



<http://www.diva-portal.org>

This is the published version of a paper presented at *Linnaeus ECO-TECH 2016*.

Citation for the original published paper:

Jonasson, J., Danielski, I., Mikaelsson, L-Å., Fröling, M. (2016)

PLANNING TO BUILD SUSTAINABLE? -THE CASE OF STORSJÖ STRAND.

In: *Proceedings of: Linnaeus ECO-TECH 2016. Kalmar, Sweden, November 21-23, 2016*

N.B. When citing this work, cite the original published paper.

Permanent link to this version:

<http://urn.kb.se/resolve?urn=urn:nbn:se:miun:diva-29696>

# **PLANNING TO BUILD SUSTAINABLE? -THE CASE OF STORSJÖ STRAND**

*Jonas Jonasson*

*Itai Danielski*

*Lars-Åke Mikaelsson*

*Morgan Fröling*

*Department of Ecotechnology and Sustainable building,  
Mid Sweden University, Sweden*

## **ABSTRACT**

The municipality of Östersund is presently developing a new township called Storsjö Strand close to the town centre by the lakefront of the lake Storsjön. The ambition is that the new area should be a good example of more sustainable building engineering and societal planning. Mid Sweden University was engaged to follow the process in action research setting, and to enhance the learning process. A triple helix process intending to better achieve such outcomes was presented at the Eco-tech 2014 conference. The process has now moved to a stage where the first two buildings are erected.

This paper reports on present status with a focus on how the sustainability goals have been transferred through the chain of involved organizations and individuals, developers and contractors, but also how the goals affect the production of the building, regarding materials, methods and costs, based on interviews. We have observed connections between sustainability outcomes, and the combination of quality of the goals set for the project and the types of processes for achieving them. So far, it seems like the sustainability goals partly have been transferred through the process. The process will be followed until the buildings has been in use for some time

## **KEYWORDS**

Sustainable buildings; Building processes; Integrated Planning.

## **1.INTRODUCTION**

The new township Storsjö Strand in Östersund is located by the lake Storsjön close to the town center of Östersund. At present two apartment buildings are being erected, and although they are placed next to each other they differ in many ways. One has a concrete frame and the other one a massive wood frame. The two houses have different developers and different contractors, and also different final deadlines. One thing they both have in common is that they should both fulfil the Storsjö Strand sustainability demands.

## **Sustainable building at Storsjö Strand**

At the start of any building project there is some sort of need that needs to be fulfilled. Östersund has a shortage of apartments and wants to further increase the population, so there is a need to stimulate the building of more dwellings [1]. One way of doing that is to sell attractive land to private developers with the will to build.

The land for the Storsjö Strand project is owned by different landowners but main owners of the land is the municipality and Jernhusen, a company owned by the Swedish State, that owns develops and manages real estate along the Swedish railway. The lakefront location of the buildings is attractive, which increases the possibility of selling the finished apartments at a higher price than the average pricing in the area, which of course is attractive for developers. Storsjö Strand is however not a problem free development. The locations closeness to the lake is not optimal neither from water protection nor building construction point of view, and the soils are polluted due to earlier industrial activities.

Development of the area has been discussed for many years but it was in 2007 that the current development process started with the work on a new comprehensive plan for the area. The Comprehensive plan was adopted in 2009. Although it does treat some aspects that can be linked to sustainability, e.g. the areas possibility as a recreation area, Strategic Environmental Assessment, flooding risks, polluted soils from earlier activities, etc., sustainability does not play a prominent role in the Comprehensive plan. At the same time there was an opportunity to apply for governmental funds from the Delegation for Sustainable Cities and it was first when the funding was granted in 2009, that the project rapidly shifted towards the development of a sustainable township<sup>1</sup>. The Delegation for Sustainable cities was active between 2008-2012 with the mission to stimulate sustainable city development in different ways, aiming at creating attractive ecologically, socially and economically sustainable city environments [2]. The funds for the project were given for the program writing process, which led to the creation of a sustainability program for Storsjö Strand and a process for educating developers and implementing the program in the developers planning process. This process included dialog and negotiations aiming to come to a consensus on intentions behind the goals in the sustainability program and how the goals should be interpreted, and to develop the project goals and sustainability aspects. The process was described at the Eco-Tech conference in 2014 [3]

The sustainability program contains information about sustainability ambitions, visions, goals, focus areas, the project organization etc, and in the end a checklist on sustainability demands.

## **Theoretical framework**

Building is a complex process with many actors involved and sustainability adds even more complexity to the building process [3]. Not least because even the meaning of the term sustainability varies between actors in a project. When actors negotiate with the aim to come to an agreement the ideal situation is that outcomes will lead to mutual benefit, although the parties also have partly competing and own interests. The outcome of negotiations is usually a tradeoff, and even in processes explicitly aimed for sustainable development, negotiations typically lead to the environment getting the worst deal [4]. Svane introduced the term “situations of opportunity” which translates to periods in time when there is an *opportunity* to influence the process so as to more or less comply with environmental objectives. One example of a situation

<sup>1</sup> Ågnell A.K, interviewee, director of land and exploitation 2010-2015, municipality of Östersund. Interviewed 2015-03-26

of opportunity is the negotiations leading up to the signing of a contract [5]. Sustainability objectives thus needs to be included in the negotiations to be realized in the project.

Bokalders and Block [6] lists seven steps for successful sustainable building processes based on experiences from successful developers:

- 1) There has to be a pronounced will to build with a sustainability focus.
- 2) Consultants and contractors should have the knowledge and will to build sustainable buildings
- 3) A detailed program with sustainability goals and demands has to be produced at the beginning of the planning process
- 4) The original intentions cannot be removed during negotiations with contractors
- 5) There has to be a well-functioning control and quality management during the production phase
- 6) The transfer to the residents must be thoroughly prepared
- 7) There has to be follow-up meetings with consultants, contractors, and maintenance personnel, after the project is finished

The integrated planning model (IP)[3,7] is a tool for cooperative planning that also involves the contractors and subcontractors in the process. In [8] Mikaelsson and Larsson have suggested a refined model of IP that emphasizes the importance of healthy and effective leadership, worker health and safety, a quality perspective and an understanding of the building sites impact on the environment in the planning and production phase of sustainable buildings.

Based on experiences from earlier research it has been shown that it is not easy to achieve high ambitions set up at project initiation [9]. As stated above, there are theories on how sustainable building processes should be conducted, so since the final outcome often shows that the goals are not achieved, the theories are either inaccurate or not followed in the process.

### **Purpose and research questions**

The research on the Storsjö Strand project is a part of a project on sustainable building (HåSa) funded by the EU structural Fund. The goal of the HåSa project is to contribute to more sustainable building in central Sweden, in cooperation between public organizations, building companies, residents and home owners by merging high sustainability demands with an effective building process and collaboration between stakeholders in different stages of the building process. The research on the Storsjö Strand project is ongoing, and the process will be followed until the buildings have been in use for some time. The research is mainly based on an action research approach, where we aim to not only study the process but also collaborate with other actors in an attempt to improve the process.

When it comes to sustainability outcomes in buildings, we recognize the correlation between goals and how good they are, and the processes for achieving them, and how good they are. To be able to evaluate and improve the building process we need to study these goals and achievement processes and relate them to the outcome. The process for achieving the goals involves the production of buildings, and it is therefore interesting to investigate the role of the contractors and subcontractors in this process, and how important their role is for the quality of the process.

The aim of this study is to investigate how the sustainability goals have been transferred through the critical borderline between developers and contractors, but also how and if the goals affect the production of the building, regarding materials, methods and costs. We also aim to evaluate

the result against point 2) and 4) in Bokalders and Blocks list, and if the situation of opportunity in the contract situation between developers and contractors was used to include sustainability objectives.

In short, we ask the following questions:

- How was the sustainability program and the sustainability goals transferred across the critical borderline between the developer and the contractor?
- Where the results from the process for educating developers to come to a consensus on intentions behind the goals in the sustainability program and how they should be interpreted, transferred across the critical borderline between the developer and the contractor?
- In what way does the sustainability program affect the production i.e. does the contractor have to adjust the construction process in any way to achieve the goals in the sustainability program?

The result should be used to evaluate and improve the process of sustainable building in the Storsjö Strand project.

## **2.METHODOLOGY**

Action research methodology, is often described as a cyclic process consisting of four steps: plan, do, study and act (PDSA), which is consistent with the IP model [7, 8], although the IP model is a tool designed to be used in the production phase of a building project.

At this stage the research is still in the Plan phase of the PDSA cycle, where we are focusing on determining the current level of performance.

In order for the transfer and implementation of sustainability objectives to be successful, it is the receiver's perception of the objectives that are important. The focus is therefore on the contractor's view on the process. Based on the limited number of contractors a qualitative approach is used. The data collection procedures in qualitative research involve four basic types: observation, interviews, documents, audio and visual materials [10]. It has not been possible to view the contracts between the developers and contractors, and we have naturally not been included in the negotiation process leading up to contract signing.

Data is gathered through telephone interviews with open ended questions. This was chosen because it could give a better insight in the negotiating process, and the possibility to ask follow-up questions. Interviewees were chosen based on their knowledge of both the negotiation leading to signing a contract with the developer, and the planning of the production.

The questions asked in the interviews are:

### *1. What is the contract form in the contract between the contractor and developer?*

The freedom of choice when it comes to production methods and materials determines which possibilities the contractor has to adjust the production process. This is regulated in the contract form that, in this type of project, can be either a design and build contract (turn-key contract) or a build contract. The degree of freedom regulates the relative importance of the contractor for the sustainability outcomes. The first question is therefore about the type of contract that the contractors sign with the developer.

*2. What is the role of the sustainability program in the contract between the developer and the contractor?*

The contract is the result of the negotiations between the developer and the contractor, and therefore a situation of opportunity for the developer to influence the process so as to more or less comply with environmental objectives.

*3. Have the criteria and goals from the sustainability program been discussed as to reach a consensus on how they should be interpreted?*

Since the contractors were not involved in the program forming process between the municipality and the developers, the contractor's answer could show if there is any deterioration in the intentions and the relative importance of the document across the critical borderline between the developers and the contractors.

*4. Is it possible to identify any differences between sustainable and traditional building?*

This question is followed by the suggestions:

*-Negotiation and contract*

*-Building material*

*-Communication with the developer or the developer's consultants*

*-Handling of deviations and changes*

To find out if the sustainability program has affected the building process, the differences must be identified.

### **3.RESULTS**

#### **Results from the interviews**

The representatives for the constructors are labelled constructor A and constructor B.

*1. What is the contract form in the contract between the contractor and developer?*

In both cases the contract is a design and build contract. Both contractors feel that the underlying documents are very detailed and not much choice is left for the contractors. Contractor A means that this is not special for this project, but a development that is significant for the building sector in general.

*2. What is the role of the sustainability program in the contract between the developer and the contractor?*

Contractor A recognizes that they are expected to comply to the sustainability program but that much of the demands e.g. choice of material and products have already been prescribed by the developers and their consultants. The contractor says that they have not been asked to present anything regarding the fulfillment of the demands in the sustainability program to the developer. Contractor B did not know about the sustainability program at all. Both contractors say that it is not used as a tool or help for the day to day production. On the other hand, both contractors are well aware of the demands in the environmental certification tool Miljöbyggnad [11], which is only a subset of the original demands. Miljöbyggnad has three levels; gold, silver, and bronze. The contractors both state that the level they are obliged to reach is a general level silver, with gold level on energy use and power demand for heating.

*3. Have the criteria and goals from the sustainability program been discussed as to reach a consensus on how they should be interpreted?*

None of the contractors recognizes any discussions or educational activities specifically targeting the sustainability program

*4. Is it possible to identify any differences between sustainable and traditional building?*

Contractor A does not think that there are any major difference, except that the time for planning the production is longer. At the site there is no difference. There are many controls and papers to fill in, but that is no different than other projects. Contractor A has had direct contact with the developer's consultants to ensure that the drawings comply with Miljöbyggnad at the silver level.

Contractor B means that there is a big difference between the Storsjö Strand project and traditional building. Main concerns are the low standard of the delivered product, and problems with the site disposition. It is not possible to say what differences that are directly connected to sustainable building.

#### **4.DISCUSSION**

According to Svane et.al, the negotiations leading up to a contract is important for the implementation of sustainability objectives. In this case, it seems as if the sustainability demands in form of checklists and the certification system Miljöbyggnad have been transferred across the borderline, but not the intentions and background of the demands in the sustainability program. Bokalders and Block states i) the importance of a pronounced will from developers to build sustainable and ii) the importance of the knowledge and will of consultants and contractors to build sustainable buildings, in order to achieve a good outcome. In this study there is no sign of educational efforts regarding sustainability aimed at the contractors, which will affect the knowledge and possibly the will of the contractors to build sustainable buildings. According to theory this should affect the quality of the sustainability outcome.

Fulfilling the sustainability program is a condition for the developers to buy the land to build on at a reduced price. Therefore it seems strange that the negotiations between the developers and the contractors does not more strongly involve the sustainability program. The results regarding the sustainability program shows that the original intentions are lost, or at least have deteriorated, somewhere in the chain of negotiations across the critical borderlines between different stages in the process. From this study it is not possible to clearly decide where the deterioration of demands begins. This must be investigated further in order to determine if it begins in the borderlines within different groups inside the municipality's organization, between the municipality and the developers or between the developers or the contractors.

The possibilities for the municipalities to steer towards sustainability in the contract situation has greatly been reduced since the Swedish parliament decided that municipalities cannot demand more from a buildings technical performance than what is stipulated in the Swedish building code [12]. The building code is thus no longer a "lower limit", but also at the same time an "upper limit" for the municipalities demands. The first land allocation agreements that were signed in the Storsjö Strand project was signed before the legislations were implemented 1<sup>st</sup> of January 2015, and will therefore have the sustainability program as a contract document. For contracts signed after there is no possibility for the municipality to demand e.g. that recycle adaptive, ecocyclic, and/or locally produced materials should be primarily chosen, or that energy use should be lower than what is stipulated in the building code, when selling municipality owned land to private developers. The reduced steering possibilities for the municipality means that the good will of the developers becomes increasingly important, which

in turn makes the educational process more important. The educational process should also include the contractor, as a suggestion using the refined IP model.

It is difficult to see what the difference is between sustainable building and a traditional building when it comes to methods and costs, based on the interviews with the contractors. In order to determine this there has to be an assessment of what differences has to do with sustainability and what that has to do with the building site and the project organization.

## 5.CONCLUSIONS

- How was the sustainability program and the sustainability goals transferred across the critical borderline between the developer and the contractor?

The sustainability goals were partly transferred, and especially the certification tool Miljöbyggnad is well implemented in the process. The sustainability program as a whole is not seen as a mandatory document, but rather a guideline that the contractors should try to achieve but without obligation.

- Where the results from the process for educating developers and to come to a consensus on intentions behind the goals in the sustainability program and how they should be interpreted, transferred across the critical borderline between the developer and the contractor?

The short answer is no. The sustainability program does not seem to be well established, and therefore the intentions behind the sustainability demands and the checklists in the sustainability program is not well established either.

- In what way does the sustainability program affect the production i.e. does the contractor have to adjust the construction process in any way to achieve the goals in the sustainability program?

The sustainability program and sustainability goals affect the production planning, but not the production itself, although it ought to. There are building site specific demands regarding transport, energy use, local building materials etc. If sustainable building is not fully adapted by the contractors (which the answer to the above research question implies), it is not easy to identify the differences between sustainable building and traditional building.

The original intentions have deteriorated along the process in the Storsjö Strand project. According to theory this should have an effect on sustainability outcomes.

There seems to be no educational efforts regarding sustainability aimed at the contractors. According to theory this should have an effect on sustainability outcomes.

The educational process is important and should include the contractors as well, in order to increase the knowledge on sustainable buildings, but also to bring the contractors views to the table. With the reduced power of the municipality due to legislations the developers will to build sustainable becomes increasingly important.

## 6.ACKNOWLEDGMENT

We gratefully acknowledges the financial support of the European Structural Fund

## 7.REFERENCES

- [1] Östersunds kommun, 2014. Mer Östersund; En plan för tillväxt i ett attraktivt Östersund 2014-2020 (More Östersund; a plan for growth in an attractive Östersund 2014-2020) Municipality of Östersund, Östersund, Sweden (in Swedish)
- [2] Delegation for sustainable cities, 2009. Economical Support, Available at: [http://www.hallbarastader.gov.se/Bazment/hallbarastader/sv/ekonomiskt\\_stod.aspx](http://www.hallbarastader.gov.se/Bazment/hallbarastader/sv/ekonomiskt_stod.aspx) .Accessed 30 September, 2016
- [3] Jonasson J., Danielski I., Mikaelsson L.Å., Fröling M., 2014. Approach for sustainable processes for the built environment in a triple helix cooperation: The case of Storsjö Strand in Östersund.In: Proceedings of Linnaeus ECO-TECH 2014,November 24-26, 2014, Kalmar, Sweden
- [4] Svane,Ö., Wangel, J., Engberg. L. A., Palm, J., 2011 Compromise and learning when negotiating sustainabilities: the brownfield development of Hammarby Sjöstad, Stockholm. *International Journal of Urban Sustainable Development*, 2(3),141-155.
- [5] Svane, Ö., 2008. Situations of Opportunity - Hammarby Sjöstad and Stockholm City's Process of Environmental Management, *Corporate Social Responsibility and Environmental Management*, 15, 76-88.
- [6] Bokalders, V., Block, M., 2014. Byggekologi; Kunskaper för ett hållbart byggande,(Building ecology; Knowledge for sustainable building) , AB Svensk Byggtjänst p.168.(in Swedish)
- [7] Mikaelsson, L. Å., Bengtsson, S., Lindell, J., Larsson, P.,1992. Bygga Inför 2000 talet [Building construction at the threshold of the 21st century], Byggförlaget,Stockholm, Sweden. (Swedish)
- [8] Mikaelsson, L.Å., Larsson, J., 2016 Integrated Planning for Sustainable Building Production- An Evolution Over Three Decades. *Journal of Civil Engineering and Management*, Available at: <http://www.tandfonline.com/doi/abs/10.3846/13923730.2015.1023350>. Accessed 28 september, 2016
- [9] Green,A., 2006 Hållbar energianvändning i svensk stadsplanering. Från Visioner till uppföljning av Hammarby Sjöstad och Västra Hamnen. Linköping University, Linköping, Sweden (In Swedish)
- [10] Creswell, J. W., 2014. Research Design, Qualitative, Quantitative and Mixed Methods Approaches. Sage Publications, London, United Kingdom.

[11] Swedsh Green Building Council, 2016. Miljöbyggnad. Available at: <https://www.sgbc.se/var-verksamhet/miljoebyggnad>. Accessed 30 September, 2016 (In Swedish)

[12]Persson, G., Hasselgren B., 2014. Cirkulär 14:36;Nya regler om exploateringsavtal, markanvisningar och kommunala särkrav på byggandet. (New rules on exploitation contracts, Land allocation contracts, and municipal demands on building). Sveriges kommuner och landsting, Stockholm, Sweden (In Swedish)