Wood Products Industries in Future Bio-economy Business

Policies and real life actions to encourage the use of wood in construction – good and failed examples

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Dependence on wood almost irreplaceable

1. Phase virtually irreplaceable

2. Phase widely replaceable

3. Phase reclaiming relevancy

Development phases of wood use

Development of wood composites

Development of engineered wood products

adapted from Schulz H., 1993
EU Policies influencing wood use in construction

Competitiveness and Innovation Framework Programmes

- promote sustainable development
- manage climate change


Specific Building Codes (Eurocodes, e.g. EC 5)

National Building Codes

NO formal barrier to enhanced use of wood in European Construction
EU Policies influencing wood use in construction: green building push

EC (2010). Energy efficient buildings
EC (2011). Roadmap to a Resource Efficient Europe
EC (2012). Bioeconomy strategy
EC (2014). On resource efficiency opportunities in the building sector

Framework Programs
FP 5 – 7
Era Net Wood Wisdom
Horizon 2020

Forest-based Sector Technology Plattform
Industrial Policies (PPP) to promote wood use (in construction)

CEI Bois Roadmap 2010

1. BWW - Building with Wood
2. LWW - Living with Wood
3. WiTP - Wood in Transport and Packaging
4. WiSD - Wood in Sustainable Development
5. CEI-Bois Consolidation

Communication & Dissemination

Action area: Lobbying, Promotion, R & D, Innovation, Competence

Double wood based materials’ market share in Construction (2004 → 2010)

www.cei-bois.org
Real Life Actions → Product Innovations

- Engineered wood products
  - Gluelam
  - I-Joists
  - CLT
  - LVL (Beech)

- Reinforcing systems / technologies

- Wood – hybrid systems (e.g. wood-concrete)

- Modified wood products

- High capacity connectors

- WPC

- Laminate flooring / Fiber insolation products
High capacity EWPs

HFM, Rosin
Variable composites and connection technologies
Durability by wood modification
**Industrialisation**
→ **Process Innovations**

Lean production, high production speed

On-line quality control

IT-based data and process management processing engineering manufacturing

Adapted design codes and standards

*Transparency Economy Competitiveness*
Factory pre-fabrication

+ Reduction of on-site construction time
+ Quality upgrade by high precision work flows at the factory
+ Processing of construction details independent of outdoor conditions
+ No intermediate storage on-site
+ Reduction of noise emission on-site
+ Reduction of interface problems on-site by pre-assembling interior buildings and installations

Kaufmann, Nerdinger 2012
Factory prefabrication

+ Reduction of construction costs by time savings on-site

+ Reduction of financing costs by shorter pre-financing time
  
  – Higher degree of details and pre-planning

  – Constructive joints (weather proofed sealing and tolerances to be respected)

  – Restriction of element / module size by transportation means

  – Accessibility of construction site for truck-crane
Lean and efficient on-site processes

Kaufmann, 2012

Huber und Söhne, 2012

Kaufmann, 2012
Real Life Actions: technological advances and regulatory changes

- Structural wood products industries have adapted rationalized processing routines

- Lenghtwise and crosswise lamination concept is simple, but very efficient

- High capacity products (beams and panels) and development in machinery have influenced the construction processes

- Wood products are ideal candidates for pre-fabrication

- Systematization and prefabrication are offering new perspectives for timber based construction in rehabilitation of existing building stock - including non-timber buildings

- Fire safety regulation have been adapted (in pilot countries) and allow use in multi-storey buildings
Wood market shares residential housing

**Single family**
- US/CDN: 70 - 80%
- Scandinavia: 60 - 90%
- Austria: 30 - 35%
- Switzerland: 20 - 25%
- Germany: 15 - 20%
- Mediterranean: < 5%

**Multi family**
- US/CDN
- Scandinavia
- Austria
- Switzerland
- Germany: 4 - 8%
- Mediterranean: < 1%

Lignatec, 2012
Wood market shares non-residential buildings

US/CDN
Scandinavia
Austria
Switzerland
Germany

15 - 25 %

Mediterranean

< 1 %

www.swiss-architects.com
Trends for residential housings

Single family
US/CDN
Scandinavia
Austria
Switzerland
Germany

Multi family
US/CDN
Scandinavia
Europe
Austria
Switzerland
Germany

To avoid decrease in market share multi-storey housing needs to be diffused!
Market potential of wood construction in selected regions in Europe

<table>
<thead>
<tr>
<th>Region in Europe</th>
<th>Northern</th>
<th>Central and UK</th>
<th>Western</th>
<th>Southern / Eastern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Potential in 2030</td>
<td>High</td>
<td>Intermediate</td>
<td>Low to intermediate</td>
<td>Low</td>
</tr>
<tr>
<td>Countries</td>
<td>Finland, Sweden, Norway</td>
<td>Austria, N-Italy, S-Germany, CH, UK</td>
<td>France, Ireland, Netherlands, N-Germany</td>
<td>Czech Rep, Hungary, Poland, S-Italy, Spain</td>
</tr>
</tbody>
</table>

Hurmekoski 2016

Construction industries: low rate of innovation conservativeness regional, cultural traditions lack of timber engineering skills perceived cost risks
Conclusion

- Wood use in construction is the strongest pillar of the forest based bio-economy. Several national Bioeconomy strategies don’t reflect this fact.

- 70% of the end uses of wood products are related to building activities.

- The share of forest products as construction material is regionally and culturally highly variable.

- Timber use is still mostly restricted to single family houses, but rarely recognized as material for multi-storey construction

- To overcome this, push activities are needed
  - carbon taxes
  - internalizing environmental externalities in commodity prices
  - EPD / certificates mandatory
  - continued research, education, training activities