

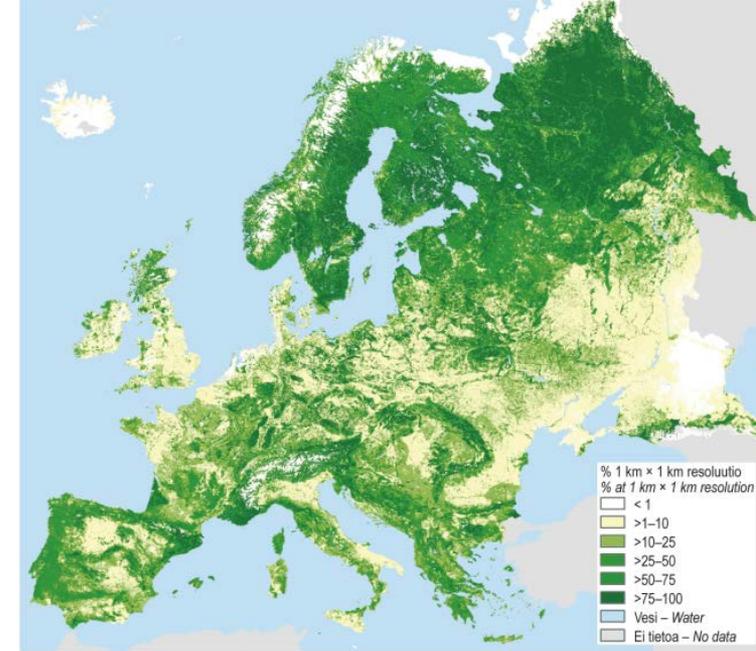
Sustainable Building Construction as a Driver for Bio-Economy

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Finland – Wood Land



Lähde - Source: Schuck, A., Van Brusselen, J., Päivinen, R., Häme, T., Kennedy, P. and Folving, S. 2002. Compilation of a calibrated European forest map derived from NOAA-AVHRR data. European Forest Institute. EFI Internal Report 13.

Metsän osuus maapinta-alasta Euroopassa
Proportion of forest from total land area in Europe

Metsätilastollinen vuosikirja 2010

The most wood dependent country in the world

- 18% of Finland's export revenue from the forest sector
- Annual harvest 50-60 million m³ (growth > 100 million m³)
- World leader companies and brands both in forest products sector and forest related machinery and software manufacture:
 - *Arbonaut, Fortum, Hewsaw®, Honka, Jartek, John Deere forestry equipment, Kara, Kerto®, Kesla, Kontio, Logset, Metso, Metsä Group, Ponsse, Pöyry, Raute, Stora Enso, Thermowood®, UPM, Valmet, Valon Kone,...*

Changes in paradigm

- Already 6 years of
 - recession in Finland and our main markets (Europe, Asia, Middle East, North Africa,...)
 - declining markets and over capacity in certain paper grades
 - low volume in domestic house construction.
- Wood product value chains, as well as pulp and paperboard production have suffered from the recession less than the paper production has
- Novel wood based value chains are expected to boost the renewal of the forest sector (being still mostly in the introduction phase of their life cycles):
 - *Biodiesel, cross-laminated timber, dissolving pulp, hemicellulose based products, lignin based products, modified wood, nano scale products, side products and derivatives from pulp production, wood-nonwood composites,...*
 - *Service models for sustainable development solutions in various businesses.*

Bio-economy, Finnish perspective

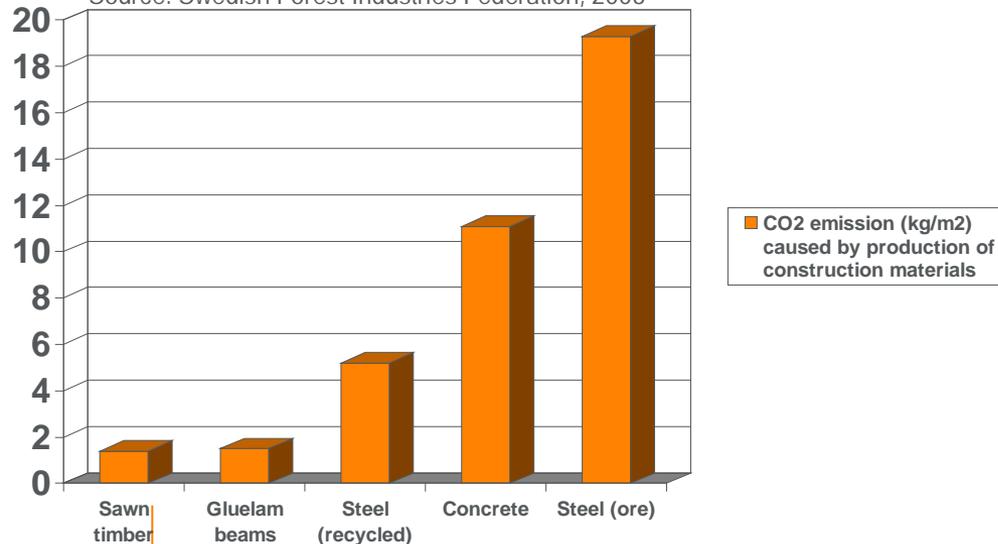
Bio-economy refers to economy that relies on renewable natural resources to produce food, energy, products and services. The bio-economy will reduce our dependence on fossil natural resources, prevent biodiversity loss and create new economic growth and jobs in line with the principles of sustainable development

- Finland published a national bio-economy strategy in 2014, in which the strategic goals are:
 1. *A competitive operating environment for the bio-economy,*
 2. *New business from the bio-economy,*
 3. *A strong bio-economy competence base,*
 4. *Accessibility and sustainability of biomasses.*
- The aim of the Bio-economy Strategy is to push the Finnish bio-economy output up to EUR 100 billion by 2025 and to create 100,000 new jobs.

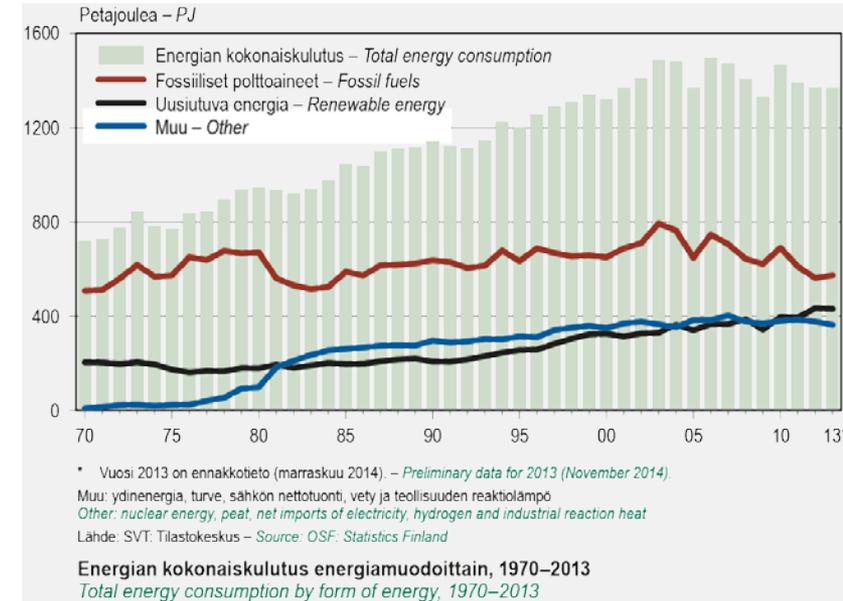
Sustainability of timber construction: energy consumption and emissions by wood

- 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.

Source: Swedish Forest Industries Federation, 2003



Global problem: the total energy consumption increases faster than the proportion of energy from renewable sources





Wood as a construction material?

Timber construction keeps the forest sector going in Finland

- Saw logs make up >70% of the stumpage income => timber is not mobilised without well functioning wood products industries

A piece of lumber is the only construction material that:

- is both renewable and industrially available
- stores carbon: one m³ of wood captures 0.8 tons of CO₂
- has weather protection, insulation, and load bearer in the same package
- has versatile positive psycho-physiological effects on humans
- has transparent certificate of sustainable sourcing (*and is the only construction material from which the consumers and dealers require such certificates!*)
- is most often locally sourced
- burns, but is used to protect steel and concrete structures from fire
- is produced using the energy obtained from its own side products (and some energy can be even sold further)

- ...



How is timber construction positioned in the bio-economy discourse?

Wood products industries represent processes that are based on:

- Sustainable forestry (*which is based on sawlog production*)
- High-tech raw material procurement chains
- Energy efficient conversion processes...



and aim at carbon storing products for building and living.

Timber Construction is an Essential Part of the Bio-Economy





Solutions to the environmental concerns via the concept of *cleantech*

According to www.cleantechfinland.com: *Cleantech refers to technologies, services, solutions, process innovations or products that help reducing the environmental load caused by human activity, to save energy and natural resources, and to improve the living environment.*

Cleantech is a marketing brand of environmentally conscious and state-of-the-art solutions for process monitoring, product manufacture and recycling, reduction of waste and emissions, and greening of industrial footprints

- Cleantech is among the strongest growth businesses in Finland. Combined turnover of the cleantech sector grows by 10-15% per annum
- 40% of public R&D funding in Finland is allocated to the cleantech sector.

Are there markets for solutions serving the needs of sustainability?

- Bio-economy, as well as cleantech can be seen as parts of a megatrend that emphasise the significance of **sustainability**
- Such megatrend is expected to result in **societal changes that scale up to the level of global changes caused by the development of information society** in the past 20 years => Enormous market for materials, techniques, and services that add to the sustainability of different business sectors.

Case China: China wants to clean the highly polluted country. Therefore, they have set a vision of being nr 1 cleantech nation in the world by 2020.

⇒ **Cleantech investments of
> 500 000 000 000 €**



Where is cleantech or bio-economy expected to sell?

Responses to question: *Is cleantech or bio-economy brand useful from the viewpoint of your company's competitiveness in these areas?* (company respondents) / *Is cleantech or bio-economy brand useful from the viewpoint of competitiveness of industries in these areas?* (public respondents). Scale 1–5 (totally useless – very useful). **Statistically significant differences (t-test) between the mean values of company and public answers are denoted by red font.**

	Cleantech brand		Bio-economy brand	
	Company respondents (N=16)	Public respondents (N=31)	Company respondents (N=22)	Public respondents (N=31)
	Mean value			
Finland	3.80	3.55	4.14	3.90
EU	4.25	4.55	4.41	4.29
Russia	2.80	2.97	2.95	2.94
North America	3.40	4.19	3.48	3.87
South America	2.93	3.19	2.95	3.10
China	3.00	3.84	3.05	3.48
Mean value, all	3.36	3.72	3.50	3.60

Source: Marttila, J. & Heräjärvi, H. 2015. Puutuotealan kasvumahdollisuudet cleantech-yhteistyön avulla. Esitutkimushankkeen loppuraportti. Luonnonvara- ja biotalouden tutkimus 53/2015. 60 p. <http://urn.fi/URN:ISBN:978-952-326-107-5>

Timber construction has great cleantech potential

What does construction activities mean in global scale:

- Half of the exploitation of natural resources
- 40% of waste production
- Within construction sector, building construction consumes 2/3 of the material and energy use
- Building construction is the most important customer of wood products both in terms of volumes and values
 - *E.g.*, in Finland >70% of wood products end up in buildings.

No giant leap is needed from timber construction sector to fit into the definition of cleantech. Timber construction sector already represents state-of-the-art technologies in terms of *industrial production processes, energy efficiency, indoor air quality, recycling, IT, replacement of non-renewing or endangered materials...*



Summary

- The world is changed, and will be further changed by the megatrend of sustainability, which forces us to create new kinds of economic activities
- Construction activities cover half of the exploitation of natural resources and produces 40% of the waste
- Wood is the only renewable material available for industrial construction processes, and features many other sustainability arguments, too
- The growth expectations derived from the bio-economy discourse are very much dependent on the viability, growth and profitability of the wood product value chains
- I encourage wood products industries to closer collaboration with cleantech sectors. Such collaboration has not taken place, so far, but it may create major business innovations and open huge new market possibilities

Kiitos!

Thanks!

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