

The EU Circular Bioeconomy:

How to fully develop its potential within the next 10 years?

The EBU Alliance vision in support of the EU Bioeconomy Strategy – in short

1. Promote the role of HEIs and research to boost this innovative and competitive sector, including their contribution to refine a systemic and long-term approach;
2. Deploy circular bioeconomy multi-disciplinary education programmes and projects;
3. Increase EU funding on bioeconomy research and innovation in the FP10;
4. Support structural activities beyond specific education or research projects;
5. Set up a coherent policy framework supporting sustainable circular bioeconomy;
6. Support the EU in achieving an epochal shift towards the Green Transition, including through a leading role in global collaborations.

Since the initial launch of the EU Bioeconomy Strategy in 2012 and its update in 2018, as well as the European Green Deal, the bioeconomy landscape has profoundly evolved, encouraging the setting-up of regional and national bioeconomy strategies. The concept of sustainable and circular bioeconomy was taken up at global level with initiatives such as the Global Bioeconomy Summit and a Global Partnership on Bioeconomy, currently under discussion at FAO level. According to the 2025 FAO survey to establish this Partnership, 24 countries have already adopted dedicated strategies.

Bioeconomy discussions are also becoming more prominent in the international arena, with the G20 Bioeconomy Initiative under Brazil's presidency adopting High-Level Principles on Bioeconomy in 2024, and South Africa taking the Initiative forward in 2025 under their G20 Presidency. At the 2025 Global Forum for Food and Agriculture, over 60 agriculture ministers recognized the bioeconomy's role in a sustainable, resilient, and inclusive economy in their Final Communiqué. The sustainable bioeconomy holds the key to addressing critical global sustainability challenges, including climate change, biodiversity loss, and food security.

This influence is the result of the **intellectual leadership of the EU in this meta-sector**, while other countries are still pushing towards a massive exploitation of natural and fossil resources to maintain the growth standards of the last 50 years. On the other side of the world, major investments are made to strengthening the bioeconomy sector, for instance in China. To strengthen Europe's potential to become a global frontrunner, we advocate to consider the **huge economic potential of the bioeconomy, including the creation of new green jobs**, new investments could be done by a growing number of bio-based industries, bringing about substantial benefits to the EU climate objectives. It is now necessary to maintain and strengthen the initial investments that the EU made in terms of research and innovation and that contributed to establish the EU leadership in the field. Data from the Bio-Based Industries Consortium (BIC) show a **continuous increase in the turnover of the EU bioeconomy, from approximately 1.75 trillion Euro in 2014 to more than 2.35 trillion Euro in 2021**, with the food and beverage sector being the largest contributor (47%) followed by the primary sectors, agriculture and forestry (19%). The rest of this turnover (34%) is attributed to the so-called bio-based industries (including chemicals and plastics, pharmaceuticals, paper, forest-based industries, textiles, biofuels and bioenergy).

In total, **the number of employed persons in the EU bioeconomy amounted to 16 million in 2021**. Employment in the bio-based industries increased from 2.9 million in 2014 to approximately 3.3 million in 2021, with the chemicals and plastics industries and the pharmaceuticals sector contributing with notable increases in employment (*European Bioeconomy in Figures 2014-2021, BIC, 2024*).

The EBU Alliance vision in support of the EU Bioeconomy Strategy

The European Bioeconomy University (EBU) Alliance, is a collaboration of leading universities across Europe, founded with the mission to address the environmental, economic, and societal challenges of the 21st century. The EBU Alliance, established in July 2019, connects eight institutions¹, all leaders in the field of bioeconomy, to foster a knowledge-based transformation towards sustainability. As a key alliance in the bioeconomy, representing education, research, innovation and dialogue with the civil society, it celebrated its **5th anniversary in November 2024** with a significant number of activities and projects among its partner institutions under its belt. **The EBU Alliance plays a pivotal role in the Green Transition to be achieved within the next decade, building on its community of lecturers, researchers, staff, students and alumni and providing key scientific knowledge.**

The European Bioeconomy Scientific Forum (EBSF) is the biannual official event of the EBU Alliance. The event brings together high-level scientists, experts, policymakers, industry representatives, youth, and other stakeholders from across Europe and beyond.
EBSF 2025 edition: <https://www.european-bioeconomy-university.eu/ebfsf2025/>

1. In this changing world scenario, where circular bioeconomy is becoming both a new opportunity of investment and a potential systemic solution to current global challenges, the EBU Alliance acknowledges the importance of the role of Higher Education Institutions (HEIs) in multidisciplinary programmes and entrepreneurial education to train a new generation of changemakers.

The EBU Alliance, as a research alliance, believes in the necessity to further define “circular bioeconomy” in an omni-comprehensive way, with both concepts always considered together. Circular bioeconomy is a competitive meta-sector where bio-based innovations complement and take over from fossil-based systems. Sustainability is deeply interlinked with circularity, and competitiveness should be measured through the long-term functioning of ecosystems and the services they provide. Sustainable, circular economy examples include biogas production from organic waste, which produces renewable energy while returning valuable nutrients to agricultural fields, or biorefineries which valorise multiple fractions of biomass through a cascading chain of processes and products.

The value of bioeconomy is in considering a sustainable use of natural resources on the long term.

As known since the “Limits to Growth” Report (*Club of Rome, 1972*), without a healthy natural environment and functioning ecosystem services, we cannot maintain climatic conditions suitable for human life and therefore sustain economic growth. Natural resources are limited and as such, they should be optimally used and regenerated in circular bioeconomy.

The EBU members propose a systemic view of the circular bioeconomy to be reflected in the new EU Bioeconomy Strategy and encourage a synergistic approach in terms of political initiatives, encompassing all components of the bioeconomy (from agriculture and forestry primary production to bio-based products). For instance, such vision would address alignment of the Common Agricultural Policy and the Farm to Fork Strategy to incentivise circular bioeconomy valorisation of residual biomass, promotion of sustainable intensification of agriculture, or policies that take on board the economic, social, human, geopolitical and environmental implications of the bioeconomy.

2. Reshaping our education systems will play a key role in fostering the bioeconomy transition, with the overarching goal of empowering students, citizens or professionals to become well-skilled agents of change, having fully embraced the values brought about by the bioeconomy. To fully deploy the

¹ The founding universities include AgroParisTech (France), the Alma Mater Studiorum University of Bologna (Italy), the University of Eastern Finland - UEF, University of Hohenheim (Germany), BOKU University (Austria), and Wageningen University and Research (Netherlands). In 2023, the Warsaw University of Life Sciences (Poland) and the Swedish University of Agricultural Sciences - SLU (Sweden) also joined as core members, expanding the alliance's reach and impact.

bioeconomy potential, there is a recognised importance to support education activities and **the EBU universities joined forces in this direction, though multidisciplinary education programmes (including lifelong learning) considering different bioeconomy sectors.**

During the *EC workshop on Bioeconomy Education (20/11/2024)* several gaps were identified:

- A lack of “bioeconomy programmes” branded as such, and fully embracing interdisciplinarity; there is a misperception that going from a specific field to an interdisciplinary area will result in a loss of knowledge, but in fact many people working in the bioeconomy have gone through a multidisciplinary curriculum, which is of clear added value;
- Lack of entrepreneurship curricula: namely entrepreneurial programmes combining trainings and mobility between bio-based industries, and collaborative projects are still one of the most fertile terrains to scale up innovations and bring them to the market; and
- Lack of mobility/trainings, that could be seen as advantage to shift from the traditional disciplinary sectors to this new broad meta-sector of the bioeconomy.

The EBU multi-disciplinary education programmes already address these challenges:

- EBU Joint Doctoral Programmes** as transdisciplinary research and education programmes with double degree awarded through bilateral agreements among EBU members.
- Multi-level Bio-Based Education Centres** as knowledge and innovation hubs
- Student mobility and **dedicated additional trainings**, to address specific skills gaps
- EBU e-learning platform** to exchange the best practices
- Specific joint programmes at Master’s level, fostering interdisciplinarity and entrepreneurship

EBU is ready to share the insights learnt through these experiences, to have a broader impact and be an actor of systemic change. It reckons that training paths should put a clear emphasis on soft skills (ability to work in teams, take initiatives, communicate or exercise leadership, entrepreneurial mindset) and reflective skills (critical thinking, open-mindedness), systems thinking and multi- and trans-disciplinarity.

Examples of EBU projects:

FOEBE (2020-2023) & FOEBE+ (2023-2026) aim to foster entrepreneurship for a sustainable and innovative bioeconomy, by equipping students with additional skills. This hybrid programme gathers an annual cohort of diverse students and consists in 8 online modules (idea generation, intellectual property, marketing, digitization...), synchronous and asynchronous, plus an in-person study week. Some FOEBE alumni went on to win the BISC-E Challenge or to become bioeconomy ambassadors.

DESTINY Doctoral Network (2024-2027) aims to train a new generation of researchers and practitioners through a multi-disciplinary curriculum, equipping Doctoral Candidates with the knowledge they need to design and assess novel biomass production systems and bio-product value-chains. In their research programme at the crossroads between bioeconomy and sustainability science, these candidates will design sustainable bioeconomy systems for Europe, factoring in social, economic and governance aspects.

BIObec (2021-2024) aimed to build bridges between the bio-based industry and the education system by interlinking universities, innovation labs, and R&D centres with industrial actors and regions. To achieve this, the project proposed a holistic framework that merges the traditional idea of an education centre, with that of a knowledge hub: the multi-level Bio-Based Education Centres (BBECs). Six BBECs were designed to be flexible enough to answer the present and future needs of the industry and of the surrounding ecosystem at local, regional and/or national levels.

3. With the aim to keep up with the current trends in bioeconomy, the EBU Alliance supports the renewal of the public-private partnership CBE JU and advocates for an increase of funding in the Cluster 6 successor under FP10. Since the Draghi Report, the European Commission started a paradigm

shift towards EU security and competitiveness, with expected changes in the FP10 that would be more oriented towards innovation and higher TRLs. Innovation is important but there is still the need to guarantee funding for basic research, both in collaborative projects under FP10 and in public-private partnerships such as CBE JU. The EU security also relies on food availability and liveable climatic conditions, and dedicated research and innovation is essential to achieve this goal.

4. There is also a need for supporting HEIs and research infrastructures in a long-standing and structural approach, connecting all the bioeconomy dots beyond single projects. In coherence with the EBU associated partners network (such as BIOEAST), EBU could become a game-changing actor at EU level by fostering networks between stakeholders, providing inspiration as a think-and-do-tank, connection with global actors and providing a coherent framework for action.

5. The regulatory scenario has recently evolved from the *Heitor, Draghi, Letta reports* to a proper recognition of the bioeconomy into the *“Building the future with nature”* communication and several 2025 policy initiatives: *A competitiveness compass for the EU, The EU Strategy for agriculture and food, the EU Forest Strategy 2039, the EU Life Sciences Strategy, the EU Biotech Act and the EU Clean industrial deal*. The cross-sectoral nature of the bioeconomy and its diversity within Europe mainly rely on the different industrial specialisation of EU regions (*Fritzsche et al. 2020*). Nevertheless, to keep a leading role, too many regulatory hurdles to the deployment of bioeconomy innovations should be avoided. **The EBU Alliance believes that the times are mature to adopt a coherent policy and regulatory framework where all pieces of legislation and initiatives are harmonised together, with the support of value network instruments connecting all the stages of the value chains**, facilitating the process of bioeconomy innovations in reaching the market.

6. The EU has a strategic role to play to ensure that priority is given to a sustainable and circular bioeconomy at global level, in compliance with the Paris Agreement. *“The global economy must be reshaped to deliver not just more growth, but better growth—growth that is green, inclusive, and resilient”* (*Mazzuccato, 2025*). With the aim of making an epochal shift towards the Green Transition, in addition to establish international research networks and global education collaboration, there is a need to raise awareness worldwide, also among the developing countries, about the economic potential and the environmental benefits of the sector, boosting investments, supporting the EU bio-based industries and SMEs, and looking for research and innovation solutions tailored for local needs. The EBU Alliance is committed to support the EU in achieving this ambitious objective.

EBU activities beyond the Alliance – how we reach out:

- **Associated partners:** the EBU has an association policy enabling collaborations beyond its core 8 members, including other countries, as well as socio-economic actors.
- **Participation to strategic bioeconomy activities and events**, such as the Changemakers festival (March 2024), Global Bioeconomy Summit (October 2024), EC workshop on Education in the bioeconomy (November 2024), as well as contribution to consultations and policy initiatives.
- **Connection with existing networks** such as [ICA](#), [ELLS](#) or [WBA](#).
- **Participation in projects**, with one or several EBU member representing the alliance (e.g.: [Beaming](#), [NEBA Alliance](#)).
- **Work as a think-tank**, to activate dialogue and propose policy recommendations.

More info on the EBU website: <https://www.european-bioeconomy-university.eu/>

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