

The VTT logo consists of the letters 'VTT' in a white, bold, sans-serif font, centered within an orange square. The background of the slide features a repeating pattern of stylized, interlocking shapes in orange, blue, white, and black, creating a dynamic, geometric effect.

VTT

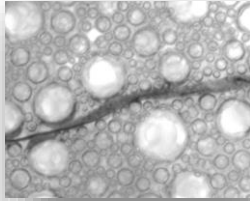
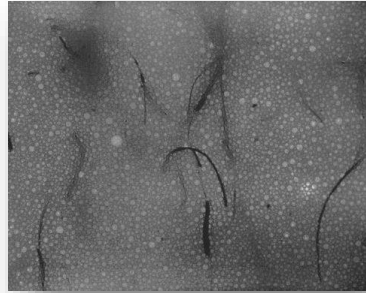
Vaahtorainauksen läpimurtoja ja haasteita

FiberTech 2023-metsäteollisuuspäivät
23.8.2023

Harri Kiiskinen

05/09/2023 VTT – beyond the obvious

FOAM FORMING – Milestones



2006

- Work started in laboratory scale
- First sheets made



2011

- KISU-semi pilot
- First conference presentation
- Porous demo materials



2012

- Foam process to VTT SUORA
- First reels made



2015

- Paptic started
- Reels at 1000 m/min
- Metsä-Board moves to mill scale

2017

- VTT SAMPO Pilot started
- Foam recovery unit
- TAPPI foam session



2018

- Stratified foam forming

2019

- Foam forming review paper
- Membrane recovery unit
- TAPPI foam special issue



2022

- AISTI started
- Fiberwood started

VTT Spin-off companies – Foam technology



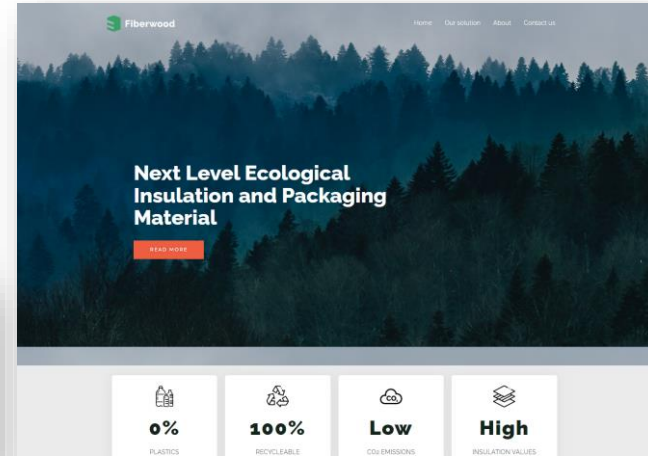
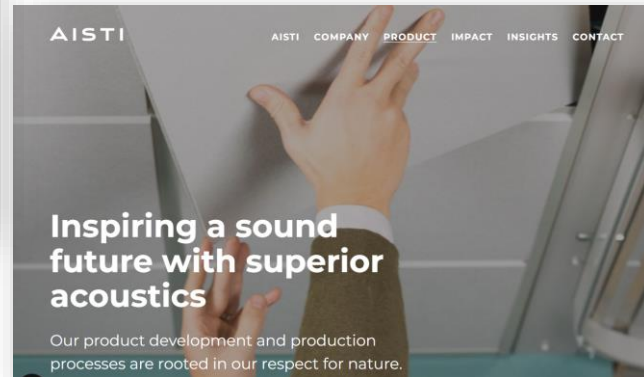
PAPTIC

<https://paptic.com/>

The Sustainable Alternative to Plastics in Packaging

AISTI <https://aisti.com/>

Plastics-free acoustic tiles made out of recycled wood fibres by foam forming technology.



Fiberwood

<https://www.fiberwood.fi/>

Plastics-free thermal insulation boards made out of wood pulp and side-stream fibre particles by foam forming technology.

VTT

Forming 2006

Pressing 2009

VTT
SUORA

Foam forming 2012



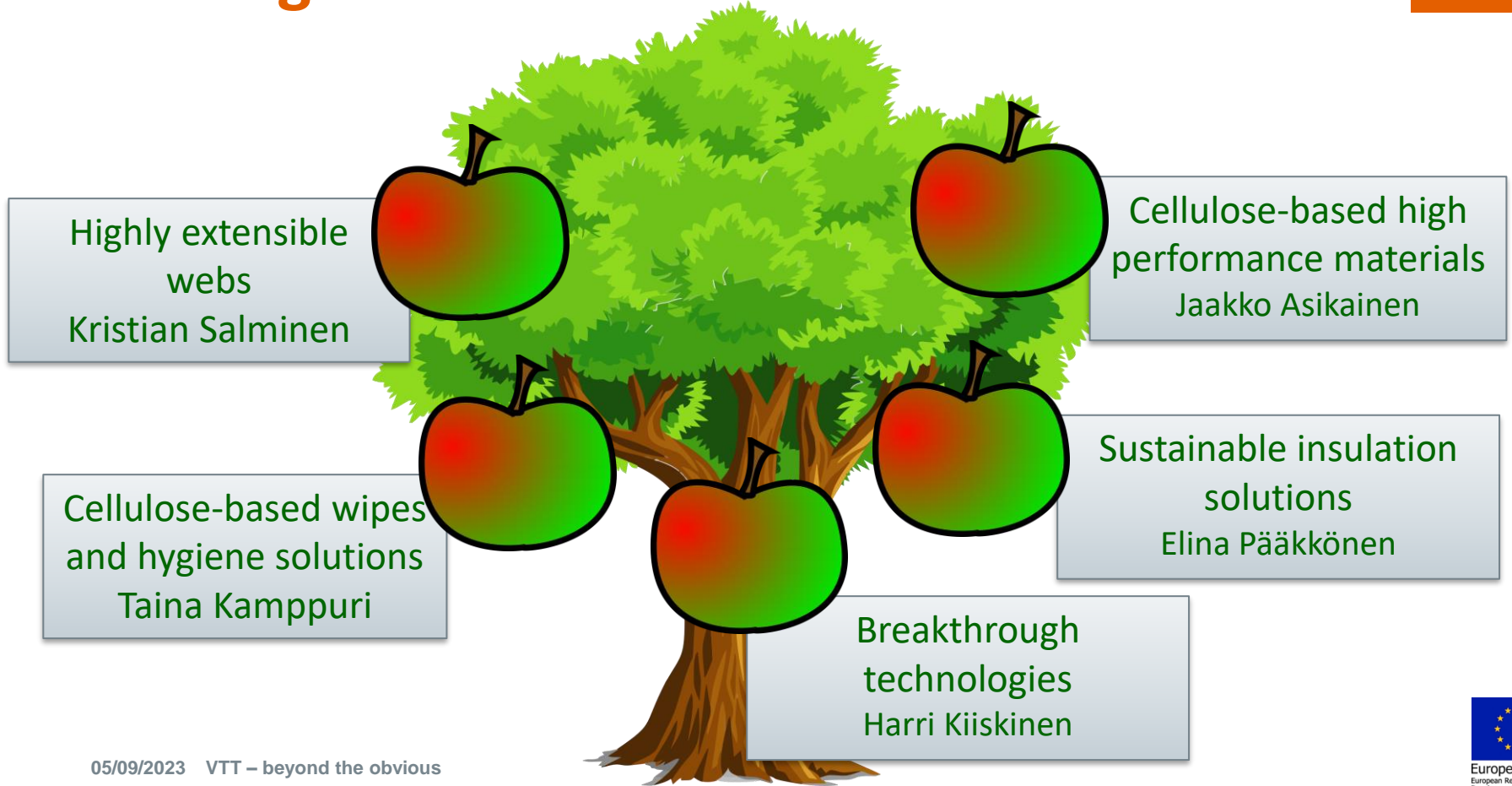
A large industrial facility with complex machinery, including multiple levels of blue metal walkways, numerous silver pipes, and large cylindrical components. A blue material is being processed on the left side. The facility is well-lit with overhead lights.

VTT

VTT
SAMPO

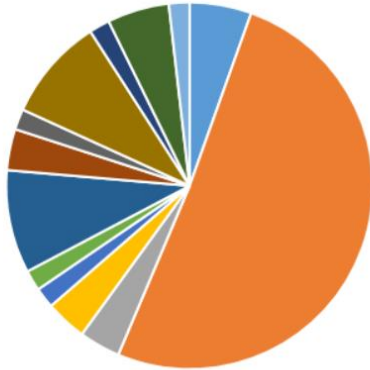
2017

Piloting Alternatives for Plastics – PAfP

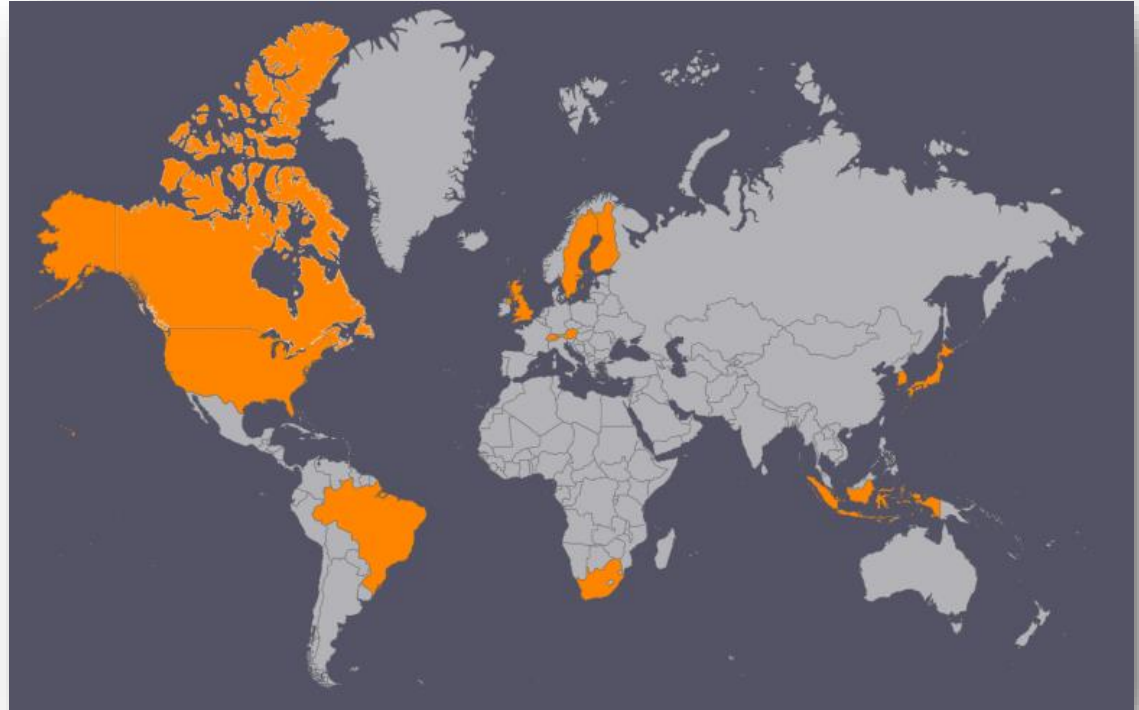


International PAFp Program

- 54 Companies
- 12 Countries
- Budget 6.9 M€
- 1.4.2020 – 31.8.2023



■ Austria ■ Finland ■ Indonesia ■ Japan
 ■ Russia ■ South Africa ■ Sweden ■ Switzerland
 ■ South-Korea ■ USA ■ Canada ■ Brazil



Piloting Alternatives for Plastics 2020 – 2023

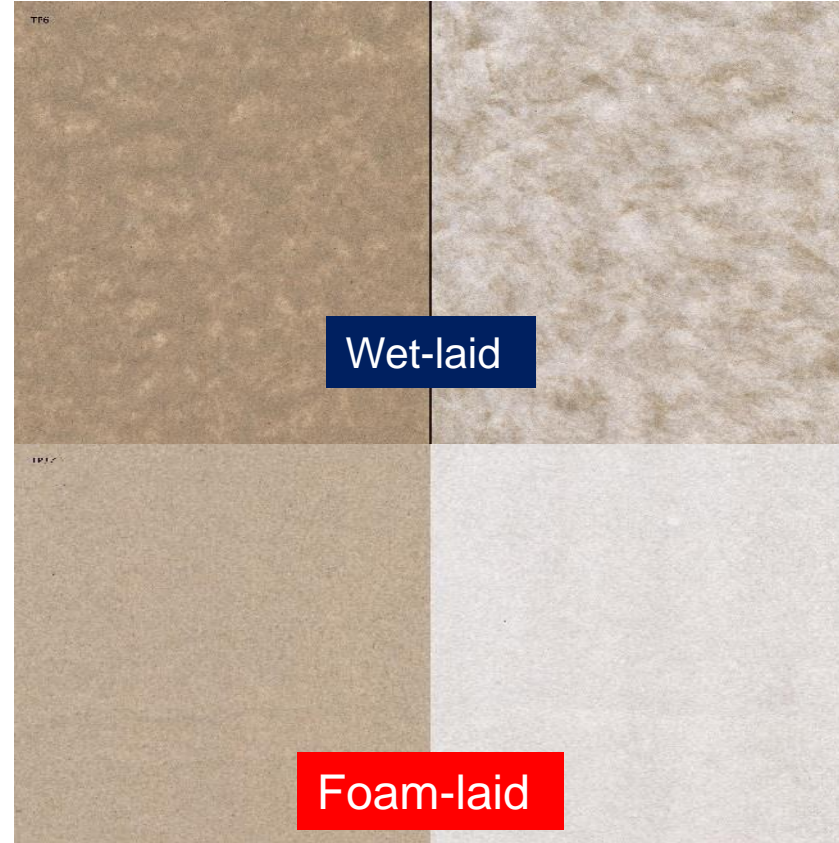
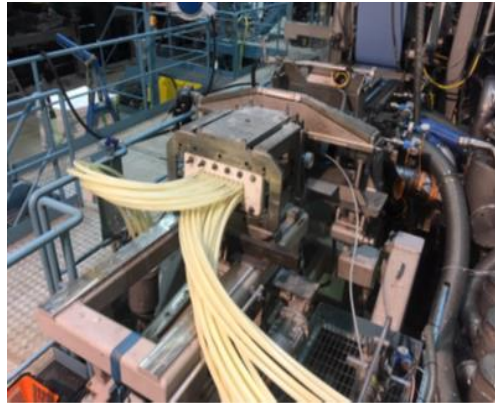
Program partners



Stratified forming with wet-laid and foam-laid

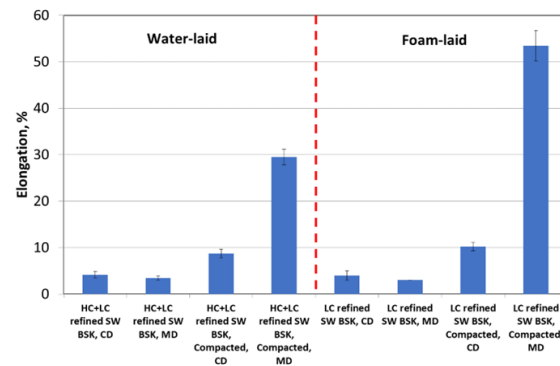
Pilot-scale data

- Rheological properties of foam enables high layer purity in stratified forming
- By controlling tailoring the properties of foam, interesting gradient structures are possible

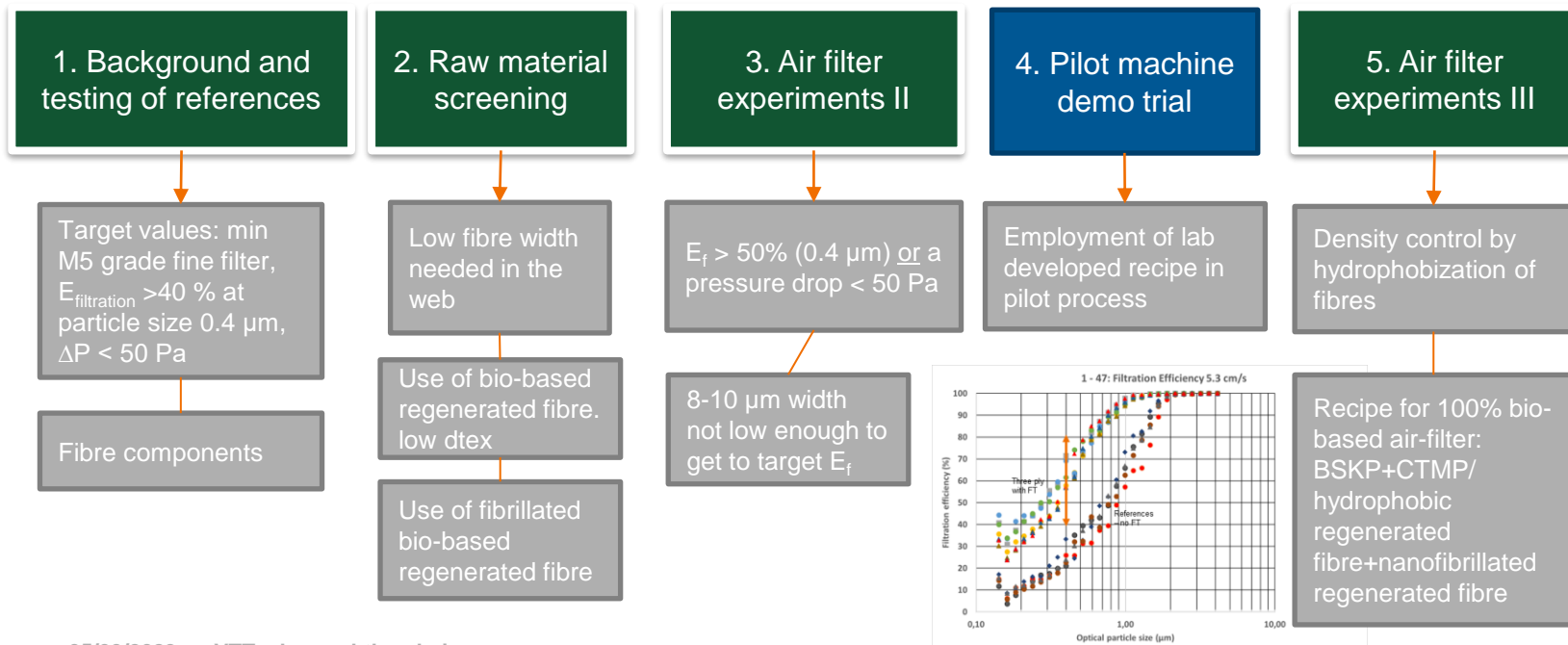


The production of extensible webs was demonstrated successfully in a pilot trial

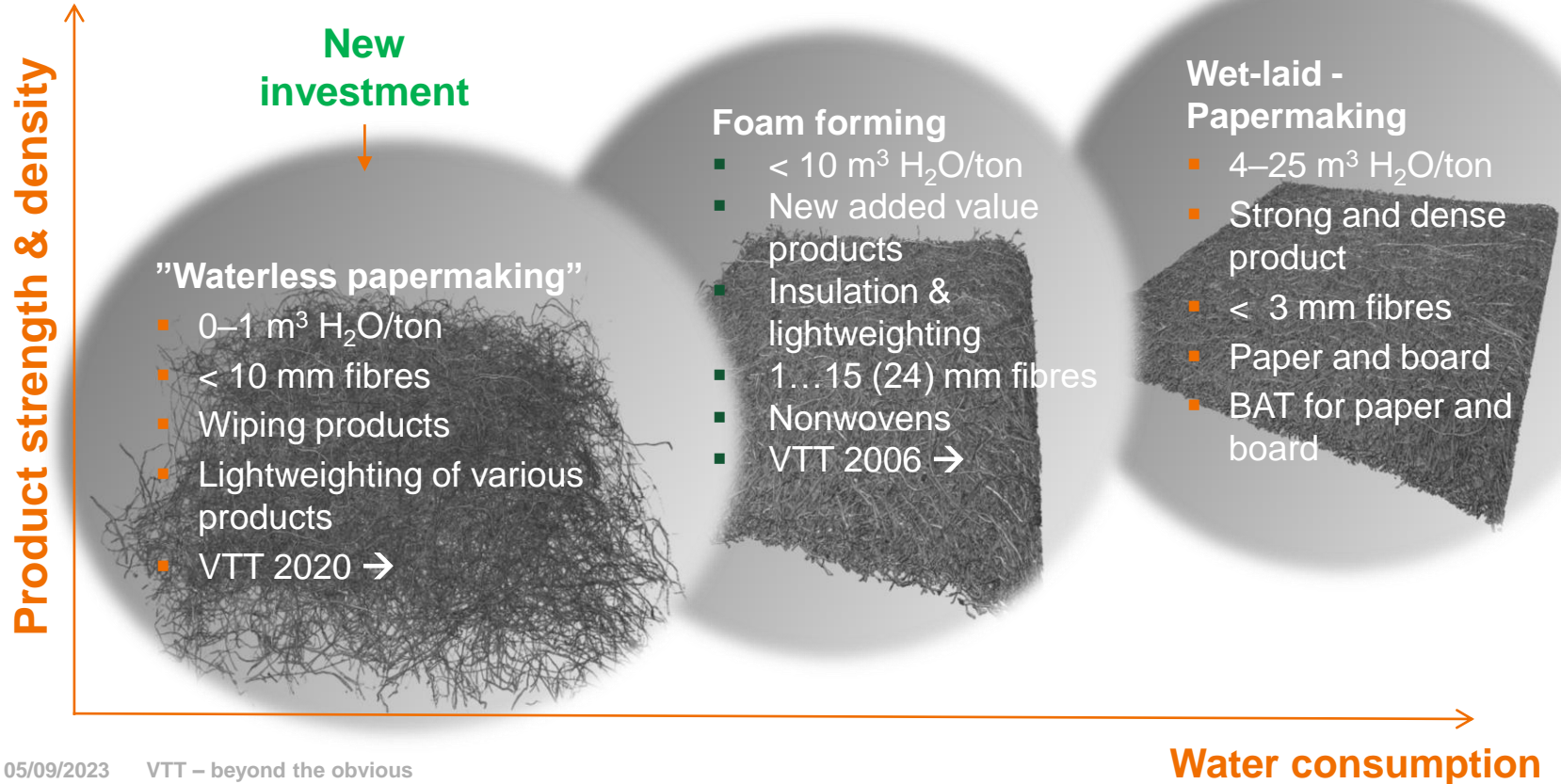
- Webs could be formed by both wet-laid and foam forming technologies.
- Foam formed samples gave better uniformity and higher extensibility than wet-laid samples.
- **Highest extensibility (in MD) was 66%!**
- Up to 45 mm deep trays (sliding blank) could be produced with a line designed for plastic materials with no changes in the process.
- **An interesting alternative solution for thermoformed plastic packages and for some molded pulp products.**



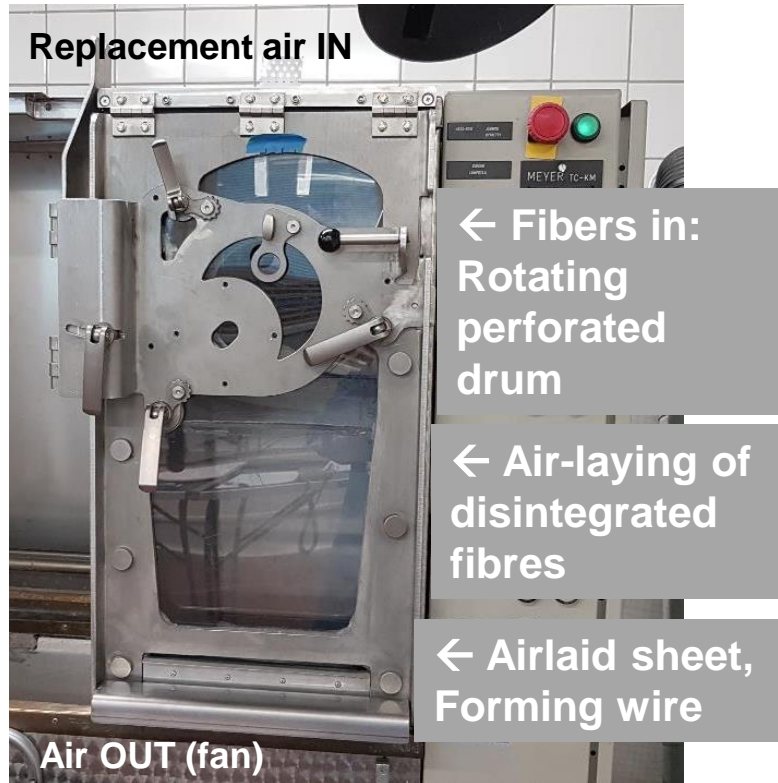
Foam forming enables manufacturing of plastic-free air-filter materials



Forming technologies for fibrous products



Airlaying – Web forming without water



VTT's investments for 2023 – 2025

January 17, 2023

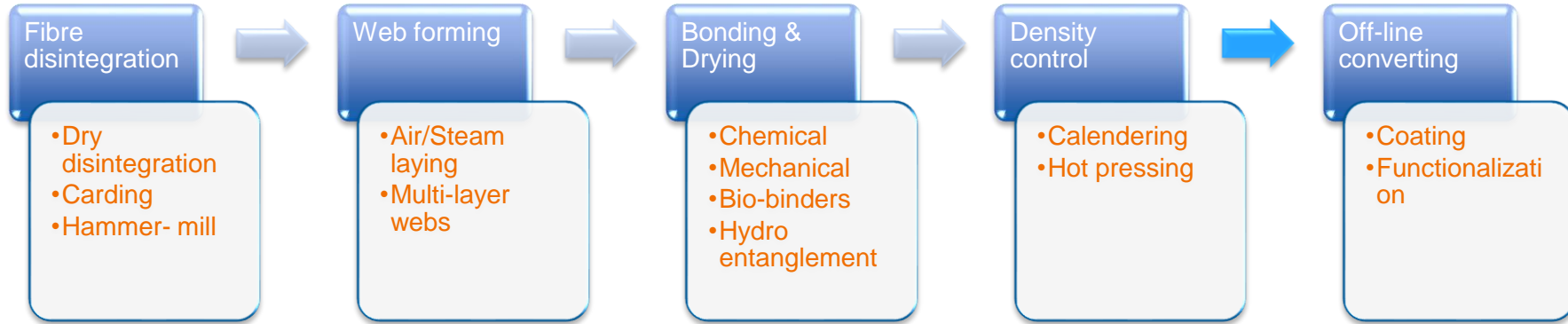
1. Clean, stable heat to cities: A Finnish district heat reactor operational in 2030
2. **Solutions to plastic and textile recycling with new piloting platform**
3. **Piloting environment for sustainable fibre products to substantially reduce forestry energy and water consumption and enable new product innovations**
4. **Digital development platform for biosynthetic materials: 10 times faster with new natural materials**
5. Piloting environment for medical devices

4.0 + 1.0 M€

VTT is building a nationally unique piloting environment in Jyväskylä. It helps speed up the renewal of the forestry industry, improves resource efficiency and enables the production of new innovative fibre-based products. The objective is to develop new energy-efficient manufacturing processes whose water and energy intensity is significantly smaller than with current methods.

Energy 1st Fibre Product Forming

Enabling to reach carbon zero targets of fiber products



- VTT investment
- Energy savings through the waterless forming
- Modular structure
- Hybrid layering
- > 35 companies

- Current products e.g. board grades
- Nonwoven webs
- Multi-ply products
- Budget 4+1 M€
- Scheduled start Q4/2024
- ~10 M€ project portfolio

Energy 1st Fiber Products Forming

ERDF Program 2024 – 2026



WP1: Pushing the boundaries of fiber product manufacturing



WP2: Performance of 3D fiber materials



WP3: Strengthening solutions for fiber-based products



WP4: Expanding ground for sustainable nonwoven webs



WP5: Towards waterless forming processes

bey⁰nd

the obvious

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