

Insert project photo ↑

INTERREG IIIB NORTHERN PERIPHERY PROGRAMME • INTERREG IIIB NORTHERN PERIPHERY PROGRAMME

**MAIN PROJECT  
FINAL PROJECT REPORT**

**Project Name:** Eco House North

**Project Registration Number:** 04/02/52

**Measure:** Insert measure

**Project Website:** [www.econo.fi](http://www.econo.fi)



(See guidance notes for further information on what information to include in these sections. The headings below provide a suggested outline. However, please feel free to use a different structure of headings if they are better suited to your project. The minimum content requested in the guidance notes should still be addressed).

## **Executive Summary**

The goals of the project were:

- develop ecological and comfortable architecture
- turn eco-houses into a competitive industrial product
- improve the competitiveness of companies and their ability to employ
- implement model houses and areas.

Practical work was divided into four lines of action:

1. Massive timber structures and log houses.
2. Industrially produced wooden houses.
3. Refurbishing of wooden houses.
4. Marketing and implementation of ecological houses.

During the project:

- an international co-operation network has been put together
- the know-how and competitiveness of companies has been enhanced
- already 18 new jobs have been created (it is estimated that there will be another 20 new jobs in future)
- new log house models have been designed, model buildings have been constructed, and the ecology of production has been improved
- massive timber structures have been developed
- new wooden house models have been designed and experimental buildings have been constructed
- environmentally-conscious planning recommendations have been drawn up
- wooden building elements have been developed and the environmental impact of production has been reduced
- marketing of eco-houses and the needs of buyers have been analyzed
- tools for designing and production management have been developed
- training has been arranged
- information about ecologically sound construction and energy conservation has been distributed.



PARTICIPANTS OF THE STARTING SEMINAR IN SCOTLAND.

## Project Information and Objectives

The EU is committed, by means of agreements, to protecting the climate and conserving energy. Achieving these goals requires an environmentally conscious change in the planning and implementation of buildings. People in Northern Europe know how to make good wooden houses, but there are deficiencies in the ecological properties of these buildings and in their durability in a harsh climate. This calls for extensive development in timber construction.

Eco House North, ECONO is an ecological timber construction development and pilot building project set up to improve the condition of the environment and to increase the competitiveness of northern Europe's timber industry. The objective is to develop competitive, ecological wooden houses which are suitable for areas with a severe climate, and for effective land use (low-dense planning). The project includes wood product companies, builders, business organisations, designers and building developers.

The primary objectives of this project are to:

- Develop ecological wooden house architecture and bring this know-how to local SMEs.
- Develop low-dense wooden area planning.
- Contribute to making ecological building the predominant industrial construction method.
- Bring new business opportunities and work places to sparsely populated areas.
- Create a strong building industry cluster in the peripheral regions of Northern Europe.

The main objectives of research and development are to:

- Develop the concepts of ecological, healthy, energy-saving, industrially produced wooden house systems.
- Reduce structural damages of wooden houses and extend their serviceable life.
- Develop wooden house technique and details which are suitable for harsh climate.
- Introduce ecological wooden houses to mass production.
- Increase the amount of winter construction of pre-fabricated houses and even out seasonal fluctuations in production.

The work is divided into four lines of ecological construction development:

- 1) In-situ-constructed massive timber buildings and log houses.
- 2) Industrially manufactured wooden houses.
- 3) Rehabilitation of wooden houses.
- 4) Economics, the construction process and logistics.

In practice, the work consists of:

- acquiring and continuously updating market information
- developing high-quality ecological architecture
- developing business operation and co-operation concepts
- assembling Northern European production and provider groups
- holding exhibitions and constructing model houses
- offering consultation services.

## ORGANISATION

The project was led by the Council of Oulu Region, Ilkka Yliniemi.

The project manager was Kimmo Kuismanen.

The project co-ordinator was at the beginning Heini Raasakka and from November 2005 Mari Väänänen.

The Steering Committee of the project consisted of following members (deputy in parentheses):

- Finland: Ilkka Yliniemi, (Rauno Logrèn), chairman  
Pentti Perkaus (Markku Mäläskä)
- Island: Sigurður Einarsson (Sigurður Hardarsson)
- Norway: Ole Hammari, (John Kristofferssen)
- Scotland: Brian Burns, (Howard Liddell)
- Sweden: Kent Kullberg, (Per Persson)

## ECONO PARTNERS

### Leading partner:

- Council of Oulu Region, Oulu, Finland.

### Public organisations:

- Regional Council of Lapland, Rovaniemi, Finland
- Oulu Regional Business Agency, Finland
- Ylivieska Region, Finland
- Municipality of Inari, Finland
- Municipality of Sodankylä, Finland
- Municipality of Kalix, Sweden.

### Business operation and building development:

- Head Consulting Oy, Oulu, Finland
- EUTOR Oy, Kempele, Finland
- Brian Burns Associates, Inverness and Nairn, Scotland.

### Architectural design:

- Ab CASE consult Ltd, Oulu, Finland
- Batteríð Arkitekter ehf., Hafnarfjörður, Iceland
- Arkitektkontor John Kristoferssen AS, Tromsø, Norway
- GAIA Architects Ltd, Inverness, Scotland
- MAF Arkitekter, Luleå, Sweden.

### Engineering office:

- Siv ing Ole Hammari, Alta, Norway.

### Wood product companies:

- Lappli-Talot Oy, Tornio, Finland
- Honkamajat Finland Oy Ltd, Oulu, Finland
- Kiimingin Mökkinikkari Oy, Kiiminki, Finland
- Pohjois-Suomen Hirsitalokeskus Oy, Ylikiiminki, Finland
- Lappiporras Oy, Kemi, Finland
- Lunawood Ltd, Iisalmi, Finland
- Rakennusliike Halonen, Sotkamo, Finland
- Topi-Kalustaja Oy, Kalajoki, Finland
- James Jones & Sons, Moray, Scotland
- North Woods Construction Ltd, Ullapool, Scotland
- SA Englund Bygg, Kalix, Sweden.

## Project Implementation

### ECOLOGY OF MATERIALS



Wood is an ecological material as such, but in an eco-house the supplementary materials, furnishings and treatments must also be in accordance with sustainable development. In order to have healthy indoor air, such materials are chosen which do not release harmful emissions.

MASSIVE WOODEN ELEMENTS CAN BE DONE BY GLU-LAM TECHNIQUE OR BY MECHANICAL JOINTS.

### DESIGNING AN ECOLOGICAL HOUSE

Know-how and care are required in designing an eco-house. Environmentally conscious design recommendations have been made during the ECONO project:

- Analysis of building location and microclimate.
- Protection of green surroundings and biotopes.
- Improvement in the microclimate of yards and buildings.
- Natural ventilation and energy conservation.

### CRITERIA OF AN ECOHOUSE

The criteria of eco-houses was developed. The houses designed are competitively priced and technically uncomplicated (eco-minimalist approach):

- long-lasting wooden structures
- conservation of energy
- adaptation to a harsh climate
- healthy indoor air
- simple ventilation technology; mechanical or natural
- minor maintenance and repair needs, economical life cycle.

### ECONO HOUSES

The houses are made of natural materials; they take the environment into account and are healthy to live in. If desired, the buildings can be fitted with additional elements that save the environment and energy, such as solar panels, wind energy, composting latrines, a food cellar, greenhouses, etc.

### MASSIVE STRUCTURES

Different ways to make massive wood constructions were studied. The selected structure - *Brettstapel* - combine durability, ecology, heat-storing mass, and beauty. An architect can shape massive wood into both traditional and modern forms.

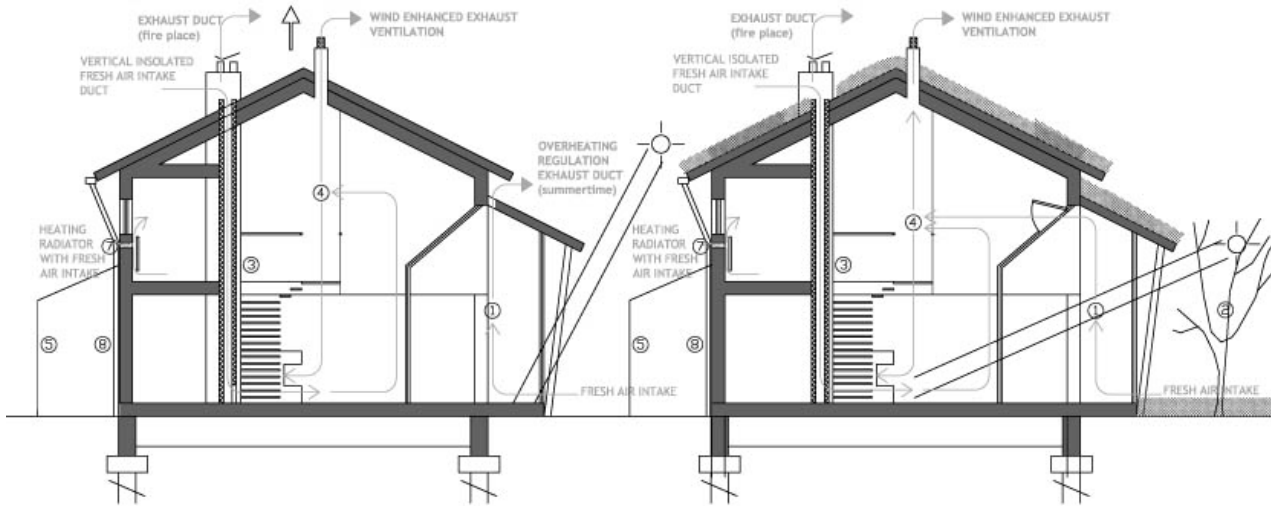
### LOG HOUSES

In the North, logs have traditionally been considered a reliable material that can last hundreds of years when properly used. The ECONO log house models are designed for leisure use as well as permanent living; new models are also suitable for a town environment. In Central Europe many doctors recommend living in a log house because it is healthy.

## DEVELOPMENT OF LOG TECHNOLOGY

The project has developed:

- the ecology of production by increasing reuse of waste
- log joints suitable for a harsh climate
- massive log walls with 20% better thermal insulation
- more extensive use of natural materials, such as in sealing materials.



DEVELOPMENT OF ECOLOGICAL BUILDING AND VENTILATION TECHNIQUES WAS AN ESSENTIAL PART OF THE WHOLE PROJECT.

ONE OF THE LOG HOUSE MODELS DEVELOPED (BELOW).



## WOODEN HOUSES

The starting point for planning and designing a collection of wooden houses is wooden elements that are moderately priced and suitable for a harsh climate. The marketing group studied the needs of markets and inhabitants. The houses are flexible and barrierfree, and they can be designed individually according to the needs of clients (mass tailoring principle). Wooden houses have healthy indoor air and can utilize either mechanical or natural ventilation.



## DEVELOPMENT OF WOODEN ELEMENTS

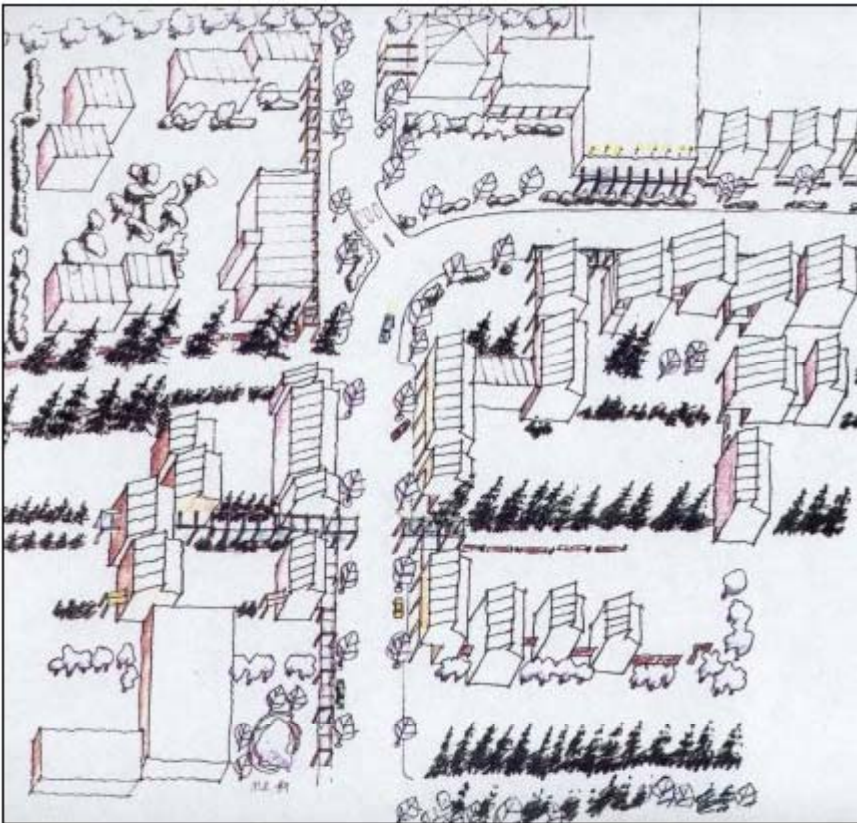
Various industrially produced wooden elements were designed and tested during the project.

1. A veneer-web PRT post-beam structure with 300 mm of insulation.
2. A wooden timber frame structure with 200-250 mm of insulation.
3. A wooden timber frame structure with 270 mm of insulation.

Option 1 was tested at a building site in Oulu. Based on calculations and test structures at Oulu, a decision was made to use option 3 in the future.

## LOW-DENSE TOWN PLANNING

To protect the environment and reduce costs, a built environment should be as dense or compact as possible. To combine an ecological community structure with single-family home living, new types of buildings that enable a new type of town plan and yard living were designed during the project.



## ECOLOGICAL REFINEMENT OF BUILDINGS

Most of the houses of the future already exist. Therefore, we developed methods for ecologically refurbishing buildings to improve the ecology and energy economics of the present building stock.

## SANITARY ROOM ELEMENT

The construction of sanitary rooms in existing buildings often results in moisture damage. Constructing bathrooms in exterior units or, in the case of apartment buildings, one above the other, reduces these risks. The development of wooden modular units expands the use of wood at new sites.

## NATURAL VENTILATION

Many inhabitants and planners want to avoid mechanical ventilation because it is noisy, often results in a feeling of draftiness, intake ducts can foul indoor air, and the equipment requires expensive replacements relatively frequently. Furthermore, ventilation appliances substantially increase a building's consumption of electricity.

Solutions based on natural ventilation were developed for ECONO houses. These solutions provide necessary air venting and a controlled supply of intake air.

## WOODEN STAIRS

Wooden stairs as such are ecological, but varnishes used in their treatment usually burden the environment. During the development of the ECONO stairs, emissions from their surface treatment are reduced to a fraction of the initial situation.

## THERMALLY TREATED WOOD

Heat treatment enhances the durability of wood and changes its appearance. In outdoor structures, thermally treated wood can be left with no other treatment, in which case the surface gradually develops a grey colour. The outdoor use of thermowood was tested during the project.

## KITCHEN DESIGN

In an eco-house, even supplementary building elements are made from natural materials and treated with environmentally friendly products, such as waxes and oils. Mobile workstations were designed during the project.

## PILOT BUILDING

House models and structures developed during the project are tested in several building projects in 2006-2008:

1. As Oy Mesaanipuomi, Oulu, Finland; group of three semidetached houses, which all have different wooden structures.
2. Talon Manninen, Liminka, Finland; a detached log house.
3. Koitelinkoski, Finland; log house for tourist purposes.

## MARKET FOR ECOHOUSES

The wishes of inhabitants, the development of building regulations and the future of energy conservation were studied in the ECONO project. The new range of house models are designed to meet the tightening requirements well into the future.

## IMPLEMENTATION OF ECOHOUSES

Along with design, quality control has a substantial effect on the quality of construction. This project has also paid attention to the education of the people involved and the collaboration of the entire implementation process.

## EDUCATION

Designers and the employees of production companies have been trained during the project. Training of builders and owners of building companies will begin in 2007.

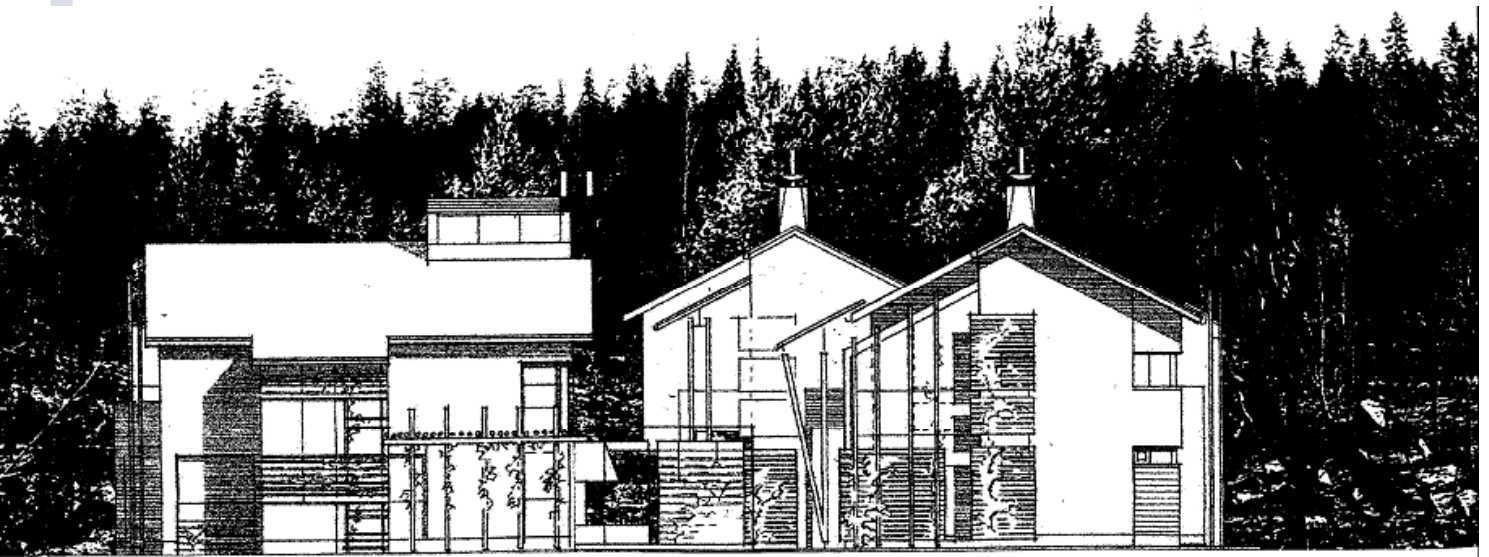
## PRODUCTION MANAGEMENT

Designing of wooden houses has been made more efficient by introducing new CAD software to the CASE architect office. New CAD-CAM computer software has been taken into use at Lapli-Talot factories, and this enables the use of CAD drawings for the direct steering of the production.

## COOPERATION CONTINUES

The house models, wooden products and production lines designed during the project are currently being put into use. Several partner companies have already agreed to continue co-operation even after the project.

For more information, visit: [www.econo.fi](http://www.econo.fi).



## Project Results

### SUMMARY OF ACTIVITY LINES

1) MASSIVE TIMBER. Technical and economical studies of massive wooden constructions (*Brettstapel*) has been made, and a pilot house designed in Scotland (building start in 2007). There are plans to found a new massive timber factory in Scotland. Studies to start massive timber production in Finland are carried on. New log house models have been designed and most of them will go into production during 2007. A pilot house was built in 2006, and another one is under construction in Finland.

2) INDUSTRIAL WOODEN HOUSES. Studies into the design of ecological houses and wooden products have been made in Island, Finland, Norway and Sweden. The environment qualities of production has been monitored in Finland.

New house models have been designed, which will go into production during 2007. Three pilot buildings are constructed in Finland. Possibilities to start manufacturing natural ventilation fittings in Island and Finland are studied. There are plans to start ecological wooden house building in Norway.

3) REHABILITATION. Guidelines for refurbishing of wooden buildings have been made. A wooden volume element to make safe wet rooms to existing and new wooden buildings has been developed in Sweden. New wooden element factory was founded in Sweden.

4) MARKETING. Market research into the wooden house markets in all five countries. Business consulting for the partner companies in Finland and Scotland has been made.

There has been education for the employers of some partners. A plan for ecological building education and training at Sodankylä Finland has been made.

## MARKETING, IMPLEMENTATION AND LOGISTICS

### MAIN LINES OF OPERATION

Two practical operating policies were agreed on at the opening seminar in Scotland in 2004:

- a Scandinavian policy and
- a Scottish policy.

The primary operators in the Scandinavian operating policy were Veijo Halonen and Seppo Laukka from Finland and their Norwegian partners, led by Ole Hammari. The work of the Scottish group was led by Brian Burns, Bernard Planterose and Howard Liddell.

The principle idea of the implementation group was:

- to steer ecological development work and whole project according to the strategic and operative needs of the partner companies.

### COMPLETED PLANS AND DEVELOPMENT MEASURES

To ensure that the companies' strategies and objectives would steer the project throughout its duration, company analyses were initiated on the basis of the needs of companies that:

- most profoundly and broadly face the customer interface in construction and whose chain of values in the direction of the source of raw materials is the longest and most extensive.
- company analyses of other partner companies were also done.

The companies' objectives and strategies related to the Econo project were further specified as the project progressed.

### ACQUISITION OF MARKET INFORMATION AND COMMUNICATIONS

Basic studies of the construction markets of the different countries in the project area were conducted and the results were published on the web pages of the Econo project.

Main presentations:

- the Econo project was extensively introduced at the construction exhibition (*Boligmessa*) in Tromsø on 27.-29.10.06
- the project was presented at a seminar arranged in Scotland.

### EDUCATION

In terms of education, from the standpoint of getting further benefit from the project, it focused on identifying essential competence and education needs as well as know-how and education organizations with the right resources, location and strategy and an interest and readiness to assume the responsibility of practical development and implementation of know-how and education over a longer period.

A bottleneck is created by the lack of element house and log house installation teams that are capable of working in the international operating environment.

From the beginning, the intent has been to plan and implement education of builders as a joint effort of Finns and Norwegians. It appears that the Norwegian partner of the Sodankylä Vocational Institute will be the university of applied sciences in Alta / Ole Hammari. Alongside the course-type education, the intent is to begin developing long-term know-how and organization of Finnish-Norwegian cooperation in education.

Know-how in designing and constructing massive-wood structures has been acquired on field trips to Central Europe, in which Scottish and Finnish partners participated.

## MILESTONES

### CONFERENCES AND MEETINGS

Several conferences and meetings with the purpose of maintaining cooperation were held after the project's opening seminar in Glengoe, Scotland, in the autumn of 2004, including

- partner and network partner mapping meetings in Tromsø in the autumn of 2004 and spring of 2005
- several meetings of partners in Scotland in 2004 - 2006
- a project contact event with Sodankylä's firms and other key operators in Sodankylä in the summer of 2006
- participation in the project's final seminar in Oulu in the autumn of 2006, with participants from all five project countries.

### MOST SIGNIFICANT ACHIEVEMENTS

- a joint database was constructed for future joint activity of the partners
- connections to information sources and information acquisition channels were formed for future operation
- a functional cooperation network of Finnish-Norwegian business and know-how and an operating model of cooperation were built
- a functional Scottish-Finnish network for the development of Brettstapek structures was set up
- Swedish and Finnish partners studied the possibilities of implementing joint pilot projects to test developed room elements
- during the project a Finnish-Norwegian cooperation network constructed a functional information acquisition and dissemination model and a practical operating model for cooperation on which basis practical cooperation is continuing
- practical business operation has started as a Finnish-Norwegian-Scottish joint effort
- an organization that will assume responsibility for developing and implementing education was identified and agreed on, and practical cooperation in education was started (Sodankylä Vocational Institute in cooperation with the university of applied sciences in Alta / Ole Hammari)
- an organization that will assume responsibility for developing and implementing a construction logistics center was identified and agreed on (Municipality of Sodankylä and certain companies in the sector)
- measures were initiated to implement Brettstapel projects in Scotland and Finland.

### IMPACT ON THE ENVIRONMENT AND PRODUCT ECOLOGY

The ecobalance of nearly all the participants was improved by developing the environmental characteristics of either their products or production. Ecology was defined on a market or business basis in the group's work in such a way that the ecological focus of the work was directed to questions that customers and key operators in different market areas consider important.

### IMPACT ON COMPETITIVENESS

During the project the Finnish, Scottish, Swedish and Norwegian partners began close cooperation in which they together prepared and tested practical operating models of cooperation in the first projects. The project identified the main bottlenecks in competence and resources in northern European cooperation. Joint operating models and practical solutions for resolving the bottlenecks were developed.

The Finnish partners that played a central role in the project were manufacturers of element houses and log houses, the Scottish partners were timber producers, and the Swedish partner was a construction firm that owns an element factory.

On the basis of the above, the primary impact on the partners' competitiveness can be summarized as:

- creation of a new, international network of cooperation and an operating model based on international cooperation
- identification of know-how needed by the new operating model and organizational development needs, and initiation of practical development measures

- significant growth in work productivity
- establishment of new production plants
- creation of new jobs
- development of new products
- creation of permanent partnership relations that include joint offers to third parties and continuation of development work also after termination of the project.

## NEW PRODUCTION

- Scotland. Massive timber production will be started in a new factory.
- Sweden. A new wooden element factory in Kalix has been founded.

## NEW EMPLOYMENT

New employment 12/2006 (*expected in future*): Iceland – (3), Finland 4 (10), Norway – (5), Scotland – (5), Sweden 14 (15) = total 18 (38). Pilot building employment not included.

- Finland. 3 new permanent jobs created (Lappiporras Oy, Ab CASE consult Ltd). The growth of the turnout of the key ECONO partners will be about 43 % in three years. This means 24 new jobs.
- Scotland. At least 3-4 new jobs in three years estimated, after a massive wooden element factory is founded.
- Sweden. 14 permanent jobs created (Erikssons Ab), and now it has 14 employees (4 women).
- In Island there are plans to develop ecological building material production
- In Norway there are plans to start ecological wooden house building.

## STUDIES

- Influence of Climate on Design of Houses (Finnish, English)
- Low and Dense Wooden Architecture (Finnish, English)
- Ecological Refinement of Existing Buildings (Swedish, English)
- Natural Area Analyses (English)
- Housing and timber construction in Norway: Status, trends and perspectives for sustainability (Finnish, English)
- Natural ventilation design guide (Finnish, English).

## DESIGN

- 15 different log house models
- 10 different wooden house models
- 1 *Brettstapel*-house model
- Development of wooden volume elements
- Urban planning studies of wooden house areas.

## REPORTS

- House Building Rules in Norway (Finnish)
- The Use of different CAD-programmes for ECONO-house Design (Finnish and English)
- Wooden House Markets and the User Needs in NPP Countries (Finnish, English)
- *Brettstapel* (massive wood) constructions in Germany (German)
- *Brettstapel* construction material (Finnish, English)
- Report of the Austrian *Brettstapel* study tour (English)
- New better isolated I-beam structures (English and Finnish)
- Timber Housing in Scotland (draft report)
- Reports and concepts of natural ventilation (Swedish, English)
- Ásbyrgi Hotel, study-programme for ecology of materials and tourist building in Iceland
- Life cycle assessment of possible materials for the building on Iceland, research programme
- Topi Kalustaja Oy. Puukalustemalliston kritiikki (critique of existing wooden kitchen furniture)
- Five concepts for ecological wooden houses (Finnish, English)
- Criteria of ecological wooden houses in the ECONO project
- Eco-minimalism in building.

## ANALYSES

- building with volume elements, Englunds, Kalix and Luleå
- ecological refinement of wooden buildings, Kalix kommun, Sweden
- marketing group has analysed the products of partner companies in Finland
- marketing group has analysed the products of partner companies in Scotland
- 10.1. ECONO goals and work programme for Rakennusliike Halonen
- 7.4. 2005 Mammutihirsi log production
- 14.4. 2005 Honkamajat log production
- 21.4. 2005 Mökkinikkarit log production
- 30.9. 2005 wooden house manufacturing, Tornio
- 12.10. 2005 wooden fixtures needs and ecology, Kalajoki.

SALMON-TAIL JOINT AT KOITELINKOSKI LOG HOUSE (RIGHT).



A VENEER-WEB PRT PILLAR-BEAM STRUCTURE WITH 300 MM OF INSULATION WAS USED IN A PILOT BUILDING IN OULU (RIGHT).

PRESENTATION MATERIAL OF ECO HOUSES WAS MADE FOR THE PARTNERS (BELOW).



## PILOT BUILDINGS

The project has not paid any building costs, but many solutions developed have been tested at the building sites with the kind permission and co-operation of the builders.

As. Oy. Mesaanipuomi (2006-7), Oulu, Finland (manufacturing: Lappli Talot Oy)

- 600 m<sup>2</sup>, three 1-story semidetached houses
- experiment building with three different constructions
- testing new details
- natural wood treatments.

Koitelinkoski (2006), Finland (manufacturing: Kiimingin mökkinikkarit Oy)

- tourist building, 100 m<sup>2</sup>, log cottage
- "salmon-tail" joints.

Talo Manninen, Liminka (2006-7), Finland (manufacturing: Mammuttihirsi Oy)

- 160 m<sup>2</sup>, detached log house
- energy-saving log house constructions
- natural wood treatments.

Kalajoki (2006), Finland (manufacturing: Honkamajat Oy)

- testing new wind proof log joints.

Thermowood

- 1.10. 2005 making test constructions for Lunawood, Karunki (monitoring of the test construction has taken place at every three months, and will continue after the project).

MESAANIPUOMI, OULU.



MANNINEN, LIMINKA.



## CONTINUATION

- Lappli-Talot will start to produce ecological ECONO houses, and they are preparing a catalogue
- Honkamajat will start to produce ecological ECONO log houses, and they are preparing a catalogue
- Kiimingin mökkiniikkarit will start to produce ecological ECONO log houses, and they are preparing website
- Mammuttihirsi will start to produce ecological ECONO log houses, and they are preparing a catalogue
- Ole Hammari and Lappli-Talot will continue project co-operation
- eco-classification of materials in Island will continue, and a data-bank will be founded
- Batterið Arkitekter continues the development of the Icelandic ecological materials databank
- there are companies in Finland and Iceland, which will study the possibilities to develop and manufacture natural ventilation fittings
- GAIA and North Woods will continue the development of *Brettstapel* architecture
- CASE has started the development of *Brettstapel* architecture
- North Woods, Rakennusliike Halonen and a German company evaluate the possibilities to start co-operation in developing and manufacturing *Brettstapel* elements
- Thermowood test construction monitoring will continue
- NAMI Consultancy Ltd from Ireland has visited the ECONO manufacturers, and they want to import wooden houses and log houses to Ireland, thus replacing import from Central Europe and Canada
- Lappli-Talot has given offers to Germany for two eco-house areas
- Kiimingin Mökkiniikkarit has given offer to Russia for an ecological log villa area
- ECONO material will be used in an ecological wooden building handbook, which will be published in Hungary at the end of 2007 (ed. Reika Veres).

## Transnationality

Some of the partners have co-operated earlier, and have found that the NPP areas have quite a lot common problems and that in other countries there exist know-how and experience that can be transplanted. Many of the partners have know-how and experience that doesn't exist in other countries, and therefore interchange of knowledge was an essential starting point of the whole project. Our manufacturers and companies are small in the global competition and one result is a strong network which brings together partners to strengthen the competitiveness in the local market and also in the domain of exports.

The partner companies have been grouped around the four development lines:

- 1) In-situ wooden houses and log houses: GAIA, Kristofferssen, CASE, Burns, Eutor, Honkamajat, Kiimingin mökkiniikkarit, Mammuttihirsi, Jones, North Woods, Halonen.
- 2) Industrial wooden houses: CASE, GAIA, Batterið, Hammari, MAF (Kalix), Head Consulting, Eutor, Lappli-Talot, Lappiporras, Tiivi, Topi Keittiö, Lunawood.
- 3) Wooden houses renovation technique and products: MAF (Kalix), Kristofferssen, Englunds (Kalix), CASE.
- 4) Building process and logistics: Hammari, Batterið, Eutor, Head Consulting, Burns, Halonen, Lappli-Talot, North Woods, Englunds (Kalix).

It is anticipated also that the co-operation will continue after the project and that it will create new employment and business opportunities in the future as well (see the previous chapter CONTINUATION).

## Dissemination and Transfer of Experience

### INFORMATION

- ECONO posters (English, Finnish, German, Norwegian, Swedish)
- ECONO-project Power Point presentations (English, Finnish, German, Norwegian, Swedish)
- ecological wooden house Power Point presentations (English, Finnish, Chinese)
- project presentation, Finnish
- eco-house presentation, Norwegian
- press releases, Finnish, English, Swedish, Norwegian

- 1500 copies of Eco House North Handbook in English, will be distributed in 2007
- 50 copies of project presentation memory-sticks have been distributed
- press conference in Oulu
- press conference in Helsinki
- press conference and fair stand in Tromsø
- the ECONO web-site will be functioning till the end of 2009.

## SEMINARS

- 5-7.11.2004 starting seminar, Scotland
- 30.-31.5. 2005 Partners seminar, Oulu
- 9.11.2006 public seminar, Oulu
- 1.12.2006 public seminar, Scotland

## EDUCATION

- 10.3. 2005 www-pages user education, Oulu
- 16.-21.5. Austrian Study Tour visiting *Brettstapel* manufacturers and buildings
- 23.-24. 8. Revit CAD-programme, Helsinki
- 25.8. Presentation on the ECONO Project and the Scottish partners' work programme at a meeting of the Scottish-based agencies involved in the Northern Periphery Programme, Inverness, Scotland
- 10.-13.11. visit to Austrian and German *Brettstapel* manufacturers
- 25.11. Revit CAD-programme, Helsinki
- 2006 Brettstapel study tour to Germany and Switzerland
- wooden building education programme for the Sodankylä municipality (2006-)
- book for educating wooden building professionals will be published in Hungary at 2007, and ECONO material will be used in that book.

## Conclusions

As a whole the project has been a successful one, most of the goals have been reached and the study programme has been fulfilled.

Because the original Norwegian partners didn't take part at the project, the Norwegian programme started late, and the results were not as good as they could have been. The municipality of Inari was passive, and we didn't get the local contacts that were expected.

To solve large complicated problems, like developing eco house constructions, big teams with large field of know-how are needed. The ECONO project was big enough to carry out such a complicated working programme. With large projects the administration costs are relatively smaller.

EDUCATION.

