

## Background

- The use of biomaterials as building components can offer sustainable solutions for the construction sector
- Research project **ENECOBOIS** analyses the wood construction sector of the Walloon region (Belgium) in cooperation with industrial partners
- LCA is chosen as approach in order to evaluate the environmental performance of wood building products

## Aim

- Provision of LC data on wood construction products, as to the current state of technology
- Identification of hot spots of environmental impacts
- Optimization of the environmental performance, especially the energy and climate performance
- Information of industry and policy makers

## Approach

Conceptual and methodological framework of the LCA study

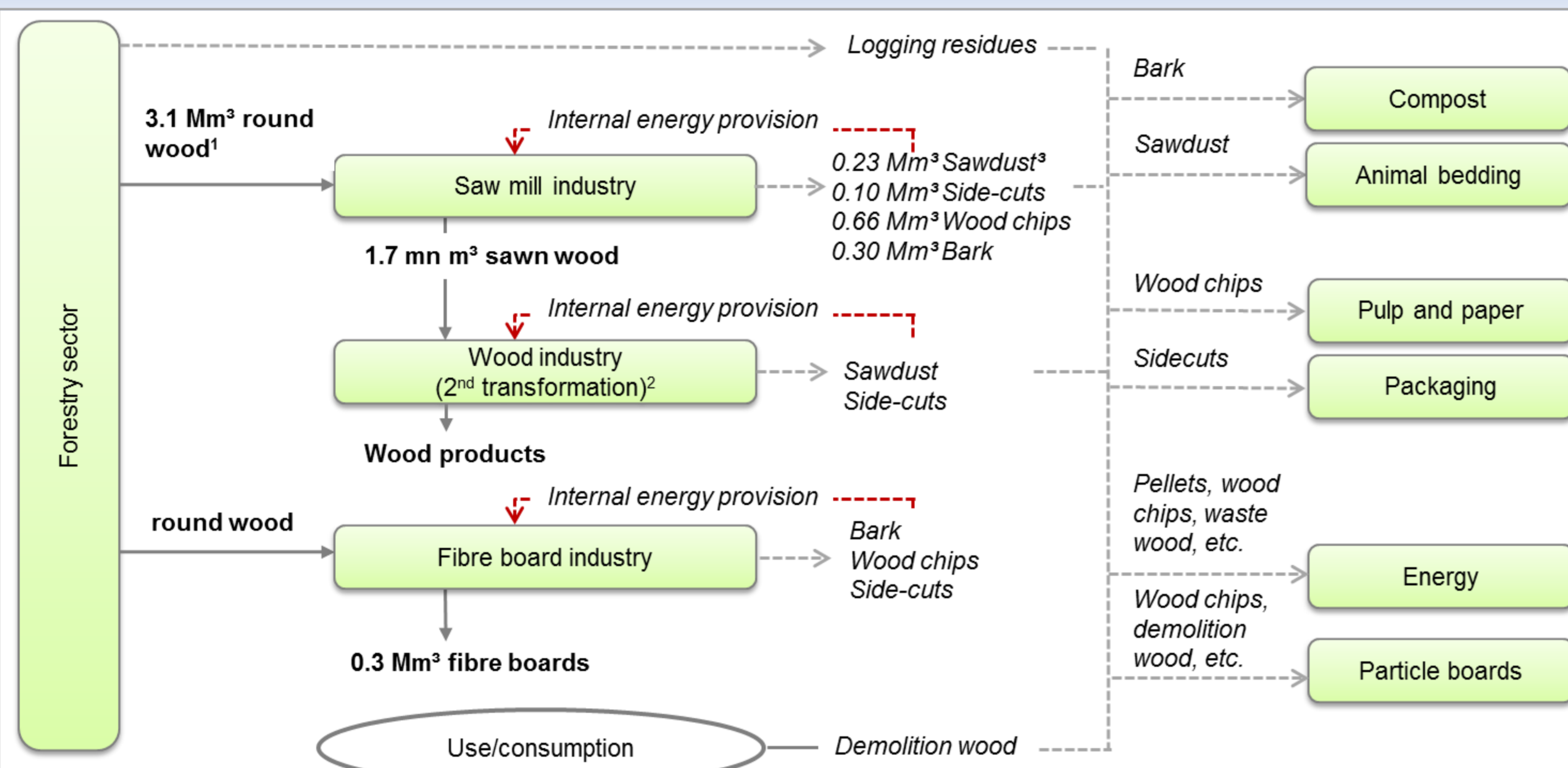
- Description of the case study region and the sector characteristics (e.g. material flows)
- Literature review on LCA studies for wood products and wood buildings
- Identification of available approaches
- Development of an adapted concept in light of the specific regional situation
- First implementation steps (data collection in the industry)

## THE PRODUCTS:

- Sawn timber & laminated components
- Medium density fibre boards
- Floorings
- Window frames
- Insulation material
- Wood building



## Results



1: 3 Mm³ softwood and 0.1 Mm³ hardwood in 2009, 2: 62% construction, packaging, laminated wood industry, 5% carpentry, 32% further traded, 3: without hardwood residues. Source: Fédération Nationale des Scieries 2011

Figure 1: Material flows in the wood construction sector in the Walloon region

## 2. Characteristics of the life cycle of wood building products:

LC of wood building products has multiple levels:

- Manufacturing stage with closely interlinked product flows
- Use phase as a building component is long and complex - operating energy usually represents the dominant part of the total LC energy consumption
- Demolition wood can be recycled in the particle board industry and follow several recycling loops
- End of life phase: provision of bioenergy

## 3. Methodological aspects: (outcome of the literature review)

- LCA on wood products are mainly attributional LCAs → different allocation procedures in different allocation situations are applied
- Relevant allocation situations for wood products: (i) multi-output, (ii) multi-input and (iii) open-loop recycling
  - System expansion (SE) is normally not applied in attributional LCA due to the complexity of associated industries (e.g. paper)
  - In case of LCA for bioenergy, the avoided burden approach, as a special case of SE is often used
  - In case of LCA for the wood products, physical or economic allocation is typically applied
- Consideration of temporal storage of biogenic carbon is missing in current LCA practice

## Discussion

- Wood building sector is characterised by multiple material flows, interlinkages between industries and products with a complex life cycle (e.g. use phase of building products) → LCA requires knowledge on market mechanisms and technical properties of products
- Allocation procedures have a significant impact on the results of LCAs especially for wood products where high quantity of co-products are produced and the material yield may be relatively low (<50 %)
- Effects of changes in the market like the on-going narrowing of prices within the entire wood-processing industry chain or changes in co-product uses can not be analysed with attributional LCA

## Outlook

For this study an integrated approach will be applied:

- Attributional LCAs for the identification of environmental hot spots in the production chain and for communication of results in the enterprises
  - Consideration of wood product's quality and its impact on the use phase
  - Consideration of temporal effects
- For policy recommendations
  - MFA to analyse environmental impacts on the sector level
  - On-going changes in material flows and in the production chain (through optimisation) will be analysed considering effects on markets