

## Annex 2: Detailed descriptions of the field visits

### 1. Field visit 1: More than a century of forest innovation

**Stora Enso** - [Anjalankoski mills](#) consist of a paper mill producing paper including 'improved newsprint' grades, and a board mill producing high-quality folding boxboard for consumer packaging, mechanical pulp, and energy. The visit to Stora Enso Anjalankoski Mills offered valuable insights into **Finland's forest-based circular bioeconomy**. The mill exclusively processes **spruce**, selected for its unique mechanical properties and trees are sourced domestically within a 200 km radius, reflecting the mill's commitment to local supply chains and resource efficiency. Bark from debarked trees is combusted to produce steam, which is reintegrated into the production process, exemplifying **closed-loop energy use**. The process highlights an efficient valorisation pathway where identical inputs serve multiple product lines. Presentations from the Finnish Forest Industry contextualised the mill within Finland's broader bioeconomy, where forests cover vast territories, 60% of which are privately owned. Forestry accounts for almost 16% of Finnish exports and 56% of the national bioeconomy. The sector is increasingly diversified, expanding into bio-based innovations in cosmetics, textiles, and biomedical applications to replace fossil-based inputs. Crucially, Finland's forest industry demonstrates exemplary circularity, recovering 100% of wood waste and utilising 95% of side streams in the form of energy, fertilisers, and secondary materials. This systemic approach, supported by upcoming circular economy legislation and clean industry initiatives, reinforces Finland's leadership in sustainable forest management and bio-based innovation.

[Ekovilla Oy](#) produces paper and paperboard blown insulation and insulating boards, which are suitable for cold environments. In addition, Ekovilla products are ecological and safe to use. Ekovilla also produces various fibres for asphalt and building boards, and **biochar** as part of the product mix. The visit to Ecovilla offered a comprehensive overview of a circular economy initiative focused on producing **eco-friendly insulation materials**. Since beginning operations in 1979, the company has adapted to alternative inputs, including hospital bed cover paper. Ecovilla's materials are particularly effective for renovation projects and offer added acoustic benefits due to their density variations. The company also experiments with other recycled sources, such as cardboard and hemp fibres, reflecting ongoing innovation in feedstock diversification.

Ecovilla maintains a **strong local sourcing strategy**, with raw materials procured within Finland. While the products are not cost-competitive with conventional insulation, the company relies on its environmental value, Finnish origin, and alignment with upcoming circular economy regulations to maintain market relevance. They are



currently scaling operations, including a recent acquisition in Sweden, with ambitions to expand across Scandinavia and Europe.

The firm's integration into the voluntary carbon market—by storing carbon in insulation products—highlights a growing interest in monetising carbon sequestration in construction materials. Ecovilla's model demonstrates how recycled material streams can be effectively utilised in sustainable construction, provided supportive regulation and market incentives are in place.

## 2. Field visit 2: New value chains and innovations

**Ecopulp Oy** is an innovative company which designs, develops and manufactures **3D-formed packaging materials** made entirely from recycled and renewable wood fibres. These products are biodegradable and **100% recyclable**, making them a sustainable alternative to traditional packaging solutions. Additionally, one of their current innovations is the development of **plant protectors for small forest trees and seeds**, designed to prevent damage caused by animals such as moose.

In all cases, the process begins with mixing the pulp, followed by a resting phase in a tank, and finally forming the desired product. The material, which initially contains a high percentage of water, is dried during the process to reach a final moisture content of around 1%.

The company has benefitted from **four investments co-financed by the European Agricultural Fund for Rural Development (EAFRD)**, the most recent of which supported the construction of a new biomass energy plant. The production process is based on a combination of **gas, pellets, and electricity**.

Eco Pulp puts strong emphasis on sustainability. Approximately 99% of the final product consists of recycled material, with only a minimal share of additives. The company also reuses its own production waste and currently has no difficulties in securing the raw materials it needs. Their packaging solutions are intended to replace expanded polypropylene, which is more difficult to recycle. In contrast, Eco Pulp's packaging is made from a single recyclable material, making the entire product easier to handle in waste management systems. An important part of their business model is that customers pay for and retain ownership of the moulds used to form their specific packaging shapes.

**BioSampo bioeconomy and circular economy research centre (XAMK)** is one of the laboratories of the South-Eastern University of Applied Sciences. The centre plays a significant role in applied research, particularly in the development of new solutions based on circular economy principles. Their work centres on applied, user-oriented research with practical outcomes. One of the main topics presented during the visit was the high-value use of biochar, which is being explored for multiple applications – from soil remediation to indoor air quality improvement, and increasingly as a



component in product development. Notably, the centre is **researching biochar-based materials for thermal and acoustic insulation**. Participants were shown initial samples of these insulation panels, which have delivered promising early results. The work continues under the **ARVOHILI project**, aimed at advancing sustainable uses of biochar in construction and other sectors. The visit also included a presentation by **XyloGas**, a company participating in the Operational Group [Wood2Biogas](#). Their technology focuses on the pyrolysis and gasification of wood chips, which results in the production of three outputs: heat, biochar, and synthetic gas (syngas). A distinctive feature of their process is that it is carried out without introducing air into the gasification chamber, which prevents the formation of nitrogen-containing compounds in the gas and improves its purity. The resulting syngas is rich in hydrogen (approximately 60%) and carbon monoxide (around 30%), making it suitable for further conversion. The pyrolysis machinery used in the process was showcased during the visit. Participants were shown the equipment and its functions were explained in detail, offering insight into the technological setup that enables the transformation of wood-based side streams into valuable products such as biochar and syngas. This provided a clearer understanding of the practical aspects of pyrolysis and its role within the broader biorefinery concept.

### 3. Field visit 3: The role of private forest owners in the forest value chain

Participants were introduced to [KouMet Oy](#) private company which **produces services for forest owners**, including forest management, forest ownership, timber and residues harvesting and/or sales, and others. The company provides services for **absent forest owners, and make annual field inspections and visits to the managed lands**. They also deal and provide all the paperwork necessary for the different silvicultural operations, which is important as some of their clients are older people. With this strategy, they establish long-term relationships with their clients, which are mutually beneficial. The participants were also briefly introduced to the JTF Peat project, which is looking for alternative uses for peat fields currently subjected to peat extraction, focusing on a 20 ha experimental peat field. As peat extraction will end in Finland within a five-year time frame, the project is looking for new alternatives for both sustainable peat production and the sustainable production of other products' on peat fields. At the end there was a short presentation of the Operational Group [Fresh forest-chips for farm-level heat production](#). **This project promotes the burning of woodchips at a scale of 500kW and introduces ORC (Organic Rankine Cycle) technology for electricity generation**. As fresh woodchips are less expensive to produce than dried wood and offer more energy output, this is a new electricity generation innovation.



**Carbons Oy** had a demonstration of the willow plantation and the **use of willow for heat, biochar and biofilters**. Here participants were able to see the [the Risupeto energy wood harvester](#) and were introduced to the production of biochar made from Willow (*Salix* spp.) wood. This Willow-biochar presents a structure (porosity) different from biochar made from other tree species (pine, spruce), being advantageous as an **electric super-conductor and for similar high-tech applications**. Furthermore, this product, made from an abundant and low-value resource (Willow trees are abundant, widespread, and can re-sprout after being harvested), **can be used in diverse applications such as landscape gardening, enrichment and aerification of agricultural soil, ingredient of asphalt/concrete, source of biochemicals, and Carbon Credits** (carbon credits still need to be further developed in the future). According to the producers, when used on agricultural soils the applications should be periodic (annual) and only with small quantities, instead of applying large quantities with low frequency (more spaced over time). **The biochar can also be mixed with chicken manure and other similar compounds, to enrich the diversify the possible applications.**

**Keltakankaan lämpö Ltd.** is a **recycled wood ecosystem**, which is owned by the municipality. At the Keltakankaan lämpö heating plant, participants were introduced to this municipality owned plant which provides heat for the communities and cities. This plant processes annually around 15.000 tons of recovered wood, including household wood debris, wood packaging materials, and green waste, but not forest residues because their price is higher than the other residues and therefore are less competitive. Started 4 years ago, this plant now produces annually 40 Gigawatts of energy to warm households in Kouvola and in other nearby locations. As the wood material can be contaminated with paints, resins, chemicals, metals, and other contaminants, they use filters to remove heavy metals and other impurities from the gases emitted. Furthermore, the bottom-ash residues are screened and treated to remove metal and other contaminants, so that they can be subsequently used in concrete and asphalt, and as a substrate for the closure of landfills.

