EXPANDFIBRE fortum Metsä

06/07/2021

What is ExpandFibre?

ExpandFibre (2020-2024) is a 50 M€ R&D collaboration and an Ecosystem launched by Fortum and Metsä Group and co-funded by Business Finland. It focuses on upgrading pulp fibre, hemicellulose and lignin from renewable and sustainable sources of straw and northern wood into new bioproducts. Its ambition is to meet the growing demands for sustainable textile fibres and other added value biomaterials.

The **research and development in ExpandFibre,** aiming at producing new ground-breaking technologies and smart business concepts, is divided into **seven research themes:**

- Textiles
- Biocomposites
- Packaging
- Lignin products
- Hemicellulose products
- Sourcing & fractionation of straw
- Other fibre products

ExpandFibre invites actors in these value chains to join in building a world-leading innovation ecosystem to eventually commercialize new bioproducts and green businesses

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expandfibre.com

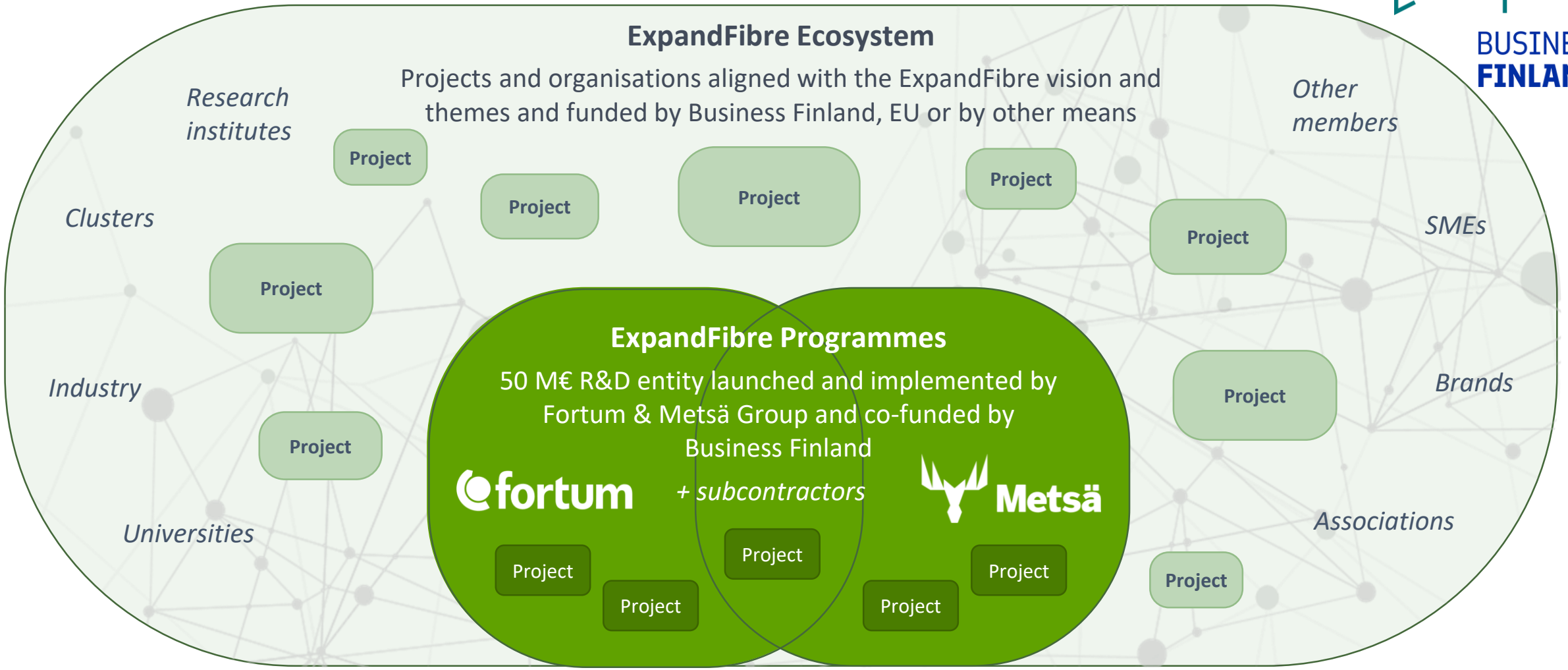
ExpandFibre Programmes & Ecosystem

Ecosystem Steering Group

VTT A! Aalto University

ELIC

BUSINESS FINLAND



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Ecosystem members by organization type

Research & education

RTOs

VTT

Luke LUONNONVARAKESKUS

aiju Technological Institute for children's products & leisure

GRADIA

Universities

HELSINGIN YLIOPISTO HELSINGFORS UNIVERSITET UNIVERSITY OF HELSINKI

JYVÄSKYLÄN YLIOPISTO UNIVERSITY OF JYVÄSKYLÄ

UNIVERSITY OF OULU

Aalto-yliopisto

Åbo Akademi

LUT University

Tampere University

Tampere University of Applied Sciences

Other

Centria UNIVERSITY OF APPLIED SCIENCES

LAB University of Applied Sciences

Other organisations

FINNISH TEXTILE & FASHION

innovestor

ELIC

EXPANDFIBRE

fortum

Metsä

Companies

Industry

SME

SC GRAND Sustainable Textile

COVEROSS More life

RES TER

montinutra

Pure Waste

Brightplus

PLAFCO FIBERTECH

ADLUX VALAISTUKSEN ASIANTUNTIJA

TOUCHPOINT Sustainable Workwear

Large

Valmet

kemira

Texon

MIRKA

Service / technology providers

SME

AEP polymers

SciTech Service

NIMAAR

SPINVERSE

GloCell

Semantum

Mega Cellulose

inweb SUSTAINABLE MANUFACTURING

CONENOR

FOCUS ON DESIGN

Elastopoli Oy

TrueMed VALIDATED

FINITE FIBER

FIBERX FINLAND

Large

Lindström

KCL piloting knowledge

LOUNAIS-SUOMEN JÄTEHUOLTO

ExpandFibre Ecosystem:

Total members: **47**

Ecosystem members by type:

Research & Education: **14**

Companies: **30**

Other organisations: **3**

ExpandFibre Ecosystem R&D&I focus points on the road towards the Vision 2030

Straw and wood fibres as raw materials

Textiles

- New, sustainable textile fibres for wearable textiles and nonwovens
- Staple fibre analytics and performance testing
- New staple fibre applications and post-treatment technologies
- Recycling and traceability
- Business models to speed up global market entries

Biocomposites

- Raw material processing and converting
- Material properties
- Recycling and end-of-life
- Biocomposites containing fibres and lignin
- All-cellulose composites & natural fibre polymer composites
- Additive chemistry

Packaging

- New pulp-based plastic-replacing packaging solutions
- Tools and processes for designing sustainable packaging
- Barriers and binders based on natural polymers

Lignin products*

- Lignin fractionation for material applications
- Lignin as functional ingredient for thermosetting resins as well as for thermoplastics and bio-composites
- Lignin dispersants
- Novel methods for lignin functionalization

*) Especially for straw

Hemicellulose products*

- Hemicellulosic sugar refining and separation
- Xylose, pentoses and furfural as industrial ingredients and platform chemicals
- Polymeric hemicellulose as industrial ingredients and platform chemicals

*) Especially for straw

Sourcing & fractionation of straw

- Sustainable agricultural residue supply chains
- Concepts for low-emission straw supply networks
- Novel biomass supply contract concepts
- New fractionation technologies for processing of agro-residual raw materials
- Side-stream utilization in animal feed and fertilizer applications

Other fibre products

- New materials based on pulp fibres for high-volume applications
- Novel chemistry for pulp fibre modification
- Functional structures including hybrid materials
- Advanced 3D and 4D fibre processing methods
- Fibre and specialty cellulose products from straw pulp, including MFC, MCC and chemically modified cellulose

Cross-cutting topics

- Replacing plastics and fossil-based materials
- Digitalisation & measuring
- Emerging technologies
- Sustainability assessment
- Design for circularity
- Piloting and test-beds for new applications
- Following regulatory environment

Vision for 2030

- **Investments** in commercial production of new bioproducts (textile fibres, biocomposites, other bioproducts, etc.)
- New bioproducts available to the markets with significantly **lower carbon footprint**
- Sales and/or out-licensing of **new technologies** related to new bioproducts
- **Professionals** trained for new bioproduct businesses
- **Sustainability awareness** increased throughout the value chains

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Specific topics for Research projects without parallel company projects

Textiles, Biocomposites, Packaging and Other fibre products	Lignin products	Hemicellulose products	Sourcing & fractionation of straw
• Advances in fibre-based material modelling • Digital tools for re-designing fibre properties • Understanding molecular level interactions between pulp fibres, water and novel chemistry • Development of solvent insensitive carbohydrate analysis methods • Flow rheology and behavior of natural polymer -containing solutions and dispersions • Novel material functionalities and advanced characterization of biomaterials	• Lignin based carbon-materials for high value applications, e.g. energy storage • Understanding of lignin chemical structure versus material properties and functions via analytical tools • Understanding of lignin particle size versus performance in various applications by using analytical tools • Potential technologies to influence lignin color	• Advancing currently low-TRL production and application options for C5+C6 sugars • Specialty sugar fine chemistry for e.g. food, pharma, cosmetics • Sugar polymer chemistry • Sustainable food production (e.g. proteins, prebiotics), end-of-life and recycling of nutrients	• Products from biorefinery side streams e.g. extractives, cellulosic fines, salts, silica, sugar-lignin reaction products, proteins

Cross-cutting topics

- Tools and strategies for increasing sustainability awareness among consumers
- Sustainability assessment of end-of-life alternatives for bio-based products (biodegradation, recycling, reuse)
- Understanding biodegradation of new materials
- Measuring and monitoring technologies for improved raw material quality and material recycling
- Advanced microparticle measuring systems and separation technologies

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Reaching targets through open co-operation

1. *To communicate the ambitions and results of ExpandFibre*
2. *To attract new partners and competences to the ecosystem*
3. *To build joint visibility & informing the community at large that together Fortum and Metsä are aiming to take a leading role in the European bioeconomy*

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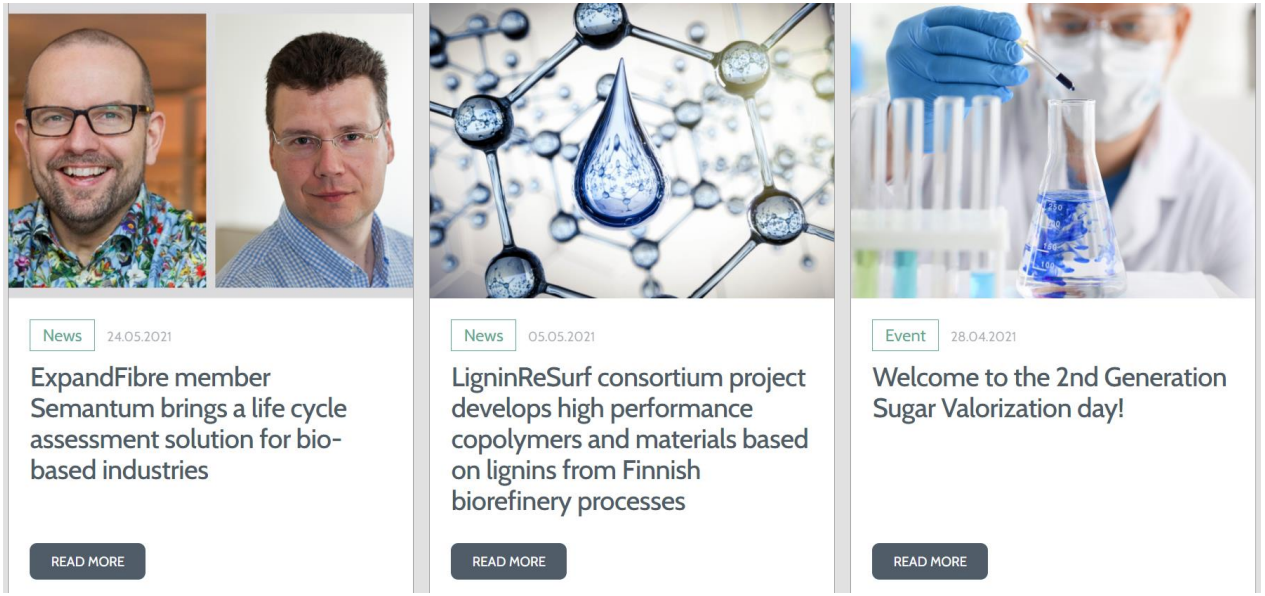
Communications

Webpages: www.expandfibre.com

- 2-3 news pieces published on the ExpandFibre website every month
- Updated ecosystem member list
- Contact form

Newsletters:

- Member newsletters to be sent towards the end of every month
- General newsletter to be sent every 2-3 months



Presentations & Material:

- One-pager and Powerpoint presentations for potential ecosystem members
- Value propositions for:
  - Finnish organizations
  - Non-Finnish organizations
  - Projects

Additionally:

- Visibility in external industry events, seminars and workshops
- Frequent ecosystem events (workshops, seminars)

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Join us to meet the growing demand for sustainable bioproducts – we need players from every part of the value-chain

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