scheduled fifty minutes. It has then been decided that the mobile system would be abandoned. It will be replaced by a fixed system, like in the other parts of the area (Freudenthal, 2006).

The techniques and strategies used in Hammarby Sjöstad are nowadays not only used in this project. They have been exported to, for example, Toronto (Canada) and two cities in Inner Mongolia, an autonomous region in northern China (Karlberg, 2004; Hammarby Sjöstad, 2006). The environmental information office in Hammarby Sjöstad, Glashus Ett, receives visitors from around the world. In 2005, about 11,000 people visited the building in search for environmental information (Hammarby Sjöstad, 2006). Among them were about 2000 inhabitants of the area and the others were often delegations from cities from around the world (Freudenthal, 2006). Although the techniques and knowledge is exported to other countries, ironically it has so far not been used in Sweden itself to the extent it is used in Hammarby Sjöstad. Arguments for this are rather unclear. The project managers will try to spread the ideas and knowledge within Sweden, in the hope that Hammarby Sjöstad is only the beginning for a sustainable future of the country.

In general, it can be said that many environmental objectives are very hard or almost impossible to measure. This makes some evaluations rather difficult. What in my view clearly can be noted, however, is a major conflict in the project of Hammarby Sjöstad. Probably this can be said for other environmentally sustainable housing projects as well: the conflict between the environmental goals and the lifestyle of the inhabitants. In relation to for example the previously mentioned large size of the windows and increased number of parking spaces, it appears that the luxurious lifestyle of modern people stands firmly in contrast with ambitious environmental goals. The environmental profile of Hammarby Sjöstad is appreciated by it’s inhabitants, but “they are not prepared to make sacrifices in their comforts to
achieve environmental goals” (Vestbro, 2004; Axelsson, Delefors & Söderström, 2001). It appeared that the people who live in Hammarby Sjöstad did not choose the neighbourhood for it’s environmental aspects but rather because a house in an attractive area close to the city centre was desired (Vestbro, 2004).

The environmental program states that “changes of lifestyle and technical solutions” are required to achieve it’s goals (Hammarby Sjöstad, 1998). I think this desired or expected change may be a serious hurdle for the Hammarby Sjöstad project. This statement in the environmental program is maybe too optimistic, since it appears that people are not prepared to change their lifestyle. This is probably not only the case in Hammarby Sjöstad, but in other areas as well. So in general, I think, it can be said that this lifestyle conflict is very important in sustainable urban development projects. Planners and researchers might have to change their approaches and goals in the future to develop projects more successfully.

Possibilities to (slightly) adjust Hammarby Sjöstad’s environmental program and it’s goals are plenty, and in case of striving for the 2005 but especially 2015 goals in my opinion necessary. The plans set out in the beginning of the project might have been too ambitious. Although the goals might be altered slightly it doesn’t mean that Hammarby Sjöstad loses it’s unique and impressive environmental character. Nevertheless, it does mean that the steps towards environmentally sustainable housing should be small rather than big.
Conclusion

Within the context of sustainable urban developments in general, a closer look has been provided on an ambitious environmentally sustainable housing project: Hammarby Sjöstad in Stockholm, Sweden. The project, which construction will be underway until 2012, has received international attention by city planners because of its unique character, combining modern architecture with a complicated environmental management and ambitious goals. It’s environmental strategy, which includes the specially designed “Hammarby Model” which treats cycles of water, waste and energy, is considered a step towards sustainability in the long term. But can the Hammarby Sjöstad project, so far, be considered an example for future housing?

Evaluations so far have shown positive as well as negative aspects of the project. Although the project – like any new building project – has endured small difficulties, some major conflicts have arisen as well. This reaches further than building faults and lies probably within the overarching (sustainable) building concept itself. Studies have shown that some environmental goals have been or will be adjusted since they will most probably in their original form not be achieved. Some important contradicting goals have been found as well. For example, the large windows provide nice views on the natural surroundings, but also cause unnecessary heat losses in the colder times of the year. Furthermore, the use of cars, which was meant to be heavily discouraged, is higher than predicted. These examples show that the luxury lifestyle of the wealthy middle class living in Hammarby Sjöstad often collides with the ambitious environmental goals. As shown in a study, the citizens do not want to sacrifice comfort to achieve these goals (Vestbro, 2004; Axelsson, Delefors & Söderström, 2001). This is probably not only the case in Stockholm, but other areas or countries as well.

The research question mentioned in the introduction of this paper was: “What is sustainable urban development and how does it work in practice, regarding the case of Hammarby Sjöstad”. Although it is difficult to sum up the answer in a few lines, I hope to have answered the question in the entire paper by providing the context of sustainable urban development in today’s planning in general as well as describing and evaluating the Hammarby Sjöstad project so far. The models and theories of planners sometimes seem simple and straightforward, but the truth can be highly complicated (Tonell, 2005). Successful implementation of the ideas of a project, like environmental strategies, sometimes appears a nearly impossible task.
In practice it proved far from easy to achieve sustainable development due to several problems. These problems have been various and have different causes as well. Some may be technical problems (concerning the complicated and modern technologies involved in the project) whereas others might have their roots in political, economical or even ideological grounds. To find out the actual causes for these problems is a tough task in itself – let alone to solve the problems.

The fact that sustainable urban development is hard to achieve is no news for city planners. Conflicts, like identified by Scott Campbell from the University of Michigan (USA), appear when different planning goals are tried to be achieved at the same time (Campbell, 1996). In my view, especially the conflict between economic growth and environmental protection is a strong burden. The society is nowadays very much aimed at economic growth and to achieve this, natural resources are extensively used. The luxury lifestyle of people is a cause of this wealth that is now more and more common all over the world. It must be noted that the global population increases and that in addition of the increasing wealth, also the global energy consumption will increase dramatically (World Commission on Environment and Development, 1987). Car use, and so carbon dioxide emissions (air pollution), and the production of waste will rise as well (Pacione, 2005).

These developments may sound rather frightening, but maybe awareness of this long term developments is vital for working on sustainability now. The habit to expect problems to be solved on the short term should, in the case of the environment, probably be abandoned. Positive results may not have to be expected too soon.

To find the best way towards sustainable solutions technology has to be further improved. The successful implementation, though, might be the main issue. Building projects, like Hammarby Sjöstad, should also be evaluated thoroughly.
Also, I think the context of the specific area or country of development is highly important in the process. A question that can arise is: “Can a sustainable housing project like Hammarby Sjöstad also be (successfully) developed in other areas?”.

Maybe, this type of projects can – for now – only be developed in Northern and Western Europe. This might be the case because for the development of this environmentally focused projects, a wealthy economic situation is needed. The environment appears, as history has shown, often only on the agenda when a particular point in the economic development of a country is achieved. Also, the political situation and the “culture” (like environmental awareness) should be right. Sweden has been very concerned with the environment in the past and much research and development is now aimed on creating sustainability. This is in many other countries in the world certainly not the case (yet). Overall, I would argue, the economic and political “climate” needs to be right to develop sustainable urban projects. Maybe a project like Hammarby Sjöstad would not be initiated or successfully developed in other parts of the world. It must be noted, though, that this is speculation.

The Hammarby Sjöstad project is so far certainly not unsuccessful. It is an interesting project and a lot has already been learned from it. The neighbourhood looks impressive and many inhabitants enjoy living there. Real evaluations of the project can, of course, only be made after the project is completed. Even then it must be noted that most environmental effects can only be fully noticed and measured over a longer period of time.

What maybe can be carefully noted is that a point learned from the Hammarby Sjöstad project is that the steps towards sustainable urban development must be careful and small. City planners will have plenty of work left in the future to try and find the best ways to achieve sustainable urban development. ■
Literature


<http://www.sbk.stockholm.se/Bilder/Sjö2.gif>.


<http://www.visit-stockholm.com/maps-stockholm/Innerstan60procent.jpg>.


