

Together towards bioeconomy

Natural Resources Institute Finland, 2017

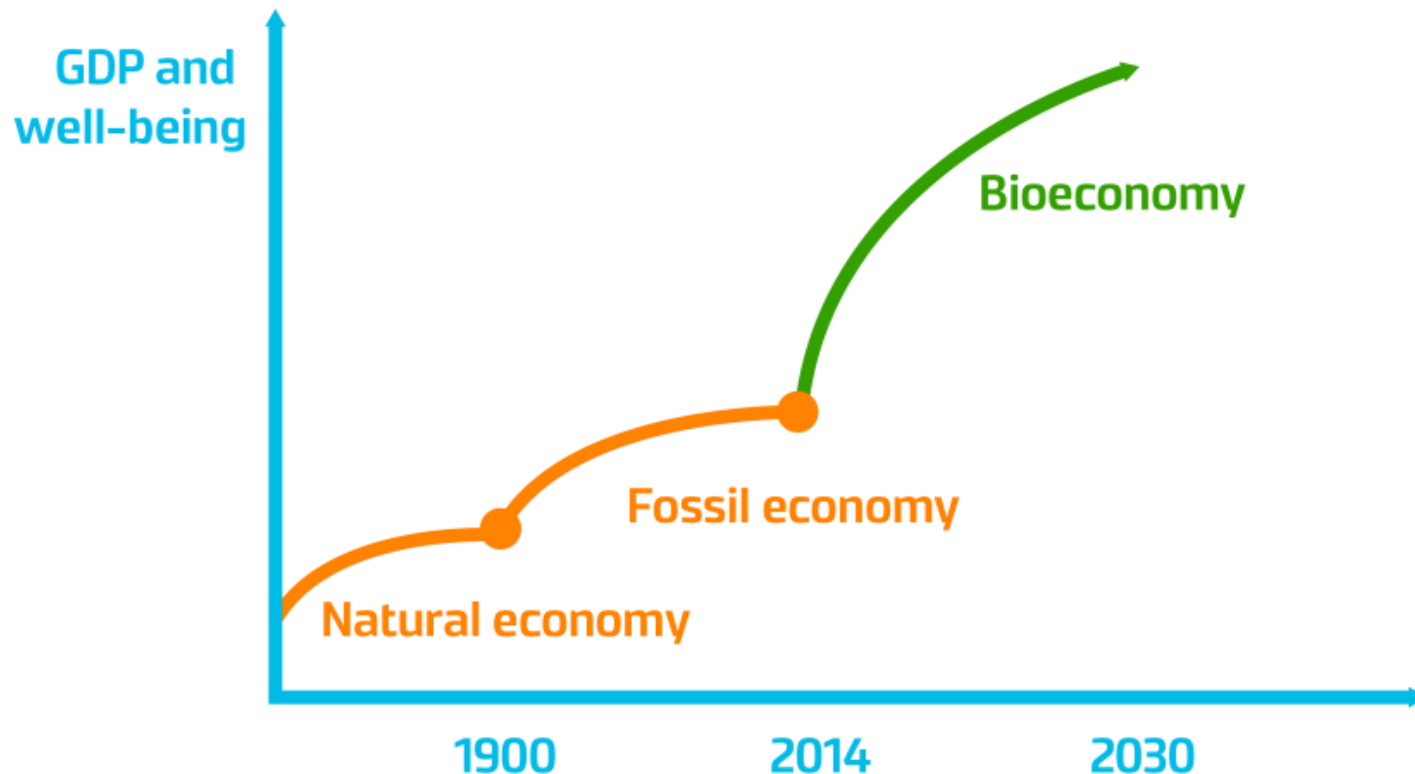
Contents of presentation

What is Luke ?

Organization of (forest related) research

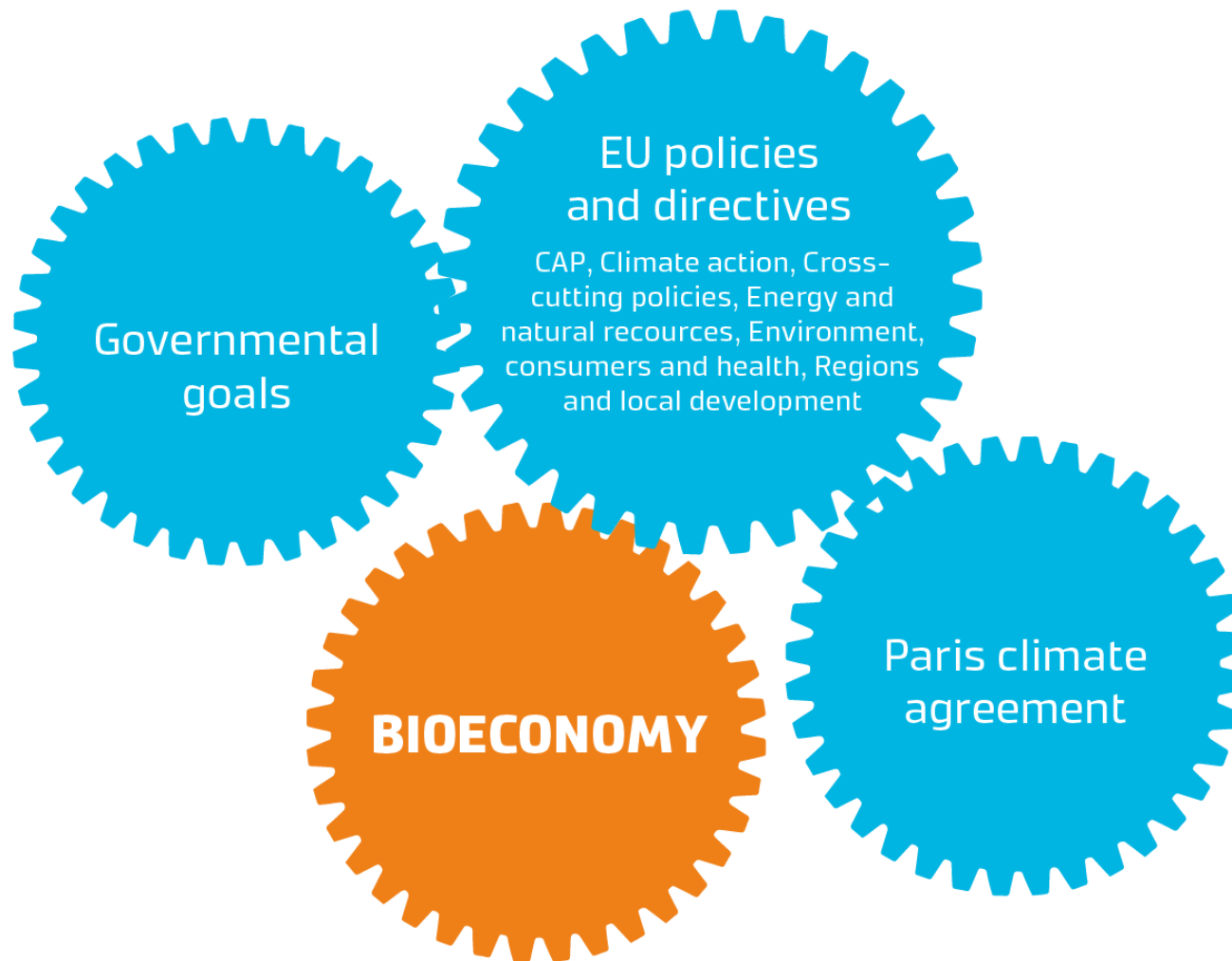
Focus of wood products related activities

Bioeconomy – the next wave of sustainable economy

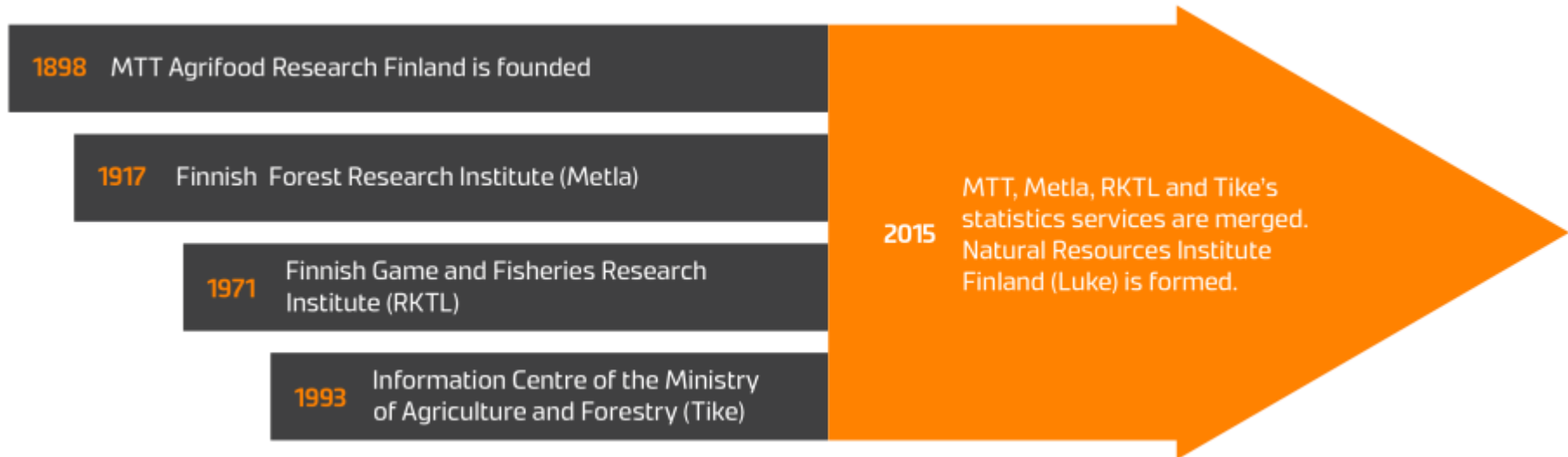


Source: Kestävää kasvua biotaloudesta, Suomen biotalousstrategia, 2014

Political and operational environment support rise and mainstreaming of bioeconomy



Over 100 years of research excellence





We are
Luke

Luke is located throughout Finland

Locations

Joensuu, Jokioinen, Oulu
Helsinki, Jyväskylä, Kokkola, Maaninka,
Paltamo, Rovaniemi, Seinäjoki, Turku

Experimental stations

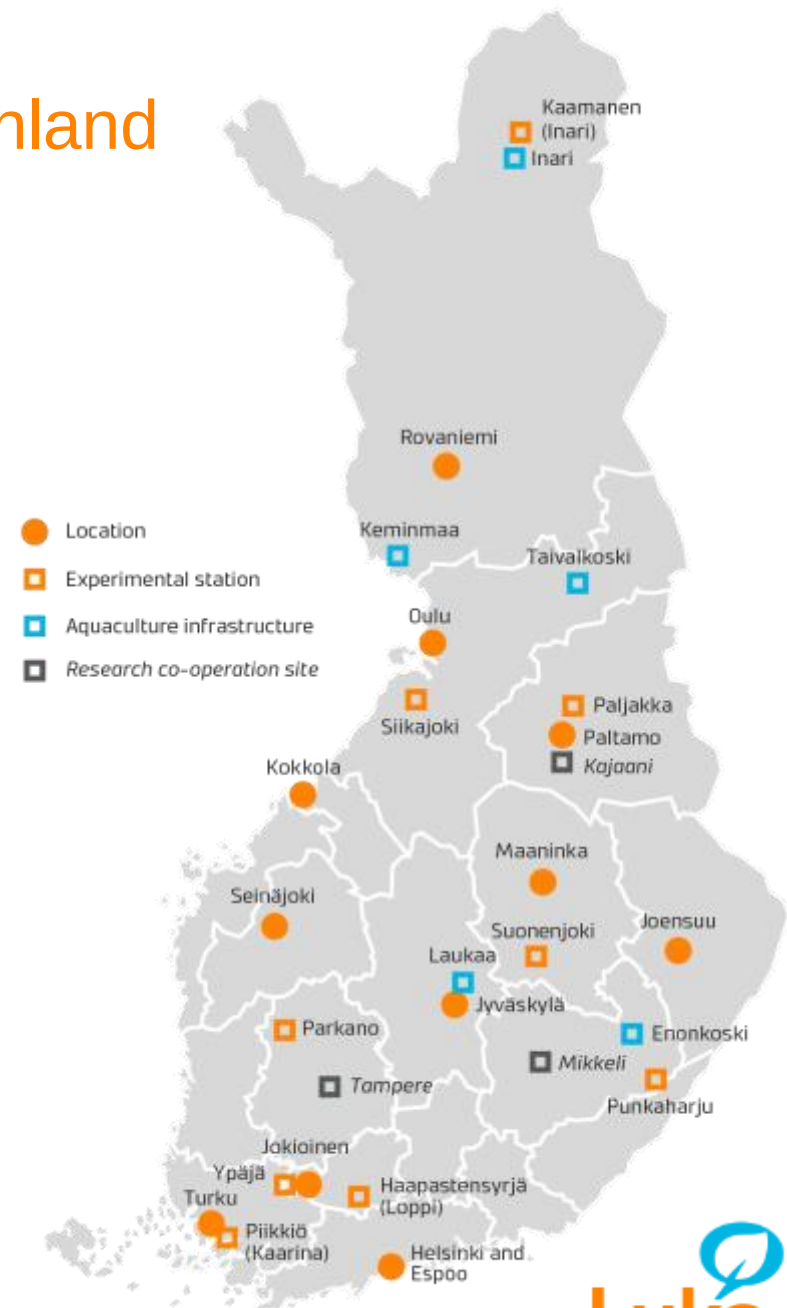
Haapastensyrjä, Kaamanen, Paljakka,
Parkano, Piikkiö, Punkaharju, Siikajoki,
Suonenjoki, Ypäjä

Aquaculture infrastructure

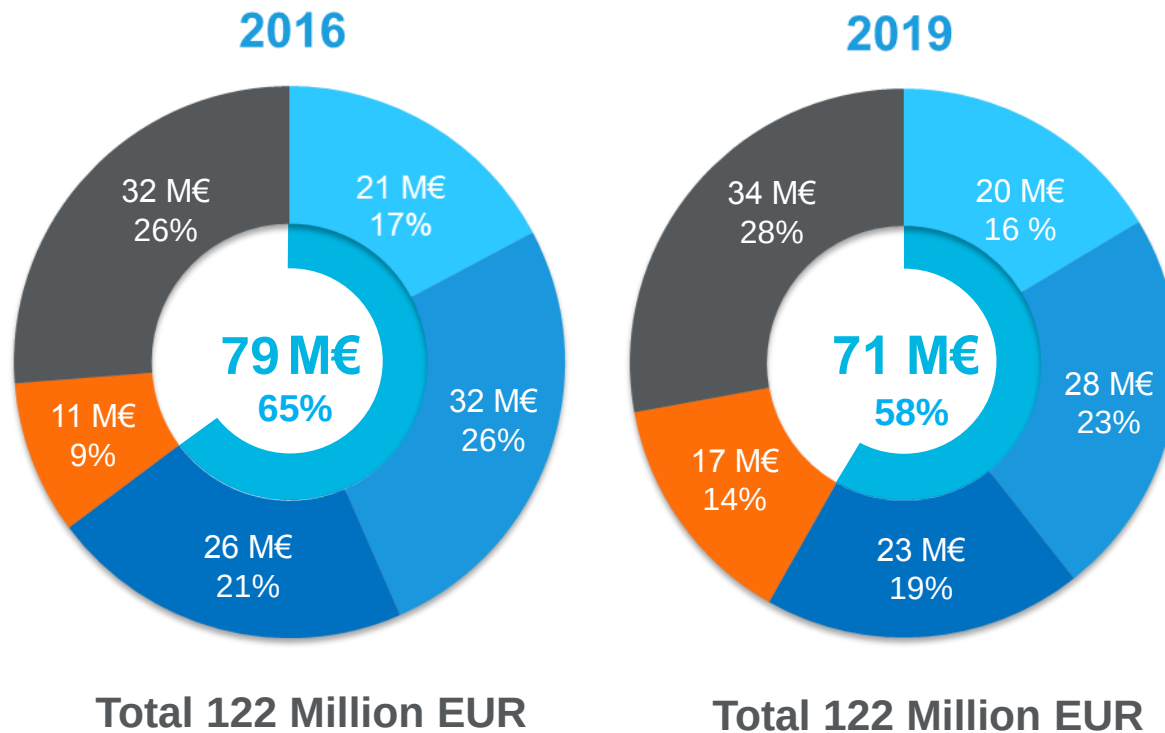
Enonkoski, Inari, Keminmaa, Laukaa,
Taivalkoski

Research co-operation sites

Kajaani, Mikkeli, Tampere



Financial structure

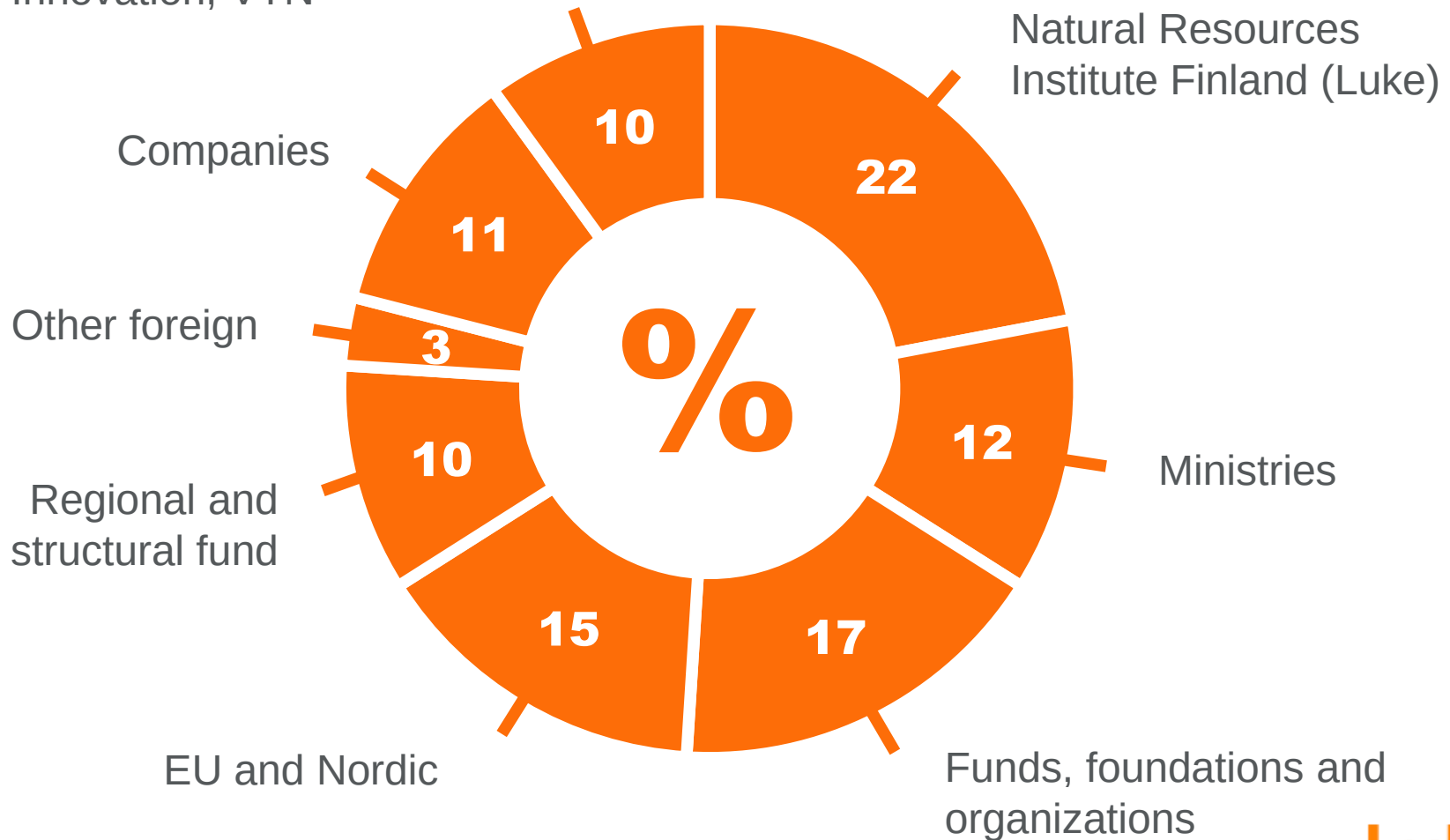


Budget funding

- Statutory services
- Self-financed share of public pre-competitive research
- Strategic research
- Customer funding
- Public pre-competitive funding

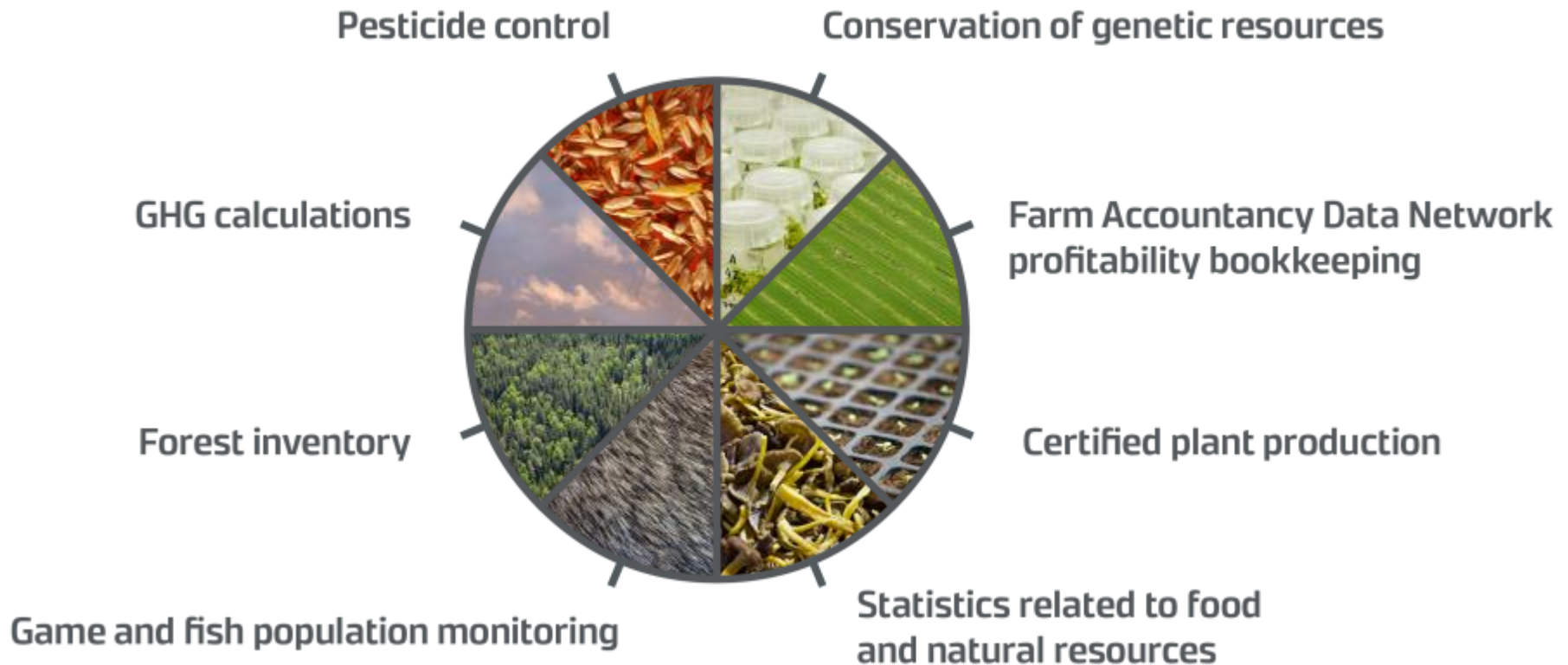
Funding sources

Academy of Finland,
Tekes – the Finnish Funding Agency for
Innovation, VTN



Statutory services

Based on legislation, Luke conducts statutory services.
We take of care of

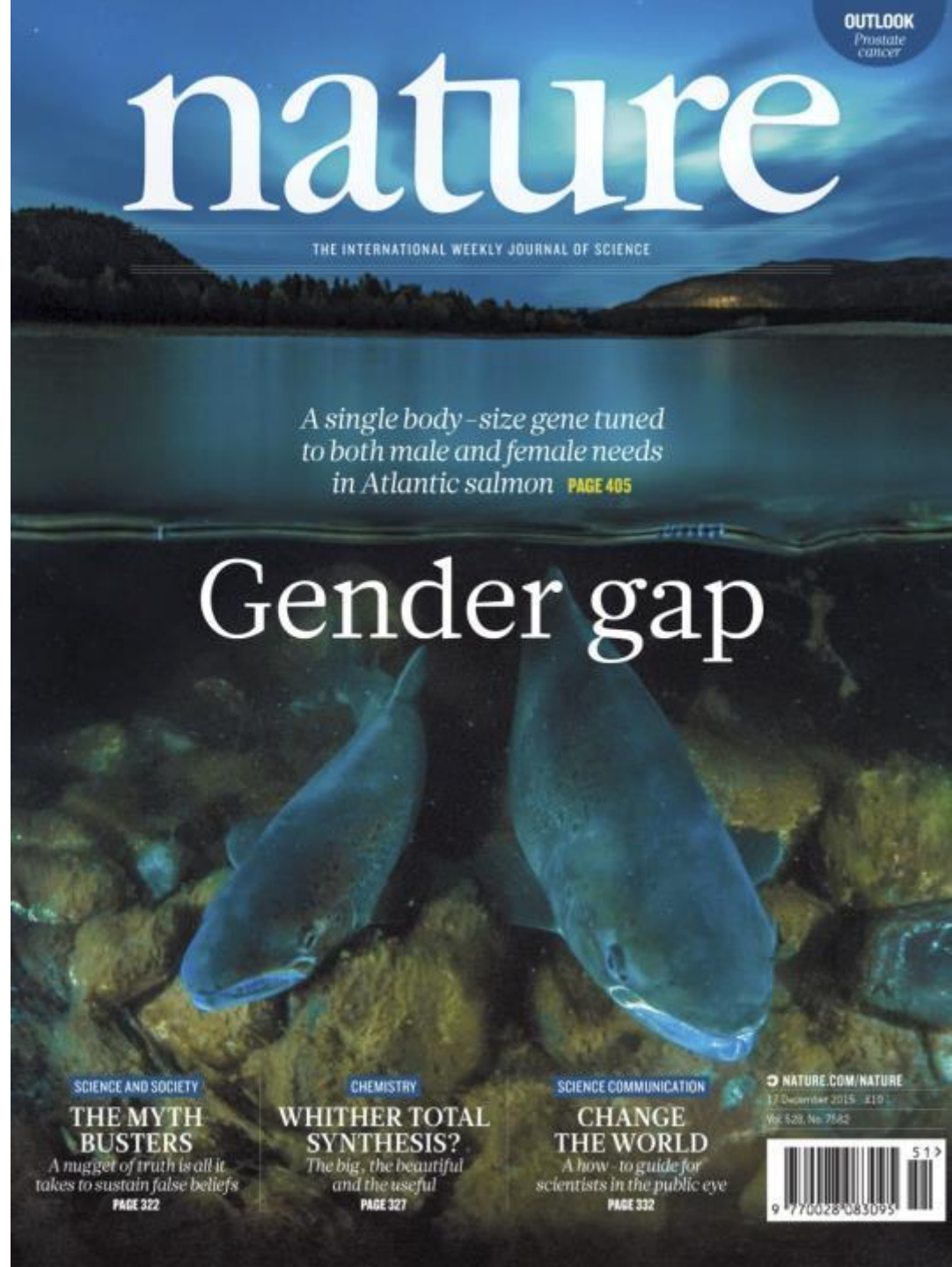




Our impact

Scientific activity

- 715 on-going research projects, including 50 EU projects.
- 570 scientific peer-reviewed articles in 2016



Societal impact

- Luke's expertise is highly appreciated in legislative and policy preparations;
 - Luke provides policy support related to natural resources (forest policies, agricultural policies, fisheries policies, rural policies, game and wildlife policies, climate and energy policies, environmental policies)
- Luke's experts are invited and participate in many governmental expert committees, national and international expert bodies and working groups
- Luke's experts are widely consulted in the hearings of permanent special committees of the Finnish Parliament, often related to major legislative projects



Luke's strategy for international activities



Get in touch and join us!



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in English: [@LukeFinlandInt](https://twitter.com/LukeFinlandInt)



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Blogs
www.luke.fi/blogi/



Customer magazine Leia
www.luke.fi/leia/



Newsletter
www.luke.fi/uutiskirje/



Publication series:
Natural Resources and Bioeconomy
www.luke.fi/en/publications/



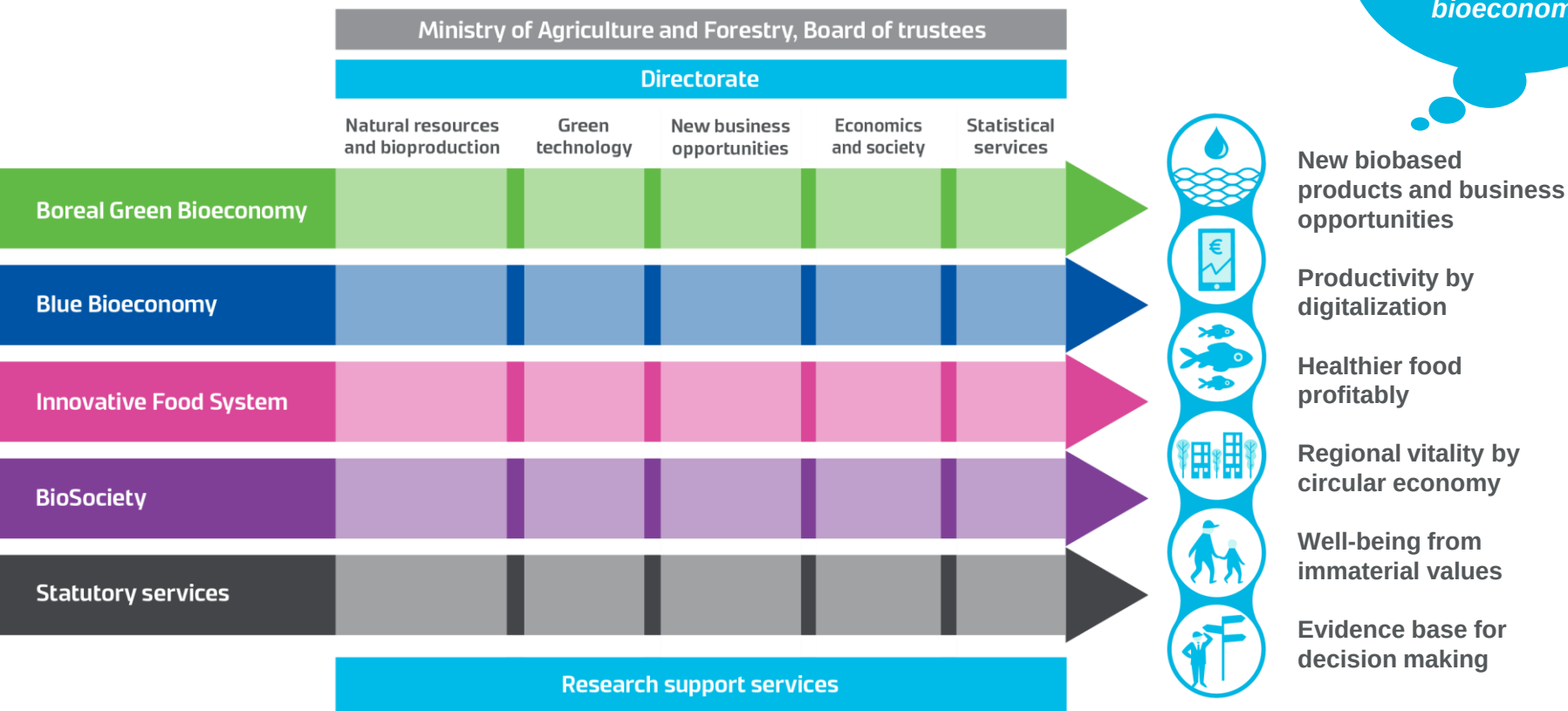
Events
www.luke.fi/tapahtumat/



Focus areas of research

Natural Resources Institute Finland (Luke)

Growth and well-being from sustainable bioeconomy



120 M€

Turnover

100 M€

Research & customer portfolio

20 M€

Statutory services

25

Locations in Finland

HQ in Helsinki

Present in 11 campuses with universities, research institutes and polytechnics

1300

Employees

50 research professors
650 researchers

We are one of the four Statistical Authorities in Finland.

We contribute for the European Statistical System and for the international statistical framework for the UNECE and OECD statistics.

Boreal Green Bioeconomy

5. Bioeconomy products, services and value chains

- Wood products industries
- Green building concepts and urbanization
- Wild forest products
- Services from nature-based well-being and health

1. Biomass production

- Intensification of bioproduction
- Abiotic and biotic risk management
- Improvement of biodiversity
- Precision breeding

3. Harvesting and logistics

- Digitalization and big data
- Supply chain and logistics
- Machine concepts
- Human-machine interactions

4. Biorefineries and industrial symbioses

- Biorefinery potential of biomass
- Biomass conversion technologies
- Industrial symbioses and biocircular economy

2. Resource-smart planning and decision making

- Data on demand
- Regional scenarios
- Land use optimization and closure of yield gaps
- Sustainability, acceptability and biodiversity

Innovative Food System

Innovative primary production

- Sustainable and competitive plant production systems
- Sustainable and competitive animal production systems
- Optimal utilization of genetic potential of livestock and plants by genomics
- Novel primary production concepts

Circular economy in food system

- Nutrient recycling
- Food waste minimization and efficient concepts
- Sustainability assessment

Smart agriculture

- Smart farming
- Smart food chain
- BigData and Data mining applications

Healthy and sustainable food and feed

- Resource-efficient processes
- Ingredients with added value
- Food quality and safety

Consumers and markets

- Understanding the customer
- Consumer-oriented creation of business value
- Development of product and service chains

BioSociety

Assessment of overall sustainability

- Sustainable technologies and digitalisation in society
- Assessment frameworks and models in overall sustainability
- Policies promoting overall sustainability

Market functionality and Competitiveness of Finnish Bioeconomy

- Institutions and structures
- Economic efficiency
- Bioeconomy strategies
- Foresight of global drivers
- Price, volume and export possibilities

Structural change of enterprises, entrepreneurship and regions

- Land ownership
- Diffusion of technologies and new business models
- Climate smart and competitive regions
- Economic structure in regions

Climate, energy and natural resources policies

- Cost efficiency of policy instruments
- Impact analysis
- Coherence of policies
- Information on risks for decision-making

Reconciliation of the natural resources use

- Analysis of immaterial values
- Solutions and tools of natural resources multi-use
- Sustainability of the natural resources use
- Human welfare from nature, new business models

Blue Bioeconomy

Blue bioproduction

Sustainable production of water-based food and other bio-products

- Breeding and genetics of aquaculture species
- Multidisciplinarity in commercial fishery value chain and in valorisation of algae
- Recirculating aquaculture system infrastructure

Nutrient circulation and industrial symbioses

Control of nutrient leaching and utilization of side streams and new production technologies

- Symbiosis between aquatic production and forest industries
- Nutrient fluxes in water and soil

Added value from aquatic biomasses

Added value products as a part of water-based business

- Multidisciplinary approach on aquatic value chains
- Expertise on biochemical and chemical analysis
- Fractionation methods

Sustainable use of aquatic ecosystems

Reconciliation of contrasting interests in aquatic resource use

- Potentials and constraints on the use of aquatic resources
- Solutions for sustainable resource use

Blue well-being and tourism

Development of services based on recreational and nature values of water

- Multidisciplinary expertise in man-nature relationship and nature tourism
- Blue care concept
- Sustainability of recreational use of water environments

Boreal Green Bioeconomy 2016-2020

Programme manager: prof. Antti Asikainen
Natural Resources Institute Finland
antti.asikainen@luke.fi

Vision

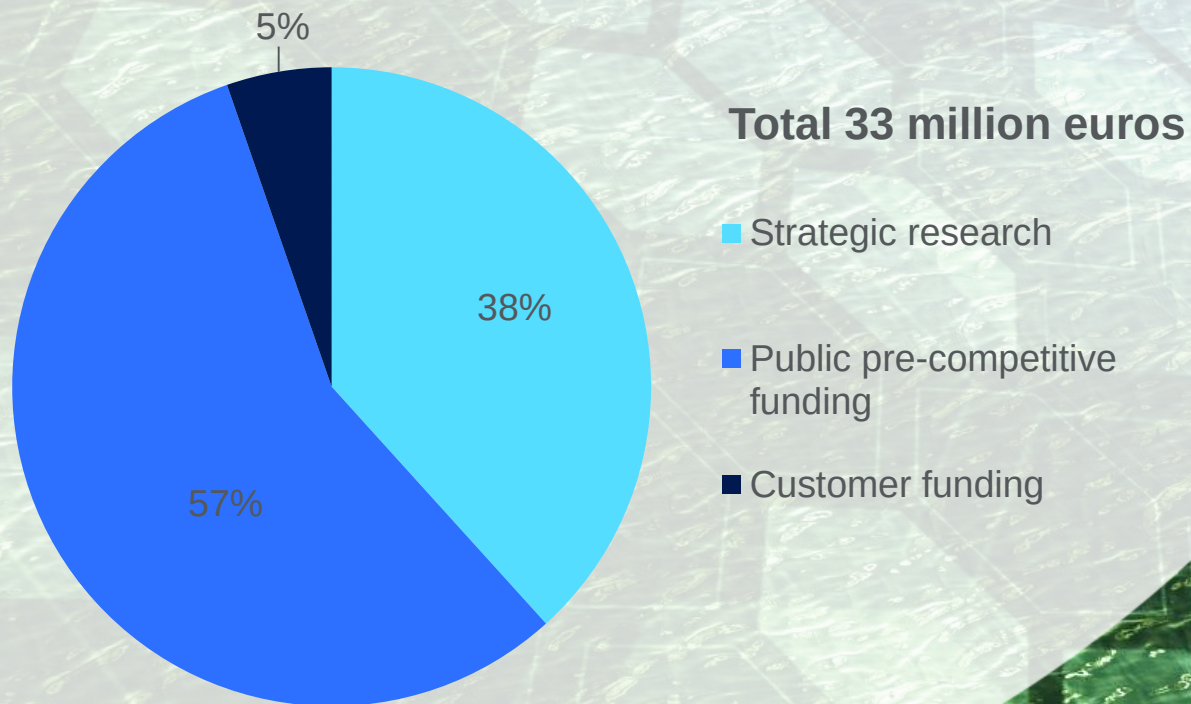
Scientific knowledge and solutions produced by Boreal Green Bioeconomy are boosting boreal region to a leading role in sustainable bioeconomy.

Focus areas of the programme and persons responsible for them

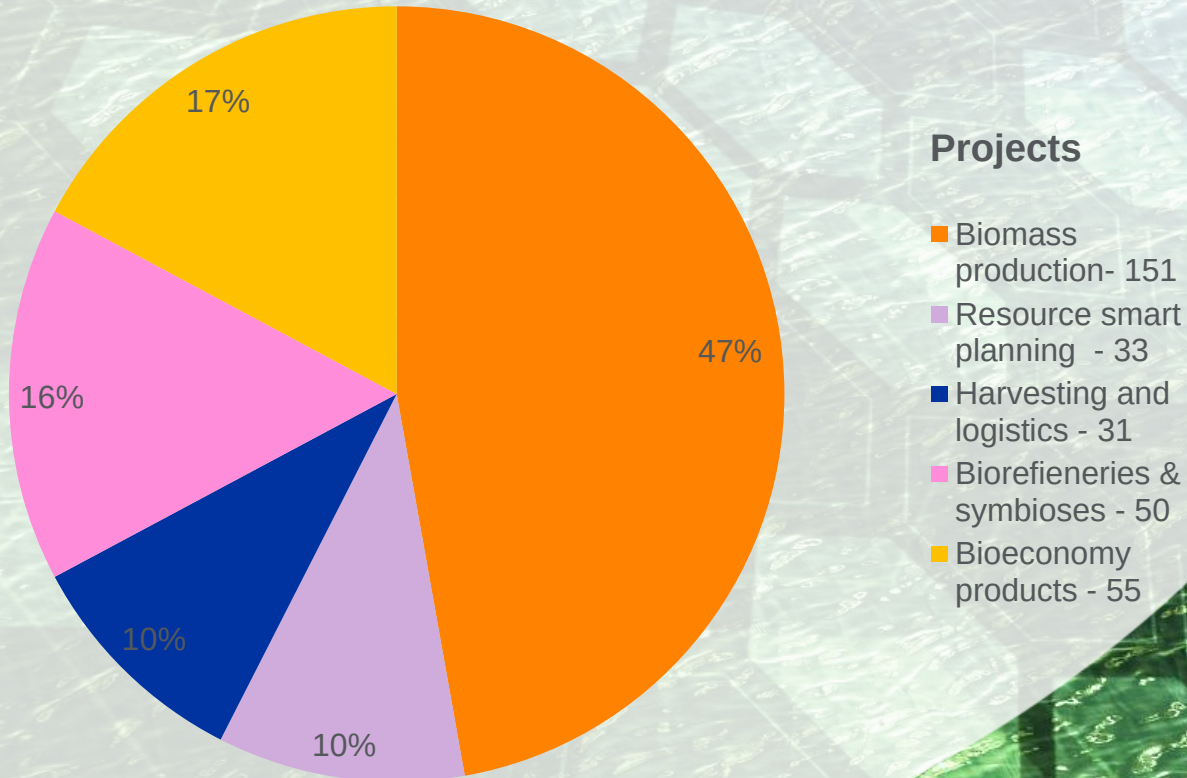
- Module 1: **Biomass production**
 - Jari Hynynen and Leena Finér
- Module 2: **Resource-smart planning and decision making**
 - Tuula Packalen and Pirjo Peltonen-Sainio
- Module 3: **Harvesting and logistics**
 - Liisa Pesonen and Juha Laitila
- Module 4: **Biorefineries and industrial symbioses**
 - Sirpa Kurppa and Risto Korpinen
- Module 5: **Bioeconomy products, services and value chains**
 - Erkki Verkasalo and Mikko Kurttila



Project suitcase and funding



Projects by focus areas



Focus area "Bioeconomy products, services and value chains"

- Erkki Verkasalo & Mikko Kurttila

Research focus

1. Wood products industries, products and value chains
 - Competitive properties, sources and end-uses of wood-based raw materials for new and improved wood and composite products in building, living and logistics industries
 - Resource and environmental efficiency, cascading and economic profitability of wood-based raw materials, processing, industrial networks and value chains
 - Future product and service markets, sustainability and end-user preferences in consumer and industrial uses
2. Green building concepts and urbanization
 - Green infrastructure, wood in environmental building, built green environments and cascading
 - Health and welfare effects of wood and indoor air in building and living

Research focus

3. Services from nature-based well-being and health

- Effects of multi-sensor (visual, sound, scent, touch) real and virtual nature experiences
- Building and evaluating new business concepts and services, including various nature activities such as hunting and berry picking
- Establishment of novel virtual nature research environment

4. Business concepts on wild forest products

- Raw material availability, sustainable production and utilization of wild forest products (including berries, mushrooms, herbs, game and other non-wood forest products)
- Competitive properties, production processes and demand of wild forest product based primary raw materials and their side streams
- Business models, competition and ecosystems among wild forest product based companies
- Dismounting institutional barriers of sustainable business development



WoodBiz – Symposium on Wood Products Industries in Future Bio-economy Business

**Summary of 7th and 8th
April, 2016**

**Erkki Verkasalo
Coordinator of
symposium**



WoodBiz 2016 Communique

<https://www.luke.fi/wp-content/uploads/2016/07/WoodBiz-Julikilausuma-2016-englantiteksti.pdf>

Wood products industries constitute a strong European bioeconomy brand

Strong attention needs to be given to wood products business cluster in European industry policy and research, development and innovation programmes (RDI)

The important role, positive direct and indirect impacts, as well as the development needs of wood products business cluster needs to be acknowledged in EU decision-making and allocation of research, development and innovation resources - a necessary part of European bioeconomy.

Growth-oriented enterprises and networks should operate as agile reformers of strategic and operational models in the bioeconomy

More collaboration between enterprises, new industrial symbioses and strong RDI partnerships are required: value creation connections and innovation partnerships in business between export-oriented wood products companies and integration with industrial customers.

Decision-makers to foster intercourse between business and science

We need more diversification in the collaboration between researchers and enterprises, a development of open innovation ecosystems, a hastening of pilots and experiments and safeguarding of research funding.

Education among the wood products business cluster to foresee the needs of the future

A development leap in multidisciplinary, entrepreneurial-oriented expertise in building with wood and design education is a must.

Multi-disciplinary research on the health-promoting and well-being effects of wood products should be strengthened

RDI resources should be allocated to investigating the indoor air and health effects of building and furnishing materials, structural solutions and living environments. People spend more than 80% of their life indoors, and lots of euros are spent because of health problems owing to poor indoor air.

Focus in RDI of wood products business cluster towards its renewal through bioeconomy solutions

Expertise capacity should be increased to provide a deeper understanding of customer behaviour, demand for products and service, and supply of and markets for raw materials. Creating growth potential from new business models, digitalization, cleantech and long-lasting and responsible products is essential, using the benefits of sustainable raw materials and transparent life cycle analysis.



Lobbying European and Nordic R&D Incentives to H2020



Forest bioeconomy NRA

Recommendations for the Finnish forest-based bioeconomy R&D
By the Finnish National Support Group to the Forest-based Sector Technology Platform

4.1. Building with wood and design

Why important:

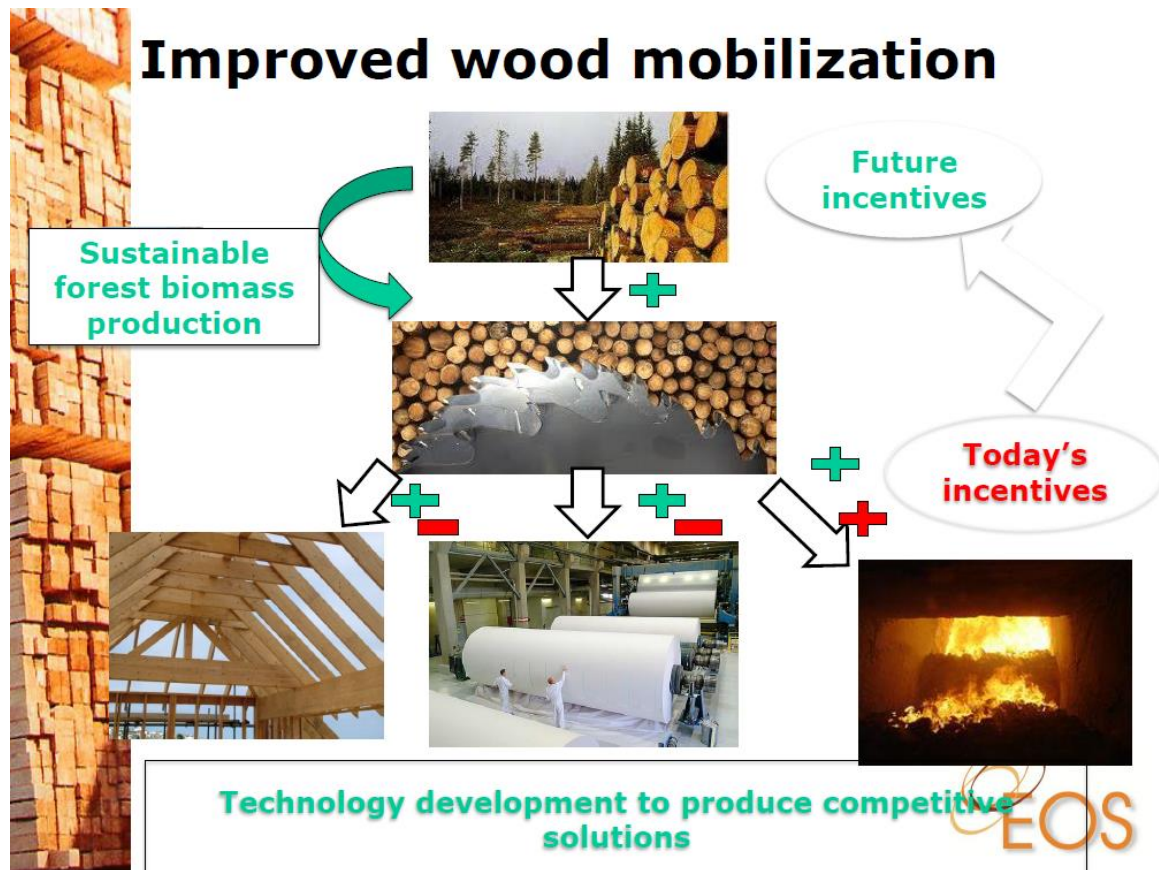
Strengthens the competence of wood products industry and secures the raw material supply for biorefiners.

Required research and innovation activities:

- Identification of barriers to sustainable construction and revision the building regulations
- Innovative construction solutions
 - Low-energy housing
- Wood-based interior systems and environmental construction product solutions
 - Design
 - Durability with sustainable measures
- Utilization of digitalization in production and housing solutions

LUKE IN EIP RMCs 2014 -

1) ECAMOB TF1 Wood Mobilisation 2014-2016 (Co-ordinators: Leena Paavilainen, Erkki Verkasalo)



LUKE IN EIP RMCS 2014 -

Novel solutions of wood mobilisation for wood-based products

Objectives												
Objectives of the commitments	NOWMOB aims to boost the capacity of EU wood-based material related sectors toward stronger economy and industry in the context of bio-economy. Accurate map of forest resources and wood availability will be elaborated on different wood species. Enhanced sustainable supply of raw materials to forest-based industries is secured through digitalization and cleantech, increasing forest production and management, matching different needs of land management, encouraging forest owners to business, improving business environment and skills of wood procurement companies and allocating wood efficiently to different wood users and mills. This leads to more thriving economy, forest-based sector, job opportunities and revenues, and commonly accepted land use in Europe. NOWMOB defines and pilots novel solutions, actions and proposals for increasing wood mobilisation, in the sense of Triple Helix.											

Participants: 12 partners (7 countries)
Erkki Verkasalo

Co-ordinator: Luke,
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LUKE IN EIP RMCS 2014 -

NOWMOB Evaluation by EC (2016)

* This RMC is likely to make a contribution to meeting the objectives, the targets and action areas of the EIP for

- Optimised raw materials flows along value chains
- Innovative extraction of raw materials and
- Processing and refining of raw materials".

* Indeed NOWMOB will develop different measures and solutions for an improved and sustainable mobilisation of wood

Activities (so far): Contacting with national stakeholders, European federations and EU lobbying agents; COSMOS proposal (H2020)

LUKE IN EIP RMCS 2014 -

Participation in other RMCs

EHIA – European Hardwoods Innovation Alliance;
co-ordinator: FCBA, France (Andreas Kleinschmit)
EFFIWOOD – Sustainable maximation of the use
efficiency of forest products; co-ordinator: FCBA,
France (Gerarad Deroubaix)

LUKE IN EU PROJECTS

Recent spearheads

Techniques and Technologies for Effective Wood Procurement, TECH4EFFECT, 2016-2019, funded by H2020

Increased effectiveness of European forest management, EFFORTE, 2016-2019, funded by EU H2020

Sustainable Regional Supply Chains for Woody Bioenergy, BioRES, 2015-2017, funded by EU H2020

Delivery of sustainable supply of non-food biomass to support a resource-efficient Bioeconomy in Europe, S2Biom, 2013-2016, funded by EU FP7

STARTREE – Non-wood forest products and multipurpose trees – A challenge and opportunity 2010-2015, funded by FP7

Wood Materials and Products in the Development of Bioeconomy 2014-2015

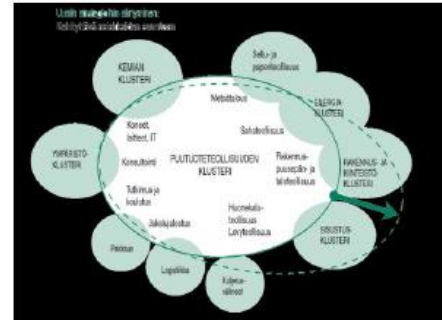
The objectives of the RTD programme are:

- to create a foundation for knowledge and expertise on which Finnish bioeconomy can be built,
- to analyze new business opportunities for wood products cluster in bioeconomy
- to add to the competitiveness of the entire forest and wood products cluster value chains

by providing knowledge of the future's wood-based raw materials, product demand and customers requirements. models.

Themes

- Wood product cluster in bioeconomy
- Wood utilization
- Wood-based raw materials
- Wood measurement
- Genetics and wood quality



Wood Materials and Products in the Development of Bioeconomy

Thematic structure





Symposium Highlights - TARGETS

- Importance of wood products cluster in the European bio-economy
- Opportunities for business, markets, products, services, and sustainable consumption
- Implications of and effects to EU-strategic processes
- Networking at international level

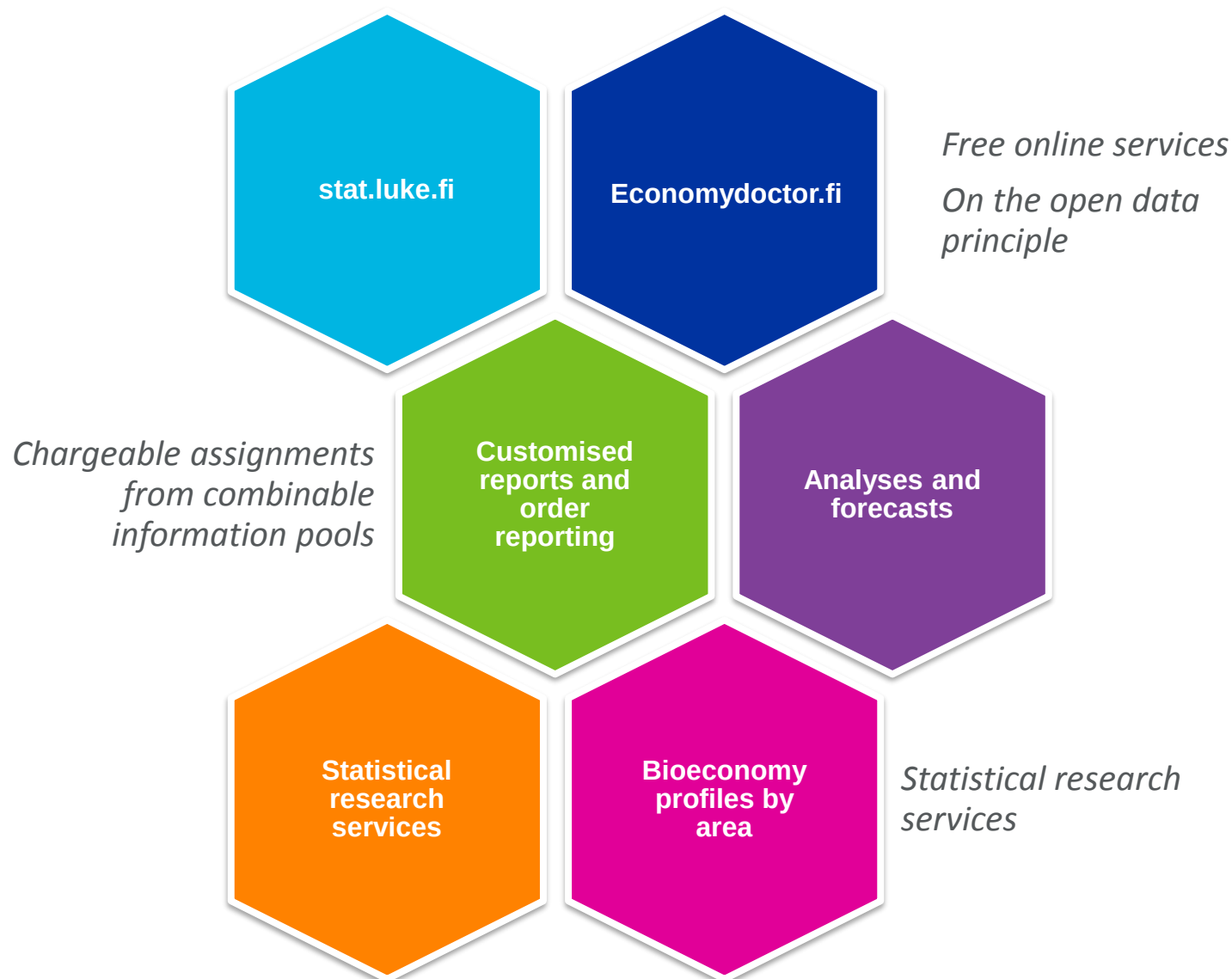
<https://www.luke.fi/en/news/woodbiz2016-symposium-experts-claiming-wood-products-industries-constitute-a-strong-brand-in-the-european-bioeconomy/>

WoodBiz 2016 Communique



<https://www.luke.fi/wp-content/uploads/2016/07/WoodBiz-Julkilausuma-2016-englanti-teksti.pdf>

Luke statistical information services



Key competence

- Analysis, benchmarking, data bases and relevant measurement methods of wood-based raw materials, their streams, properties, product suitability and economic feasibility – broad expertise, leading national expertise but too few research staff
- Value chain and wood allocation analysis and environmental performance tools of wood products
- Knowledge of wood products cluster, production economy / operation analysis is needed more
- Supply-demand, market analysis and foresight analysis methods and expertise

Key competence

- Sustainability and environmental efficiency in building with wood and cascading uses
- Green plant building expertise, wood products in home yard and public environmental building
- Luke has to build part of the competence by strengthening the expertise
 - Leading research expertise in the field of nature-based tourism, recreation and well-being
 - Capacity for holistic approach in which rural development aspects, agriculture and forest environments are incorporated in business development
 - For game populations, unique data and public internet services
 - Research expertise related to raw material availability, utilization and competitive properties