

AllThings.Bio

Jobs and Careers in the bioeconomy



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 **Bio-based Industries
Consortium**



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Bioeconomy: an important economic sector in Europe

There are multiple definitions of bioeconomy. According to the European Commission (EC), the bioeconomy includes the **production of renewable biological resources** (also called “biomass”), **and the conversion of these resources and waste streams into value added products**, such as food, feed, bio-based products and bioenergy. Or, in short, the term bioeconomy describes everything that we produce with renewable biomass.

Bioeconomy is **an important economic sector in Europe**, employing more than 8% of the workforce, annually adding value to the amount of €614 billion and offering the potential to create 1 million new green jobs by 2030, in particular in rural and coastal areas e.g. in forestry and blue bioeconomy (the bioeconomy based on aquatic biomass).

Most of the growth in employment is expected to take place in non-food sectors (including liquid biofuels and bioenergy), as well as in support services (logistics, equipment and input production, etc.).





EU BIOECONOMY

European Commission's Knowledge Centre for Bioeconomy



EMPLOYMENT
(MILLION JOBS)

17.5



VALUE ADDED
(BILLION EUR)

614

		EMPLOYMENT (MILLION JOBS)	VALUE ADDED (BILLION EUR)	VALUE ADDED (SHARE TOT)
	AGRICULTURE	9.3	189	31%
	FORESTRY	0.5	25	4%
	FISHING AND AQUACULTURE	0.2	7	1%
	FOOD, BEVERAGES AND OTHER AGRO-MANUFACTURING	4.4	215	35%
	BIO-BASED TEXTILES	0.7	21	3%
	WOOD PRODUCTS AND FURNITURE	1.4	47	8%
	PAPER	0.6	42	7%
	BIO-BASED CHEMICALS AND PHARMA- CEUTICALS, PLASTICS AND RUBBER	0.4	60	10%
	LIQUID BIOFUELS	0.02	3	1%
	BIOELECTRICITY	0.02	4	1%

DATA 2017
EU-27

Johel
Research
Centre

Source: based on Ronzon et al, 2020
<https://doi.org/10.3390/su12114507>

The EC distinguishes ten potential areas for exploitation within the bioeconomy:

- 1 Agriculture
- 2 Forestry
- 3 Fishing and aquaculture
- 4 Food, beverages and other agro-manufacturing
- 5 Bio-based textiles
- 6 Wood products and furniture
- 7 Paper
- 8 Bio-based chemicals and pharmaceuticals, plastics and rubber
- 9 Liquid biofuels
- 10 Bioelectricity



Bioeconomy: offering business opportunities at various scales

A wide range of **technical developments** are taking place within the bioeconomy. For example in the forest sector, where large-scale processing of timber or pulp has been the norm in the major producing areas, we are seeing a transition from struggling paper mills to forest-based bio-refineries in some areas.

The bioeconomy also becomes tangible in the **development of new biomaterials**, such as engineered wood or reed insulation, the production of bioelectricity or the deployment of biorefineries (facilities integrating biomass conversion processes and equipment to produce fuels, power, and value-added chemicals).

Technical developments continue to **provide new opportunities to add value to raw materials**, taking advantage of the underlying biophysical qualities of primary products. Opportunities are found in the large-scale, high-tech, capital-intensive bioeconomy as well as at the smaller scale. Smaller plants at the local or regional scale offer the advantages that relatively low initial investments are needed, that small and medium-sized enterprises - carriers of innovation and core to the transition to the bioeconomy - can be easier involved and that potentially use can be made of available local resources.

Bioeconomy: also key to rural development

Europe's rural areas are facing key issues such as low population density, remoteness, poor infrastructure or dependence on the primary sector. Rural challenges can be turned into opportunities to enable rural employment, by building on local assets, supporting local skills and knowledge, taking advantage of new trends and emerging economies, and attracting newcomers. **As rural areas are rich in biological resources, bioeconomy is one of the sectors offering such opportunities**, and the European Rural Parliament calls for increased use of (agro-forestry, agro-ecology and) bio-economy approaches.

Developing sustainable bioeconomy value chains in rural areas in order to promote employment, economic growth, and social inclusion, while preserving eco-systems is key. A sustainable value chain is one in which the economic, environmental, and social added value is distributed equitably between the different actors. E.g. the return of recovered nutrients from digestate or food waste in that value chain, rather than being concentrated in certain areas or being distributed unequally outside of the rural sectors.

When developing new sustainable bioeconomy value chains at the rural/regional scale, it is important to explore the potential to increase jobs in rural areas, rather than focus on bioeconomy developments in the processing and manufacturing phase, often in urban areas.

Key differences between supply and value chains

Supply chains describe the flow of goods and services between different actors, such as the production of wheat, its collection, processing, the manufacturing of pasta and eventual sale.

VS

Value chains describe the flow of value between different actors in a supply chain and may include a broader set of actors than in supply chains. Value can be reflected by a range of terms:

- **Economic** - where value chains describe the flow of profit or income between actors in the supply chain. For example, the flow of income to different actors based on the input and output costs.
- **Environmental/climatic** – where value chains describe the flow of benefits to given environmental or climate objectives. For example, the greenhouse gas emissions avoided as a result of a bioeconomy value chain.
- **Social** – where value chains describe the flow of benefits to people and communities. For example, the jobs created in rural areas as a result of new supply chains

Bioeconomy: offering jobs and career opportunities for many

The bioeconomy offers jobs and career opportunities for people with varying levels of education attainment. Besides, it offers **employment opportunities for less advantaged persons** (from disadvantaged and vulnerable groups such as ex-offenders, recovering drug users, ethnic and religious minorities, migrants and refugees, the LGBTIQ community, and disabled persons, for many of which employment is a means to eliminate discrimination, exclusion and poverty).

The potential for job creation through the bioeconomy is one of the strongest capacities we have for increasing local employment – in urban as well as in rural areas. It provides social sustainability, particularly because the bioeconomy jobs are of such diverse types; with room for many kinds of talent and effort.



Skills needed in the bioeconomy

Companies operating in the bioeconomy depend on many of the same skills as companies operating in the food and food ingredients industry, the chemical industry or the materials processing industry, since these industries make use of highly automated processing equipment, the production is process-oriented, and the industries process biomass into products and materials.

Overall, among the most important skills needed in the bioeconomy are **the ability to think and take an initiative; to identify and implement solutions;** and to **monitor and steer a technical process.**

For industrial-scale production, the bioeconomy makes use of technologies and systems that **integrate digital interfaces for monitoring and control as well as automated technologies for processing of the biomass.** This is a very similar set-up to the system used in the food industry.

There is general agreement that **a good balance is needed between hard skills and transversal skills,** with soft skills such as problem-solving, collaboration, entrepreneurship, holistic/systemic thinking, critical thinking – repeatedly mentioned.

Why pursue a professional career in the Bioeconomy?

1

The bioeconomy is a highly interesting, diverse and relatively new working field that is able to cross the boundaries and connect already existing industrial sectors with new ones

2

It offers great potential to render agriculture, aquaculture, fisheries, forestry and industry sectors more sustainable

3

The possibility to develop a unique skill set to meet future challenges

4

Being part of a highly qualified and sought after set of professionals

5

The chance to work with the latest tools and technologies

6

The possibility to contribute to the creation of new knowledge, discoveries and innovations



Interact with the bioeconomy

Play our **serious game** to get familiar with the bioeconomy.

Use our **label scanning app** to learn what the bioeconomy labels say about the products they are found on.

Serious Game Mission BioHero



Scanning App Label BioHero



Join our **LinkedIn group** to discuss all matters related to the bioeconomy.

Further reading

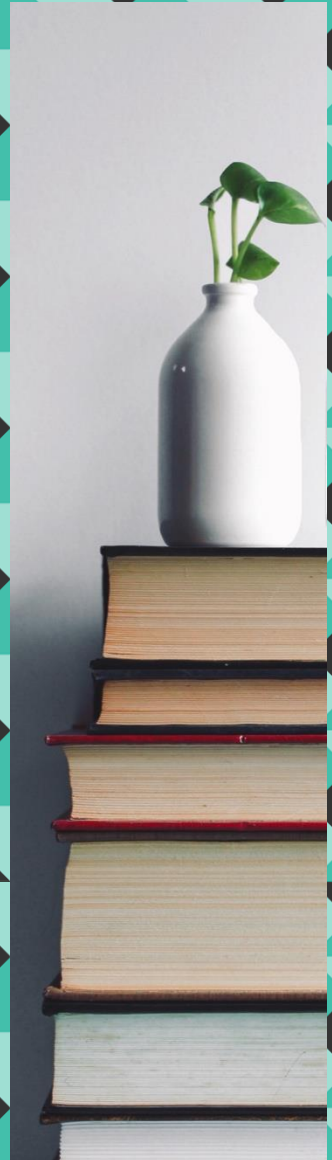
Documentation from **UrBIOfuture** - Boosting future careers, education and research activities in the European bio-based industry (May 2019 - April 2020):

- [Webinar](#) "Introduction to the EU Bioeconomy career opportunities"
- [Flyer](#) "Are you looking for a job or a new career pathway? Join the Bioeconomy sector"
- [Flyer](#) "Would you like to become part of the change? Go for studies in the Bioeconomy sector"

Additional further reading:

- [EFFAT Bioeconomy \(2019\)](#): The bioeconomy and a future bio-based food industry and agricultural sector: How can workers' organisations shape the change?
- The Bioeconomist, in: Iris Lewandowski (ed.), [Bioeconomy: Shaping the Transition to a Sustainable, Bio-based Economy](#)
- [The Fundamentals Of Bioeconomy: The Biobased Society](#). United Federation of Danish Workers 3F
- Transnational Institute, [The Bioeconomy – a Primer](#)

→ AllThings.Bio's [podcast](#) on bioeconomy



Beyond bioeconomy in general, the Allthings.bioPRO factsheets series cover the project's four missions, tangible themes that are familiar to the wider public, as follows:

- Jobs and Careers
- Kids and Schools
- Fashion and Textiles
- Food Packaging

The factsheets are living documents, that are refined and expanded over the duration of the project (September 2020 - August 2023), taking into account feedback collected during engagement with the public.

The latest editions of the factsheets can always be found at the project website, www.allthings.bio.

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