



# BRIDGES -PROJECT



## Mapping the Innovation Potential in Kainuu Region

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Timo Karjalainen  
Kajaani University Consortium

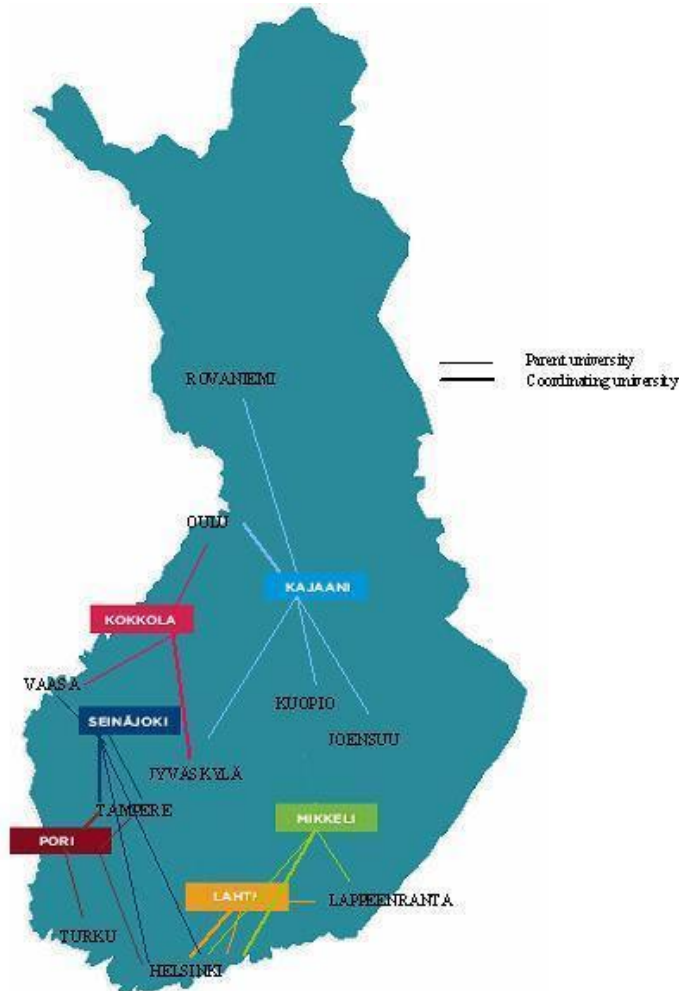


## Kainuu, Finland

- Size comparable to Belgium
- Population 75 300
  - Population density 3.7 inh./km<sup>2</sup>
- Distance to Brussels 2000 km
- Distance to Helsinki 500 km
- Distance to Burgos 3150 km
- 8 municipalities



# University Consortiums in Finland



## Kajaani University Consortium, KUC

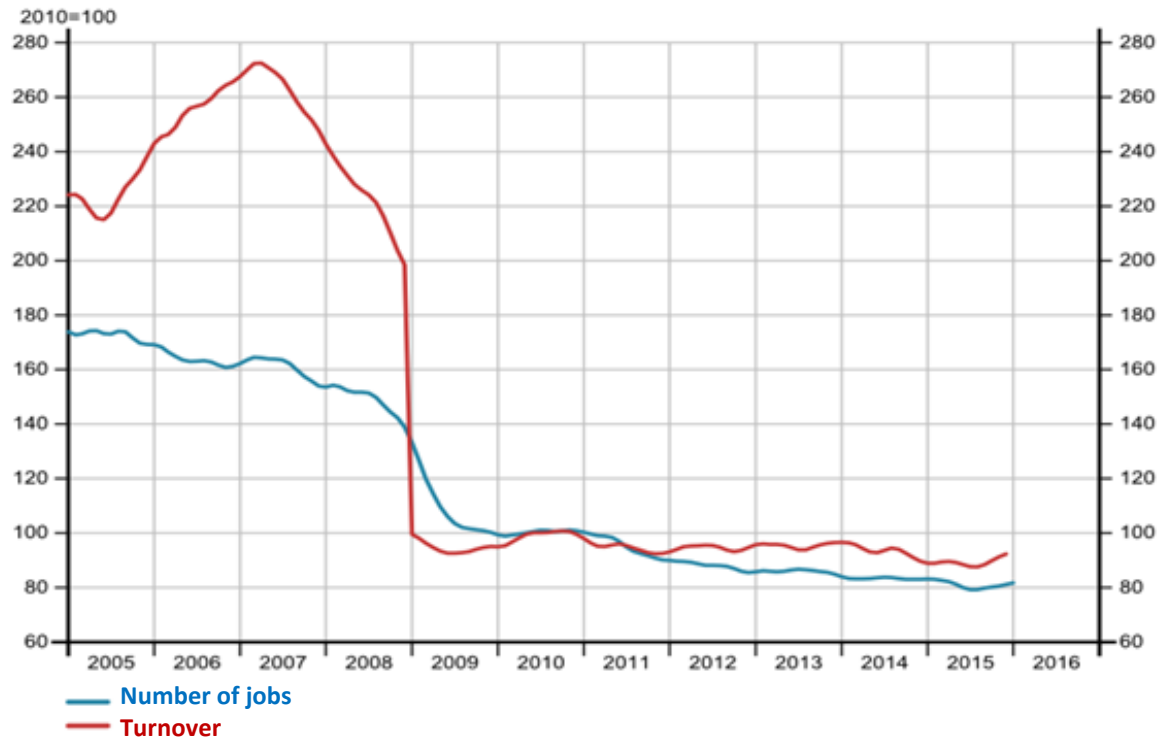
- It's consists of four networked universities (Eastern Finland, Lapland, Jyväskylä and Oulu)
- Units in Kajaani and Sotkamo.
- The Consortium is coordinated by University of Oulu.

# General description of Kainuu and its economic

- The strengths of region are ICT, measuring and gaming technology, welfare, sports and health.
- Pure and clean nature and the huge forest based natural resources, forests, lakes agricultural land, but also valuable minerals.
- Active research, development and innovation activities are available
- The challenge is sparsely populated region.
- Employment rate of Kainuu was 64.9 % in the year 2016, which is 3 % lower than in average in Finland.
- The expectations of better employment are directed particularly to the jobs of the forest bioeconomy. Forest bioeconomy is the focus when aiming to strengthen the regional economy in Kainuu.

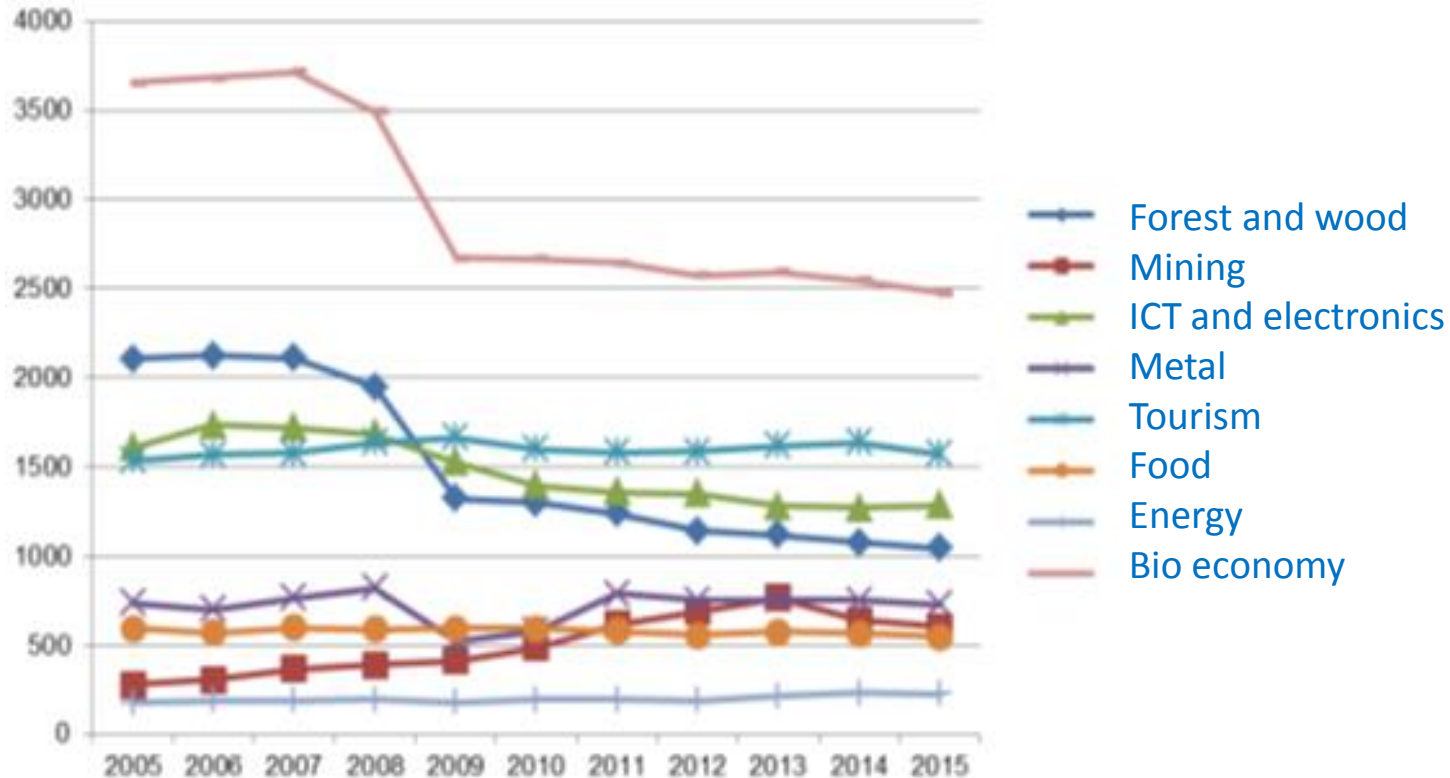


# Trends of forest and wood cluster in Kainuu.



- The turnover of the forest industry collapsed in Kainuu in 2007 - 2008
- The paper mill with three production lines of UPM Kymmene was closed in Kajaani.
- This field of the industry contained much innovative research and development in forest bioeconomy → The know-how has been now redirected, among others, to the study of fluid biofuels and to the analytic chemistry.

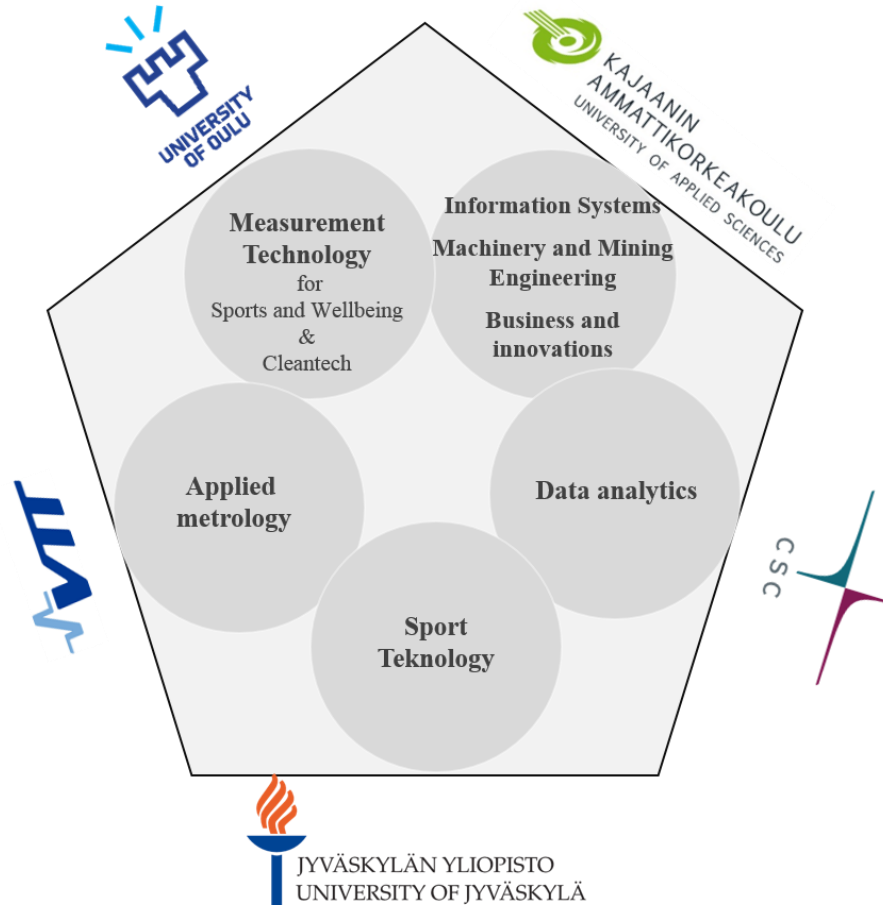
# The jobs of the different branches of the industry in Kainuu (Number of jobs)



- There are about 2500 jobs in bioeconomy sector. In forest bio-economy 1100 jobs.
- In addition to forest bioeconomy also the jobs in food industry and part of jobs in energy cluster are included



# Cemis (Centre for Measurement and Information Systems)



## CEMIS

- Contract based measurement and information systems research and training center.

## Members

- University of Oulu
- University of Jyväskylä
- VTT Technical Research Centre of Finland (MIKES)
- Kajaani University of Applied Sciences Ltd
- CSC – IT Center For Science.

## Unit of Measurement Technology, MITY

- Founded in 1991 and re-organized in 2011.
- Unit consists of two research groups: Cleantech and Health & wellbeing.
- 50 professionals with multi-disciplinary education and expertise.
- Focus



- Novel applications of measurement technologies for real-time environmental monitoring, mining industry, forest industry and bioeconomy.
- Online biosensors for applications of human physiology and analytical services for the food sector, analyzing of plant ingredients, their bioactivities and processing of plant material.



## The research of Natural Resources Institute Finland (LUKE) in Kainuu

LUKE has research stations in Kainuu:

- Sotkamo - focusing on production biogas from agricultural waste materials
- Paltamo - focusing on fish farming and
- Puolanka - seeds of trees are stored in order to preserve genetic diversity of forest trees.



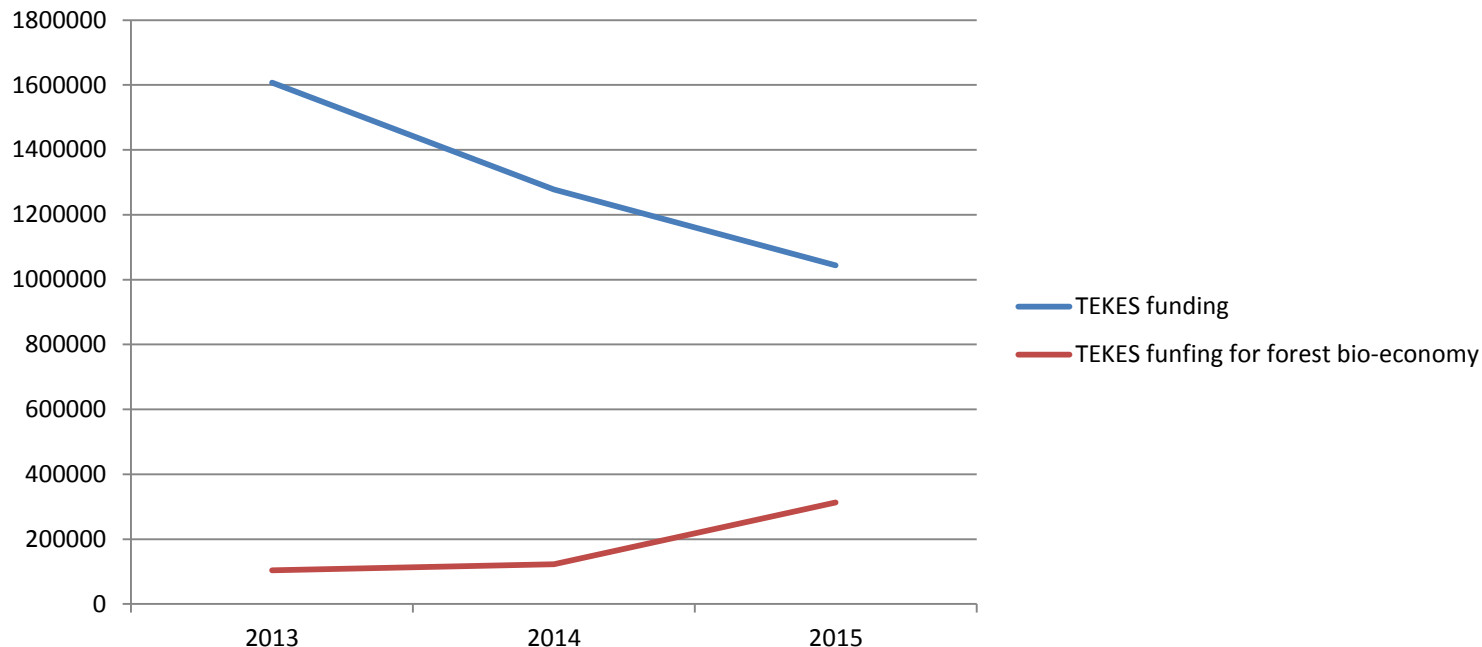
## Excisting innovation services in Kainuu

- Innovation services of University of Oulu
- Innovation services of University of Jyväskylä
- VENTURE service of Technical Research Centre of Finland (VTT)
- Business Development –team of CEMIS (CBD)
- Kainuun Etu Oy



## Funding the R&D activities in Kainuu 1/2

- TEKES (Finnish Funding Agency for Innovation) offers funding for research and development work carried out by companies, research organisations, and public sector service providers in Finland.
- TEKES has financed innovation activities by 4 million euro during last three years in Kainuu.
  - Only 14 percent of this substitute has focused on forest bioeconomy!!



## Other public fundings

European Regional Development Fund (ERDF), European Social Fund (ESF) and European Agricultural Fund for Rural Development (EAFRD) have endowed bioeconomy based actions, renewable energy, low-carbon and energy efficient activities by 3,1 million euro.

This is only 12.1 per cent of all given subsidies of funds!!





## Excamples of innovative companies in forest bioeconomy

**Ponsse Ltd** is one of the biggest manufacture of forest machines. Vehicle data systems for these forest machines has been developed and manufactured in Kajaani.

Global company **VALMET** focused on measurement technology of paper and pulp technologies.

**Prometec Ltd** ... On-line biofuel sample taking robot

**Kiantama Ltd** ... Forest berries and side flows refiner

**St1 Biofuels Ltd** ... Bioethanol







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AA  PUU



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LÄMPÖ OY  
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 ELEMENTTI  
SAMPO

# Kantola Business Park WOODPOLIS



*Laatulas*  
- puhtaasti Kainuusta -



HMO oy



TimberBros



MYyntipalvelu

 Esa Haverinen



 KUHMON  
IKKUNA



*Nopan-Metalli Oy*



 CROSSLAM



OY TIMBER  
FRAME



# Wood constructions

- Woodpolis has focused on wood construction in Kantola business park.
- Aiming to increase the turnover by 100 million euro and create 70 new jobs.
- In the business park round wood is processed different part of wood buildings, even for prefabricated unit of block of flats.



# Biofuels

- Kainuu is aiming to replace all fossil fuels by renewable energy resources
- The share of total energy primary energy consumption is 65 %
- The share of wood energy in primary energy consumption 33 %
  - Forest chips
  - Wood pellet, two wood pellet factories
  - Wood briquet
  - Bioethanol production from wood
    - Sample of circular economy (Side flows from saw mills are refined to biofuels)

## Extraction of valuable ingredients from nature biomass

### Extraction, enrichment and isolation technologies

- Different raw materials like
- Berries and side streams of berry industry, herbs, lichen, nettle,...
- The most interesting raw materials and processes are tested in an industrial-scale.
- An example of successfully completed research study is lingonberry side stream utilization in cosmetics. The research and development cycle of lingonberry ingredients, which were recently commercialized is skin care products launched by LUMENE in 2013



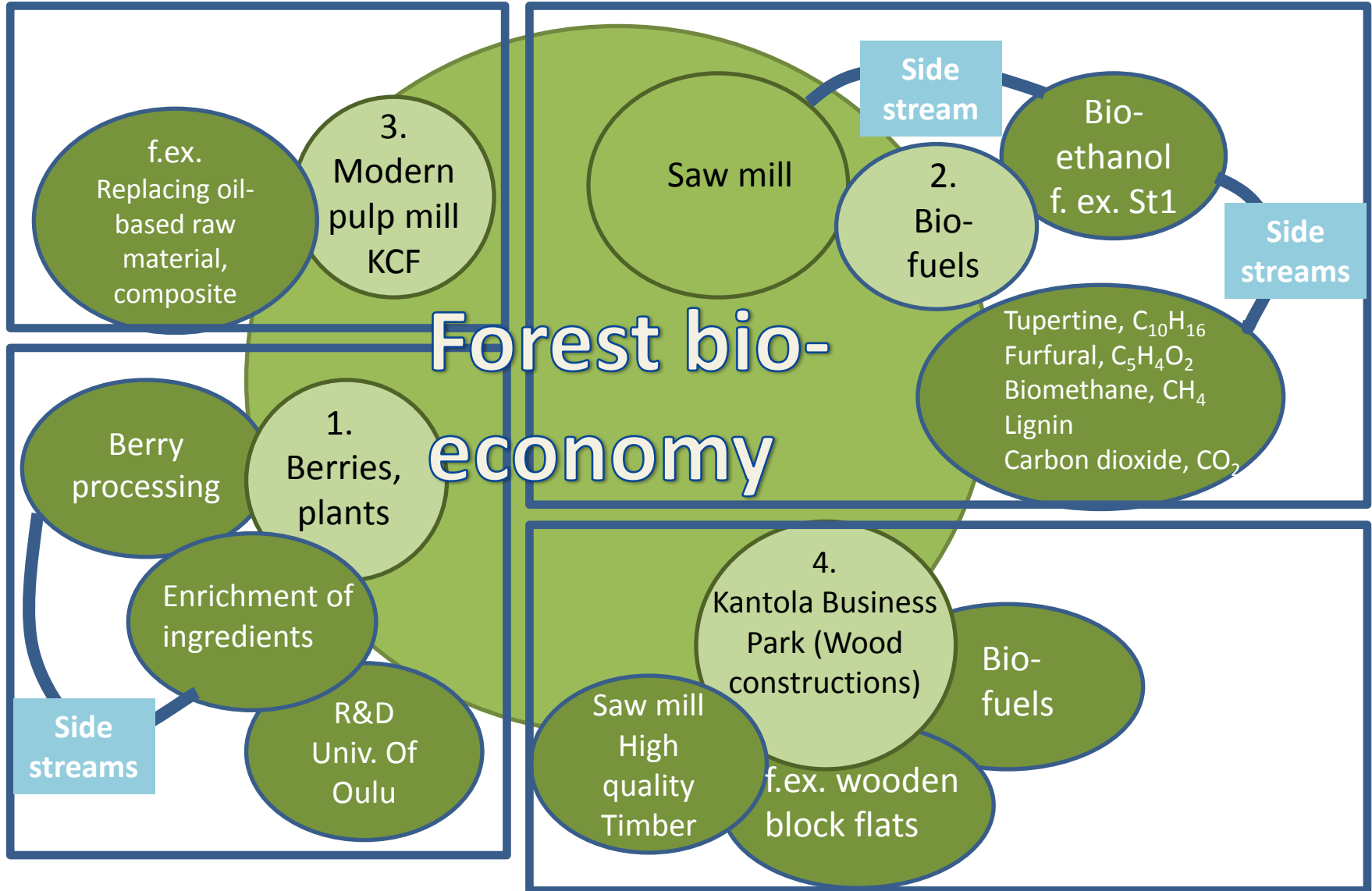
## Modern pulp mill (Bio-product factory)

Kainuu has huge potential in forests. The forests are growing better and better producing high quality tree substance to industry. That's way the development company has been incorporated to launch the modern pulp factory in Kainuu.

Developing company KaiCell Fibres Ltd has only one aim

**MODERN pulp mill!!**

# Four clusters in forest bio-economy in Kainuu



R2B, Start ups

Existing companies and new companies outside region

# Mapping of forest bioeconomy businesses in Kainuu

Mapping criteria	N/r of businesses	
<b>(1) Bio-based economy businesses that have received public support</b>	4	(1) Forest berries and plants. Enrichment of ingredients from berries (lingonberry, cloudberry, and bilberry) and side streams from berry industry. (2) forest biofuels (forest chips, bio-oil, bio-ethanol),(3) Refining forest biomass for pulp and bio-products (Bio-product factory) (4) Wood Constructions.
<b>(2) Bio-based economy businesses that have utilised advanced research services</b>	3	(1)Forest berries and plants. (2) forest biofuels, (3) Bio-product factory, (4) Wood Constructions
<b>(3) Bio-based economy businesses that have been developing products through Research2Business innovation</b>	2	(1)Forest berries and plants (2) forest biofuels,
<b>(4) Bio-based economy businesses that have applied for patents</b>	1	(1)Forest berries and plants.
<b>(5) Bio-based economy businesses that have applied for Phase 1 SME or Phase 2 SME Instrument</b>	0	-



## Conclusions

- Kainuu has huge potential refining forest biomass for future bio-products and biofuels as bio-oil and bioethanol
- Long tradition for wood fuel production and use
- In common, strong know-how in measurement technology.

In forest bioeconomy, the innovation potential wholenesses are in Kainuu

- Bioethanol production and its side flows
- Wood construction in Kantola Business Park
- Bioproduct factory (strong impact to regional economy)
- Concentration and enrichment of valuable component of plants and berries

**Thank you!**

Timo Karjalainen  
Kajaani University Consortium  
email: [timo.karjalainen@oulu.fi](mailto:timo.karjalainen@oulu.fi)