Facts about the bioproduct mill concept

– what you should know about Metsä Fibre's bioproduct mill concept

Metsä Fibre's bioproduct mill concept represents a new generation of industrial thinking, combining resource efficiency, energy efficiency, and environmental efficiency. At the core is an extremely efficient pulp mill that functions not only as a processor of renewable raw materials but also as an enabler of a diverse industrial ecosystem and bioproduct manufacturing. Metsä Fibre's bioproduct mills are located in Kemi and Äänekoski.

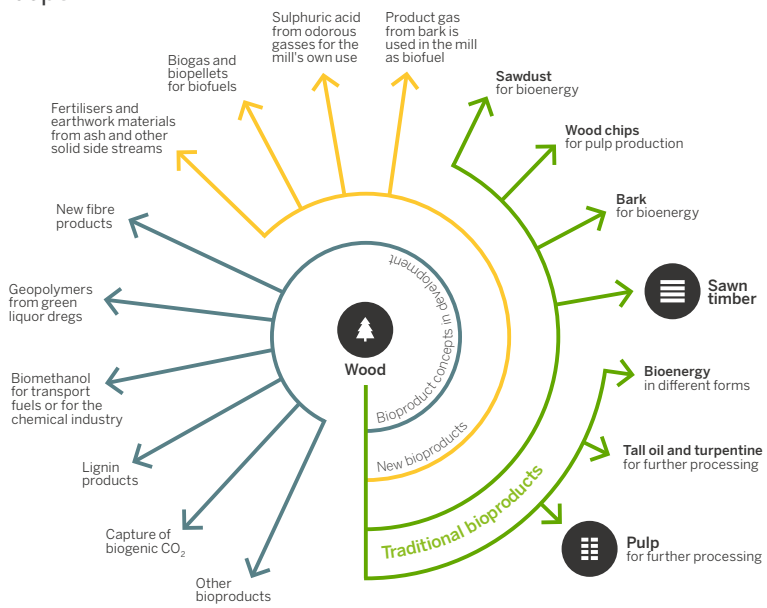
RESOURCE EFFICIENCY

The basic idea of the bioproduct mill concept is that renewable wood raw material is utilised 100 % and production side streams are used efficiently as pulp and other bioproducts. The goal is to maximise the value of the raw material and minimise waste – while replacing fossil-based materials and fuels with renewable alternatives.

In our operations, every part of the tree is directed to the use for which it is best suited. Logs are sent to sawmills for sawn timber, while pulpwood is used to produce pulp, biochemicals, and other bioproducts. Branches, treetops, bark, and sawdust are utilised in bioenergy production, and wood chips generated as a by-product at sawmills are used as raw material for pulp.

At our bioproduct mills in Kemi and Äänekoski, we produce softwood and hardwood pulp, along with a range of side-stream products such as tall oil, turpentine, bioenergy, product gas, sulphuric acid, ash and lime. Developing new bioproducts from production side streams – both independently and in collaboration with our partners – is a key part of our strategy to accelerate the development of sustainable bioeconomy.

Utilisation of main and side streams in our bioproduct mill concept



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ENERGY EFFICIENCY

Energy efficiency has been a key starting point in designing Metsä Fibre's bioproduct mill concept. The mills have been built according to the Best Available Technique (BAT), and in many aspects, with technology that is even more advanced than these standards. State-of-the-art technical solutions and carefully selected equipment enable precise control of production processes, optimisation of energy use, low water consumption, and minimisation of environmental impacts at every stage of production.

Our bioproduct mills are fully energy self-sufficient: they generate all the energy they need from renewable sources. The electricity self-sufficiency rate of the Äänekoski bioproduct mill is 240%, and that of the Kemi mill is as high as 250%. This means both mills produce significantly more electricity than they consume. The surplus electricity is fed into the national grid and also utilised as district heating in nearby communities. As such, our bioproduct mills are major producers of renewable energy in Finland.

ENVIRONMENTAL EFFICIENCY AND CLOSED CIRCULATION

Environmental efficiency is one of the cornerstones of the bioproduct mill concept. It is reflected in the everyday processes of the mill and is evident, for example, in how chemicals and water are recycled through closed circulation within production.

In the recovery line of the bioproduct mill, the cooking chemicals used in the pulp process are recovered and reused, while simultaneously generating a significant amount of renewable bioenergy. A multi-stage wastewater treatment plant operates as part of the recovery process, and the resulting sludge is used to produce biopellets for energy generation. This reduces the wastewater load and improves the overall utilisation rate of materials.

Closed chemical cycle also prevents chemicals generated during the process from entering the environment. For example, sulphur compounds recovered from odorous gases are utilised in sulphuric acid plants operating within the bioproduct mill area, where they are converted into sulphuric acid. This acid is then used in the production of tall oil within the same industrial site. Previously sourced externally, sulphuric acid is now replaced by acid produced from the mill's own side streams, reducing both environmental sulphur emissions and truck traffic to the site.

The bioproduct mill concept is based on the smart use of resources and the principles of circular economy. Every process is designed to minimise environmental impact and maximise the efficient use of raw materials, resulting in an energy- and resource-efficient industrial entity. Learn more about our proactive environmental work at the bioproduct mills in Kemi and Äänekoski.

"The electricity self-sufficiency rate is 240% for the Äänekoski bioproduct mill, and 250% for the Kemi bioproduct mill."

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A UNIQUE INDUSTRIAL ECOSYSTEM

The business model of the bioproduct mill is built on an efficient network of partnerships, where the development of new products is a collaborative effort across the value chain. In the industrial ecosystem formed around the mill, companies of various sizes and development stages operate, utilising Metsä Fibre's pulp or the side streams from pulp production. This creates extensive value chains that offer small and medium-sized enterprises significant opportunities to produce innovative, high-value bioproducts that can replace fossil-based materials and fuels.

The industrial ecosystem offers companies operating in the area not only locally sourced raw materials but also diverse synergies in areas such as energy production, wastewater treatment, and site maintenance. Development work is also carried out collaboratively – covering new products, processes, and operating models. This close collaboration forms the foundation for continuous innovation and sustainable growth.

The impact of the industrial ecosystem extends beyond the mill itself into society at large. The bioproduct mills and the value chains built around them create jobs, support regional vitality, and generate new types of research and development projects as well as innovations. For example, in Äänekoski, pulp and its side streams are utilised in the production of Kuura® textile fibre, Muoto® 3D packaging, and biomethanol.

Thus, the bioproduct mill serves not only as a production hub but also as a platform for product development and an expanding business ecosystem. This partnership-driven model supports resource- and energy-efficient operations, promotes environmental responsibility, and strengthens regional vitality – providing a sustainable foundation for industrial development.

"Our bioproduct mills go far beyond traditional pulp production – they are platforms for innovation, collaboration, and sustainable business growth."

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Industrial ecosystem of the Äänekoski bioproduct mill

NOURYON

Receives
dried pulp transported by truck.

Produces carboxymethyl cellulose (CMC), used as a binder and filler in industries such as food and pharmaceuticals.

SPECIALTY MINERALS NORDIC

Receives
carbon dioxide obtained from flue gases from the bioproduct mill through a pipe.

Produces
precipitated calcium carbonate (PCC) for the paper and paperboard industries.

VEOLIA

Receives
raw methanol from the bioproduct mill through a pipe.

Produces
biomethanol for vehicle fuel, among other things.

VALIO

Receives
district heat produced from surplus steam via the district heating network.

Uses
the steam in cheesemaking.

KEKKILÄ

Receives
lime, ash, and surplus wood material transported by truck.

Produces
various fertilisers.

BIOENERGY FOR ELECTRICITY AND ENERGY NETWORKS

The bioproduct mill generates bioenergy for its own use, for other operators in the mill area, and as electricity to the national grid.

Several other partners outside the mill area also utilise side streams from the bioproduct mill's production.

METSÄ BOARD BOARD MILL

Receives
dried pulp transported by truck.

Produces
folding boxboard for consumer packaging.

METSÄ WOOD VENEER MILL

Receives
steam for energy.

Produces
birch veneer.

METSÄ SPRING AND VALMET 3D FIBRE PRODUCT DEMO PLANT

Receives
dried pulp transported by truck.

Produces
wood-based Muoto™ packaging to replace plastic packaging materials.

METSÄ SPRING TEXTILE FIBRE DEMO PLANT

Receives
wet pulp from the bioproduct mill through a pipe.

Produces
wood-based Kuura® textile fibre.

LIGNIN PRODUCT DEMO PLANT (UNDER CONSTRUCTION)

Receives
lignin separated from fibres during pulp production.

Produces
a novel lignin product that can be used, for example, as a plasticiser in conrete and gypsym applications.

METSÄ WOOD KERTO LVL MILL (UNDER CONSTRUCTION)

Receives
steam for energy.

Produces
beam and panel materials for the construction industry.

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