

Barents Forest Sector Network Working Group

Wood as Construction Material and as part of North Karelia Climate and Energy Program

Pasi Poikonen, Research Scientist

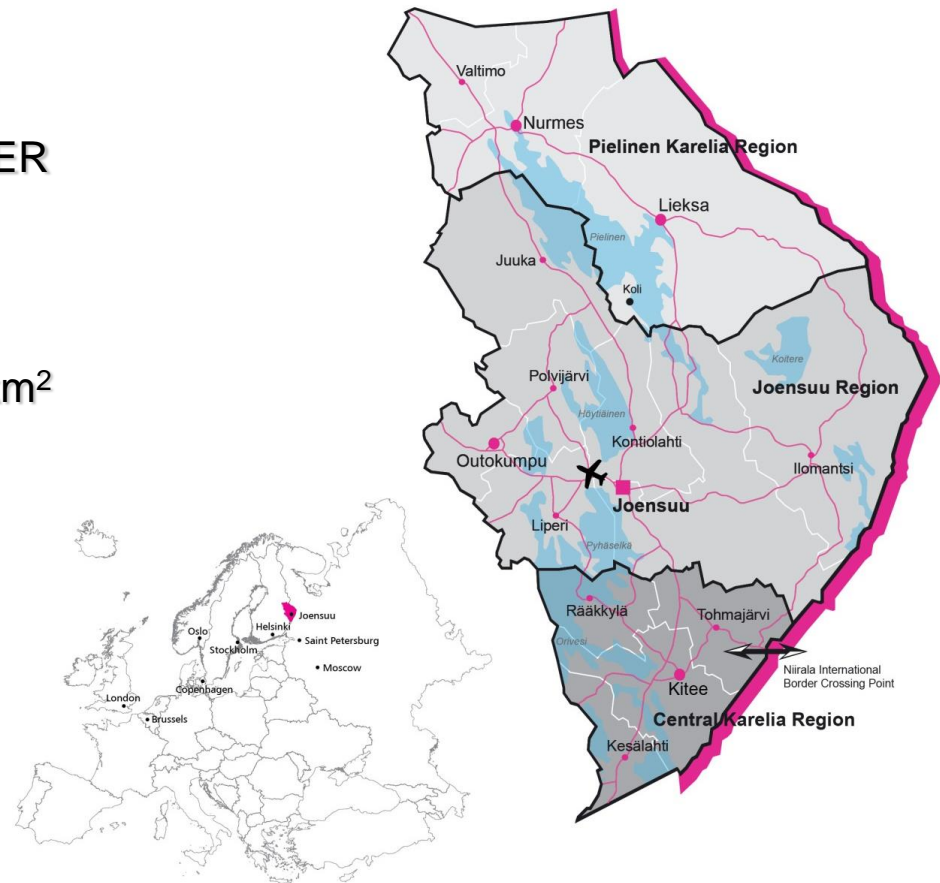
Natural Resources Institute Finland Luke, Joensuu, Finland

18.10.2018

Hotel Luleå, Sweden

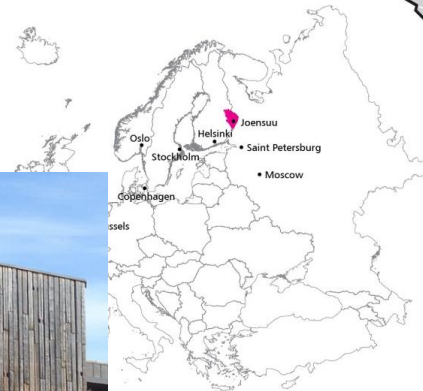
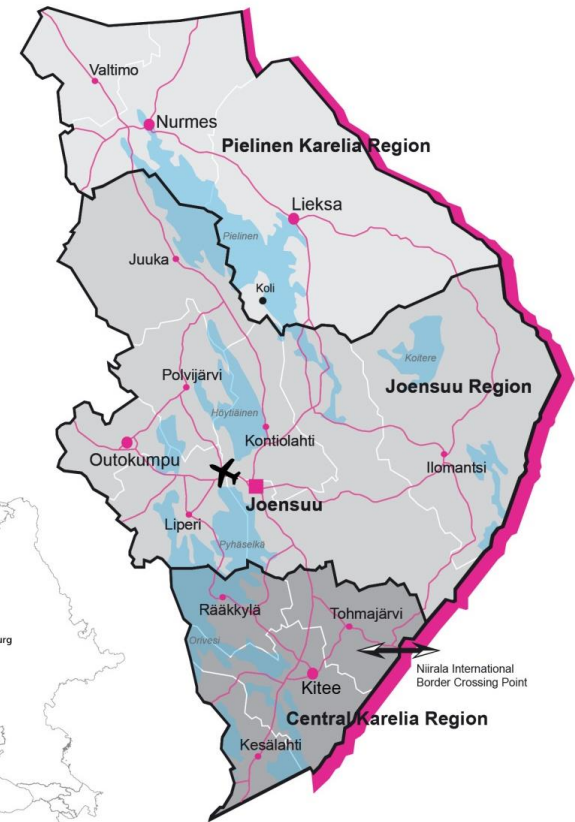
Where is North Karelia and Its Key Data

- ❖ ONE OF THE 18 PROVINCES OF FINLAND
- ❖ JOENSUU AS THE REGIONAL CENTER
- ❖ 166 000 INHABITANTS
- ❖ 14 MUNICIPALITIES
- ❖ POPULATION DENSITY 9.4 persons/km²
- ❖ SIZE OF THE REGION 21 585 km²
- ❖ THE EASTERNMOST REGION OF THE CONTINENTAL EU
- ❖ 300 km COMMON BORDER WITH RUSSIA



Joensuu – Forest Capital of Europe

- University of Eastern Finland
- Karelia University of Applied Sciences
- European Forest institute
- Natural Resources Institute Finland
- Riveria
- Joensuu Science Park Ltd



LUKE Natural Resources Institute Finland

A research and expert organization that works to promote the sustainable use of natural sources and bioeconomy.

The strengths include multidisciplinary expertise in the sustainable production, and use of natural resources and extensive knowledge in raw materials.

One of the world's most multidisciplinary research centres. Founded in 2015 when MTT Agrifood Research Finland, Metla Finnish Forest Research Institute and the Finnish Game and Fisheries Research Institute were merged.

Specialized interests in wood construction are in quality of wood as well as wood product market, carbon footprints and environmental product declarations.

WWW.LUKE.FI
www.luke.fi/en/natural-resources/forest/wood-quality-and-utilization-in-the-wood-products-industries/

Starting Point for the Regional Climate and Energy Programme

- International obligations
 - UNFCCC and the Kyoto Protocol
 - European union

❖ Finland's share

- Obligation for the Regional Council of North Karelia:

"The Government requires that regions and urban areas draft their own climate and energy strategies and implementation programs based on the national climate and energy strategy."

National Climate and Energy Strategy 6.11.2008.

Targets for the Construction Sector

- ❖ Buildings are more energy efficient and the efficiency of use is good
- ❖ North Karelia is the leading region in wood construction
- ❖ Renewable energy is used as the principal heating source of buildings
- ❖ Regional energy advice is active and professional

Measures for the Construction Sector 1/2

- In construction and renovation, attention is paid to insulation, controlled ventilation, the recovery of heat, the utilization of passive solar energy and ventilation and other ecologically sustainable solutions
- Water circulation heating is preferred
- New houses are built as energy efficient as possible
- Old buildings are utilized as efficiently as possible
- The facilities of the public sector are used more efficiently
- Training in wood construction is organized for construction professionals, and local builders' interest in wood construction is increased
- Building wooden apartment buildings is established as a normal practice in construction
- In local detail plans the construction of wooden apartment buildings is made possible

Measures for the Construction Sector 2/2

- ❖ Information is given on alternative heating solutions based on renewable energy sources
- ❖ The use of renewable energy in house-specific energy solutions is supported
- ❖ Local building codes are reviewed to remove the barriers for the installation of solar collectors, solar panels and wind turbines
- ❖ The awareness on the potential uses of passive solar energy is raised
- ❖ Centralized heating systems that use renewable energy are favoured in new residential areas
- ❖ An energy advice project aimed at construction and renovation is carried out
- ❖ A model for construction and energy advice is established in the region

Sustainability of timber construction: energy consumption and emissions by wood

- Average Finnish single family house contains 15-20 m³ wood, which corresponds to a CO₂ storage of 13-15 tons
- 70% of Finnish consumption of solid wood products goes to construction
- Wood product manufacturing processes are energy efficient – side products provide most of the energy needed.



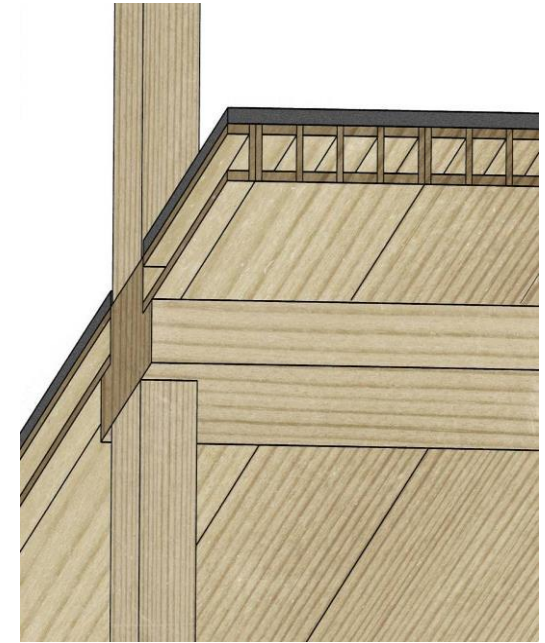
Metla House, born in 2004

The first large modern wooden office building in Finland



Metla House, Technical Data

- Wooden three-storey wood-frame Office Building for 220 employees (area 7,800 m², volume 33,300 m³)
- 2,000 m³ of timber was used (20 hectares of forest)
- Construction cost EUR 16 million
- The frame of the building consists of columns, beams and wooden box-beams (Lignatur-technique)



Massive end walls tell historical tales to interested viewers

- Logs were recycled to Metla house from two demolished buildings, and they were used in the previous buildings for >100 years
- Some logs were recycled already to the previous houses, and their origin dates back to 1650s
- They are expected to serve another 100 years in the Metla house...

Metla House, specialties and well-being

The conference room is covered on the yard side with aspen shingles treated with pine tar.

The conference room chairs are made of 12 Finnish deciduous tree species: aspen, grey alder, elm, birch, linden, ash, goat willow, oak, common alder, bird-cherry, rowan, and maple.

No indoor air quality problems. The best class S1 is regularly met (total content of VOCs in indoor air is <200 micrograms per cubic metre)

- Usually office spaces aim at class S2 (total VOC content < 600 mg/m³)



Eno Library



Photo: vaarakirjastot.fi/eno

Heinävaara Primary School



Boreal green bioeconomy

Joensuu Areena, the largest wooden building in Finland



2004
JOENSUU AREENA

The largest wooden building in Finland.

The frame of the hall consists of 28 almost identical wooden spheres that connect at the top of the building into a roof light that resembles a boat.

4000 m³ of timber (about 15 hectares of forest) was used to build the Arena.



Apartments and Buildings for Students



Joensuun Elli Houses with Cross-Laminated Timber Solution



2013 JOENSUUN ELLI'S WOODEN BLOCKS OF FLATS IN NOLJAKKA

The regional construction project of 2013.

The first project in Finland in which CLT elements have been so extensively used.

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Where is Potential in the Future for increasing Wooden Material in Buildings?

Current State in Finland – Share of Wood Buildings

- Private houses: 85 %
- Summer cottages: 99 %
- Multistorey apartment buildings: 4-5 %



Thank You for Your Attention

Pasi Poikonen
Research Scientist
Natural Resources Institute Finland
M.Sc. (For. & Tech.)
Yliopistokatu 6
FI-80100 JOENSUU
Tel. +358 29 532 5188
E-mail: pasi.poikonen@luke.fi

