



SMART HOUSING

S M Å L A N D

2014



SMART
HOUSING
SMÅLAND

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SMART HOUSING SMÅLAND

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SMART HOUSING SMÅLAND 2014

Message from the Process manager and Chairman

From a company perspective, there are already large gains from the innovation environment, says Ola Adolfsson, Chairman of the steering group of Smart Housing Småland (SHS) and CEO of Flexator. My own company has secured new deals and construction projects which we probably would not have done without our involvement in SHS. The recently started BIM project has been perceived as positive by several companies and the collaboration of several companies with universities has improved.

At the end of 2014 and the first weeks of the new year we have felt somewhat of a "ketchup effect" within and around SHS, says Per-Erik Eriksson, process manager of SHS. In addition to the project on BIM (building information models), several other pilot studies and development projects are ongoing together with companies in the innovation environment. During the late autumn we also contributed to the corporate research school ProWood commencing with industry doctoral students at seven companies in our environment and to the educational programme Expert competence for sustainable timber engineering being expanded with new courses and more participants from industry. Naturally a lot of energy has been dedicated to developing structures and procedures for our completely new VINNVÄXT environment. However, at the same time our efforts have involved developing and showing a full scale housing prototype in Almedalen and attracting further research funding for several of our joint project applications. The start seems promising!

SHS VISION

"Smart Housing Småland is an internationally leading innovation environment that, with a focus on the user, creates smart housing and a sustainable built environment based on glass and wood."

SUMMARY

2014 is the first full year of Smart Housing Småland (SHS) and the first step towards the vision. The financing came already during the summer of 2013 and during the autumn the steering group and process management gathered quickly to get the innovation environment on track. Owing to the fast mobilisation, during 2014 SHS has gained proper momentum.

We have identified important development areas within both glass and industrialised construction through business coaching. A development group within BIM has also started.

15 pilot study and business development projects have been in progress during the year in which 25 different companies have participated. Of these projects, six have now been completed. In several cases the external research applications build further on the results which have emerged in these projects.

We work with visionary, product related and concept prototypes. A first concept prototype "housing prototype 1.0" was built on a full scale and shown to 1,800 enthusiastic visitors during Almedalen Week in July.

In the internationalisation area, the focus has been on knowledge development and external analysis, among other things, for paving the way for EU projects. Within urban development, innovations with respect to housing are stimulated for the groups: big cities, residential cities in Småland as well as in the wooden house networks of the municipalities of the Highlands.

Four of six of the applications which SHS has supported since the start have been approved by external financiers. It has related to everything from gender issues in the Vinnova project "**Chafe against the norm**" to the EU project "**LIMES – Light Innovative Materials for Enhanced Solar Efficiency**" which focuses on lighter and stronger glass. Approximately SEK 50 million has been applied for externally, of which roughly SEK 8.5 million has been granted to date. This corresponds to a sixfold upshift of utilised research and innovation funds for applications.

The main focus of the communication work has been on structures on graphic manner, websites, templates etc. and starting strategic work to create a brand.

The steering group has comprised of twelve people from industry, research and the public. The process management has comprised of 13 people with a spread within both the public sector, research institutes and academia throughout Småland, which has been a major benefit for initiating different processes, projects, activating networks and being able to anchor the work in three regions and two higher education institutions.

ACTIVITIES

During 2014 Smart Housing Småland (SHS) has focused on getting activities rolling and getting bodies from business, academia and the public sector involved to commence the work on prototypes, major project initiatives within research and innovation and at the end of the year starting to find forms for the organisation around SHS. We did not have to wait for the result. An impressive 13 projects have been completed and seven are ongoing. However, obviously the most important thing is not starting projects, but that those which demonstrate a development potential can continue. The results may include prototypes, research and innovation projects, knowledge overviews or other projects which continue to develop the innovation environment.



First and foremost corporate commitment is required for this to succeed, but also supplementary project financing. We have started to become very successful in this area. Four of six of the applications which SHS has supported since the start have now been approved by external financiers.

Sub-strategies and procedures on projects and other initiatives are starting to become established. Major work on input from the network has also been conducted to further define goals and indicators for SHS in the short and long-term.

During the year the process management consisted of 13 people, which has been a major benefit for initiating different processes, projects, activating networks and being able to anchor the work in three regions and two higher education institutions. The plan for 2015 is to reallocate the resources slightly in order to become more active, without, however, losing the anchoring.

More than 2 200 people participated in SHS arrangements.	80 companies/organizations participated.	50 companies/organization has put in their own resources in SHS.
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SUB-STRATEGIES

Meeting places

Sub-strategy managers: Per-Erik Eriksson SP Wood Technology and Johan Palm Träcentrum in Nässjö.

During the year business coaching with a focus on glass has been conducted, in which companies have shown tremendous interest. Another area is industrial construction. By means of this SHS has attained a good perception of urgent development areas like:

- glass weight
- glass recycling
- procurement
- architect collaboration
- competence development for building tall wooden houses
- insulation material
- supplier chains

Until now we have been in contact with 30 companies within the glass sector and approximately 60 people. In the wood sector we have had contact with approximately 18 wood producers/suppliers and roughly 36 people. Thus, in total we have had coaching contacts with 48 companies and 86 people.

Example: Building information modelling - BIM

A good example is that a development group within the area building information modelling (BIM) has started. BIM is a technical solution which is growing in the construction sector. With BIM each stage in the construction process can be checked against set targets. The work method aims to eliminate the information gap during the construction process. A BIM model is a virtual model of the reality. The model collects and organises all information from the lifecycle of a building. The BIM model may contain information on both the physical and the logical structure of the object and the building itself. It can be described as a virtual prototype.

Pilot studies and business development

Sub-strategy manager: Marianne Grauers, Glafo.

The aim of the pilot study and business development projects is that they should show innovation opportunities and strengthen the innovation environment. Companies are offered opportunities of short projects with fast decision-making paths in collaboration with researchers. The intention is that companies should develop their business and create a continued willingness and capacity to develop individually and in networks.

The pilot study and development projects have involved participants from many companies as well as Linnaeus University, Jönköping University, SP and Glafo. The projects have been within the innovation areas housing need/control, housing design, formation, building systems/technology, smart functions, manufacturing and business systems. The challenges during 2015 involve starting more business development projects on the initiative of industry, attaining a clearer sustainability profile in more projects and increasing the share of projects with a focus on housing.

Until now 25 different companies/trade organisations, five universities/research institutes and six public bodies have participated.

Example: Who should we build for and how do they want to live?

An example of an interesting pilot study during 2014 is "Vilka skall vi bygga för och hur vill de bo" (**Who should we build for and how do they want to live**, SHS report 2014:006), for which Kaj Granath at Jönköping University was project manager. The results show that there are four clear groups which now experience difficulties in terms of finding good housing solutions in the Swedish housing market: youths, families with many children, newly arrived refugees and old people who require small housing.

In a further perspective, you can turn the question back to the producers: who do you want to build for? There is empirical material which makes it possible for a creative housing producer to identify new consumer groups in the housing market and customise solutions focusing on the selected target group.



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The majority of Sweden's municipalities report a shortage of rented dwellings, particularly of the size one to two rooms and kitchen. Youths search for area-efficient and financially reasonable apartments, preferably in central locations. Families with children seek area-efficient and practical apartments which function for the needs of everyday life. Newly arrived refugees prefer apartments in multi-dwelling buildings, but besides this those needs do not appear to be explicit or identified. The elderly want comfortable, easy to manage and area-efficient housing with a high level of accessibility and preferably with access to service.

From a general user perspective, there are clear preferences for housing which can be furnished in a good manner and have adequate storage and a well-planned kitchen and bathroom with space for necessary equipment. Appreciated qualities are safe, comfortable, light and airy apartments with access to a balcony or terrace.

The basis of the report also shows that value shifts in society also pave the way for new definitions of housing quality. More mobile consumers seek flexible and differentiated contract forms. A new generation of relatively wealthy and healthy pensioners is prepared to continue to consume and has the resources to pay for services as a supplement to the housing in a manner which we have not seen before.

This pilot study may form the basis of mapping and analysis of innovative housing solutions from a producer perspective, and also for continued method development for knowledge transfer from the consumer back to the planning stage.



Transparent intelligence in Housing prototype 1.0. A sliding door with privacy glass that can switch between opaque and transparent state. Photo: Bertil Herzberg.

Prototypes

Sub-strategy manager: Mikael Ludvigsson, Glafo.

The prototype strategy involves a number of activities of different complexity level. It ranges from the basic material test of tomorrow's biomass/glass to a full scale concept module of 48 m². In between them, soon realisable products in interdisciplinary projects are developed where universities and institutes work together with appropriate companies. In addition, there is a strategic weight in also being able to demonstrate opportunities which exist in ten and perhaps even 50 years.

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We work with three different types of prototypes: visionary, product-related and concept modules.

PROTOTYPES	VISIONARY	PRODUCT RELATED	CONCEPT
2017	3.0
2016	sustainability...	bio composites as building elements	2.0
2015	energy...	load bearing glass	1.1
2014	connected ...	windows	Housing prototype 1.0
		Prototype workshop	
		General strategy & concept module 2015	

Example of how the different prototypes can cooperate and build on.

Visionary prototype 2014 entails a concept where smart functions are integrated in furnishing and walls. Product-related prototype 2014 is a concept for energy efficient light weight windows.

The visionary and product-related prototypes of 2014 will be presented at Smart Housing Småland's theme day early in 2015. Three reports have been published "Prototypverkstad trä och glas" (Prototype workshop wood and glass, SHS report 2014:001), "Små prototyper" (Small prototypes, SHS report 2014:005) and "Bostadsprototyp 1.0" (Housing prototype 1.0, SHS reports 2014:010 Swedish, 2014:011 English).

Example: Housing prototype 1.0

The first concept module was presented already during Almedalen Week in the summer of 2014, namely housing prototype 1.0, for which Per-Erik Eriksson, SP Wood Technology, was project manager.

The starting point of the work was that there is not adequate construction adequately fast, nor is construction adequately attractive or at the right price. Here there are many challenges and opportunities for industry. Housing prototype 1.0 here has functioned as a concrete way of creating opportunities for industry and research to meet and develop new ideas, concepts and solutions. The prototype contains a great deal of innovation and to some extent illustrates what can be achieved within the innovation environment Smart Housing Småland in the long-term.

The housing prototype is the result of a series of workshops where house manufacturers, researchers and architects have participated. The prototype was constructed in factories. By constructing industrially, you can increase both competition and productivity within housing construction. Wood in particular is also well-suited for industrial construction as it is light. Loadbearing timber frames are used in the prototype – such technology can now be used for buildings with six floors. The exterior walls glazed throughout in the

prototype may, with further development work, be used as loadbearing walls. The entire module was assembled in a factory and then delivered on a lorry.

One of the starting points was that apartments must become more space efficient. The planning of the apartment has a kitchen and bathroom in the middle and two separable rooms, one at each end of the volume module. This allows two households to share the area of 48 m² with retained accessibility and a complete large kitchen. Alternatively it can be used as a regular two-room apartment. Glass has been used to create light, separation and to create a sense of space. Daylight penetration to the kitchen area is enabled by, for example, the large window openings at the ends and room separation with glass sliding doors. There is a so-called "privacy glass" in one of the sliding doors where the transparency can be switched on and off.

The prototype attracted a lot of attention in Almedalen. An impressive 1,800 people visited the prototype, including Stefan Attefall, the Minister for Public Administration and Housing. The focus in Almedalen was mainly on the housing shortage among youths and how this type of construction could contribute to solving the shortage. Every night one youth politician slept over in the prototype and the following day a breakfast meeting was held about the housing situation of youths.

Read more about Smart Housing Småland's initiative in Almedalen on the blog which was set up for the event (<http://byggmera.smarthousing.nu/>) and in the SHS report 2014:010.

WOULD YOU BE WILLING TO USE HOUSING PROTOTYPE 1.0?

Now that we have the housing module in place at the campus of Linnaeus University in Växjö, we lend it out for study visits, meetings, temporary lodging, research projects, product development ... we want it to be used as much as possible in order to develop the innovation environment. Please feel free to contact us if you have any ideas on how you would like to use

Internationalisation

Sub-strategy manager: Mikael Pekkari, SP SME

The internationalisation work has focused on knowledge building, business intelligence and to a certain extent profile building. An important goal is and has been to market SHS as an obvious resource for research projects within Horizon 2020. The long-term goal of SHS is to facilitate the development of companies of an international customer base and develop an internationally prominent innovation environment characterised by collaboration between companies, research institutes and colleges/universities.

Inventorying of international knowledge centres, networks and potential partners has been conducted. In the first instance by compiling the collective networks of the project consortium. Even the Brussels office of Småland-Blekinge has been mobilised to

continuously monitor and report from relevant initiatives and seminars in Brussels, and to highlight prerequisites for impact work within the EU administration. A number of international trade fairs and conferences have also been monitored, like Glasstec, ICCG10 and Forum HolzBau.

The experiences of Swedish wooden house companies of export projects have been compiled in a combined literature study and interview survey conducted by Jönköping International Business School – Jönköping University. SHS report 2014:002 from this comprises a discussion base for priorities and strategy development within internationalisation in a series of workshops with industry representatives and researchers in the spring of 2015. These mappings will form the base of prioritised collaborations with international centre formations and networks within transparent intelligence and industrial wood construction.

Urban development

Sub-strategy manager: Mikael Pekkari, SP SME

The aim of the urban development strategy is to stimulate innovations within urban development with respect to housing. The projects which are conducted should create exchange and meetings between producers and large customer groups and business opportunities for companies of the innovation environment.

Three main groups are prioritised here; big cities, residential cities in Småland as well as the wooden house networks of the municipalities of the Highlands. Information meetings and seminars have been conducted with urban development managers in both big city municipalities and the residential cities of Småland. In January the project gathered approximately 20 representatives of the municipalities of the Highlands and local wooden house producers in a future workshop. The meeting agreed on an investment in coordinated construction procurement and on investigating alternative financing models for buyers of small houses.

The collaboration with the Swedish Wood Building Council and the national Trästad (Wood city) project has been formalised. A clear division of roles, co-production of information material and shared events have resulted in synergies. The first example of co-production is a white book which collects experiences of public bodies who have promoted higher wood construction. The goal is to erase uncertainties linked to, among other things, building norms, competition legislation and public procurement rules.

Within the Trästad project – Bra Bostäder (Good housing) – the three residential cities of Småland prepared a shared declaration of intent in 2012, with the aim of developing housing in a flexible construction system "Good Homes for Small Households at a reasonable price." The municipalities have been involved and organised an introductory seminar series with the Bra Bostäder project, in which SHS has also participated.

WOULD YOU LIKE TO WORK WITH INNOVATIONS?

We are looking for people, companies and organisations who want to participate and develop smart housing of the future. The projects of Smart Housing Småland should support development of the innovation environment. We support both pilot study and business development projects, and we can support application writing for research

Research and innovation

Sub-strategy managers: Ann-Charlotte Larsson, Linnaeus University and Peter Johansson, Jönköping University

During the year the focus has been on starting initiatives for application of external project funds as well as identifying and discussing the following research areas: entrepreneurial product development, sustainable housing and construction with wood, Smart Homes, transparent intelligence and bio-based construction material.

User centred design methods have been highlighted as one of the main methods for continued development of housing research, among other things, with links to design and architecture.

The internal funds of the research and innovation budget have been used as "lubricants" to secure research and innovations. A total of ten applications have received support from SHS, of which four of the six which have been processed so far have been granted funds from external financiers like the EU, the Knowledge Foundation and Vinnova. Two of these applications have been the result of international collaborations and one of these has been granted funds by the EU.

Vinnova granted two small projects, which really have the potential to take our pilot study results forward. This includes a so-called initiation project within Vinnova's call Challenge-driven innovation to continue working on "**Lastbärande glas i bostäder byggda med volymelement**" (**Loadbearing glass in housing built with volume elements**). This is a direct continuation of both the pilot study "**Byggnadens ljusinsläpp i förändring**" (**Light penetration of buildings undergoing change**) and the prototype project "**Bostadsprototyp 1.0**" (**Housing prototype 1.0**). In addition, the application "**Skava mot normen**" (**Chafe against the norm**) of a research team at Linnaeus University was approved within Vinnova's programme Norm-critical innovation. It focuses on gender aspects of housing and comprises a continuation of a pilot study which SHS has supported during the year. Two further projects have been directly linked to SHS – one on "**Strategiarbete för agil förnyelse med mindre och medelstora företag i fokus**" (**Strategy work for agile renewal with a focus on small and medium-sized companies**) and the EU project "**LIMES – Light Innovative Materials for Enhanced Solar Efficiency**".

Example: Gender perspectives on housing

A project which was managed by Johanna Rosenqvist at Linnaeus University focuses on gender perspectives on housing. The aim has been to elucidate housing needs and diversity in the design of housing environments by means of intersectional (feministic sociological theory and analytical tools for studying how different forms of discriminatory power structures interact in a society) gender perspectives on users of the future.

Some of the issues which have been addressed cover what we really know about the current and future housing needs, for who it is designed and how it impacts housing forms of the future. Based on this, a review of previous research and conditions within the area Swedish housing policy and housing construction has been conducted. The issues have been addressed and discussed by means of three workshops.

- Theory workshop: gender, intersectionality and history of the housing
- Method workshop: problem description, market and development potential
- Design workshop: gender focus on housing environment

The result of this first study was an extended Vinnova financed pilot study "**Att skava mot normen**" (**Chafe against the norm**).

Approximately SEK 50 million has been applied for externally, of which roughly SEK 8.5 million has been granted to date. This corresponds to a sixfold upshift of the utilised research and innovation budget. In addition, the research school ProWOOD has started with seven industry doctoral students in a collaboration between Jönköping University and Linnaeus University, as well as Inwido, Flexator, SP, Swerea IVF, Södra, Yaskawa and BWG Homes.



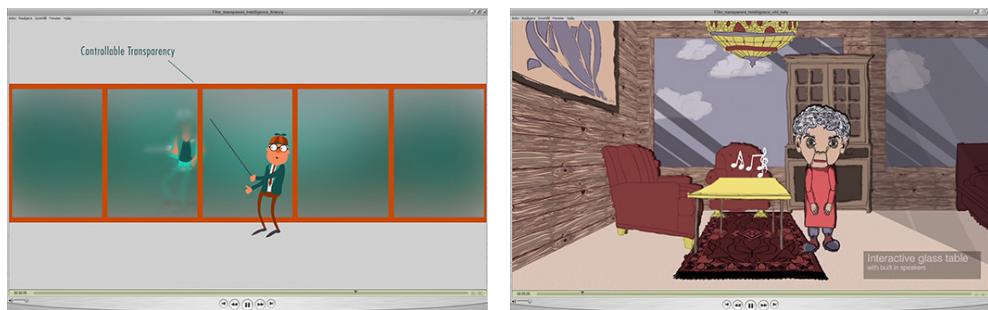
Housing prototype in Almedalen. Photo: Hugo Nabo.

Communication

Sub-strategy manager: Carin Karlsson, County Administrative Board of Kronoberg

The main focus of the communication work within Smart Housing Småland has been on attaining structures on graphic manner, websites, templates etc. and starting strategic work to create a brand. First and foremost it is about defining what the innovation platform entails and which opportunities exist there to attract collaboration parties, companies and financiers. In addition to this, vast communication initiatives have been used to have a good impact in Almedalen where the first housing prototype was demonstrated. The results with approximately 1,800 visitors show that the impact was good.

A follow-up of the communication work for 2014 has been completed. The survey showed that the main source of information on SHS is its management, thereafter the newsletter, colleagues as well as the website. The majority of the respondents stated that they had received adequate information.



We made a project together with the students at Hyper Island where they got the assignment to make two short animated films about transparent intelligence.

STEERING GROUP 2015

Ola Adolfsson	Flexator, Chairman
Helen Andréasson	SP
Olof Björkmarker	Region Kronoberg
Johan Blixt	Södra Timber
Håkan Brynielsson	The Regional Council in Kalmar County
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Lotta Fonsell	Villa VIDA
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PROCESS MANAGEMENT 2015

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Mikael Pekkari	SP SME, responsible for the strategies urban development and internationalisation
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Johan Palm	Träcentrum Nässjö, responsible for pilot studies and business development projects
Peter Johansson	Jönköping University, research and innovation manager, training manager industrial product development
Carin Karlsson	County Administrative Board of Kronoberg, communication manager
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Support for the process management

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Glafo, the Glass Research Institute

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