

# REGIONAL BIOECONOMY PROFILE

Lombardy (IT)



## POLICY

### Structure of the Bioeconomy Institutional system

Info source: Regional Government, Regional Green Chemistry Cluster

Responsible Regional  
Authorities / Agencies

Regione Lombardia  
Lombardy Region  
(<http://www.regione.lombardia.it/>)

### List of " bioeconomy-relevant" regional policy initiatives

Regional Bioeconomy Smart Specialisation Strategy (if applicable)	N.A.
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### REGIONAL BIOECONOMY RELATED POLICY INITIATIVES

**BIOMASS PRODUCTION** N.A.

**BIOMASS CONVERSION** N.A.

### ADDITIONAL REGIONAL POLICY INFORMATION

**Green Chemistry Cluster:** the Region promoted and supports a Regional Green Chemistry Cluster managed through the Lombardy Green Chemistry Association ([www.chimicaverdelombardia.it](http://www.chimicaverdelombardia.it)). The goal of the cluster is to create at regional level "the best framework conditions for the setting up of a bioeconomy based on the use of biomass from agriculture, forest and waste, following the principles of sustainability and cascading use and through the active involvement of the whole value chains". The association has currently 20 members, mostly companies and research institutions. The Region provides up to 50.000 euro financing per year for the start up phase of the cluster in the period 2014-15.

For further information concerning the policy: Mr Carlo Corti, Dirigente Struttura "Ricerca, Innovazione e Trasferimento Tecnologico" - DG Attività Produttive, Ricerca e Innovazione tel. 0039026765 6045 [carlo\\_corti@regione.lombardia.it](mailto:carlo_corti@regione.lombardia.it)

For further information concerning the cluster's activities: Mr Daniele Colombo, President of the Lombardy Green Chemistry Association Tel +39.02.8515.5230 –

mail [presidente@chimicaverdelombardia.it](mailto:presidente@chimicaverdelombardia.it) / [segreteria@chimicaverdelombardia.it](mailto:segreteria@chimicaverdelombardia.it)



## RESEARCH

### *R&D Investments (public and private sector)*

#### **REGIONAL PUBLIC R&D INVESTMENT in Bioeconomy (year xxxx)**

Info source: Eurostat/Region

R&D investment related to :

<b>Biomass production</b>	N.A. M EUR
Agriculture	
Forestry	
Marine	
Waste	
<b>Biomass conversion</b>	N.A. M EUR
Food/feed use	
Energy use	
Industry uses	

#### **PRIVATE R&D INVESTMENT in Bioeconomy (year xxxx)**

Info source: Eurostat + Industry

R&D investment related to :

<b>Biomass production</b>	N.A. M EUR
Agriculture	
Forestry	
Marine	
Waste	
<b>Biomass conversion</b>	N.A. M EUR
Food/feed use	
Energy use	
Industry uses	

### *R&D Programmes in Bioeconomy*

#### **EUROPEAN R&D ACTIVITIES in Bioeconomy (year xxxx)**

Info: Regional Participation in FP6, FP7, KBBE, H2020 projects in Bioeconomy or related

**Listing of Regional Participation in EU bioeconomy R&D projects** N.A.

**Examples of EU bioeconomy R&D projects** N.A.

## Participation in other EU bioeconomy R&D projects:

<b>EU R&amp;D funding projects (FP7 or H2020)</b>	EC Contribution	xx M EUR
<b>EU regional development funding (ERDF)</b>	EC Contribution	xx M EUR
<b>EU rural development funding</b>	EC Contribution	xx M EUR

## NATIONAL/REGIONAL R&D Activities in Bioeconomy (year xxxx)

*Info: Regional Activities funded by MS or Region*

### Listing of Regional Bioeconomy Research Pogrammes

#### ✓ **BOMO - eco sustainable wood-furniture value chain**

Setting up of a value chain, from wood to furniture production, based on the criteria defined by the Sustainable Forest Management.

<http://www.agricoltura.regione.lombardia.it/shared/ccurl/307/413/Relazione%20finale%20BOMO.pdf>

#### ✓ **WOODAGRI - Rationalization of wood biomass supply in agriculture**

Optimisation of non-forest wood production through dedicated machinery and techniques for collection, transportation and storage.

<http://www.agricoltura.regione.lombardia.it/shared/ccurl/443/133/927%20SCHEMA%20FINALE%20WEB.pdf>

#### ✓ **EVASFO - Evaluation short rotation forestry**

Market assessment of specific machinery for short-life cycle species for non-food biomass production.

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/919/19/AL\\_20090412\\_3815\\_623\\_scheda\\_sintesi\\_finale\\_AG\\_R\\_MS.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/919/19/AL_20090412_3815_623_scheda_sintesi_finale_AG_R_MS.pdf)

#### ✓ **BIORETE – Economic, technical and legislative issues on biomethane supply to the gas grid**

Analisis of the biomethane process, storage and distribution.

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/656/891/1383\\_scheda\\_sintesi.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/656/891/1383_scheda_sintesi.pdf)

#### ✓ **BIOBI - Biomass for biogas**

Technical and economic information on biogas production from energy crops and other organic wastes in Lombardy.

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/980/298/1183\\_BioBi%20scheda%20finale.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/980/298/1183_BioBi%20scheda%20finale.pdf)

#### ✓ **AGRIDEN - Bio-hydrogen production from agro-zoo-technical residues**

Optimisation of a two steps anaerobic fermentation process to produce methane and hydrogen.

<http://www.agricoltura.regione.lombardia.it/shared/ccurl/270/443/1181%20AGRIDEN%20-%20Rapporto%20di%20ricerca%20finale.pdf>

#### ✓ **PROBITEC –Optimisation of the production of biogas from agricultural biomass and animal refluents**

Productivity of different agricultural biomass and identification of ideal combinations..

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/810/222/1169\\_PROBITEC%201\\_scheda%20finale\\_web.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/810/222/1169_PROBITEC%201_scheda%20finale_web.pdf)

✓ **AGRENGEST – Operational management issues of agro-energetic plants in Lombardy**

Analysis of different bio-energy plants in order to collect data for future planning of public and private investments.

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/316/523/SCHEDA%20web%20Agrengest\\_def.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/316/523/SCHEDA%20web%20Agrengest_def.pdf)

✓ **REPE – Environmental and energetic analysis of the use of fowl droppings for energy purposes**

Feasibility of the use of fowl droppings for energy purposes via small plants on site. Environmental, technological and economic aspects.

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/372/409/1011-REPE\\_Scheda\\_finale\\_web.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/372/409/1011-REPE_Scheda_finale_web.pdf)

✓ **ECOBIOGAS – Biogas production analysis: implications for the agro-food sector and regional policies**

The project focussed on impact on agricultural commodity markets, land use conflicts environmental sustainability.

[http://www.agricoltura.regione.lombardia.it/shared/ccurl/588/227/1713\\_ECOBIOGAS\\_RELAZIONE%20FINALE%20web.pdf](http://www.agricoltura.regione.lombardia.it/shared/ccurl/588/227/1713_ECOBIOGAS_RELAZIONE%20FINALE%20web.pdf)

✓ **BIOMASSKET – Biomass market for non-food uses**

Support for the setting up of a non-food biomass market.

<http://www.agricoltura.regione.lombardia.it/shared/ccurl/204/713/941%20BIOMASSKET.pdf>

✓ **VeLiCa - Vegetali Lino Canapa (hemp and flax)**

The project assessed the re-introduction of traditional farming of hemp and flax in Lombardy by enhancing their profitability through the integrated exploitation of all components (fibers, chemicals, energy). The 5M€ is co-financed (50%) by the regional government).

<http://www.velica.org/>

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## Examples of Regional Bioeconomy Research Projects

✓ **VeLiCa - Vegetali Lino Canapa (hemp and flax)**

Flax and hemp can produce both oil and fiber. Once the more suitable and more productive genotypes will have been selected, the oil obtained from the seeds will be used for the production, through innovative heterogeneous and homogeneous catalytic techniques, of Biodiesel, bio-lubricants with high flash point, polyols to be used as intermediate for the synthesis of polyurethanes and other bio-polymers. On the other hand, selected enzymes will be used to isolate  $\omega$ -3 and  $\omega$ -6 components from the oil thus obtaining valuable oils for the nutraceutical market.

By growing the plant till seed maturity we will get a low quality fiber, namely technical fiber. This kind of fiber can be used to produce insulating boards, but we will concentrate on the production of composites with PET or other plastic materials. This kind of composites are already known and used in the automotive and aviation industry due to their high crash resistance and lightness. In this project we will study formulations suitable for the production of fruit&veg crates that will be more resistant, therefore long lasting, more light, recyclable and more easily disposable with respect to analogous composites with glass fiber.

The more innovative part of the project is represented by the exploitation of all the residues of these transformations. The meal, residue of oil pressing, is rich in proteins and therefore a valuable feed. However, the present project will look for new application of protein hydrolysates obtained from such meals. In particular, we will test these hydrolysates as cosmetic ingredients and we will look for other bio-active molecule, such as anti-microbial, antioxidants and maybe antitumoral agents: flax seeds e.g. are rich in lignans (phytoestrogens) able to slow down the growing of some hormone-dependent tumor.

Glycerol, the residue of biodiesel and biolubricants production, will be used for the preparation of hyper-branched polymers potentially useful for drug delivery.



Finally, the biomass left after scutching of the fiber will be treated with cocktails of enzymes to separate lignin and give simple sugars. This biomass could also be sent to a gasifier to produce the H<sub>2</sub> required for some treatment of the oil.

More detailed information in English/Italian on <http://www.velica.org/>

## MARKETS

### *References to existing Market Studies/Forecasts about Bioeconomy*

<b>Biomass production sectors</b>	<b>Enterprises</b>	<b>Employment</b>	<b>Turnover</b>	<b>Value added</b>
	<b>numbe</b>	<b>number</b>	<b>M EUR</b>	<b>M EUR</b>
Agriculture	N.A.	N.A.	N.A.	N.A.
Forestry	N.A.	N.A.	N.A.	N.A.
Marine	N.A.	N.A.	N.A.	N.A.
Aquaculture	N.A.	N.A.	N.A.	N.A.
Waste	N.A.	N.A.	N.A.	N.A.
<b>Biomass conversion sectors</b>				
Food/Feed	N.A.	N.A.	N.A.	N.A.
Energy	N.A.	N.A.	N.A.	N.A.
Industrial incl.				
- Paper				
- Wood	N.A.	N.A.	N.A.	N.A.
- Chemicals				
- ....				

### *Example of existing Market Studies:*

#### **“Il sistema industriale lombardo nel business delle biomasse” (January 2011, in Italian)**

The study, financed by the Chamber of Commerce of Milan, has been carried out by the Renewable Energies Lab of Politecnico di Milano as an up-date of a previous 2009 study and focusses on the Lombardy industrial sector in the bioenergy business in order to:

- ✓ assess main technologies used in the energy production from biomass, in order to identify technical gaps and innovation opportunities;
- ✓ provide an exhaustive picture of the evolution of the commercial exploitation of biomass for energy use in Lombardy;

- ✓ map main regional players;
- ✓ identify main pieces of legislation influencing the sector development.

Full text, with quantitative data, available at:

[http://www.mi.camcom.it/c/document\\_library/get\\_file?uuid=62fb745d-fae2-4997-96d0-9720e017e2b1&groupId=10157](http://www.mi.camcom.it/c/document_library/get_file?uuid=62fb745d-fae2-4997-96d0-9720e017e2b1&groupId=10157)

*See below examples of "some" quantitative data that may possibly be available for "some" bioeconomy sectors (in Italian)*

### Number of companies

Divisione	2010	2011	2013
<b>A 01 Coltivazioni agricole e produzione di prodotti animali, c...</b>	50.767	49.911	47.527
<b>A 02 Silvicultura ed utilizzo di aree forestali</b>	869	899	949
<b>A 03 Pesca e acquacoltura</b>	186	189	181
<b>C 10 Industrie alimentari</b>	5.655	5.702	5.750
<b>C 11 Industria delle bevande</b>	276	271	271
<b>C 12 Industria del tabacco</b>	1	1	1
<b>C 13 Industrie tessili</b>	4.782	4.625	4.348
<b>C 14 Confezione di articoli di abbigliamento; confezione di ar...</b>	8.571	8.483	8.134
<b>C 15 Fabbricazione di articoli in pelle e simili</b>	2.067	2.018	1.941
<b>C 16 Industria del legno e dei prodotti in legno e sughero (es...</b>	6.096	5.982	5.552
<b>C 17 Fabbricazione di carta e di prodotti di carta</b>	1.211	1.189	1.156
<b>C 20 Fabbricazione di prodotti chimici</b>	2.087	2.041	1.911
<b>C 21 Fabbricazione di prodotti farmaceutici di base e di prepa...</b>	366	344	320
<b>C 22 Fabbricazione di articoli in gomma e materie plastiche</b>	4.185	4.094	3.905
<b>C 31 Fabbricazione di mobili</b>	5.719	5.597	5.203
<b>C 32 Altre industrie manifatturiere</b>	7.585	7.508	7.146
<b>D 35 Fornitura di energia elettrica, gas, vapore e aria condiz...</b>	1.075	1.411	1.867
<b>E 38 Attività di raccolta, trattamento e smaltimento dei rifiu...</b>	960	974	1.027
<b>Totale</b>	102.458	101.239	97.189

## Employment

Divisione	2011	2013
<b>A 01 Coltivazioni agricole e produzione di prodotti animali, c...</b>	59.710	43.101
<b>A 02 Silvicoltura ed utilizzo di aree forestali</b>	1.337	852
<b>A 03 Pesca e acquacoltura</b>	249	141
<b>C 10 Industrie alimentari</b>	64.786	62.959
<b>C 11 Industria delle bevande</b>	5.616	5.405
<b>C 13 Industrie tessili</b>	55.257	49.893
<b>C 14 Confezione di articoli di abbigliamento; confezione di ar...</b>	52.349	49.230
<b>C 15 Fabbricazione di articoli in pelle e simili</b>	12.682	13.296
<b>C 16 Industria del legno e dei prodotti in legno e sughero (es...</b>	24.363	22.237
<b>C 17 Fabbricazione di carta e di prodotti di carta</b>	19.580	18.974
<b>C 20 Fabbricazione di prodotti chimici</b>	58.244	55.309
<b>C 21 Fabbricazione di prodotti farmaceutici di base e di prepa...</b>	26.963	28.525
<b>C 22 Fabbricazione di articoli in gomma e materie plastiche</b>	56.932	53.744
<b>C 31 Fabbricazione di mobili</b>	29.797	28.400
<b>C 32 Altre industrie manifatturiere</b>	28.146	27.096
<b>D 35 Fornitura di energia elettrica, gas, vapore e aria condiz...</b>	13.309	13.745
<b>E 38 Attività di raccolta, trattamento e smaltimento dei rifiu...</b>	16.668	20.258
<b>Totale</b>	<b>525.988</b>	<b>493.165</b>



## Financial data

	Tot. valore produzione (000 EUR)		Ricavi delle vendite (000 EUR)		Valore Aggiunto (000 EUR)	
	2011	2012	2011	2012	2011	2012
<b>ATECO 2007</b>						
<b>Coltivazioni agricole e produzione di prodotti animali, caccia e servizi connessi</b>	2.484.187	2.738.075	2.484.187	2.563.375	381.246	404.738
<b>Silvicoltura ed utilizzo di aree forestali</b>	29.137	41.796	29.137	27.121	13.208	12.829
<b>Pesca e acquacoltura</b>	29.204	26.643	29.204	28.063	7.013	7.345
<b>Industrie alimentari</b>	21.953.432	22.439.702	21.953.432	21.954.133	3.525.511	3.496.731
<b>Industria delle bevande</b>	2.936.695	3.151.830	2.936.695	3.035.911	699.993	735.163
<b>Industrie tessili</b>	8.637.311	8.599.064	8.637.311	8.426.968	2.194.948	2.086.200
<b>Confezione di articoli di abbigliamento; confezione di articoli in pelle e pelliccia</b>	7.427.432	7.321.561	7.427.432	7.143.241	1.798.522	1.675.229
<b>Fabbricazione di articoli in pelle e simili</b>	1.630.317	1.715.194	1.630.317	1.674.634	367.510	410.306
<b>Industria del legno e dei prodotti in legno e sughero (esclusi i mobili); fabbricazione di articoli in paglia e materiali da intreccio</b>	2.271.048	2.214.238	2.271.048	2.152.346	491.120	509.343
<b>Fabbricazione di carta e di prodotti di carta</b>	5.271.490	5.206.525	5.271.490	5.105.181	1.138.493	1.121.429
<b>Fabbricazione di prodotti chimici</b>	30.663.145	30.329.863	30.663.145	29.643.206	4.655.588	4.163.374
<b>Fabbricazione di prodotti farmaceutici di base e di preparate farmaceutici</b>	11.497.805	10.987.293	11.497.805	10.503.669	3.362.544	3.097.943
<b>Fabbricazione di articoli in gomma e materie plastiche</b>	15.986.313	15.657.902	15.986.313	15.290.570	3.275.919	3.210.062
<b>Fabbricazione di mobili</b>	3.785.377	3.696.846	3.785.377	3.641.541	853.349	825.654
<b>Altre industrie manifatturiere</b>	3.712.093	3.420.413	3.712.093	3.298.213	963.081	877.138
<b>Fornitura di energia elettrica, gas, vapore e aria condizionata</b>	53.088.589	59.189.689	53.088.589	57.160.991	4.709.623	4.816.606
<b>Attività di raccolta, trattamento e smaltimento dei rifiuti; recupero dei materiali</b>	4.532.521	4.611.857	4.532.521	4.454.773	1.480.800	1.407.909
<b>Tutte</b>	175.936.096	181.348.491	175.936.096	176.103.936	29.918.468	28.857.999

## **i** GENERAL INFORMATION

### **Main/Regional economic and social indicators**

Info source: Eurostat

#### **REGIONAL DEMOGRAPHY**

Number of inhabitants	people	<b>9 794 525 p</b>
Population by age group	Share of total population (%)	<b>23.4 % (&lt;25)</b> <b>55.5 % (25-64)</b> <b>37.4 % (&gt;64)</b>

#### **REGIONAL ECONOMY (2011)**

GDP	M EUR	<b>337 161 M EUR</b>
GDP per head	Euro per inhabitant	<b>33 900</b>
GDP per head	Euro per inhabitant in percentage of the EU average	<b>135</b>
GDP PPS	Euro per inhabitant	<b>33 200</b>
GDP PPS	Euro per inhabitant in percentage of the EU average	<b>132</b>

#### **REGIONAL ECONOMY STRUCTURE**

Agriculture weight in the economy	% of GVA % of employment	<b>N.A. %</b> <b>N.A. %</b>
Industry & construction weight in the economy	% of GVA % of employment	<b>N.A. %</b> <b>N.A. %</b>
Services weight in the economy	% of GVA % of employment	<b>N.A. %</b> <b>N.A. %</b>

#### **REGIONAL SOCIAL**

Employment rate, aged 20-64	% of population, aged 20-64	<b>69.3 %</b>
Unemployment rate	% of the active population	<b>30.8 %</b>
Unemployment rate of young people	% of the active population less than 25 years	<b>7.8 %</b>

## ***Symbols, Units, Acronyms used***

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

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