

REGIONAL BIOECONOMY PROFILE

CENTRAL OSTROBOTHNIA (FI)



POLICY

Structure of the Bioeconomy Institutional system

Info source: Region

Responsible Regional
Authorities / Agencies

Keski-Pohjanmaan liitto
Regional Council of Central Ostrobothnia
www.keski-pohjanmaa.fi

List of " bioeconomy-relevant" regional policy initiatives

Regional Bioeconomy Smart Specialisation Strategy	Smart Specialisation Strategy (Regional Council of Central Ostrobothnia)
	Internalization Strategy (Regional Council of Central Ostrobothnia)
	Regional Climate Strategy (Regional Council of Central Ostrobothnia)
	Rural Strategy (Regional Council of Central Ostrobothnia and Centre for Economic Development, Transport and the Environment)
	Strategy for environmental protection in Western Finland (Centre for Economic Development, Transport and the Environment)
	Bioenergy Program (Regional Council of Central Ostrobothnia)
	Biovalley Feasibility Study (City of Kannus)
	Regional/Provincial Program (Regional Council of Central Ostrobothnia)
	Strategy for North Finland (Regional Councils of North Finland)

Biovalley region in Central Ostrobothnia

Biovalley is a region of strong expertise in the natural resource sector and bioeconomy in the Kalajokilaakso, Lestijoki-laakso, and Perhonjokilaakso river valley areas as well as in the sub-region areas of Kokkola and Pietar-saari. There are approximately 183.000 inhabitants, i.e. about 3 % of the country's population, but approximately 17% of the Finnish milk, 22 % of the Finnish food potatoes, 13 % of the Finnish wooden house production, 10 % of the Finnish pulp production and 9 % of the Finnish forest chips are produced here, among other things. Additionally, 46 % of the Finnish fur production farms are located in the region. The region lives strongly and diversely from the bioeconomy. In addition to agriculture and forestry, there is strong natural resource sector business activity in food industry, wood processing industry, building carpentry industry, bioenergy and in the manufacture of equipment, as well as in chemical industry. The diverse business activities are supported by research- and development organizations and educational organizations, which provide companies with the latest research information and skilled personnel. (www.biolaakso.fi)

REGIONAL BIOECONOMY RELATED POLICY INITIATIVES

- ✓ The Finnish national Forest Industry Future Cluster programme 2007 – 2011; Central Ostrobothnia responsible for forest chemistry and novel products competence area.
- ✓ Natural (non wood forest products) products development programme and innovation network 2011-2014.
- ✓ A Finnish-Chinese cooperation agreement in 2012 for the promotion of: food and bio based products-- Business opportunities for SME` s.
- ✓ EU – China biomass based health products promotion as a part of EU-China food, agriculture and biotechnology LOI(A preparatory action proposal for European Parliament).

ADDITIONAL REGIONAL POLICY INFORMATION

- ✓ Animal production (cows and fur animals) is considerable in the Central Ostrobothnia region. This means also huge amount of animal manure ensuring potential to biogas production. Starting biogas production from animal manure is most potential with fur animals (MTT, Luova Oy)

www.metla.fi
www.mtt.fi



RESEARCH

R&D Investments (public and private sector)

REGIONAL PUBLIC R&D INVESTMENT in Bioeconomy (year 2007-2013)

Info source: Region

Biomass production

Info source: Centre for Economic Development, Transport and the Environment

Farm Investments (2007-2013)	Grants	37.362 M EUR
	Interest Subsidy Loans	69.184 M EUR
Agriculture, Forestry, Grocery products, Natural products R&D projects (2007-2013)	EU rural development funding	4.2 M EUR

Biomass conversion

Food/feed biomass conversion (2007-2013) Info source: Centre for Economic Development, Transport and the Environment		1.5 M EUR
Renewable energy studies EU+ public finance (Centria 2007-2013, EAKR) Info source: Regional Council of Central Ostrobothnia	Chemplant Environment Laboratories	560,000 EUR
Toholampi Energy ORC-energy plant Info source: Toholampi	TEM/ministry of economic and employment	3.3 M EUR
	Total Investment (including support from TEKES)	≈ 9 M EUR

PRIVATE R&D INVESTMENT in Bioeconomy (year 2007 - 2014)

Info source: Region

Biomass production

Info source: Centre for Economic Development, Transport and the Environment

Private R&D investment	Grants to farms from Centre for Economic Development, Transport and the Environment	112.086 M EUR
Fishway investments (2014)	Korpela Energy	1 M EUR
Cage construction (2009-2014)	Regional fur farms	100 M EUR

Biomass conversion

ELY-keskus R&D grants Info source: Centre for Economic Development, Transport and the Environment	Private share	3.5 M EUR
Chemplant Environment Laboratories Info source: Regional Council of Central Ostrobothnia	Private share	30,000 EUR



R&D Programmes in Bioeconomy

EUROPEAN R&D ACTIVITIES in Bioeconomy (year 2007-2013)

Kokkola University Consortium Chydenius is acting under the auspices of three universities, including University of Oulu. By this connection researchers are involved in Bio-based Industries Consortium, which brings together European large and small companies, clusters and organisations across technology, industry, agriculture and forestry.

Examples of EU bioeconomy R&D projects involvement, including region Keski-Pohjanmaa

Ecogel Cronos 2013 – 2016 (Technology Center Ketek): High productivity manufacturing process for composite parts

inanotool 2013 – 2015: EULIFE+ (Technology Center Ketek).

Bioenergy from Forest II, Interreg III A, Central Ostrobothnia Rural Institute, Kokkola University Consortium Chydenius, Finnish Forest Research Institute Metla, Keski-Pohjanmaan Metsänomistajien liitto.

In Finnish: <https://www.chydenius.fi/tutkimus/soveltava-kemia/projektit/bioenergia/>

Forest Refine - Efficient forest biomass supply chain management for biorefineries; Interreg Botnia-Atlantica, Kokkola University Consortium Chydenius, Finnish Forest Research Institute Metla, Centria University of Applied Sciences, Central Ostrobothnia Rural Institute.

<http://www.biofuelregion.se/page.cfm?tp=8>

Work report <http://www.biofuelregion.se/page.cfm?tp=8&page=73>

Info sheets: <http://www.biofuelregion.se/page.cfm?tp=8&page=61>

HighBio - Refining of new products and new raw materials by gasification of biomass; Interreg IV A Nord, University of Jyväskylä / Kokkola University Consortium Chydenius.

<https://www.chydenius.fi/en/natural-sciences/research/highbio-interreg-nord>

Project publication: <https://jyx.jyu.fi/dspace/handle/123456789/27212>

Info sheets: <https://www.chydenius.fi/en/natural-sciences/publications-and-reports/highbio-reports>

HighBio2 - Biomass to energy and chemicals; Interreg IV A North, University of Jyväskylä / Kokkola University Consortium Chydenius.

<https://www.chydenius.fi/en/natural-sciences/research/highbio2>

Project publication: <http://issuu.com/unichydenius/docs/978-951-39-5455-0>

Project video: https://www.youtube.com/watch?v=Qb3lxfpUI_8&feature=youtu.be

Info sheets: <https://www.chydenius.fi/en/natural-sciences/research/highbio2/info-sheets>

Participation in other EU bioeconomy R&D projects:

EU regional development funding (ERDF)	Biovalley Feasibility Study 50,000 EUR	EC Contribution 3.154 M EUR
	Chemplant 504,000 EUR	
	Interreg Botnia-Atlantica projects 1,5 M EUR	
	Interreg Nord 1,1 M EUR	
EU rural development funding		EC Contribution 4.2 M EUR

NATIONAL/REGIONAL R&D Activities in Bioeconomy (year 2007-2013)

In addition to r&d projects, Kokkola University Consortium Chydenius participate in networks to find new partners and information to support companies in the region. For example, during year 2014 professor Ulla Lassi (University of Oulu/Kokkola University Consortium Chydenius) is leading Bioeconomy research community Oulu (BRC - Oulu). Bioeconomy research community Oulu is a joint venture of active research groups within the domain of biomass conversion and valorization value-chain. The research community is engaged in national and international research programs and organizations supporting its agenda and continuously looking for new partnerships within bioeconomy-related topics of transnational significance.

Listing of Regional Bioeconomy Research Programmes

Natural products development programme and innovation network 2011-2014

Ecogel Cronos 2013 – 2016 (Technology Center Ketek): High productivity manufacturing process for composite parts, total budget 4,3 M €, Ketek share around 300 000 €

inanotool 2013 – 2015: EULIFE+(Technology Center Ketek) 265 529 €, of which EU-funding share 132 765 €

Natural Products 177 000 €

National funding / Metla projects:

- Efficient wood acquisition logistics as part of the value chain (Tehokas puunhankintalogistiikka osana arvoketjua) 2014–2017. 72 000 €. Funded by Metla/LUKE
- Proven woodbiomass delivery chains from forest to end users. 2012 – 2016. 160 000€. Funded by Metla/Luke
- Stimulus environment for bluefox. 2013-2016; 50.000 euroa rahoittaja STKL
- Wellbeing of bluefox by various Ca:P diets. 2013-2015; 88.000 euros funded by STKL

International funding/ Metla projects:

- WoodBio - Wood biomass in the Nordic Bioeconomy. 2014-2017. Metla/Kannus share around 45 000€. Funded by the Nordic Council of Ministers.
- RIFABILITY- Work related low-level muscle activity as Risk Factor to Disability in high technological environments. 2012-15. Metla/Kannus share 37 000€. Norwegian Research Council.

Woodbiomass intensive production 2011- 2014: 300 000 €/a. Financed by Metla

Energywood intensive production principles and actions 220 000 €. Financed by Vapo oy

Bull Berry Oy beverage manufacturing company's Lamica project 2010-2012 267,000 € + investment loan 186,000 €. Financed by Tekes

Examples of Regional Bioeconomy Research Projects:

18 M EUR

- ✓ Anacompo
- ✓ AOPI, Advanced oxidation processes in industrial wastewater treatment; Academy of Finland, coordinated by University of Oulu and University of Eastern Finland.
https://www.chydenius.fi/tutkimus/soveltava-kemia/projektit/Posteri%20_%20AOPI.pdf
- ✓ Biovalley feasibility study
- ✓ Catalytic conversion of biomass into biofuels; Fortum Foundation, University of Oulu / Kokkola University Consortium Chydenius, joint degree with Universit   Savoie.
<https://www.chydenius.fi/tutkimus/soveltava-kemia/projektit/catalytic-conversion-of-biomass-into-biofuels>
Ph.D. thesis: <https://www.chydenius.fi/tutkimus/soveltava-kemia/julkaisut-ja-raportit/vaitoskirjat>
- ✓ Creative2020
- ✓ Developing forest energy
- ✓ Energy office (regional)
- ✓ Energy wood production
- ✓ Farm-Artturi
- ✓ Forest Industry Future: a national business model for bioeconomy SME`s (2012 – 2013)
- ✓ Forest Power
- ✓ Fur Farm 2020
- ✓ Fur production reserve TURVA
- ✓ Green Care
- ✓ GreenHouse; ELY Centre Ostrobothnia, European Fund for Regional Development, University of Jyv  skyl   / Kokkola University Consortium Chydenius.
<https://www.chydenius.fi/tutkimus/informaatioteknologia/projektit/greenhouse>
- ✓ Groceries development in Central Ostrobothnia
- ✓ Hydro Bothnia feasibility study
- ✓ Innovation network for nature products
- ✓ MERSU
- ✓ Milk Management
- ✓ Nakomate
- ✓ Nordic Green Care

- ✓ Quality Hay feasibility study
 - ✓ Renewable forest industry – clusterMarepurum
 - ✓ SuFuFlex - New innovative sustainable transportation fuels for mobile applications; Academy of Finland, University of Oulu/Kokkola University Consortium Chydenius.
<https://www.chydenius.fi/tutkimus/soveltava-kemia/projektit/susfuflex>
 - ✓ Sustainable forest energy
 - ✓ Tastes from countryside
 - ✓ Tohokvantti (generic analyses for groceries, agriculture and biogas)
 - ✓ Trotting in Kaustinen horse centre
-

Educational projects included:

23 M EUR

- ✓ Agribisnes; ELY Centre Ostrobothnia, Rural Development Programme for Mainland Finland, University of Jyväskylä / Kokkola University Consortium Chydenius, Federation of Education in Central Ostrobothnia / Central Ostrobothnia Rural Institute.
In Finnish: <https://www.chydenius.fi/opiskelu/kauppatieteet/koulutus/agribisnes>
- ✓ Driving licence to work
- ✓ Education for hunters
- ✓ Farmi2020
- ✓ Forest owners project
- ✓ Forest information path
- ✓ From an idea to entrepreneurship
- ✓ FutureFurStudio
- ✓ GreenCare entrepreneurship
- ✓ Innocow
- ✓ KEMMA; ELY Centre Ostrobothnia, regional European Social Fund, Kokkola University Consortium Chydenius.
In Finnish: <https://www.chydenius.fi/tutkimus/soveltava-kemia/projektit/kemma>
Theses: <https://www.chydenius.fi/en/natural-sciences/publications-and-reports>
- ✓ Networks for cattle producers
- ✓ The wonder of fur
- ✓ Tietoseppä



MARKETS

References to existing Market Studies/Forecasts about Bioeconomy

Biovalley feasibility study (Regional Council of Central Ostrobothnia)

Rural development strategy (Regional Council of Central Ostrobothnia)

Biostock potential analysis, Martti Härkönen (Regional Council of Central Ostrobothnia)

Raw Materials potential for Biorefineries etc:

- ✓ Market studies/Forecasts (Tommi Räisänen, Metla):

http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_11_IS_2014-04-24_Biomass_terminals_Raisanen_Athanassiadis.pdf

http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_10_IS_2014-03-24_Potentials_for_Kokkola_Raisanen_Athanassiadis.pdf

http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_9_IS_2014-01-10_Pulp_wood_potential_Raisanen_Athanassiadis.pdf

http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_8_IS_2014-01-10_Small_trees_potential_Raisanen_Athanassiadis.pdf

http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_7_IS_2013-12-17_Logging_residues_potential_Raisanen_Athanassiadis.pdf

[http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_6_IS_2013-12-17_Stump_potential_Raisanen_Athanassiadis\(2\).pdf](http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_6_IS_2013-12-17_Stump_potential_Raisanen_Athanassiadis(2).pdf)

http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_5_IS_2013-12-04_Tree_bark_Raisanen_Athanassiadis.pdf

http://www.biofuelregion.se/UserFiles/file/Forest%20Refine/1_3_IS_2013-01-31_Biomass_for_biorefining.pdf

- ✓ Peat potential analysis
www.gtk.fi
- ✓ Groceries development in Central Ostrobothnia –project (Hannele Syri-Nieminen, www.kpedu.fi : *employed 836 p/y and totalling 336 M EUR turnover (yr 2012)*)
- ✓ Fur production in Central Ostrobothnia Region yr 2013 *employed 1 000 p/yr directly, including indirect employment totaling 3 000 p/yr*. Farms regionally 212 (having 295 000 minks and 410 000 foxes) and nationally 980 (having 1,7 million minks and 2 million foxes). *Turnover regionally 83 M EUR, nationally 400 M EUR*. Info Source: www.profur.fi

Table 1. Bioeconomy output, value added, people employed and exports in 2011

Info source: The Finnish bioeconomy strategy

Sectors	Output M EUR	Value added M EUR	Employment number	Exports M EUR
Food, total	16 093	4 356	128 400	515
Agriculture	4 822	1 658	90 100	0
Food industry	11 271	2 698	38 300	515
Bioeconomy products total	29 273	9 317	101 400	13 819
Forestry	4 232	2 898	25 000	68
Wood products industry	6 870	1 542	36 400	2077
Pulp and paper industry	13 653	2 967	23 300	9185
Construction	9 228	3 344	58 120	100
Chemical industry	1 644	434	1 600	1 347
Pharmaceutical industry	1 339	845	4 100	932
Renewable energy	4 033	1 903	5 801	0
Water treatment and distribution	610	400	2 700	0
Bioeconomy services total	2 993	1 416	33 900	0
Nature tourism	2 737	1 226	32 000	0
Hunting	85	79	100	0
Fishing	171	111	1 800	0
Bioeconomy total	60 685	20 104	319 321	14 248
National economy total	375 777	163 424	2 509 500	54 221
Share of bioeconomy	16,1 %	12,3 %	12,7 %	26,3 %

Table 2. Examples of "some" quantitative data that may possibly be available for "some" bioeconomy sectors

Info source: Region

Biomass production sectors	Enterprises number	Employment number	Turnover M EUR	Value added M EUR
Agriculture (incl. Fur sector)	1419 (yr2011)	2685 (yr2011)	390 (yr 2011)	N.A
Forestry	110 (yr 2011)	1150 p/y	50 (yr2011)	N.A
Marine	N.A	N.A	N.A	N.A
Aquaculture	13 (yr2011)	60 (yr2014)	51	N.A
Waste	N.A	N.A	N.A	N.A
Biomass conversion sectors	Enterprises number	Employment number	Turnover M EUR	Value added M EUR
Food/Feed	52	1250 p/y	336	N.A
Energy	N.A	N.A	N.A	N.A
Industrial incl. - Paper - Wood - Chemicals -	N.A	N.A	N.A	N.A



GENERAL INFORMATION

Main/Regional economic and social indicators

Info source: Stat.Finland

REGIONAL DEMOGRAPHY (2013)

Number of inhabitants	people	68659 p
Population by age group	Share of total population (%)	N.A. % (<25) N.A. % (25-64) N.A. % (>64)

REGIONAL ECONOMY (2011)

GDP	M EUR	2263 M€
GDP per head	Euro per inhabitant	33000 €
GDP per head	Euro per inhabitant in percentage of the EU average	N.A. N.A.
GDP PPS	Euro per inhabitant	N.A.
GDP PPS	Euro per inhabitant in percentage of the EU average	N.A.

REGIONAL ECONOMY STRUCTURE (2010)

Agriculture weight in the economy	% of GVA % of employment	6.4 % 9 %
Industry & construction weight in the economy	% of GVA % of employment	30 % 22.3 %
Services weight in the economy	% of GVA % of employment	63.7 % 67.6 %

REGIONAL SOCIAL

Employment rate, aged 20-64	% of population, aged 20-64	N.A. %
Unemployment rate	% of the active population	11.2 %
Unemployment rate of young people	% of the active population less than 25 years	2 %

Symbols, Units, Acronyms used

%	Percentage
N.A.	Not Available
T.B.C.	To Be Confirmed
p	People
EUR	Euro
Bn	Billion
M EUR	Million Euros
FP6	Sixth Framework Programme
FP7	Seventh Framework Programme
H2020	Horizon 2020
R&D	Research and Development
KBBE	
ERDF	EU regional development funding
GDP	Gross Domestic Product
GDP PPS	Gross Domestic Product in Purchasing Power Standards
GVA	Gross Value Added