












ReWoBioRef

Mobilisation and utilisation of recycled wood for lignocellulosic(LC)bio-refinery processes

Background and objectives

- There will be a growing demand within the next decade for alternative LC feedstock to operate biorefinery processes. An enormous **not yet explored** feedstock potential lies in recycled waste wood (RW) as secondary raw material source.
- The overall innovative and challenging objective of the project is to **explore** the techno-economic feasibility, scientific requirements and material specifications to **utilize recycled waste wood** in **lignocellulosic (LC)** biorefinery processes as an **alternative feedstock** source. The supplementary aim is to valorize the recycled waste wood components (cellulose, hemicelluloses and lignin), for more sustainable biobased fuels, chemicals and materials.

Partnership

<i>Country</i>	<i>Partner</i>	<i>Main role (s) in the project</i>
	Fraunhofer WKI	Overall project coordination and management; Microeconomic and environmental assessments for the wood recycling industry
	Fraunhofer ICT	Pre-Treatment methods for recycled wood mixtures ; Ethanol based organosolv & alkaline oxidation will be compared with steam explosion
	VTT	Valorisation of waste wood fractions into high-value products ; Hydrolysability of cellulose and hemicellulose and lignin valorisation
	Brunel University	Characterization of waste wood material; Environmental and economic assessments; Transnational dissemination activities
	University of Ljubljana	Characterization of recycled waste wood materials and selection criteria for pre-treatment steps
	Reiling GmbH	Sorting & mechanical pre-treatments of waste wood fractions; Selection criteria; LCIA data mapping; Microeconomic assessments
	bvse e.V.	Selecting and screening regarding amounts and access for A I & A I and III qualities of recycled wood & garden wastes; LCIA data mapping
	WIC	Collection of the wooden residues and recovered wood from different wood processing and recycling companies, LCIA data mapping
	Roal	Selection and provision of enzymes for the valorisation of waste wood fractions into high-value products
	St1 Biofuels	Industrial utilizer of waste wood for bio-ethanol and potential producer of lignin and hemicellulose sidestreams of novel bioproducts
	ENERKEM	Provision of a general feasibility study and a proof-of-concept of their technology for heavily contaminated waste wood classes A IV ⁽⁺⁾ and D ⁽⁺⁾ .

**RESEARCH AND
ACADEMIC PARTNERS**

SME, INDUSTRY & INDUSTRIAL ASSOCIATIONS

Progress towards project objectives

1. A I RW could **easily be mobilized** for the use in a biorefinery with little extra effort; More **challenging** A I to A III mixtures shall be investigated
2. Pre-treatments of A I RW with **Organosolv, Steam Explosion and AlkOx** processes in laboratory scale **show no significant differences to beech wood**; A I / A III mixtures shall be investigated
3. **Significantly improved business cases** and income statements of an OS-based biorefinery for A I RW compared with beech wood; **Enerkems** gasification process[©] reveals mutual business opportunities for MSW/A IV RW mixtures; **Detailed business cases** will be explored
4. **Positive** contribution to cascade use of recycled wood; Definition of system boundaries for expressive LCA required; **LCA models by Umberto** shall be calculated for **three utilization** streams: Energy, Particle board and Biorefinery
5. Additional material flow provides **new sales channels** and **market opportunities** for waste wood recyclers and higher security of supply with raw materials for investors and biorefinery operators

Lessons learnt and open questions

1. **Starting date** and **funding security** had been kept uncertain for some time; Differences in national funding mechanisms and implication on administrative issues were unclear to coordinator.
2. **Program** only **restricted** to eligible countries, which **doesn't** always **bring optimal capacities** into a project consortium.
3. **French partner** didn't obtain national funding and finding an **adequate substitution** as requested **wasn't possible** in the given short time. Collaboration among specific partners not always ideal.
4. **Workload** for the coordinator **extremely high** compared to national funded projects, e.g. proposal had to be rewritten into German in major sections to suit national requirements.
5. **National Funding Organization FNR requested** by directive of the funding ministry BMEL the establishment of a **National Advisory Committee** to ReWoBioRef and CaReWood.
6. **Summary:** Little motivation to volunteer for a coordinator role again.

