



Skills needs in the bio-based industry: our challenge to life science universities

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ICA-CoP Bio-Edu Workshop 2023, 26 April 2023, Warsaw

Where we are coming from



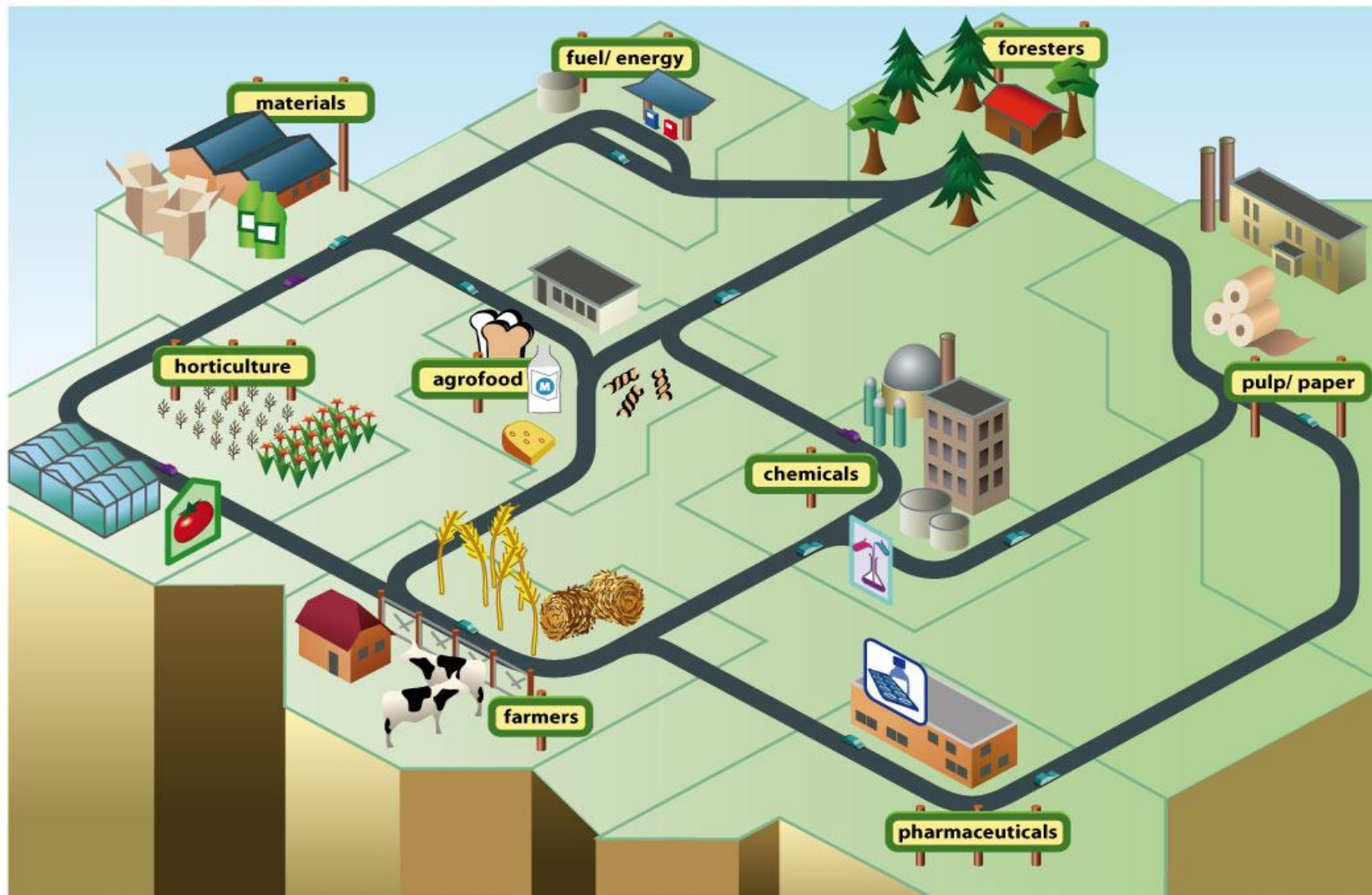
Where we are going to

Build and strengthen value systems across industry sectors



Where we want to be

Circular bio-based ecosystems across industry sectors across Europe



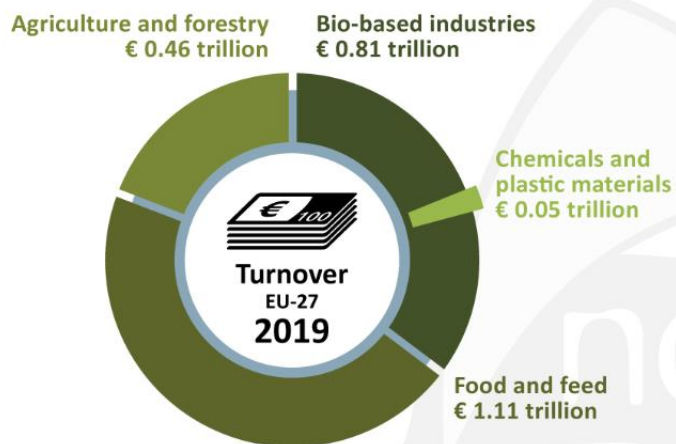
My storyline today

- ☀ The bioeconomy and the bio-based economy in Europe
- ☀ The Bio-based Industries Consortium (BIC)
- ☀ Deploying a sustainable circular bio-based industry across Europe
- ☀ Skills needs to realise and sustain the bio-based industry and sector

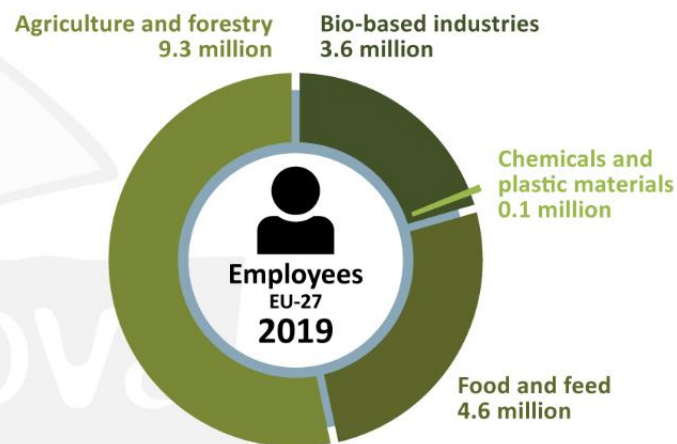
EU-27 Bioeconomy 2019

Report by Nova, commissioned by BIC

Bioeconomy overall € 2.43 trillion



Bioeconomy overall 17.6 million



Turnover:

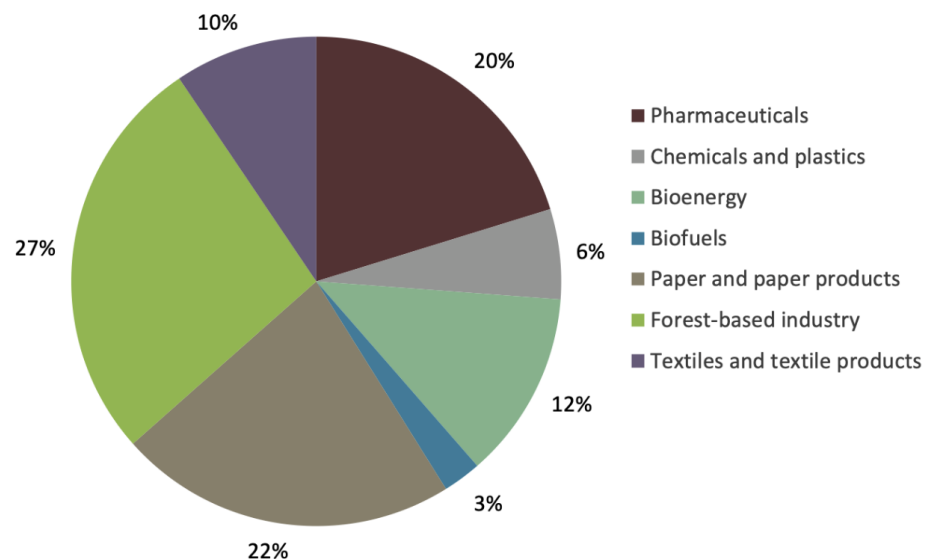
- ~ 25% increase vs 2008
- ~ 50% by food & beverages
- ~ 20% by primary sectors agriculture and forestry
- ~ 30% by bio-based industry

Employment:

- ~ 9% lower vs 2008 (productivity; efficiency)

Turnover of only industrial sectors 2019: +35% vs 2008

Turnover in the bio-based economy in the EU-27, 2019, total: 814 billion Euro*



Largest shares:

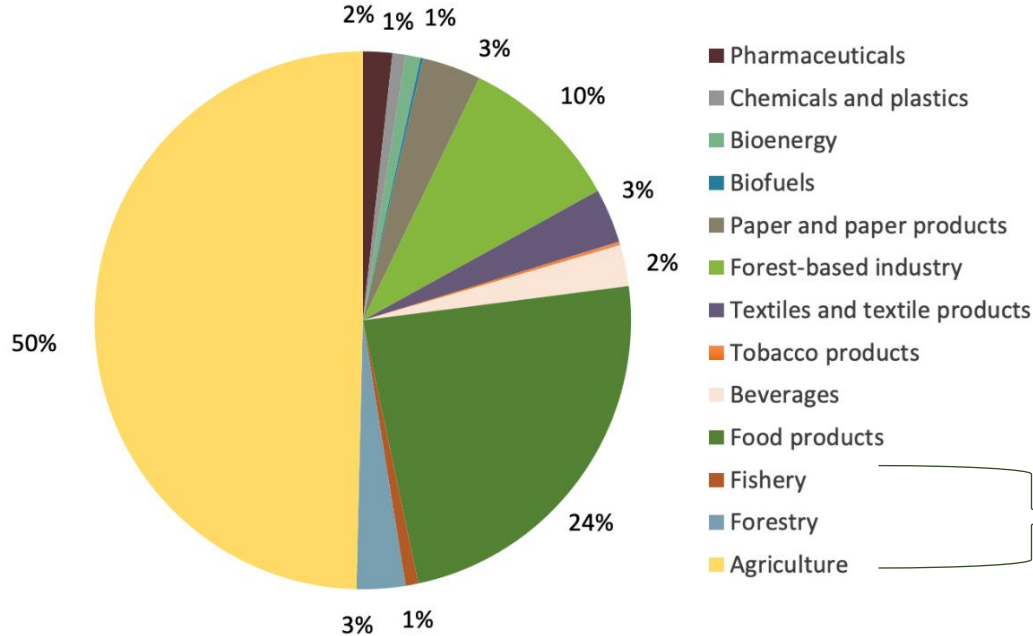
- Forest-based: 27%
- Paper & paper-products: 22%
- Pharmaceuticals: 20%

Largest growers since 2008:

- Chemicals & Plastics:
 - +68% (to 54 b€)
- Pharmaceuticals:
 - +42% to 142 b€)

Employment in the European bioeconomy 2019: -9% vs 2008

Employment in the bioeconomy in the EU-27, 2019, total: 17.6 million

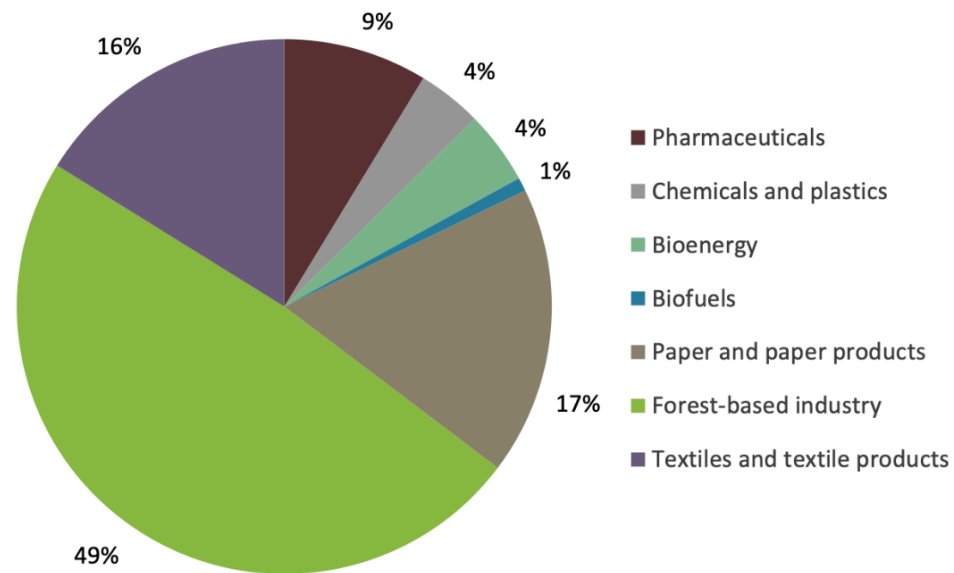


Education levels only available for these 3 (NACE)

- 40.2% have primary education (levels 0-2)
- 46.2 % have secondary education (levels 3-4)
- 13.6 % have tertiary education (levels 5-8)

Employment in only industrial sectors 2019: -5% vs 2008

Employment in the bio-based economy in the EU-27, 2019, total: 3.6 million*



The Bio-based Industries Consortium (BIC) is a non-profit organisation connecting industry, academia, regions and citizens to transform bio-based feedstocks into novel sustainable products and applications, and create circular bioeconomy ecosystems through investments, innovation and know-how.

240+
industry (full)
members

large companies
and SMEs

200+
associate
members

research organisations,
academia and trade
associations



1	CBE JU	2	Business
	<ul style="list-style-type: none"> ⌚ BIC represents the private sector in a public-private partnership with the European Commission called the Circular Bio-based Europe Joint Undertaking 		<ul style="list-style-type: none"> ⌚ Facilitating connections and providing market intelligence through activities including networking events and commissioned reports/studies
3	Finance	4	Society
	<ul style="list-style-type: none"> ⌚ Mobilising public and private finance and investors through services such as a regional funding platform and a pitching event 		<ul style="list-style-type: none"> ⌚ Increasing awareness, knowledge, acceptance and education through activities such as a student competition (BISC-E) and positive impact stories on the BIC Investment Portal

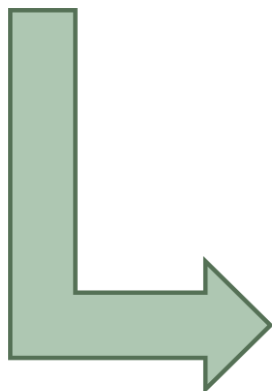


BIC also carries out specific activities to achieve a favourable policy, regulatory and financing framework for the bio-based industries, such as representing our members interest vis-à-vis the EU Institutions.

BIC Vision: the circular bio-society in 2050

The ending of our linear Society

Transition is needed



Turning the straight line into a circle



A circular bio-based society

Bio-based value systems envisioned in the BBI JU / CBE JU

Biomass and organic waste

From the agro-based industries

- Feedstock originating from the agriculture and agro-food industries
- Agricultural crops such as flax, hemp and fibre
- Co-products, side streams, and residues from the agriculture, including animal manure and from the agro-food industries, including residues from food processing plants

From the forest-based industries

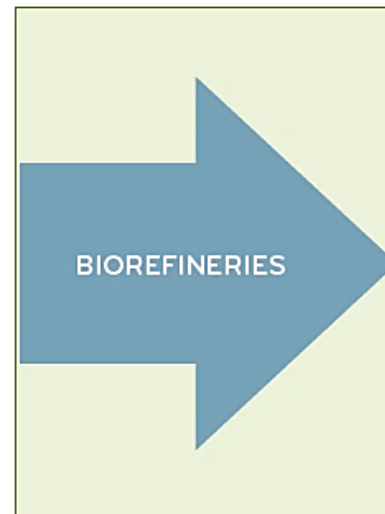
- Feedstock originating from the forest and forest-based industries
- 'Woody and non-wood forest feedstock'
- Co-products, side streams, and residues from the forest and forest-based industries, including the wood industry, saw mills, Paper and Pulp

From the aquatic-based industries

- Feedstock originating from the aquatic and aquatic-based industries, including aquaculture, the fish and fish processing industries
- Co-products, side streams and residues from the aquatic and aquatic-based industries

Bio-waste and CO₂

- Biodegradable garden and park waste
- Food and kitchen waste from households, restaurants, caterers and retail premises
- Waste water and sludge
- CO₂



Bio-based products & markets

- Bio-based chemicals
- Bio-based plastics, polymers, materials, packaging
- Specialties (for example bio-based surfactants, lubricants, pharmaceuticals, nutraceuticals, cosmetics)
- Textiles
- Food ingredients and feed
- Advanced biofuels



CBE JU call for proposals 2023; 215.5 M€ funding

Deadline 20 September 2023

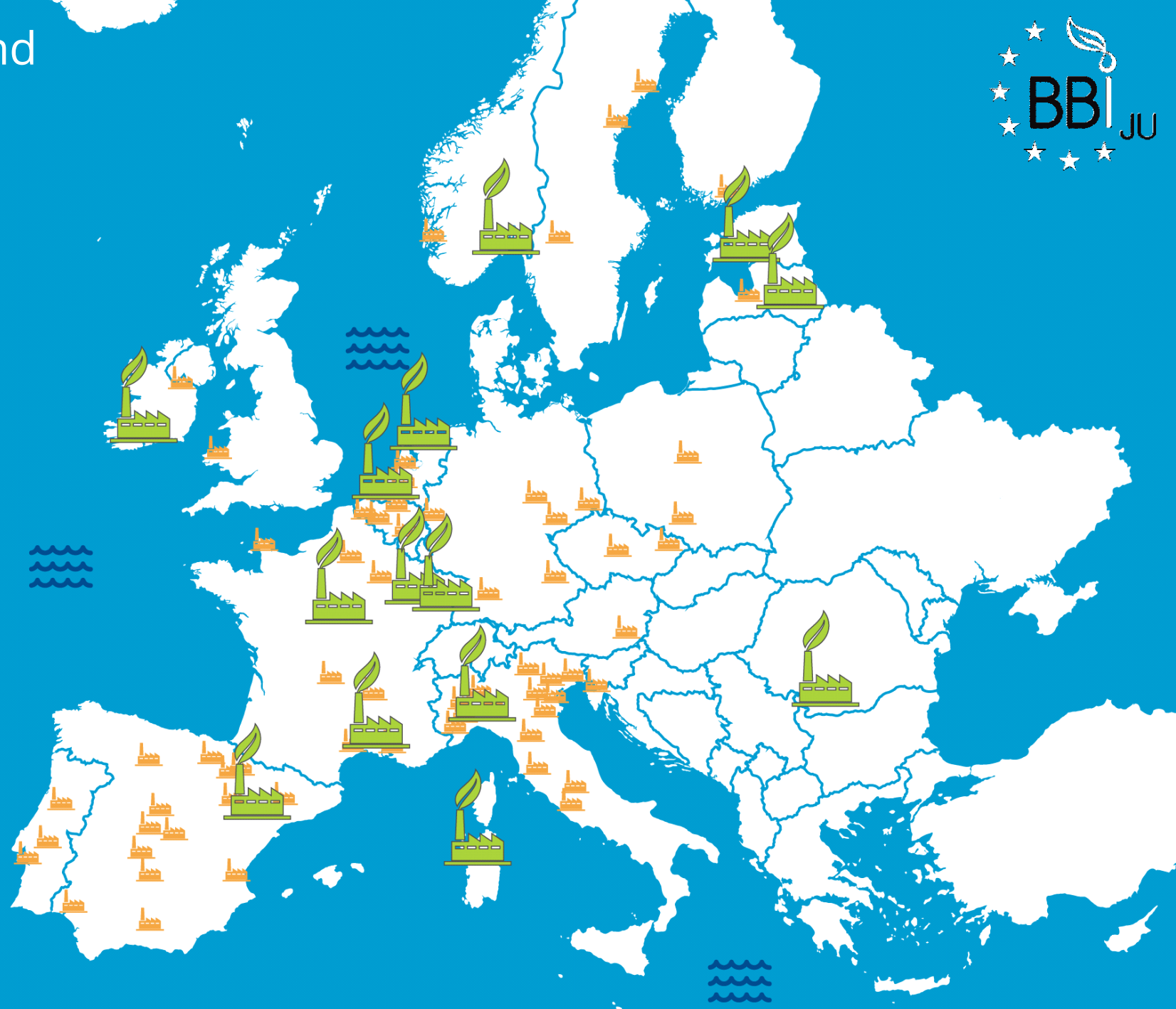


Flagships are first-of-their-kind biorefineries deployed at industrial scale



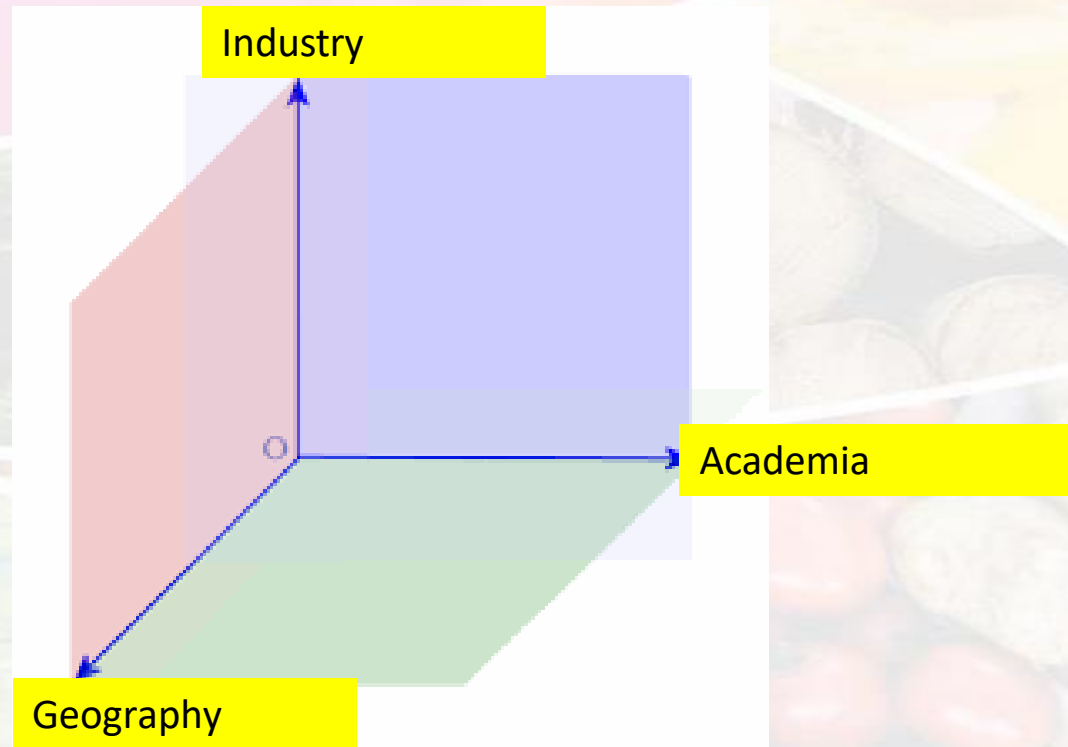
Demonstration plants are represented by the locations that receive the main investment in the project.

Deploying the bio-based industry across Europe



-  Flagship biorefinery
-  Demonstration plant

Establish competitive inclusive bio-based industry Europe-wide



To facilitate and expand bio-based activities (R&I; investments) and stimulate innovation, we must cross borders/boundaries:

- Industrial sectors
- Academic disciplines / technologies / expertise
- Geographical / cultural areas

Industry needs people with the skills & competencies to realise and sustain this mission.

In 2018 AWP: Identify opportunities to promote careers, and research activities in the European bio-based industry



UrBIOfuture

careers, education & research

‘Boosting future careers, education, and research activities in the European bio-based industry’

1 May 2019 – 30 April 2020

Coordinator: Universitat Autònoma de Barcelona (ES)

Top skills needed by industry by 2030+



RESEARCH AND INNOVATION

Knowledge transfer: from the LAB to the Industry
Innovation and Change

01



PERSONAL INITIATIVE AND ENTREPRENEURSHIP

Critical thinking
Problem solving

02



MANAGEMENT

Development of business models
Project management

03



SUSTAINABILITY AND INDUSTRY

Circular economy / Zero waste industry
Sustainable competitiveness / Economy

04



SPECIALISTS IN BIO-BASED SECTOR BUSINESS

Bio-based market knowledge & techno-economic expertise Identify
and create market application for new bio-based products

05

Education programmes used for mapping with industry needs

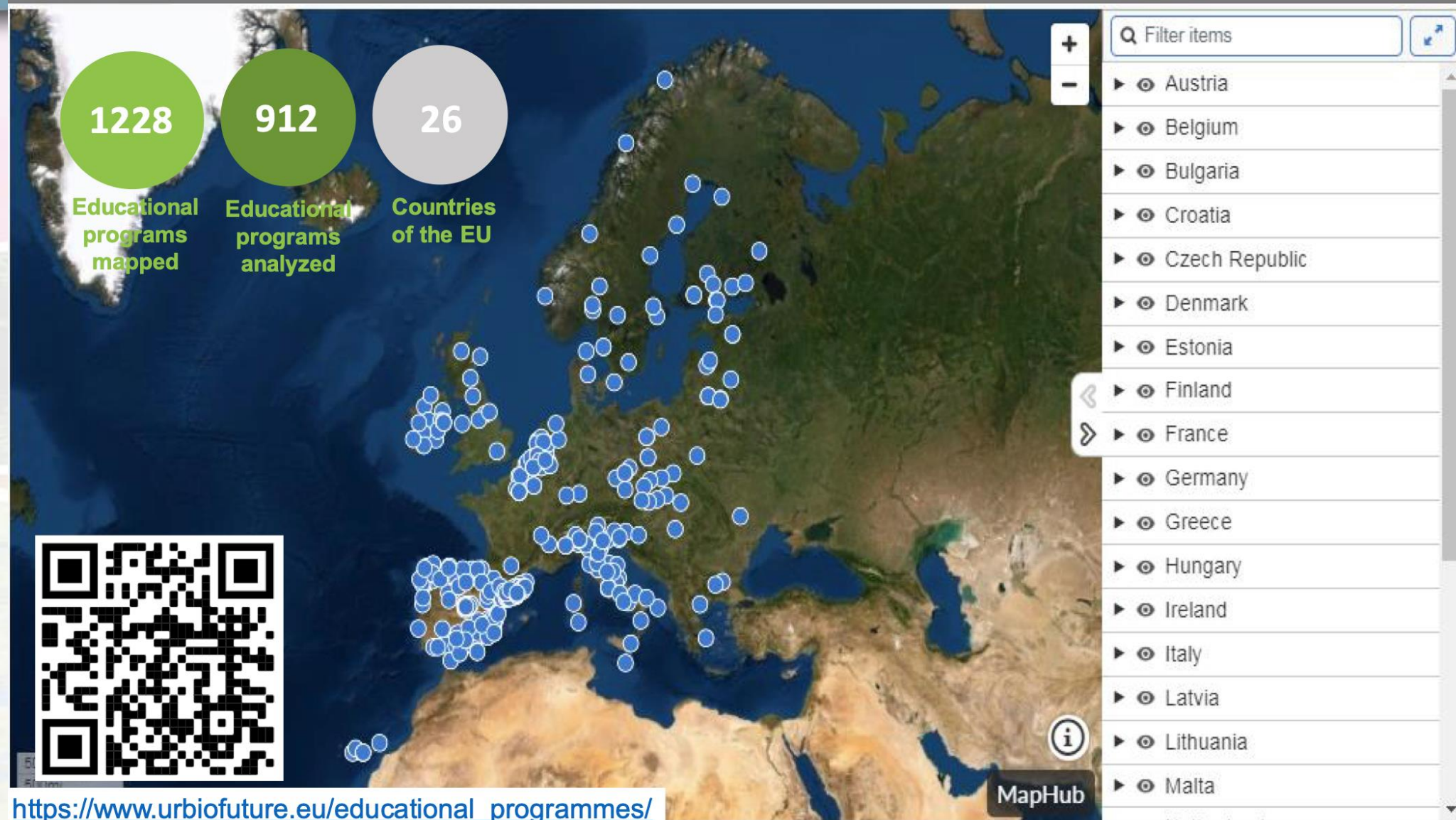
Distribution of programmes: MSc 46%; Undergraduate 35%; PhD 12%; VET 7%

From the UrBIOfuture project

Industry stakeholders state:

- Current education system does not train the necessary skills required by the industry
- Educational programmes' changing pace is very low in adjusting to new industrial requirements or the progress of the sector

Confirming the need to increase collaboration between industry and education institutions.



In 2020 AWP: Create and interlink bio-based education centres to meet industry's needs of skills and competences



'Preparing the creation of Bio-Based Education Centres to meet industry needs and boost the contribution of the bioeconomy to societal challenges'

1 September 2021 – 29 February 2024

Coordinator: Alma Mater Studiorum - Università di Bologna (IT)

Train early-stage researchers to lead the future of the European bio-based industry sector



Training Future Leaders 4 the
European Bio-Based Industries

Industry-led PhD MSCA programme

- managed by BiOrbic, the Bioeconomy SFI Research Centre located in University College Dublin (UCD)

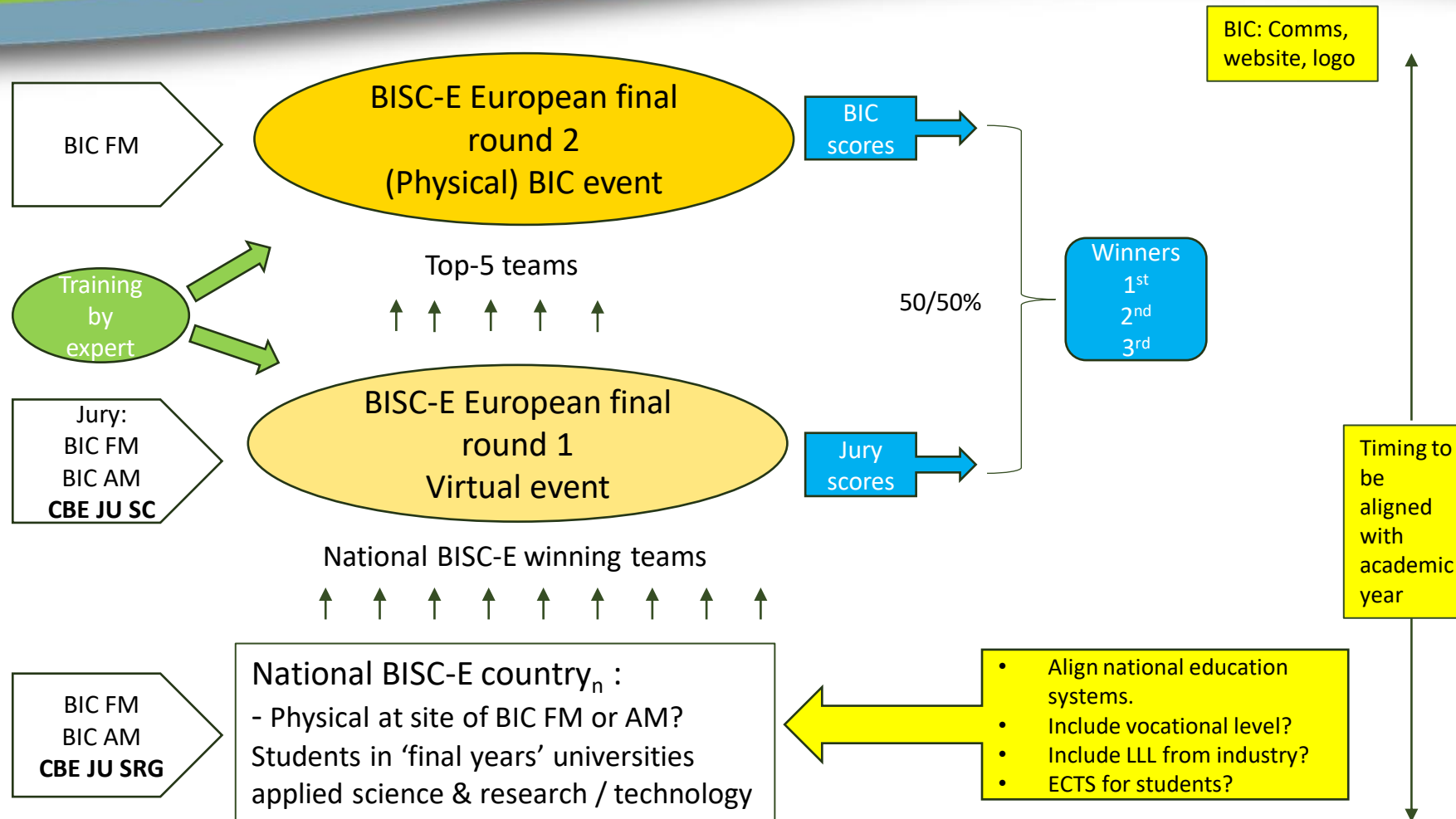
September 2022 – September 2028

10 industry and 8 academic partners

8 EU Member States & 1 Associated Country

BISC-E: Stimulate and practice entrepreneurship

Interaction students with academia and industry experts



n: 1 – 27 EU MS; + 1 – 10 AC

BISC-E 2023

20 countries

Belgium: University of Ghent – Nathan De Geyter; Nathalie De Coensel	Italy: University of Verona – Salvatore Fusco
Bulgaria: Agriculture University Plodiv – Dean Dimo Atanasov	Latvia: Latvian State Institute of Wood Chemistry – Ugis Cabulis
Croatia: Josip Juraj Strossmayer University of Osijek – Sanja Jelić Milković	Lithuania: Lithuanian Biotechnology Association – Inga Matijošytė
Czech Republic: Mendel University – Pawan Kumar Mishra	Netherlands: TKI Chemistry & Circularity – Bert van Rees; Kees de Gooijer
France: Bioeconomy4Change – Valerie Valet	Poland: Łukasiewicz Research Network, Automotive Industry Institute – Piotr Wieczorek; Krzysztof Biernat
Germany: University of Hohenheim – Andreas Kiesel; Evelyn Reinmuth	Portugal: University of Minho – José Teixeira
Greece: National Technical University of Athens; School of Chemical Engineering – Antonis Kokossis	Romania: University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca – Andrei Mihalca
Hungary: Debrecen University – László Zsombik	Slovenia: Chamber Of Commerce/Industry + University of Ljubljana – Nina Meglič
Iceland: Agricultural university of Iceland – Ragnheidur Þórarinsdóttir	Spain: University of Almería – Francisco Javier Egea Gonzalez
Ireland: Munster Technology University – Zoe Rush; Helen McMahon	Sweden: University of Borås – Mohammad Taherzadeh

European Coordinator BISC-E2023:
The Association for European Life Science Universities; Simon Heath.



Identifying and measuring skills demand in the bioeconomy

EC study Sept 2022



Table 3 – Skills and competences in demand according to OVATE across all professionals (ISCO major group 2)

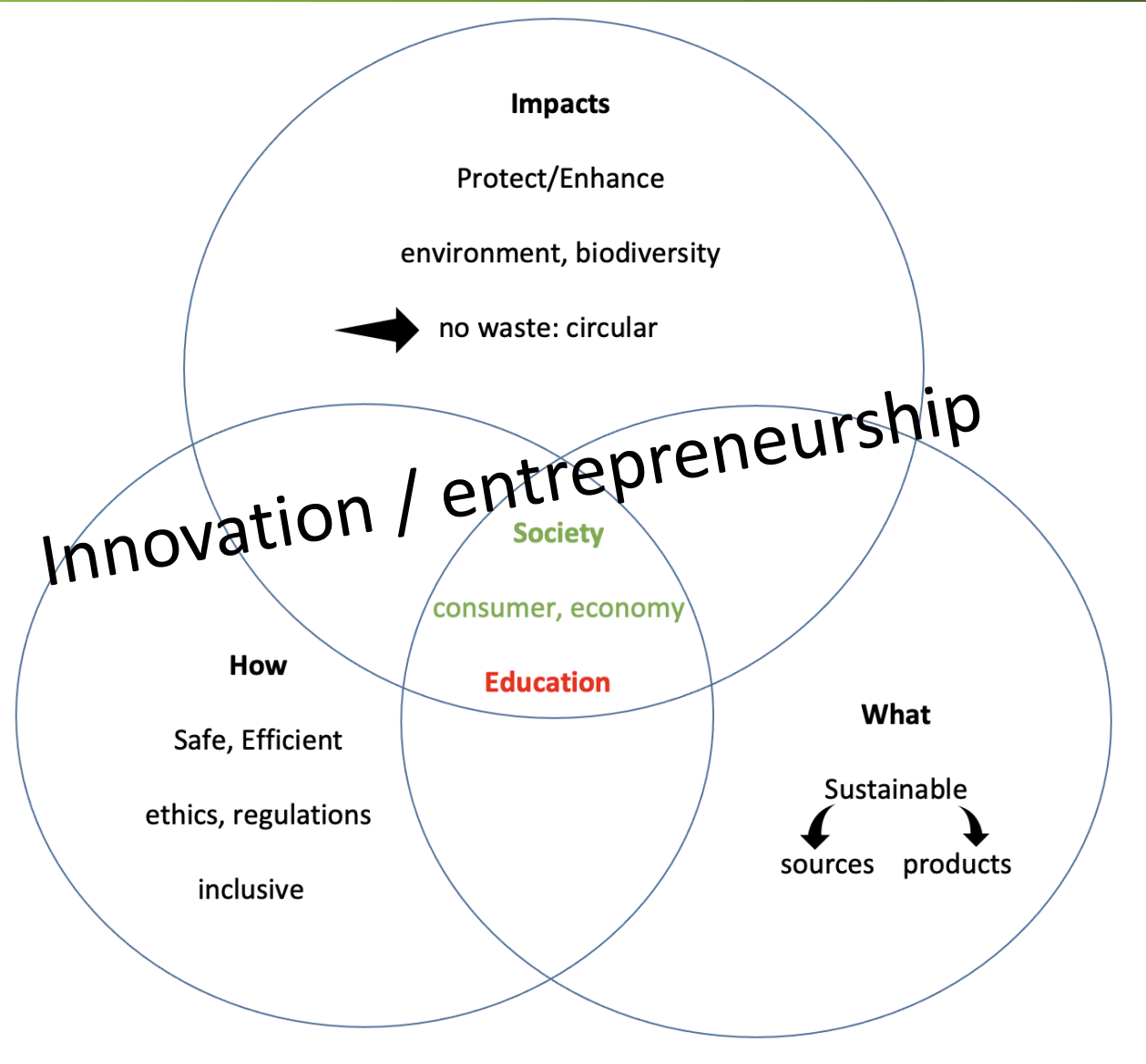
Skills	Percentage
personal skills and development	56%
adapt to change	55%
working in teams	55%
accessing and analysing digital data	50%
management and administration	41%
software and applications development and analysis	37%
using digital tools for collaboration and productivity	36%
developing solutions	34%
computer use	32%
database and network design and administration	30%

OVATE: Online Vacancy Analysis Tool for Europe (CEDEFOP)

Employment analysis and projections based on **qualification** level and on **occupation**

Disciplinary knowledge in biology, chemistry, biochemistry: tacitly expected from graduates

Bio-based industry's mission



Bio-based industry's challenge to life science universities

Dialogue industry HCA network – education institutions

Entrepreneurship; business plans, scale-up processes

Inter- and transdisciplinary cooperation and 'translation'

Systemic thinking; multistakeholder involvement/participation, societal participation

Environmental insight

Technological and digital skills

Communicative skills

Flexibility to work in different locations and in different cultures

Specific disciplines

Lifelong learning

Thank you!

