



EU bioeconomy education

May 2024

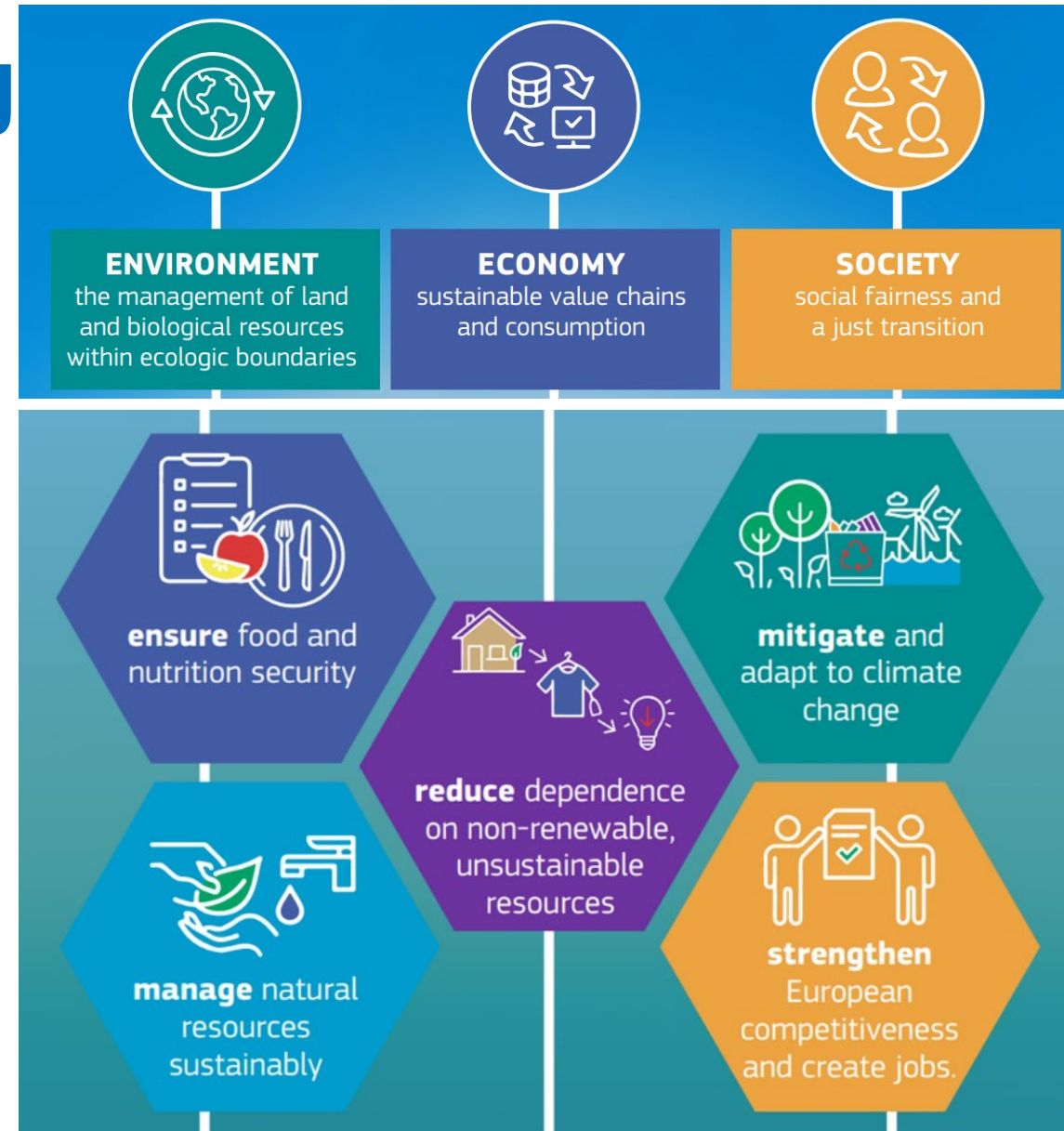
European Commission, DG Research & Innovation

The EU's understanding of the Bioeconomy

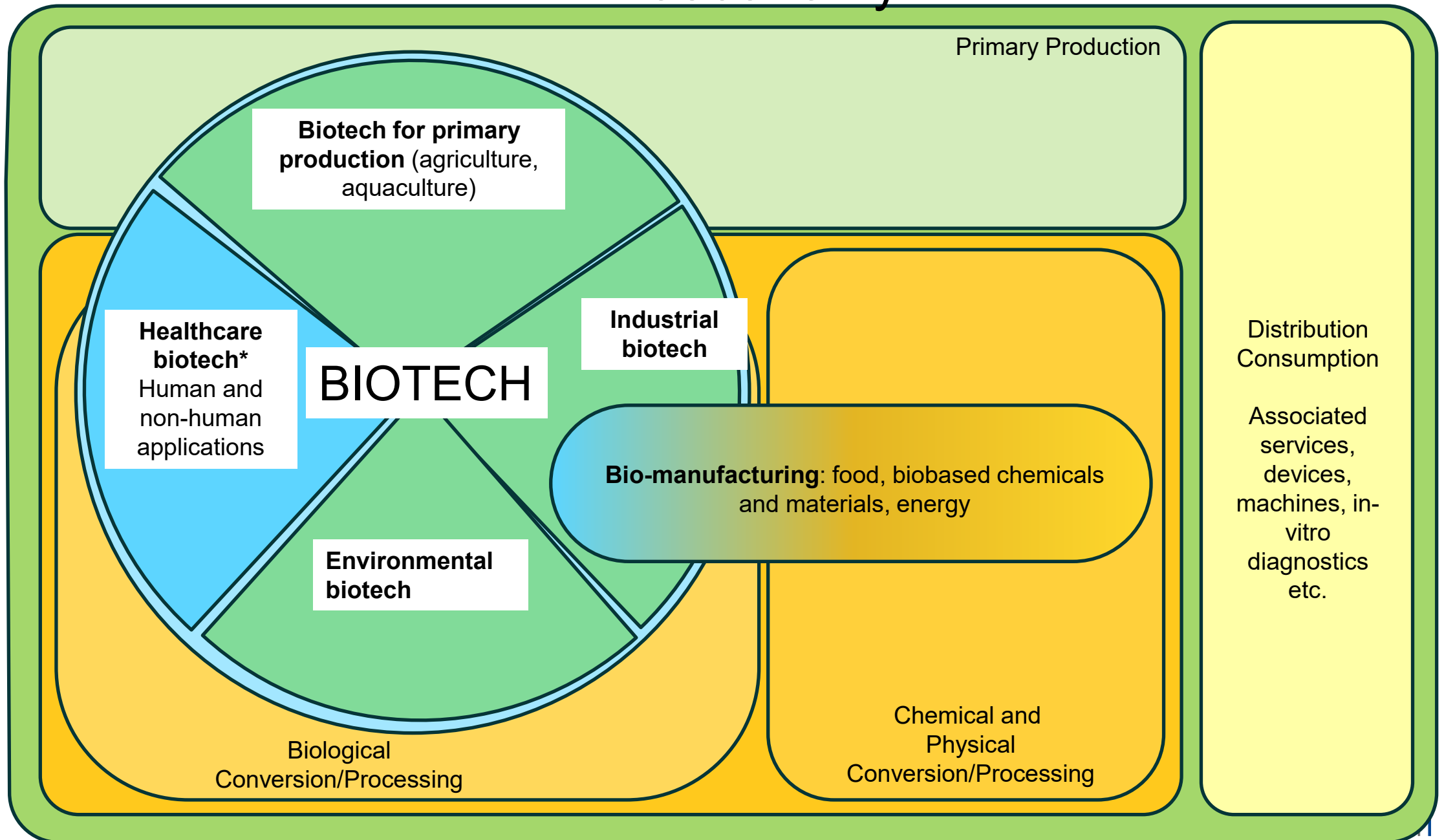
All sectors and associated services and investments that produce, use, process, distribute or consume biological resources (animals, plants, micro-organisms, including organic waste), including ecosystem services.

Characteristics

- The EU Bioeconomy Strategy takes a **holistic approach** focusing on all three dimensions of sustainability.
- Key principles: sustainability, circularity
- **Cross-sectoral** policy framework
- It addresses **five different objectives**.
- Strategic view on **trade-offs** (e.g. scarce biomass), co-benefits (e.g. for biodiversity)



Bioeconomy



* The Healthcare sector is currently not included in the definition of the bioeconomy

EU Bioeconomy Strategy



2012



- o Efficient use of renewable resources
- o Focus on R&I

First Bioeconomy Strategy

2018



- + Substitution of harmful products
- + Regional development
- + Understanding ecological limits

Updated Bioeconomy Strategy

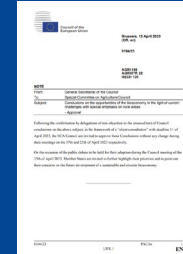
Towards a green and just transition

2022



Bioeconomy Progress Report

2023



Council Conclusion

In progress

Update of the EU Bioeconomy Strategy

- Bioeconomy **contributes to the European Green Deal** which enables sustainable and just transition pathways
- **Mainstreaming and up-scaling** of sustainable bioeconomy ever more important in view of the current food and energy price crisis

“On the opportunities of the bioeconomy in the light of current challenges with special emphasis on rural areas”
(AgriFish Council 25/4/2023)

- EMPHASISES the **central role of a sustainable and circular bioeconomy** for climate, environment + achieving the objectives of the EGD and its strategies.
- Calls on the EC to **better integrate bioeconomy in all EU policies**
- Calls on the EC to present before the next strategic period [...] an **updated EU Bioeconomy Strategy and Action Plan**

The updated EU Bioeconomy Strategy (2018) – Action Plan

- **Three priorities:**
 - Strengthening and scale-up the **biobased sectors**
 - **Deploy local bioeconomies** across Europe
 - Understand the **ecological boundaries** / protect the biosphere
- A set of **14 well-defined actions**





1

STRENGTHEN AND SCALE-UP THE BIO-BASED SECTORS, UNLOCK INVESTMENTS AND MARKETS

-  Mobilise stakeholders in development and deployment of sustainable bio-based solutions
-  Launch the EUR 100 million Circular Bioeconomy Thematic Investment Platform
-  Analyse enablers and bottlenecks for the deployment of bio-based innovations
-  Promote and develop standards, labels and market uptake of bio-based products
-  Facilitate the development of new sustainable biorefineries
-  Develop new biodegradable products, including bio-based plastic substitutes

2

DEPLOY LOCAL BIOECONOMIES RAPIDLY ACROSS EUROPE

-  Launch a Strategic Deployment Agenda for sustainable food and farming systems, forestry and bio-based products
-  Launch pilot actions for the development of bioeconomies in rural, coastal and urban areas
-  Support regions and Member States to develop Bioeconomy Strategies
-  Promote education, training and skills across the bioeconomy

3

UNDERSTAND THE ECOLOGICAL BOUNDARIES OF THE BIOECONOMY

-  Enhance knowledge on biodiversity and ecosystems
-  Monitor progress towards a sustainable bioeconomy
-  Promote good practices to operate the bioeconomy within safe ecological limits
-  Enhance the benefits of biodiversity in primary production









EU BIOECONOMY

European Commission's Knowledge Centre for Bioeconomy

EMPLOYMENT
(MILLION JOBS)
17.4

VALUE ADDED
(BILLION EUR)
657

EMPLOYMENT (MILLION JOBS) VALUE ADDED (BILLION EUR) VALUE ADDED (SHARE TOT)

	AGRICULTURE	8.8	193	29%
	FORESTRY	0.5	25	4%
	FISHING AND AQUACULTURE	0.2	6	0.9%
	FOOD, BEVERAGES AND OTHER AGRO-MANUFACTURING	4.7	237	36%
	BIO-BASED TEXTILES	0.8	25	4%
	WOOD PRODUCTS AND FURNITURE	1.3	50	8%
	PAPER	0.6	48	7%
	BIO-BASED CHEMICALS AND PHARMACEUTICALS, PLASTICS AND RUBBER	0.5	65	10%
	LIQUID BIOFUELS	0.03	3	0.5%
	BIOELECTRICITY	0.03	5	0.8%

DATA 2019
EU-27

Joint
Bioeconomy
Centre

Source: based on Ronzon et al., 2022
<http://data.europa.eu/89k7d7d5461-2d02-4b36-8e79-697b04fa4278>

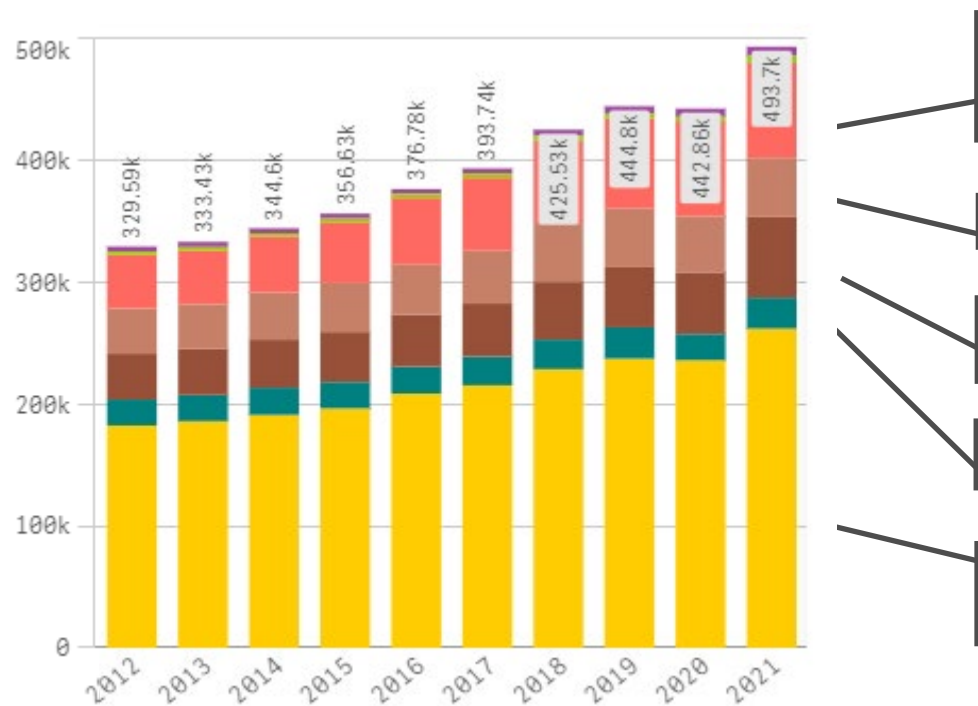
A key sector of the EU's economy

- Based on this definition the **bioeconomy is an important sector in the EU: 8.3%** of the EU's workforce and **4.7%** of GDP; agriculture and the manufacture of food, beverage **65%** of the total value added
- The **bioeconomy's share in GDP is much higher** (10.4% for EU-28 in 2020), when including **bioeconomy services** (Ronzon WUR 2023)
- **High innovation potential** for sustainable / new biobased products through **biomanufacturing** (e.g. textiles, packaging, cosmetics, building material and services e.g. carbon farming)
- **High job creation potential**, in rural and coastal areas, through the growing participation of primary producers and deployment of bio-based solutions



Growing importance of bio-based industries in the EU Bioeconomy

Development of value added in the bio-based industries between 2012 and 2021 in EU27 (mio €)



Bio-based chemicals (12.1 bn €)
 Pharmaceuticals (62.0 bn €)
 Plastics and rubber (3.8 bn €)

+ 4.9% compared to 2019

Paper (48.7 bn €)

Wood products and furniture (66.3 bn €)

Bio-based textile (25.4 bn €)

Food, beverage and tobacco (262.2 bn €)

+ 10.4% compared to 2019

BB industries in EU*

- 7.9 million workers
- €494 billion of value added

*Construction and waste treatment are not accounted for

Study focus & specific objectives

Study focus



Higher education

Vocational education & training (VET)

Entrepreneurship training

Specific objectives of the study



1. Provide overview of **current training and education availabilities** at different levels concerned by the study.
2. Provide overview of **current and future (2030+2050) needs** for professional profiles and skills, setting out unmet training and educational needs.
3. Support the relevant **upgrade, adaptation and development of bioeconomy-related training and education** to meet future workforce needs for the deployment of a sustainable and circular bioeconomy by developing and considering relevant elements (e.g. modules, curricula, methods and tools but also by looking at the relevant context and structures).
4. Improve **collaboration** between educational institutions and industry, and improve **transfer of science, technology and innovation knowledge** and skills in the bioeconomy.

The study focuses on 10 Member States (BE, BG, EE, FI, DE, IT, LV, NL, SK and ES)

Curricula development

Identifying emerging skills needs

Training providers need to establish processes to identify and respond to emerging skills needs. This should include developing engagement with local industry stakeholders and entrepreneurs.

Updating content and teaching methods

Courses need to be updated to reflect new skills demands that are identified. Here employers and educational institutions need to work together to design and deliver up-to-date training to prospective and existing employees. Problem and praxis-based teaching methods should also be used.

Adopting a modular approach

Given the lack of a 'one-size-fits-all' model, modules and options – including on entrepreneurship - should be developed and delivered across a range of courses and programmes. This approach will also support the development of multi-, inter- and trans-disciplinary courses, which break down siloes.

Cross-cutting recommendations

1. Make long-term skills commitments in bioeconomy- and related strategies to strengthen skills related initiatives.
2. Monitor impacts of different approaches and disseminate data and best practices across Europe, including a one-stop shop for talent monitoring and sharing best practices.
3. Promote the merits of the bioeconomy, including by delivering awareness-raising activities and embedding the bioeconomy within careers guidance for young people and adults

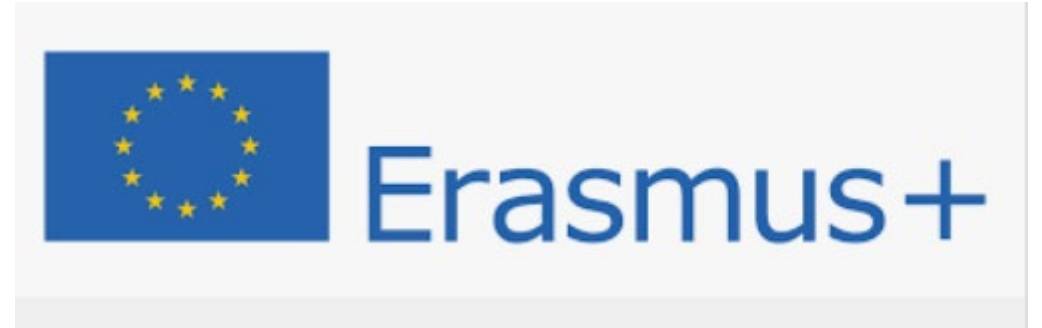
Recommendations for HE and VET providers

1. Support individualized learning by developing new bioeconomy learning paths, modules, learning nuggets, and micro-credentials for certification, including on entrepreneurship. These should be shared to be used across a range of bioeconomy courses.
2. Use varied teaching methods to develop skills, including problem- and practice-oriented teaching and learning.
3. Boost high-quality bioeconomy training, including 'train the trainer' and ensuring the provision of up-to-date training materials and modules

EU funding streams for bioeconomy education



Marie Skłodowska-Curie Actions
Developing talents, advancing research



Bioeconomy education

- **Final report**
 - <https://op.europa.eu/en/publication-detail/-/publication/6a5f6dd4-3312-11ed-975d-01aa75ed71a1/language-en/format-PDF/source-266382552>
- **Policy brief**
 - <https://op.europa.eu/en/publication-detail/-/publication/da7a3790-330c-11ed-975d-01aa75ed71a1/language-en/format-PDF/source-266382205>
- **FACTSHEETS**
 - **Higher education**
 - <https://op.europa.eu/en/publication-detail/-/publication/82c681fc-2fef-11ed-975d-01aa75ed71a1/language-en/format-PDF/source-265943753>
 - **Vocational education and training**
 - <https://op.europa.eu/en/publication-detail/-/publication/8898756d-2ff1-11ed-975d-01aa75ed71a1/language-en/format-PDF/source-265943548>
 - **Entrepreneurship education**
 - <https://op.europa.eu/en/publication-detail/-/publication/e98d595a-2fee-11ed-975d-01aa75ed71a1/language-en/format-PDF/source-265943595>



Promoting education, training and skills across the bioeconomy

Final Report



Independent
Expert
Report

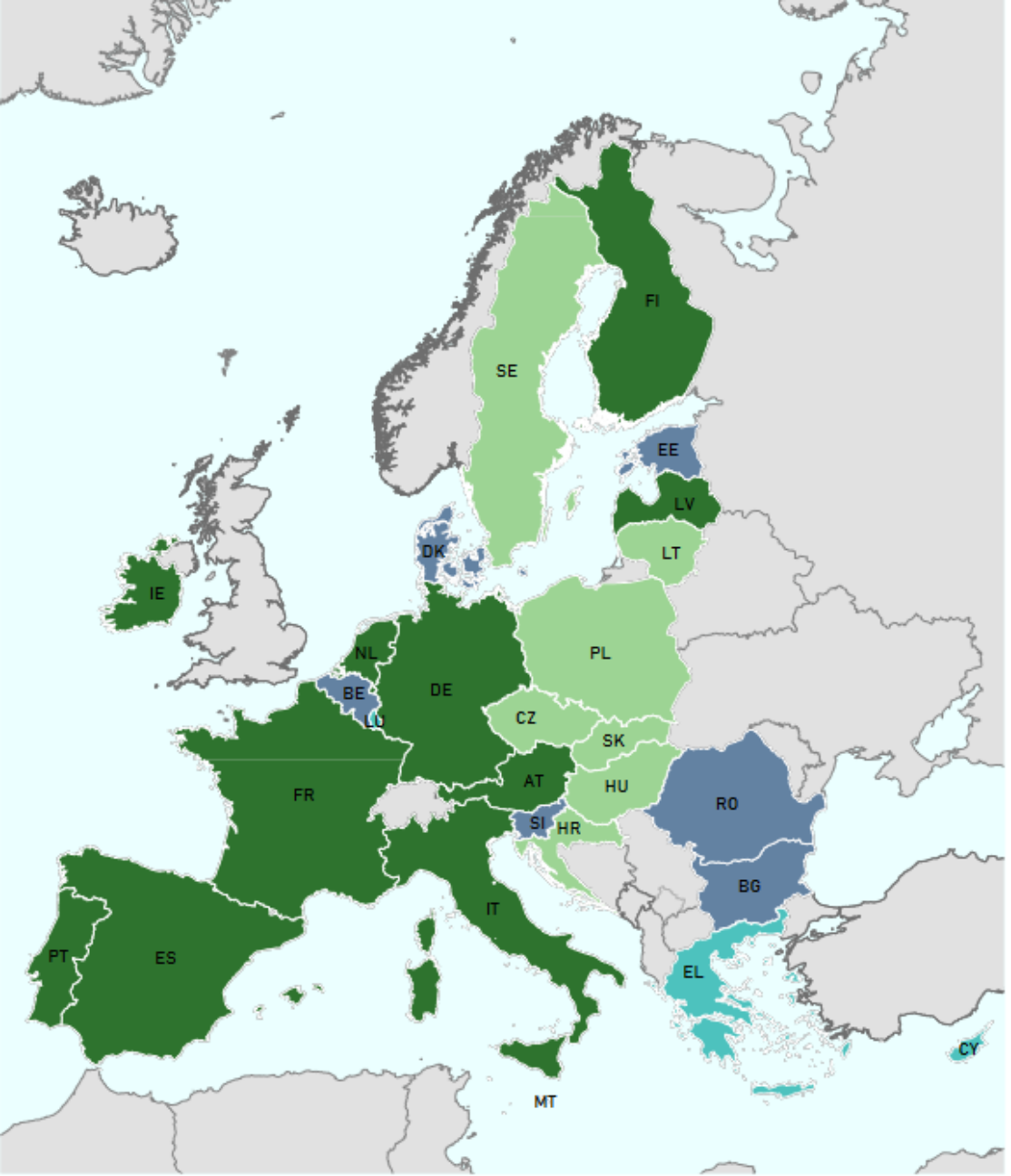
[Bieconomy Education Conference](#)

- <https://webcast.ec.europa.eu/bioeconomy-education-conference-2022-09-15>



Priority 2: Deploy local bioeconomies e.g. Status of the national bioeconomy policies in the EU-27

(as of Dec 2022)



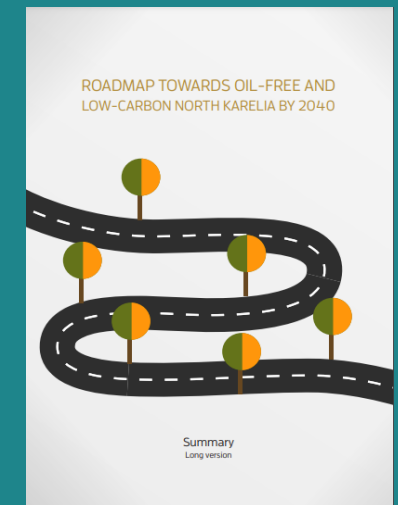
Status of national bioeconomy strategies:

- Dark Green: Dedicated bioeconomy strategy at national level
- Light Green: Dedicated bioeconomy strategy at national level under development
- Blue: Other policy initiatives dedicated to the bioeconomy
- Teal: Other related strategies at national level

Source: EC's Knowledge Centre for Bioeconomy
 Administrative Boundaries:
 © EuroGeographics © UN-FAO © Turkstat

- **10 Member** states with **dedicated bioeconomy strategies** at national level (AT, DE, ES, FI, FR, IE, IT, LV, NL, PT)

- **28 EU** regions have dedicated strategies



Thank you



© European Union 2023

Unless otherwise noted the reuse of this presentation is authorised under the [CC BY 4.0](#) license. For any use or reproduction of elements that are not owned by the EU, permission may need to be sought directly from the respective right holders.

Slide xx: [element concerned](#), source: [e.g. Fotolia.com](#); Slide xx: [element concerned](#), source: [e.g. iStock.com](#)