Metsäbiotalouden tulevaisuus

Päättäjien Metsäakatemian seminaari 7.5.2025

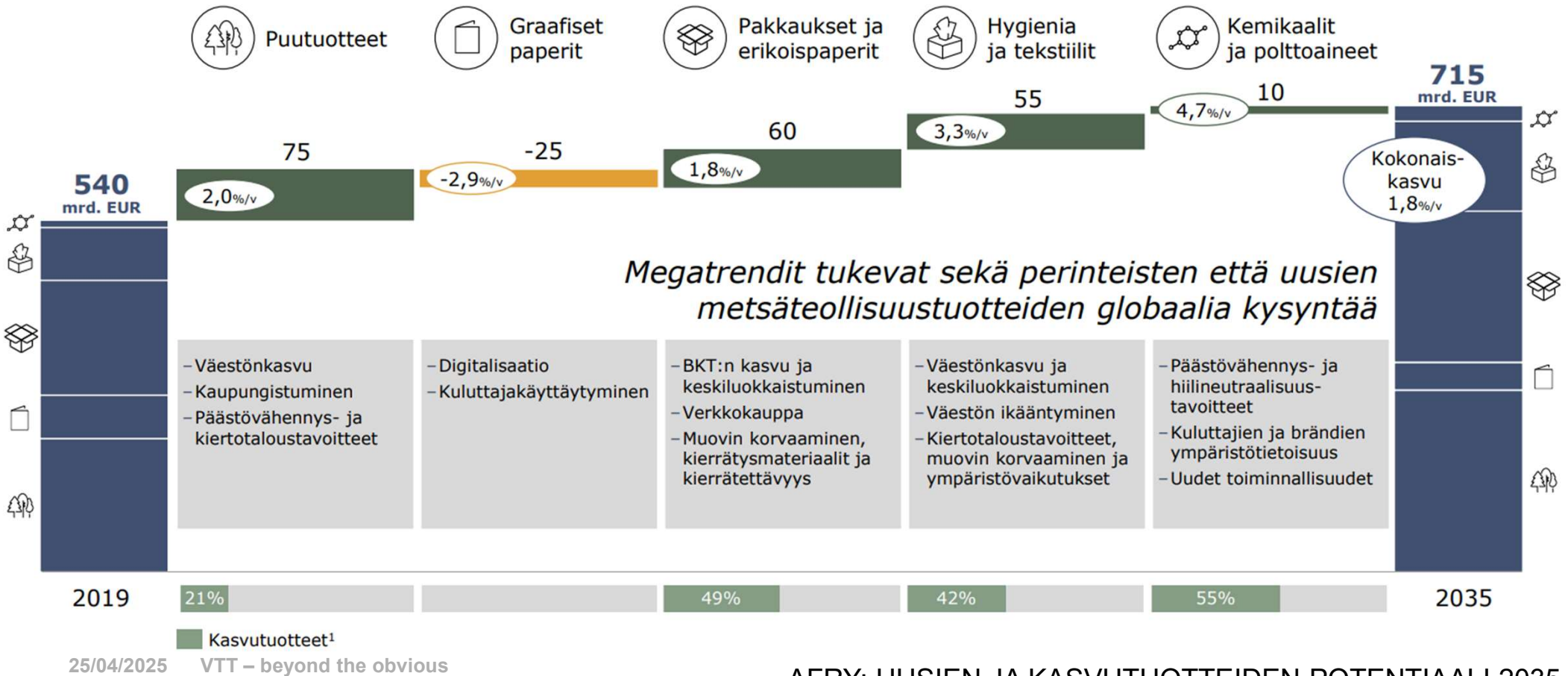
Atte Virtanen, Vice President
VTT Technical Research Centre of Finland

Over the long term, the outlook is positive, although the situation is not easy at the moment

The world's population is growing, and the demographic structure is changing, **while emission reduction** and **circular economy goals**, as well as consumer awareness, are guiding societies and consumers towards more sustainable solutions. All of these contribute to the increasing demand for forest industry products.*

*) AFRY: UUSIEN JA KASVUTUOTTEIDEN POTENTIAALI 2035

Regulation-Driven Demand vs. Raw Material Costs & Availability: Growth Limitations



AFRY: UUSIEN JA KASVUTUOTTEIDEN POTENTIAALI 2035

Growth opportunities

In Finland, growth is needed both through the renewal of industrial production and new (technology-based) growth sectors.

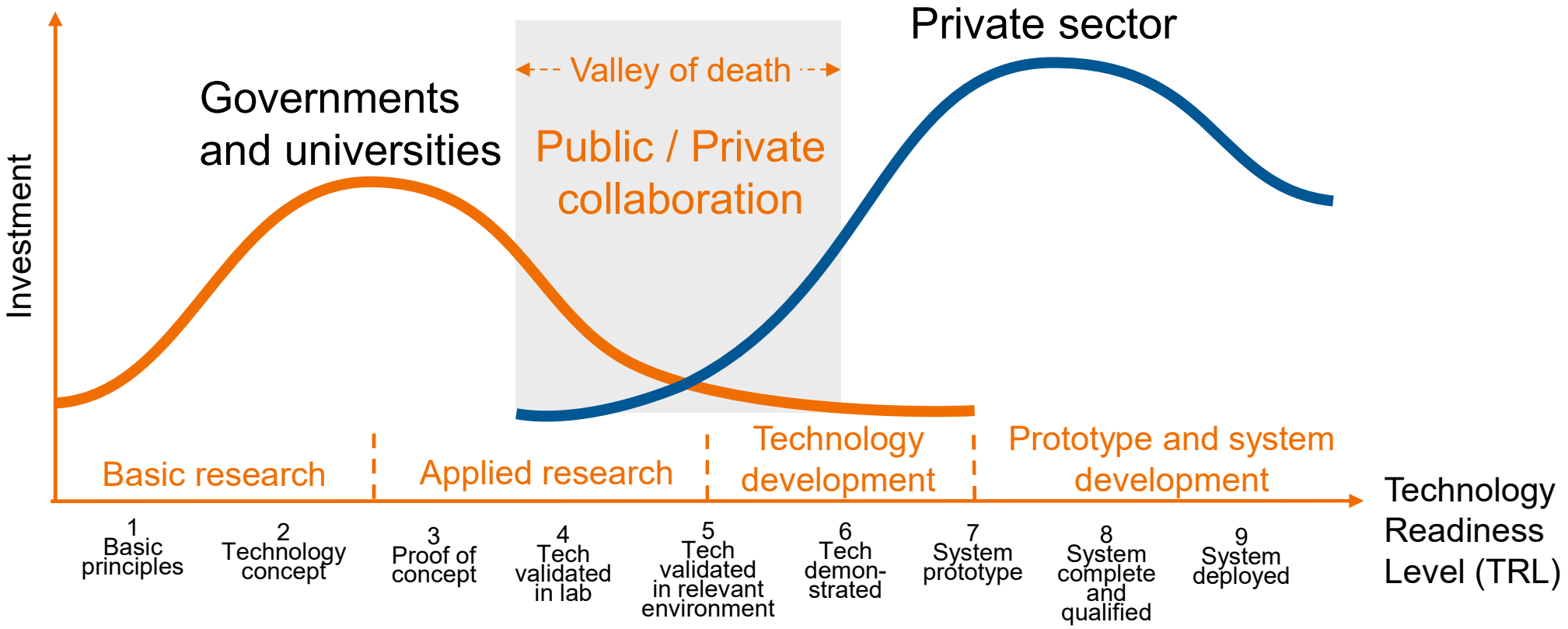
1. Renewal of industrial production

2. Technology-based new growth sectors

3. **Sustainable utilization of natural resource**

Renewal of industrial production

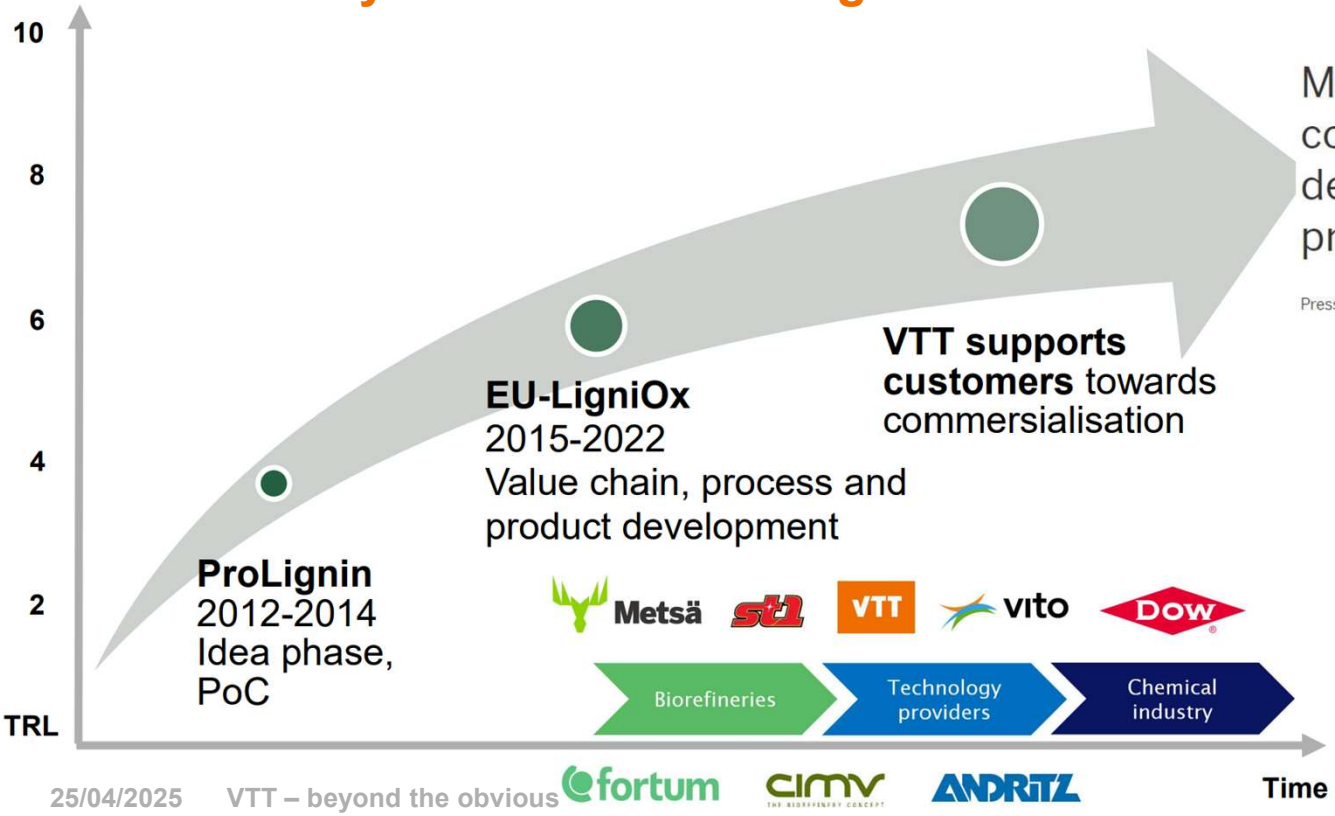
We need an effective path for turning the results of academic research into innovation



Examples

EU-funded collaborative research boosting technology transfer

- Horizon Europe Projects & Achieving TRL 6-7
- 10 Years of Development: From Lab to Pilot
- Demo Factory Investment Starting in 2025



Metsä Group and ANDRITZ to construct a demo plant for developing new lignin products

Press releases | 22.03.2024 12:00 EET | Metsä Group

"What makes this project great in my view is how it included the entire value chain – from concept to end product – and that all parties were excited about the technology and recognized its business potential from the beginning," Elina Lohiniva, Business Development Director at ANDRITZ

Circular Bio-based Europe Joint Undertaking

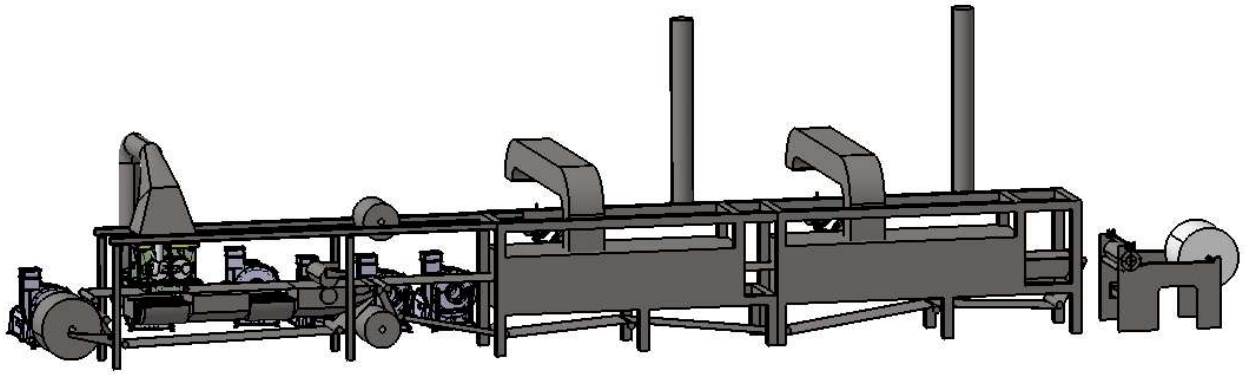
Co-funded by the European Union

Examples

Energy-First Fiber Product Forming Program

€24 Million ERDF & Horizon Europe & National projects tackling Energy, Water, and Carbon Zero Challenges in Fiber Product Manufacturing

- **Sustainable fiber products: 90% less water, 40% less CO2 emissions**
- **70 companies have committed to collaboration**
- Building on **Horizon Europe**, European Regional Development Fund (**ERDF**), Business Finland, Research Council of Finland funds and industrial collaboration
- Collaborative development of advanced fiber-based materials and associated energy and water-efficient industrial processes



- 6 meur new pilot line investment
  - Pilot line length 20 m
  - Located in Jyväskylä
  - Start-up: October 2025

Co-funded by the European Union

Technology-based new growth sectors

What are we aiming at?

VTT's purpose is: We bring together people, businesses, science, and technology to solve the biggest challenges of our time and create sustainable growth, jobs and wellbeing.

Finland and Europe are facing an existential challenge, as Mario Draghi notes in his report: we must find ways to enhance productivity and foster sustainable economic growth while also addressing increasing global challenges and security threats.

VTT contributes to achieving sustainable economic growth by:

1. **Developing scalable solutions for global challenges – together with customers**
2. **Enhancing societal resilience and sustainable development**
3. **Expanding the talent pool and enhancing expertise.**

FinnCERES

Monitieteinen osaamiskeskittymä

Innovatiivinen ja yrittäjähenkinen ympäristö

Tutkijoita: >300

Professoreita: >30

Tieteellisiä julkaisuja: >150/year

A!

Aalto University

Arvostettuja tieteellisiä saavutuksia

Monitieteisyys:

Taide, tekniset tieteet ja kauppatieteet

&

VTT

Monitieteistä soveltavaa tutkimusta ja innovaatioita

Maailmanlaajuiset verkostot

Pilotointimahdollisuudet

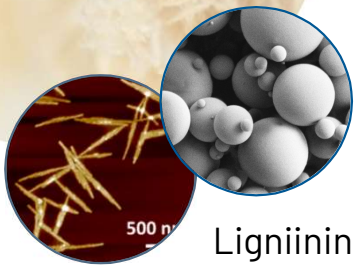
Monika Österberg
Flagship Director
FinnCERES Scientific PI
Aalto-yliopisto

Tekla Tammelin
Flagship Vice Director
FinnCERES Scientific PI
VTT

FinnCERES Materials Cluster

Tutkimusteemat 2022–2026

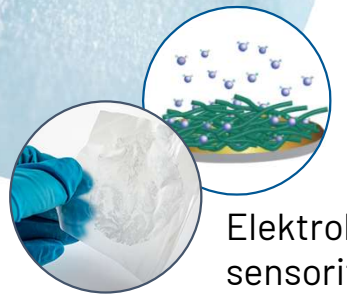
Tulevaisuuden **BIOJALOSTAMOT**



Ligniinin arvonnosto

Uudet keittoteknologiat

Puhdas **ILMA** ja **VESI**



Elektrokemialliset sensorit

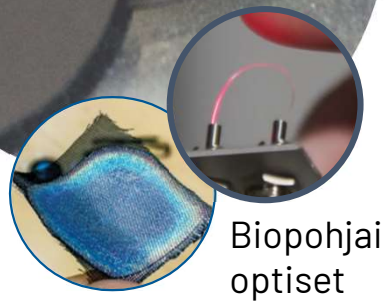
Biopohjaiset kalvosuodattimet ja filtterit

LIGNOSELLULOOSA on enemmän kuin muovi

Tekstiilien värjäys

Komposiitit ja pakkaukset

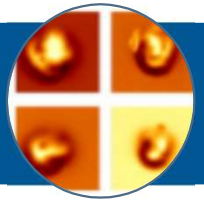
ELEKTRONIIKKA, OPTIIKKA JA **ENERGIASOVELLUKSET**



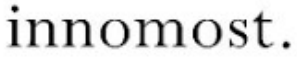
Biopohjaiset optiset kuidut

Biohiiltä akkuihin

PERUSTUTKIMUS: Molekyylien vuorovaikutukset ja rakenneanalytiikka

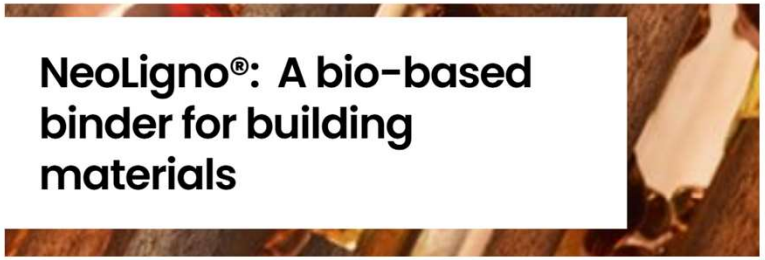


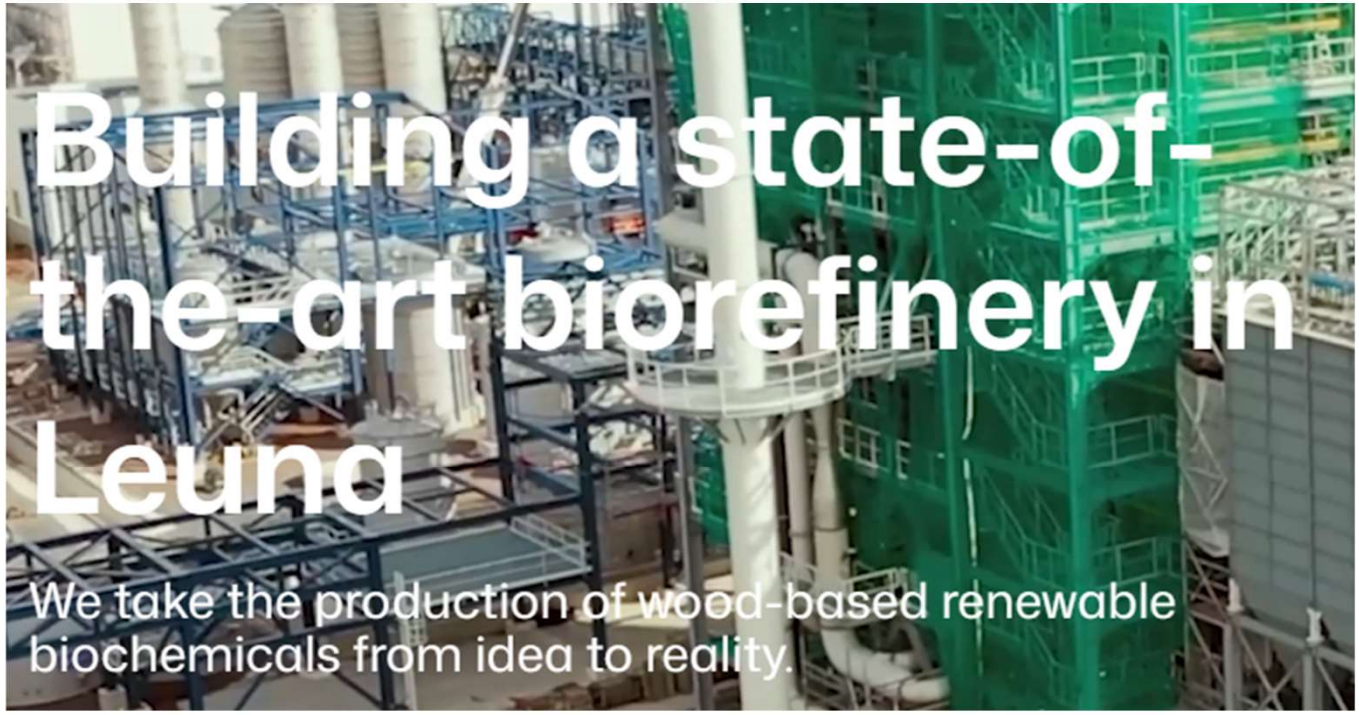
Dozens of startups projects are pushing wood fibre innovations into the field



Dozens of corporate projects are pushing forest industry innovations into the field

Metsä Group starts pre-engineering of Kuura textile fibre mill





Sustainable utilization of natural resource

Emission Free Pulping program
Improved value creation from the wood feedstock

CHALLENGES

- Traditional pulping processes are very energy consuming and emitting CO2
- Growth opportunities for industry are constrained
- urgent need to safeguard biodiversity and ecosystems
- costs for raw material are increasing
- lack of water

SOLUTION

- Industry, universities & research institutes to tackle the challenges together
- 5-year program, expected total budget 15 million euros of which 1/3 private
- 30 full-time researchers, work is steered by the industry

IMPACT

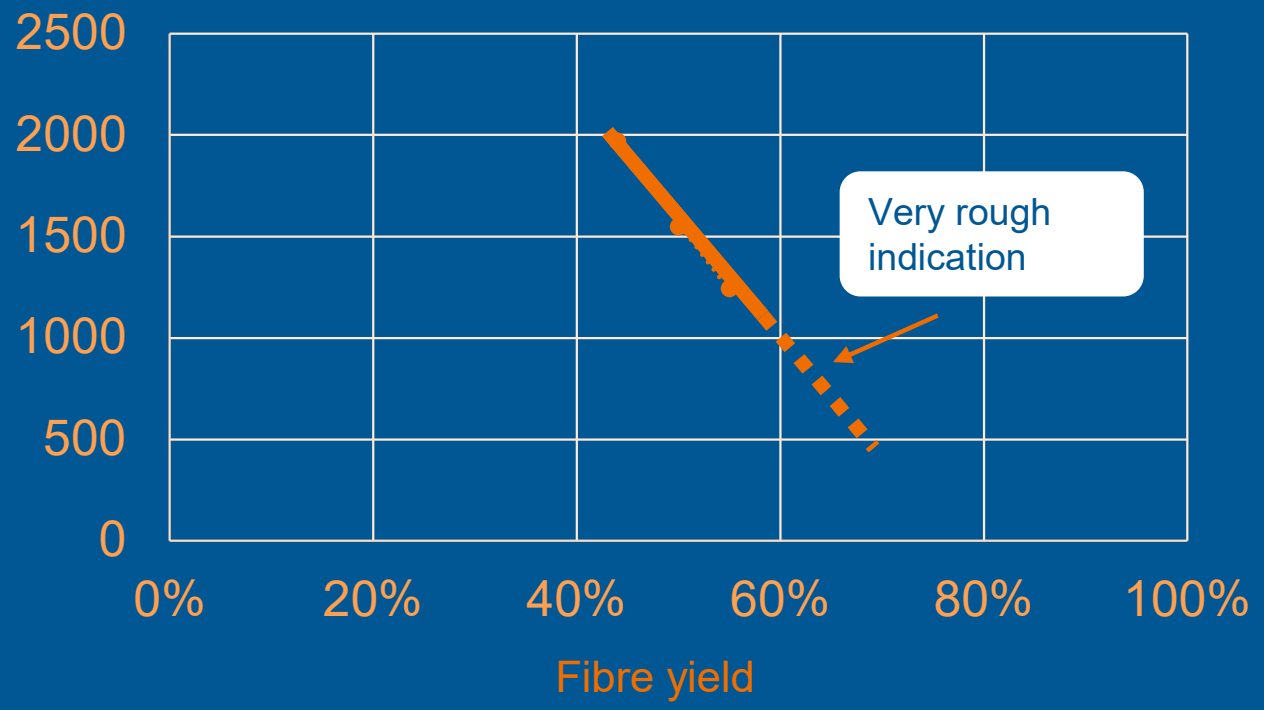
- A scientific platform with pulping process focus
  -> strengthened competences in the, with focus on future production concepts.
- **Industrially relevant solutions, drastic reduction of CO2 emissions and aiming at increasing the product yield from current 50% to around 70%**

Industry and scientific community join forces

7 industrial companies committed, and research carried out in 10 research organizations and universities

Biogenic CO2 emissions from a recovery boiler decreases drastically as the fibre yield increases

Current fibre product yield is ~50%



Content Source: RISE

Challenges and opportunities

PRODUCT DEMAND

Packaging
Replacing plastics
Tissue & hygiene
Energy sector
New products & uses

RAWMATERIAL

Limited forest resources
Restrictions on increased harvesting
Increasing cost

PULPING SOLUTIONS

Kraft pulping dominating
Few scaled up processes
Limited yield potential
Low R&D prioritization

Content Source: Hannus, Stora Enso

READING MATERIAL

Lankusta lääkkeisiin - Tuoteportfolion arvonnoususta uutta arvonlisää metsäsektorille

unece-fao-sp-51-main-report-forest-sector-outlook_0.pdf

Global forest sector outlook 2050: Assessing future demand and sources of timber for a sustainable economy

The European pulp and paper industry in transition to a bio-economy: A Delphi study – ScienceDirect

Harnessing the full potential of a global forest-based bioeconomy through non-timber products: Beyond logs, biotechnology, and high-income countries – ScienceDirect

Development of a forest-based bioeconomy in Finland: Insights on three value networks through expert views – ScienceDirect

Wood-based textile fibre market as part of the global forest-based bioeconomy – ScienceDirect

Workshop-report_final-1.pdf