

# Forest facts



This wooden multi-story construction is a four-story residential building in Uppsala, Sweden. (Photo: Mark-Herbert)

## Wooden multi-storey construction – market development with consumer knowledge, municipal goals and industrial strategies

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- This Forest Fact sheet will present the state of the art of wooden multi-storey construction market development in Finland and Sweden.
- From a consumer perspective, housing requirements were captured in three factors: environmental and social sustainability, quality, and design.
- A literature review points to the importance of cost efficiency gains from prefabrication.
- Municipal perspectives clearly illustrate how political goals may influence the governance and perception of public procurement processes.
- A transition to sustainable construction practises is supported by legislation that requires sustainability declarations.



### Wooden multi-storey construction (WMC) for sustainable development

Wooden multi-storey structures (WMC) have beneficial climate impacts compared to other materials and can, for this reason, support a more sustainable housing sector. The industry contribute to the achievement of several of the *UN Sustainable Development Goals* (SDGs), including Sustainable cities and communities (11), Responsible consumption (12) and Climate action through carbon storage and substitution (13). However, this sustainability transition requires a continued collaboration between industry, customers and public actors. Although the construction sector is evolving through innovations and learning, wood material construction remains a niche compared to the single-family house construction where wood is a prevalent material in Finland and Sweden.

The project set out to analyse the conditions for the market growth of wood construction for a sustainability transition in the construction industry. It also aimed at understanding the competitiveness of Finnish and Swedish wood construction, and support housing solutions that fulfil end-users' needs for attractive and

climate-friendly apartments in multi-story houses. The overarching objective was to identifying means to transform wood construction from a niche activity to a main solution for providing sustainable, low-carbon housing to growing urban populations. Three perspectives were identified as key for understanding of the roles and value creation among *consumers, industry actors* and *municipalities* (Figure 1).

These three perspectives were studied in three WMC work packages in Finland and Sweden, respectively. Previous research has shown that there are both similarities and differences between the two geographical markets in terms of:

- ✓ Understandings of wood properties in construction
- ✓ Professional norms in the construction sector
- ✓ Sourcing and procurement skills
- ✓ Interpretations of legislation and rules and
- ✓ Political goals that reflect societal sustainability objectives.

Assuming a bioeconomy perspective, residential construction is carried out with an understanding of ecological, social and financial value dimensions. It also means identifying mutual understandings of pathways for sustainability transitions.

### Consumer preferences - sustainability values

Needs for residential construction is one of the starting points for the project, in Finland as well as in Sweden. For individual houses, the norm is wood as a construction material. Apartment buildings three levels and more, on the other hand, are commonly built in concrete and steel. Wooden multi-storey construction is less established.

Consumer preferences concerning construction materials in apartment houses is in most cases not expressed in purchasing practises. Price and location are long standing factors that determine consumer decisions. This is explained in part by the fact that consumers are not part of the decision processes in the planning or the construction process. When a consumer buys an apartment, the apartment is, in most cases, already constructed, which means that only interior surface materials is subject for decisions to be altered.

The market is limited by portfolio construction material decisions made by construction agents. Political goals can influence what is offered through municipal city planner decisions.

### Municipality political goals

The distribution of WMC in Finland and Sweden is concentrated to large and a few medium size cities. Cities that have a relatively high proportion of wooden apartment buildings are referred to as "Wood cities", for example Växjö, Skellefteå and, since 2021, Uppsala (Figure 2). In Finland, cities that are branded as wood cities are, for example old cities, like Porvoo and Rauma, and more recent developments in Linnanfältti in Turku, Jäkäsääri in Helsinki and Linnanmaa in Oulu. In these cities, the local political municipal city planning strategy is characterized by clear WMC objectives and awareness of needs for integration and collaboration between private and public domains.

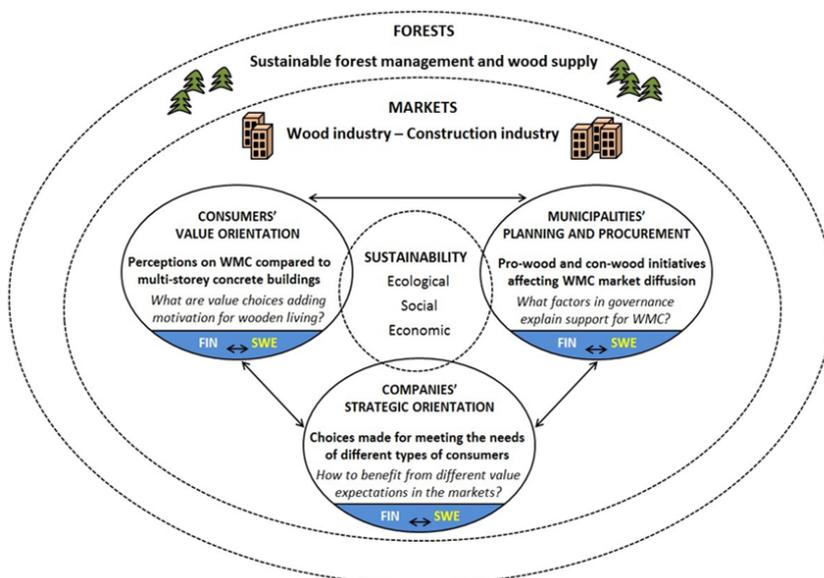


Figure 1. Wooden multi-storey perspectives construction in Finland and Sweden.



**Figure 2:** Block with wooden panels in the wood city Uppsala. Photo: Cecilia Mark-Hebert, SLU.

City planners enact political local goals. Their decisions are based on wanting to attain local political goals, but also limited by what they see as their domain, in other words, the conditions they can add to land consignment requirements. Individual city planners express understandings of advantages and disadvantages of WMC (Table 1).

**Table 1.** Advantages and disadvantages or risk with wooden multi-storey construction

Advantages	Risk or disadvantages
Renewable bio-material	Maintenance costs
Weight – wood is a relatively light material	Sound transmission for certain frequencies
Standardized working conditions reducing the risk of injuries	Limited supply for construction companies that produce in wood
Wood properties – cross laminated wood has good fire properties	Perceived risks of fire
Efficiency in production	Needs to develop new technique
Project time and flexibility – fast and flexible construction	Educational costs

Some of these perceived pros and cons are well-documented. Political sustainability goals at EU-level are reflected in national and local goals. As societal goals point to needs for a transfer to sustainable development, governance structures are put in place to support the change process.



**Figure 3.** Historic and future plans for policy development in EU (top) and Sweden (below) to promote use of wood in house construction (Ministry of Enterprise and Innovation, 2004) \* National Board of Housing, Building and Planning (Boverket), 2020b).

**Corporate strategic development**

Legislation in house construction and political programs are setting the scene for a gradual change in the construction industry (Figure 3).

The findings support the notion of a slow transition in the Finnish and the Swedish housing market towards using more wood as bearing structures in constructions for residential needs. The trend is supported, partly by competitive advantages and by climate performance of wood. The case studies suggest that corporate focus currently is placed on industrial efficiency, pricing, building permits, and successful project management. However, in contexts where wood construction is seen as an advantage, the collaboration between the construction industry and the end users was more developed, and served as a platform for WMC market development.

**Conclusions and recommendations**

Sustainable development for forest resources assumes meeting societal goals in value creation in forest related product and services, such as construction of residential construction. Sustainability practices develop as our understandings gradually develop – it is a moving target. Continued market development for wooden multi-storey construction is presented in this project from three perspectives -environmental and social sustainability, quality, and design- assuming the following:

- ✓ Political objectives that are confirmed at a regional and local level.
- ✓ Increased awareness of “design for re-design”; which means understandings of the fact that what is constructed today may need to be used in a different way compared to our current needs, in the future.
- ✓ Choices of material are based on expectations of function. Part of the expectations relate to physical properties and ease in use in production. Other expectations relate to materials that can be re-used.

- ✓ system perspectives mean replacing linear business models with circular ones, in a circular value system that embrace environmental, social and financial values.
- ✓ The wood construction sector should find ways to speed up the adoption gradual improvements of processes and building components for efficiency and quality.
- ✓ It could win market shares by continuing and broadening its sustainability performance, market communication and by developing aesthetic values in wood construction.

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**Key words:** Apartment, construction industry, multi-level residential construction, sustainable development, wood

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