Circular Events
2021 Kickoff

BUSINESS
FINLAND
Accelerating the transition to a circular economy in the Nordics

Agenda

- Finnish BioCircular Innovation Roadmap
  Einar Kleppe Holthe, Natural State
- Circular Nordics 2021
  Einar Kleppe Holthe, Natural State
- Governmental circular collaboration
  Inger Johanne Wiese, Norwegian Ministry of Climate and Environment
- BioCircular Finland opening words
  Marika Ollaranta, Business Finland
- Finnish BioCircular Innovation Roadmap
  Jarmo Heinonen, Business Finland
- Future of biomaterials
  Jussi Manninen, VTT
- Kick-start your bio-based business in Finland
  Helvi Väisänen, Business Finland
- Bio-based solutions company cases:
  - Pyroll Packaging by Tapani Holappa
  - NordShield by Emmi Kavander
  - Spinnova by Pia Qvintus
- Nordic perspective on circular economy
  Cathrine Barth, Circularities
- Circular industrial locomotives
  Susanne M. Nævermo-Sand, Celsa Nordic
- Visual intelligence as fuel for circular innovation
  Hanne Wetland, Knowit
- Panel discussion
  with Cathrine Barth (Circularities), Susanne M. Nævermo-Sand (Celsa Nordic), Hanne Wetland (Knowit) and Marthe Haugland (Nordic Innovation)
- The Nordic Circular Hotspot Partnership Program
  Einar Kleppe Holthe, Natural State
- Q&A dialogue with the audience
Circular Nordics 2021

Einar Kleppe Holthe
Founder & CEO
Natural State
Circular economy, often referred to simply as circularity, is an economic system aimed to design out waste and pollution, keep products and materials in use, and regenerate natural systems. Even though global awareness is finally rising, most people don’t know what circular economy is, and the market is still very fragmented and hard to navigate. With co-funding from Nordic Innovation, the Nordic Circular Hotspot aims to bridge the knowledge gap and contribute in a meaningful way to:

- **Reinvent** how the Nordics design, produce and market products;
- **Rethink** how the Nordics use and consume goods and services;
- **Redefine** growth in the Nordics and what is possible through reuse, reduction, repairing and regeneration.
Change Management

Collaboration is key
During three months we have hosted events with speakers from leading global companies
The Nordic Circular Summit is a two-day event hosted by [1254x644], with a mission to explore the tremendous circular opportunities that the region has to offer.

The 2020 summit was a live event on November 26 and 27, 2020, spread over 10 different sessions— with topics including circular cities, ocean solutions, fashion and furniture, finance, energy, the food sector, manufacturing and more. Nordic Circular Summit 2020 was a milestone event with over 1,000 delegates from around the world, comprising of two engaging days of interaction, inspiration, and information sharing.

The summit site had 6.8k unique visitors, and content that engaged 62800 people on Facebook.
Governmental collaboration for a circular transition

Inger Johanne Wiese
Senior Advisor
Ministry of Climate and Environment
BioCircular Finland
opening words

Marika Ollaranta
Head, BioCircular Programme
Business Finland
Finnish BioCircular Innovation Roadmap

Jarmo Heinonen
Senior Director, Innovation Ecosystems, Industries, Business Finland

Accelerating the transition to a circular economy in the Nordics

#BuildBackCircular #CircularNordics www.nordiccircularhotspot.org
FINNISH BIO AND CIRCULAR INNOVATION ROADMAP

MR. JARMO HEINONEN
SENIOR DIRECTOR, INNOVATION ECOSYSTEMS INDUSTRIES
BUSINESS FINLAND
24.3.2021
FINLAND LEADS THE WAY TOWARDS BIO AND CIRCULAR ECONOMY

VISION

Finland is showing the way for solving global challenges and offers solutions for better tomorrow.

Finnish bio and circular solutions are utilized globally.

PURPOSE

Develop competitive bio and circular based solutions and ecosystems to solve global climate challenges.

Finnish solutions, network and expertise matches demand and opportunities in the international markets.

National and international networking, EU funding, national banks, investors.
# Finnish Bio & Circular Economy: Business Ecosystems

## Sustainable Textiles
1st generation cellulose fibre industrial production
1st recycled textile ecosystem operating
Utilization of recycled textiles fibres in different end-user applications

## Packaging
- Bio-based barriers
- Traceability – digital elements
- New business models – Package as a service

## Plastics
- Market creation, shaping of plastics
- Cross-sectoral R&D together with customers in different value chains
- Substitutes or radical innovations?
- From mechanical to chemical recycling
- Life cycle of bio-based plastics

## Biobased Solutions
- Nanocellulose based biomedical solutions
- Biocomposites
- Biofuels
- Biochemicals
- Ligning based binders
- Proteins

## Circular Value Added Streams
- Towards zero-waste processes
- Metals recycling
- Batteries recycling
- Carbon neutral production – minimizing CO2
- Nutrient recycling

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**Synthetic Biology**

**New Business Models & Digital Transformation**

**Building & Construction**

**Climate**
Example of Finland-based Circular Ecosystem

Joint industry-academia project
- 8 large companies
- 14 SMEs
- 2 cities
- 4 universities
- 2 Research centers (GTK, VTT)
- 21 M€ budget

Key topics
- Sustainable primary resources
- Value addition in metal refining
- Battery recycling
- Precursors and active materials
- Circular business ecosystems
THANK YOU!

MR. JARMO HEINONEN
SENIOR DIRECTOR, INNOVATION ECOSYSTEMS INDUSTRIES
BUSINESS FINLAND
Future of biomaterials

Jussi Manninen
Executive Vice President
VTT Technical Research Centre of Finland
Kickstart your bio-based business in Finland

Helvi Väisänen
Senior Adviser
Business Finland

#BuildBackCircular #CircularNordics www.nordiccircularhotspot.org
KICK START YOUR BIO-BASED BUSINESS IN FINLAND

Mrs. Helvi Väisänen
Senior Advisor, Invest in Finland
Business Finland
BUSINESS FINLAND MISSION IS SUSTAINABLE GROWTH, RENEWAL AND SUCCESS

Promoting Innovation
Promoting Exports for SMEs
Attracting foreign investments and travelers

Tools
• Research and innovation funding
• Guidance and coaching
• Networking and contacts
• Expertise and vision of our domestic and international networks
• Theme programs

INTERNATIONAL GROWTH
BEST ECOSYSTEMS IN THE WORLD
WHY WORK WITH FINLAND?
FINLAND OFFERS AN EXCELLENT PLATFORM

THE BEST primary education in the world \(2\)

THE BEST business environment in the world \(1\)

THE BEST destination in EU for international business expansion \(3\)

THE BEST country in the world \(8\)

THE BEST university – industry research collaboration in the world \(1\)

THE BEST in the world in innovation \(9\)

THE MOST stable country in the world \(4\)

THE BEST destination in EU for international business expansion \(3\)

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BUSINESS OPPORTUNITIES IN

BIO & CIRCULAR ECONOMY
Kick start your bio-based business.

CLEANTECH
Greenest country in the world.

HEALTH
A living lab for global cures.

ICT AND DIGITALIZATION
Brainpower for your next big thing.

TRAVEL & TOURISM
Fast growing, safe and sustainable business environment.
UNIQUE PLATFORM FOR BIO-BASED GROWTH

RENEWING, STRONG INDUSTRY CLUSTER

GOVERNMENTAL FACILITATION

GROWTH & PARTNERING POTENTIAL

ABUNDANT FEEDSTOCK

WORLD CLASS COMPETENCE
FINLAND – BASE FOR INTERNATIONAL BIOPRODUCTS MANUFACTURERS
THE NEXT GENERATION OF BIOBASED PACKAGING COMES FROM FINLAND

UPM
BioVerno naphtha can be used in bioplastics for paperboard packaging. Lappeenranta biorefinery utilises tall oil for the new bioplastic cartons.

KOTKAMILLS
ISLA® Duo is an easily recyclable cupstock based on dispersion barrier.
- Winner of the NextGen Cup Challenge 2018.

STORA ENSO
Fibre-based, 100% recyclable EcoFishBox is free from expanded polystyrene with minimal plastic content.
- World Star Winner 2017
- World Star Sustainability Award Gold Medal 2017

HUHTAMÄKI
Signed a deal to supply McDonald’s with sustainable paper straws in the UK and across Europe.
RESEARCH-BASED SPIN-OFFS WITH REVOLUTIONARY PACKAGING SOLUTION

**PAPTIC®**
is a new material replacing paper and plastic in packaging.
- Winner of Bio-based Product of the Year 2017
- 2nd position in Bio-based Material of the Year 2017
- Winner of the ExpoLive Innovation Award Grant

**WOODLY®**
is a new type of wood-based packaging material that can be used to substitute plastics.

**SULAPAC®**
is a biodegradable and microplastic-free material that has plastic-like properties, yet it biodegrades completely.
- World Star Winner 2017
- Winner of Green Alley Award 2017

**JOSPAK**
offers a recyclable cardboard tray with 85% less plastic.
- WorldStar 2019 and ScanStar 2018 awards
FINLAND - THE EPICENTER OF BIOBASED GROWTH

NEW, COMMERCIAL ADVANCED PRODUCTS
- 100% renewable diesel
- Microfibrillated cellulose
- Pyrolysis oil
- High-quality barrier board
- Cross laminated timber
- Kraft lignin

NEW PRODUCT DEVELOPMENTS
- Wood based textiles
- The next generation bio-based packaging
- Bio-composites
- Lignin applications
- Bio-based chemicals

OPEN INNOVATION ECOSYSTEMS
- ExpandFibre
- Cliq Innovation
- Telaketju- Co-Innovation of circular economy textiles
- SEED –digital transformation of biobased industry
- FinCeres
Future High Performance Ecosystems (HPE) in Bio and Circular economy

**TEXTILES**
- Sustainable textiles
- TELAKETJU2
- New Cellulose and Fibre products
- Äänekoski

**PACKAGING**
- BeLight
- Packaging Valley
- Package Heroes, SA
- Piloting alternatives for plastics, EAKR

**PLASTICS**
- Griffin GE, Plast to Value
- Riihimäki
- Kilpilahti

**CIRCULAR VALUE ADDED SIDESTREAMS**
- Neste, VETURI
- BATCIRCLE, BATTRACE
- SYMMET
- Carbon cycle 2020
- Nutrient Recycling
- Biochemicals, Lignin
- Optibark

BF funded ecosystem project
BF funded strategic research
BF funded business ecosystem (companies)
National expertise centre
Regional industry parks
Ecosystem platform O
EU research infrastructure
National flag ship project
INVEST IN FINLAND
– SERVICES FOR FOREIGN COMPANIES

Opportunity analysis
Exploring entry alternatives
Data collection & analysis
Facilitate Corporate Networking
Location management
Setting up a business
Our comprehensive services are confidential and complimentary
KIITOS
THANK YOU

Mrs Helvi Väisänen
helvi.vaisanen@businessfinland.fi
Bio-based solutions
company cases
Bio-based solutions company cases

Tapani Holappa
Sales Director
Pyroll Packaging
Bio-based solutions company cases

Emmi Kavander
Chief Communications Officer
NordShield (Nordic BioTech Group)
Harnessing the indisputable power of nature
Vision

We want to substitute all usage of non-renewable ingredients and heavy metals in antimicrobial treatments.
Mission

Offering and enabling adoption of antimicrobial protection that is safe for the planet and the life on it. Together with our partners, we work for the best tomorrow.
NordShield® antimicrobial technology:
A revolutionary, unique combination of naturality and power

NordShield® provides scalable, natural based antimicrobial technology that has the required efficacy for the market and is durable.
A physical, and yet invisible, armor to inactivate viruses and bacteria

- All qualities of the fabric incl. look, touch, feel, smell and colors remain the same
- The unique layer formation ensures seamless coverage of the fiber
Durable protection in the textile & sports industries

**NordShield® Fiber**

**NordShield® EcoLayr**
Anti-mold treatment for transport and warehousing

**NordShield® BioLayr**
Non-biocide for consumer area:
Durable antiviral and antibacterial treatment

**NordShield® Pathogen Barrier**
For medical area:
Durable pathogen barrier against viruses and bacteria, classified as medical device
Antiviral and antibacterial disinfectants with long lasting NordShield® antimicrobial protection

NordShield® Brilliant series

- Brilliant Surfaces
- Brilliant Mask Armor
- Brilliant Hands
- Brilliant Fresh

NordShield® acts as armor, inactivates the bacteria or virus, and stops them from spreading
NordShield® has a sustainable lifecycle, serving circular economy

Trees → Forest Industry → Production side streams → NordShield® → Example on NordShield® BioLayr

Renewable ingredients

Biodegradable fiber treatment technology
Summary:
NordShield® has developed and commercialized a unique and irreplicable antimicrobial technology that solves a wide range of global environmental issues, with application areas that are nearly endless.

NordShield® offers worldwide unique, scalable, natural based antimicrobial protection.

Together with our partners and stakeholders, we want to create the best tomorrow.
Bio-based solutions company cases

Pia Qvintus
Business Development Director
Spinnova - The Sustainable Fibre Company
OUR SOLUTION

A breakthrough technology for a new, environmentally friendly textile fibre made directly from wood pulp or side streams without dissolving and harmful chemicals.
Spinnova is a technology platform that can convert many raw materials in the most sustainable textile fiber.

- Zero harmful chemicals
- Zero waste
- CLOSED PROCESS
- Evaporated water
- Drying
- 0% ZERO PERCENT HARMFUL
- Patented Spinning Technology
- Spinnova scope

AGRICULTURAL WASTE
WOOD
TEXTILE WASTE

Spinnova scope
Key Technical Differentiators

**Spinnova**

**Mechanical treatment**
- Refining wood fibres into micro fibrils.
- Grinding pulp mechanically
- Feedstock is micro fibrillated cellulose
- Dry spinning and drying
- No dissolving or harmful chemicals
- No washes / rinses
- No side / waste streams

**Man-made Cellulosics**

**Dissolving**
- Chemically breaking wood fibres into cellulose polymers.
- Chemically dissolving wood fibres into a polymer solution
- Feedstock is dissolved pulp
- Wet spinning with harmful chemicals
- Several wash and rinse cycles
- Side and waste streams*

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* Lyocell uses a complex chemical process, however in a closed cycle, so it’s more sustainable than a viscose process.
Our Sustainability Promise

NO MICROPLASTICS

0%

As Spinnova is made of wood, there are zero microplastics in the Spinnova fibre. It will never pollute our oceans and the life within them.

ALL NATURAL

100%

The Spinnova fibre is completely natural. Our raw material commitment is to only use FSC and/or PEFC certified wood or cellulosic waste streams.

BIODEGRADABLE

100%

At the end of its life, the Spinnova fibre can return to nature quickly. Taking just a few months to biodegrade in natural and marine environments, it has a fast end of life, leaving nothing harmful behind.

LESS WATER USE

99%

To be exact, our water use is 99.5% less than cotton’s over the entire lifecycle from farming to fibre process. While cotton plants rely on heavy watering, trees don’t. No water is added during our process.

NO HARMFUL CHEMICALS

0%

We are experts on how we can make material, such as pulp, behave as we want it to. This is how we have created a process, where wood fibre does not need dissolving with harmful chemicals. Instead, we refine it mechanically.

MINIMAL CO2 EMISSION

CO2

Over the entire lifecycle, our emissions are considerably less than cotton’s. Starting with our raw material, responsibly farmed wood, which helps our planet breathe. Trees grown this way absorb more CO2 from our atmosphere than lumbering and pulping emit. Combined with our low-emission tech, we help to counteract climate change.
Another unique feature of the Spinnova fibre is that it can be upcycled in our process without losing quality or need to add virgin fibres. Always without using harmful chemicals. A whole new world of opportunity for real circularity, without sustainability shortcuts!
Circular Ecosystem of the Future by Spinnova

Wood or waste

SPINNOVA VIRGIN FIBRE

BRAND TAKEBACK PROGRAMME

Amazingly Circular Fibre

A NEW ITEM

No dissolving, no harmful chemicals.

AN ITEM

BRAND MANUFACTURER

SPINNOVA REUSE FIBRE

BRAND TAKEBACK PROGRAMME

BRAND MANUFACTURER
• Industrial pilot factory production in Finland
• 1st commercial mill in production in the end of 2022
• Wood-based kraft pulp first commercial raw material
• Waste stream based fibres also in R&D pipeline
• Commercializing with brands; e.g. Bestseller, Bergans, H&M and Marimekko
• Several demo product launches coming in the near future
Thank you!

pia.qvintus@spinnova.fi
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BUSDINESS
FINLAND
• **Nordic perspective on circular economy**  
  Cathrine Barth, Circularities

• **Circular industrial locomotives**  
  Susanne M. Nævermo-Sand, Celsa Nordic

• **Visual intelligence as fuel for circular innovation**  
  Hanne Wetland, Knowit

• **Panel discussion**  
  with Cathrine Barth (Circularities), Susanne M. Nævermo-Sand (Celsa Nordic), Hanne Wetland (Knowit) and Marthe Haugland (Nordic Innovation)

• **The Nordic Circular Hotspot Partnership Program**  
  Einar Kleppe Holthe, Natural State

• **Q&A dialogue with the audience**
Nordic perspective on circular economy

Cathrine Barth
Founder & Circular Strategist
Circularities
Circular industrial locomotives

Susanne M. Nævermo-Sand
Sustainability & Communication Manager
Celsa Nordic
With our customers we build a greener society, for the future generations.

Steel is 100% recyclable. Recycled steel maintains the inherent properties of the original steel.

Our value chain is based on the circular economic principles:

**REUSE**
Let your scrap be recycled in Europe's cleanest manufacturing process and get a new life as climate-smart reinforcing steel.

**PRODUCE**
Nordic sustainability. Renewable reinforcing steel manufactured with hydropower and passion.

**APPLY**
With our customers we build a greener society, for the future generations.

**RECYCLE**
Steel is 100% recyclable. Recycled steel maintains the inherent properties of the original steel.
STEEL IN THE CIRCULAR ECONOMY

A SUSTAINABLE CIRCULAR ECONOMY IS ONE IN WHICH SOCIETY REDUCES THE BURDEN ON NATURE BY ENSURING RESOURCES REMAIN IN USE FOR AS LONG AS POSSIBLE.

STEEL COMPONENTS CAN BE EFFECTIVELY REUSED, REMANUFACTURES, OR RECYCLED.
BY KNOWING THE ACTUAL IMPACT OF EACH STAGE OF A PRODUCT’S LIFE, WE CAN MAKE THE BEST DECISIONS ON WHAT MATERIALS WE SHOULD USE.

We are no better than the weakest link
Renewable reinforcing steel manufactured with hydropower and passion
Visual intelligence as fuel for circular innovation

Hanne Wetland
Business Designer
Knowit
Visual intelligence as fuel for circular innovation

@hannewetland
Innovation nerd and facilitator

Hanne Wetland – LEARN FROM 500 INNOVATION PROJECTS

YouTube

Want to see more and join us at next years conference? Get your tickets at y-oslo.co...
The innovation methods we use are made for a linear economy.
Customer is king

Growth hacking

Jobs-to-be-done

problem-solution-fit

Customer journeys

Lean innovation

Potential market

Early adoptors

Innovation accounting

product-market-fit
I.e.
We need other innovation methods for a circular economy.

Systems are super.
How might the nordics become an industrial supersymbiosis?
Key question for innovation

From:
How do you solve your customers problems?

To:
How do you make a circular system better?
We are used to do innovation inside of organisations
From this
To this

System thinking

Design thinking

Lean Startup

Agile

Continuous Adaptation

Recruit

Understand

Take responsibility

Collaborate
To this
We must all act at the same time
Circularity is not a text. It’s a map - visualise it!
We should all be able to work like this
Or this
Five system perspectives
Currently applied in two circular innovation programs
Value circles

Goal
Give everyone access to understanding and mapping out the tangible and intangible circular flows within a system. Making sure we all see the same picture.

I.e.
How food, lawn movers or other resources flow through society.
Every resource has its color

1. Black: emissions
2. Grey: Pollutants and mixed waste
3. Orange: Product
4. Light green: material 1
5. Dark green: material 2
6. Light blue: Energy
7. Dark blue: Money
8. Purple: data
The meaning of arrows

- Colour = type of resource
- Density = amount/value
- Stripe = Velocity/scarcity/existence
1) Choose main character resource flow.
2) Place out all organisations.
3) Draw resource-flows in this sequence:
   a) Main character resource
   b) Means of transport
   c) Waste sidestreams
   d) Emissions and pollutants
   e) Money
   f) Data
Invercote

Dokumentasjon

Embalsey/Plastik

Honi

knowit
> Common infrastructure

**Goal**

Make organisations aware of the system they rely on. The highway they all use - or need - to be able to effectively circulate resources, and thrive

i.e.

Watersystem, wastesystem, roads, the grid, thermal heat system, ecc

What should be centrally controlled infrastructure, and what should be left to the competition?
Goal
Describe what activities are done - or what needs to be done - in order to close a circular flow or create a circular market dynamics. Activities are described neutral without relating them to an organisation.

I.e.
For used building materials to be reused. For boats to be shared.
I.e. Reuse of building materials

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> Sub-systems

**Goal**
See what subsystems different organisations use. Create effective flows based on knowledge of the volume hidden in amounts of small operations.

I.e.
We all purchase and waste bread. The industry all uses plastic films to wrap their stuff.
Goal
Discover the unintended unwanted consequences of our actions. See how the system preserve its negative effect even when we believe we do right.

I.e.
Electric cars filling up the public transport lane causing queues and idling emissions. Service models making us use more stuff.
Thank you
@hannewetland
Panel Discussion

Cathrine Barth
Circularities

Susanne M. Nævermo-Sand
Celsa Nordic

Hanne Wetland
Knowit

Marthe Haugland
Nordic Innovation
Nordic Circular Hotspot Partner
Program for market development

Einar Kleppe Holthe
Founder & CEO
Natural State

Natural State
The Nordic Circular Hotspot is launching a Partnership Programme for strategic, systemic and more efficient circular market development in the Nordics. We invite both the corporate segments, the private and public sectors and the regulatory & societal silos in the Nordic market sphere for cross segment, cross sector and cross silo circular collaboration in the Nordics. We are now developing a digital circular economy stakeholder platform called the Nordic Circular Arena, which we will pre-launch in June 2021.
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