

An aerial night view of a city, likely Singapore, with a complex network of glowing white lines overlaid on the image. The lines connect various points across the city, symbolizing a network or data flow. The city lights are visible in the background, and the overall color palette is dominated by blues and whites.

# BUSINESS FINLAND

BioNets  
Programme  
Results  
March 2018

Project examples

# Precision Forestry

Silvere

**Challenge:** Current methods for forest inventory, the foundation for forest management planning, are outdated and unreliable resulting in sub-optimal utilization of forest resources and inaccurate forest valuations.

**Solution:** Using state of the art remote sensing techniques combined with big data analytics and AI Silvere creates the optimal forest management plan based on single-tree level detail.



**Benefits:** The end-to-end service provided by Silvere gives forest owners and professionals the most accurate information about their forests, enabling a forest management plan optimized for their specific objectives.

The solution provided by Silvere has potential to improve the net yield of a forest by as much as 55% compared to currently used methods.

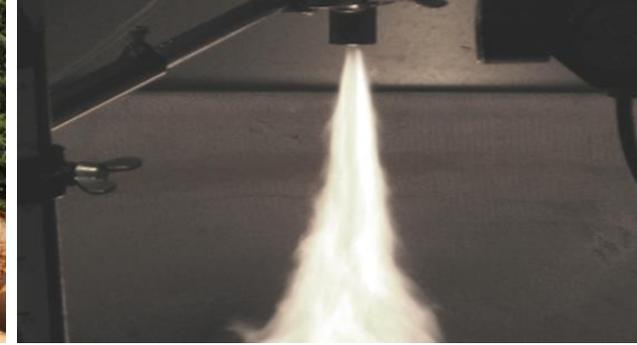
# New Fibre Products

Aalto University, Tampere University of Technology,  
Turku University, VTT Technical Research Centre of  
Finland Ltd and Åbo Akademi University.

**Challenge:** New non-oil based materials are needed due to the globally increasing use of materials.

**Solution:** Technologies are developed to produce new raw materials and products from wood cellulose fibres by:

- Introducing new oxidative enzymes for fibre modification.
- Liquid-flame spraying to make fibres antimicrobial.
- High consistency modification of cellulose fibres to produce functional cellulose based chemicals.
- Obtaining fundamental knowledge of forming and coating of materials based on foam.



**Benefits:** The Finnish cellulose fibre material is up-graded with new, specific processes that bring savings in energy, water and chemical consumption.

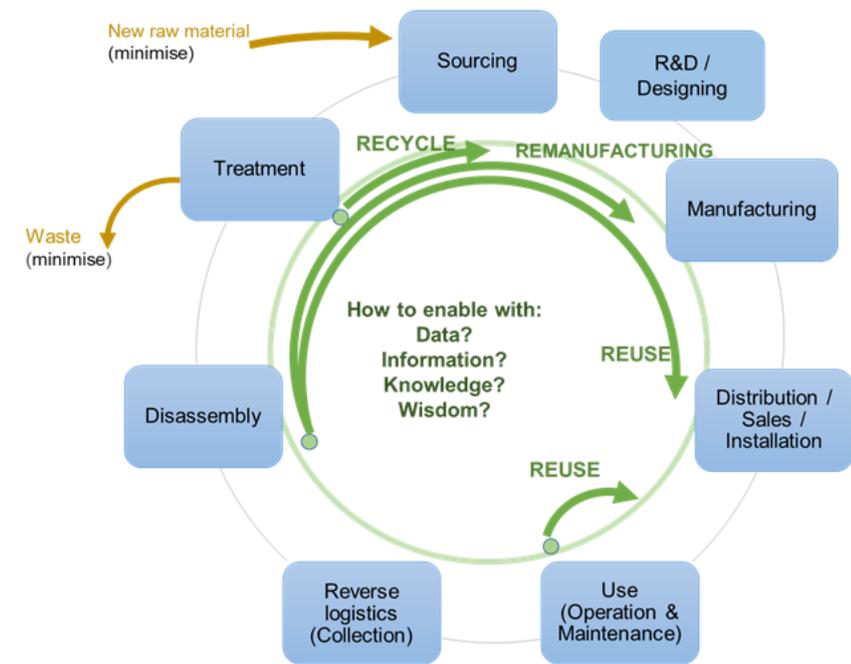


# From data to wisdom – Approaches enabling circular economy.

VTT, Lappeenranta University of Technology and Tampere University of Technology, BMH Technology, Fortum Power and Heat, Solita, UPM-Kymmene and LCA Consulting.

**Challenge:** Novel business models that leverage the largely untapped potential of circular economy are gradually emerging in industries. These business models are disruptive by their nature as they change value creation and distribution logics of supply chains. While most existing research and development activities have focused on the role of material flows, the Data to Wisdom (D2W) project focuses on information flows in the circular economy.

**Solution:** The goal is the systematic identification and creation of relevant data in radically new value constellations, and the conversion of this data into wisdom that is used to pilot and implement new circular business models.



## Examples of pursued benefits:

**Partner companies:** Expansion to new market areas, capturing sustainable value from international markets.

**Business ecosystems:** Increased competitiveness due to increased and more efficient sharing and use of information.

**Societal:** Enablers for the achievement of the regional "resource wisdom roadmap" targets.

**Environmental:** Reduction of material waste due to more effective use of information.

**Research community:** Beyond-state-of-the-art knowledge on how data could be converted into wisdom and how this wisdom benefits the development of business towards circular economy.

## Rapeseed Ingredient

Research and development for creating a unique functional protein ingredient made from rapeseed.

Avena Nordic Grain Oy.

**Challenge:** The global food consumption needs new sustainable and nutritional solutions. Plant-based protein market is growing globally and there is demand for new and natural products that are affordable.

**Solution:** Develop a new production process for rapeseed that results in a totally new and unique healthy plant-based ingredient with a competitive price.



**Benefits:** Our customers are pioneers in their field and they are capable to develop **healthy and desirable** products to drive their success and support further growth of plant based ingredients.

”This new ingredient provides great opportunities for our customers globally and **further diversifies the use of rapeseed** as food ingredient” - Pekka Risikko, Business Manager, Avena Nordic Grain Oy

## PISARA Water Wisdom County: Facilitating access to international export markets

Jyväskylä Energy Ltd / PISARA

**Challenge:** The combined impact of cumulative debt restructuring, the tightening of operational reliability requirements and stringent water quality assurance regulations, as well as the disappearance of vocational skills, will in future present water management institutions with increasingly tough challenges.

**Solution:** Pisara's asset management concept includes internationally scalable business models, earnings logic and operating models, and supports the latest digital water services and systems.



**Benefits:** When planned properly, the water supply is maintained and developed both as a technical system and as a valuable asset. The ability to apply and develop new digital solutions plays a key role in maintaining an efficient and reliable water supply system.

## Wood-to-biomedical - platform for building a new Finnish ecosystem

UPM

**Challenge:** Even today the global medical and biomedical field has many unsolved challenges.

**Solution:** Wood based materials for e.g. cell culture applications, clinical applications and diagnostics can help to solve to some of the challenges and improve the life of people.



**Benefits:** The project integrates SMEs, corporations and research organizations, their technologies and solutions into Finnish and global value networks.

This expands the biomedical ecosystem and enables a wide development co-operation in wood-to-biomedical area. The project is an important investment in the future.

# Nanotechnology Products for Wound Healing

Finnish Red Cross Blood Service, UPM-Kymmene, University of Helsinki, Faculty of Pharmacy

**Challenge:** Better clinical protocols are needed for skin burns and deep wounds world wide.

**Solution:** Through interdisciplinary scientific research and technology development, the consortium aims to develop new high tech products for demanding wound healing area.



**Benefits:** State-of-the-art knowledge and new high tech products for demanding wound healing area.

For society, the new wound healing products help to reduce clinical costs and open possibilities to new SMEs to join the value chains and ecosystem.

# Sustainable Binders from bark, SusBinders

VTT, LUKE, XAMK

**Challenge:** Almost 3 million tons of softwood bark is produced as a low-value side-stream in the Finnish forest industry each year. Currently bark is burnt for energy. However, polyphenolic tannins could be produced in significant amounts from the bark. Tannins could partly replace toxic fossil-based phenols in the global adhesive and resin market, and thus generate more value for bark and new business opportunities.

**Solution:** Development of improved tannin extraction methods and further upgrading of tannins by purification and formulation to binders in resins and adhesives.



**Benefits:** Commercial exploitation of softwood bark based polyphenols for technical applications targeting at market volumes matching available volumes.

Increased profitability of the wood working industry by upgrading low-value bark. Sustainable and green tannin polyphenols for resins and adhesives for laminates, plywood and packaging.

# Colloidal Lignin adhesives and coatings – COLIAD

Aalto University – Department of Bioproducts and Biosystems and VTT

**Challenge:** The nordic bioproduct industries (pulp & paper, biofuels) seek innovative ways to valorize whole plant biomass they process, with special interest in the **lignin polymer**

**Solution:** The COLIAD-project addresses the challenge of lignin utilization by converting this industry by-product into high quality nanoscale particles (CLPs), which improves the lignins suitability to current bioproducts.



**Benefits:** Successful implementation of CLP technology into the current bioproducts will allow the lignin producers to harness greater value from their lignin, with great contribution towards transformation to CO<sub>2</sub>-neutral bioindustry.

Development in high volume markets around lignin utilization sets path for numerous future businesses.

# sense n insight

Package Testing & Research Ltd

**Challenge:** 2/3 of new products fail on the market during the first year.

**Solution:** A multisensory research service to measure the most critical consumer touchpoints before launch.



**Benefits:** Easy to buy, quick implementation, compact reporting. Saves clients both money and resources.

“The research designed and executed by Sense N Insight resulted in important customer understanding relevant to the success of our product launch.” - Jaakko Kaminen, CEO, Welmu International

## Handprint

A positive indicator  
- shows your environmental benefits



VTT & LUT

**Challenge:** Footprint methods provide high-quality information about environmental burdens of products or processes.

**Solution:** VTT and LUT have developed a handprint method for assess and communicate positive environmental effects.



### **Benefits:**

#### **Aiming for a smaller customer footprint**

The method offers a new way of thinking positively about environmental impacts. Handprint helps companies to assess and communicate the positive effects of their products on sustainability. Communicating positive environmental effects improves the competitiveness of companies.

## Developing the by-products of a potato starch factory and testing the process with other raw materials

Finnamyl Oy

**Challenge:** All around the world the interest for plant protein is growing. The techniques are not developed enough to separate the high quality protein from plant material.

**Solution:** To develop the methods to separate protein from byproducts of a potato starch factory and other plant materials.



**Benefits:** The demand for food quality plant protein is high. This gives an option to soya protein and helps in recirculation of raw materials. For Finnamyl Oy this gives a possibility to run the factory around the year instead of only three month campaign in the fall.

# Fully biodegradable premium eco-packaging - Sulapac®

**Challenge:** There are already close to 9 billion tons of plastics somewhere on the surface of the earth. Astonishing 6,3 billion tons of the amount has already transformed into plastic waste. The core of the problem is that while plastic can be very useful on a short time span, there are no ways to get rid of the microplastics.

**Solution:** Sulapac develops ecological packaging, which fulfills the requirements of the global cosmetics industry and combines functional sustainable packaging with beautiful Nordic design. It is the first fully biodegradable package which is also water- and oil resistant and does not allow oxygen penetration.



**Benefits:** The packages are made of renewable natural wood chips and other biodegradable biomaterials. The innovative material replaces the use of traditional plastic packaging that is a significant source of harmful microplastics.

Sulapac works with known Nordic designers to create individual packaging concepts for the global brand owners. The material allows basically unlimited design possibilities.

# FineFibre - A novel chemical derived from agricultural by-products

Betulium

**Challenge:** Earlier attempts to commercialise nanocellulose – a 1980s invention – failed due to the high price of the product. So far, nanocellulose has mainly been made of wood which is more expensive than the agricultural raw materials.

**Solution:** Betulium discovered to produce nanocellulose from the by-products of the agricultural industry. Betulium seeks to build partnerships with end-product manufacturers and create own distribution network for the specialty chemical applications.



**Benefits:** Betulium's concept enables higher added value from the surplus raw materials that would otherwise be worthless or very inexpensive.