UNIVERSITEIT GENT

FACULTY OF BIOSCIENCE ENGINEERING

Advantages of using more wood products for the EU from a climate perspective

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Wood as a renewable resource

Wood formation in trees… **maximum** potential?

Available from:

- (Semi-)natural forest: multifunctional management
- Planted forest (plantations): poplar,…
- Arable land: agroforestry, SRC (short rotation coppice)….

Trends:

- Ecosystem services
- More hardwoods
- More forests excluded from wood production

Wood availability

Deficit before 2030?

Sustainability of the forestry-wood industry chain

Forest as part of nature – **ecological** approach

Wood and an eco-techno approach

A: Balance between **material and energy use**

B: Vertical integration and **cascade use**

C: Tree quality and wood **quality**

D: Service life **impact**

Balance between material and energy use

Energy from woody **biomass** both for residential and industrial use…

- Combustion:
  - firewood, pellets,…
- Thermochemical conversion:
  - charcoal, pyrolysis, gasification,…
- Biorefineries and biochemical processes:
  - liquid biofuels, white chemistry,…

Impact of international trade and subsidies

→ replacing/substituting fossil fuels…

Balance between material and energy use (2)

Forest products use as a material is **low in energy** consumption considering processing

Material use is an excellent **alternative /substitute** for man-made materials requiring a lot of energy to be produced

Materials versus Bioenergy case poplar/willow

Poplars and willows for bioenergy – specific clones and cultivation/harvesting

Multipurpose applications? Integrated wood transformation or specific production for bioenergy

Vertical integration and cascade use

A tree is traditionally subdivided for different transformations: slicing/peeling, sawing, chipping, … **integration**

Waste is not really generated: **residuals** are used

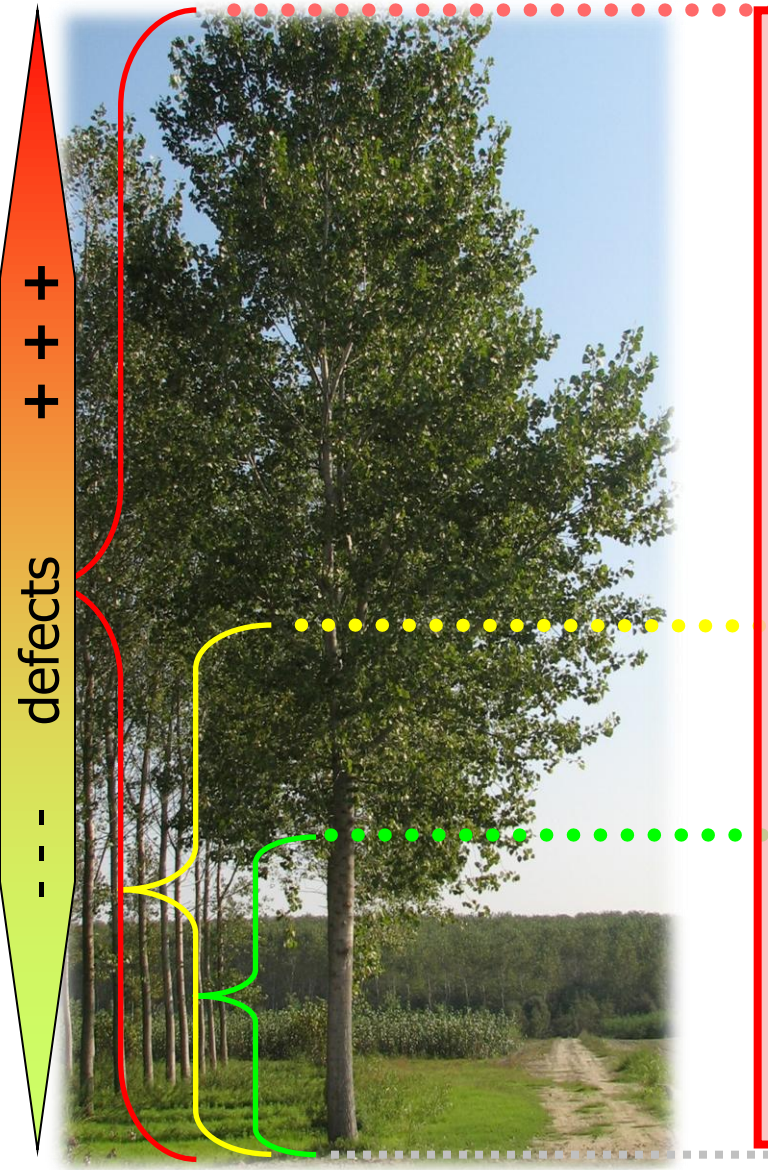
Recycling and reuse are key elements in the traditional **cascade** approach allowing the production of different wood based panels, eminent example of particleboard (chipboard).

End of life allows for generation of energy or composting…

Integrated processing

Lower part of the tree, logs for: *veneer, plywood, timber,...*

Top and residues from sawmills / veneer peeling : bulk products... *panels, paper, energy,...*



CHIPPING

Particleboard and fibreboard
Paper
Biomass for energy

Blockboard core
Pallets and industrial packaging
Doors and windows frames
Components for furniture

SAWING

PEELING

Small packaging for fruits

Plywood

Adapted from Fioravanti (2007)

Tree quality and wood quality

Trees **suitable for materials**:

- Aesthetics … sliced veneer, parquet, music instruments
- Mechanics… timber, engineered wood products
- Durability… exterior use, wood protection
- Surface… panels, paper, packaging
- Chemicals… biopolymers, white chemistry building blocks

Tree quality and wood quality (2)

Wood has technological assets:

- Beauty… furniture
- Multi-level natural composite… construction, load bearing
- Interesting and abundant chemistry

Tree- and wood quality
case poplar

Considered critical for many poplar/willow wood products:

- veneer – plywood
- engineered wood products, glulam
- timber constructions ?
- packaging (food, transport,…)

Service life impact

Wood and moisture… dimensional changes, fungal decay

"**Durability**" also means "sustainability" in many languages

Energy efficient housing – **green** building

Link to LCA approach

Impact on CO_2 sequestration

Positive aspects of fit for purpose approach in relation to long lasting products

Need for technology to **enhance service life**

More wood in the EU ?

Forestry requires eco-economical investments, technology, know-how beyond nature conservation…foresters…

Wood **production** outside the forests is viable, more than just energy crops

Stimulate **SME's** and craftsmanship… to enhance potential of quality wood products – resource of woody biomass is not necessarily fully suited within economics of scale…

More wood in the EU ?

Quality: **green** building – fit for purpose

Quantity with technology **upgrade**:

Pulp & paper / Wood based panels & EWP / Modification

Chemical building blocks: bio-refineries & new materials

2nd generation bio**fuels** and thermochemical conversion

Selection – breeding – **forestry** – agriculture – ecosystem service

Sustainability – biodiversity – nature: eco-economic **strategy?**

Climate perspective ?

Combine **cascade use** and **service life** approach

Forestry-wood industry chain victim of **renewable energy** boost in search for replacing fossil fuels…?

Focus on **low energy transformation** processes and substituting man-made materials… stimulate timber construction

Stimulate growing **more trees**, producing more long-lasting high quality **forest products**… woody biomass and timber…

THANK YOU FOR YOUR ATTENTION

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