



Circular forest-based economy

Looking at the forest-based sector, circular economy is prevalent in practically all Europe, but regions and countries have different opportunities and specific framework conditions, which should find its reference and impact in policy actions and development priorities.

An overview of the circular economy concept driven by the wood construction value chains demonstrate their performances on the recovery and recycling processes in four macro-regions of the European Union (Northern, Southern, Western and Eastern). It is based upon the results of fact finding activities and takes into consideration both technical and regulatory criteria. A broad map of a sector in which side stream and wood waste value chains are rather efficient and well-functioning with a good overall management of material streams, albeit the value chains are structured in different ways across Europe, is the reality today.

Construction, demolition and new bio-based products represent two of the five priority areas in the EU action plan for the circular economy. As a matter of fact, in the EU-27 (+UK), more than 70% of wood products are used in construction or furnishing. About half of the log volume ends up to side streams. The most common way to treat waste wood is energy recovery or recycling (mostly by wood panel industries), with large variation between countries. However, it deserves to be stated that in 2016 recycling reached for the first time higher value than energy recovery.

Based on the conducted literature review, three dedicated workshops, interviews and questionnaire surveys among 99 industry experts in 10 countries across Europe, it can be stated that European companies know rather well the classification of wood side streams and are fundamentally positive for harmonisation of regulation and standards. On the other hand, they suspect unpredictable and complex requirements that can affect daily operations and market behaviour negatively and feel that sorting and allocation of the side streams to different uses should be improved. Competition of side streams between different uses is common.

High resource efficiency and well-functioning value chains are strengths for industrial by-products and provide income for suppliers, whereas construction and especially demolition wastes cause costs. Innovative products and advanced technology for by-products and recycle materials are under development, but market penetration with recycle products (wrongly) perceived of low quality and performance is difficult. New uses, markets and valorisation are needed.



Triple Helix collaboration works well and is advanced in some regions, but not all over Europe due to regional specifics. With the exception of big corporations of forest and energy sectors, companies lack either knowledge or incentives, resources and sometimes pressure for RTDI and investments (SMEs, secondary processing), or even all of the above mentioned. Development needs were shown both in research, testing, piloting, proofs-of-concept and branding of side streams and their business and market potential, as well as in regulation, standardisation, communication, promotion, education, value chain management and stakeholder collaboration, four-angle sustainability and societal thinking. RTDI needs are in one hand common for all parts of side stream value chains, but on the other hand specific for different sub-sectors.

Plentiful good practices regarding products and materials, technology and processes, management and efficiency, innovation and also construction and demolition are identified. These will be presented further on in the form of a *European Good Practice Catalogue*. Most of them are applicable and transferable to other European countries. Some of the good practices compiled-in as a starting point are currently further analysed, screened and developed towards more detailed recommendations in the ongoing activities of *WoodCircus*. The data collection on policy instruments and development incentives, funding programs and agencies has started and will set the scene on the actual framework conditions.

Key words: Circular economy, wood processing industries, wood construction, value chain, resource efficiency, sorting, reuse, recycling, side-streams, added-value products, markets, regulations, framework conditions, innovations, citizens perceptions