FOREST4EU

ITHub 1 - Wood Mobilisation

FOREST4EU partner: CNPF

OG: Normandy Wood Building (BBN)

OG's country: France

Type of Innovation: Product

Prefabricated modular construction system made from Normandy hardwoods

Developing a standard detached house made exclusively of local wood

Introduction

The Normandy region is renowned for its oak and beech forests, which produce high-quality wood. The hardwood market is therefore large, and companies in the region are involved in the production and processing of this resource. It is used for a wide variety of purposes, including construction, joinery and cabinet-making, cooperage, veneer and panel production, and wood energy. The technical issues are diverse and evolve according to the species and destination selected.

For structural timber, oak can be supplied by fresh sawn timber, or air-dried or re-dried. Each of these methods of supply brings with it its own set of constraints (mould and deformation in the case of fresh sawn timber, and a complex supply cycle in the case of re-dried timber). Beech can be used in the form of glued laminated timber, which provides mechanical strength, a standardised appearance and the use of lower quality raw timber. However, beech does not tolerate humidity. Regarding wood used for siding, chestnut has many advantages, but the available volumes are very low and it shows tannin stains. Douglas fir, on the other hand, can be used in larger volumes, but the market is very tight and it is less resistant to punching.

Constraints linked to the construction system can also be highlighted. The timber post-and-beam system requires on-site installation, making it tricky to incorporate prefabricated floors, it takes longer to install than timber-framed studs, and it is more complex to install networks. The timber-framed façade system requires fixing systems that ensure perfect watertightness while allowing for expansion gaps with the load-bearing part. Bâtiment Bois de Normandie wants to develop a prefabricated modular construction system based on hardwood from Normandy, enabling the construction of houses, collective housing and public buildings. The target groups for this innovation are social landlords, local authorities and private clients.

Methodology and results

The main environmental benefit of the project is to be able to supply buildings whose life cycle analysis is better than or equal to current timber-frame construction standards. In particular, this means that the structure can be easily converted, deconstructed and/or reused.

From an economic point of view, the design must be able to minimise costs, and its viability depends in particular on economies of scale. Modular design must therefore be standardised and simplified, via a controlled industrial process in agreement with reliable partners and committed to framework agreements.

From a social point of view, the design of the uses, the manufacturing techniques and the destination of the buildings are intended to be as inclusive as possible, in particular through the use of common spaces, the comfort of use of the buildings, the use of local staff for its manufacture as well as a training component and an increase in the skills of the staff during installation and maintenance. A number of private partners have already committed to the project: Bellême Bois (timber supply and sawing), RBD (machining), Artémis (engineering office), Technopieux Normandie (foundations), Leduc Bâtisseur (frame assembly), Manubois (structural timber supply).

Institutional partners are also supporting the creation of the prototype. The provision of a location as well as administrative, financial and technical support ensure the success of the project.

Discussions with these partners have led to the emergence of a number of solutions and ideas. The choice of wood species and cross-sections was determined. A selection was also made for the thermal envelope system, which is currently being developed. The entire primary structure will be produced by the end of the year 2023, for assembly in the 1st quarter of 2024. Work is scheduled for completion in March 2024.

Lessons learned

Ultimately, the building will be used as a demonstrator and will be open to a wide range of visitors, from professionals in the timber industry to social landlords, elected representatives and architects. Once the prototypes have been tested and marketed, this project will make it possible to add value to local wood that is currently poorly exploited and/or exported. We will therefore avoid importing softwood and exporting unprocessed French wood. The volumes produced will make it possible to develop the local industry through to secondary processing and thus create long-term jobs in the sector, as this is a long-term project. Skills upgrading should accompany this recruitment drive.

The estimated economic impact on the oak market is €2.5 million, on the beech market €1.2 million and on the chestnut market €1.8 million, excluding tax, for the Normandy region. It could lead to the creation of 20 to 25 direct jobs and 10 to 15 indirect jobs (transport, maintenance, administration, etc.).

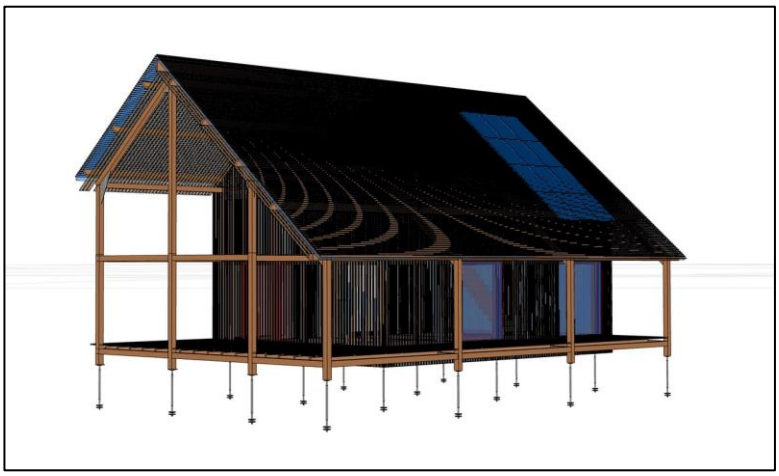

Figure 1. 3D preview of a demonstration building developed as part of the project. ©batimentboisdenormandie

The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

Further information

https://www.batimentboisdenormandie.fr/

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