Annual Work Programme and Budget 2022

Circular Bio-based Europe Joint Undertaking

Bio-based Industries Consortium

EUROPEAN PARTNERSHIP

Co-funded by the European Union

ANNEX to GB decision no 7/2022

In accordance with the Council Regulation (EU) 2021/2085 and with Article 33 of the Financial Rules of the CBE JU.

The work programme is made publicly available after its adoption by the Governing Board.

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LIST OF ACRONYMS, DEFINITIONS AND ABBREVIATIONS

AAR	Annual Activity Report
AWP	Annual Work Programme
B2B	Business-to-Business
B2C	Business-to-Consumer
BBI JU	Bio-based Industries Joint Undertaking
BIC	Bio-based Industries Consortium
CA	Commitment Appropriations
CAPEX	Capital Expenditure
CAS	Common Audit Service
CBE JU	Circular Bio-based Europe Joint Undertaking
CCS	Carbon capture and storage
CCU	Carbon capture and use
CEN	European Committee for Standardization
CSA	Coordination and Support Action
CSC	Common Support Centre
EC	European Commission
ECA	European Court of Auditors
EFTA	European Free Trade Association (Iceland, Liechtenstein, Norway, and Switzerland)
FLAG	Flagship Action
FWC	Framework Contract
GB	Governing Board
HR	Human Resources
IA	Innovation Action
IAS	Internal Audit Service
ICF	Internal Control Framework
ICS	Internal Control Standards
IKAA	In Kind Additional Activities
IKOP	In Kind Contribution to Operational Activities
OPEX	Operational Expenditure
SRIA	Strategic Research and Innovation Agenda

FOREWORD

Dear readers,

It gives me great pleasure to present to you the first Annual Work Programme for the Circular Bio-based Europe Joint Undertaking in what will be its first full year of operations.

CBE JU will build on the important work its predecessor, BBI JU, in advancing competitive circular bio-based industries in Europe. This new partnership will demonstrate the potential of the bio-based industry to green the EU's industrial production and contribute to the recovery of our economy in a sustainable and inclusive way. A circular and sustainable bioeconomy is essential to reach the ambitious goals of the European Green Deal, to make our societies prosperous, and to protect the environment while ensuring rural and coastal innovation.

With an expanded remit, CBE JU is expected to scale up technologies leading to industrial deployment, thus attracting investment and creating jobs, while aiming to achieve the goals outlined in the Strategic Research and Innovation Agenda (SRIA) 2030. In addition, the partnership will involve a wider range of stakeholders including the primary sector, regional authorities, and investors to prevent market failures and unsustainable bio-based processes. To deliver on its objectives, the partnership will only fund projects that respect the principles of circularity, sustainability, and planetary boundaries. Consequently, CBE will significantly contribute to the EU's climate targets for 2030, paving the way for climate neutrality by 2050, and advancing circular and sustainable production in line with the European Green Deal.

The motto of the CBE JU Programme Office is 'Building a greener, safer and better Europe' and to do so, the new partnership will launch its first call for proposals in 2022 with an anticipated overall indicative budget of EUR 120 million, which will support the strategic orientations defined in the SRIA as feedstock, processing and products, and the cross-cutting aspects of finance, communication and the environmental sustainability framework. The calls will fund three types of actions, that of, RIAs, IAs which includes Flagships, as well as CSAs.

As a concluding remark, while this will be the first Annual Work Programme for CBE JU, it will also mark my last term as Executive Director since my mandate comes to an end in September 2022. I would therefore like to extend my sincere thanks to the whole BBI JU, now CBE JU, community – beneficiaries of our projects, members of the advisory bodies and the Governing Board (both past and present), the founding partners, our experts, colleagues from the CBE JU Programme Office and all the stakeholders who have been developing European bio-based industries over the past years – for their important contribution towards this success. It was the determining factor in the creation of CBE JU and it has been an honour for me to lead this programme.

Philippe MENGAL

Executive Director

1. INTRODUCTION

1.1. MISSION STATEMENT OF THE CBE JU

Advancing *a competitive bioeconomy for a sustainable future* is the primary mission of the Circular Bio-based Europe Joint Undertaking (CBE JU) during its mandate.

In the context of the European Green Deal[1] supported by the revised EU Bioeconomy Strategy[2], EU Biodiversity Strategy[3], A Clean Planet for All Communication, the Circular Economy Action Plan[4] and the Farm to Fork Strategy[5], the European bio-based sector, including SMEs, regions and primary producers should become climate neutral, more circular and more sustainable while remaining competitive on the global market. A strong, resource efficient and competitive bio-based innovation ecosystem can decrease Europe's dependency on and accelerate the substitution of non-renewable fossil raw materials and mineral resources.

CBE JU is thereby supporting research and innovation activities in the field of sustainable bio-based solutions under the umbrella of Horizon Europe, the EU's research and innovation programme for the 2021-2027 period. By replacing non-renewable fossil resources with waste and sustainably sourced biomass to produce industrial and consumer goods, the bio-based industries will help Europe become the world's first climate-neutral continent while increasing the sustainability and circularity of production and consumption systems.

Those activities will be carried out in close collaboration between stakeholders along the entire bio-based value chain, including primary production and processing industries, consumer brands, SMEs, research and technology centres and universities. CBE JU also aims to support the deployment of bio-based innovation at regional level with the active involvement of local actors and with a view to reviving rural, coastal and peripheral regions.

Its public-private funding scheme will boost innovation and market deployment and pave the way for future investments. To this end, the CBE JU will organise calls for proposals aimed at supporting research, demonstration and deployment activities. To deliver on its objectives, CBE JU should only fund projects that respect the principles of circularity, sustainability and planetary boundaries.

CBE JU will build on the success and achievements of its predecessor, the Bio-based Industries Joint Undertaking (BBI JU) while enlarging its scope and addressing the remaining challenges of Europe's bio-based industries.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0640&from=EN
[2] https://op.europa.eu/en/publication-detail/-/publication/edace3e3-e189-11e8-b690-01aa75ed71a1/language-en/format-PDF/source-149755478
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0380&from=EN
[4] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0098&from=EN
[5] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0381&from=EN

The general and specific objectives of CBE JU, as per Council Regulation (EU) 2021/2085 of 19 November 2021 establishing the Joint Undertakings under Horizon Europe[6] are reported below in Figure 1.

General objectives	Specific objectives
1. Accelerate the innovation process and development of bio-based innovative solutions	1.1. Increase the intensity of cross-disciplinary research and innovation activities to reap the benefits of the advancement in life sciences and in other scientific disciplines for the development and demonstration of sustainable bio-based solutions
	1.2. Increase and integrate the research and innovation capacity of stakeholders across the Union to exploit the local bioeconomy potential including in regions with underdeveloped capacity
	1.3. Increase the research and innovation capacity for addressing environmental challenges and development of more sustainable bio-based innovations by ensuring that sustainability issues and environmental performance are integrated throughout the whole innovation chain and in future innovative solutions
2. Accelerate market deployment of the existing mature and innovative bio-based solutions	2.1. Reinforce the integration of bio-based research and innovation in the Union bio-based industry and increase the involvement of R&I actors including feedstock providers in the bio-based value chains
	2.2. Reduce the risk for research and innovation investment in bio-based companies and projects
3. Ensure a high level of environmental performance of bio-based industrial systems.	3.1. Ensure that circularity and environmental considerations, including contributions to climate neutrality and zero pollution objectives, are taken into account in the development and implementation of research and innovation bio-based projects and facilitate societal acceptance.

Figure 1 CBE JU general and specific objectives.

[6] Council Regulation (EU) 2021/2085 of 19 November 2021 establishing the Joint Undertakings under Horizon Europe and repealing Regulations (EC) No 219/2007, (EU) No 557/2014, (EU) No 558/2014, (EU) No 559/2014, (EU) No 560/2014, (EU) No 561/2014 and (EU) No 642/2014

1.2. BACKGROUND AND LINK WITH THE SRIA

To achieve the objectives set out in the Council Regulation, the CBE Programme Office will implement Annual Work Programmes that will support:

- the acceleration of the innovation process and development of bio-based innovative solutions by funding actions (ranging from CSAs to RIAs and IAs ending TRL 6) focusing on testing and upscaling the use of novel technologies for converting bio-based feedstock into useful, innovative, environmentally sustainable and circular solutions;
- the acceleration of market deployment of existing mature and innovative bio-based solutions by promoting and supporting actions to scale up innovative bio-based processes, products, and applications starting from at least TRL 5 and ending at TRL 7-8, including Flagships, across Europe, and
- the development of a high level of environmental performance of bio-based industrial systems through different types of actions, ranging from CSAs to RIAs up to targeted IAs.

The strategic priorities identified in the SRIA for each CBE general and specific objectives will be used as baseline in each topic. They are here reported in Figure 2.

FEEDSTOCK		Strategic priority 1.1.1 - Ensure the availability and quality of sustainable bio-based feedstock
		Strategic priority 1.3.1 - Protect and enhance biodiversity and ecosystem services in bio-based feedstock supply systems
		Strategic priority 2.1.1 - Demonstrate the sustainable supply of bio-based feedstock
PROCESSING		Strategic priority 1.1.2 - Develop innovative production systems in the bio-based industry
		Strategic priority 1.3.2 - Improve environmental performances of bio-based processes
		Strategic priority 2.1.2 - Deploy innovative production technologies
PRODUCTS		Strategic priority 1.1.3 - Develop innovative bio-based products
		Strategic priority 2.1.3 – Scale-up production and market uptake of innovative bio-based products
CROSS-CUTTING	**Communication**	Strategic priority 1.2.1 - Stimulate research activities in countries and regions with underdeveloped R&I capacity for bio-based systems
		Strategic priority 1.2.2 – Increase the awareness and capacity of national and regional research support agencies for industrial bio-based systems
		Strategic priority 1.2.3 - Facilitate the development of expertise in bio-based fields by improving higher education and skills development
		Strategic priority 2.1.4 - Build policy makers' awareness and acceptance of bio-based solutions
		Strategic priority 3.1.3 – Facilitate social acceptance of bio-based applications
	Finance	Strategic priority 2.2.1 – Improve the risk profile of bio-based projects
		Strategic priority 2.2.2 - Develop investment tools and approaches that mitigate the investment risk in bio-based systems
	Environmental sustainability framework	Strategic priority 3.1.1 - Set effective and robust environmental sustainability and circularity criteria for bio-based systems
		Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems

Figure 2 CBE JU SRIA Strategic priorities mapped along the value chain (Feedstock – Processing – Products) and the identified cross cutting issues.

1.3. STRATEGY FOR THE IMPLEMENTATION OF THE PROGRAMME

CBE JU programming

The CBE JU strategic and programming documents are developed jointly by both partners (EC and BIC) with the support of the Programme Office.

A structured co-creation process is foreseen for the formulation of calls included in the Annual Work Programmes, based on the SRIA and the lessons learned from previous calls, as monitored and reported by the CBE JU Programme Offices. The CBE JU Scientific Committee and States Representatives Groups will be also involved and consulted on the draft Programmes

Types of actions

The CBE JU calls fund three types of actions:

- **Research and Innovation Actions (RIAs)** include activities of 'testing', 'demonstrating' and 'piloting'. These activities aim to establish new knowledge or to explore the feasibility of a new or improved technology, product, process, service, or solution. These may include basic and applied research, technology development and integration, testing, demonstration, and validation on a small-scale prototype, in a laboratory or simulated environment.

- **Innovation Actions (IAs)** include activities of 'testing', 'demonstrating' and 'piloting' and also aim at scaling up activities from prototype, in a (near to) operational environment, industrial or otherwise, to large-scale product validation and market replication.

  Flagships[7] are an important and specific type of Innovation Action which aim to support the first application/deployment in the EU market of an innovation that has already been demonstrated but not yet applied/deployed in the EU market (first-of-its-kind innovation).

- **Coordination and Support Actions (CSAs)** will address needs to i) structure stakeholder communities; ii) support dissemination and exploitation of research or innovation projects; iii) exploit synergies of scale among projects; iv) raise awareness in specific areas; v) support technological visions (e.g. road-mapping, user cases, etc.) and outreach (e.g. events, publications, etc.); vi) promote international cooperation with specific regions and/or technological areas for any of the above-mentioned activities; vii) undertake other activities similar in nature to those above (i.e., this is not an exhaustive list).

Other possible types of actions, like Pre-commercial Procurement Action (PCPs), may also be considered if relevant to attain the objectives of the CBE JU in future CBE JU AWP. In addition, financial support to third parties may be included in specific call topics and funded as part of the received grants from CBE JU via financial support to third parties. This could be the case for training and mobility of researchers, or prizes.

[7] Flagship projects are strategically relevant, with very ambitious objectives and large-scale impacts expected, and of potential substantial size with regard to the financial volume, the number of project partners and the running time

Technological Readiness Level (TRL)

The technological readiness level scale, defined in the Horizon Europe General Annexes[8], will be used as reference in the CBE JU call to indicate the appropriate technological context as following:

- RIAs projects are expected to be at the level of laboratory or simulated environments and expected to deliver TRL 3-5 at the end of the projects.
- IAs projects are demonstration activities in relevant and operational environments and expected to deliver TRL 6-8 at the end of the projects. In particular, Flagship projects will need to deliver TRL 8 at the end of the projects.

The end TRL will be specified in each RIAs and IAs topic.

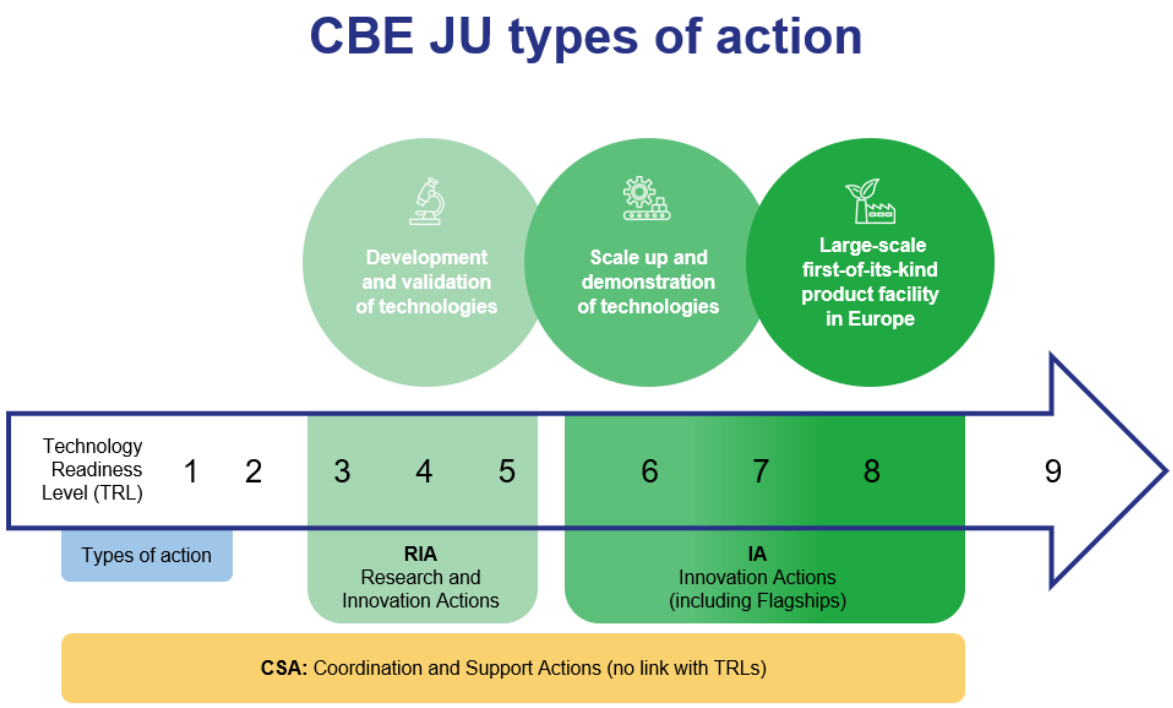


Figure 3 - CBE JU Types of Actions along the TRLs scale.

[8] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-13-general-annexes_horizon-2021-2022_en.pdf

2. WORK PROGRAMME 2022

2.1. EXECUTIVE SUMMARY 2022

The CBE JU is a EUR 2 billion public-private partnership between the European Union, represented by the European Commission (EC), and the Bio-based Industries Consortium (BIC). It is established under Horizon Europe, the EU's research and innovation programme, for the period 2021-2031. The CBE JU is not a direct continuation of the Bio-Based Industries Joint Undertaking, but rather a programme that builds on its achievements and aims at addressing its shortcomings.

The **Strategic Research and Innovation Agenda (SRIA),** adopted by the CBE Governing Board (GB), identifies the strategic priorities and the essential research and innovation actions required to achieve the objectives of the **Circular Bio-based Europe Joint Undertaking (CBE JU)**, as defined in the Council Regulation (EU) 2021/2085 of 19 November 2021 establishing the Joint Undertakings under Horizon Europe.

The scope of CBE JU is underpinned by the updated EU Bioeconomy Strategy (2018) and is in line with the **European Green Deal** objectives – to produce major contributions to the EU climate targets by delivering innovative bio-based solutions and paving the way for Europe to become the first climate neutral continent by 2050; protecting and enhancing biodiversity; combating pollution; reducing fossil resource dependence; and deploying a just transition.

CBE JU will, in particular, aim at strengthening the European bioeconomy primary sectors of the land and sea and its industries by combining the 'public' interests, pursued by the EC, and the 'private' interests of bio-based industries, such as: increasing the competitiveness of the EU economy, job creation, balanced regional development and economic cohesion, climate and environmental performance, creating better market conditions, removal of barriers, de-risking investment, increasing resource efficiency, improving circular technologies and operations while engaging all actors in the bio-based systems.

The SRIA will be the basis for the CBE JU Annual Work Programmes that will contain the call for proposals, developed jointly by both partners under the coordination of the Programme Office, and taking into account the recommendations of the advisory bodies. Six calls for proposals are foreseen during the lifetime of the partnership for a total indicative operational budget of EUR 976.5 million.

CBE JU will launch its first Call for Proposals in 2022 in which the following types of actions will be funded: research and innovation actions (RIAs), innovation actions (IAs) including Flagships, and coordination and support actions (CSAs).

Progress towards the achievement of the CBE JU objectives will be monitored through a set of Key Performance Indicators (KPIs). The monitoring and reporting of CBE activities, including KPIs, will be undertaken on an annual basis and reflected in the Annual Activity Report (AAR).

2.2. OPERATIONAL ACTIVITIES 2022

2.2.1. Objectives, indicators and risks

Scope of the activities

As presented in the SRIA 2030, the CBE JU partnership will fund projects focused on **production of bio-based chemicals, materials and products, other than biofuels and bioenergy, food and feed (food and feed ingredients and soil nutrients are in the scope), pharmaceuticals and medical devices.**

The boundary between the industrial activities that are in or out of this scope is difficult to define in a precise way because of multiple outputs from bio-based operations or multiple use of the same bio-based material or product. For example, the production of food is excluded from the scope but processes producing food may have co-products that are within the scope and side streams that can be used as feedstock for producing bio-based products within the CBE JU scope. Another example is bioethanol, that can be used as biofuel, which is then excluded from the scope, but when used as an input to other chemicals' production it is included within the scope. There are many other such examples.

The guiding principles for evaluating if an industrial activity falls within the scope of the partnership will be based on:

a) assessment of what is the dominant application of the bio-based material produced and if this dominant use falls into the scope;

b) the principle of cascading use of biological resources aiming to best valorise the sustainable use of feedstock[9].

In line with above, biorefineries for sustainable processing of biomass into an array of added-value products (e.g. bioactive substances, chemicals and materials) will fall under the scope if the focus of the project is on materials; while energy production is a complementary activity that improves the overall resource efficiency of the production process and it takes place in accordance with the cascading principle.

The feedstock for bio-based operations should respect local ecological limits and protect and enhance biodiversity and ecosystems services and should come from short supply chains as much as possible. Additional requirements are included in the dedicated section.

All supported activities must also demonstrate the potential of bio-based solutions in terms of climate and environmental performance, and circularity. Activities that do not meet the agreed requirements of climate and environmental performance will not be supported. In line with the circularity objective, attention will be given to activities that enable the conversion of bio-waste, residues and side-streams into added-value circular bio-based solutions.

[9] A non-exhaustive list of bio-based feedstock in the scope of CBE is included in Annex V of SRIA.

Supported industrial activities should contribute to local and regional economies, while reducing the dependency on imports of natural resources.

CBE JU objectives and Key Performance Indicators

CBE JU will contribute to the general and specific objectives set in the Council Regulation establishing the Joint Undertakings (Figure 1) and the main challenges described in the SRIA (Figure 2), via its portfolio of funded projects. To this end, the programme will be monitored against the targets set at

- Horizon Europe programme level[10],
- Horizon Europe partnerships level[11],
- specific CBE JU level with the KPIs defined in the SRIA.

The operational monitoring is based on indicators which are common to all Horizon Europe programme and include for example the following: 1) time to inform (TTI) all applicants of the outcome of the evaluation of their application from the final date for submission of proposals (target TTI max: 153 calendar days); 2) time to grant (TTG) measured from the call deadline to the grant signature (target TTG < 245 days). CBE JU will ensure the efficiency of all operations and the results of its operational monitoring will be included in the AAR.

The monitoring of the specific CBE JU KPIs will be based on data collected from the yearly project reporting and the progress against KPIs will be reported in the CBE JU AAR. In addition, the CBE Programme Office has the legal obligation to monitor, continually and systematically, the implementation of its programme, as well as to report and to disseminate the results of this monitoring on an annual basis.

For 2022, Table 1 summarise how the planned actions are expected to contribute to each specific CBE KPI[12] per types of action.

[10] https://ec.europa.eu/info/strategy/eu-budget/performance-and-reporting/programmes-performance/horizon-europe-performance_en

[11] https://op.europa.eu/en/publication-detail/-/publication/6b63295f-d305-11eb-ac72-01aa75ed71a1/language-en/format-PDF/source-215872593

[12] The list of CBE JU KPIs is provided in the SRIA and further elaborated in the CBE KPIs Handbook.

CBE KPIs: Objectives and Units of measurement		2031 targets	Covered in AWP2022 topics*			
			RIA	IA	FLAG	CSA
1	**Strategic participation and integration of feedstock producers and suppliers towards large-scale valorisation of sustainable biomass**					
1.1	*N of primary producers, involved as project beneficiaries and/or engaged in value chains at project level*	100	4	4	2	0
1.2	*N of bio- waste management actors, involved as project beneficiaries and/or engaged in value chains at project level*	20	2	2	0	0
2	**Unlock sustainable and circular bio-based feedstock for the industry**					
2	N of innovative bio-based value chains created or enabled based on sustainably-sourced biomass	120	2	8	3	0
3	**Ensure environmental sustainability of feedstock**					
3.1	N of projects using feedstock generated with practices that contribute to enhance biodiversity	30	2	2	1	0
3.2	N of projects using feedstock generated with practices aiming at zero-pollution (soil, water, air) and/or at reducing water consumption	40	2	4	2	0
3.3	N of projects using feedstock generated with practices contributing to climate change mitigation and/or adaptation	60	2	4	2	0
4	**Improve environmental sustainability of bio-based production processes and value chains**					
4.1	N of projects with innovative & sustainable processes that contribute to GHG emission reduction	60	2	4	2	0
4.2	N of projects developing innovative & sustainable processes that improve on resource efficiency and zero-waste	60	2	6	2	0
4.3	N of projects developing innovative & sustainable processes enabling to address zero pollution	60	2	2	2	0
4.4	N of projects with innovative & sustainable processes with improved energy efficiency	60	2	2	2	0
4.5	N of products with improved life cycle environmental performance	50	2	2	2	0
5	**Expand circularity in bio-based value chains**					
5.1	N of innovative products that are biodegradable, compostable, recyclable, reused or upcycled (circular by design)	100	2	0	0	0
5.2	N projects developing circular production practises (incl. industrial & industrial urban symbiosis)	40	2	4	1	0
6	**Increase innovative bio-based outputs and products**					
6.1	N of innovative bio-based dedicated outputs, with novel or significantly improved properties vs relevant alternatives	100	2	2	0	0
6.2	N of innovative bio-based drop in outputs meeting applications requirements	30	2	2	0	0
7	**Improve the market uptake of bio-based products**					
7	N of brand owners involved as project partners and/or engaged with other mechanisms	50	2	0	2	0
8	**Attract investment on the bio-based sector**					
8	N of actions implemented at project level to attract investment and/or to create awareness in the investment/funding community	30	2	2	0	0
9	**Increase resilience and capacity in the bio-based sector**					
9	N of projects contributing to develop the skills and capacity needed by the EU bio-based sector	50	2	0	0	0
10	**Improve participation of regions and countries with high unexploited potential and strategic interest to develop it**					
10.1	N of participants from the underrepresented EU countries and region	150	2	0	1	0
10.2	N of regional hubs established and operated to process bio-based feedstocks and other cooperation aspects	15	2	0	1	0
10.3	N of projects with synergies with other funding programmes at EU, national or regional level	60	2	2	1	0

Table 1 Expected contribution from AWP2022 per types of action to the CBE JU KPIs. * *Please note that the numbers refer to the aggregated expected contribution of every AWP 2022 topic to each of the KPIs; this number is only indicative.*

Risk management

The BBI JU[13] conducted a risk assessment exercise that evaluated the root causes of each risk and their potential consequences, taking into account the existing controls as well as the convergences and inter-dependencies between risks. This process is documented in the internal Risk Register of the organisation, which incorporates a description of the respective action plans, detailing the action owners and individual deadlines.

At the end of 2021 a total of 11 risks have been identified and described in the Risk Register with varying degrees of importance, convergence and inter-dependency. The risk assessment exercise conducted in 2021 confirmed the trend of previous years and some additional risks have been absorbed or reduced by an increased effectiveness of internal controls as well as experience gained in the core activities, such as the Horizon 2020 grant planning, processes and systems.

Certain other risks persist in the remit of the CBE Programme Office together with some new challenges and constraints to their effective mitigation. This is notably the case for threats to the effective deployment of human resources and to the performing conditions of the organisation. In these areas, the CBE Programme Office demonstrates that it is operating to high quality operational standards and efficiency ratios of operations are continuously being tested while workload patterns and the stability of services acquired outside the organisation are closely monitored.

Enhanced controls on financial contributions to the initiative will provide reasonable assurance for a timely reporting and assessment of an expected compliance with targets set in the Funding Regulation. Lessons learnt on ex ante and ex post controls shall optimise risk management of operational expenditure below materiality levels set in the financial regulations and by the assurance providers. The mitigating actions envisaged in the past will continue to be applied in 2022 and new dedicated responses to the identified threats have been envisaged in action plans for 2022.

The Risk Register remains an internal living document and the management of identified risks will be ensured through appropriate mitigating actions, wherever possible, and continuously monitored by CBE JU throughout the year.

[13] This exercise was concluded before entry into force of Council Regulation (EU) 2021/2085.

2.2.2. Scientific priorities, challenges and expected impacts

The topics of this AWP are highly relevant to meet the commitments set out in the European Green Deal and the 'Fit for 55' Package' and to achieve the ambitious EU targets of reducing net greenhouse gas emissions by at least 55% by 2030 (compared to 1990) and becoming the first climate neutral continent by 2050. They will contribute to the transition from a fossil to a sustainable bio-based economy, in line with the objectives set out in the updated EU Bioeconomy Strategy and its Action Plan[14] and will support the commitments set under the UN Sustainable Development Goals[15] (SDGs) and the COP 21 Paris Climate Agreement[16].

The scientific priorities of this AWP are aligned with the CBE JU specific objectives and the strategic priorities, as identified in the SRIA. As shown in Table 2, the topics of this AWP will cover all priorities identified along the three main blocks (feedstock, processing and products) and focus on cross-cutting actions notably the one dedicated to the environmental sustainability framework.

			CBE JU TOPICs											
			2022.IA-01	2022.IA-02	2022.IA-03	2022.IA-04	2022.IA-Flag01	2022.IAFlag-02	2022.R-01	2022.R-02	2022.R-03	2022.R-04	2022.R-05	2022.S-01
FEEDSTOCK		Strategic priority 1.1.1 - Ensure the availability and quality of sustainable bio-based feedstock										X	X	
		Strategic priority 1.3.1 - Protect and enhance biodiversity and ecosystem services in bio-based feedstock supply systems										X	X	
		Strategic priority 2.1.1 - Demonstrate the sustainable supply of bio-based feedstock		X										
PROCESSING		Strategic priority 1.1.2 - Develop innovative production systems in the bio-based industry								X	X			
		Strategic priority 2.1.2 - Deploy innovative production technologies	X		X	X	X							
PRODUCTS		Strategic priority 1.1.3 - Develop innovative bio-based products							X	X	X			
		Strategic priority 2.1.3 – Scale-up production and market uptake of innovative bio-based products	X		X	X		X						
CROSS-CUTTING	Communication	Strategic priority 2.1.4 - Build policy makers' awareness and acceptance of bio-based solutions					X							
		Strategic priority 3.1.3 – Facilitate social acceptance of bio-based applications					X							
	Environmental sustainability framework	Strategic priority 3.1.1 - Set effective and robust environmental sustainability and circularity criteria for bio-based systems	X	X	X	X	X	X						X
		Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems	X		X	X	X		X	X	X	X	X	

Table 2 AWP2022 topics link to the SRIA strategic priorities

[14] https://op.europa.eu/en/publication-detail/-/publication/775a2dc7-2a8b-11e9-8d04-01aa75ed71a1

[15] https://www.un.org/sustainabledevelopment/sustainable-development-goals/

[16] https://ec.europa.eu/clima/eu-action/international-action-climate-change/climate-negotiations/paris-agreement_en

CBE KPIs: Objectives and Units of measurement		CBE JU TOPICs											
		2022.IA-01	2022.IA-02	2022.IA-03	2022.IA-04	2022.IA-Flag01	2022.IAFlag-02	2022.R-01	2022.R-02	2022.R-03	2022.R-04	2022.R-05	2022.S-01
1	**Strategic participation and integration of feedstock producers and suppliers towards large-scale valorisation of sustainable biomass**												
1.1	*N of primary producers, involved as project beneficiaries and/or engaged in value chains at project level*		x				x				x	x	
1.2	*N of bio- waste management actors, involved as project beneficiaries and/or engaged in value chains at project level*				x								
2	**Unlock sustainable and circular bio-based feedstock for the industry**												
2	N of innovative bio-based value chains created or enabled based on sustainably-sourced biomass	x	x	x	x	x	x				x	x	
3	**Ensure environmental sustainability of feedstock**												
3.1	N of projects using feedstock generated with practices that contribute to enhance biodiversity		x				x					x	
3.2	N of projects using feedstock generated with practices aiming at zero-pollution (soil, water, air) and/or at reducing water consumption	x	x			x	x				x	x	
3.3	N of projects using feedstock generated with practices contributing to climate change mitigation and/or adaptation	x	x			x	x				x	x	
4	**Improve environmental sustainability of bio-based production processes and value chains**												
4.1	N of projects with innovative & sustainable processes that contribute to GHG emission reduction	x		x		x	x		x	x			
4.2	N of projects developing innovative & sustainable processes that improve on resource efficiency and zero-waste	x		x	x	x	x			x			
4.3	N of projects developing innovative & sustainable processes enabling to address zero pollution			x		x	x			x			
4.4	N of projects with innovative & sustainable processes with improved energy efficiency			x		x	x		x	x			
4.5	N of products with improved life cycle environmental performance			x		x	x			x			
5	**Expand circularity in bio-based value chains**												
5.1	N of innovative products that are biodegradable, compostable, recyclable, reused or upcycled (circular by design)							x	x	x			
5.2	N projects developing circular production practises (incl. industrial & industrial urban symbiosis)	x			x	x							
6	**Increase innovative bio-based outputs and products**												
6.1	N of innovative bio-based dedicated outputs, with novel or significantly improved properties vs relevant alternatives			x				x	x	x	x	x	
6.2	N of innovative bio-based drop in outputs meeting applications requirements			x						x		x	
7	**Improve the market uptake of bio-based products**												
7	N of brand owners involved as project partners and/or engaged with other mechanisms					x	x			x	x		
8	**Attract investment on the bio-based sector**												
8	N of actions implemented at project level to attract investment and/or to create awareness in the investment/funding community		x										
9	**Increase resilience and capacity in the bio-based sector**												
9	N of projects contributing to develop the skills and capacity needed by the EU bio-based sector												
10	**Improve participation of regions and countries with high unexploited potential and strategic interest to develop it**												
10.1	N of participants from the underrepresented EU countries and region						x					x	
10.2	N of regional hubs established and operated to process bio-based feedstocks and other cooperation aspects						x						
10.3	N of projects with synergies with other funding programmes at EU, national or regional level		x				x						

Table 3 Expected AWP2022 topics contribution to CBE JU KPIs

2.2.3. Calls for proposals

In this chapter, the topic identified for the CBE JU call 2022 are presented with their expected outcomes, their scope and their specific requirements.

Please note that additional requirements are described in the section 'Additional requirements' at the end of this chapter and must be also incorporated in the proposals. Some additional requirements are applicable to all proposals while others are specific to the different types of actions (RIAs, IAs and IA-Flagships). Please carefully read these additional requirements together with the call conditions specified in section 2.2.3.1.

In addition, please note that a Glossary, which contains the description of some specific terms which are marked with an * in the topics text, is included in Annex 4.2

HORIZON-JU-CBE-2022-IA-01 Biogenic carbon capture and use (CCU) for circular bio-based products

Type of action	Innovation Action
Indicative budget	The total indicative budget for the topic is EUR 10 million
Expected EU contribution per project	It is estimated that a contribution of EUR 5 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
TRL	TRL 6 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of increasing the intensity of cross-disciplinary research and innovation activities.
Link to CBE JU SRIA	Strategic priority 2.1.2 - Deploy innovative production technologies Strategic priority 2.1.3 - Scale up production and market uptake of innovative bio-based products Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3

Expected outcomes

Successful proposals will support researchers and innovators to upgrade technological solutions for biogenic gaseous carbon capture and use (CCU*) and the production of sustainable circular non-fossil-based products, in line with the objectives of the European Climate Law and with the initiatives outlined in the 'Sustainable Carbon Cycles' Communication from the European

Commission[17]. The successful proposals will contribute to mitigating climate change along the bio-based industrial systems.

Project results should contribute to the following expected outcomes:

- Higher carbon removal* potential[18] of bio-based systems.
- Improved environmental performances of bio-based processes.
- Public awareness and acceptance of bio-based solutions.
- Support market uptake growth and acceptance of scalable bio-based solutions.

Scope

The European Union has established the European Climate Law, having as objectives to become climate resilient and economy-wide climate neutrality by 2050, with the aim to achieve negative emissions thereafter. To achieve these objectives, the circular economy and the sustainable bioeconomy sectors need to promote technological solutions for carbon capture and use (CCU) and the production of sustainable renewable-carbon-based products.

Proposals under this topic should:

- Develop new or improve existing innovative CCU processing and conversion of circular gaseous carbon emitted from bio-based industry. These conversion steps can include, e.g., intensified use of industrial (bio)technologies tailored to the composition and characteristics of the exhaust emissions from existing and emerging processing of bio-based feedstock.
- Provision for the project integrating 'safe-and-sustainable-by-design' generic criteria and framework considerations[19], in line with the EU Chemicals strategy for sustainability.
- Improve the efficiency and circularity of the bio-based industry to minimise process losses.
- Apply innovative design of circular bio-based products in the scope of CBE, for example safe and sustainable by design bio-based products[20] and solutions for specific new applications, and/or with carbon storage capacity and/or low carbon footprint to substitute non-circular, fossil-based, energy-intensive or carbon-intensive product, and/or replacing toxic and hazardous substances in industrial processes and in final products and/or circular-by design bio-based products to allow for reuse, recycling, composting and biodegradation (in specific environments and conditions).

[17] https://ec.europa.eu/clima/system/files/2021-12/com_2021_800_en_0.pdf

[18] The concept of carbon removal is described in the Communication 'Sustainable carbon cycles'. A quotation from the Communication is included in the Glossary at the end of this document for the term 'carbon removal'.

[19] The publication of the 'Safe and Sustainable by Design chemicals and materials' Framework, aiming to the definition of criteria and evaluation procedure for chemicals and materials, is expected to become available by end of 2022. The proposed SSbD framework is expected to assess chemicals and materials following a hierarchical approach in which safety aspects are considered first, followed by environmental aspects. Please see also European Commission, Joint Research Centre, Caldeira, C., Farcal, R., Moretti, C., et al., Safe and sustainable by design chemicals and materials : review of safety and sustainability dimensions, aspects, methods, indicators, and tools, 2022, https://data.europa.eu/doi/10.2760/879069

[20] See footnote 19

- Improve the environmental performances of bio-based processes through the capture, fractionation, extraction, and conversion of gaseous carbon from the exhaust flows, and recirculation as much as possible, thus minimising pollutant emissions from the plant.
- Design and apply an integrated monitoring system of the carbon removal* potential of the developed technologies, to allow for reporting and verification to be recognised as contributing to EU climate and environmental objectives (following the upcoming European certification framework[21]). The monitoring systems for carbon removal should include factors such as e.g., the storage time in bio-based materials, the risk of storage reversal, the uncertainty of the measurement, or the risk of carbon leakages increasing greenhouse gas (GHG) emissions elsewhere.
- Apply and/or adapt existing/mature or novel digital technologies, provided that they are instrumental to achieving the project's outcomes and scope, especially to ensure high standards of resource efficiency and environmental protection. Applications of digital technologies that should be considered in the scope are among the following areas i) chemicals, materials and process design & modelling ii) (real-time) process monitoring and optimisation (including environmental performance) iii) predictive maintenance & plant engineering and iv) data analytics and data management of the CCU technologies in the scope.

  (Note) Points i)-iv) should consider the contribution to/from data/feedback loops across circular, bio-based value chains but also coordination of processes among different sectors (especially if symbiosis concepts apply in the project)
- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions.
- Propose recommendations on opportunities/challenges for targeted stakeholders, including, where possible, national/regional stakeholders, investors and brand owners*.

Proposals must implement the multi-actor approach and demonstrate the involvement of all concerned key actors in the bio-based systems, such as researchers and technology providers and bio-based industries emitting gaseous carbon. Please see the section *Additional requirements* for more details.

[21] https://op.europa.eu/en/publication-detail/-/publication/449e35f3-8821-11ec-8c40-01aa75ed71a1/language-fi/format-XHTML

HORIZON-JU-CBE-2022-IA-02 Cooperative business models for the sustainable mobilisation and valorisation of agricultural residues, by-products, and waste in rural areas

Type of action	Innovation Action
Indicative budget	The total indicative budget for the topic is EUR 10 million
Expected EU contribution per project	It is estimated that a contribution of EUR 5 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 7 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes CBE JU specific objective of reinforcing the integration of bio-based research and innovation throughout industrial bio-based systems.
Link to CBE JU SRIA	Strategic priority 2.1.1 Demonstrate the sustainable supply of bio-based feedstock. Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3

Expected outcomes

Successful proposals will support the Bioeconomy Strategy and the Common Agriculture Policy by promoting diverse forms of cooperation among primary producers to produce sustainable value-added bio-based products in fair bio-based value chains.

Project results should contribute to the following expected outcomes:

- Vertical integration of primary producers in bio-based systems and improved cooperation between regional stakeholders in rural areas
- Deployment of replicable, regional, circular bio-based business models through organisational innovation*.
- Mobilisation and circular use of secondary biological resources and new valorisation pathways for high added-value applications in the scope of CBE through biorefinery processing and technologies.

- Through the development of new jobs and growth, diversification, and revitalisation of the economy in rural areas, ensure fair benefit distribution among all actors involved, with a focus on the primary sector.
- Production of added-value bio-based materials and industrial products with improved sustainability characteristics and identification of factors for success in respect to robust contracts and agreements, training, and capacity building.
- Support the establishment of cooperatively owned biorefineries, taking advantage of having full control of the value chain, optimizing value creation and stability in high quality feedstock supply.
- Preservation/improvement of soil quality and fertility.
- Public awareness and acceptance of bio-based solutions.
- Support market uptake growth and acceptance of scalable bio-based solutions.

Scope

The sustainable mobilisation and valorisation of secondary resources can result in the creation of new economic and social opportunities in rural areas, while also protecting the environment and climate. Implementing these new opportunities needs the establishment of new bio-based systems, new business models and interactions between primary producers and other actors all the way to consumers, as well as ensuring circularity. However, individual farmers usually do not have the financial and technical capacity to invest in the necessary infrastructure or to provide a sufficient quantity and quality of these biological resources to make innovative valorisations economically viable.

Farmers' cooperatives and producer organisations play an important role in helping farmers to capture a higher share of the value added in the supply chain, to strengthen their position on the market as well as in the areas of R&I, capacity building, and knowledge transfer.

This topic addresses cooperative business models among primary producers for the efficient conversion of agricultural residues, by-products, and waste into high-value bio-based materials and products with improved sustainability characteristics.

Proposals under this topic should:

- Demonstrate the potential of contractual agreements or fully developed shareholder/ownership concepts (e.g., cooperatives or producer organisations) to optimise harvesting, logistics and processing of secondary bio-based feedstock at relevant scales.
- Co-design and implement business cases for primary producers that build on existing rural infrastructures, support the economy of scale, and contribute to a fair distribution of costs, benefits, and risks among the economic operators in the bio-based system.
- Demonstrate resource-efficient pathways for the valorisation and conversion of waste, by-products, and residues from agriculture for innovative high-value materials and products at relevant scales.
- Establish long-term strategies to serve the stakeholder's interests long-term.

- If applicable, explore cross-sectoral synergies and collaborations (e.g., regional clusters) to improve the economic viability and commercial operativity and synergies with the food industry.
- Analyse and minimise the potential negative impacts of alternative uses of biomass streams on the environment and market/sector (e.g. in terms of biodiversity, soil fertility, competing sectors, etc.), while taking care of the full circularity potentials (e.g. soil improver, bio-based fertilisers, organic crop protection agents, etc.).
- Apply and/or adapt existing/mature or novel digital technologies, provided that they are instrumental to achieving the project's outcomes and scope, especially to ensure high standards of resource efficiency and environmental protection. Applications of digital technologies that should be considered in the scope among the following areas: i) chemicals, materials and process design & modelling ii) (real-time) process monitoring and optimisation (including environmental performance) iii) predictive maintenance & plant engineering and iv) data analytics and data management of the bio-based business models and solutions in the scope.

  (Note) Points i)-iv) should consider the contribution to/from data/feedback loops across circular, bio-based value chains but also coordination of processes among different sectors (especially if symbiosis concepts apply in the project)
- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions.

Propose recommendations on opportunities/challenges to be addressed for targeted stakeholders, including, where possible, national/regional stakeholders, investors and brand owners*.

Proposals must implement the multi-actor approach and demonstrate the involvement of all concerned key actors, such as primary producers, in the bio-based systems. Please see the section *Additional requirements* for more details.

HORIZON-JU-CBE-2022-IA-03 Cost-effective production routes towards bio-based alternatives to fossil-based chemical building blocks

Type of action	Innovation Action
Indicative budget	The total indicative budget for the topic is EUR 12 million
Expected EU contribution per project	It is estimated that a contribution of EUR 6 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 6-7 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes CBE JU specific objective of reinforcing the integration of bio-based research and innovation throughout industrial bio-based systems.
Link to CBE JU SRIA	Strategic priority 2.1.2: Deploy innovative production technologies. Strategic priority 2.1.3: Scale up production and market uptake of innovative bio-based products. Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3

Expected outcomes

Successful proposals will contribute to developing bio-based novel dedicated* or drop-in* platform chemicals [22] with improved technical and/or environmental performances, contributing to the circularity and carbon neutrality of related systems. Projects are therefore expected to address the EU Bioeconomy Strategy and its action plan, the Chemicals Strategy for Sustainability, the EU industrial strategy, and the upcoming transition pathway for the energy-intensive industries ecosystem (more specifically the 'chemicals transition pathway').

Project results should contribute to the following expected outcomes:

- Resource- and energy-efficient cascading use of sustainably sourced biomass.

[22] Spekreijse, J., Lammens, T., Parisi, C., Ronzon, T. and Vis, M., Insights into the European market for bio-based chemicals, EUR 29581 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-01500-0, doi:10.2760/739561, JRC112989.

- Diversification on the range of EU-produced chemicals, while also growing the bio-based chemicals portfolio with high-volume/low cost and/or low volume/high-cost chemicals, depending on application, performance, and functionality.
- Higher sustainability and competitiveness of the European chemical industry.
- Reduction of direct emissions (scope 1 and 2)* and indirect emissions (scope 3)* against available fossil-based and/or bio-based benchmarks of the chemical industry, with a clear technical pathway to carbon neutrality.
- Public awareness and acceptance of bio-based solutions.
- Support market uptake growth and acceptance of scalable bio-based solutions.

Scope

Europe needs to diversify the sources of sustainable feedstock for its chemical industry, for not only improving on environmental sustainability performance of industrial processes and products, but to also enhance their strategic autonomy and resilience. Cost-competitiveness and scalability often remain a challenge for many bio-based chemicals. In contrast to fossil-based chemicals, they are characterised by relatively novel and comparably lower production scales, having higher OPEX costs (as well as CAPEX costs for new biorefining facilities). Accelerating the development of the bio-based chemicals portfolio will be key for growth of the bioeconomy and towards accelerating further on the fossil-based feedstock substitution. In addition, climate change, driven by industrial emissions of greenhouse gases (GHGs), has a fundamental socio-economic and environmental impact. The reduction of GHGs emissions is a priority for the chemical industry, as an energy-intensive industry sector. Bio-based platform chemicals, derived from sustainably sourced feedstock and with a lower carbon footprint, can contribute to realising this priority.

The topic does not address bio-based chemicals that already have a large-scale, industrial production capacity in Europe.

Proposals under this topic should:

- Demonstrate novel or improved production routes for bio-based platform chemicals, within the scope of CBE and reaching the targeted TRL, encompassing different enabling technologies [23] .Assess and prove technoeconomic feasibility for the proposed bio-based platform chemicals, in comparison to fossil-based and/or bio-based benchmarks, where these exist.
- Apply and/or adapt existing/mature or novel digital technologies, provided that they are instrumental to achieving the project's outcomes and scope, especially to ensure high standards of resource efficiency and environmental protection. Applications of digital technologies that should be considered in the scope are among the following areas

  (Note): i) chemicals, materials and process design & modelling ii) (real-time) process monitoring and optimisation (including environmental performance) iii) predictive maintenance & plant engineering and iv) data analytics and data management of the production processes in the scope.

[23] Enabling technologies include (without the list being exhaustive): catalysis, biocatalysis, metabolic engineering, systems biology, enabling digital technologies (e.g. for chemicals design, high-throughput testing, chemical process design, control and optimisation)

(Note II) Points i)-iv) should consider the contribution to/from data/feedback loops across circular, bio-based value chains but also coordination of processes among different sectors (especially if symbiosis concepts apply in the project)

- Demonstrate scalability of the process towards industrial production and market size/applications for the chemical building blocks (dedicated and/or drop-in chemical structures) produced, including identifying appropriate business models for their market uptake.
- Assess the environmental sustainability performance for the production (and along the full bio-based system) of the bio-based platform chemicals via Life Cycle Assessment or other appropriate methodologies (see more under *Additional requirements*).
- Provision for the project integrating 'safe-and-sustainable-by-design' generic criteria and framework considerations[24], in line with the EU Chemicals strategy for sustainability.
- Demonstrate the applicability and added-value of the bio-based chemical building blocks compared to the fossil-based ones, while considering the target end uses in bio-based products.
- Develop and propose a strategic roadmap for closing the competitiveness EV between well-established fossil-based routes and the proposed novel or improved bio-based routes.
- Propose recommendations on opportunities/challenges to be addressed to targeted stakeholders, including, where possible, national/regional stakeholders, investors and brand owners*.
- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions.

Proposals must implement the multi-actor approach and demonstrate the involvement of all concerned key actors in the bio-based systems, such as researchers and technology providers bio-based processing industries, end-users and consumers (in case of B2C value chains). Please see the section *Additional requirements* for more details.

[24] See footnote 19

HORIZON-JU-CBE-2022-IA-04 Co-processing of mixed bio-based waste streams

Type of action	Innovation Action.
Indicative budget	The total indicative budget for the topic is EUR 12 million.
Expected EU contribution per project	It is estimated that a contribution of EUR 6 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
TRL	TRL 6-7 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes CBE JU specific objective of increasing the intensity of cross-disciplinary research and innovation activities.
Link to CBE JU SRIA	Strategic priority 2.1.2 - Deploy innovative production technologies Strategic priority 2.1.3 - Scale up production and market uptake of innovative bio-based products Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3

Expected outcomes

In line with the European targets of recycling for biowaste, from the Waste Framework Directive, lowering the fraction of municipal bio-waste* sent to landfill to 10% by 2035, successful proposals will support the uptake of separation and conversion technologies for mixed bio-waste streams and will contribute to reaching the European targets on bio-waste and the efficient use of resources.

Project results should contribute to the following expected outcomes:

- Increased processing shares of bio-waste, and waste from bio-based products and processes, as well as their higher priority uses in the waste hierarchy*.
- Expanded opportunities for the valorisation of bio-waste in all stages and across all sectors – from bio-based industries to municipal bio-waste – exploiting chances of industrial symbiosis*.
- Public awareness and acceptance of bio-based solutions.
- Support market uptake growth and acceptance of scalable bio-based solutions.

Scope

The CBE JU scope includes a variety of bio-based waste and side streams from different sectors: residual streams from agriculture and horticulture, forestry, horticulture and from aquatic biomass cultivation, processing, and from fisheries; food and feed waste (from the food and feed production/processing); bio-waste other than food waste from production processes, e.g. textiles, wood, pulp and paper, etc., including post-consumer waste; sewage and wastewater sludge; used cooking oil; construction and demolition waste that include wood-based component, residues and by-products from the bio-based industry. These streams may contain impurities as well as polymers and mineral components (also naturally occurring in bio-based feedstock).

Annual waste generation is projected to increase by 70% by 2050 while global consumption of materials such as biomass, fossil fuels, metals and minerals is expected to double in the next forty years. In the meantime, pressure on raw material and energy resources is increasing. Thus, converting bio-based waste streams in renewable raw materials is more necessary than ever. However, industry sets stringent requirements for the composition and purity of renewable raw materials to ensure proper processing and meet product requirements.

Proposals under this topic should:

- Valorise effectively and sustainably existing mixed residual and/or waste streams from bio-based products and processes from all relevant sectors and processing steps. The focus of this topic is on bio-based feedstock streams that are generated as heterogeneous mixtures, and on bio-based feedstock streams that contain non bio-based impurities (e.g. plastics, minerals, metals – excluding toxic or harmful substances) that hinder their valorisation using currently available technologies. The topic excludes homogeneous side streams from primary production (e.g. agri- or forest biomass residues) and mixed municipal solid waste. The topic also excludes conversion of contaminated biomass (e.g. from bioremediation). The proposal should develop innovative technologies for recycling and upcycling of secondary bio-based feedstock, residues, and bio-based products' waste, including sorting, separation, pre-treatment and upgrading technologies. Physical, chemical and biotechnologies are in scope.
- Set up and implement innovative and environmentally sustainable processing technologies and apply the cascading approach, when applicable, for example producing high-value bio-based products in the scope of CBE JU, recycling nutrients for agriculture and horticulture use, etc.
- Valorise the polymer and mineral component of bio-based waste streams, waste from bio-based products and processes (e.g., N- P- components in sewage sludge) into products in the scope of CBE JU.
- Demonstrate an integrated processing plant for mixtures of bio-based residues, bio-waste, waste from bio-based products and processes, while implementing symbiotic processes across different industrial operations.
- Apply and/or adapt existing/mature or novel digital technologies, provided that they are instrumental to achieving the project's outcomes and scope, especially to ensure high standards of resource efficiency and environmental protection. Applications of digital technologies that should be considered in the scope are among the following areas

(Note) i) chemicals, materials and process design & modelling ii) (real-time) process monitoring and optimisation (including environmental performance) iii) predictive maintenance & plant engineering and iv) data analytics and data management of the processing technologies in the scope.

(Note II) Points i)-iv) should consider the contribution to/from data/feedback loops across circular, bio-based value chains but also coordination of processes among different sectors (especially if symbiosis concepts apply in the project).

- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions.
- Propose recommendations on opportunities/challenges to be addressed to targeted stakeholders, including, where possible, national/regional stakeholders, investors and brand owners*.

Proposals must implement the multi-actor approach and demonstrate the involvement of all concerned key actors in the bio-based systems, such as researchers, local authorities, bio-based feedstock providers including waste managers, and bio-based processing industries. Please see the section *Additional requirements* for more details.

HORIZON-JU-CBE-2022-IAFlag-01 Maximum valorisation of sustainably sourced bio-based feedstock in multi-product, zero-waste, zero-pollution biorefinery

Type of Action	Innovation Action – Flagship
Indicative budget	The total indicative budget for the topic is EUR 14 million.
Expected EU contribution per project	It is estimated that a contribution of EUR 14 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
TRL	TRL 8 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of reinforcing the integration of bio-based research and innovation throughout industrial bio-based systems.
Link to CBE JU SRIA	Strategic priority 2.1.2 Deploy innovative production technologies. Strategic priority 2.1.4 Build policymakers' awareness and acceptance of bio-based solutions. Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems. Strategic priority 3.1.3 – Facilitate social acceptance of bio-based applications.
CBE JU KPIs	Please refer to the KPIs table 3

Expected outcomes

In line with the objectives of the Circular economy and the Zero pollution action plan[25], successful proposals will facilitate the large-scale deployment of industrial bio-based systems. These systems will contribute to the EU Bioeconomy Strategy implementation, demonstrating improved environmental performances, maximum resource- and energy-efficiency, and optimal cascading use of bio-based feedstock, aiming for 'zero waste'* and 'zero-pollution'* operations.

[25] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0400&from=EN

Project results should contribute to the following expected outcomes:

- Enhanced sustainability and circularity performance of bio-based systems realising the 'zero-waste', 'zero-pollution' ambition.
- Revitalised communities of the bioeconomy by creating new green jobs and investments.
- Deployed industrial symbiosis*.
- Integrated pollution prevention and control in bio-based systems of air, water, soil and noise levels.
- Public awareness and acceptance of bio-based solutions.
- Support market uptake growth and acceptance of scalable bio-based solutions.

Scope

The EU Bioeconomy Strategy sets the circularity and the environmental protection at the basis of the modernisation of bio-based industries in the Union, to ensure a trustful green transition of EU economy away from a linear fossil-based system.

The objective of this topic is to deploy solutions with the highest circularity levels, while extracting maximum value from the bio-based feedstock to produce bio-based products in the scope of CBE and prevent and control any pollution from bio-based industries.

Proposals under this topic should:

- Demonstrate at large scale a new biorefinery concept extracting maximum value from (all components of) the sustainably sourced bio-based feedstock to produce a variety of materials/products in the scope of CBE JU.
- Set up and operate a biorefinery model that maximises the total value extracted from the input bio-based feedstock, and to minimise the required input (feedstock, energy, other chemicals, other process materials), rather than 'just' focusing on a small number of main products, applying efficient use of biomass fractions (including cascading approach to valorise side-streams where applicable).
- Demonstrate the 'zero-waste' ambition by:
    - Reducing any exhaust emissions from the industrial installation. These include exhaust flows that are usually not considered in the common pollution prevention and control operations, such as hot water, vapours, odours, etc.
    - Designing circular processes and looking on the best practices already available or under development, including in other EU R&I programmes.
    - Applying circular by design concepts to output materials/products.
- Demonstrate the 'zero-pollution' ambition by:

  - Eliminating/minimising hazardous substances from the feedstock, if any.
  - Using safe bio-based substances to substitute hazardous and toxic ones in processes.
  - Re-circulating any process flow such as air/water/energy/chemicals, also looking on the best practices already available or under development, including in other EU R&I programmes.

- Provision for the project integrating 'safe-and-sustainable-by-design' generic criteria and framework considerations[26], in line with the EU Chemicals strategy for sustainability.
- Ensure that the operation of the biorefinery contribute to climate change mitigation, both aiming at negative GHG emissions and at realizing effective carbon removal*, either through production of circular bio-based materials and/or carbon storage in nature-based solutions (e.g. reforestation, soil, grasslands, etc.).
- Design the biorefinery operations to include the reduction noise levels.
- Perform a full life cycle assessment of the environmental impacts of the output materials/products.
- Explore the viability of implementing industrial symbiosis, between different installations (respecting the short value chain concept) or other symbiosis (e.g., with municipal waste management) to share and exploit materials and carrier streams and any process flows such as air/water/energy/chemicals, to achieve the 'zero-waste' and 'zero-pollution' ambition.
- Apply circular by design concepts to output materials/products in the scope of CBE JU.
- Validate integrated monitoring and reporting systems on the effective reduction of pollutant emissions.
- Demonstrate the replicability of the zero-waste biorefinery concept by conducting replication studies under different assumptions (e.g., location, feedstock source) at a proof-of-concept level.
- Assess the contribution of the project to the 'zero-pollution' ambition, climate change neutrality and biodiversity protection and restoration targets.
- Evaluate the socio-economic impacts on local communities of the proposed solutions.
- Apply and/or adapt existing/mature or novel digital technologies, provided that they are instrumental to achieving the project's outcomes and scope, especially to ensure high standards of resource efficiency and environmental protection. Applications of digital technologies that should be considered in the scope are among the following areas: i) chemicals, materials and process design & modelling ii) (real-time) process monitoring and optimisation (including environmental performance) iii) predictive maintenance & plant engineering and iv) data analytics and data management of the multi-product, zero-waste, zero-pollution biorefinery.

[26] See footnote 19

(Note) Points i)-iv) should consider the contribution to/from data/feedback loops across circular, bio-based value chains but also coordination of processes among different sectors (especially if symbiosis concepts apply in the project)

- Quantify and showcase the achievements and challenges of the project to national/regional stakeholders and policymakers, investors and brand owners* to foster their support to scale up the industrial capacity to deploy sustainable circular bio-based solutions across Europe.
- Design and perform dissemination activities to targeted stakeholders, including public and relevant industry actors, enabling the replication, market and social acceptance of the large-scale development of bio-based solutions of the multi-product, ‘zero-waste’, ‘zero-pollution’ biorefinery in the scope.

Proposals should target relevant input bio-based feedstock (i.e., widely available in Europe) to ensure replicability of the biorefinery concept.

Proposals must implement the multi-actor approach and demonstrate the involvement of all concerned key actors in the bio-based systems, such as researchers, experts in pollution prevention and monitoring, bio-based processing industries, regional policy makers, civil society. Please see the section *Additional requirements* for more details.

HORIZON-JU-CBE-2022-IAFlag-02 Alternative sources for high added value food and/or feed ingredients

Type of action	Innovation Action – Flagship.
Indicative budget	The total indicative budget for the topic is EUR 14 million.
Expected EU contribution per project	It is estimated that a contribution of EUR 14 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 8 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of reinforcing the integration of bio-based research and innovation throughout industrial bio-based systems.
Link to CBE JU SRIA	Strategic priority 2.1.3: Scale up production and market uptake of innovative bio-based products. Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3.

Expected outcomes

In line with the Farm to Fork strategy for a fair, healthy and environmentally friendly food system, biodiversity strategy, and the European Green Deal priorities, successful proposals will support the large-scale production of high value food and or feed ingredients from alternative sustainable sources (excluding animal sources), without impacting or regenerating local biodiversity and ecosystems.

Project results are expected to contribute to the following expected outcomes, depending on the choice between focus on food or/and feed ingredients:

- Availability of premium (i.e., nutritious, healthy, functional and environmentally sustainable) food ingredients meeting consumers' expectations, including on economic level.
- Availability of high added value sustainable feed ingredients, ensuring nutritional quality and health and safety profile.

- Rebalanced ratio between animal and plant-based proteins in human consumption, needed for healthy food supply respecting the planetary boundaries[27].
- Contribution to the sustainable food supply for a growing world population (SDG 2 Zero hunger).
- Increased circularity of biomass resources, and resource efficiency, as confirmed by the LCA assessments, leading to improved EU strategic autonomy via reduction/replacement of imports.
- Public awareness and acceptance of bio-based solutions.
- Support market uptake growth and acceptance of scalable bio-based solutions.

Scope

Europe needs to increase its strategic autonomy by diversifying sources of sustainable food ingredients (including proteins). Promoting healthier or more sustainable foods are gaining ground among European consumers. Since the introduction of the first Novel Food Regulation in 1997, consumers have witnessed a growing number of novel foods and food ingredients introduced on the market, e.g., based on new crops or algae, to name a few. Additional effort is required to support this trend and bring more products to the market, while ensuring their high environmental sustainability, as confirmed by the life cycle assessment, as well guaranteeing high quality for the consumers (including toxicological safety, high nutritional performance, taste, and texture, technological functionality etc.). Even more importantly, novel ingredients require the development of new value chains, and attention to issues such as production costs, food safety, scalability and consumer acceptance. Furthermore, positive environmental impacts cannot be taken for granted with novel ingredient sources, and care must be taken to ensure that comparisons between novel and existing sources are valid.

The scope of this topic is to deploy the production of improved nutritious, healthy, and environmentally sustainable food and feed ingredients from alternative non-animal sources.

Proposals under this topic should:

- Validate at large scale the processing and production of food ingredients from sustainable alternative sources, demonstrating their clear-cut environmental sustainability gains, and reduced environmental footprint, compared to existing alternatives, as based on peer-reviewed life-cycle analysis.

[27] Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems - The Lancet (Willett et al, 2019)

- Contribute to the EU sustainability targets under the Farm to Fork strategy and the European Green Deal, such as reduction in fertilizers, pesticides, herbicides, water and energy ensuring a holistic approach.
- These sources may include e.g., novel crops, plant-based resources, fungi, algae (micro and macro), microorganisms (bacteria, yeast, etc.), biomass side streams or food waste.
- Ensure that food safety criteria are met, and that any circularity approach is achieved in a safe, non-hazardous way, without (re-)connecting epidemiological pathways or introducing pathogen/toxin/pollutant enrichment cycles when involving biogenic materials, show sustainability of production, reduced environmental footprint compared with alternative sources.
- Address consumer understanding, awareness and acceptance, especially related to nutritional profile, safety, taste, functionality, quality and texture of foods / feed palatability based on alternative sources.
- Communicate and disseminate the results by inclusive actions (e.g., mutual learning exercises, interaction with the educational system) seeking the engagement of the civil society (e.g., consumer organisations, special focus groups, NGOs), and awareness on issues related to high resource efficacy, and circularity of biomass, as well as innovation and scientific approaches.
- Benefit from high potential of bio-based innovation, seeking cross-sectorial solutions, and complementarities to the projects under BBI JU, Horizon 2020 and Horizon Europe.
- Depending on the chosen source, the projects may propose necessary technical options for sustainable intensification of production, e.g., development of new varieties, and/or cultivation practice, in line with all relevant legal EU and national frameworks, to enable future scale-up. Environmental side-benefits should be duly considered, if relevant, e.g., carbon storage potentials, soil health etc.
- A life cycle assessment should be included in the proposals. An assessment of economic and social impacts should be included.
- Present the economic impact on consumers, including the comparison of new products with their current alternatives on the market (if available).
- Apply and/or adapt existing/mature or novel digital technologies, if they are instrumental to achieving the project's outcomes and scope, especially to ensure high standards of resource efficiency and environmental protection. Applications of digital technologies that should be considered in the scope are among the following areas: i) chemicals, materials and process

design & modelling ii) (real-time) process monitoring and optimisation (including environmental performance) iii) predictive maintenance & plant engineering and iv) data analytics and data management of the processing and production of food ingredients in the scope.

(Note) Points i)-iv) should consider the contribution to/from data/feedback loops across circular, bio-based value chains but also coordination of processes among different sectors (especially if symbiosis concepts apply in the project)

- Quantify and showcase the achievements and challenges of the project to national/regional stakeholders and policymakers, investors and brand owners* to foster their support to scale up the industrial capacity to deploy sustainable circular bio-based solutions across Europe.
- Design and perform dissemination activities to targeted stakeholders, including public and relevant industry actors, enabling the replication, market and social acceptance of the large-scale development of bio-based solutions in the processing and production of food ingredients in the scope. Consider the parallel topic HORIZON-JU-CBE-2022-R-04 (Proteins from alternative and unconventional sources) to pursue potential synergies and avoid overlap.

Proposals must implement the multi-actor approach and ensure adequate involvement of all key actors in the value chains relevant for this topic, across the sustainable circular bio-based system, such as researchers, feedstock producers and suppliers, regional actors, regional policy makers civil society, as well as the bio-based processing industry, including brand owners. Please see the section *Additional requirements* for more details.

HORIZON-JU-CBE-2022-R-01 High performance bio-based polymers for market applications with stringent requirements

Type of action	Research and Innovation Action.
Indicative budget	The total indicative budget for the topic is EUR 9 million
Expected EU contribution per project	It is estimated that a contribution of EUR 4.5 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 5 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of increasing the intensity of cross-disciplinary research and innovation activities.
Link to CBE JU SRIA	Strategic priority 1.1.3: Develop innovative bio-based products Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3.

Expected outcomes

In line with the objectives of the EU Bioeconomy Action Plan, the Sustainable Products Initiative (SPI) and the Industrial strategy, successful proposals will contribute to delivering to the EU capacity to produce specialty bio-based polymers for applications under stringent operating conditions[28].

Project results should contribute to the following expected outcomes:

- Diversified bio-based polymer product portfolio, in terms of polymer types and range of applications under stringent operating conditions.
- Improved safety, sustainability, and circularity profiles of the end-products that use specialty bio-based polymers for applications under stringent operating conditions.
- Improved strategic autonomy and lower dependency of the EU on imports of specialty polymers for stringent operating conditions in specific market sectors.

Scope

[28] Please consider the Sustainable Product Initiative

The wide variety of molecular structures of bio-based polymers can offer significant opportunities to develop products tailored to specific applications [29]. Some specific applications demand polymers that are capable to perform as desired under stringent operating conditions in e.g., market sectors such as electronics, automotive, aerospace, maritime/naval, construction, textiles, packaging, etc.

Tailor-made bio-based polymers for these applications can benefit from their inherent physical/chemical properties, and from their potentially higher sustainability when compared with fossil-based counterparts (if any). The focus of this topic is on applications characterised by stringent operating conditions where the 'bulk properties' [30] of the developed solutions are prominent.

Some of these specialty polymers or their components may heavily depend on imports from outside the EU. Their production routes need to be designed, and their properties tested and proven useful and applicable under stringent conditions as demanded by specific market sectors. Innovative bio-based polymers in scope may be synthesised from bio-based building blocks, produced through biotechnology, other sustainable bio-based processing technologies, or through the functionalisation with biocatalysts or by other means of biopolymers extracted from bio-based feedstock.

Proposals under this topic should:

- Develop bio-based polymers with tailored functional properties for a pre-defined range of applications for market requirements under stringent conditions. The bio-based polymers should be circular-by-design, allowing for their reuse and recycling, including composting in case of biodegradable biopolymers.
- Develop validation tests (e.g., test rigs and testing procedures) and test the bio-based polymers against the application requirements. These tests should include their end-of-life handling.
- Provide an assessment of the environmental sustainability of the developed bio-based polymers.
- Provision for the project integrating 'safe-and-sustainable-by-design' generic criteria and framework considerations [31], in line with the EU Chemicals strategy for sustainability.
- Apply and/or adapt existing/mature or novel digital technologies provided that they are instrumental to achieving the project's outcomes and scope. Applications of digital technologies that should be considered in the scope are among the following areas: i) chemicals, materials and process design & modelling ii) process monitoring and optimisation and iii) data analytics and data management of the production of bio-based polymers in the scope.

[29] Examples of final applications include films, foams, membranes, conductive polymers, semi-conductive polymers, dielectric materials, etc.

[30] For this topic, 'bulk properties' are defined as those that are opposite to 'surface properties'.

[31] See footnote 19

- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions and raise awareness on opportunities to be addressed.

Proposals should involve relevant actors, such as producers, end users, and customers of the developed bio-based polymers to validate their properties and market acceptance. Proposals should build particularly on the past BBI JU projects on biopolymers.

HORIZON-JU-CBE-2022-R-02 Bio-based coatings, barriers, binders, and adhesives

Type of action	Research and Innovation Action.
Indicative budget	The total indicative budget for the topic is EUR 9 million.
Expected EU contribution per project	It is estimated that a contribution of EUR 4.5 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 5 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of increasing the intensity of cross-disciplinary research and innovation activities.
Link to CBE JU SRIA	Strategic priority 1.1.3: Develop innovative bio-based products Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3.

Expected outcomes

Successful proposals will contribute to delivering solutions[32] with improved environmental and production-efficiency performances, and higher technical and application performances, as well as circularity through advanced/new functionalities compared to the state of the art. Projects are expected to contribute to the EU Bioeconomy Strategy and its action plan, Plastics Strategy, Waste Framework Directive, the Sustainable Products Initiative (SPI) and the Circular Economy Action Plan[28].

Project results are expected to contribute to the following expected outcomes:

- Diversification of the bio-based coatings and/or barriers and/or binders, and/or adhesives product portfolio and increase of their range of application.
- Improved sustainability and circularity when compared with fossil-based state of the art.
- Improved health and safety profile when compared with fossil-based state of the art.

[32] Solutions include intermediate products, materials, end-products.

Scope

Packaging, construction, agriculture, aquaculture, marine operations, textiles, furniture, wood-based industry and transport are some of the industrial sectors looking for bio-based alternatives to fossil-based coatings, barriers, binders, and adhesives. On one side, these sectors need to lower their environmental footprint and improve their health and safety performance; on the other side, they are looking to improve the functionalities of materials benefiting from the huge variety of chemical structures available in bio-based materials (e.g., protection, barrier and mechanical characteristics; possibility of adding antimicrobial, anti-odour, anti-scratch, antifouling functions; increasing shelf life of products and food; including biomarkers etc.).

The abovementioned sectors can benefit from bio-based alternatives with improvements in both areas through biotechnological solutions and other innovative technologies available; however, so far only a few products are available. Research should focus on novel, viable alternatives in collaboration with customers, consumers and end users.

Proposals under this topic should:

- Develop and validate novel formulations for renewable, recyclable or bio-degradable, and min 95% (aiming at 100%) bio-based coatings and/or barriers and/or binders and/or adhesives, with improved or unprecedented properties with respect to state of the art.
- Develop adequate tests and results thereof on the developed bio-based solutions to show their benefits compared with state of the art. [24]Provide proof of an improved functional, health and safety profile of the developed solutions compared with state of the art, showing fewer potential hazards and higher safety for consumers and end-users of the intended applications. Provision for the project integrating 'safe-and-sustainable-by-design' generic criteria and framework considerations[33], in line with the EU Chemicals strategy for sustainability.
- Apply and/or adapt existing/mature or novel digital technologies provided that they are instrumental to achieving the project's outcomes and scope. Applications of digital technologies that should be considered in the scope are among the following areas: i) chemicals, materials and process design & modelling ii) process monitoring and optimisation and iii) data analytics and data management of the bio-based products in the scope.
- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions and raise awareness on opportunities to be addressed.

[33] The publication of the 'Safe and Sustainable by Design chemicals and materials' Framework, aiming to the definition of criteria and evaluation procedure for chemicals and materials, is expected to become available by end of 2022. The proposed SSbD framework is expected to assess chemicals and materials following a hierarchical approach in which safety aspects are considered first, followed by environmental, social and economic aspects. Please see also European Commission, Joint Research Centre, Caldeira, C., Farcal, R., Moretti, C., et al., *Safe and sustainable by design chemicals and materials: review of safety and sustainability dimensions, aspects, methods, indicators, and tools*, 2022, https://data.europa.eu/doi/10.2760/879069

HORIZON-JU-CBE-2022-R-03 Circular-by-design bio-based materials to improve the circularity of complex structures

Type of action	Research and Innovation Action.
Indicative budget	The total indicative budget for the topic is EUR 9 million
Expected EU contribution per project	It is estimated that a contribution of EUR 4.5 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 5 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of increasing the intensity of cross-disciplinary research and innovation activities.
Link to CBE JU SRIA	Strategic priority 1.1.2: Develop innovative production systems in the bio-based industry) Strategic priority 1.1.3: Develop bio-based products with novel properties Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3.

Expected outcomes:

Successful proposals should contribute to research and development of innovative, sustainable bio-based materials, in the scope of CBE, to improve on the circularity and recyclability of currently used complex structures, such as multi-layered or multi-material structures, including plastics and composites. Bio-based innovations should address a range of end-use applications where there is a priority to identify more sustainable, circular options (e.g., packaging, construction materials, etc.). Projects are therefore expected to contribute to the EU Bioeconomy strategy and its action plan, the Plastics Strategy, the Waste Framework Directive, the Sustainable Products Initiative (SPI) and the Circular Economy Action Plan.

Project results are expected to contribute to the following expected outcomes:

- Higher availability of circular-by-design* bio-based materials and B2B* products, as innovative solutions to current products with complex structures and in line with application (performance) requirements, while being positively assessed for environmental performance.
- Diversified bio-based materials and B2B products portfolio and their applications.

- Contribution to increasing the availability of renewable carbon-based complex structures, their circularity and addressing zero pollution goals.

Scope:

The recyclability and circularity for complex structures (e.g., multi-layered products, multi-material products and composites)* remain a challenge that needs to be tackled. Their recycling can often be challenging due to their composition but also due to differences in practices across Europe in sorting, collection, and treatment of waste. Research and innovation should address current materials/components (in the aforementioned complex structures) that are currently fossil-based, or non-circular bio-based or partly bio-based/fossil-based, aiming for circular bio-based alternatives.

Proposals under this topic should:

- Design and develop novel 'circular-by-design' bio-based materials and B2B products, in the scope of CBE JU, as competitive solutions that address the circularity issues of complex materials, while meeting the supply chain and end-use performance requirements.
- Test the possible associated recycling and/or upcycling options (lab and pilot-scale). The proposed innovations should increase the valorisation of the complex structures after use and move up in the waste hierarchy*.
- Provision for the project integrating 'safe-and-sustainable-by design' generic criteria and framework considerations,[34] in line with the EU Chemicals strategy for sustainability.
- Apply and/or adapt existing/mature or novel digital technologies provided that they are instrumental to achieving the project's outcomes and scope. Applications of digital technologies that should be considered in the scope are among the following areas: i) chemicals, materials and process design & modelling ii) process monitoring and optimisation and iii) data analytics and data management of the bio-based products in the scope.
- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions and raise awareness on opportunities to be addressed.
- Develop guidelines and recommendations defining how to manage the developed bio-based materials and products throughout their life cycle, with a specific reference to end of life.
- Develop recommendations, based on the functionality and technical performance of the innovative bio-based structures, with regards to the potential end-uses/value chains being applicable for future, further scale up developments.

In the proposal, the preliminary assessment of the environmental sustainability of the developed bio-based materials and B2B products should include all vectors that are relevant to the biomass feedstock environmental sustainability.

34 See footnote 19

HORIZON-JU-CBE-2022-R-04 Proteins from alternative and unconventional sources

Type of action	Research and Innovation Action.
Indicative budget	The total indicative budget for the topic is EUR 9 million
Expected EU contribution per project	It is estimated that a contribution of EUR 4.5 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 5 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of increasing the intensity of cross-disciplinary research and innovation activities.
Link to CBE JU SRIA	Strategic priority 1.1.3: Develop bio-based products with novel properties. Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3.

Expected outcomes

Europe needs to diversify protein sources to decrease its dependence on imports and the environmental footprint often associated with animal-based proteins. In line with the Farm to Fork strategy for a fair, healthy and environmentally friendly food system and the European Green Deal priorities, successful proposals will support the mobilisation of proteins for food, feed, and non-food bio-based applications.

Project results are expected to contribute to the following expected outcomes:

- Identification of currently under- or unexploited sources of proteins.
- Mobilisation of novel protein streams from sustainable alternative sources.
- Increased availability of proteins in the EU and reduced dependency on imports.
- Sustainable premium (defined as nutritious, healthy, and environmentally sustainable) feed, food, and non-food chains meeting the customer expectations, including on economic level.

Scope

The growing world population requires an increase in affordable protein supply. However, this cannot be realised by depleting limited natural resources (land, water, nutrients[35], etc.), which are

[35] Nutrients can come from natural sources but are not a natural resource *per se*.

already under strong pressure globally and in the EU. Today's largest source of protein for human consumption is based on farm animals, which often involve multiple sustainability issues. Moreover, low-grade or speciality proteins not suitable for food or feed applications could serve as feedstock for the bio-based industry. However, the extraction and purification of such streams are difficult, especially from unconventional sources.

Proposals under this topic should:

- Develop and test available and upcoming potentially disruptive technologies[36] to produce proteins from unconventional sources (e.g., proteins derived from plants, agro-food by-products, fungi[37], microorganisms, algae[38], protein-enriched fermentations, or invertebrates, including terrestrial (e.g., insects) or marine, with the potential for scale-up and deployment across Europe, enabling the production of bulk proteins for food and feed applications.
- Identify, mobilise, and extract proteins from sustainable alternative biomass sources.
- If necessary, functionalise the proteins for the intended use, also considering the application of specific emerging processing treatments for this aim. When targeting food and feed applications, health and safety regulations need to be duly considered, as well as solubility, functionality, bioactivity, consumer organoleptic experience, e.g., texture and taste (for food), bioactivity, functionality, nutritional requirements, digestibility and appetence (for feed). When targeting non-food applications, proposals must demonstrate that the intended use is not conflicting with food chain.
- For any use, and to increase economic value, the proposals should aim at novel and/or improved properties (e.g., nutritional profile, improved digestibility, nutraceutical properties), as well as full valorisation of biomass (extraction of microelements, vitamins, secondary metabolites, colorants, antimicrobials etc.), enabling industrial symbiosis*
- Apply and/or adapt existing/mature or novel digital technologies if they are instrumental to achieving the project's outcomes and scope. Applications of digital technologies that should be considered in the scope are among the following areas: i) chemicals, materials and process design & modelling ii) process monitoring and optimisation and iii) data analytics and data management of the production of alternative proteins in the scope.
- Disseminate the outputs and learning outcomes from the project in order to increase the public awareness, and awareness of relevant industry actors, of potential benefits of bio-based solutions and raise awareness on opportunities to be addressed.
- Benefit from high potential of bio-based innovation, seeking cross-sectorial solutions, and complementarities to the projects under BBI JU[39], Horizon 2020 and Horizon Europe.

Depending on the chosen source, the projects may propose necessary technical options for sustainable intensification of production, e.g., development of new varieties, and/or cultivation

[36] Including physico/chemical technologies and biotechnologies

[37] Including filamentous fungi and yeasts

[38] Including micro- and macroalgae (seaweeds)

[39] E.g., projects FARMYNG, PLENITUDE etc.

practice, in line with all relevant legal EU and national frameworks, to enable future scale-up[40]. Environmental side-benefits should be duly considered, if relevant, e.g., carbon storage potentials, soil health etc.

Proposals must implement the multi-actor approach and ensure adequate involvement of all key actors in the value chains relevant for this topic, such as primary producers, in the bio-based systems. Please see the section *Additional requirements* for more details.

[40] See also a parallel topic HORIZON-JU-CBE-2022-IAFlag-02 Alternative sources for high added value food and/or feed ingredients.

HORIZON-JU-CBE-2022-R-05 Sustainable fibres biorefineries feedstock

Type of Action	Research and Innovation Action.
Indicative budget	The total indicative budget for the topic is EUR 9 million .
Expected EU contribution per project	It is estimated that a contribution of EUR 4.5 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
TRL	TRL 5 at the end of the project.
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of increasing the intensity of cross-disciplinary research and innovation activities.
Link to CBE JU SRIA	Strategic priority 1.1.1 Ensure the availability and quality of sustainable feedstock. Strategic priority 1.3.1 Protect and enhance biodiversity and ecosystem services* in bio-based feedstock supply systems. Strategic priority 3.1.2 - Incorporate the environmental sustainability and circularity criteria in bio-based systems
CBE JU KPIs	Please refer to the KPIs table 3.

Expected outcomes

A successful proposal will contribute to the European Green Deal, the EU Bioeconomy strategy and its action plan, the Circular Economy Action Plan, the Sustainable Textiles strategy, the Zero pollution action plan[25], as well as the New European Bauhaus initiative and the EU Industrial Strategy, as well as the upcoming Sustainable Product initiative[41]. The growth of European fibrous bioeconomy is also a powerful tool for revitalising marginal areas suffering from desertification or experiencing socio-economic difficulties.

Project results are expected to contribute to the following expected outcomes:

- Sustainable provision of green biomass for the industrial biorefining process, with environmental and social co-benefits (e.g., increased valorisation of green biomass, large-scale high-carbon sequestration, improved understanding and application of biodiversity enhancing potentials (e.g., nature-based solutions), improved ecosystem services*, recyclability, as well as skilled green jobs, especially in the rural contexts).

[41] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12567-Sustainable-products-initiative_en

- This topic includes underexploited feedstocks for making alternative, sustainable fibres, from crop plants, trees, agricultural and forestry residues, fungi and algae, or marine/freshwater plants (e.g., Salicornia);
- Development of fibre substrates, e.g., textiles, non-woven materials, composite bio-based materials, to foster innovation across industrial ecosystems, ranging from fashion, automotive, construction, to furniture sectors, enabling several possible end applications with future benefits for consumers based on the selected green fibre feedstocks. This may look on the potential of innovative biotechnology, synthetic biology and related technology, supporting development of circular bio-based end products.
- Improved sustainable exploitation, cultivation and, where relevant, processing methods based on promising selected green feedstocks.
- Increased competitiveness of European bio-based sector underpinned by biotechnology, in particular, SMEs, as well as of the primary biomass producers (agriculture actors), with socio-economic benefits in the engaged participation in the bio-based systems.
- Increased public awareness of links between biodiversity/natural resources and its potentials, leading to increased trust in the scientific approaches based on informed and robust communication and mutual-learning efforts.

Scope

Dedicated, purposely grown industrial crops and novel terrestrial and aquatic sources of biomass to deliver specific precursors for further processing into chemicals and materials such as textiles, or composites present an attractive route to high value applications. Examples include promising European green fibre crops, such as well-known species as flax and hemp, or trees, but the proposals could also focus on less developed fibrous species e.g., nettle or perennial grasses, or aquatic plants like Salicornia. The proposals should focus on the identification of those promising low-input crops with associated ecological benefits (biodiversity enhancement, soil quality and retention potential, low requirement for water and nutrient use, pollinator friendliness, as relevant depending on the specific source).

In addition to the aforementioned crop selection, the projects should include research on breeding / cultivation and harvesting optimisation steps, and other agronomic options necessary for the subsequent scale-up into the industrial use, in the context of an urgent need to improve EU agriculture innovation potentials, including its bio-based rural element, as related to e.g., fibre quality traits (mechanical properties and overall performance), e.g., fibre length, strength, stress resistance etc., in addition to addressing high yield, considering the need for efficient biomass processing. This should consider a representative variety of European soil and climatic conditions, allowing the replication and subsequent take-up by the bio-based industry and rural actors, especially to identify the conditions suitable for cultivation on unused, marginal, or contaminated land that is currently not in use, in line with the biodiversity protection. Proposals addressing this point could also contain remediation actions for marginal or contaminated soils in order to convert or return these lands to use for agricultural purposes, and/or that can be cultivated in novel and highly resource-efficient conditions.

Proposals under this topic should:

- Enable any of several possible end applications, based on the developed fibre substrates, e.g., textiles, non-woven materials, composite bio-based materials, to foster innovation across industrial ecosystems, ranging from fashion, automotive, construction, to furniture sectors etc.
- Develop a plan for a subsequent up-scaling at biorefinery level, which should include the role of all actors in the value chain, from the feedstock supplier to the actors on the end-market. Furthermore, the model should show that the bio-based system does not interfere with the food chain (feedstocks not suitable for food production/marginal lands etc.).
- Proposals may apply and/or adapt existing/mature or novel digital technologies if they are instrumental to achieving the project's outcomes and scope. Applications of digital technologies that should be considered in the scope are among the following areas: i) chemicals, materials and process design & modelling ii) process monitoring and optimisation and iii) data analytics and data management of the activities in the scope.
- Social innovation (e.g., mutual-learning methods), inclusive communication and dissemination measures must form part of the proposals in mapping understanding, drivers and barriers from the view of public opinions. This will serve to promote an increased trust in the scientific approaches among the stakeholders.

International cooperation is encouraged as a win-win solution (for instance, regarding the biotechnology aspects, but also on improved environmental impacts, especially biodiversity protection*), while taking care of the European industrial competitiveness.

Among the past and ongoing EU funded research projects, on which the project should build activities, proposals should include specifically: the ones under the BBI JU[42], Horizon Europe calls[43], and other EU partnerships[44].

Proposals must implement the multi-actor approach and ensure adequate involvement of all key actors in the value chains relevant for this topic, including primary producers, in the bio-based system. Please see the section *Additional requirements* for more details.

[42] Examples include: Horizon 2020, CE-FNR-14-2020 call: Innovative textiles – reinventing fashion - IA (projects HEREWEAR, MY-FI and New Cotton), as relevant. Also BBI JU past and ongoing projects: H2020-BBI-JTI-2016: GRACE GRowing Advanced industrial Crops on marginal lands for biorefineries GRETE H2020-BBI-JTI-2018- 'Green chemicals and technologies for the wood-to-textile value chain', GLAUKOS H2020-BBI-JTI-2019- 'Sustainable clothing and fishing gear', SSUCHY H2020-BBI-JTI-2017- Sustainable structural and multifunctional bio-composites from hybrid natural fibres and bio-based polymers

[43] See calls HORIZON-CL6-2021-CIRCBIO-01-05: Novel, non-plant biomass feedstocks for industrial applications, HORIZON-CL6-2021-ZEROPOLLUTION-01-06: Increasing the environmental performance of industrial processes in bio-based sectors: construction, woodworking, textiles, pulp and paper and bio-chemicals, and any further upcoming calls.

[44] E.g., European Innovation Partnership on Sustainability in Agriculture (EIP AGRI)

HORIZON-JU-CBE-2022-S-01 Developing and validating monitoring systems of environmental sustainability and circularity: collection of best practices and benchmarks

Type of action	Coordination and Support Action.
Indicative budget	The total indicative budget for the topic is EUR 3 million
Expected EU contribution per project	It is estimated that a contribution of EUR 3 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts
Financial support to third parties	It is estimated up to EUR 450 000.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The total amount estimate for this support is EUR 450 000. The support to third parties can only be provided in the form of grants. The maximum amount to be granted to each third party is EUR 60 000
Link to CBE JU Specific Objectives	This topic contributes to the CBE JU specific objective of ensuring the integration of circularity and environmental sustainability requirements, contribution to climate neutrality and zero pollution ambition in the development and implementation of bio-based research and innovation.
Link to CBE JU SRIA	Strategic priority 3.1.1 Set effective and robust environmental sustainability and circularity criteria for bio-based systems.
CBE JU KPIs	Please refer to the KPIs table 3.

Expected outcomes

The successful proposal will support bio-based industries, traders, and certification companies in tracing environmental impacts and circularity of industrial bio-based systems to enable responsible production in the industrial bio-based systems in the EU, in line with the 2030 Climate Target Plan and the EU Zero pollution action plan[25]. Project outcomes will contribute to enhancing circular bio-based systems to operate according to planetary boundaries, replacing fossil-based systems and their carbon footprint, mitigating climate change, restoring biodiversity, and protecting air, water,

and soil quality along supply chain of biological feedstock and industrial value chains within the EU and Associated Countries and across borders.

Project results are expected to contribute to the following expected outcome:

- Monitoring systems and assessment of the environmental impacts and circularity of bio-based systems for the EU single market and for international trade.

Scope

The environmental sustainability and circularity assessment of industrial bio-based systems is instrumental to guarantee and monitor that they are developed with the aim to contribute to the just green transition of the EU economy away from a linear fossil-based system. The method for such assessment would represent an instrument for policymakers and for investors to support the best performing bio-based sectors and to leverage investments and ensure competitive edge solutions. This requires the development of scientifically robust metrics and performance benchmarks, which should benefit to the greatest extent possible from existing methodologies and indicators[28]. Methods and indicators should use the available environmental observations efficiently.

Proposals under this topic should:

- Identify the range of industrial bio-based systems in the scope of CBE within the EU to be analysed in the project.
- Evaluate existing and/or develop new methods to assess environmental impacts of the selected industrial bio-based systems and their products on climate change (mitigation and adaptation), biodiversity (protection and enhancement), land use and water resources use as priorities, but also on air, water, and soil quality[45]. This task should be performed based on the existing initiatives[46], the review of relevant studies, including from BBI JU, as well as of past and ongoing R&I projects. The impact on climate should include both the greenhouse gas emissions and the carbon removal* potential of bio-based systems. Assessments should consider the life cycle perspective and should include an extensive study of end-of-life issues of the bio-based products in the scope of CBE JU.
- Evaluate existing and/or develop new methods to evaluate iLUC risks of bio-based systems (especially concerning bio-based feedstock) and demonstrate low/zero-iLUC risk levels.
- Evaluate existing and/or develop new criteria and metrics to assess the carbon removal potential of bio-based solutions, (following the upcoming European certification framework[47]).
- Evaluate the trade-offs and the interconnectivity of all assessed impacts to make a multicriteria analysis and more complex assessment.
- Evaluate existing and/or develop new metrics of circularity of industrial bio-based systems based on the application of the cascading approach of biomass use, the resources efficiency,

[45] For soil quality indicators, a reference can be found in the Soil Mission Implementation plan https://ec.europa.eu/info/sites/default/files/research_and_innovation/funding/documents/soil_mission_implementation_plan_final_for_publication.pdf

[46] Taxonomy, safe- and- sustainable- by design (SSbD) framework, sustainable products initiative (SPI https://ec.europa.eu/growth/industry/sustainability/sustainable-product-policy-ecodesign_en)

[47] [47] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13172-Certification-of-carbon-removals-EU-rules_en

including energy, and effectiveness on a life-cycle perspective (i.e., durability, reuse, repair, remanufacturing and recycling patterns of bio-based products), other circular aspects.

- Develop monitoring tools of the environmental impacts, iLUC risks, carbon removal potential and circularity of bio-based systems, to measure the pre-set KPIs in CBE JU.
- Develop digital tools for the environmental, sustainability and circularity monitoring such as those of advanced GIS, mobile web, robotics, cloud innovations, etc.
- Perform an assessment of the trade-offs and synergies with economic and social objectives (including geographical distribution aspects, urbanization pressures, etc.) of bio-based systems in the scope of CBE and with competing and adjacent economy sectors in the bioeconomy (e.g., food and feed, biofuels and bioenergy), as well as with the fossil-based industrial systems.
- Collect and analyse the (range of) best available industrial bio-based systems in the scope of CBE JU within the EU in terms of environmental and circular performances, to build a preliminary set of benchmarks or references of best performing industrial systems for similar ones.
- Disseminate the results of the developed methods to assess and monitor the environmental impacts, the iLUC risks, the circularity and the carbon removal potential of bio-based systems, as well as results from the collection of best available industrial bio-based systems. All results should be publicly available, following the principles of open science (FAIR data) and using of the possibilities offered by the European Open Science Cloud (EOSC) to store and give access to research data.
- Explore the possibility to collaborate with and/or provide inputs to the European Commission Knowledge Centre on Bioeconomy[48].
- Consult stakeholders, making use of existing fora for discussion of stakeholders, including policymakers at EU and national levels.
- Develop and disseminate guidelines on the assessment methods and monitoring systems developed in the project and all the outputs from the project to leverage the engagement in deploying the environmental sustainability and circularity criteria of bio-based systems. Targeted stakeholders of dissemination may include policymakers, bio-based industries, bio-based feedstock producers and providers, researchers and innovators, consumers, civil society.
- Proposals may involve financial support to third parties to provide direct support (e.g. in the form of cascading grants) to researchers, developers, SMEs, start-ups and other multidisciplinary actors. A maximum of € 60 000 per third party might be granted. Conditions for third parties support are set out in Part B of the General Annexes. Consortia need to define the selection process of organisations, for which financial support will be granted. Maximum EUR 450 000 of the EU funding can be allocated to this purpose. The financial support to third parties can only be provided in the form of grants.

[48] https://knowledge4policy.ec.europa.eu/bioeconomy/about_en#:~:text=The%20Knowledge%20Centre%20for%20Bioeconomy%20is%20a%20European,and%20filters%20relevant%20information%20and%20makes%20it%20accessible%3B

Consortia of applicants should involve LCA experts and researchers in the bio-based technologies, bio-based industries, trade bodies, consumers' organisations, etc.

International cooperation included with international organisations is encouraged, in order to collect best practices (indicators, methodologies, tools and data) outside EU and to expand the outreach of projects outputs.

Additional Requirements

In addition to the specific requirements set at topic level, the proposals must address the additional requirements that are standard for the respective action(s). Rather than repeating these standard requirements in each topic, they are presented in this section per type of action.

Complementarity and synergies with other projects

All types of action: proposals should build on and seek complementarity and demonstrate synergies with finalised or ongoing projects funded under Horizon 2020 (including the BBI JU programme) and Horizon Europe or other funding schemes, either European or national, with the aim to avoid overlap and promote synergies to advance beyond the state of the art.

The proposals should reflect awareness of the running/finalised projects in relevant fields to avoid overlap in Part B under section 1.1 Objectives and ambition.

Feedstock

Eligibility condition: All RIAs and IAs, including Flagships: proposals shall confirm in Part B[49] that:

- in case they foresee industrial operations located in EU/EEA/EFTA countries, the bio-based feedstock comes from such countries[50];
- in case they foresee industrial operations located in an Associated Country, the bio-based feedstock comes from the same country or from neighbouring EU/EEA/EFTA countries.

All RIAs and IAs, including Flagships: under Part B section 1.1 Objectives and ambition and 1.2. Methodology, the proposals should describe the feedstock to be used in the project and ensure that the feedstock:

- is under the scope of the feedstocks foreseen in CBE JU SRIA (including Annex V);
- respects the “cascading use”(*) and “food first” (**)principles.

(*) The cascading use of biomass entails maximising the resource-use efficiency by prioritising the processing steps by value creation.

(**) In line with the ‘food first’ principle, the CBE projects should aim to develop and deploy bio-based solutions to valorise biomass (primary, residual or waste) that cannot be used for food/feed production or consumption. In this context, biomass that can be placed on the market for food purposes shall not be used as feedstock in CBE projects, except if this biomass is a surplus. Surplus is unplanned production that cannot be sold on food or feed market without causing economic loss or market distortions.

Environmental sustainability requirements

a) **All RIAs and IAs, including Flagships**: proposals should demonstrate that the feedstock is produced respecting local ecological limits, and considering protection and enhancement of

[49] Specific question

[50] Bio-based feedstock may include bio-waste from imported products. A non-exhaustive list of bio-based feedstock in the scope of CBE is included in Annex V of SRIA.

biodiversity and ecosystems services. As much as possible, the feedstock should come from short supply chains. In addition, to ensure the environmental sustainability of feedstock, the proposal should confirm in the Part B that, if funded, it will comply with the following: Climate change mitigation:

i. will not impact 'Land with high carbon stock'[51]
ii. will have low/zero ILUC.

b) Biodiversity protection:
   i. will not use high-risk Plant Production Products (PPPs)[52]
   ii. will not include harvesting impacting on biodiversity in forests[53]
   iii. will not introduce invasive species[54]
   iv. will not impact land with high biodiversity and marine protected areas[55].

c) Zero pollution ambition (air/water/soil):
   i. will avoid open air burning of stubble/crop residues
   ii. will use pesticides and fertilisers within the limits set by the organic farming framework[56]
   iii. will not spread manure in forestry.

d) Water resources protection:
   iv. will not deplete surface or groundwater resources beyond replenishment capacities.

All RIAs and IAs, including Flagship: proposals should fulfil the 'Do No Significant Harm' principle[57] and demonstrate that their project, if funded, will not carry out activities that make a significant harm to any of the six environmental objectives listed in Article 9 of the EU Taxonomy Regulation[58] (as defined in Article 17 which specifies what can constitute a 'significant harm' for these objectives).

In addition, they should include as part of the proposal in Part B under section 1.1 Objectives and ambition and 1.2. Methodology:

- An identification of the environmental critical issues early on and the explanation on how the projects will steer the development process in the right direction

- An ex-ante estimation of the environmental sustainability performance (including climate neutrality and zero pollution) and circularity of the proposed processes/products, compared to benchmark(s) selected by the consortium and described in the proposal. The benchmark(s) should be based on the best performing processes/products and should be duly justified in the proposal. The proposal should demonstrate improvements of environmental performances compared to the selected benchmark(s).

[51] https://knowledge4policy.ec.europa.eu/glossary-item/land-high-carbon-stock_en
[52] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R2019&from=EN
[53] According with the Biodiversity strategy and the Forest strategy for 2030 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0572&from=EN
[54] https://ec.europa.eu/environment/nature/invasivealien/index_en.htm
[55] According to Natura 2000 framework https://ec.europa.eu/environment/nature/natura2000/index_en.htm
[56] https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming_en
[57] programme-guide_horizon_en.pdf (europa.eu)
[58] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0852&from=EN

- A preliminary assessment of the carbon removal[59] (i.e., CCU* and/or CCS*) potential, if applicable.

In addition, proposals should include as part of the **project** an **ex-post assessment** of the **environmental sustainability and circularity** of all the products and processes developed and of their improvements compared with benchmark(s). More specifically:

- **RIAs**: proposals should include a dedicated task to use the early stage data to assess the potential improvements of the environmental performances of processes/products developed in the project.

- **IAs:** proposals should include a dedicated work package or task to assess ex-post the environmental impacts and circularity of the products or processes developed, using LCA methodologies, as part of the project.

- **Flagship:** proposals should include a dedicated work package or task for full assessment of the environmental impacts and circularity of the developed products or processes, using life-cycle-sustainability assessment (LCSA) methodologies, as part of the project.

The **life-cycle assessment (LCA)** and **life-cycle-sustainability assessment (LCSA)** methodologies should be based on widely used standards and certifications, and they should make use of accepted and validated approaches[60]. They should use Commission recommendations and the European norms, technical reports and technical specifications. In particular, LCAs should use the standards developed by CEN/TC 411 for bio-based products[61].

All IAs, including Flagship: proposals should ensure the publication of the outputs of LCA of environmental impacts following the principles of open science (FAIR data) and using the possibilities offered by the European Open Science Cloud (EOSC) to store and give access to research data. This should be performed e.g., through the publication of peer-review scientific papers, and/or the uploading of data of the life cycle inventory (LCI) to the EOSC database, and/or sharing the data and the outputs with the European Knowledge Centre for Bioeconomy[48].

Business cases, business models and business plan (*see definitions in the Glossary*)

- **RIA:** Proposals should include in Part B under section 2. Impacts a check of the economic viability of the products and processes to be developed (including an analysis of the value chain and potential market for the envisaged products).

[59] The estimation should consider the instructions from the EU framework for the certification of Carbon Removals when it will be made available (under development). See the Commission Communication on 'Sustainable Carbon Cycles', and the European Climate Law (Regulation (EU) 2021/1119). The carbon removals described int the Communication include 'recycle carbon from waste streams, from sustainable sources of biomass…to use it in place of fossil carbon in the sectors of the economy that will inevitably remain carbon dependent…promote technological solutions for carbon capture and use (CCU) and the production of sustainable synthetic fuels or other non-fossil based carbon products… upscale carbon removal solutions that capture CO2 from the atmosphere and store it for the long term, either in ecosystems through nature protection and carbon farming solutions or in other storage forms through industrial solutions'

[60] See 'Life cycle thinking and the use of LCA in policies around the world', 2017.

[61] European Committee for Standardisation Technical Committee 411 on bio-based products (https://standards.cen.eu/dyn/www/f?p=204:32:0::::FSP_ORG_ID,FSP_LANG_ID:874780.25&cs=1D63BAA7EABE56EB230DDAA05D6F2CE70)

- **IA, including Flagship:** Proposals should be based on a sound business case and should present in Part B under section 2. Impacts their business case together with the specifications of an inclusive business model, covering all actors of the value chain (from feedstock providers through to the final sellers).

- **Flagship:** in addition to the above, proposals should include a detailed preliminary business plan in a separate Annex.

Multi-actor approach

All IAs, including Flagship and RIAs when explicitly mentioned in the topic text: proposals should include the multi-actual approach and describe it in Part B under section 1.2. Methodology.

The multi-actor approach is a form of responsible research and innovation, aims to make the R&I process and its outcomes more demand-driven, reliable, and relevant to society. This is more than just widely disseminating the results of a project or listening to the views of a board of stakeholders. A multi-actor project ensures the genuine and sufficient involvement of a targeted array of actors which serves the objectives of the topic and cover all the value chain from the bio-based feedstock suppliers to the (end-) **users of the project results**. Which relevant key actors participate depends on the objective of the topic and of the proposal.

Among the actors to be considered there are: farmers / farmers' groups, foresters / foresters' groups, aquaculture producers, fishermen / fishermen's groups, advisors, technology suppliers and developers, businesses, brand-owners, consumer associations, local communities, citizens, civil society organisations including NGOs, government representatives, etc.

The genuine and sufficient involvement of such actors should take place **all over the whole course of the project**: from participation in project ideation, planning and experiments to implementation, dissemination of results and a possible demonstration phase. Building blocks for the project proposal are expected to come from science as well as from practice and from intermediaries: it is a 'co-creation' process.

End-users are to be involved, not as a study-object, but to use their practical and local knowledge and/or entrepreneurial skills to develop solutions and create 'co-ownership' of results for (end-) users. This should speed up the acceptance and uptake of new ideas, approaches and solutions developed in the project.

Therefore, a **multi-actor project proposal must demonstrate**:

- How the proposed project proposal's objectives and planning are targeting the needs/problems and opportunities of the (end-)users of the project results.

- How the description of the project concept and, in particular, the composition of the consortium reflects a balanced choice of key relevant actors in the value chain who have complementary types of knowledge (scientific and practical) and will ensure a broad implementation of project results which should be useful in practice.

- How the project intends to include existing practices and tacit knowledge in scientific work. This should be illustrated in the project proposal with enough high-quality knowledge exchange activities indicating the precise and active roles of the different non-scientific

actors in the work. Thanks to the cross-fertilisation of skills, competencies, and ideas between actors, this should generate innovative findings and solutions that are more likely to be applied on a broad scale.

- How the project will facilitate the multi-actor engagement process by making use of the most appropriate methodologies.
- The project's added value: how the project will complement existing research and best practices.
- The proposal should demonstrate how the project will result in practical knowledge, approaches, or tools, made that are easily understandable, and accessible and useable and how this free material for practice will feed into the existing dissemination channels most consulted by the (end-) users of the project results in the countries and regions.

To ensure EU-wide communication, in areas related to agriculture, forestry and rural communities, this knowledge should also be assembled in a substantial number of 'practice abstracts' in the common EIP format[62] of the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability' (EIP-AGRI). For other topics, the EIP may also be used if they are covered under its innovative areas[63], as may other similarly effective solutions for dissemination at EU level through the main existing dissemination channels targeting (end-)users.

Involvement of interactive innovation groups operating in the EIP-AGRI context, such as EIP-AGRI Operational Groups funded under Rural Development Programmes is strongly recommended.

[62] The EIP common format for "practice abstracts" is available at: https://ec.europa.eu/eip/agriculture/en/content/eip-agri-common-format

[63] For the innovative areas covered by the EIP see section 8 (pp.8-9) of the Commission Communication 2012(79) final: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0079&from=EN

Indicative budgets per topics

Topic	Indicative budget (million EUR)
Innovation actions	
HORIZON-JU-CBE-2022-IA-01 Biogenic carbon capture and use (CCU) for circular bio-based products	10
HORIZON-JU-CBE-2022-IA-02 Cooperative business models for sustainable mobilisation and valorisation of agricultural residues, by-products, and waste in rural areas	10
HORIZON-JU-CBE-2022-IA-03 Cost-effective production routes towards bio-based alternatives to fossil-based chemical building blocks	12
HORIZON-JU-CBE-2022-IA-04 Co-processing of mixed bio-based waste streams	12
Innovation actions – flagship	
HORIZON-JU-CBE-2022-IAFlag-01Maximum valorisation of sustainably sourced bio-based feedstock in multi-product, zero-waste, zero-pollution biorefinery	14
HORIZON-JU-CBE-2022-IAFlag-02Alternative sources for high added value food and/or feed ingredients	14
Research and innovation actions	
HORIZON-JU-CBE-2022-R-01 High performance bio-based polymers for market applications with stringent requirements	9
HORIZON-JU-CBE-2022-R-02 Bio-based coatings, barriers, binders, and adhesives	9
HORIZON-JU-CBE-2022-R-03 Circular-by-design bio-based materials to improve the circularity of complex structures	9
HORIZON-JU-CBE-2022-R-04 Proteins from alternative and unconventional sources	9
HORIZON-JU-CBE-2022-R-05 Sustainable fibres biorefineries feedstock	9
Coordination and support actions	
HORIZON-JU-CBE-2022-S-01 Developing and validating monitoring systems of environmental sustainability and circularity: collection of best practices and benchmarks	3
Total	**120**

2.2.3.1. Conditions of the calls and calls management rules

This section sets the general conditions applicable to calls and topics for grants under this Annual Work Programme. It also describes the evaluation and award procedures and other criteria.

Call management and general conditions

Call identifier:	HORIZON-JU-CBE-2022
Call opening:	22 June 2022[64]
Call deadline:	22 September 2022 17:00:00 (Brussels local time) - (single stage call)
Indicative budget:	EUR 120 million

The call included in this AWP, including evaluation and award procedures, will follow the General Annexes to the Horizon Europe Work Programme 2021–2022 [65] which shall apply mutatis mutandis (with the exceptions introduced in the specific topic conditions). There is no derogation from the Horizon Europe Rules for Participation. If a topic deviates from the general conditions or includes additional conditions, this is explicitly stated under the specific conditions for the topic.

Admissibility conditions	The conditions are described in HE General Annex A.
Eligibility conditions	The conditions are described in HE General Annex B.
Financial and operational capacity and exclusion	The criteria are described in HE General Annex C.
Award criteria	The criteria are described in HE General Annex D.
Documents	The documents are described in HE General Annex E.
Evaluation Procedure	The procedure is described in HE General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in HE General Annex G.

[64] The Executive Director may decide to open the call up to one month prior to or after the envisaged date of publication

[65] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-13general-annexes_horizon-2021-2022_en.pdf

Additional conditions

Admissibility

The conditions are described in Annex A of the General Annexes to the Horizon Europe Work Programme 2021–2022 which shall apply mutatis mutandis to the actions covered in this AWP.

Page limits

- **Innovation Actions**: the page limit of the application is 70 pages (Part B).

Dissemination and Exploitation plan

- **All types of Actions:** A first version of the 'plan for the dissemination and exploitation including communication activities' of the project's results should be included in the Part B of the proposal in line the standard HE application forms. This plan is an admissibility condition, unless the work programme topic explicitly states otherwise.

Eligibility

The conditions, including countries eligible for funding, type of actions and definition of TRL are described in Annex B of the General Annexes to the Horizon Europe Work Programme 2021–2022 which shall apply mutatis mutandis to the actions covered in this Work Programme, taking into consideration the following:

Given the illegal invasion of Ukraine by Russia and the involvement of Belarus, there is currently no appropriate context allowing the implementation of the actions foreseen in this programme with legal entities established in Russia, Belarus, or in non-government controlled territories of Ukraine. Therefore, such legal entities are not eligible to participate in any capacity. Exceptions may be granted on a case-by-case basis for justified reasons. This criterion also applies in cases where the action involves financial support given by grant beneficiaries to third parties established in Russia, Belarus or in non-government controlled territories of Ukraine (in accordance with Article 204 of the Financial Regulation No 2018/1046).

Financial support to third parties

For the topic HORIZON-JU-CBE-2022-S-01, financial support to third parties is foreseen. The conditions of Annex B of the General Annexes to the Horizon Europe Work Programme 2021–2022 applies.

Financial and operational capacity and exclusion criteria

The criteria is described in Annex C of the General Annexes to the Horizon Europe Work Programme 2021–2022 which shall apply mutatis mutandis to the actions covered in this Work Programme.

Award criteria

If admissible and eligible, the proposals will be evaluated and ranked, depending on the type of action, against the award criteria reported in the table below.

- **Innovation Actions:** In bold, it is highlighted the additional sub-criterion that will be used for Innovation Actions, including Flagships.

	Excellence	Impact	Quality and efficiency of the implementation
Coordination and support actions (CSA)	- Clarity and pertinence of the project's objectives. - Quality of the proposed coordination and/or support measures, including soundness of methodology.	- Credibility of the pathways to achieve the expected outcomes and impacts specified in the work programme, and the likely scale and significance of the contributions from the project. - Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.	- Quality and effectiveness of the work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall. - Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.
Research and innovation actions (RIA) **Innovation actions (IA), including Flagships**	- Clarity and pertinence of the project's objectives, and the extent to which the proposed work is ambitious and goes beyond the state of the art. - Soundness of the proposed methodology, including the underlying concepts, models, assumptions, inter-disciplinary approaches, appropriate consideration of the gender dimension in research and innovation content, and the quality of open science practices, including sharing and management of research outputs and engagement of citizens, civil society and end-users where appropriate.		
Innovation actions (IA), including Flagships		- Ability to ensure the level of in-kind contribution to operational activities (IKOP)[66] defined in the call/topic as % of total projects eligible costs (IAs 15% and IA-Flagship 20%)[67]	

Scores and weighting

Evaluation scores will be awarded for the criteria, and not for the different aspects listed in the table above. For full applications, each criterion will be scored out of 5.

- **All Types of Actions:** For the criteria 'excellence' and 'implementation' the threshold will be 3, whereas for the criterion 'impact' the threshold will be 4. The overall threshold, applying to the sum of the three individual scores, will be 11.

[66] Contributions by private members, constituent entities or the affiliated entities of either, by international organisations and by contributing partners, consisting of the eligible costs incurred by them in implementing indirect actions less the contribution of that joint undertaking and of the participating states of that joint undertaking to those costs

[67] Please refer to the Annexes to be included in the proposal described below.

To determine the ranking for all 'Innovation actions' including Flagships, the score for 'Impact' will be given a weight of 1.5.

Proposals that pass the individual threshold AND the overall threshold will be considered for funding, within the limits of the available call budget. Other proposals will be rejected.

Documents

The documents including the submission of proposals are described in Annex A of the General Annexes to the Horizon Europe Work Programme 2021–2022 which shall apply mutatis mutandis to the actions covered in this Work Programme.

Annexes

The following separate Annexes should be included in the Proposal.

- **Innovation Actions:** For all legal entities that are member of the BIC consortium, a certification from BIC attesting this fact should be included in the proposal.
- **Only for Flagship topics:** a detailed business plan.

Evaluation procedure and ranking

The entire evaluation procedure, including indicative timetable for evaluation and for signature of the grant agreement, and ranking are described in Annex F of the General Annexes to the Horizon Europe Work Programme 2021–2022 which shall apply mutatis mutandis to the actions covered in this Work Programme.

Hearings

- **Only for Flagship topics:** As part of the panel review, the CBE JU will organise hearings with applicants of all Flagships proposals.

Indicative timetable for evaluation and for signature of the grant agreement

Unless otherwise stated in the specific call conditions, the timing for evaluation and grant preparation is as follows:

- information on the outcome of the evaluation: around 5 months from the deadline for submission;
- indicative date for the signing of grant agreements: around 8 months from the deadline for submission.

Legal and financial set-up of the grant agreements

The Legal and financial set-up of the grant agreements, including funding rates, are described in Annex G of the General Annexes to the Horizon Europe Work Programme 2021–2022 which shall apply mutatis mutandis to the actions covered in this Work Programme.

Funding rate

- **Innovation actions: up to 60% of the eligible costs** (except for non-profit legal entities, where the funding rate is up to 100% of the total eligible costs)

In addition to the standard provisions, the following specific provisions in the model grant agreement will apply:

IPR-CBE JU right to object

According to the Horizon Europe rules, and as foreseen in article 16 of the Grant Agreement, and in order to protect Union interests, the right for joint undertaking to object to transfers of ownership of results or to grants of an exclusive licence regarding results should apply to participants. Therefore, the provisions set out in General Annex G to the Horizon Europe work programmes on the right to object apply generally. It should be noted that in accordance with the Council Regulation and the MGA, the right to object applies also to participants that have not received funding from the JU and for the periods set therein.

Consortium agreement (ARTICLE 7 of the HE Model Grant Agreement)

In line with Horizon Europe Model Grant Agreement, the consortia of the proposals selected for funding must have internal arrangements set out in a written consortium agreement between the beneficiaries regarding their operation and coordination, to ensure that the action is implemented properly.

Contribution to the monitoring framework of the CBE JU – KPIs projects' reporting

For monitoring the contribution of each project to the CBE JU objectives and indicators, as described in the SRIA, all projects will have to report on an annual basis their KPIs progress during the course of Horizon Europe.

The reporting shall consist of filling a template questionnaire in a secure online data collection platform managed by the CBE Joint Undertaking. The projects will need to submit all information included the questionnaire(s) relevant for their type of action. The submission of the questionnaire(s) shall be integrated as a specific annual deliverable in the grant agreement. The template questionnaire(s) with the KPIs Handbook will be made available online at the time of the publication of this AWP.

2.2.4. Cooperation, synergies and cross-cutting themes and activities

Council Regulation (EU) 2021/2085 and the SRIA establish strong grounds for synergies in particular with other Horizon Europe and Union's initiatives, as well as with other R&I programmes that have an inherent potential for the bio-based sector.

In its first year of establishment, CBE JU will analyse, map and identify R&I initiatives, programmes and funds at the EU, national and regional levels, with which synergies can be built and strengthened. As to maximise the scientific, socio-economic and environmental impacts of the CBE JU actions, a multipronged approach will be pursued:

- at the **EU and European levels**: priority will be given to the appropriate Horizon Europe programmes and partnerships, including co-programmed and institutionalised partnerships, as well as to relevant EIT Knowledge and Innovation Communities (KICs). A particular focus

will be placed on ensuring a legacy with the synergy initiatives carried out successfully under BBI JU.

- at the **national and regional levels**: CBE JU will intensify its interaction with Member States through the States Representatives Group to strengthen further its ability to aggregate and mobilise national and macro regional stakeholders, as to contribute to the adoption of policy and funding initiatives in the bioeconomy field.

- at **operational level**: synergies between and among programmes and instruments can take different forms, ranging from simple information exchange to strategic coordination and co-programming. CBE JU will identify the most appropriate actions for each of the selected initiatives, as to ensure meaningful complementarity and maximise impacts.

2.3. SUPPORT TO OPERATIONS

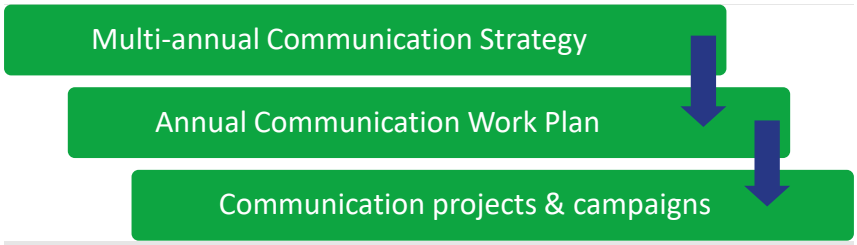
2.3.1. Communication, dissemination and exploitation

CBE JU communication: a strategic approach

Communication activities support CBE JU's strategic goals by:

- Raising awareness about bio-based industries and engaging with its stakeholders;
- Promoting the CBE JU and its funding opportunities;
- Highlighting the achievements of CBE JU's predecessor, BBI JU.

The Annual Communication Work Programme is based on the multi-annual Communication and Stakeholder Management Strategy. It provides a list of communication activities under each objective, along with the communication channels and budget.



Communication priorities in 2022

In the first year of CBE JU, a large part of the communication efforts will be dedicated to updating the communication strategy, tools and channels to the objectives of the new organisation.

Raising awareness about different aspects of CBE JU to various stakeholder communities (potential applicants, beneficiaries, decision makers,…), as well as promoting the funding opportunities will be at the heart of CBE JU's communication.

Lastly, CBE JU will focus on highlighting the achievements of the 140+ BBI JU-funded projects and the environmental and socio-economic impacts of BBI JU, placing them in the context of the European Green Deal and other relevant policies, such as the EU Bioeconomy Strategy, the EU Biodiversity Strategy, the Farm to Fork Strategy and the Circular Economy Action Plan.

Strengthening and widening the communication channels and networks will provide additional support to these activities.

- **Updating the communication strategy, tools and channels**

In the first part of the year, CBE JU will carry out evaluation of the previous communication activities in view of creating a new communication policy and strategy. Communication tools and channels will adapt to the objectives, new visual identity and messaging of the organisation.

- **Promoting the new partnership**

Raising awareness about different aspects of CBE JU to various stakeholder communities (potential applicants, beneficiaries, decision makers,…) will be an important part of CBE JU's communication efforts in 2022. The new partnership will be promoted via CBE JU's digital channels, at events and exhibitions, and via the large CBE JU's ambassador network (BBI JU-funded projects, members of the Governing Board and advisory bodies, relevant Commission services, National Contact Points, etc.). CBE JU will strive to reach audiences beyond its current stakeholder groups, in particular at national and regional level, by investing in public relations and advocacy. Lastly, an event to celebrate the full establishment of the joint undertaking will take place in the first half of the year.

- **Promoting CBE JU funding opportunities**

Promoting the first CBE JU Call will be at the heart of the 2022 communications. The call will be promoted on CBE JU's digital channels with the help of a dedicated call page and publication, as well as other useful material. The CBE JU Info Day will take place in virtual format in the first half of the year and will provide networking opportunities for potential applicants via an online platform. CBE JU will take part in national and regional info days across Europe and will pay particular attention to good geographical distribution, in line with the Widening Participation Strategy. Funding opportunities will be promoted at every high-level event with CBE JU's participation.

- **Promoting the achievements of BBI JU-funded projects**

By 2022, around 90 BBI JU-funded projects will have reached an important level of maturity or successful end. A new package of success stories featuring these projects will be prepared in collaboration with the Commission services and communicated via the CBE JU, Commission, BIC and other channels. Project factsheets on the BBI JU website will be updated to reflect the latest achievements. The collection of bio-based products produced by BBI JU-funded projects will be renewed in view of setting up a permanent exhibition in the CBE JU Programme Office and showcasing at events, when possible. A digital campaign will highlight the products throughout the year. The second edition of the BBI JU Photo Competition will be launched to promote the achievements of the projects through a collection of captivating pictures.

- **Highlighting the impacts of the BBI JU initiative, in line with relevant EU policies**

In 2022, the CBE JU will continue highlighting the environmental and socio-economic impacts of the initiative based on the KPIs reported in the AAR and analysis of the project portfolio through an integrated communication campaign. Examples of the initiative's added value for regions and people, as well as its use in the daily life of the EU citizens will support the campaign. Communication about the BBI JU's investment in different countries will be shared throughout the year. CBE JU will also continue preparing communication packages on the contribution of the initiative to relevant EU policies, with a focus on those launched in 2022, such as the EU Strategy for Sustainable Textiles. The current communication on the contribution to the EU policies will be updated and shared on relevant dates in the EU policy agenda, in collaboration with Commission services and BIC.

- **Boosting the impact of CBE JU communication**

Increased engagement with the CBE JU's wide stakeholder community via digital channels and events will improve the communication results and help raise awareness about the CBE JU. In particular, the preparatory steps towards a permanent CBE JU stakeholder forum will be taken in 2022.

CBE JU Programme Office will continue its close collaboration with the EC services and BIC for a higher impact of the communication activities. Strengthening collaboration on communication with the wide network of CBE JU ambassadors will ensure an increased reach in regions and strengthen CBE JU's media outreach.

Communication tools and channels

The new CBE JU **website** will be the main information hub. All communication activities will link to its content. In 2022, the second phase of the website development will focus on automating content management (e.g. for project factsheets) and adding new features (e.g. navigation for success stories). CBE JU **newsletter and social media** accounts (Twitter, LinkedIn, YouTube) will drive CBE JU's digital communication and support campaigns. Increasing the follower base and reaching higher engagement rate on these channels will be a priority action in 2022.

A slow return to physical **events** with enhanced networking opportunities will mark a turning point in the communication activities globally. CBE JU will embrace this chance to connect with its community and showcase the partnership at national, European and international events. The events organised by CBE JU will however provide a remote participation option for those who cannot attend in person.

Public relations and advocacy will target CBE JU's stakeholders in support to the communication priorities. **Media relations** will receive a boost, via building new partnerships and enhancing the existing ones. A dedicated section on the CBE JU website will support this channel.

Indicative budget

Title	Description	Amount, €
Events and campaigns	Organisation of CBE JU Info Day and celebration event, participation in at least 15 key events, organisation of awareness raising and networking events, campaigns	350,000.00
Communication material	Publications, videos, promotional material	40,000.00
Communication tools	Website, digital dissemination tools, networking and stakeholder management tools, communication equipment	120,000.00
Public relations	Media relations and partnerships, prizes, sponsorship, branding	45,000.00
Total		**555,000.00**

Indicative list of events

Event	Date(s)	Place	CBE JU role
EU Industry Days	8-11 February	Brussels, Belgium	Speaker
BIOKET 2022	15-17 March	Lille, France	Speaker
Rethinking Materials Summit	4-5 May	London, UK & online	Speaker
EUBCE	9-12 May	Marseille, France	Speaker, member of the Organising Committee
EU Green Week	30 May-6 June	Brussels, Belgium	TBC
CBE JU Info Day	7 June	Online	Organiser
International Congress on Biomass	6-7 July	Brussels, Belgium	Speaker
ESOF 2022	13-16 July	Leiden, the Netherlands	TBC
World Bioeconomy Forum and roundtables 2022	7-9 September	TBC	TBC
EUCYS award ceremony	13-18 September	Leiden, the Netherlands	Sponsor of the bioeconomy award
EU Bioeconomy conference	6-7 October	Brussels, Belgium	TBC
CBE JU celebration event	27 September	Brussels, Belgium	Organiser
R&I Days	28-29 September	Brussels, Belgium	TBC
IFIB 2022	29-30 September	TBC	TBC
EFIB 2022	26-27 October	Vilnius, Lithuania	TBC
ECOMONDO	8-11 November	Rimini, Italy	Speaker
Plant Based Summit	TBC	TBC	TBC
Wood Industry Summit 2021	TBC	TBC	TBC
European Week of Regions and Cities	TBC	TBC	TBC

2.3.2. Procurement and contracts

For the year 2022 the CBE JU will implement its administrative budget also by means of procurement procedures and contracts, supporting the administrative and operations services in

accordance with its financial rules[68]. It is essential that the CBE JU makes the most efficient use of its resources by using existing framework contracts and service level agreements (SLAs) with EC services. The extensive use of the existing contracts provides a lighter solution in terms of workload and the possibility to rely on quality service providers.

When framework contracts or SLAs are not available, CBE JU will need to launch individual procurement procedures in order to obtain desired services and implement its AWP effectively.

The table below provides a summary of tenders planned for 2022 under administrative budget and the related procurement procedure expected to be used on the basis of the information currently available. It may be subject to modifications.

Subject	Indicative/Maximum amount, €	Type of procedure	Indicative timeline
Media campaigns and events (information and awareness raising events; online campaigns)	Up to 350.000,00	FWC/SLA and public procurement	Q1-Q4
[69]CBE JU FWC Communication: events, social media, copywriting, graphic design and videos	Up to 2,300,225	Open	Q4
Communication material (Publications, videos, promotional material)	Up to 65.000,00	FWC/SLA and public procurement	Q1-Q4
Communication tools (website, digital dissemination tools, networking tools, communication equipment)	Up to 120.000,00	FWC/SLA or public procurement	Q1-Q4
Public relations including media support	Up to 50.000,00	FWC/SLA and public procurement	Q1-Q4
Integrated IT tool to collect, monitor and elaborate information on projects KPIs	Up to 200.000,00	FWC/SLA	Q2-Q3
Upgrade of common meeting rooms for hybrid meetings	Up to 60.000,00	FWC/SLA	Q1-Q2

[68] https://www.bbi.europa.eu/sites/default/files/BBI_GB_12_19_revised_Financial_Rules.pdf
[69] FWC to be launched by CBE JU and that will cover all the communications activities of the initiative

2.3.3. Other support operations

2.3.3.1. IT and logistics

Cloud/Office 365/Intranet

The CBE JU continues the roll-out of cloud-based services. Based on the outcome of the Data Protection Impact Assessment conducted, the CBE JU will continue to work towards the finalisation of the migration of the email and file services to the cloud in 2022, to improve availability and accessibility of these two essential IT services.

The CBE JU's Intranet will continue its evolution, especially in a context of possible extended telework period. This tool has proved its effectiveness and has been a solid platform for BBI JU staff in 2021. The extended use of Sharepoint will allow the CBE JU staff to share documents and work simultaneously online enjoying the full capabilities of Microsoft 365 (previously Office 365) and its online applications.

On this point, the enhanced use of Microsoft 365 will be an important activity of 2022, including the implementation of data protection and security measures to mitigate some residual risks detected in the data protection impacts assessment performed before its deployment.

New IT services FWC

In 2022 the current IT services FWC, concluded in 2018 with Realdolmen, after an open procedure led by Clean Hydrogen JU on behalf of the 6 Joint Undertakings in the White Atrium building, comes to end. During the year, a new public procurement has to be launched and concluded, to provide continuity of the shared managed IT services (user support, infrastructure support, printing, email, etc.) to the 6 JUs.

Unified communications

The cloud-based unified communications solution Microsoft Teams has been put in place to improve collaboration and teamwork while keeping a high level of security. Despite being initially foreseen as a pilot project, this tool provided a flexible platform to share and discuss work-related documents, facilitate knowledge transfer, enable easy-to-setup online meetings internally and involving external participants, and more. In 2022, the use of this tool will be enhanced and complemented by other IT tools supporting on line work, meetings and trainings. Integration with the telephone infrastructure located in the White Atrium building is also foreseen, to allow the availability of the same services both at the office and when working remotely.

New Cyber-security and information security regulations

The Union institutions, bodies and agencies have been preparing new regulations on measures for a high common level of cybersecurity and information security. The entry into force is expected in early 2022. They will be binding and mandatory. As stated in Article 4, Agencies shall establish an internal cybersecurity risk management, governance and control framework that ensures an

effective and prudent management of all cybersecurity risks. The framework shall be in place no later than 15 months after the entry into force of this Regulation. Having regard of the above, the CBE JU will have to start preparatory work to be able to comply with these regulations.

NWOW/Meeting rooms adaptation to hybrid working

Following the “return to office” from the COVID-19 home working scenario, the CBE JU must adapt its facilities to accommodate the new ways of working (NWOW) in the most efficient manner possible. ICT services and equipment must support this approach and provide solutions to the previously unknown requirements, like hybrid working, hot desking, etc.

CBE JU KPI reporting tool

After the completion of a study project, the implementation of the KPI data gathering and reporting tool is foreseen to take place in 2022. The new tool is going to facilitate the work of the programme office by automating most of the tasks throughout the KPI reporting.

The study project will result in a precise list of requirements and a recommendation on the platform to build the tool upon, based on all the CBE JU’s criteria.

Both the study project and the implementation project will be procured under DIGIT framework contracts.

Paper-less office

The CBE JU is looking into possibilities to integrate the Qualified Electronic Certificates in ARES, to allow for a full paper-less signatory chain.

2.3.3.2. Office refurbishment

The CBE JU plans to adapt the office structure and equipment to the new ways of working of the European Institutions after the pandemic. In line with the European Commission approach, telework will be extended and the office space has to be revised in order to favour a more dynamic interaction among colleagues, increasing the meeting spaces, making the best use of common working spaces. The CBE JU premises will offer to staff and guests a new experience based on flexible workspaces, equipped for hybrid working allowing physical presence and remote work. In this context also the common meeting rooms in White Atrium will be upgraded offering hybrid and flexible solutions for large meetings.

The works on the offices areas to adapt them to the NWOW are managed and budgeted by the building owner in accordance with the “Convention d’Usufruit of 16 November 2010”, amendment to include the BBI-CBE JU in 2014. The costs linked with these works are budget under the building chapter for 2022. At the same time – and jointly with the JUs located in White Atrium – CBE is exploring the options concerning the permanence in the same building or for launching a new procurement procedure for a new building from 2025, when the current contract will expire.

2.3.3.3. Human resources

HR management

The CBE JU Programme Office will continue implementing its activities in compliance with the applicable rules and procedures to support the appropriate management of public and private funds, under the leadership of the Executive Director who is the Chief Executive responsible for the day-to-day management of the CBE JU in accordance with the decisions of the Governing Board.

In the HR domain, the CBE JU aims to achieve its goals through effective recruitment procedures, proper allocation and administration of resources and in developing, motivating and retaining valuable/high qualified staff while maintaining an optimal and efficient working environment.

In the current context and in the foreseeable future, health and safety of staff remain the top priority for the Programme Office. Since the start of the pandemic, the CBE JU provided staff with the tools and conditions to perform their tasks in an optimal way. By providing a reliable IT infrastructure, IT equipment and IT tools for shared remote working, lending ergonomic furniture and materials, staff is in condition to enjoy full flexibility for what concern the remote work and the presence in office. At the same time, the Programme Office will continue to maintain high attention to the vaccination campaign launched by the EU institutions in order to ensure the best coverage in terms of vaccination from the COVID-19. Office cleaning and air conditioning will be closely monitored and presence in office will be conditioned to a strict respect of the safety and health measures agreed among the JUs in White Atrium and in line with the EC approach. Staff will be have been provided with personal protective material (masks, hydro-alcoholic gel, disinfectant wipes etc.) that is at their disposal in the office.

To prepare the return to the office the Programme Office will provide staff with clear guidelines and framework in order to allow the staff to enjoy the new work experience in the New Ways of Working.

This objective will be implemented in four main HR areas:

Staff implementation and recruitment

The CBE JU will welcome 6 additional staff members reaching its full staff establishment plan thanks to the recruitment procedure launched in 2021 to establish a reserve list for project officers.

The CBE JU will give the opportunity to trainees to acquire a first-hand experience as well as an understanding of the objectives and activities of the JU. With these traineeships, the CBE JU will benefit from the input of enthusiastic young graduates, who can give a fresh point of view and up-to-date academic knowledge, which will further enhance the everyday work of the JU.

The HR function will also perform an analysis on how the Programme Office should evolve in the near future in terms of staff allocation ensuring that the organisation achieve its objectives.

Legal matters and HR management

In 2022, the CBE JU will continue from where BBI JU left off, to develop its internal guidelines and strengthen its legal framework, paying particular attention to how EC staff implementing rules apply to the JU particularities. The Programme Office will also organise an annual appraisal and reclassification exercise.

New staff implementing rules are expected to be adopted in 2022 in consultation with DG HR and the Standing Working Party[70].

Learning and development opportunities for better efficiency and staff engagement and motivation

The CBE JU promotes the continuous development of its staff to ensure that they are competent in their roles and can respond to the challenges of their job in fast changing world. Learning and development is also a tool to engage staff, ensuring their professional growth. Learning and development is an integral part of the CBE JU human resources policy and serves the interests of both the individual and the organisation. Therefore, in 2022 the HR function will continue to develop a learning and development framework focusing on the following priorities:

- **Collaborative working and knowledge-sharing** in order to favour effective teamwork across the whole organisation;
- Improve the capacity of staff members to **communicate** effectively among themselves and with external stakeholders;
- **Vision, leadership** and effective **management** of people, projects and processes in an increasingly complex world, with increasing pressure on staff;
- **Staff well-being** in order to foster the quality and safety of the staff in the working environment and to maintain their wellbeing while teleworking from home in the context of the new ways of working and the hybrid return to the office. Staff well-being is a key factor in determining the CBE JU long term effectiveness.

The HR function will also organise coaching opportunities for specific key functions and team coaching to help staff to develop their growth and potential within the organisation. Moreover, teambuilding activities will be organised in order to foster and promote team spirit and strengthen the collaboration among staff members. It wil be a good opportunity for staff to reconnect after the physical isolation imposed by the pandemic and thus creating a strong sense of belonging. In addition to this, several common learning events will be organised in house in order to build common working methods and to further foster the cohesion in the team. Tailor-made trainings will be organised to reinforce the knowledge and use of IT tools as part of the digitalisation of our processes (e.g.: ARES, SYSPER, SYSTAL…).

The HR function will also continue to improve the CBE JU Intranet to improve the communication within the team and facilitate the access to key documents for staff. In addition, the HR function will continue to build on the CBE JU agreed corporate values and these values will be integrated in the staff assessment process. A Staff Engagement Survey will be organised to gain insight into

[70] The Standing Working Party, composed of DG HR, representatives of agencies and partner DGs, has been created by the Commission to discuss and draft implementing rules to the Staff Regulations in agencies, allowing the harmonisation of HR rules in the agencies network.

job satisfaction, employee commitment, engagement and motivation. The aim of our annual staff engagement survey is to use the insight gained, to address possible issues and to make targeted improvements where necessary.

Digitalisation of the HR processes and transition to the New Ways Of Working post COVID19 (NWOW)

In 2022, the HR function will continue to implement the digitalisation of the CBE JU HR processes. In that respect, the HR function will reinforce the use of the following IT tools:

- SYSTAL: an innovative recruitment solution, aiming to better attract, source and select talented staff, trainees and seconded experts. The solution includes a recruitment tool capable to support the CBE JU recruitment team as well as to improve the candidates' experience of a selection process. The new tool is on the cloud and it's designed to facilitate the selection process for applicants and selection committee members.
- SYSPER: the use of this EC HR Management tool will be extended to staff performance management (for probation periods and hopefully for annual appraisals);
- NDP: Numerisation des Dossiers Personnels. The HR function started in 2021 with the digitalisation all its personnel files. The objective is to finalise the project by the end of 2022.

In 2022, the HR function will finalise the work with an architect to design the CBE JU office space taking into account the following elements:

- The NWOW post COVID19 and hybrid way of working;
- The reinforcement of teleworking for all staff.

Once the project will be approved, the works to revise the office space will be launched through the building usufruct contract. The aim it to finalise the works by Q3 2022.

2.3.3.4. Strategy for achieving efficiency gains and synergies

In 2022, the CBE JU will continue from its predecessor BBI JU, to collaborate with the other JUs in order to find additional synergies. The collaboration will also continue with the agency network and the EC HR support services (DG HR and PMO) with participation of the HR function to different working groups. This will be particularly important in the light of the new ways of working. The HR function will also continue to follow the evolution of the new HR strategy of the European Commission.

For what concerns the CBE internal procedures, the Programme Office will continue to implement the action agreed in 2021 in the context of the KaiZen project. As an example, public procurement workflows will be simplified achieving efficiency gains and more flexible expense procedures will allow shorter workflows. Also on the grant side, a reinforced cooperation between project officers and financial officers will be implemented, allowing a faster and more efficient processing of transactions. These measures will allow operational services to be more agile and financial officers provide stronger support upfront, speeding up the processing of routine transactions.

For what concerns the collaborations and synergies with other JUs and in line with the existing collaborations, CBE JU programme office will take action in several areas of common interest:

- Selection of JUs' confidential counsellors: CBE JU will be the lead service for the launching of the new call for expression of intertest for confidential counsellors and the coordination of the inter-JU network in this area. CBE JU is also ensuring the coherence with the implementing rules about disciplinary proceedings and the coordination with the EUAN

- Maintenance and improvement of SYSTAL: after leading the implementation of SYSTAL for four Joint undertakings in 2021, CBE JU will coordinate the improvement of this HR tool and possible updates request to the contractor.

- IT service contract renewal: in 2022 the IT service contract will expire and will have to be renewed and possibly a new procurement procedure will have to be launched in order to obtain IT services beyond 2023.

- Upgrade of meeting rooms for hybrid working: considering the changes brought by the pandemic, the JUs are exploring the possibility to upgrade the existing meeting rooms in order to have a better performance for what concerns the hybrid meetings. This will be a joint action from all JUs and its importance in budgetary terms is conditioned to the permanence in the White Atrium beyond 2024.

- Management of the building contract/renewal: as explained above, the JUs are currently negotiating the possibility to renew the existing usufruct contract to remain in the same building and at the same time are exploring the other possible options. Given the short time frame and the legal constraints, a decision will have to be taken in 2022.

- Accounting officers' arrangement among the JUs: the unilateral decision of DG BUDG to stop the accounting services is forcing the JUs to find alternative solutions to ensure

efficient and reliable finalisation of the JUs' accounts. In the context of the Common back officer arrangements – see below – the JUs will propose a joint solution to the respective Governing Boards in order to manage the transition and to ensure a reliable and correct finalisation of the accounts in early 2023. In this context, DG BUDG is offering two additional contractual agents to the JUs to manage such service and they will be allocated in the most efficient way.

For what concerns the Common Back Office arrangements foreseen by the Single Basic Act, the JUs will continue to work jointly in order to identify the areas where better efficiency and effectiveness can be ensured by common services. As stated in the SBA text, the JUs will proceed with a screening of resources and a check on the viability of this solution in order to have arrangements in place by the end of November 2022. Particular attention will be given to solutions that guarantee an equivalent level of protection of the financial interest of the Union and respect the accountability of each Authorising officer.

2.3.3.5. Staff establishment plan

Function group and grade	2021				2022	
	Authorised budget		Actually filled as of 31/12		Authorised budget	
	Permanent posts	Temporary posts	Permanent posts	Temporary posts	Permanent posts	Temporary posts
AD 16						
AD 15						
AD 14		1		1		1
AD 13		2		1		2
AD 12				1		
AD 11						
AD 10						
AD 9		2		2		3
AD 8		3		3		4
AD 7		2		2		
AD 6						
AD 5						
TOTAL AD		10		10		10
AST 11						
AST10						
AST 9						
AST 8						
AST 7						
AST 6						
AST 5		2		1		2
AST 4				1		
AST 3		1				
AST 2				1		1
AST 1						
TOTAL AST						
AST/SC 6						
AST/SC 5						
AST/SC 4						
AST/SC 3						
AST/SC 2						
AST/SC 1						
TOTAL AST/SC						
TOTAL AD+AST+ AST/SC						
GRAND TOTAL						

Contract Agents	FTE corresponding to the authorised budget 2021	Executed FTE as of 31/12/2021	Headcount as of 31/12/2021	FTE corresponding to the authorised budget 2022
Function Group IV	5	5	5	10
Function Group III	5	4	4	6
Function Group III				
Function Group I				
TOTAL	10	9	9	16

Seconded National Experts	FTE corresponding to the authorised budget 2021	Executed FTE as of 31/12/2021	Headcount as of 31/12/2021	FTE corresponding to the authorised budget 2022	FTE corresponding to the authorised budget 2023
TOTAL					

Recruitment forecasts 2022 following retirement/mobility or new requested posts					
Job title in the JU	Type of contract (Official, CA, TA)		TA/Official		CA
			Function group/grade of recruitment internal (Brackets) and external (single grade) foreseen for publication		Recruitment Function Group (I, II, III and IV)
	Due to foreseen retirement/ mobility	New post requested due to additional tasks[71]	Internal (brackets)	External (brackets)	
	1	6			7

[71] As included in the legal and financial statement of the Council Regulation (EU) 2021/2085, of 19 November

2.4. GOVERNANCE ACTIVITIES

2.4.1. Governing Board

CBE JU's Governing Board has overall responsibility for the strategic orientation and the operations of the CBE JU and shall supervise the implementation of its activities in accordance with Article 17 of the Council Regulation (EU) 2021/2085.

The GB is composed of five representatives of the European Commission on behalf of the EU, and five representatives of BIC.

The indicative key decisions of the GB in the year 2022 are listed below:

Key decisions in 2022 – timetable	**Quarter (Q1, Q2, Q3, Q4)**
Adoption of the SRIA	Q2
Adoption of the amended AWP for 2022	Q2
Assessment of the Annual Activity Report for 2021	Q2
Adoption of the AWP for 2023	Q4

2.4.2. Executive Director

The Executive Director is the chief executive responsible for the day-to-day management of the CBE JU in accordance with the decisions of the Governing Board. The CBE JU Executive Director shall, in accordance with Article 174(11) of Council Regulation (EU) 2021/2085, for its remaining term of office[72], be assigned to the functions of Executive Director of the CBE JU.

During the first CBE JU Governing Board meeting in December 2021, the Executive Director proposed the following priorities for 2022:

1. Finalise the transition BBI-CBE JU under Horizon Europe with all governance bodies in place;
2. Set up the CBE JU organisation and implement the New Ways Of Working;
3. Agree upon monitoring systems to report on output, outcome and financial contribution, and submit them to the Governing Board for approval;
4. Keep CBE JU operational standards at the highest quality and ensure efficiency to absorb the 2022 workload linked with the transition phase and new missions expected by CBE JU;
5. Prepare, launch, promote and evaluate the call 2022 explaining all the novelties linked to the new programme as compared to BBI JU;

For each priority the management has defined the timeline and elaborated objectives for the organisation that will be cascaded into individual objectives for the CBE JU staff.

[72] The Executive Director ends its mandate in Q4 2022.

2.4.3. States Representatives Group

The States Representatives Group (SRG) is one of the advisory bodies of CBE JU. In line with Article 20 of the of the Council Regulation (EU) 2021/2085, the SRG provides recommendations and the opinion of EU's Member States and associated countries on the operations of CBE JU, including: the progress of the programme implementation, the SRIA, the draft programmes, the annual activity report, as well as other measures taken to address specific objectives of the initiative.

According to the Council Regulation, each Member State and associated country can nominate up to two representatives and up to two alternates. The names of the SRG representatives are published in the CBE JU website, together with their opinions and recommendations. The SRG Secretariat, embedded in the CBE JU Programme Office, will facilitate the smooth functioning of the group, its meetings as well as the exchange of information among the SRG representatives.

In 2022, the SRG will be formally established. In its first meeting, it will adopt its rules of procedure and elect its Chair and Vice Chair. During the year, at least two SRG meetings are planned: one in Q1 and the second in Q3. Additional meetings could take place, if needed, to address major issues. In all meeting, the SRG members will be invited to report information about national and regional activities and initiatives linked to CBE JU with a view to ensure complementarities and identify areas of cooperation with the CBE JU.

SRG Timetable for 2022	
1st SRG Meeting will focus on: formally establish the group, present the CBE JU SRIA, and launch the consultation of the first CBE Annual Work Programme 2022 and its call for proposals.	Q1
2nd SRG Meeting will focus on: discussing the draft CBE JU Annual Work Programme 2023 and its call for proposals, and on presenting the CBE JU programme progress and main achievements since the last meeting.	Q3

2.4.4. Scientific Committee

The Scientific Committee (SC) is one of the advisory bodies of CBE JU. According to Article 21 and 55 of the Council Regulation (EU) 2021/2085, the SC provides advises to the Governing Boar on the scientific priorities to be addressed in the annual work plans and feedbacks on the scientific achievements described in the annual activity report. It will suggest, in view of the progress of the Strategic Research and Innovation Agenda and individual actions, corrective measures or re-orientations to the governing board, where necessary; and will provide independent advice and scientific analysis on specific issues as requested by the governing board, in particular as regards developments in adjacent.

The CBE SC is composed by 15 independent experts with a balanced representation of world-wide recognised experts from academia, industry, SMEs, non-governmental organisations and regulatory bodies. Collectively, the Scientific Committee members have the necessary scientific competencies and expertise covering the technical domain needed to make science-based recommendations to the CBE JU. The SC is supported in all its activities by the SC Secretariat, embedded in the CBE JU Programme Office.

SC Timetable for 2022	
1st SC Meeting will focus on: formally establish the group, present the CBE JU SRIA, and launch the consultation of the first CBE Annual Work Programme 2022 and call for proposals.	Q1
2nd SC Meeting will focus on: discussing the draft CBE JU Annual Work Programme 2023 and its call for proposals and on presenting the CBE JU programme progress and main achievements since the last meeting.	Q3

2.4.5. Deployment Groups

In accordance with Article 56 of the Council Regulation 2021/2085, Deployment Groups shall be established to advise the Governing Board on issues critical to market uptake of bio-based innovation and to promote deployment of sustainable circular bio-based solutions.

The Deployment Groups will be expected to provide their opinion on the basis of a request from the GB, the State Representative Group or the Scientific Committee but they may also act on their own initiative and provide recommendations to the Governing Board and the Executive Director on various deployment aspects.

Without prejudging the future decision of the GB, three Deployment Groups covering the following groups of stakeholders are under discussion: primary sector and biological feedstock providers, regional authorities and investors. The Deployment Group on investors will be built up on the results of the Synergy Label Pilot initiative implemented by the predecessor BBI JU. In the same way, the Deployment Group on the primary sector will take into consideration the Action Plan agreed by the members of the Task Force[73] on 8 October 2021.

In 2022, the CBE JU Programme Office will prepare a proposal for the Governing Board on the Deployment Groups including their composition, objectives and timeline; and launch the establishment of at least one Deployment Group.

[73] Following the publication of the Study *Participation of the agricultural sector in the BBI JU: business models, challenges and recommendations to enhance the impact on rural development,* a Task Force was created with representatives from the EC (DG AGRI and DG RTD), BIC and CBE JU to analyse the feasibility and the impact of the proposed recommendations and set up an Action Plan to prioritize, in an effective and in a coherent way, its implementation.

2.5. STRATEGY AND PLANS FOR THE ORGANISATIONAL MANAGEMENT AND INTERNAL CONTROL SYSTEMS

The Internal Control Framework (ICF), approved in 2019, provides reasonable assurance to the GB regarding the achievement of BBI JU's objectives as well as those of the CBE JU. In line with the requirements expressed in the CBE JU Financial Rules and in the EU Financial Regulation[74], it shall:

- Ensure that operational activities are effective and efficient. The CBE JU meets its objectives defined in the AWP using the adequate human and financial resources.
- Ensure that legal and regulatory requirements are met. The CBE JU operates in full accordance with all legal and regulatory requirements.
- Ensure that reporting is reliable. The CBE JU management produces regular, reliable and easily accessible management information on financial management, use of resources and progress on the achievement of operational objectives.
- Ensure that assets and information are safeguarded. The CBE JU managers take the measures necessary to ensure the completeness and preserve the integrity of the data on which management decisions are taken and reports are issued.

All the CBE JU management processes and functions concur to these four objectives granting the largest possible preventive, detective and corrective controls in line with the available resources.

In 2022 the CBE JU will continue to run its operations by improving the quality level of programme implementation while integrating the corrective actions that were identified in the past.

The main activities that will be performed include the following:

- Report on compliance and effectiveness of internal control in the annual activity report;
- Carry out periodic review of risks at least yearly in the context of preparing the annual work programme;
- Coordinate visits of the European Court of Auditors and of the external auditor of CBE JU accounts;
- Liaise with the auditors of the Internal Audit Service;
- Follow up on the implementation of action plans on audit recommendations and on observations of the discharge authority;
- Ensure a smooth implementation of the findings of the ex post audit strategy and optimise the JU's specific audit efforts based on the analysis of the first ex-post audits and of the specificities of CBE JU beneficiaries.

[74] Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council of 18 July 2018 on the financial rules applicable to the general budget of the Union, amending Regulations (EU) No 1296/2013, (EU) No 1301/2013, (EU) No 1303/2013, (EU) No 1304/2013, (EU) No 1309/2013, (EU) No 1316/2013, (EU) No 223/2014, (EU) No 283/2014, and Decision No 541/2014/EU and repealing Regulation (EU, Euratom) No 966/2012

2.5.1. Financial procedures

In 2022, the CBE JU will continue to consolidate and improve its financial procedures in both the administrative and grant management areas, in line with its Manual of Financial Procedures as well as the general EU financial regulatory framework and IT tools used for financial transactions performed by the CBE JU.

On the grants side the majority of transactions will continue to be dealt with via the Horizon 2020 corporate tools - COMPASS/SYGMA, with certain grants-related transactions being performed directly in the EC accounting system ABAC, or completed in ABAC following initiation in other tools (e.g. COMPASS/SYGMA or EMI). Staff (existing as well as newly-recruited where relevant) will continue to be trained adequately to ensure maximum competence in the use of the IT tools as well as the various different transactions which can arise (e.g. grant amendments, the participant guarantee fund mechanism, recoveries).

On the administrative side, the business procedures already in force should ensure high-quality processing, optimal budgetary implementation and accurate accounts. There will be continued monitoring of these procedures to evaluate their efficiency and fine-tune or update them where necessary.

The administration and finance unit and the programme unit will continue to collaborate in order to ensure coherent understanding and implementation of the financial rules of Horizon 2020 grants. This will also ensure the speedy and efficient verification and validation of all transactions, both complex and straightforward.

2.5.2. Ex ante and ex post controls

Ex ante controls:

There is a full set of processes and procedures which regular application in 2022 will continue to provide reasonable assurance that the principles of sound financial management have been applied to each transaction. In particular ex ante controls on operational expenditure will be implemented by the CBE JU in line with the adopted Horizon 2020 and Horizon Europe ex ante control strategy.

In order to implement ex ante controls, desk reviews will be performed by the CBE JU Programme Office; on top of this reviews on periodic reports will be carried out by external experts and ad-hoc technical reviews can also be launched when deemed necessary. The CBE JU will continue to update and develop internal procedures defining the *ex ante* controls to be performed and taking into account risk-based and cost-effectiveness considerations.

In 2022, the CBE JU will continue to cooperate with the Fraud and Irregularities in Research (FAIR) Committee of the R&I family as well as with the CAS, in line with the H2020 working arrangements for OLAF cases. Relevant Programme Office staff has received training on fraud detection and prevention; the possibility to deepen the knowledge in this field will continue to be promoted within the learning and development framework of the CBE JU.

For what concerns the prevention of possible double funding, the CBE JU will continue to collaborate with EC services and the Research Executive Agency in order to detect at an early stage possible overlapping during the grant agreement preparation, subsequent to the adoption of the ranking list by the Governing Board. Any possible overlapping at the level of topic definition is monitored by EC services responsible for the preparation of relevant work programmes. Regarding possible double funding controls during the project implementation, the H2020 grant management tools launches automatically a double funding and plagiarism check during GAP and the Programme Office implements any appropriate measure in accordance.

Ex post controls:

Ex post controls of operational expenditure will continue to be implemented in line with the Horizon 2020 Horizon Europe Audit Strategy. The Common Implementation Centre (CIC) of the European Commission developed this audit strategy in cooperation with all its clients (i.e. the entities that implemented the Horizon 2020 budget: Services of the European Commission, Executive Agencies and Joint Undertakings).

The main objective of the Audit Strategy is to provide the individual Authorizing Officers with the necessary elements of assurance in a timely manner, thus allowing them to report on the budget expenditure for which they are responsible. Ex-post controls on operational expenditure contribute in particular to:

- assessing the legality and regularity of expenditure on a multi-annual basis;
- providing an indication of the effectiveness of the related ex-ante controls;

- providing the basis for corrective and recovery mechanisms, if necessary.

The Common Audit Service (CAS) of the European Commission is the part of the CIC serving all Horizon Europe stakeholders in the implementation of the audit strategy. Its mission is to deliver a corporate approach for the audit cycle: audit selection, planning, application of rules, relations with beneficiaries and management information on the audit process.

The CBE JU is effectively integrated in this control chain: it participates in the audit process definition and in the monitoring of its implementation in continuous collaboration with CAS and its clients. The main objectives of the cooperation are to align operations and exploit synergies on the common audit effort. The efficiency gains should reduce the audit costs and the administrative burden on auditees, always in line with the specific objectives for ex-post controls explained above.

In 2022, the CBE JU will continue to implement the results of the ex post audits on BBI JU beneficiaries and will provide adequate reporting through the budget discharge process.

2.5.3. Audits

The audit environment is an accountability pillar within the CBE JU's internal control Framework since it provides reasonable assurance about the state of effectiveness of risk management and control processes and serves as a building block for the annual Declaration of Assurance of the Executive Director.

In 2022, the CBE JU will continue to ensure the coordination and support to the audits carried out by the Internal Audit Service (IAS), and the Court of Auditors (ECA) and by the external auditor of the CBE JU accounts. The CBE JU will also continue to follow up and confirm the implementation of the relevant recommendations.

3. BUDGET YEAR 2022

The amended 2022 budget covers all administrative needs for 2022 as well as H2020 operational activities. It is noted that the budget of the JU shall be adapted to take into account the amount of the Union contribution as laid down in the budget of the Union. The only potential updates to the budget relate to any change in EFTA rate for 2022. The EFTA rates in use are 2.11% for all BBI JU remaining budget ("frontloaded" by the EC from the previous MFF), and for CBE JU, 2.47% for 2021 and 2022.

STATEMENT OF REVENUE (EUR)

Heading	Item	Initial Budget 2022 CA	Initial Budget 2022 PA	Amendment 2022.1 CA	Amendment 2022.1 PA	Amended Budget 2022 CA	Amended Budget 2022 PA	Budget 2021 CA	Budget 2021 PA	Executed Budget 2020 CA	Executed Budget 2020 PA
EU contribution (excl. third countries contribution/EFTA)		**2,166,413**	**40,769,770**	**247,913,076**	**955,783**	**250,079,489**	**41,725,553**	**2,523,230**	**121,971,859**	**67,604,259**	**184,010,322**
of which Administrative	1007	2,166,413	2,166,413	819,683	819,683	2,986,096	2,986,096	2,523,230	2,523,230	2,286,218	2,286,218
of which Operational[75]		0	38,603,357	247,093,393	136,100	247,093,393	38,739,457	0	119,355,270	65,318,401	181,724,104
Third countries contribution (including EFTA) (amd 1)[76]		**53,510**	**1,007,013**	**5,634,030**	**-123,680**	**6,169,137**	**883,333**	**54,303**	**3,183,071**	**1,929,263**	**4,517,749**
of which Administrative EFTA	1007	**53,510**	53,510	12,420	12,420	65,930	65,930	54,303	54,303	55,098	55,098
Of which Administrative third countries excluding EFTA		0	0	0	0	0	0	0	0	300,000	300,000
of which Operational EFTA		0	953,503	6,103,207	-136,100	6,103,207	817,403	0	3,174,850	1,574,165	4,162,651

[75] For 2022 amended operational payment appropriations (including EFTA) include EUR 1 million for the budget of the expert evaluators for the CBE Call 2022 (managed by REA on behalf of CBE) – moved from Title 2 under BBI JU to Title 3 under CBE JU.

[76] This figure is amended to take into account an EFTA rate of 2.11% used for BBI JU remaining budget (calculated annually up to the end of the BBI JU programme), as well as a rate of 2.47% used for the 2022 EU administrative and operational contribution to the CBE JU.

Heading	Item	Initial Budget 2022 CA	Initial Budget 2022 PA	Amendment 2022.1 CA	Amendment 2022.1 PA	Amended Budget 2022 CA	Amended Budget 2022 PA	Budget 2021 CA	Budget 2021 PA	Executed Budget 2020 CA	Executed Budget 2020 PA
Industry (financial) contribution		**2,219,923**	**2,219,923**	**832,103**	**832,103**	**3,052,026**	**3,052,026**	**2,307,533**	**2,624,809**	**2,641,316**	**2,641,316**
of which Administrative	1007	2,219,923	2,219,923	832,103	832,103	3,052,026	3,052,026	2,307,533	2,624,809	2,614,316	2,614,316
of which Operational		0	0	0	0	0	0	0	0	0	0
SUB-TOTAL revenues		**4,439,846**	**43,996,706**	**254,860,805**	**1,664,204**	**259,300,651**	**45,660,911**	**4,615,066**	**127,779,739**	**72,174,838**	**191,169,387**
C2 reactivation of unused appropriations from administrative expenditure[77]		**1,135,769**	**1,566,182**	**0**	**0**	**1,135,769**	**1,566,182**	***600,000***	***600,000***	**1,449,181**	**1,656,594**
of which from 2018		0	0	0	0	0	0	0	0	1,062,598	1,156,594
of which from 2019		35,769	266,182	0	0	35,769	266,182	*300,000*	*600,000*	386,583	500,000
of which from 2020		1,100,000	1,300,000	0	0	1,100,000	1,300,000	*300,000*	*0*	0	0
C2 reactivation of unused appropriations from operational expenditure[78]		**476,647**	**40,000,000**	**0**	**-11,196,795**	**476,647**	**28,803,205**	**0**	**46,881,708**	**37,790,766**	**3,847,600**

[77] Unused budgetary commitment and payment appropriations from prior years' administrative budget, which can be reactivated in the budgets of up to 3 subsequent years following the year of origin, in accordance with the "N+3" rule applicable to Joint Undertakings

[78] Unused budgetary commitment and payment appropriations from prior years' operational budget, which can be reactivated in the budgets of up to 3 subsequent years following the year of origin, in accordance with the "N+3" rule applicable to Joint Undertakings

Heading	Item	Initial Budget 2022 CA	Initial Budget 2022 PA	Amendment 2022.1 CA	Amendment 2022.1 PA	Amended Budget 2022 CA	Amended Budget 2022 PA	Budget 2021 CA	Budget 2021 PA	Executed Budget 2020 CA	Executed Budget 2020 PA
of which from 2017		0	0	0	0	0	0	0	0	602,874	0
of which from 2018		0	0	0	0	0	0	0	4,291,956	12,776,650	3,847,600
of which from 2019 (voted)		476,647	0	0	0	476,647	0	0	42,589,752	24,411,242	0
of which from 2020 (voted)		0	28,803,205	0	0	0	28,803,205	0	0	0	0
of which from 2021(voted)[79]		0	11,196,795	0	-11,196,795	0	0	0	0	0	0
SUB-TOTAL reactivations		**476,647**	**41,566,182**	**1,135,769**	**-11,196,795**	**1,612,416**	**30,369,387**	***600,000***	**47,481,708**	**39,239,947**	**5,144,194**
TOTAL REVENUES		**6,052,262**	**85,562,888**	**254,860,805**	**-9,532,590**	**260,913,067**	**76,030,298**	**5,215,066**	**174,626,894**	**111,414,785**	**196,313,581**

[79] Following a re-examination of the operational payments forecast for BBI JU ongoing projects, the total voted reactivated PA from 2021 are being deducted with amendment 1, as deemed surplus to real needs. They will instead be reactivated in the budget of 2023 and/or 2024.

STATEMENT OF EXPENDITURE (EUR)

Title/ Chapter	Heading	Initial Budget 2022 (CA)	Initial Budget 2022 (PA)	Amendment 2022.1 (CA)	Amendment 2022.1 (PA)	Amended Budget 2022 CA (in €)	Amended Budget 2022 PA (in €)	Budget 2021 CA (in €)	Budget 2021 PA (in €)	Budget 2020 executed CA (in €)	% ratio 2020 CA to 2022	Budget 2020 executed PA (in €)	% ratio 2020 PA to 2022
1	**Staff Expenditure**	**3,010,080**	**3,010,080**	**1,175,653**	**1,175,653**	**4,185,733**	**4,185,733**	**3,183,466**	**3,183,466**	**2,816,778**	**67.29%**	**2,674,206**	**63.89%**
11	Staff in active employment	2,649,280	2,649,280	1,089,710	1,089,710	3,738,990	3,738,990	2,705,966	2,705,966	2,515,235	67.27%	2,486,530	66.50%
12	Staff recruitment / Miscellaneous expenditure	78,500	78,500	24,064	24,064	102,564	102,564	87,200	87,200	20,000	19.50%	15,153	14.77%
13	Mission and duty travels	60,000	60,000	19,767	19,767	79,767	79,767	80,000	80,000	12,000	15.04%	8,770	10.99%
14	Other staff costs (socio-medical structure)	212,300	212,300	42,112	42,112	254,412	254,412	300,300	300,300	267,660	105.21%	161,705	63.56%
15	Entertainment and representation expenses	10,000	10,000	0	0	10,000	10,000	10,000	10,000	1,883	18.83%	2,048	20.48%

Title/ Chapter	Heading	Initial Budget 2022 (CA)	Initial Budget 2022 (PA)	Amendment 2022.1 (CA)	Amendment 2022.1 (PA)	Amended Budget 2022 CA (in €)	Amended Budget 2022 PA (in €)	Budget 2021 CA (in €)	Budget 2021 PA (in €)	Budget 2020 executed CA (in €)	% ratio 2020 CA to 2022	Budget 2020 executed PA (in €)	% ratio 2020 PA to 2022
2	**Other administrative expenditure**	**1,429,766**	**1,429,766**	**488,552**	**488,552**	**1,918,318**	**1,918,318**	**2,031,600**	**2,031,600**	**2,515,297**	**131.12%**	**2,549,528**	**132.90%**
20	Rental of buildings and associated costs	333,766	333,766	132,329	132,329	466,095	466,095	339,500	339,500	317,652	68.15%	314,225	67.42%
21	Administrative information technology	295,000	295,000	65,967	65,967	360,967	360,967	345,000	345,000	696,290	192.90%	342,218	94.81%
22	Movable property and associated costs	0	0	1,451	1,451	1,451	1,451	5,000	5,000	5,207	358.86%	3,507	241.70%
23	Current administrative expenditure	35,000	35,000	6,905	6,905	41,905	41,905	35,000	35,000	23,637	56.41%	20,751	49.52%
24	Telecommunications and postal charges	19,000	19,000	4,838	4,838	23,838	23,838	19,000	19,000	13,559	56.88%	6,686	28.05%

Title/ Chapter	Heading	Initial Budget 2022 (CA)	Initial Budget 2022 (PA)	Amendment 2022.1 (CA)	Amendment 2022.1 (PA)	Amended Budget 2022 CA (in €)	Amended Budget 2022 PA (in €)	Budget 2021 CA (in €)	Budget 2021 PA (in €)	Budget 2020 executed CA (in €)	% ratio 2020 CA to 2022	Budget 2020 executed PA (in €)	% ratio 2020 PA to 2022
25	Expenditure on formal meetings	77,000	77,000	30,785	30,785	107,785	107,785	133,000	133,000	5,075	4.71%	3,974	3.69%
26	External communication, information, publicity	400,000	400,000	105,547	105,547	505,547	505,547	600,000	600,000	180,918	35.79%	666,930	131.92%
27	Service contracts	50,000	50,000	92,354	92,354	142,354	142,354	225,000	225,000	137,000	96.24%	62,100	43.62%
28	Experts' contracts and evaluations[80]	0	0	0	0	0	0	0	0	990,879	N/A	990,880	N/A
29	Expert reviewers	220,000	220,000	48,376	48,376	268,376	268,376	330,100	330,100	145,080	54.06%	138,257	51.52%
	Reactivations of prior year unused administrative budget	**1,135,769**	**1,566,182**			**1,135,769**	**1,566,182**	***600,000***	***600,000***	**0**	**0**	**0**	**0**

[80] For 2022 amended operational payment appropriations include EUR 1 million for the budget of the expert evaluators for the CBE Call 2022 (managed by REA on behalf of CBE) – moved from Title 2 under BBI JU to Title 3 under CBE JU.

Title/ Chapter	Heading	Initial Budget 2022 (CA)	Initial Budget 2022 (PA)	Amendment 2022.1 (CA)	Amendment 2022.1 (PA)	Amended Budget 2022 CA (in €)	Amended Budget 2022 PA (in €)	Budget 2021 CA (in €)	Budget 2021 PA (in €)	Budget 2020 executed CA (in €)	% ratio 2020 CA to 2022	Budget 2020 executed PA (in €)	% ratio 2020 PA to 2022
	of which from 2017	0	0			0	0	0	0	0	0	0	0
	of which from 2018	0	0			0	0	0	0	0	0	0	0
	of which from 2019 (voted)	35,769	266,182			35,769	266,182	0	0	0	0	0	0
	of which from 2020 (voted)	1,100,000	1,300,000			1,100,000	1,300,000	0	0	0	0	0	0
3	**Operational expenditure**[81]		**39,556,860**	**0**	**0**	**0**	**39,556,860**	**0**	**122,530,120**	**104,683,894**	**N/A**	**160,854,026**	**406.64%**
30	Previous years' calls		39,556,860	0	0	0	39,556,860	0	122,530,120	104,683,894	N/A	160,854,026	406.64%
31	Current year's call (s)	0	0	0	0	0	0	0	0	0	0	0	0
	Reactivations of prior year unused operational budget	**476,647**	**40,000,000**	**0**	**-11,196,795**	**476,647**	**28,803,205**	**0**	**46,881,708**	**0**	**0**	**0**	**0**

[81] For 2022 amended operational payment appropriations include EUR 1 million for the budget of the expert evaluators for the CBE Call 2022 (managed by REA on behalf of CBE) – moved from Title 2 under BBI JU to Title 3 under CBE JU.

Title/ Chapter	Heading	Initial Budget 2022 (CA)	Initial Budget 2022 (PA)	Amendment 2022.1 (CA)	Amendment 2022.1 (PA)	Amended Budget 2022 CA (in €)	Amended Budget 2022 PA (in €)	Budget 2021 CA (in €)	Budget 2021 PA (in €)	Budget 2020 executed CA (in €)	% ratio 2020 CA to 2022	Budget 2020 executed PA (in €)	% ratio 2020 PA to 2022
	of which from 2019	476,647	0	0	0	476,647	0	0	0	0	0	0	0
	of which from 2020	0	28,803,205	0	0	0	28,803,205	0	0	0	0	0	0
	of which from 2021[82]	0	11,196,795	0	-11,196,795	0	0	0	0	0	0	0	0
	SUB-TOTAL reactivations	**1,591,386**	**41,566,182**	**0**	**-11,196,795**	**1,591,386**	**30,369,387**	***600,000***	***600,000***	**0**	**0**	**0**	**0**
	TOTAL EXPENDITURE	**6,052,262**	**85,562,888**	**254,860,805**	**-9,532,590**	**260,913,067**	**76,030,298**	**5,215,066**	**174,626,894**	**110,015,969**	**42.2%**	**166,077,760**	**218.40%**

[82] Following a re-examination of the operational payments forecast for BBI JU ongoing projects, the total voted reactivated PA from 2021 are being deducted with amendment 1, as deemed surplus to real needs. They will instead be reactivated in the budget of 2023 and/or 2024

4. ANNEXES

4.1. IKAA PLAN

As stated in the article 51 of Council Regulation 2021/2085, the additional activities are those directly linked to projects and activities of the Circular Bio-based Europe Joint Undertaking, including in particular:
(a) investments in new facilities demonstrating a new value chain, including investments in durable equipment, tools and accompanying infrastructure, in particular related to regional deployment and its sustainability verification;
(b) investments in a new innovative and sustainable production plant or flagship;
(c) investments in new research and innovation and justified infrastructure, including facilities, tools, durable equipment or pilot plants (research centres);
(d) standardisation activities;
(e) communication, dissemination and awareness-raising activities.
2. The investments directly linked to projects are in particular:
(a) non-eligible investments needed for the implementation of a Circular Bio-based Europe Joint Undertaking project during the duration of that project;
(b) investment made in parallel with a Circular Bio-based Europe Joint Undertaking project, complementing the results of the project and bringing it to a higher TRL;
(c) investments needed for the deployment of a Circular Bio-based Europe Joint Undertaking project's results following the closure of the project until the winding up of the Circular Bio-based Europe Joint Undertaking. In justified cases, the investment related to deployment of results of projects from the preceding initiative (BBI Joint Undertaking) may be taken into account.

The exact nature of the activities and amount planned will be known only when the GB will approve the results of the call (selection of projects).

4.2. GLOSSARY

Added-value product = a product with a significantly increased value from a technical, economic and/or environmental perspective, compared with the starting material or feedstock from which the product is obtained

B2B product = a product destined to be sold by one business entity to another business entity

B2C product = a product destined to be sold by one business entity directly to the end consumers

Benchmark = a standard product/process/service representative of a specific technological field or market application, used as reference with which features of another product, process or service developed are compared. Depending on the bio-based output developed, the benchmark can be fossil- and/or bio-based

Bio-based = derived from biomass

Biodiversity enhancement (coming on top of biodiversity protection) **=** refers to reporting practices, methodologies and tool improvements about the integration and improvement of biodiversity aspects related to bio-based systems. Note that the European Commission will put forward a proposal for legally binding EU nature restoration targets[83] Restoring EU's ecosystems will help to increase biodiversity, mitigate and adapt to climate change, and prevent and reduce the impacts of natural disasters

Biodiversity protection (see also biodiversity enhancement) = is expected to be a starting condition for all CBE projects (100 % of projects should comply). Several drivers for biodiversity protection should be accounted for: climate change mitigation, LULUCF, sea/freshwater pollution, soil pollution, invasive alien species, direct exploitation of endangered plants, animals, other organisms, and their habitats, and respective ecosystems services

Bioeconomy = the production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products and bioenergy

Biogenic = derived from biomass. Such as 'biogenic carbon cycle': the natural carbon cycle

Biomass = 'material of biological origin excluding material embedded in geological formations and/or fossilised

(Bio-based) dedicated chemicals = Bio-based chemicals that are produced via a dedicated pathway and do not have an identical fossil-based counterpart. As such, they can be used to produce products that cannot be obtained through traditional chemical reactions and products that may offer unique and superior properties that are unattainable with fossil-based alternatives.

(Bio-based) drop-in chemicals = Bio-based versions of existing petrochemicals which have established markets. They are chemically identical to existing fossil-based chemicals.

Bio-based product = a product wholly or partly bio-based

[83] https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030/eu-nature-restoration-targets_en#:~:text=The%20European%20Commission%20will%20put,the%20impacts%20of%20natural%20disasters

(Bio-based) smart drop-in chemicals = a special sub-group of drop-in chemicals. They are chemically identical to existing chemicals derived from fossil resources, but their bio-based production pathways provide advantages compared to the conventional pathways

Biodegradation = complete breakdown of an organic matter by microorganisms, in the presence of oxygen (aerobic biodegradation), to carbon dioxide, water, and mineral salts of any other elements present (mineralisation) and new biomass, or in the absence of oxygen (anaerobic biodegradation) to carbon dioxide, methane, mineral salts, and new biomass

Biodegradable = a material or product is biodegradable if it can, under specific environmental conditions and with the help of microorganisms, naturally break down into basic components (e.g., water, carbon dioxide and biomass)

Bio-based polymer = a polymer comprised, at least in part, of building blocks called monomers, produced from renewable feedstock. Bio-based polymers can lead to a number of products like bio-based plastics

Bio-waste = defined as biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants (Waste Framework Directive). It does not include forestry or agricultural residues, manure, sewage sludge, or other biodegradable waste such as natural textiles, paper or processed wood. It also excludes those by-products of food production that never become waste.

Brand owners = refer to industrial stakeholders selling commodities under a registered brand. They may be existing or new stakeholders of bio-based value chains, contributing thus to the market uptake of bio-based products

Building block = a molecule which can be converted to various secondary chemicals and intermediates, and, in turn, into a broad range of different downstream uses. Examples of large markets for bio-based chemical building blocks are in the production of bio-based polymers, fibres, surfactants, and solvents

Business case = a justification for investing in a project to generate a profitable business. It is typically related to pursuing an opportunity or solving a problem. It may include technical, economic, market, social, environmental and regulatory aspects, even if only at a qualitative level. A business case includes an evaluation of risks, costs and benefits of the proposed project versus alternatives. It may involve a relatively high level of uncertainty.

Business model = a description of the way in which an commercial activity for conducting a business, generates revenues and value for its customers/ involved stakeholders. It describes the costs and revenues, the actors involved and the relationships among them. It includes a quantification of the cost and revenue streams but no time dimensions or specific actions.

Business plan = a detailed description of how the business will be developed. It includes a quantification of the cost structure, financing thereof, and foreseen revenues, a description of the actions to be performed, their timing and the actors involved. It includes technical, economic, market, social, environmental and regulatory aspects and is based on data, as much as possible, and/or assumptions (to cover areas where data are not available). The level of uncertainty is lower than in the Business case. Risks are described and contingencies are foreseen.

Carbon removal = the carbon removals described in the Commission Communication on sustainable carbon cycles[17] include '*recycle carbon from waste streams, from sustainable sources of biomass…to use it in place of fossil carbon in the sectors of the economy that will inevitably remain carbon dependent…promote technological solutions for carbon capture and use (CCU) and the production of sustainable synthetic fuels or other non-fossil based carbon products… upscale carbon removal solutions that capture CO_2 from the atmosphere and store it for the long term, either in ecosystems through nature protection and carbon farming solutions or in other storage forms through industrial solutions*'

CCS = Carbon dioxide capture and storage. The geological storage is ruled by Directive 2009/31/EC[84]. Other storage are mentioned in the Communication on sustainable carbon cycles[17]. See the European Commission framework for carbon capture, use and storage: https://ec.europa.eu/clima/eu-action/carbon-capture-use-and-storage_en

CCU = Carbon dioxide capture and use. See the European Commission framework for carbon capture, use and storage: https://ec.europa.eu/clima/eu-action/carbon-capture-use-and-storage_en

Circular bio-based system = a full operational system, from feedstock intake through market application and use of resultant bio-based products, and their end-of-life handling to close the circle (cradle-to-cradle)

Circular-by-design = including circular economy considerations at the design stage of a product and/or business model considering their lifecycle. It aims to minimise resource consumption intensity, waste generation, extend the lifetime of products and optimise production and logistics

Circular economy = a business concept aiming to create a closed-loop system and maintain the value of products, materials, and resources for as long as possible by returning them into the product cycle at the end of their use, while minimising the generation of waste. In this economic system, 'waste' can become a feedstock source for another process or value chain.

Climate change adaptation = is the process of adapting to climate change, taking action to prepare for and adjust to both the current effects of climate change the predicted impacts in the future.

Climate change mitigation = consists of actions to limit global warming and its related effects. This involves reductions in human emissions of greenhouse gasses (GHGs) as well as activities that reduce their concentration in the atmosphere. It is one of the ways to respond to climate change, along with adaptation.

Ecosystem services = the benefits that people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth' (Millennium Ecosystem Assessment). An ecosystem service could also include practices that prevent or cut down pollution. People describe e.g., the green biorefinery to have an ecosystem service function by cutting down the run-off of nutrients that could otherwise have polluted the surrounding waters.

[84] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0031

Emissions (Scope 1, 2 and 3) = Scope 1 greenhouse gas emissions are emissions coming directly from a company and its controlled entities (including process emissions). Scope 2 emissions come indirectly from the generation of purchased energy. Scope 3 emissions are all indirect emissions that are not included in scope 2 and occur in the value chain of the reporting entity, including both upstream and downstream emissions.

Feedstock = any unprocessed/raw material fed into a manufacturing/conversion process

Fossil-based = made from fossil resources

GHG emissions = GHGs comprise carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and fluorinated gases. There are direct and indirect emissions that need to be monitored and addressed (see also emissions (scope 1, scope 2 and scope 3)

Indirect land use change (ILUC) = displacement of agricultural production into non-croplands (e.g., grasslands and forests) due to the destination of croplands previously used for food agricultural production having been shifted to the production of non-food bio-based products (e.g., biofuels). Indirect land use change risks causing an increase in greenhouse gas emissions because non-croplands such as grasslands and forests typically absorb high levels of CO_2. By converting these land types to cropland, negative environmental effects may occur, including increase of atmospheric CO_2 levels, and biodiversity loss

Industrial symbiosis/ Industrial-urban symbiosis = the concept affects both material and energy flows. It refers, partly, to a process by which waste or by-products of an (industry) or an (industrial) process become the raw material for another. Application of this concept allows for materials to be used in a more sustainable way and can contribute to circular (bio)economy. Industrial symbiosis creates an interconnected network that strives to mimic the functioning of ecological systems within which energy and materials cycles operate in a continuous mode, without waste products. Deploying industrial and/or industrial-urban symbiosis solutions for energy, water and waste and other by-products can also contribute to the regional development of circular bio-based systems

Intermediate product = a product (e.g. material) requiring further processing or conversion steps to obtain the final product

Life cycle assessment (LCA) = assessment of the environmental impacts of a product, process, or service throughout the entire life cycle. The main references for LCA methodologies are the international standards ISO 14040 and ISO 14044. **Environmental LCA** is complemented by **life cycle costing assessment** (LCCA), which aims to assess the economic impacts of a product/process/service, and by **social life cycle assessment** (S-LCA), which aims to evaluate social implications of a product/process/service

Life cycle sustainability assessment (LCSA) = assessment of the environmental, economic, and social impacts of a product, process, or service throughout the entire life cycle.

Material = a substance or a mixture of substances also resulting from a production process, constituting one of the components which more complex products are made by

Multi-material, Multi-layered products = products composed of multiple layers where the choice on material per layer depends on the final product technical characteristics (e.g providing barrier properties, mechanical strength, heat resistance etc)

Multi-material products, Composites = materials composed of at least two materials of different properties. When combined, they provide unique and superior properties (e.g. strength and lightweight characteristics), compared to those of the individual constituents. The individual components do not dissolve or blend into each other, with one material being the matrix and combined an additional material (the reinforcement)

Nature-based solutions = solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions

New = refers to a product or a process that entails clearly described innovative and/or advanced properties or enhancements compared to existing benchmarks (for example a 'new material' does not mean that such types of material currently does not exist on the market, but it means that the material has properties that are unmatched by existing benchmark products available on the market)

Novel = novel technologies are such as new, emerging, so far unused for bio-based feedstock conversion; novel bio-based feedstock

Organisational innovation= an idea, a new product, a new method, a new service, a new process, a new technology, or a new strategy adopted by an organisation

Outputs = referring to the following product categories: i) Chemicals (platform chemicals, additives, solvents, surfactants…), ii) Materials, 3) other products related with end use. Use established classification for reporting, for example the one in: EU Biorefinery outlook 2030

Plastic = any synthetic or semisynthetic organic polymer entailing the property of plasticity, i.e., the ability to deform without breaking. For example, thermoplastics and thermosetting polymers are the two types of plastic

Platform chemical = intermediate molecules which can be converted to a wide range of chemicals or materials

Primary biomass producers = biomass feedstock suppliers (primary and/or secondary biomass), including the following sectors: agriculture, forestry, fisheries, and aquaculture/marine

Resource efficiency = means using the Earth's limited resources in a sustainable manner while minimising impacts on the environment. It allows us to create more with less and to deliver greater value with less input. Improved energy efficiency addresses technoeconomic feasibility but also environmental sustainability aspects. Resource efficiency aspects addressed in bio-based processes covers biomass feedstock valorisation efficiency but also encompasses the other resources such as water, solvents, (bio)catalysts and other auxiliaries etc.

Secondary bio-based feedstock = waste that can be recycled in a circular economy and is injected back into the economy as secondary raw materials. In this context, secondary bio-based feedstock is any waste that can be used in bio-based processes

Sustainable = this refers to a product/process/system that enhances and creates benefits for the environment, economy, and society. In a broad sense, sustainability has four dimensions:

environmental sustainability, productivity, fairness, and macroeconomic stability (European Commission, 'Annual Sustainable Growth Strategy 2020', COM(2019) 650 final, 17 December 2019).

Waste hierarchy = (a) prevention;(b) preparing for re-use;(c) recycling;(d) other recovery, e.g. energy recovery; and (e) disposal, as in the Waste Framework Directive 2008/98.

Zero-pollution ambition = on 12 May 2021, the European Commission adopted the EU Action Plan: "Towards a Zero Pollution for Air, Water and Soil" (and annexes)- a key deliverable of the European Green Deal. The action plan aims to strengthen the EU green, digital and economic leadership, whilst creating a healthier, socially fairer Europe and planet. It provides a compass to mainstream pollution prevention in all relevant EU policies, to step up implementation of the relevant EU legislation and to identify possible gaps

Zero waste = preserving the natural resources and significantly reducing/eliminating waste during production but also across the value chain.