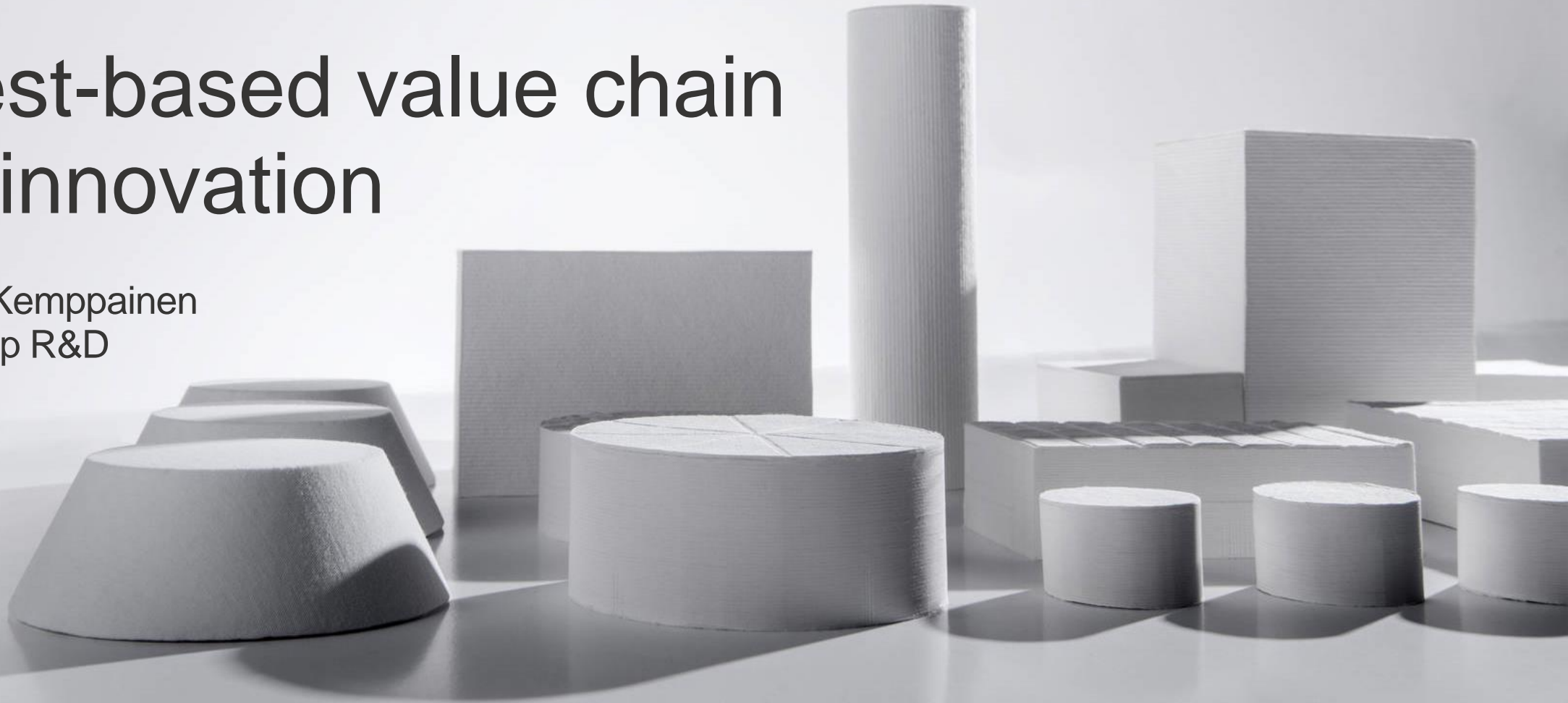




Forest-based value chain and innovation

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A man in a dark jacket and cap stands in a forest, looking up and holding a map. The sun is shining brightly through the trees, creating a warm, golden light. The forest is filled with tall, thin trees and lush green undergrowth.

**Wood is the
solution to
many future
challenges.**

How does Metsä Group contribute to future challenges?

By making forestry regenerative by

- Making new bio-diversity enhancing measures as the mainstream of forest management practices
- Making Finnish forests more resilient to climate change and ensuring their growth so that they remain as carbon sinks



By bringing to markets new products that

- Replace fossil-based products that have a larger carbon footprint
- Help tackle the (micro)plastics challenge
- Store carbon for a long time



By accelerating the transfer to circular bioeconomy by

- Developing use for bio-CO₂, sawdust, bark, sludges, ashes, lignin and other side streams
- By building innovation, industrial and business ecosystems that are needed for the transfer



By decreasing the carbon footprint and environmental impact of our current products by

- Increasing energy efficiency and switching the final remaining fossil energy sources to renewable
- Switching to fossil-free raw materials and packaging materials
- Continuously reducing our air and water emissions



We are committed to regenerative forestry

- Metsä Group's goal is to ensure that **Finnish forest assets transfer in a more vibrant, diverse and climate resilient condition from one generation and owner to the next**. Regenerative forestry means boosting economic growth and natural assets side by side.
- As the members of Metsä Group's parent company Metsäliitto Cooperative own around half of private forests in Finland, this goal is significant for all of Finland.

Wood raw material from regeneration felling

Bark, branches and top into renewable energy
15%



Pulpwood into pulp and other bioproducts
25%

Log into sawn timber, plywood and LVL products
60%

Nothing is wasted from the tree

Textile fibre from paper-grade pulp

- The basic idea is to convert Metsä Group's paper-grade pulp into Kuura[®] textile fibre.
- The project is now in a demonstration phase – a greenfield demo plant is operational in Äänekoski, Finland since late 2020.
- Tight integration to a bioproduct mill and use of never-dried pulp are central elements of the Kuura concept.
- Our main partner is ITOCHU Corp., Japan.
- Product name launched in March 2021.
- Read more at kuura.io site.



Actual end product
made using Kuura.

3D fibre product replacing plastics

- The goal is to develop an improved production technology relying on a high level of automation and enabling production of multilayer three-dimensional structures, which, in turn, would generate superior end products.
- The project is now in a demo phase – a greenfield demo plant is operational in Äänekoski, Finland since May 2022.
- Our main partner and co-owner of the demo plant is Valmet, Finland.
- The Muoto™ products are designed for high-volume end uses and the properties can, to some degree, be tailored to meet customers' requirements. The products are typically delivered directly to the end customers.
- Read more at muoto.io.



An example of using Muoto as part of the total packaging solution.



Metsä Spring's portfolio: External startups

Startups with minority investment from Metsä Spring



Unique, waterproof wood-based composite material and products

Commercial demo plant in Helsinki



Spruce sawdust extracts as stabilising, emulsifying and bioactive ingredients

Pilot plant in Turku, planning a demo plant to Metsä Group Vilppula sawmill site



Birch bark constituents as ingredients in cosmetics

Pilot plant in Kokkola



Insulation and packaging materials from woody side streams

Pilot plant under construction in Kerava

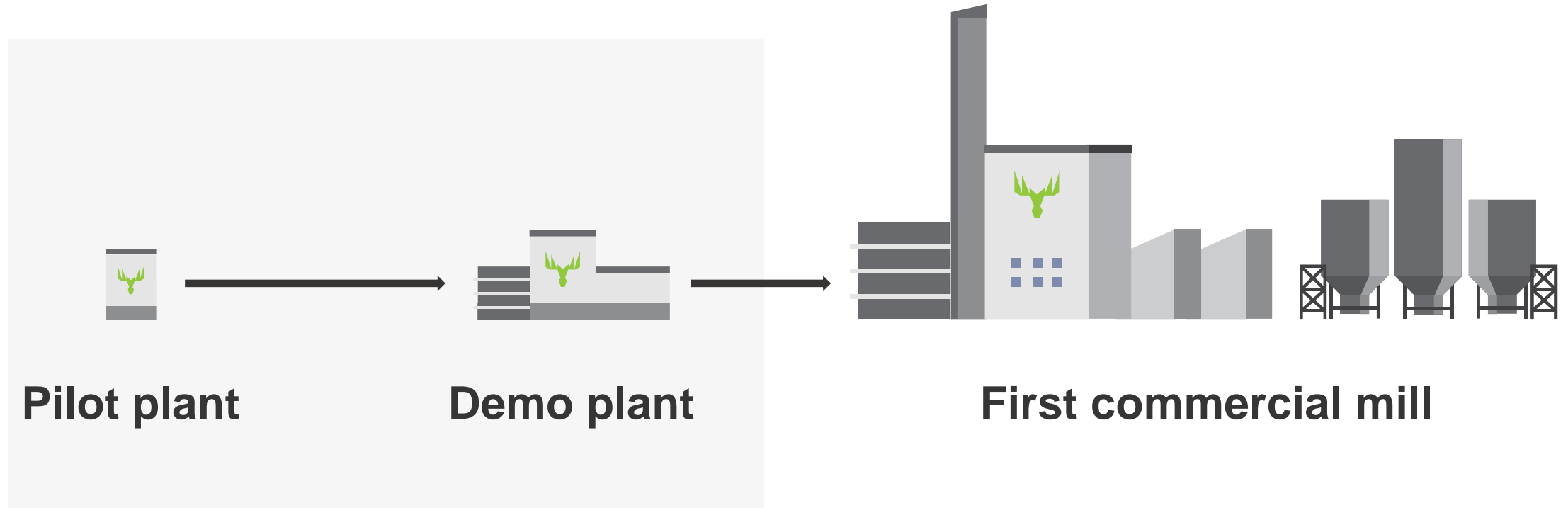


Air purification material from wood pulp

Bench-top production in Gothenburg



Scaling up



Metsä Spring's sandbox

ExpandFibre Innovation ecosystem

- ExpandFibre Innovation Ecosystem, uniquely hosted by Metsä Group and Fortum and co-funded by Business Finland, aims to accelerate the development of sustainable bioproducts.
 - 20 publicly funded consortium projects and close to 100 organisations have joined the ecosystem.
- During 2020-2024 up to 70 M€ of public funding by Business Finland is directed to the topics on the ecosystem roadmap and results disseminated efficiently to accelerate the development.
- More information at www.expandfibre.com



Metsä Board and Soilfood recycle wood fibre nutrients to boost soil quality

- Soilfood produces wood-based soil improvement fibres from fibre fractions made as side streams at Metsä Board's paperboard mills.
- The result is a product that recycles the nutrients of wood fibre back into soil and stores the carbon of the wood into soil.
- The fibres increase the fertility of the soil and improve its water retention.





Metsä Group's pulp production achieves excellent results for its environmental footprint

The study comprehensively examined the environmental footprint of Äänekoski bioproduct mill pulp production.

In Äänekoski bioproduct mill, the fossil CO₂-eq emissions per pulp tonne are approximately 30 percent lower than those of average European pulp mills with ECF production processes and 45 percent lower than the average TCF production

Source: Fraunhofer Institute for Microstructure of Materials and Systems (IMWS) in Halle, German



Even small lightweighting makes a big difference



Metsä Board's annual folding
boxboard capacity:
1.3 million tonnes
= 160 million 19 g packages
in a day



By reducing paperboard
weight by **1%**, material
savings equivalent to some

1.6 million packages
can be achieved **per day**

How can you help us do this?



- Focus on **better regulation** and develop a **coherent and predictable framework** promoting circular bioeconomy based on ecosystem services respecting the planetary boundaries.
 - Take into account complexity and specificities of ecosystems and vegetation zones.
 - Assess how the new legislation will affect the availability of wood raw material.
 - Ensure that our forests remain solid pillars of the EU circular bioeconomy.
- Fully **recognise** the climate and other **benefits of wood based value chains**.
 - Remember that ecosystem services include, but are not limited to, biological carbon sinks.
 - Prioritise the reduction of fossil emissions. Biological sinks should not compensate fossil emissions.
 - Promote the use of woody biomass for higher value-added material uses according to the cascade use principle.
- **Strengthen strategic autonomy, resilience, and security of supplies** as a part of the EU's geopolitical strategy.
 - Make forest-based industries an indispensable part of the EU's geopolitical strategy.
 - Promote the market entry of sustainable innovations and take into account the fact that in our sector the path from ideas to novel industrial scale production is long.

Q&A