

## **TOWARDS A CARBON NEUTRAL SETTLEMENT IN NORWAY. SCIENCE IN ACTION. – THE CASE OF BRØSET, TRONDHEIM.**

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### **Summary**

Policy makers often find their leeway restricted when it comes to shaping sustainable urban planning practice. Within each professional sector, there are limited opportunities for creative exploration in the cross-fire between minimum state regulations and relentless pressure from private developers. In face of the environmental challenges society is up against, a more extensive focus on the potential repertoire of design methods, solutions and experiences is needed.

Brøset is a 35 hectare site located 4 kilometers outside the center of Trondheim. Despite this moderate distance to the center, the area's character is of suburban nature. Brøset has been chosen as a location for a new neighborhood that combines low energy demand with a socially sustainable living environment [1]. Sustainability is defined in a holistic way, including low energy demand and healthy materials, as well as social and economic issues. According to existing regulations approximately 1050-1750 housing can be constructed at Brøset. Designing a settlement that enables people to lower their carbon-footprint is not only a matter of technology, material and energy use, but also includes lifestyle, housing patterns, and transport.

The development of the Brøset area also forms a major component of the participation of Trondheim city in the Norwegian Cities of the Future project, a strategic government-run program with focus on land use and transportation, energy use in buildings, consumption and waste, and climate change [2].

This paper describes experiences from the capacity building activities developed around the Brøset project initiated in 2007 in Trondheim as a framework for new knowledge and new recognition regarding sustainable resource use in local architecture and planning.

**Keywords:** sustainable building, action research, knowledge brokerage, city planning, inter disciplinary

## **1 The case of Brøset**

This paper describes experiences from the capacity building activities developed around the Brøset project initiated in 2007 in Trondheim as a framework for new knowledge and new recognition regarding sustainable resource use in local architecture and planning. The development of the Brøset area forms a major component of the participation of Trondheim city in the Norwegian Cities of the Future project, a strategic government-run programme with focus on land use and transportation, energy use in buildings, consumption and waste, and climate change [2].

The Brøset project particularly focuses on the manner in which the interaction between urban form and lifestyle can be used to reduce urban carbon footprint, and consists of two parallel tracks: (1) the urban planning project led by the municipality, and (2) the corresponding interdisciplinary research project at NTNU and Sintef Building and Infrastructure. Trondheim municipality leads the planning project, aiming to develop the 35 hectare area into high-quality carbon-neutral housing settlements mixed with local facilities such as kindergartens, nursing homes and green infrastructure, located at about four kilometres from the city centre. The development is performed in close co-operation with the site owners the Norwegian State (Statsbygg and St Olavs hospital) and the County of South-Trøndelag, rather than selling the site on the open market to the highest bidder as originally planned.

## **2 The interdisciplinary research project**

In 2009, NTNU started a corresponding interdisciplinary research project ‘Towards carbon neutral settlements – processes, concept development and implementation’ in co-operation with Sintef Building and Infrastructure, Trondheim municipality, the Norwegian Research Council, the Norwegian State Housing Bank and Trondheim Energy. Four subgoals are defined:

- Develop models for the early phase planning process that may contribute to secure the fulfillment of ambitious goals throughout the process
- Develop concepts for buildings, energy supply, infrastructure and urban fabric that support a carbon neutral settlement.
- Develop knowledge and understanding of the cultural changes that are necessary in order to achieve carbon neutral settlements.
- Implement concepts, models and knowledge in real-life.

The project will be carried out through four main research activities:

- A. Models for programming and planning carbon neutral neighborhoods
- B. Concepts for carbon neutral neighborhoods
- C. Socio-cultural changes towards carbon neutral settlements
- D. Translation of knowledge

## **3 The preliminary results from research activities**

The overall research project is a cross disciplinary and iterative process, both among the different research projects, but also towards the urban planning project. This makes the researcher active participants within the urban planning project, and thus that the research partly may be defined as “action research”.

From the process so far the research group has provided the urban planning project with both state of the knowledge, and analysis and descriptions of the area and possible interaction with the urban fabric surrounding Brøset, with regards to:

- The defining of “Carbon neutral”. Thus the urban planning project has adopted a target of 3 ton CO<sub>2</sub>eq per capita (compared to the average 12 tons per capita in Norway) [3].
- Describing and understanding the transport patterns in Trondheim. Thus identifying possible scenarios and actions for reducing environmental impact from transport to and from the Brøset area [4 and 5].
- Describing and understanding the actor network for the development of Brøset, identify and interact with all stakeholders, and thus facilitate the process toward a consensus towards sustainable development of the city.
- Transfer of knowledge, to the planning authorities, to architects, consultants and entrepreneurs, as well as other stakeholders and the general public [6].

#### **4 The progress of the urban planning project**

In Fall 2007, the local authorities of Trondheim selected the area of Brøset to be developed as “a sustainable neighborhood”. “Sustainable” is defined in a holistic way, including low energy demand and healthy materials as well as social and economic issues such as low cost housing for vulnerable groups. In April 2008, the local authorities of Trondheim decided that the municipality should be in charge of the planning process of Brøset, and the the area was “locked down” for any development, through an area plan.

In fall 2009 an agreement between the Municipality of Trondheim and the land owners was reached, the program for development of the Brøset area passed was accepted by the city council and the work on preparing the urban planning competition started.

Through the process and in dialog with the research group the municipality later decided that instead of running a traditional competition, they should make use of parallel commissioning. Thus an open call for cross disciplinary teams to participate in the parallel commissioning will be made public medio June 2010.

Within the parallel commissioning four cross disciplinary teams will work in parallel, as well as meet at workshops for information exchange and discussions, in order to develop plans for how to develop a carbon neutral settlement at Brøset. Throughout this process they will have access to the research group and the municipality for feedback and discussions, both individually (each team) and during the workshops.

The teams should be cross disciplinary, with expertise within architectural-, planning-, technological- and social solutions.

For this each selected team will receive a fixed sum of NOK 400 000.- (approx.. € 50 000.-), that shall cover all expenses for each team. In return the municipality will have ownership of all ideas and plans produced during the process. There will not be selected a “winner” through this process, but the municipality will select freely among the ideas brought forward, and combine them in order to agree on the final area plan for a carbon neutral settlement at Brøset. This will in turn constitute the framework for later more detailed development plans for the different parts of the area.

The process of parallel commission, will take place in the period of September – November 2010.

- Start-up seminar and on-site inspection in Trondheim (1 day)
- Individual work period.
- A midterm workshop, with all teams, researcher and the municipality. Presentations and discussions (2 days).
- Another individual work period.
- A final workshop, with all teams, researcher and the municipality. Presentations and discussions (1 day).

The researchgroup will partly observe and partly take actively part in this process.

## 5 Conclusions

Policy makers often find their leeway restricted when it comes to shaping sustainable urban planning practice. Within each professional sector, there are limited opportunities for creative exploration in the cross-fire between minimum state regulations and relentless pressure from private developers. In face of the environmental challenges society is up against, a more extensive focus on the potential repertoire of design methods, solutions and experiences is rightfully called for.

However, by means of relatively small interventions in the local built environment, it is possible to improve the quality of life of many of its inhabitants while reducing their carbon footprint. For more information, please visit <http://www.broset.com> or contact the author.

The experience so far is very positive. The close collaboration and interaction between planners and researcher has led to knowlegde tranfer from research to planners, and a valuable feedback and case studies for the researchers. It has also led to a higher momentum in the project, as well a better media coverage and interaction with the general public.

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