



AMENDED ANNUAL WORK PLAN & BUDGET

2020



In accordance with the Statutes of the BBI JU annexed to Council Regulation (EU) No 560/2014 of 6 May 2014. The annual work plan and budget will be made publicly available after its adoption by the Governing Board.

For UK applicants: Please be aware that following the entry into force of the EU-UK Withdrawal Agreement¹ on 1 February 2020 and in particular Articles 127(6), 137 and 138, the references to natural or legal persons residing or established in a Member State of the European Union are to be understood as including natural or legal persons residing or established in the United Kingdom. UK residents and entities are therefore eligible to participate under this call.

¹ Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community.

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This document establishes the 2020 Annual Work Plan and Budget, outlining the scope and details of research and innovation activities prioritised for the Call for Proposals in 2020, as well as the governance and activities of the Bio-Based Industries Joint Undertaking (BBI JU) foreseen for 2020. The drafting of this document is done via two separate processes covering the call topics and the rest of the document content. Call topics are developed via a collaboration between the Bio-based Industries Consortium (BIC), the European Commission and the BBI JU. The rest of the document is mainly drafted by BBI JU with input from the two members. The text is consulted in several phases with the BBI JU advisory bodies, and finally according to article 15 of the statutes of BBI JU Council Regulation (EU) No 560/2014 the Executive Director presents the document to the Governing Board which formally adopts it.

The document consists of four parts:

1. An introduction, including a description of BBI JU's background, objectives and mission.
2. The description of the scope and details of research and innovation activities of the Call 20, call and project management rules, BBI JU's support to operations, governance and the internal control framework.
3. BBI JU's 2020 Budget including the staff establishment plan
4. A list of acronyms.



1. INTRODUCTION





1.1. BBI JU's Background

The Commission Communication of 13 February 2012 entitled "Innovating for Sustainable Growth: A Bioeconomy for Europe", and in particular its Action Plan, calls for a public-private partnership to support the establishment of sustainable and competitive bio-based industries and value chains in Europe. In view of moving towards a post-petroleum society, the Communication aims to integrate better biomass producing and processing sectors in order to reconcile food security, natural resource scarcity and environmental objectives with the use of biomass for industrial and energy purposes.

Against this background, the BBI JU was established in 2014. It is a public-private partnership between the European Union and the Bio-based Industries Consortium (BIC). Operating under Horizon 2020, it is driven by the Strategic Innovation and Research Agenda (SIRA), published in March 2013 and updated on July 2017.

The European Union is represented by the European Commission (EC). BIC is a non-profit organisation that was created to represent the group of industries that supports the BBI JU. Its members cover the entire bio-based value chain and consist of large industries, small and medium-sized enterprises (SMEs), regional clusters, universities, research and technology centres, European trade associations, and European Technology Platforms. BIC's aim is to ensure and promote the technological and economic development of the bio-based industries in Europe. Any interested stakeholders along the bio-based value chain may apply for membership to BIC. It applies general principles of openness and transparency regarding membership, achieving a broad industrial involvement.

BIC and the EC developed the initial SIRA and the up-dated SIRA based on extensive consultation with public and private stakeholders. The SIRA describes the main technological and innovation challenges that need to be overcome in order to develop sustainable and competitive bio-based industries in Europe. It identifies research, demonstration and deployment activities to be carried out by a Joint Technology Initiative on bio-based industries, the BBI JU.

1.2. BBI JU's Objectives

The overall objective of the BBI JU is to implement a programme of research and innovation activities in Europe that will assess the availability of renewable biological resources that can be used for the production of bio-based materials, and on that basis, support the establishment of sustainable bio-based value chains. Those activities should be carried out through collaboration between stakeholders along the entire bio-based value chains, including primary production and processing industries, consumer brands, SMEs, research and technology centres and universities.



This objective should be achieved through the support of research and innovation activities, using resources from the public and private sectors. To this end, the BBI JU should organise calls for proposals aimed at supporting research, demonstration and deployment activities.

To achieve a maximum impact, the BBI JU should develop close synergies with other Union programmes in areas such as education, environment, competitiveness and SMEs, and with the European Structural and Investment Fund (ESIF), which can specifically help to strengthen national and regional research and innovation capabilities in the context of smart specialisation strategies.

Complementarities with other parts of Horizon 2020 such as Societal Challenge 2, the biotechnology area of the Leadership in Enabling and Industrial Technologies (LEIT) and SPIRE are to be encouraged.

The specific objectives of the BBI JU are to:

1. contribute to the implementation of Regulation (EU) No 1291/2013 and in particular Part III of Decision 2013/743/EU;
2. contribute to a more resource-efficient and sustainable low-carbon economy and to increasing economic growth and employment, in particular in rural areas, by developing sustainable and competitive bio-based industries in Europe, based on advanced biorefineries that source their biomass sustainably, and in particular to:
 - i. demonstrate technologies that enable new chemical building blocks, new materials, and new consumer products from European biomass, which replace the need for fossil-based inputs;
 - ii. develop business models that integrate economic actors along the whole value chain from supply of biomass to biorefinery plants to consumers of bio-based materials, chemicals and fuels, including through creating new cross-sector interconnections and supporting cross-industry clusters; and
 - iii. set up flagship biorefinery plants that deploy the technologies and business models for bio-based materials, chemicals and fuels and demonstrate cost and performance improvements to levels that are competitive with fossil-based alternatives.



2. ANNUAL WORK PLAN 2019





2.1.1. Executive summary

The 2020 Annual Work Plan and Budget (AWP) is the seventh one on the critical path towards 2020. It continues to be based on the acceleration of the development of new sustainable value chains from biomass feedstock supply via efficient processing, to the acceptance and application of bio-based products in the end-markets.

The AWP 2020 confirms the focus on better integrating biomass feedstock suppliers at the front end of the value chain, creating a demand for biomass feedstock from biorefining processes. Similarly, the AWP will stimulate the building of partnerships with end market actors to create a 'market pull' for bio-based products for identified applications.

The Strategic Innovation and Research Agenda (SIRA) of 2013 included the main defined technological and innovation challenges to developing sustainable and competitive bio-based industries in Europe. It was adjusted in 2017 namely through the addition of some new objectives that reflect the ambitions of members of the Bio-based Industries Consortium (BIC).

The scientific priorities and impacts for the year 2020 were identified by BIC and the EC, in collaboration with the BBI JU programme office, via a wide consultation which targeted industry members of BIC, universities, RTOs, European Technology Platforms and European industry associations, and BBI JU's advisory bodies - the State Representative Group Committee (SRG) and the Scientific Committee (SC).

A priority paper for 2020 has been developed, which updates the priority paper 2019-2020 of February 2018. The update reflects the priorities left to be dealt with taking into account the AWP 2019. In addition, BIC industry members have included a few new potential themes for 2020.

As a result of this analysis, the scientific priorities for 2020 are the following, well aligned with the four strategic orientations of the SIRA:

1. foster supply of sustainable biomass feedstock to feed both existing and new value chains;
2. optimise efficient processing for integrated biorefineries through research, development and innovation;
3. develop innovative bio-based products for identified market applications;
4. create and accelerate the market-uptake of bio-based products and applications.

In 2020 the call has an indicative budget of EUR 102 million for a total of 16 topics with 5 RIAs topics, 4 CSAs, 4 DEMOs and 3 FLAGs.



In 2020 the programme office continues to face with the challenge of absorbing growing workload while keeping high quality standards. BBI JU is a mature organisation. A challenge will be to underpin the current strengths, while maintaining the performance level. Throughout a culture of continuous improvement, the programme office continues to consolidate some processes while implementing corrective actions where needed. In addition, the reporting landscape is further elaborated to ensure effective demonstration of and communication around the achievements and impact of the initiative. Considering BBI JU has one more call to implement and the fact that 2021 will be the first year of Horizon Europe implementation, whatever the form of the future partnership around bio-based industries, 2020 will be an important year of transition. In this context the BBI JU programme office will contribute to the discussions on Horizon Europe from the perspective of the operational functioning of BBI JU as implementing body by building on the lessons learnt from the implementation of Horizon 2020.

Another priority for 2020 will be to analyse and communicate the impact and the added value of the BBI JU iPPP and its project portfolio to a wide audience of stakeholders. To do so, the BBI JU will update the analyses and studies about the socio-economic and environmental positive impact of BBI JU projects and demonstrate the added value of the initiative. Results and achievements of completed BBI JU's projects will be widely communicated with a specific focus on the scientific advancements and to the market uptake potential. This communication will be supported by specific tools and campaigns (including events) to communicate the added value of the BBI initiative in the daily lives of EU citizens, as specifically requested by several EU institutions.

2.1.2. Operations

2.1.3. Objectives and indicators of the AWP 2020

In 2020, BBI JU will continue to contribute to the overcoming of the main technological and innovation challenges described in the SIRA, via its funded portfolio. To this end, it aims at achieving the targets set for the year 2020 on each of the specific KPIs defined in the Specific Programme implementing Horizon 2020, in the Impact Assessment of the BBI JU, and in the SIRA. Tables 1 and 2 show how the planned actions in 2020 are expected to contribute to the specific targets².

² Please note that the numbers refer to the aggregated expected contribution of every AWP 2020 topic to each of the KPIs; this number is only tentative, as one topic may deliver more than one project selected for funding (therefore increasing its contribution) or no projects selected for funding (no contribution of this topic to the aggregated contribution).

Table 1: Specific research and innovation objectives of BBI JU and related Key Performance Indicators (KPIs): Expected contributions of successful 2020 actions.

Objectives & KPIs		TARGET 2024 ³	Addressed in AWP 2020			
			CSA	RIA	Demo	Flag
Objective	New cross-sector interconnections in the bio-based economy (new bridges creating cooperation between the different sectors and actors)					
KPI 1	Number of new cross-sector interconnections in BBI JU projects	36	0	5	4	3
Objective	New bio-based value chains					
KPI 2	Number of new bio-based value chains created/realised with BBI JU projects	10	0	5	4	3
Objective	New building blocks based on biomass of European origin					
KPI 4	Number of new bio-based building blocks developed (TRL 3), validated (TRL 4-5) or demonstrated (TRL 6-7) with BBI JU projects	5	0	1	1	1
Objective	New bio-based materials					
KPI 5	Number of new bio-based materials developed (TRL3), validated (TRL 4-5) or demonstrated (TRL 6-7-8) with BBI JU projects	50	0	1	1	2
Objective	New demonstrated 'consumer' products based on bio-based chemicals and materials					
KPI 6	Number of new bio-based 'consumer' products or bio-based applications demonstrated (TRL 6-7-8) with BBI JU projects	30	0	1	3	3
Objective	BBI JU flagship projects producing new bio-based intermediate products (materials, chemicals) or bio-based consumer products, which have proven to become cost-competitive with the alternatives based on fossil resources or other non-renewable resources					
KPI 7	Number of Flagship grant agreements signed between BBI JU and the project consortia	5	0	0	0	3
KPI 8	RIA 'TRL gain': validated, improved technologies that fill gaps in value chains and make for new chemical building blocks, new materials, new 'consumer' products or new applications.	20	0	5	0	0

³ The target reflects the end of the JU activities in accordance with article 1 of the BBI JU Council Regulation.



Objectives & KPIs	TARGET 2024 ³	Addressed in AWP 2020			
		CSA	RIA	Demo	Flag

Number of new and improved processing technologies validated with BBI projects. This KPI is complementary to KPIs 4, 5 and 6.

Note: The description of the specific BBI JU objectives and KPIs is provided in the Strategic Innovation and Research Agenda (SIRA) developed by the industry, in collaboration with the EC (SIRA Version 2017, Table 7 'BBI Key Objectives' page 62-63)⁴ and in the Impact Assessment of the BBI JU⁵.

The monitoring of the above-mentioned KPIs (Table 1) will be based on data collected from the yearly project reporting. The quantitative KPI information will be completed by qualitative information, e.g. details on interconnected sectors and co-operations' modes for KPI 1, details on what is new in value chains (KPI 2), and details on final markets and bio-based applications (for KPIs 4-6). KPI 3 (number of grant agreements) and KPI 7 (number of flagships) will be measured at programme level and the numbers will refer to successful projects, i.e. those that have signed Grant Agreements and have delivered the expected outcomes. BBI JU ongoing projects report annually on their expected KPI results by 2024 or by the end of the project (the earliest). The verification of these results will take place as the projects finish. BBI JU will report on the progress against KPIs in its Annual Activity Report.

⁴ http://bbi-europe.eu/sites/default/files/documents/BBI_SIRA_web_0.pdf

⁵ http://eur-lex.europa.eu/resource.html?uri=cellar:7959e353-eaf4-11e2-a22e-01aa75ed71a1.0001.01/DOC_1&format=PDF

Table 2: Overall and cross-cutting objectives of BBI JU Programme and related monitoring indicators: Expected contributions of successful 2020 actions.

Objectives & Indicators		Targets	
Objective	A broad participation of SMEs	Target at the end of BBI JU programme	
KPI	Share of EU financial contribution going to BBI JU beneficiaries flagged as SME at Grant Agreement signature stage	20% of EU contribution allocated to SMEs (Horizon 2020 target)	
Objective	Widening participation	Target at the end of BBI JU programme	
KPI	Share of participants and EU financial contribution going to BBI JU beneficiaries originating from newer Member States and Associated Countries, at Grant Agreement signature stage	Increased participation of less active countries ⁶	
Objective	Private funding to be provided according to BBI JU Regulation	Target at the end of BBI JU programme	Addressed in AWP 2020
KPI	PPP leverage: - financial contribution already committed by private members in project selected for funding	Programme level: See article 4 of the BBI JU Regulation	Public funding: EUR 102 million. Private funding: - EUR 49 million in kind contributions by the members other than the Union or their constituent entities consisting of the costs incurred by them in implementing indirect actions less the contribution of the BBI JU and any other Union contribution to those costs.
Objective	Reach an appropriate balance between research, innovation and deployment	Target at the end of BBI JU programme	Addressed in AWP 2020
KPI	Indicative share (%) of RIAs, Demonstration Actions (IA), Flagship Actions (IA) and supporting Actions (CSA)	Programme level: reach a balance of RIA 30,5% – DEMO 30,5% – FLAG 35,5% – CSA 3,5% (of public funding)	RIA 21,6% (EUR 22 million); IA – Demonstration Actions 27,5% (EUR 28 million); IA – Flagship Actions 46% (EUR 47 million); CSA 4,9% (EUR 5 million)

⁶ The participation will be monitored by 1) comparing the participation from a country in the current call with its participation in the previous BBI JU call as well as 2) analysing the evolution of its participation year by year.



The indicators mentioned in Table 2 are part of a broader range of Horizon 2020 Performance Indicators⁷ and together with other indicators will also be included in the BBI JU's Annual Activity Report. Those indicators will be measured at both programme and project level. For example, participation statistics (applicants by country, SMEs) will be extracted at programme level from the general statistics based on the submission and Grant Agreement signature stage for past calls. This will be completed with further details from on-going projects based on data collected from the annual and / or periodic project reporting.

BBI JU Office operational efficiency. BBI JU operates under Horizon 2020 rules and it therefore 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.⁸ The operational monitoring is based on indicators which are common to all Horizon 2020 programmes 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 < 243 days). BBI JU will ensure the efficiency of all operations and the results of its operational monitoring will be included in the Annual Activity Report.

2.1.4. Risk Management BBI JU Annual Work Plan 2020

The BBI JU conducted a risk assessment exercise within the scope of the objectives and priorities set out in the AWP 2020. The risk identification and assessment 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 2019 a total of 4 risks have been identified and described in the Risk Register with varying degrees of importance, convergence and inter-dependency.

The assessment 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 Programme Office and the mitigating actions envisaged in the past will continue to be applied in 2020. In these areas, the Programme Office demonstrates that it is operating to high quality operational standards. Efficiency ratios of operations and risks

⁷ Based on Annex II (PERFORMANCE INDICATORS) and Annex III (MONITORING) to Council Decision 2013/743/EU.

⁸ This legal requirement is set out in Article 31 of the Regulation (EU) No 1291/2013 establishing Horizon 2020.



related to staff are continuously being tested in order to mitigate the threat of an expected increase in workload for the period 2020-2021. This is also the case for those processes that are not yet fully implemented (such as the ex post controls on operational expenditure) and where a closer monitoring of preliminary data will support the relevant control measures already in force.

The process of withdrawal by the United Kingdom from the European Union (Brexit) remains outside the direct control of BBI JU but the organisation got prepared to face possible scenarios and to act according to the guidelines to be defined at central level for all the institutions of the EU.

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 BBI JU throughout the year.

2.1.5. Scientific priorities and challenges

The scientific priorities and impacts for the year 2020 were identified by BIC and the EC, in collaboration with BBI JU, via a wide consultation which targeted industry members of BIC, universities, RTOs, European Technology Platforms and European industry associations, and BBI JU's advisory bodies - the State Representative Group Committee (SRG) and the Scientific Committee (SC).

The scientific priorities are aligned with the SIRA, which presents four main strategic orientations:

1. foster supply of sustainable biomass feedstock to feed both existing and new value chains;
2. optimise efficient processing for integrated biorefineries through research, development and innovation;
3. develop innovative bio-based products for identified market applications;
4. create and accelerate the market-uptake of bio-based products and applications.

A priority paper for 2020 has been developed, which updates the priority paper 2019-2020 of February 2018. The update reflects the priorities left to be dealt with taking into account the AWP 2019. In addition, BIC industry members have included a few new potential themes for 2020.

1. FOSTER SUPPLY OF SUSTAINABLE BIOMASS FEEDSTOCK TO FEED BOTH EXISTING AND NEW VALUE CHAINS

Strategies: expand and diversify the biomass feedstock portfolio through improved utilisation of existing and new sources, aligning logistical systems to meet the demand and including the primary sectors' actors as partners in the new bio-based value chains.



Sub-orientations and potential themes for this strategic orientation and their anticipated impacts are:

AGRI-BASED FEEDSTOCK

- Utilise valuable components in animal residues in bio-based operations: Pursue involvement of primary sector, livestock industry, food processing industry (including e.g. slaughterhouses).

Expected impacts: Rural development; higher employment and income; lower environmental impact and contribution to KPI 1, 2, 4, 5, 6.

- Set-up regional closed-loop systems in biorefinery clusters and hubs; see also “ linking to off-grid renewable energy sources” in SO2

Expected impacts: Rural development; higher employment and income; lower environmental impact and contribution to KPI 1, 2, 4, 5, 6.

- Valorise ‘available biomass that is in surplus of demand for food production’ into products and services. This may be the case in the sugar beet and dairy industries.

Expected impact: prevent the creation of unused land or unutilized feedstock.

- High-value ingredients and products from agro-food residues.

Expected impacts: Rural development, higher income for agro-food industry, less waste and residues routed to disposal, higher environmental sustainability of agro-food processing and contribution to KPI 1, 2, 3, 4, 5, 6.

- Expand the use of lignin as raw material to produce biomaterials

Expected impacts: Higher incomes and market opportunities for forest-based industry; fostered replacement of fossil-based counterparts with lignin-based biomaterials; lower environmental impacts of the processes (compared to existing benchmarks) and contribution to: KPIs 1, 2, 5, 6.

FOREST-BASED FEEDSTOCK

- Use geo-referenced (satellite) data for biomass content of forests and for setting optimal utilisation of forests and forest biomass.

Expected impact: anticipate and combat climate change impacts.



AQUATIC/MARINE FEEDSTOCK

- Exploit marine-based feedstock for the bio-based industry through the use of innovative 'omics' tools, nano-technologies, reactor types, etc.

Expected impacts: Coastal areas development; higher efficiency of marine biomass processing; lower biomass losses during processing stages and contribution to KPIs 1, 2, 4, 5, 8.

BIO-WASTE AND CO₂

- High-value products and nutrients from different bio-waste streams (e.g. livestock effluents, food processing side streams, organic fraction of MSW, wastewater, etc.).

Expected impacts: Valorisation of streams currently being a burden for disposal; lower inputs of 'fresh' nutrients in agriculture; less bio-waste sent to landfill and/or incineration and contribution to KPIs 1, 2, 4, 5, 6.

- Valorise relevant parts of 'waste' and residues from municipalities (not limited to OFMSW).

Expected impact: extend cooperation with municipalities.

- Convert CO₂ into useable platform molecules. This could include atmospheric CO₂ as feedstock.

Expected impacts: Lower environmental footprint compared to identified benchmarks; higher income opportunities for business cases that produce significant amount of CO₂ and contribution to KPIs 1, 2, 4, 5, 6, 8.

2. OPTIMISE EFFICIENT PROCESSING FOR INTEGRATED BIOREFINERIES THROUGH RESEARCH, DEVELOPMENT AND INNOVATION

Strategies: expand the utilisation of new, breakthrough processes for the pre-treatment and conversion of a variety of biomass feedstock and in downstream processing for separation and purification of new bio-based products.



CONVERSION OF PRE-TREATED FEEDSTOCKS TO BIO-BASED CHEMICALS AND MATERIALS

- Use tailored (mixtures of) microorganisms and/or enzymes for co-digestion or co-fermentation of different feedstock; or to enable conversion of new (types of) feedstock. The scope can include the application of biotechnology to break-down 'plastic waste'

Expected impacts: Higher yields in fermentation processes; less impacts of feedstock variability (in terms of e.g. composition, characteristics, seasonality) on conversion yields and contributions to KPIs 1, 2, 4, 5, 6.

- Apply and/or upscale innovative 'omics' tools, synthetic and systems biology, nanotechnologies, electro-chemical, chemo-catalytic, thermo-chemical, biotechnological processes or a combination thereof to convert various types of biomass.

Expected impacts: Higher yields of the targeted products; lower environmental impacts of the processes; achieved bio-based conversion pathways that are currently impossible or too costly to implement and contribution to KPIs 1, 2, 4, 5, 8.

- Valorise manure and/or bio-waste from agriculture into products via biogas/bio-methane.

Expected impact: reduce GHG emissions.

- Combine bioprocessing towards new products with local off-grid renewable energy sources to provide energy (storage) for remote, rural locations with limited power network.

Expected impact: Local valorisation of available biomass feedstock by the use of offgrid energy pre-empting the need to transport biomass.

DOWNSTREAM PROCESSING

- Apply downstream processing technologies to obtain high-purity products and to efficiently recover valuable by- and co-products, as well as water and unconverted biomass in an integrated biorefinery set-up.

Expected impacts: Higher yields in the targeted products compared to existing alternatives; higher recovery rate of unconverted biomass; lower water and/or energy requirements due to recycling and circular approach; lower environmental impacts and contributions to KPIs 1, 2, 4, 5, 8.

SYSTEM MODELLING

- Digitalisation of bio-based processes to increase competitiveness of bio-based value chains.



Expected impact: Improved monitoring of bio-based processes; shorter intervention time in process control operations; higher yields of bio-based processes. Set the basis for ‘big-data’ analysis to reveal trends and learnings for bi-based processes. Learn from modelling in the chemical industry.

3. DEVELOP INNOVATIVE BIO-BASED PRODUCTS FOR IDENTIFIED MARKET APPLICATIONS

Strategies: increase the applicability of high value-added bio-based products and avoid price competition with fossil-based products by pursuing advanced functionalities and unmatched performance.

DROP-IN BIO-BASED PRODUCTS

- Smart bio-based drop-in chemicals to improve bio-based industry’s competitiveness

Expected impacts: Lower environmental impacts of the processes compared to alternative pathways; lower energy requirements; less solvents or toxic chemicals required in the processes and contribution to KPIs 1, 2, 4, 5, 6.

BIO-BASED PRODUCTS THAT OUTPERFORM FOSSIL-BASED COUNTERPARTS

- Bio-based nature-inspired performance materials.

Expected impacts: Improved performances compared to benchmark products and applications; shorter time-to-market of bio-based fibres and materials thanks to their high functionalities and contribution to KPIs 1, 2, 4, 5, 8. Bio-based nature-inspired performance materials.

- Smart packaging

Expected impacts: Improved functionalities of packaging materials; lower costs of bio-based packaging materials compared to the current state-of-the-art and contributions to KPIs 1, 2, 4, 5, 6.

- Bio-based plastics that are degradable, compostable or suitable for recycling.

Expected impacts: Reduced amount of plastics sent to landfill or incineration; reduced environmental impacts associated to end-of-life phase of plastic materials and contribution to KPIs 1, 2, 4, 5, 8.



'NEW' BREAKTHROUGH CHEMICALS AS THE FOUNDATION FOR TOMORROW'S MARKET

- (Co-)polymerisation processes based on new bio-based monomers.

Expected impacts: Lower energy requirements in the processes; lower environmental impacts of the target processes; the obtained polymers at least matching performances of benchmarks and contribution to KPIs 1, 2, 4, 5, 6.

PROTEINS AND ACTIVE INGREDIENTS FOR FEED/FOOD, PHARMA AND COSMETICS

- Provide nutrition solutions for food and feed

Expected impacts: resolve issues with dedicated functionalities and applications.

- Innovative approaches to obtain proteins and other high-added products from 'unusual feedstock'

Expected impacts: Higher extraction yields of the target compounds; lower environmental impacts of the developed processes compared to identified alternatives; high-purity products for high-value applications and market sectors and contributions to KPIs 1, 2, 4, 5, 6.

4. CREATE AND ACCELERATE THE MARKET-UPTAKE OF BIO-BASED PRODUCTS AND APPLICATIONS

Strategies: Respond to the concerns of society about bio-based products by engaging in dialogue with societal and consumer groups on benefits and how potential risks are addressed and managed. Also, contribute to education to ensure adequate supply of needed skilled personnel for the current and future bio-based industry and research activities.

POLICY AND REGULATORY REQUIREMENTS

PUBLIC AWARENESS AND ACCEPTANCE

- Include society and end consumers in designing the bio-based sector in Europe



Expected impacts: acceptance and support of bio-based applications in day-to-day life.

PUBLIC AND PRIVATE
DEMAND

- Expand the bio-based industry across Europe.

EDUCATION

- Identify opportunities for careers, education and research activities in the European bio-based sector.
- Identify best practices of inclusive bio-based business models

Expected impacts: Rural development; spread knowledge about opportunities linked to bio-based business cases; optimised solutions for efficient bio-based value chains.

2.1.6. Follow-up of the 2019 Calls for proposals

The 2019 Call was closed on 4 September 2019. A total of 184 proposals were received, from 178 were admissible and eligible. The proposals were evaluated by independent experts, first remotely as of 16 September and then centrally between 14 October and 8 November 2019 over three non-consecutive weeks. The ranking list of projects to be funded is expected to be adopted by the Governing Board at the end of 2019. In accordance with the established procedures, the Grant Agreement Preparation phase starts directly after the Governing Board decision and is expected to be concluded during May 2020.

ACTIVITIES FOR 2020

Finalisation of the 2019 call management process (*)	
Finalisation of evaluations (information on outcome of the evaluation)	Q4 – 2019 / Q1 2020
Preparation and signature of the grant agreements for the selected proposals	Q1/Q2 - 2020
Pre-financing payments	Q2 – 2020
Follow-up of project implementation	Starting Q2 - 2020

(*) maximum 8 months from the final date for submission of completed proposals (4/09/2019), according to Horizon 2020 rules

2.1.7. The 2020 Call for proposals

INTRODUCTION

This annual work plan (AWP) follows the structure of the strategic innovation and research agenda (SIRA)⁹ of the Bio-based Industries Consortium (BIC). BIC and the EC developed the SIRA based on extensive consultation with public and private stakeholders.

The topics of this AWP are highly relevant to meeting commitments under the [UN Sustainable Development Goals](#) (SDGs) and [the COP 21 Paris Climate Agreement](#). The actions addressing the topics will help implement important EU policies and initiatives such as the European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy '[A Clean Planet for all](#)', the transition from a fossil to a sustainable bio-based economy, the need for circularity and industrial transformation, and the [EU Bioeconomy Strategy](#).

This AWP also includes topics that address the need for knowledge and technologies to ensure sustainable implementation of the new EU directives on the landing obligation of fish bycatch and on the sorting of textiles from municipal waste.

Unless otherwise specified in this AWP, 'Europe' means Member States and Horizon 2020 Associated Countries. For specific terms, please refer to the glossary.

⁹ Strategic Innovation and Research Agenda, May 2017; Bio-based industries for development and growth in Europe; see <http://biconsortium.eu/library/bic-documents>.



STRATEGIC ORIENTATIONS AND SUB-ORIENTATIONS

At the heart of the SIRA, and central to BIC's mission, are the bio-based value chains and the pillars around which they are structured, which aim to:

- foster supply of sustainable biomass feedstock to feed both existing and new value chains;
 - optimise efficient processing for integrated biorefineries through research, development and innovation;
 - develop innovative bio-based products for identified market applications; and
 - create and accelerate the market uptake of bio-based products and applications.
- These pillars form the four strategic orientations of the bio-based industry in Europe. Each strategic orientation (SO) has sub-orientations.

THE POSITIONING OF A TOPIC IN THE ANNUAL WORK PLAN

This AWP follows a **non-prescriptive approach** with open topics. Any examples given, such as for feedstock and market applications, have been given for orientation only. Other innovative approaches are also welcome.

The focus of a topic in the AWP 2020 determines its positioning in a particular SO and relevant sub-orientations. For example, if a topic focuses on a new technology for the conversion of biomass feedstock into compounds for further valorisation, the topic will be placed in SO2 (processing). However, the positioning of a topic in a specific SO does not mean that its scope is limited to that SO. On the contrary, all SOs together make up a value chain and any proposal for a topic in an SO must take the full value chain into consideration, the aim being to optimise the value chain. The extent to which this needs to happen depends on the type of action. A **research and innovation action** (RIA), for example, may focus on resolving a technological challenge in a value chain (placing it in SO2), but does so to make an existing full value chain operate better or make a totally new value chain possible. An **innovation action** (IA – demonstration and flagship) must cover a full value chain, from feedstock (SO1) to market uptake (SO4), even if it focuses on a specific SO.

REFERENCE TO THE STATE OF THE ART AND TO OTHER PROJECTS

All proposals (except for Coordination and Support Actions – CSAs) should specifically demonstrate the **benefits versus existing state-of-the-art** technologies. This might include evidence of new processing solutions and/or new products obtained.



Also, even if not stated explicitly in a topic, proposals should always be **complementary and demonstrate synergies with other projects** funded under FP7, Horizon 2020 or other funding schemes, on either European or national level, and both ongoing and concluded schemes. The proposals should reflect awareness of the objectives of running projects in relevant fields to avoid overlap. Proposals for higher technology readiness levels (TRLs¹⁰) should build upon projects that ended at lower TRLs.

SUPPLY CHAIN AND PRIMARY SECTORS

All proposals must ensure that the biomass supply chain is sustainable. In cases of biomass supply from the agricultural and marine sectors, the proposals must show that they can integrate with the food chain and are not in competition with it but can help to enhance it. In addition, the proposals do minimise any direct or indirect land use change (ILUC) or water and soil health imbalances.

In particular, proposals including feedstock supply by primary sector(s) should seek to involve actors from the related **primary sector(s) as strategic partner(s)** in the value chain and as beneficiaries in the project consortium. The primary sector's actors should indeed participate in the design of the targeted value chains and benefit from them. These benefits can include: (i) greater levels of employment; (ii) more high-skilled employment; (iii) better paid employment; and (iv) strengthening of the local or regional economy.

Proposals focusing on integrating biomass feedstock supply should offer solutions to the technical and economic hurdles affecting cultivation and harvesting of the biomass in the targeted **biomass feedstock supply** systems. The proposals should also offer solutions to problems in the logistics, transport modes and associated infrastructure for these systems. These hurdles and bottlenecks may include collection systems, intermediate storage and safety aspects. Dealing with these hurdles and bottlenecks should in particular be covered by the IA-demonstration and flagship projects.

SUSTAINABILITY, BIODIVERSITY AND END OF LIFE

If applicable, proposals must describe the expected **ecosystem service gain** that could be achieved by the implementation of the project. The proposals should also take into account the expected positive impacts on **biodiversity**¹¹ in the targeted value chains.

All proposals must commit to conducting, as part of the project and in at least part of a work package, an **environmental assessment** using **life-cycle assessment (LCA)** methodologies. These methodologies should be based on widely used standards and certifications, and they should make use of accepted

¹⁰ Technology readiness levels as defined in Annex G of the general annexes to the Horizon 2020 work programme: http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-ga_en.pdf.

¹¹ See released chapters of the [Global assessment report and ecosystem services](#) (May 2019) of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).



and validated approaches¹². This means that when a consortium has developed a process or a product, an LCA should be performed to assess the environmental impacts of the process or product. LCAs 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 products¹³.

Along with environmental and economic impacts, if applicable, the social impacts of the products or processes developed should also be analysed, in particular the potential impacts on job retention and/or job creation.

For **research and innovation actions (RIAs)**, the LCA may be limited to identify critical issues early on and steer the development process in the right direction. In these cases, it is essential that the proposal includes a careful explanation of how and why the critical issues were selected so that the expert evaluators can assess the proposal. Points to be addressed in such LCAs are:

- The 'impact criteria' including: (i) the use of water, biomass resources and energy; and (ii) greenhouse-gas emissions.
- Uncertainties related to the LCA approach including: limitations, data gaps, and the sensitivities of any modelling performed.
- A series of other questions: What is the function and added value of this product? What is the target market? How will consumers use the product? What are the necessary materials, products or processes? Is there more than one approach to using this product? What are the potential risks? Where will the targeted product or material end up when it is no longer used, and how will it be further treated, if needed? What are the specific, bio-based considerations potentially relevant to this LCA (such considerations could include: (i) how to measure the performance/safety of the project; (ii) what the project's effects will be on the environment; (iii) whether there are specific data on the chemical, bio-based material, product or process; (iv) the performance of the product; and (v) the limits of the operational system).

¹² See '[Life cycle thinking and the use of LCA in policies around the world](#)', 2017.

¹³ 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), which has published:

- EN 16751:2016 (Bio-based products — Sustainability criteria);
- EN 16760:2015 (Bio-based products — Life Cycle Assessment);
- CEN/TR 16957:2016 (Bio-based products — Guidelines for Life Cycle Inventory (LCI) for the End-of-life phase).

See also:

- the Commission Recommendation on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations (2013/179/EU) at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013H0179&from=EN>;
- the International Reference Life Cycle Data System (ILCD) Handbook developed by the European Commission Joint Research Centre (http://eplca.jrc.ec.europa.eu/?page_id=86);
- the Guide for Interpreting Life Cycle Assessment Result, (2016), developed by the European Commission Joint Research Centre, 2016 (<https://ec.europa.eu/jrc/en/publication/guide-interpreting-life-cycle-assessment-result>); and
- The European Platform on Life Cycle Assessment (<http://ec.europa.eu/environment/ipp/lca.htm>).



RIA proposals should also include a check of the economic viability of the products and processes developed. This check should include an analysis of the value chain and market, and an assessment of pricing risks in the bio-based products. Where applicable, an analysis of social impacts should also be included in RIA proposals.

Innovation actions - **demonstration actions** must assess the environmental and economic impacts of the developed processes and/or products on the different stakeholders and actors involved in the value chain (e.g. members of the consortium, society, consumers and local communities), via an LCA and an LCCA. If applicable, proposals should also analyse social impacts, in particular the potential for job retention and/or job creation, and the need for an appropriately skilled workforce.

Innovation actions – **flagship actions** must fully assess the environmental, economic and social impacts of the products or processes developed. This assessment must use life-cycle sustainability assessment (LCSA) methodologies based on standards, certifications and approaches that are widely used and validated.

The applicants are encouraged to take note of the EIB Statement on Environmental and Social Principles and Standards¹⁴ and to follow the EIB Environmental and Social Handbook¹⁵.

Proposals for projects on the **biodegradability** of materials or products should assess their projects by applying the appropriate criteria, acknowledging that the biodegradability tests¹⁶ are not suitable for every natural polymer and not available for all specific environments. The European Chemicals Agency's proposal of January 2019 restricting the intentional use of microplastics¹⁷ applies a broad definition of 'polymer'. This proposed definition includes modified lignin under the scope of microplastics restrictions. Lignin is a natural polymer but may be chemically modified in industrial processes. Because the current biodegradation tests measure mineralisation by CO₂ production, they

¹⁴ <https://www.eib.org/en/publications/environmental-and-social-principles-and-standards>

¹⁵ https://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

¹⁶ Biodegradability is measured with the following tests:

- Council Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Part C.4, C.5, C.9 in conjunction with C.6 and C.42 of the Annex;
- OECD Guidelines for the Testing of Chemicals No 301 — Ready Biodegradability; OECD 302 — Inherent Biodegradability; OECD 306 — Biodegradability in Seawater; OECD 310 — Ready Biodegradability — CO₂ in sealed vessels (Headspace test);
- or equivalent methods.

Moreover, and contributing substantially to the reduction and avoidance of marine and terrestrial litter, testing should build upon existing standards and test approaches set out below:

- EN 13432 — Packaging — Requirements for packaging recoverable through composting and biodegradation — Test scheme and evaluation criteria for the final acceptance of packaging;
- EN 17033 — Plastics — Biodegradable mulch films for use in agriculture and horticulture;
- EN 14995 — Plastics — Evaluation of compostability — Test scheme and specifications;
- ISO 14851 and 14852 — Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium;
- TG 306 — Biodegradability in Seawater;
- TG 305 — Bio-concentration: Flow-through Fish Test.

¹⁷ <https://echa.europa.eu/-/echa-proposes-to-restrict-intentionally-added-microplastics>



do not represent the biodegradation route of lignin. This biodegradation route proceeds on the basis of biological processes leading to beneficial humus compounds.

Proposals for projects on **recyclability** of materials or products should include the phase of their lifecycle where the envisaged materials or products are captured/separated for recycling (e.g. intermediate processing steps, end of life). Proposals should take into account that different materials applied in e.g. multi-layered products may cause a barrier to the recyclability of bio-based products. (The same issue exists for fossil-based products; however, these products have mature separation and recycling processes.)

Proposals should also include whether these materials or products are recycled into conversion steps or reuse. For either recycling route, proposals should include whether the adequate recycling system is existing, in development, or absent and should be developed. Finally, proposals should meet accepted standards for recyclability.

Proposals for projects that include **compostability** (organic recycling) of materials or products must include the specific conditions (e.g. temperature, timeframe) under which the materials or products need to biodegrade. These conditions are described in standards such as the European standard on industrial composting EN 13432 for packaging and EN 14995 for plastic materials in general. Proposals should also take into account that different materials need different conditions to compost and this may cause incomplete or inefficient composting.

TARGETED PRODUCTS, SAFETY ASPECTS AND STANDARDISATION

As part of the BBI JU AWP, '**bio-based chemicals and materials**' can include **components and ingredients for food and feed**. Proposals addressing bio-based chemicals and materials therefore should interpret these chemicals and materials in a broad sense: they can include polymers; fibres; proteins; food and feed ingredients; bioactive chemicals; etc.

Where relevant, proposals should include **process and product safety** (and thus also occupational and consumer safety) as elements for consideration in any value chain, especially when new products and materials are obtained. Any potential hazards associated with the developed processes and products should be analysed to check that the products will comply with any relevant EU legislation on chemicals risk management, toxicity and safety.

If relevant, proposals should also allow for the **pre-normative and co-normative research** needed to develop the necessary quality standards for the product. Pre-normative research is the research carried out to establish the validity and reliability of the subject matter to be standardised. Co-normative research is the research that is necessary to quantify the repeatability, reproducibility and uncertainty of the procedures that are incorporated in the standard.



BUSINESS PLAN, PROJECT'S RESULTS AND DISSEMINATION

Proposals for RIAs may include more general considerations on the potential market for the envisaged products. However, proposals for both types of IAs (i.e. demonstration actions and flagship actions) should be based on a sound **business case and a business plan**. Proposals for both types of IAs should also seek an appropriate integration and remuneration of primary biomass producers and biomass suppliers.

The **technology readiness level**¹⁸ (TRL) envisaged at the end of the project must always be given in the topic description, and proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project. It goes without saying that the project proposal should enable the technology or system to achieve the end TRL within the project timeframe.

On the **expected impacts**, proposals should include convincing evidence of the claimed impacts. The claimed impacts should be quantified and based on calculations if the expected impact in the topic text is specified quantitatively (for example, 'it will decrease biomass losses by x%¹⁹'). If the expected impact in the topic text is not specified quantitatively (for example 'it will reduce residual streams'), the applicants should include convincing evidence that the expected impact can be achieved and indicate the level of improvement with adequate justification.

Proposals should also include a clear and convincing **dissemination and exploitation plan** to: (i) share the results with the bio-based industry, the public sector, R&I organisations, and consumers; and (ii) make use of the results (in particular through transfer or licensing). Proposals, in particular on innovation-action topics, should consider using bio-based materials for their dissemination activities and materials.

STANDARD REQUIREMENTS FOR PROPOSALS FOR THE DIFFERENT ACTIONS

Proposals for RIAs and for IAs (whether demonstration actions or flagship actions) must address a number of specific requirements that are standard for the respective action. Rather than repeating these standard requirements in each topic, the topic scope will refer to Table 3 below. Any proposal must address all items given for the specific action in this table.

And **proposals must always refer to the topic text**. This includes specific requirements to be met and which may not be taken up in the following table.

¹⁸ Technology readiness levels as defined in Annex G of the general annexes to the Horizon 2020 work programme: http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-ga_en.pdf.

¹⁹ The proposal should present a convincing justification of the calculation of this rate, based on established econometric models and statistical data.



Table 3: 'Standard requirements' for proposals for the different actions

	RIA	IA – demonstration action	IA – flagship action
Benefits versus the state of the art	Proposals should specifically demonstrate the benefits versus the state of the art (including versus fossil-based counterparts, if applicable) and existing technologies. This should be done by providing evidence of new [or more efficient] processing solutions and new products obtained.		
Relationship with other projects	Proposals should build on and seek complementarity with completed and ongoing projects funded under FP7, Horizon 2020 (including the BBI JU programme) or national funding schemes. This will avoid overlap. Proposals should promote synergies and advance beyond the state of the art.		
Logistics	N/A	Proposals should seek to resolve technical and economic problems affecting logistics, transport modes and associated infrastructure in the targeted biomass feedstock supply systems. These problems could cover collection systems, intermediate storage and safety aspects.	
Biodiversity preservation and enhancement	Proposals should take into account biodiversity preservation and/or enhancement if applicable.	Proposals should guarantee biodiversity preservation in the targeted value chains, and, if applicable, strive towards biodiversity enhancement. In both cases a justification has to be provided.	

	RIA	IA – demonstration action	IA – flagship action
Sustainability assessment	Proposals should commit to assessing, as part of the project, the <u>environmental and economic impacts</u> of the products or processes developed, using LCA methodologies based on standards, certifications and approaches that are widely used and validated.		Proposals should commit to carrying out, as part of the project, a full assessment of the <u>environmental, economic and social impacts</u> of the developed products or processes, using life-cycle-sustainability assessment (LCSA) methodologies based on standards, certifications and approaches that are widely used and validated.
	If applicable, proposals should also analyse the <u>social impacts</u> .	Proposals should also analyse the <u>social impacts</u> .	
	The LCA may focus on a set of critical issues early on to steer the development process in the right direction. In this case, it is essential that this selection is carefully explained in the proposal in order to allow for expert assessment.	N/A	N/A
	Proposals should also include a check of the <u>economic viability of the products and processes developed</u> (including an analysis of the value chain and market).	N/A	N/A



	RIA	IA – demonstration action	IA – flagship action
Compliance with relevant EU legislations	Depending on the final applications of the targeted products, proposals should analyse any potential hazards associated with the developed processes and products. The proposals should also check that the products will comply with any relevant EU legislation on chemicals risk management, toxicity and safety.		
Standardisation aspects	If relevant, proposals should allow for the pre-normative and co-normative research necessary for developing the needed quality standards for the product.		
Business plan	N/A	Proposals should be based on a sound business case and business plan.	
Business models	N/A	Proposals should include the specifications of an inclusive business model, with all actors (from feedstock providers through to the final sellers) as partners and beneficiaries of the new value chain. These inclusive business models must be the ones that make all expected impacts referred to in the IA topics.	



STRATEGIC ORIENTATION 1. FOSTER SUPPLY OF SUSTAINABLE BIOMASS FEEDSTOCK TO FEED BOTH EXISTING AND NEW VALUE CHAINS

Make better use of existing feedstock sources

BBI₂₀₂₀.SO1.D1 – RESOLVE SUPPLY-CHAIN HURDLES FOR TURNING RESIDUAL WASTE STREAMS INTO FUNCTIONAL MOLECULES FOR FOOD AND/OR NON-FOOD MARKET APPLICATIONS

SPECIFIC CHALLENGE:

Residual streams from various industries contain functional molecules that could be used for food and non-food market applications. The functions of interest depend on the intended use of the final products that operators intend to make with the targeted molecules. Residual streams are any streams that are not main products of an industrial operation and are disposed of at low or no value. They include residues from the agricultural, livestock, marine, aquatic, fisheries, food processing, forestry and forest-based industry sectors.

Today, most of these residual streams either find low-value applications that are mainly based on their calorific content (i.e. they are used as fuel), or they are not used at all, often because of supply-chain constraints. The supply-chain constraints could be due to a variety of reasons, including: (i) the relatively long distances between where the residues are generated and where they can be processed; (ii) the low density and/or high water content of the residues; (iii) the capacity of available processing units exceeding available local feedstock.

It is crucial that the functional molecules from these residual streams be separated in a way that is cost-efficient, energy-efficient and eco-efficient. This will mean that these molecules can be made available for subsequent use in higher-value applications, which will provide significant employment and income opportunities for the primary sectors and may improve the commercial sustainability of existing processes.

Fully enjoying the opportunities of these functional molecules will only be possible if the availability of the residual streams can be maximised by resolving any supply-chain constraints.



Various technologies exist to separate and convert the functional molecules from residual streams into high added-value intermediates and products. However, the applicability of these technologies depends on sustainable integration of the feedstock supply.

The **specific challenge** is to resolve supply chain hurdles and enable the recovery and processing of functional molecules in residual streams from various sectors.

SCOPE:

Create and integrate a sustainable supply-chain system into a value chain that is capable of using available or new technologies to use functional molecules in residual streams in high-value food and/or non-food applications.

The scope of this topic includes all necessary steps to collect, transport and store the residual streams being targeted at the processing site. These steps could include pre-treatment actions if they are necessary to transport and/or store any of the targeted residual streams. The quantities, qualities and physical original physical locations of these streams determine the optimal location and size of the operational site that they integrate into. The operational sites can be either centralised large-scale biorefineries, or small/medium-scale processing units, or a combination thereof.

Proposals must be suitable for direct acceptance and implementation by farmers, foresters or fishers, depending on the supply chain addressed. Proposals therefore need to include these actors in the related primary sector as strategic partner(s) leading the value chain. The involved primary producers should participate in the design of the value chain and benefit from its results. In order to increase the participation of primary producers, it is recommended to promote the participation of relevant cooperatives as members of the consortium, as well as to foster the role of advisors or innovation brokers to support ('speak on behalf of') primary producers during the project implementation. Proposals should consider establishing an advisory board of primary producers that collaborates with the consortium by advising on and measuring the impact of the project.

Proposals should include processing operations tailored to local circumstances. These operations will need to cope with availabilities, distances, qualities of the residual streams, possible variations in these qualities, etc. The business case underlying the proposal must include a feasibility assessment (technological and financial) of: (i) the associated processes at the envisaged scale; and (ii) combinations with other relevant processes.

The biomass-feedstock supply chain is an essential part of the expected project proposals. Proposals must include proof that sufficient quantities of the targeted residual streams are available and exploitable to effectively and sustainably maintain the business case for future upscaling to commercial levels.



Proposals should include upstream processes if needed (e.g. pre-treatments), conversion routes, and downstream processes. Cascading concepts are a relevant part of the proposals.

Proposals may include physical, chemical or biotechnological routes (or combinations of these).

The designed value chain aims specifically at using the inherent functions of the residual streams. It focuses therefore on producing intermediates that equal or outperform their fossil-based counterparts. The targeted high-end market applications are necessarily more valuable than the market applications of these streams in the energy sector.

Proposals should also include market actors in the targeted market sectors to ensure application and economic impact.

If proposals aim at food applications, they must also include considerations of consumer safety and consumer perception of the targeted consumer applications. Any potential hazards associated with the developed processes and products should be analysed to check that the products will comply with relevant EU legislation on chemicals risk management, toxicity and safety.

Proposals must address all the requirements for demonstration actions shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 6-7. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum contribution of EUR 7 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KEY PERFORMANCE INDICATORS (KPIs):

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — create at least one new bio-based value chain;
- contribute to **KPI 6** — demonstrate at least two new consumer products containing bio-based food and/or non-food functional molecules that meet market requirements.

ENVIRONMENTAL IMPACTS:

- reduce overall CO₂ emissions in the value chain by 20%, including from road transport where applicable;
- reduce landfill in the region of the selected processing location;



- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.

ECONOMIC IMPACTS:

- extract at least 50% more value from the residual streams compared with the state of the art;
- produce at least one B2B or B2C product in sufficient quantities to allow validating the value chain.

SOCIAL IMPACTS:

- create new job opportunities in the bio-based sector in rural, coastal and/or urban areas;
- contribute to social development in the related primary sector(s) (e.g. rural, forest or coastal development) by adding new value-chains and by creating sustainable, high-tech jobs supported by educational and training steps as needed;

TYPE OF ACTION: Innovation action – demonstration action.

Make greater use of under-used or new feedstock for bio-based industries

BBI₂₀₂₀.SO₁.F₁ – VALORISE THE ORGANIC FRACTION OF MUNICIPAL SOLID WASTE THROUGH AN INTEGRATED BIOREFINERY AT COMMERCIAL LEVEL

SPECIFIC CHALLENGE:

The organic fraction of municipal solid waste (OFMSW) presents an important feedstock for biorefining to convert it into valuable compounds for applications in a variety of market segments. However, this precious feedstock is often perceived as a challenge for urban agendas, due to its potential pressure on the environment and human health. Together with other waste streams, the OFMSW is often used for energy recovery or sent to landfill. This pre-empts exploiting its potential for valuable products achievable in cascading operations. Aerobic (composting), anaerobic digestion and energy recovery processes on the OFMSW have been able to reduce this fraction going to landfill. However, these processes mainly result in low-value products such as compost, biogas and digestate, and incineration of valuable resources.

Building on earlier projects on OFMSW, industry is ready to scale up the total value chain to a first-of-a-kind biorefinery at commercial level. Successful operation at this level will start to realise a better exploitation of the potential of the OFMSW in Europe.



The **specific challenge** is to sustainably scale up the conversion of OFMSW into added-value products to commercial levels.

SCOPE:

Produce large-scale added-value end products from the OFMSW for identified market applications in a successfully operating, first-of-its-kind biorefinery.

This topic excludes proposals having compost, digestate, biogas, methane or biofuels as the main products. It also excludes proposals having OFMSW sub-streams (such as food-processing waste, food waste from hotels, restaurants and the catering industry) as the main part of the feedstock for biorefining.

If applicable, the OFMSW may be mixed with municipal wastewater sludge, but keeping the OFMSW as the main fraction. Complex and heterogeneous municipal solid waste must be the main feedstock addressed by proposals.

The activities of this biorefinery must be included in a strategy for the valorisation of the OFMSW resources of the area where the biorefinery is operating. In particular, projects should realise a biorefinery that is integrated in the existing territorial waste management schemes and policies, involving all relevant stakeholders from the public and private sectors, and seek to improve and optimise current waste management schemes and practices in the subject territory.

Proposals should be fit for replicability in other territories.

The envisaged biorefinery should fully integrate feedstock supply and processing technologies to deliver products with targeted functionalities to meet identified market demand at competitive prices. It should demonstrate effective and cost-efficient operation at a commercial level, applying where relevant the cascading use of the biomass feedstock to maximise resource efficiency.

Proposals may include any processing technology (excluding those leading primarily to compost, digestate, biogas, methane or biofuels) that has been demonstrated in an optimised value chain at TRL 6-7 and should encompass all processing stages leading to intermediate and end products.

Proposals should address all requirements for IA - flagship actions as shown in Table 3 in the Introduction.

The technology readiness level (TRL) at the end of the project should be 8. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:



It is considered that proposals requesting a maximum contribution of EUR 15 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** – create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** – create at least one new bio-based value chains;
- contribute to **KPI 4** – produce at least one new building block based on OFMSW;
- contribute to **KPI 5** – produce at least one new bio-based material based on OFMSW;
- contribute to **KPI 6** – Demonstrate at least one new ‘consumer’ products based on bio-based chemicals and materials that meet market requirements.

ENVIRONMENTAL IMPACTS:

- increase the overall resource efficiency;
- reduce quantities of OFMSW routed to landfill and incineration as compared with relevant business cases identified as benchmarks;
- reduce greenhouse gas emissions.

ECONOMIC IMPACTS:

- increased added-value to bio-based products resulting from underutilised feedstocks;
- increase income and business opportunities for stakeholders and actors in the bio-based sectors, in particular in the collecting, management and treatment of OFMSW.

SOCIAL IMPACTS:

- create new job opportunities in the bio-based sector, particularly the rural and/or urban areas;
- retain and/or develop new skills.

TYPE OF ACTION: Innovation action – flagship action.



BBI₂₀₂₀.SO₁.D₂ — USE BIOGENIC GASEOUS CARBON TO INCREASE FEEDSTOCK AVAILABILITY FOR THE INDUSTRY

SPECIFIC CHALLENGE:

Gaseous-carbon emissions are a threat to climate stability when they exceed the extraction capacity of plants, forests and the sea. This threat has been present since gaseous-carbon emissions from industrial activities started to add to the natural (biogenic) carbon cycle. Some sections of industry are therefore seeking to create a low-carbon emission economy by avoiding or reducing fossil-based carbon emissions or capturing these emissions for storage or use. Carbon-containing emissions are also potential feedstock sources for industry (serving as 'C1-carbon' sources). Some conversion and use technologies for gaseous carbon have been proven in the laboratory and even at pilot scale. It is now time to scale up these technologies to demonstration level so they can subsequently be commercialised.

The bio-based industry can demonstrate efficient recycling and recovery concepts for its biogenic gaseous emissions. Turning biogenic emissions into something of value by producing valuable chemicals contributes to the industry's 'zero-waste' biorefining objectives and abates climate change.

Biogenic gaseous carbon can be used: (i) as a feedstock for the conversion into platform chemicals; (ii) to increase the growth of biomass as feedstock for industrial exploitation; or (iii) to create energy solutions. However, the last option is not within the scope of this topic.

The **specific challenge** is to use biogenic gaseous carbon as a feedstock for the bio-based industry through: (i) direct conversion into bio-based chemicals or intermediates; or (ii) growing new biomass sources.

SCOPE:

Demonstrate the conversion of biogenic gaseous carbon into chemicals or intermediates for: (i) further processing into value-added applications; or (ii) using to grow new biomass.

Eligible gaseous feedstocks within the scope of this topic are: (i) C1-carbon emissions from biorefineries or any other bio-based operation, including anaerobic fermentation processes (e.g. in brewing and bioethanol production) and hydrothermal liquefaction and gasification of biogenic feedstock; and (ii) CH₄ (methane) and CO₂ from biogas²⁰ or syngas plants.

²⁰ Biogas consists of 60% CH₄ and 40% CO₂. Both biogenic gases can be utilised in an integrated concept to produce bio-based chemicals or intermediates, or used for growing new biomass sources. The number of biogas plants in the EU is increasing significantly (already more than 17,400 in 2015) of which only a fraction feeds into the natural gas grid, leaving large volumes of the gas available as local sustainable feedstock for conversion into added-value products.



All proposals must include a description of the necessary logistics for the capture and preparation of the biogenic C1-carbon feedstock.

If the biogenic gaseous-carbon sources are mixtures, proposals must include cleaning or purification phases to prepare the C1-carbon feedstock for efficient conversion steps.

Proposals for converting the biogenic gaseous carbon into chemicals or intermediates can apply any relevant technology (biotechnological, chemical, combinations, etc.). Proposals must include the appropriate size for the operations (small, medium or large) to adequately handle the local availability of the feedstock sources. These sources could be dispersed over relatively long distances. Early involvement of equipment/machinery developers is essential. The business case underlying the proposal must include a feasibility assessment (technological and financial) of the associated processes at the planned scale and location, and in combination with other relevant processes.

Proposals for using biogenic gaseous carbon to grow biomass as feedstock for industrial exploitation must focus on capture, pre-treatment (as necessary), and the steps needed to grow biomass.

All proposals must show a clear direction for the envisaged value chain by including next steps to develop value-added products and applications.

Proposals must demonstrate the life-cycle benefits of the project.

The scope of this topic does not include processes that will lead to energy, fuel, or electro-fuels.

All proposals must address all the requirements for demonstration actions shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 6-7. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum contribution of EUR 7 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — create at least one new bio-based value chain;
- contribute to **KPI 6** — demonstrate at least one new consumer product based on bio-based chemicals and materials that meet market requirements.



ENVIRONMENTAL IMPACTS:

- reduce greenhouse gas (GHG; including CO₂) emissions (expressed in CO₂ equivalents) by at least 20% through the capture and use of the biogenic gaseous carbon from the value chain being addressed;
- help replace fossil-based products with bio-derived GHG-based alternatives; or prevent the use of fossil-based feedstock by introducing new bio-based products for needed applications for which there is no fossil-based counterpart;
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material by using biogenic emissions as raw materials.

ECONOMIC IMPACTS:

- diversify the incomes of the bio-based sector(s) from which the targeted gaseous emissions originate;
- produce at least one B2B or B2C GHG-based product in sufficient quantities to allow validating the value chain.

SOCIAL IMPACTS:

- create new job opportunities in the bio-based sector in rural, coastal and/or urban areas;
- increase the competitiveness of European biomass producers and the bio-based industry by increasing: (i) feedstock and energy efficiency; (ii) business growth; and (iii) investment, while ensuring environmental sustainability and an increase in local biodiversity.

TYPE OF ACTION: Innovation action – demonstration action.

BBI₂₀₂₀.SO₁.F₂ — TURN LIGNIN INTO MATERIALS AND CHEMICALS FOR HIGH-END APPLICATIONS

SPECIFIC CHALLENGE:

Lignin occurs in wood and non-wood cellulosic biomass. It is available in very large quantities as a by-product of lignocellulosic biorefineries and chemical pulping operations. Although it is a valuable biopolymer, it is currently mainly burnt as low-value fuel.

Several projects are running or have been completed at demonstration levels (TRL 6-7) to turn the by-product lignin from industrial operations into added-value products, often replacing fossil-based counterparts in the process. Industry now sees enough opportunities to scale up these value chains to commercial levels. Large-scale transformation of lignin into high-end applications will significantly improve the economics of lignocellulose biorefineries. And replacing fossil-based products with lignin-based high-end products will make a significant contribution towards a climate-neutral Europe by 2050.

Lignin can be used 'as is' in various added-value applications, among others in the construction industry. In the latter case, lignin is able to sequester biogenic carbon for decades, and can substantially contribute to climate change mitigation. Lignin can also be treated to increase its usability in chemical and biotechnological processing. This processing allows it to be used in fibre applications, platform chemicals, and building blocks. The high polymeric character of lignin means it contains many functionalised molecules. Smart processing steps can therefore retain the desired polymerisation and functionality. Functionalised building blocks can lead to high-end applications in a variety of market sectors.

The **specific challenge** is to sustainably commercialise the transformation of lignin into chemicals and materials for high added-value applications.

SCOPE:

Produce on a large scale, in a first-of-its-kind operational setting, components from by-product lignin for use in established or newly emerging high-value applications²¹.

The scope of this topic is to make use of lignin-containing by-products from existing operations that today are 'wasted' or burnt, provided they will be sustainable feedstock for large- or medium-scale

²¹ In contrast to the flagship topic BBI VC3.F2 – 2014, this topic's scope is to commercialise specifically the by-product lignin from existing lignocellulosic biorefineries that today finds no or low-value use. The scope of this topic also differs from that of the RIA topic BBI2020.SO2.R2, which is about developing a new processing scheme to valorise (the major part of) all fractions of lignocellulose, whereas F1 focuses on lignin alone. Moreover, the topic is different from the flagship topic BBI 2017.F1, whose scope was indeed to valorise all fractions of the feedstock (not necessarily lignocellulosic biomass) targeting a 'zero waste' biorefinery.



operations. This topic's objective is to resolve an existing situation of under-use of the by-product lignin from lignocellulosic biorefineries, not to use crops that are cultivated specifically for lignin.

The scope of this topic includes both greenfield biorefineries and refurbished industrial facilities.

Proposals must include the related feedstock supplying sector(s) as strategic partner(s) in the value chain. This means that these sectors must participate in the design of the value chain and benefit from the value chain. These benefits can include: (i) greater levels of employment; (ii) more high-skilled employment; (iii) better-paid employment; (iv) strengthening of the local or regional economy; and (v) increasing local biodiversity. In order to increase the participation of the primary sector actors, it is recommended to promote the participation of representative organisations (such as agricultural cooperatives for farmers) as members of the consortium, as well as to foster the role of advisors or innovation brokers to support ('speak on behalf of') the primary sector actors during the project implementation.

An essential requirement for project proposals under this topic is high efficiency in: (i) feedstock preparation; (ii) processing steps; (iii) formulation of materials into applicable high-end products; and (iv) formulation of building blocks into applicable high-end products. Proposals might therefore consider including digital technologies and tools to achieve high efficiency in all stages of the value chain.

The scope of this topic includes any processing technology with a proven track record of converting lignin into desired materials and components at lower TRLs.

Proposals must clearly specify the targeted chemical building blocks or materials from the lignin-conversion steps. Proposals must also clearly specify the identified or newly emerging market application for the building blocks or materials.

The scope of this topic includes any application that demonstrates a high-end market application of the obtained lignin-based products. These applications may range from creating components in the construction industry to applications in sectors such as textiles, cars, cosmetics, pharmaceuticals, and packaging. Successful proposals will include market actors as strategic partner(s) in the value chain. These partners can assist in directing the value chain towards identified or newly emerging market demands.

Proposals must include a sustainable end-of-life phase. This means that the targeted end-product must be either fully recyclable, degradable, or compostable under specified conditions²².

²² See remarks on biodegradability in the Introduction.



Proposals may include any processing technology that has been demonstrated in an optimised value chain at TRL 6-7 and should encompass all processing stages leading to intermediate and end products.

Proposals must address all the requirements for flagship actions shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project must be 8. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum contribution of EUR 16 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — create at least two new bio-based value chains;
- contribute to **KPI 5** — demonstrate at least two new bio-based materials;
- contribute to **KPI 6** — demonstrate at least two new consumer products based on lignin-derived bio-based chemicals and materials that meet market requirements;
- contribute to **KPI 7** — number of flagship grant agreements signed between the BBI JU and project consortia.

ENVIRONMENTAL IMPACTS:

- reduce greenhouse gas (including CO₂) emissions (expressed in CO₂ equivalents) by replacing fossil-based chemicals or materials.
- reduce lignin-rich streams going to lower-value uses by at least 30% compared with the state of the art;
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.

ECONOMIC IMPACTS:

- increase the value of lignin by at least 50% compared with the current value (compensated for process costs);
- demonstrate an effective and efficient business model for lignin transformation that could be applied elsewhere in Europe;



SOCIAL IMPACTS:

- create new job opportunities in the bio-based sector in rural, coastal and/or urban areas;
- increase the competitiveness of European biomass producers and the bio-based industry by: (i) making use of residual streams; (ii) business growth; and (iii) investment, all while ensuring environmental sustainability and an increase in local biodiversity.

TYPE OF ACTION: Innovation action – flagship action.



BBI₂₀₂₀.SO₁.F₃ — PRODUCE FOOD INGREDIENTS WITH HIGH NUTRITIONAL VALUE FROM AQUATIC SOURCES

SPECIFIC CHALLENGE:

Among the UN Sustainable Development Goals, ‘feeding the planet’ features prominently. The growing world population will need additional sources of protein and ingredients with high nutritional value that do not deplete finite natural resources. The food industry can make a substantial contribution by increasing its resource efficiency. However, there will also be a need to tap new sources of protein.

The aquatic and marine worlds and the fisheries and aquaculture industries contribute to the UN’s goal while maintaining healthy marine and aquatic ecosystems. Scientific evidence unambiguously points to sustainable culture and capture at low trophic levels as a way to bring about an increase of food production from aquatic resources²³. These include, for example, microalgae, seaweed, marine invertebrates, side streams from the fish processing industry, and herbivore filter feeders (e.g. molluscs). Moreover, the recent implementation of the landing obligation for fish bycatch under the common fisheries policy²⁴ opens up opportunities for the efficient and sustainable transformation of such under-used streams into valuable ingredients.

A number of projects have demonstrated the successful conversion of aquatic biomass, mainly algae, into high-value ingredients for food applications. Actors in the aquatic and marine worlds are confident that by combining forces they can start converting the many aquatic and marine species and fisheries/aquaculture-industries side streams into food applications at commercial level. Europe can take the lead in this direction by enabling such a first-of-its-kind operation.

The **specific challenge** is to sustainably scale up the conversion of new and sustainable aquatic and marine sources for human food and contribute to food and nutrition security.

SCOPE

Sustainably produce on a large scale in a first-of-its-kind industrial setting, ingredients with high nutritional value for food for human consumption from under-used species and/or side streams from: (i) marine and aquatic sources; or (ii) the fisheries industry.

The scope of this topic includes: (i) dedicated cultivation; (ii) harvesting from ecosystems; and (iii) the use of side streams from the fisheries/aquaculture industries – all to be done in a sustainable way.

²³ Food from the Oceans - How can more food and biomass be obtained from the oceans in a way that does not deprive future generations of their benefits? High Level Group of Scientific Advisors Scientific Opinion No. 3/2017
https://ec.europa.eu/research/sam/pdf/sam_food-from-oceans_report.pdf#view=fit&pagemode=none

²⁴ https://ec.europa.eu/fisheries/cfp/fishing_rules/discards_en



Proposals for the **cultivation** of aquatic and/or marine biomass must include innovative and sustainable production and harvesting systems. They must also include the smart integration of several stages in the industrial-production plant to maximise biomass production and reduce production costs.

Proposals for **harvesting** from ecosystems must include an estimate of the available feedstock and plans to ensure the continued availability of this feedstock over the long term. Proposals must include sustainable and innovative harvesting systems. The objective of this requirement is to ensure that exploiting these sources for food ingredients preserves biodiversity and ecosystem services.

Proposals that focus on **using side streams from the fisheries or aquaculture industry** must include innovative conversion technologies and prove the sustainability of the whole value chain.

The scope of this topic includes: (i) bioreactor design where needed for the large-scale production of food ingredients; and (ii) integrating smart industrial-unit prototype design.

The main scope of this topic is the provision of food ingredients for human consumption. However, complementary production of feed ingredients or other high-value products (e.g. ingredients for cosmetics, pharmaceuticals, performance materials) may also be incorporated in projects. Proposals for these types of complementary production would be especially welcome if they contribute to the economic viability of the value chain and feature 'no waste' production. When aiming for high-value products other than food or feed, proposals need to consider the end-of-life phase of the complementary products, so that they are either fully recyclable, or else degradable or compostable under specified conditions.²⁵

Proposals must also include considerations of consumer safety and consumer perception of the planned new food ingredients. Any potential hazards associated with the developed processes and products should be analysed to check that the products will comply with relevant EU legislation on chemicals risk management, toxicity and safety.

The envisaged industrial setting must fully integrate: (i) feedstock supply and/or cultivation; (ii) sustainable logistics; and (iii) processing technologies. This is the best way to deliver food ingredients with targeted functions to meet human food demand at competitive prices. Proposals should demonstrate effective and cost-efficient operation at commercial scale, applying (where relevant) the cascading use of the biomass feedstock to maximise resource efficiency.

Proposals have to include the related primary sector(s) as strategic partner(s) in the value chain. This means that they participate in the design of the value chain and benefit from it.

²⁵ See remarks on biodegradability in the Introduction.



Proposals should include market actors (e.g. brand owners, distributors, end-users) as strategic partner(s) in the value chain. These partners can assist in directing the value chain towards identified or newly emerging market demands.

Proposals may include any processing technology that has been demonstrated in an optimised value chain at TRL 6-7 and should encompass all processing stages leading to intermediate and end products.

Proposals must address all the requirements for flagship actions shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project must be 8. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum contribution of EUR 16 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — create at least two new bio-based value chains;
- contribute to **KPI 6** — demonstrate at least two new consumer products based on bio-based ingredients, chemicals and materials that meet market requirements;
- contribute to **KPI 7** — number of flagship grant agreements signed between the BBI JU and project consortia.

ENVIRONMENTAL IMPACTS:

- increase the number of different feedstocks to enable raw-material independency;
- reduce greenhouse gas (including CO₂) emissions (expressed as CO₂ equivalents) of the considered bio-based operation (either biomass cultivation, or harvesting from ecosystems, or using side streams from the fisheries industry, or using bycatch through to the core processing) by at least 20% compared with the state of the art (shown by an LCA taken up in one of the work packages);
- protect and (if possible) increase aquatic and marine biodiversity, when cultivating aquatic and marine biomass, and especially when harvesting from the ecosystems;
- contribute to the EU's 2050 long-term strategy for a climate-neutral Europe by replacing fossil-based material with bio-based, renewable material.



ECONOMIC IMPACTS:

- reduce reliance on high-cost or unsustainable raw materials;
- increase raw-material flexibility;
- increase employment, incomes, and the strength of the local or regional economy with any of the considered operation (cultivation, harvesting from ecosystems, using side streams from the fisheries industry or using bycatch);
- when using side streams from the fisheries industry, valorise at least 50% by weight of them;
- when using bycatch as feedstock, valorise at least 70% by weight of it.

SOCIAL IMPACTS:

- increase the competitiveness of European biomass producers and the bio-based industry by supporting new jobs, growth, and investment, while ensuring environmental sustainability and an increase in local biodiversity;
- promote the inclusion of coastal or rural areas in a bio-based industry setting, raising awareness of: (i) social and economic opportunities in marine regions; and (ii) actors in value chains based on aquatic biomass;

TYPE OF ACTION: Innovation action – flagship action.



STRATEGIC ORIENTATION 2. OPTIMISE EFFICIENT PROCESSING FOR INTEGRATED BIOREFINERIES THROUGH R&D&I

Conversion of pre-treated feedstocks to bio-based chemicals and materials

BBI₂₀₂₀.SO₂.R₁ — USE ENABLING TECHNOLOGIES TO IMPROVE FEEDSTOCK AVAILABILITY AND SUSTAINABILITY FOR THE BIO-BASED INDUSTRY

SPECIFIC CHALLENGE:

Bio-based operations often deal with variable or even unpredictable conditions (e.g. weather, geographical differences, pathogens) affecting the overall resource efficiency of the targeted value chains. Proper planning of bio-based operations must take into account multiple inputs on soil conditions, biodiversity, logistics, resources management, etc. There are many enabling technologies that promote smarter, safer, more efficient and more environmentally friendly bio-based value chains. These technologies include: 'big data', geographic information systems, sensors, artificial intelligence, the internet of things, and prediction algorithms. The technologies can also assist the bio-based industry to better evaluate quality and availability of (residual) biomass as feedstock for bio-based operations. Consequently, the bio-based industry can better plan its feedstock supply and align its operational steps accordingly.

The technologies mentioned above will also help bio-based operators to adapt and fine-tune the technological steps in pre-treatment, conversion and downstream processing.

The **specific challenge** is to increase biomass availability, resource efficiency and sustainability for the bio-based industry through enabling (advanced and innovative) technologies.

SCOPE

Efficiently integrate enabling technologies into bio-based operations to optimise value chains from a technical, economic, social and environmental point of view.

Proposals must deliver a logistical and technological scheme that will increase the supply of suitable-quality feedstock to optimise bio-processing operations throughout the year. The scheme will also (i)



lower biomass losses from feedstock supply through the processing stages of the value chain; and (ii) allow a longer storage time before processing through more efficient pre-treatment steps and storage methods to better preserve the valuable components.

Proposals will also improve the economic and environmental sustainability of the targeted value chains.

This topic includes any bio-based feedstock, provided it can be sourced in Europe in a way that is sustainable both from an environmental and an economic perspective.

Proposals should include the related primary sector(s) (or their representatives) as strategic partner(s) in the covered value chains.

Proposals must also include an experimental validation of the proposed concept via direct comparison with existing comparable options.

Proposals should address all the requirements for RIAs shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 4-5 and not exceeding 5. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a contribution of between EUR 2 million and EUR 5 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — set the basis for at least one new bio-based value chain;
- contribute to **KPI 8** — validate at least one new or improved processing technology reflecting the 'TRL gain' since the start of the project.

ENVIRONMENTAL IMPACTS:

- reduce **greenhouse gas (including CO₂)** emissions (expressed in CO₂ equivalents) in transport by at least 30% as a result of improved logistics and processing;
- reduce raw-material loss by at least 20% as a result of more efficient logistics and processing;



- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.

ECONOMIC IMPACTS:

- show the potential of enabling technologies for reducing raw-material transportation costs by at least 20% when applied at large scale;
- increase resource- and operational efficiency;
- show the potential of enabling technologies for increasing income opportunities for biomass producers and other stakeholders involved in the supply chain when these technologies are applied in value chains operating at commercial level.

SOCIAL IMPACTS:

- show the potential for creating new job opportunities in the bio-based sector in rural, coastal and/or urban areas with successful project results;
- show that adequate enabling technologies can improve the integration of digital applications and human activities;
- show that adequate enabling technologies can increase the safety and efficiency of field operations.

TYPE OF ACTION: Research and Innovation action.



BBI₂₀₂₀.SO₂.R₂ — DEVELOP INTEGRAL FRACTIONATION OF LIGNOCELLULOSE TO PRODUCE COMPONENTS FOR HIGH-VALUE APPLICATIONS

SPECIFIC CHALLENGE:

Lignin and hemicellulose are mostly treated as low-quality, low-value side streams of lignocellulose fractionation. However, both lignin and hemicellulose are some of the most abundant raw materials — and a potential feedstock — for the bio-based industry. They could play a crucial role in promoting the regional supply and refinement of sustainable biomass feedstock for both existing and new value chains. Several high-value and moderate-value applications of lignin and hemicellulose have already been demonstrated. And both lignin and hemicellulose are potentially already available in large quantities from existing operations. However, it remains a challenge to raise their quality to suitable levels for further processing in an affordable resource-efficient way. To do so, it will be necessary to identify specific, sustainable and economically attractive applications. It will also be necessary to specify the required quality aspects of lignin and hemicellulose to help promote commercialisation.

For example, lignin has enormous potential as a feedstock for aromatics. However, turning it into a feedstock for bio-aromatic value chains requires chemical reactivity for further processing. Technologies to convert hemicellulose are advancing. Some of these technologies use conversion methods such as fermentation. However, the feedstock must be of adequate quality, and further developments in yeast strains able to transform hemicellulosic sugars are needed. Moreover, new high-volume applications are essential to create a large enough outlet for the large stream of hemicellulose becoming available. Industry is interested in using both lignin and hemicellulose as feedstock for new bio-based value chains.

The **specific challenge** is to break up lignocellulose into its components to create value for most of all fractions (not only cellulose) in identified applications.

SCOPE:

Develop integral processing technologies to fractionate lignocellulose and deliver components of sufficient quality to be transformed into established or newly emerging high-value applications²⁶.

The scope of this topic focuses on the development of an integral fractionation process to produce good-quality cellulose (the main product) and lignin and hemicellulose (the by-products) for established or newly emerging market applications. The scope excludes processes that create ethanol as an end-product.

²⁶ The scope of this RIA topic differs from that of the flagship action topic BBI₂₀₂₀.SO₁.F₂. This topic is about developing a new processing scheme to make use of most of all the fractions of lignocellulose, whereas F₂ focuses on lignin only and aims at upscaling proven processes to enable the use of lignin on a commercial scale.



In addition to the separation of high-quality cellulose, proposals must also include the separation and purification of lignin and hemicellulose to a sufficiently high quality so they can be turned into intermediates or end-products. The developed processes must be designed so that they can be readily scaled up.

Proposals must give convincing evidence of their innovative nature, and they must be complementary to the projects already funded by the BBI JU.

Proposals must always include the proof that the main product cellulose is of high quality (with a market value exceeding EUR 700 per ton) to serve as the basis for a profitable total business case.

Successful proposals will identify market applications for value chains based on lignin and on hemicellulose. These value chains will determine the required quality of the lignin and hemicellulose fractions. Proposals must also achieve this quality in an optimal way with a proper balance between higher-value/lower-volume products and lower-value/higher-volume products. The targeted market sectors can be any, except energy, and proposals should include actors in the related market sector(s).

Proposals should also include options for the consumption of chemicals, their recovery and re-use in the selected processes. They should also describe the recycling potential of the target applications after use.

Proposals should also consider how to turn residual amounts of the feedstock into other added-value applications such as for soil-improvement or bioenergy. The topic excludes, however, energy carriers as the main products, even if used as energy input into the process itself.

Proposals should address all the requirements for RIAs shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 4-5 and not exceeding 5. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a contribution of between EUR 2 million and EUR 5 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — set the basis for at least one new bio-based value chain;



- contribute to **KPI 4** — validate at least one new building block derived from lignin and/or hemicellulose;
- contribute to **KPI 8** — validate at least one new or improved processing technology reflecting the 'TRL gain' since the start of the project.

ENVIRONMENTAL IMPACTS:

- reduce greenhouse gas (including CO₂) emissions (expressed in CO₂ equivalents) in the envisaged value chain by at least 20%;
- achieve an increase in energy efficiency of at least 20% by the new separation techniques compared with traditional separation techniques;
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.

ECONOMIC IMPACTS:

- increase the total economic value of the end products from lignocellulose processing by at least 20%;
- reduce separation costs by at least 20% compared with the state of the art.

SOCIAL IMPACTS:

- show the potential for creating new job opportunities in the bio-based sector in rural, coastal and/or urban areas and in the forestry sector with successful project results.

TYPE OF ACTION: Research and Innovation action.



BBI₂₀₂₀.SO₂.R₃ — DEVELOP BIO-BASED SOLUTIONS TO RECYCLE COMPOSITES

SPECIFIC CHALLENGE:

The full recyclability of composites through the effective separation and recovery of their components is still an issue. This is mainly due to the adhesives used to bind the different layers and materials together. The fossil-based bonding components that are currently used cannot easily be separated from the other components, nor can they be recycled together with the matrix material.

Industry can improve the recyclability of composites by designing bio-based bonding materials that will decompose²² under specific conditions (e.g. pH, temperature, microorganisms). These new bonding materials will replace fossil-based counterparts in composites and allow multilayer plastics and composites to be recycled more easily.

A useful concept when considering recyclability is 'extended producer responsibility' (EPR)²⁷. EPR makes manufacturers of composites – or any product – responsible for the entire life cycle of the product, especially for the take-back, recycling and final disposal. EPR is crucial for creating a sustainable and circular bioeconomy. EPR will be an important input to some quickly expanding application areas, such as 3D printing of cellulose-based materials, which offers new opportunities for regional industries.

The **specific challenge** is to increase the recyclability of composites.

SCOPE:

Develop bio-based bonding materials for composites to promote the separation of these composites into their components and thus make them more recyclable.

The scope of this topic is to develop degradable bonding materials for composites, and to design and develop adequate materials for composites themselves to maximise their recyclability.

The scope of this topic includes attempting to recycle multilayer fibrous materials that are used in many market applications, including the construction industry. Proposals should include EPR considerations for a sustainable end of life of these materials.

The scope also includes: (i) novel research into the origin of fibre materials used in composites; and (ii) searching for the optimum combination of bonding materials to maximise the recyclability of composites.

²⁷ http://ec.europa.eu/environment/archives/waste/eu_guidance/introduction.html



Since the recyclability of materials can only benefit from the availability of suitable recycling facilities and capabilities, proposals must include a description of a system/method to process the recyclable material.

Proposals are also expected to draft guidelines for collecting and directing the recyclable materials to these facilities. These guidelines must also include optimal ways for handling and pre-treating (if needed).

Proposals should address all the requirements for RIAs shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 4-5 and not exceeding 5. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a contribution of between EUR 2 million and EUR 5 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — set the basis for at least one new bio-based value chain;
- contribute to **KPI 5** — validate at least one new bio-based material;
- contribute to **KPI 8** — validate at least one new or improved processing technology reflecting the 'TRL gain' since the start of the project.

ENVIRONMENTAL IMPACTS:

- improved end of life of composites, by reducing the amount of such materials diverted to landfilling or incinerating;
- reduce the amount of resources (materials, energy) and time required to separate composite materials into their constituting elements (before recycling);
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.



ECONOMIC IMPACTS:

- reduce the amount of resources (materials, energy) and time required to separate composite materials into their constituent components (before recycling);
- show with documented experimental validation that the performance of the new bio-based bonding agents is at least comparable with fossil-based counterparts in the target application(s).

TYPE OF ACTION: Research and Innovation action.



BBI₂₀₂₀.SO₂.R₄ — EXTRACT BIOACTIVE COMPOUNDS FROM NEW, UNDER-EXPLOITED AND/OR RECALCITRANT RESIDUAL BIO-BASED STREAMS FOR HIGH-VALUE APPLICATIONS

SPECIFIC CHALLENGE:

There is a strong continuing interest in obtaining high-value, sustainable, bio-based ingredients from new and alternative sources. These sources include under-exploited, 'recalcitrant' (i.e. requiring innovative processes/technologies to handle) side streams containing bioactive compounds with high market potential.

Currently, there is great demand for bio-based bioactive compounds in market sectors such as food, feed, performance chemicals, cosmetics, nutraceuticals, pesticides and pharmaceuticals. This trend is driven by consumer demand for functional products with ever-better performance, and for 'natural' and sustainable products.

Extracting bioactives from diverse sources brings challenges. These challenges include finding appropriate methods for the pre-treatment, handling and processing of raw materials and for properly characterising their diverse bioactive contents. In addition, the extraction processes themselves should be environmentally sustainable and economically viable while simultaneously preserving the functions and qualities of the targeted compounds.

The **specific challenge** is to develop appropriate processing schemes to extract bioactives from new, under-exploited and/or recalcitrant residual streams so they can be used in high-value-added applications.

SCOPE:

Develop suitable processing schemes to extract and process bioactive compounds from new, under-exploited and/or recalcitrant side streams²⁸.

The scope of this topic includes new, under-exploited and/or recalcitrant side streams from various sources. These sources can be agricultural, food-related, forest-based, marine, aquatic, fish-based, bio-waste-based, or any combination of these. Proposals should apply a cascading approach.

²⁸ The scope of this RIA topic differs from that of the flagship topic BBI₂₀₂₀.SO₁.F₂. This RIA topic is about developing new processing schemes to extract/obtain bioactives from recalcitrant side streams that contain bioactives to be utilised in any high-value application. The flagship topic F₂ focuses on only marine or aquatic sources and aims at upscaling proven processes to specifically enable production of ingredients for food and feed on a commercial scale. Moreover, the topic differs from similar topics in the past AWP (e.g. BBI 2018.SO₃.D₅ and BBI₂₀₁₉.SO₃.D₃), tackling technological solutions at lower TRL and a broader range of potential feedstocks.



The scope of this topic excludes crops cultivated for the specific purpose of producing bioactive compounds.

Proposals must include appropriate pre-treatment steps that do not damage the high-value bioactive compounds in the side stream.

Proposals must also include the necessary processing steps for modifying the bioactives to fit the targeted end-product if needed.

Proposals should aim at a full value chain of bioactive compounds, anticipating market applications. Proposals should therefore include the participation of brand owners to help steer the value chain towards identified or newly emerging market demands.

Proposals must also include considerations about consumer safety and consumer perception of the planned consumer applications. Any potential hazards associated with the developed processes and products should be analysed to check that the products will comply with any relevant EU legislation on chemicals risk management, toxicity and safety.

Proposals must address all the requirements for RIA shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 4-5 and not exceeding 5. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a contribution of between EUR 2 million and EUR 5 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — set the basis for at least one new bio-based value chain;
- contribute to **KPI 8** — validate at least one new or improved processing technology reflecting the 'TRL gain' since the start of the project.

ENVIRONMENTAL IMPACTS:

- widen the feedstock portfolio for the selected application(s);



- improve resource efficiency through the smart use of residual bio-based streams;
- reduce the amount of bio-based residual streams routed to incineration, landfill or aquatic/other discards.
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.

ECONOMIC IMPACTS:

- make use of low-cost raw materials;
- reduce reliance on high-cost and scarce protein-rich resources, such as fish oil and meal.

SOCIAL IMPACTS:

- set the foundation for creating new job profiles and additional green jobs when project successful results are scaled up into new value chains operating at commercial level;
- set the basis for new business opportunities for primary sector actors, thus contribute to rural/coastal development.

TYPE OF ACTION: Research and Innovation action.



BBI₂₀₂₀.SO₂.D₃ — UPSCALE THE PRODUCTION OF BIO-BASED PLATFORM MOLECULES FOR LARGER MARKET APPLICATIONS

SPECIFIC CHALLENGE:

The sustainable production of bio-based platform molecules with a broad range of potential applications could increase the competitiveness of bio-based materials and products compared with their fossil-based counterparts.

Platform chemicals are intermediate molecules that can be used to produce a large number of end-products, such as biopolymers, high-value additives, and other bio-based products. They can therefore unlock entire bio-based value chains if produced at competitive cost, to a high quality, and in sufficient quantities. Promising bio-based platform molecules include: HMF, FDCA, some organic acids, and alcohols²⁹ from various biomass feedstocks.

Market interest in bio-based platform molecules is increasing, and market actors are requesting larger quantities of these molecules for further formulation and testing in specific applications, including food, feed and consumer personal care. To foster the market penetration of these molecules — and make them competitive against fossil-based counterparts — industry must increase the production of targeted bio-based platform molecules. This must be done at a competitive cost and quality compared with the state of the art.

The **specific challenge** is to upscale the production of bio-based platform molecules in sufficient quantities and at sufficient quality to promote their larger application in new and existing markets.

SCOPE:

Demonstrate the sustainable production of specific bio-based platform molecules at quantities exceeding pilot-plant limits, so these molecules can be further processed for identified or newly emerging market applications.

The scope of this topic includes feedstock from any source: agricultural, food processing, forestry, marine, aquatic, fish processing, bio-waste, or any combination of these.

The scope of this topic excludes bio-based platform molecules that are currently already produced in Europe competitively, at commercial levels and in sufficient quantities, or that are the object of other BBI JU projects.

²⁹ See for example the Joint Research Centre's report 'Insights into the European market for bio-based chemicals' (2019).



Proposals must focus on applications with added value that is greater than the added value the feedstock would have if used for energy or heating.

Proposals must include the related primary sector(s) as strategic partner(s) in the value chain. This means that these sectors must participate in the design of the value chain and benefit from the value chain. In order to increase the participation of primary producers, it is recommended to promote the participation of relevant cooperatives (in particular related to farmers or fishers) as members of the consortium, as well as to foster the role of advisors or innovation brokers to support ('speak on behalf of') primary producers during the project implementation. Proposals should consider establishing an advisory board of primary producers (in the related primary sectors of the proposal) that collaborates with the consortium by advising on and measuring the impact of the project.

As much as possible, proposals should align the value chains with the smart specialisation strategies of the relevant region(s), in either part of the value chain.

Proposals must address all the requirements for demonstration actions shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 6-7. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum contribution of EUR 7 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — create at least one new bio-based value chain;
- contribute to **KPI 4** — demonstrate at least one new building block;

ENVIRONMENTAL IMPACTS:

- reduce greenhouse gas (including CO₂) emissions (expressed in CO₂ equivalents) linked to the production process of the targeted platform molecules compared with existing alternatives;
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.



ECONOMIC IMPACTS:

- increase revenues and business opportunities for the stakeholders in the involved primary sector(s).

SOCIAL IMPACTS:

- create new job opportunities in the bio-based sector in rural, coastal and/or urban areas and contribute to their development;
- increase the competitiveness of European biomass producers and the bio-based industry by supporting new jobs, growth, and investment, while ensuring environmental sustainability and an increase in local biodiversity;

TYPE OF ACTION: Innovation action – demonstration action.



STRATEGIC ORIENTATION 3. DEVELOP INNOVATIVE BIO-BASED PRODUCTS FOR IDENTIFIED MARKET APPLICATIONS

Bio-based products that outperform fossil-based counterparts

BBI₂₀₂₀.SO₃.R₅ — IMPROVE THE SUSTAINABILITY OF COATINGS

SPECIFIC CHALLENGE:

Coatings are widely used in many applications, such as in glass, concrete, metal and furniture. Depending on the specific performance required by the intended applications, coatings must serve different purposes. These purposes include preventing reflectivity, self-cleaning, protection, waterproofing, fire resistance, anti-corrosion, insulation and anti-fouling.

Because of this diverse and expanding range of requirements, people increasingly demand sustainable coatings. As part of this development, producers are introducing bio-based alternatives in coating formulations, replacing fossil-based compounds. Some of these fossil-based compounds (e.g. some solvents³⁰) present potential health risks to humans.

The **specific challenge** is to substitute fossil-based compounds in coatings with bio-based alternatives, while ensuring that the performance of the coating is at least identical to the traditional coating.

SCOPE:

Develop fully or partly bio-based coatings that guarantee at least all required performances of the intended applications³¹.

Proposals should develop at least one coating that can be: (i) tested in specific applications; and (ii) perform better than the baseline of existing coating formulations. Proposals should also address possible end-of-life scenarios for products in these application fields, including potential for recycling.

³⁰ See e.g. <https://www.uscoatings.com/blog/water-based-coating-vs-solvent-based-coating/>.

³¹ The topic differs both from the topic BBI VC1.R3 in AWP 2015, which entailed lignocellulosic biomass as starting feedstock, and from the topic BBI 2016.R5, whose focus was on smart food packaging. Moreover, the topic is more specific and more demanding than the similar topic BBI 2018.SO3.R9, which attracted many proposals, but resulted in only one granted project.

The scope of this topic includes the possibility of substituting traditional additives with enzyme-based additives³².

Proposals should include test results of the developed coating formulations to prove their benefits.

The scope of this topic includes: (i) physical changes for the targeted coatings; and (ii) microorganisms and bio-based molecules as bio-based components for the targeted coatings.

Proposals must include proof of the biological, chemical and mechanical stability of the coatings. For proposals that use microorganisms, this proof must pay particular attention to the control of microbial growing conditions, for example in humid environments.

Proposals should also include considerations about the safety of consumers and end-users of the targeted final application for the developed coatings. Any potential hazards associated with the developed processes and products should be analysed to check that the products will comply with EU legislation on chemicals risk management, toxicity and safety requirements.

Proposals should address all the requirements for RIA shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 4-5 and not exceeding 5. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a contribution of between EUR 2 million and EUR 5 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — set the basis for at least one new bio-based value chain;
- contribute to **KPI 6** — demonstrate at least one new consumer product based on bio-based chemicals and materials that meet market requirements;
- contribute to **KPI 8** — validate at least one new and improved processing technology reflecting the 'TRL gain' since the start of the project.

³² See e.g. <https://www.sciencedirect.com/science/article/pii/S0300944005002250>.



ENVIRONMENTAL IMPACTS:

- reduce greenhouse gas (including CO₂) emissions (expressed in CO₂ equivalents) linked to the production of coatings for the intended applications, compared with fossil-based alternatives used for the same targeted applications;
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.

ECONOMIC IMPACTS:

- pave the way to the marketability of new coating formulations with at least 25% bio-based content;
- show with documented experimental validation that the performance of the new, sustainable coatings is at least comparable with fossil-based counterparts in the target application(s).

SOCIAL IMPACTS:

- show the potential for creating new job opportunities in the bio-based sector in rural, coastal and/or urban areas with successful project results.

TYPE OF ACTION: Research and Innovation action.



BBI₂₀₂₀.SO₃.D₄ — DEMONSTRATE SUPERIOR BIO-BASED PACKAGING SOLUTIONS WITH MINIMAL ENVIRONMENTAL DAMAGE

SPECIFIC CHALLENGE:

Packaging is key to sustaining the quality and durability of consumer and industrial products through their lifespan. Today, most packaging materials are fossil-based and may cause environmental problems at the end of their life cycle if not properly managed.

For example, oxo-plastics (also called oxo-degradable plastics) are used in agricultural films, rubbish bags, carrier bags, food packaging and landfill covers. However, they break down into very small particles, potentially contributing to environmental (soil, marine, air) contamination by microplastics^{33,34}. And not all biodegradable packaging materials disintegrate quickly enough to avoid becoming marine litter or contaminating the soil³⁵.

With its 2018 [plastics strategy](#), the European Commission has laid out plans to: (i) make all plastic packaging on the EU market recyclable by 2030; (ii) reduce single-use plastics; and (iii) restrict the intentional use of microplastics. Products made from oxo-degradable plastics will be banned from the EU market from July 2021.

Industry can develop and produce bio-based packaging materials that enable better functional performance than their fossil-based counterparts. This improved performance can be improved gas-barrier functionality; longer shelf lives for food-packaging applications; and better consumer safety features. In addition, bio-based packaging materials can be made reusable or recyclable in applications that demand recyclability for a sustainable end-of-life. For other applications, bio-based packaging material that outperforms fossil-based alternatives can be made biodegradable²², industry- or home-compostable, or degradable in specific environments if this feature is demanded. These features may be desirable for applications such as food packaging. If a packaging material contains food remains after use, it cannot always be recycled as part of recyclable plastic streams. Making packaging material for specific food applications compostable will allow it to be collected together with food waste and to be composted, thus diverting it from landfill or incineration.

The **specific challenge** is to upscale the production of sustainable and high-performing bio-based packaging solutions that do not create environmental damage during and after use.

³³ COM(2018) 35 <https://ec.europa.eu/environment/circular-economy/pdf/oxo-plastics.pdf>

³⁴ Microplastics are synthetic, water-insoluble polymer items smaller than 5 mm that may pollute the aquatic environment and other environments.

³⁵ Imogen E. Napper and Richard C. Thompson (2019): Environmental Deterioration of Biodegradable, Oxo-biodegradable, Compostable, and Conventional Plastic Carrier Bags in the Sea, Soil, and Open-Air Over a 3-Year Period. DOI: 10.1021/acs.est.8b06984.



SCOPE:

Produce innovative, high-performance bio-based packaging material with sustainable end-of-life properties at demonstration level, the performance of which is superior to fossil-based alternatives and to existing bio-based material such as paper³⁶.

Proposals should address only one of the following two objectives.

- A. They must produce superior, **reusable or recyclable**, bio-based plastic solutions for a specific application that demands reusability or recyclability as the best end-of-life option to prevent environmental damage. The targeted bio-based plastic solutions must be integrated in a circular value chain operating at demonstration level.

OR

- B. They must produce superior bio-based plastic solutions that are **biodegradable²², industry-compostable, home-compostable or degradable in specific environments**. These solutions must be superior for a specific application that demands degradability/compostability as the best end-of-life option to prevent environmental damage. The targeted bio-based plastic solutions must be integrated in a circular value chain operating at demonstration level.

Proposals in either of the above options must therefore demonstrate and prove both:

- superior performance compared with fossil-based alternatives in comparable applications;
- a sustainable end-of-life causing no damage to the environment.

Achieving both these objectives will pave the way to improved consumer perception and greater consumer acceptance of bio-based solutions.

The demanded proof should meet accepted standards for performance, recyclability and degradability/compostability.

The scaled-up solutions must comply with all applicable regulations (e.g. for food or cosmetics packaging), and with safety regulations in particular.

Proposals should include waste-management actors as beneficiaries for the design of the value chain, including in the end-of-life phase. This is a necessity if the developed packaging solution does not integrate into existing waste-management infrastructure.

³⁶ Several topics in the past AWP (e.g. BBI 2016.R5 and BBI 2018.SO3.R10) focused on 'improved packaging solutions', but this is the first time that such theme is addressed at a demonstration level.



Proposals must address all the requirements for demonstration actions shown in Table 3 of the Introduction.

The technology readiness level (TRL) at the end of the project should be 6-7. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum contribution of EUR 7 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — create at least one new bio-based value chain;
- contribute to **KPI 5** — demonstrate at least two new bio-based materials for packaging;
- contribute to **KPI 6** — demonstrate at least two new consumer products based on bio-based chemicals and materials that meet market requirements.

ENVIRONMENTAL IMPACTS:

- minimise landfill or incineration of the packaging material after use;
- reduce greenhouse gas (including CO₂) emissions (expressed in CO₂ equivalents) in the overall value chain compared with the state of the art;
- contribute to the [EU's 2050 long-term strategy for a climate-neutral Europe](#) by replacing fossil-based material with bio-based, renewable material.

ECONOMIC IMPACTS:

- lay the basis for market-acceptable production costs of the targeted bio-based products;
- increase business opportunities for new, innovative and sustainable packaging solutions that have no negative impact on the environment.

SOCIAL IMPACTS:

- create new job opportunities in the bio-based sector in rural, coastal and/or urban areas;



- increase the competitiveness of European biomass producers and the bio-based industry by supporting new jobs, growth, and investment, while ensuring environmental sustainability and an increase in local biodiversity.

TYPE OF ACTION: Innovation action – demonstration action.



STRATEGIC ORIENTATION 4. CREATE AND ACCELERATE THE MARKET-UPTAKE OF BIO-BASED PRODUCTS AND APPLICATIONS

BBI2020.SO4.S1 — HELP START-UPS AND SPIN-OFFS TO GAIN ACCESS TO FINANCE

SPECIFIC CHALLENGE:

Start-ups and spin-offs, both young, innovative and entrepreneurial, often face big hurdles in attracting investors, or using financial instruments to help finance their business plans. They find it especially challenging in bio-based industries, as the hurdles to success are high, and investors find it more difficult to judge the associated risks. These risks are different compared with more familiar sectors like e.g. the digital sector. Entrepreneurs in the bio-based industry must cross extra hurdles to attract investors and become independent as soon as possible.

One of the ways to overcome these hurdles is by seeking out networking opportunities through suitable organisations, clusters³⁷ and platforms. These opportunities can bring start-ups and spin-offs into contact with large enterprises, regional clusters, open-innovation scale-up facilities, reference customers and other market actors. This will make start-ups and spin-offs more visible, allowing them to secure financing from the contacts made.

The **specific challenge** is to help start-ups and spin-offs to improve their networking activities with relevant stakeholders and help to improve their business case and to gain access to funding opportunities in the bio-based sector.

SCOPE:

Explore and quantify the needs of start-ups and spin-offs in the bio-based sector for specific financial and business advice. Explore also the feasibility of meeting these needs by an interactive platform or any other adequate system.

Proposals must develop and validate a methodology to qualify and quantify the needs of start-ups and spin-offs. On this basis, proposals must evaluate the interest of the spin-offs and start-ups to interact

³⁷ For example, see the [European Cluster Observatory](#) — this single access point may facilitate matches and possibly lead to new funding opportunities.



with potential partners and investors. And similarly, proposals must evaluate the interest of expert companies, organisations and investors to interact with start-ups and spin-offs.

Proposals must show that the envisaged platform or system will bring start-ups and spin-offs in contact with potential partners across networks and with a large geographical reach.

Proposals should build on completed and running projects, such as networks of pilot plants³⁸ or other projects designed to facilitate access to financing.

Proposals must connect with all available financing instruments on a European level, including relevant regional instruments. Proposals must also describe how they plan to complement the ongoing activities of bodies such as the European Innovation Council, the Circular Bioeconomy Investment Platform, and the Enterprise Europe Network.

Proposals must also connect with the finance platform currently being designed by BIC and launched by the end of 2019. The new BIC platform will aim in particular to help SMEs obtain financing for scaling up the commercialisation of bio-based technologies and products on a pilot scale.

The scope of this topic includes all start-ups and spin-offs in the bio-based sector, and is not limited to BIC members or activities, nor is it limited to spin-offs or start-ups resulting from BBI JU projects. In order to consider also actors in the primary sectors, it is recommended to foster the role of advisors and innovation brokers to support ('speak on behalf of') these actors during the project implementation.

Proposals must therefore be based on a feasible business model to create and sustain it for at least 10 years after the end of the project. The model must include estimates of costs for setting up, launching and — particularly — maintaining and updating the platform in the abovementioned period beyond the project's runtime.

Participation is encouraged from organisations that have previously managed entrepreneurship programmes targeting start-ups and spin-offs.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum of EUR 1.5 million and for a planned duration of not more than 3 years would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts or for other durations.

EXPECTED IMPACTS:

³⁸ Pilots4U, project financed under BBI-2019.SO4.S4 – Empower SME clusters to bring SMEs 'across the valley of death.'



- increase the success rate of excellent start-ups and spin-offs;
- improve the alignment of available financing/funding instruments with the demand of start-ups and spin-offs for financial assistance;
- accelerate the market entrance of new technologies, processes, products and applications for expanding the bio-based industry across Europe.

NUMBER OF PROJECTS: a maximum of one project will be funded under this topic.

EXPECTED DURATION: up to 3 years.

TYPE OF ACTION: Coordination and support action.

BBI₂₀₂₀.SO₄.S₂ — PROVIDE INSIGHT ON EMERGING TECHNOLOGIES FOR BIO-BASED VALUE CHAINS

SPECIFIC CHALLENGE:

Not all actors in the bio-based sector may be aware of or familiar with the existing and emerging technologies that could be used in bio-based value chains. Moreover, technologies are continuously evolving, and new technologies emerge so frequently that industry can hardly keep up. Without a clear overview of relevant technologies for specific applications, selecting the right one(s) for a particular value chain becomes difficult.

Mapping these technologies in a user-friendly database could resolve this situation and provide toolboxes for various cases. Such a database should categorise each technology by its characteristics: application fields, feedstock (e.g. source, size, and composition), working principle (e.g. chemical, biotechnological, mechanical), maturity (TRL), energy consumption, maximum capacity (tonne/hr), application conditions (e.g. temperature, pH), combined use with other technologies, relevant engineering studies, etc.

It would also be relevant to include information on: (i) organisations that are active in the development and licensing of the technology; (ii) where laboratory/pilot facilities are available; (iii) capital and operational costs; (iv) competing technologies; etc.

The **specific challenge** is to provide a complete overview of relevant technologies for the bio-based industry, both existing and emerging.

SCOPE:

Explore and quantify the expressed needs of actors in the bio-based sector for a user-friendly database of relevant technologies categorised by area of application and meet these needs with a well-maintained database that is accessible to everybody.

The results of a first study on demand and feasibility will determine possible next steps. One possible next step could be the implementation of such a database if there is enough interest in it and if there is commitment to maintain the database. Another next step could be to carry out a feasibility study for other application areas (value chains), and possibly also for bio-based products.

Proposals must therefore determine the feasibility of such a database. They must also estimate costs and the time it will take to set up, launch and — in particular — maintain it once the project has ended for a period of at least 10 years. Proposals must include a governance structure to maintain the database and keep it up to date by adding new information and correcting the database as new developments of technologies proceed.



This topic focuses in particular on industrial actors who are searching for new and innovative technologies that could improve their processes or enable new processes. But the scope also includes the providers of technologies and the research and technology-transfer communities. The research and technology-transfer communities should supply the database with the latest technologies and other relevant features. Proposals will ensure that both the ‘users’ and the ‘suppliers’ of the database help to maintain the database once it is operational.

Possible areas of application for the database include: biomass-feedstock preparation including pre-treatment; different conversion technologies (biotechnological, chemical, physicochemical, mechanical, etc.); downstream processing; and product formulation. The technologies for specific desired outcomes may differ for the various possible value chains. For example, they may use different feedstocks or different states of reactants.

This topic calls for proposals limiting the study to one ‘type’ of biomass feedstock that is based on either agricultural sources, forestry, marine/aquatic, food processing waste, or bio-waste. The result of this project will determine possible next steps for other types of biomass.

A similar system for just one sector, the food-processing sector, has been developed and could serve as inspiration for proposals under this topic³⁹.

Proposals are encouraged to use artificial intelligence as appropriate to accelerate the exploration and quantification of the needs in the selected value chain.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum of EUR 1 million and for a planned duration of not more than 2 years would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts or for other durations.

EXPECTED IMPACTS:

- increase the efficiency of actors in the bio-based sector in finding and selecting the best technologies to improve and scale up their bio-based concepts;
- increase business opportunities for actors in the bio-based sector through interaction with others when using the database;
- improve bio-based processes and services by finding and applying the best technologies.

³⁹ http://www.foodtech-portal.eu/index.php?title=Main_Page



NUMBER OF PROJECTS: a maximum of one project will be funded under this topic.

EXPECTED DURATION: up to 2 years.

TYPE OF ACTION: Coordination and support action.



BBI₂₀₂₀.SO₄.S₃ — CREATE AND INTERLINK BIO-BASED EDUCATION CENTRES TO MEET INDUSTRY'S NEEDS OF SKILLS AND COMPETENCES

SPECIFIC CHALLENGE:

Due to its cross-sectoral nature and (relative) novelty, the bio-based industry requires a set of skills and competencies that are not available in some regions, but that are available — and taught — in certain academic and vocational schools.

Part of the process of closing the skills gap is increased cooperation between industry and the academic world. In some countries and regions, there is already interaction between the bio-based industry, academia and government. This cooperation occurs in training or innovation centres that mostly focus on joint projects or initiatives. In some regions, these centres also have education projects to meet industry's future needs for skills, and to meet the training needs of the existing workforce. The existing centres typically focus on their regional situation and needs, benefiting local SMEs in particular. There is very little coordination between existing centres.

Industry would like bio-based 'education centres' to interact with education institutions on the skills that will be needed in the future, and on the skills that are needed by the existing workforce. Also, although regional centres focus on local needs, connecting these centres to each other will help them to draw up a common framework of standards and skills that could be tailored for local application. Increasing interaction in this way will also benefit the society at large and the bioeconomy in general.

The **specific challenge** to increase cooperation between the bio-based industry and the education system to avoid skills and competences gaps.

SCOPE:

Determine the criteria and conditions for bio-based education centres to create dynamic ecosystems that include industry, education institutions, governments, and society. These ecosystems should operate at local, regional and/or national levels.

The scope of this topic includes specifying the need for these centres and testing their feasibility as regards their design, setting-up, running and maintaining, always together with the envisaged partners.

The scope does not include the actual setting up of such an education centre and running it.

Proposals must state the appropriate level (regional, municipal, national etc.) for a bio-based education centre, taking into account the different educational systems across Europe. Proposals should also take into account the different levels of bio-based industry activities, bio-based industry



potential, and bio-based industry strategies. Therefore, proposals must design bio-based education centres in at least three different regions/Member States in Europe, preferably one in each of: (i) north-west Europe; (ii) central and eastern Europe; and (iii) Mediterranean Europe. Proposals must also work with relevant partners in the selected regions and test this design with them and with regional stakeholders from industry, academia, government and civil society.

Proposals must include processes, structures and governance plans for bio-based education centres to deliver the needed curricula in vocational and academic settings. In addition, they must contain plans for life-long-learning programmes for the existing workforce. Proposals must also include communication channels to industry and society at large.

When designing bio-based education centres, proposals should investigate the feasibility and usefulness to cooperate with digital innovation hubs⁴⁰ that deal with specific bio-based challenges and value chains. This cooperation and interlinking could allow the education centres to benefit from existing programmes and provide a holistic approach (education, technology, business) for the bio-based industrial sector.

Proposals must also include the considerations of necessary actions for sustaining bio-based education centres once they are up and running. These actions must include: (i) plans for a governance structure; (ii) a realistic budget for running and maintaining the education centre (at local, regional and/or national level); and (iii) a financial plan for its funding in the short and long term.

Proposals must also include guidelines for connecting bio-based education centres across Europe and creating EU added value. One example of the added value the proposal could bring is the provision of a common framework of standards and skills, tailored and complemented as needed for application at local levels. This network should align with other programmes on education to avoid duplication of work. These other programmes include action 2.4 in the updated bioeconomy strategy on education and skills; the European cooperation in science and technology actions; and the sector skills alliances of the Erasmus+ programme, the 'bioeconomy skills gap analysis' and the 'bioeconomy university curricula' from the Horizon 2020 Societal Challenge 2 call 2020.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum of EUR 1.5 million and for a planned duration of not more than 3 years would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts or for other durations.

⁴⁰ <http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs>



EXPECTED IMPACTS:

- regularly align the needs for skills and availability of skills through consistent interactions between the bio-based industry and educational institutions at local, regional, national and European levels;
- prevent skills gaps in the bio-based industry;
- maintain industrial activities and provide jobs and income for local communities;
- provide education and learning opportunities for community members and increase their employability;
- provide early insight into career opportunities for graduates at vocational and university levels;
- provide opportunities to educate citizens (consumers, politicians, researchers, industry, etc.) on bio-based activities and sustainability.

NUMBER OF PROJECTS: a maximum of one project will be funded under this topic.

EXPECTED DURATION: up to 3 years.

TYPE OF ACTION: Coordination and support action.



BBI₂₀₂₀.SO₄.S₄ — EXPAND CIRCULAR ECONOMY TO INCLUDE THE UNDEREXPLOITED CIRCULAR BIOECONOMY

SPECIFIC CHALLENGE:

The circular economy aims to 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 waste⁴¹. The bioeconomy covers all sectors and systems that rely on biological resources (animals, plants, microorganisms and derived biomass, including organic waste), their functions and principles⁴².

The circular economy is a concept that has been promoted for more than 20 years⁴³. It brings together many interest groups, including stakeholders from the processing industry, waste management industry, recycling industry and others. In the early 1990s, several European countries began passing waste-related laws and regulations, which prompted the European Waste Framework Directive in 2008. New EU waste rules approved in May 2018⁴⁴ require more rigorous enforcement of the waste hierarchy and introduce new requirements for waste management in the European Union.

With the bioeconomy becoming a reality, new interests have come into play, such as those focused on making use of waste streams or residual streams that so far have not been used, or that have only been used for burning as fuel.

This emergence of new interests can lead to potential conflicts of interests or at least to divergences of views as regards strategies to adopt. Some stakeholders focus on waste disposal (via landfill, incineration, etc.). Others focus on waste avoidance (e.g. by using renewable resources, utilising side streams). And others focus on using the materials found in waste. For this last category, regulations preventing the use of waste as a feedstock for other products, or preventing the moving of waste across borders, can be a hurdle. Changes in the waste hierarchy lead to conflicts between different stakeholders. The same conflict can arise when diverting biogenic waste streams from use in power-and-heat generation and composting to bio-based operations for material use.

The description and visualisation of circular economy as a concept mostly refer to the ‘two-winged butterfly’ by the Ellen MacArthur Foundation⁴⁵. Recent discussions on circular bioeconomy lead to different and evolving positions by several actors⁴⁶.

⁴¹ <https://ec.europa.eu/eurostat/web/circular-economy>

⁴² https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_strategy_2018.pdf#view=fit&pagemode=none

⁴³ See e.g. the German Law on Circular Economy of 1994.

⁴⁴ https://europa.eu/rapid/press-release_IP-15-6203_en.htm

⁴⁵ <https://www.ellenmacarthurfoundation.org/circular-economy/concept/infographic>

⁴⁶ See e.g. <http://bio-based.eu/downloads/nova-paper-9-the-circular-bioeconomy-concepts-opportunities-and-limitations/>



It is therefore important to gain an insight into the different interests held by stakeholders about the end-of-life stage for materials. This will make it easier to find ways of moving towards a bioeconomy that fully uses the resources from the circular economy and fully contributes to a circular bioeconomy.

The **specific challenge** is to reconcile legislation, waste management, circularity and the bioeconomy.

SCOPE:

Gain insight into EU, national and regional regulations on waste management; map the interests of different stakeholders in this field; and bring these stakeholders together to recommend steps to support the circular bioeconomy.

The scope of this topic includes 'bio-based waste': residual streams that could serve as feedstock for the bio-based industry. Waste-water sludges are excluded from this topic.

Proposals must analyse whether and how EU waste directives and regulations/policies on the circular economy are implemented on a Member State level⁴⁷. They need to take into account that national and regional regulations differ. They may use successful national/regional regulations as best practices. Proposals must analyse whether industry is already adapting to these regulations, and if so how and where they are adapting. Proposals must analyse where bio-based products or processes can benefit from these regulations. Proposals should identify regulatory hurdles for circular use of bio-resources.

Proposals should include industry sectors as well as large and small companies to understand their approach. This would be helpful because in some cases industry acts ahead of regulation (e.g. single-use plastics, and microplastics in home care). Proposals should also include public sectors dealing with, for example, waste management, environmental protection and monitoring, and territorial resources management planning.

Proposals should identify gaps in end-of-life scenarios for materials. These gaps could be either where current regulation is insufficient, or where it only combats symptoms instead of resolving a problem holistically. Proposals should give feedback on these gaps to the stakeholders and draw up recommendations for how to resolve these situations.

Proposals should also make recommendations on how regulations can transpose the EU directives into Member State law, while sustainably supporting the development of a circular bioeconomy.

⁴⁷ In this context see the OECD report [Meeting Policy Changes for a Sustainable Bioeconomy](#) (April 19, 2018)



INDICATIVE FUNDING:

It is considered that proposals requesting a maximum of EUR 1 million and for a planned duration of not more than 2 years would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts or for other durations.

EXPECTED IMPACTS:

- align the bio-based industry's R&I with relevant regulation, enabling especially SMEs without large in-house strategic departments to achieve pan-European value chain integration and market reach;
- help bio-based industry to align R&D&I with relevant regulations, and especially help SMEs without large in-house strategic departments to achieve pan-European value chain integration and market reach;
- inform policy makers and stakeholders from different areas about non-technological hurdles;
- provide advice to policy makers on key hurdles presented by new regulation and on opportunities for supporting EU goals;
- prevent knowledge gaps on regulation hindering the market entry of bio-based processes and products;
- provide opportunities for early-stage projects to evaluate their business case against current and upcoming regulations;
- help bio-based alternatives to take advantage of the regulatory framework to prove their superiority to fossil-based solutions.

NUMBER OF PROJECTS: a maximum of one project will be funded under this topic.

EXPECTED DURATION: up to 2 years.

TYPE OF ACTION: Coordination and support action.

TOPICS 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.

(BIO)ACTIVE OR FUNCTIONAL INGREDIENT = any compound with a proven effect on a living organism, tissue, cell, microbiota or microbiome. Such compounds may include different types of molecules, such as: polyphenols, carotenoids, fatty acids, flavonoids, glycolipids, specialty carbohydrates, peptides, and proteins.

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.

BIO-BASED = 'derived from biomass'⁴⁸.

BIO-BASED PESTICIDES (OR BIOPESTICIDES) = according to the US EPA's definition, these are 'certain types of pesticides derived from such natural materials as animals, plants, bacteria, fungi, algae and certain minerals'. They include (i) naturally occurring substances that control pests by specific mechanisms (biochemical pesticides); (ii) microorganisms that acts to control pests (microbial pesticides); and (iii) pesticidal substances that plants produce from genetic material that has been added to the plant (plant-incorporated-protectants, or PIPs)⁴⁹.

BIO-BASED PRODUCT = 'a product wholly or partly bio-based'⁵⁰.

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.'⁵¹

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

⁴⁸ ftp://ftp.cen.eu/CEN/Sectors/List/bio_basedproducts/DefinitionsEN16575.pdf.

⁴⁹ <https://www.epa.gov/ingredients-used-pesticide-products/what-are-biopesticides>.

⁵⁰ ftp://ftp.cen.eu/CEN/Sectors/List/bio_basedproducts/DefinitionsEN16575.pdf.

⁵¹ European Commission. European Bioeconomy Strategy (2012, updated version in 2018). https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_strategy_2018.pdf.



BIOMASS = ‘material of biological origin excluding material embedded in geological formations and/or fossilised’⁵².

BIOPOLYMER = ‘a polymer comprised, at least in part, of building blocks called monomers, produced from renewable feedstocks. An alternate definition for biopolymer, includes all biologically produced polymers like DNA, RNA and proteins’⁵³.

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. The largest markets for bio-based chemical building blocks are in the production of bio-based polymers, fibres, lubricants and solvents’⁵⁴.

CHEMICAL = a substance that is used in or produced by a chemical process.

CIRCULAR BIOECONOMY = the interlink between circular economy concepts and the bioeconomy.

CIRCULAR ECONOMY = a business concept aiming to create a close-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 wastes⁵⁵. In this economic system, a ‘waste’ can become a feedstock source for another process or value chain.

CO-NORMATIVE RESEARCH = the research that is necessary to quantify the repeatability, reproducibility and uncertainty of the procedures that are incorporated in the standard.

COMPOUND = in chemistry, a substance formed by two or more elements chemically bonded together. The term ‘compound’ can refer both to ‘intermediate’ (i.e. substance to be further converted into the final targeted product) and to ‘product’.

CONSUMER PRODUCTS = ‘items intended for consumers or likely to be used by consumers, even if not intended for them’⁵⁶. Such products are ordinarily used and bought by individuals or households for private purposes.

⁵² ftp://ftp.cen.eu/CEN/Sectors/List/bio_basedproducts/DefinitionsEN16575.pdf.

⁵³ https://ec.europa.eu/knowledge4policy/glossary/biopolymer_en.

⁵⁴ <http://www.industrialbiotech-europe.eu/new/wp-content/uploads/2014/08/Summary-of-the-findings-related-to-chemical-building-blocks.pdf>.

⁵⁵ <https://ec.europa.eu/eurostat/web/circular-economy>.

⁵⁶ <https://www.cen.eu/work/areas/consumerproducts/Pages/default.aspx>.

The European Standards developed by various Technical Committees of CEN in the area of consumer products can be classified into five distinct categories:

- child safety
- household goods, sports and leather
- cosmetics
- textile products
- safety of other consumer products

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 Assessment⁵⁷). 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.

EXTENDED PRODUCER RESPONSIBILITY (EPR) = ‘an environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of a product’s life cycle’ (OECD).

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

HIGH-END APPLICATIONS = final applications of targeted compounds derived from a starting bio-based stream which exceed, in terms of value, alternative applications for energetic purposes (based on the calorific value of the starting stream itself).

INDIRECT LAND USE CHANGE (ILUC) = displacement of agricultural production into non-croplands (e.g. grasslands and forests) because croplands previously used for food agricultural production have 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 CO₂. By converting these land types to cropland, negative environmental effects may occur, including an increase in atmospheric CO₂ levels⁵⁸, and biodiversity loss⁵⁹.

INTERMEDIATE PRODUCT = a substance 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 its 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 the social implications of a product/process/service.

⁵⁷ <https://www.millenniumassessment.org/documents/document.300.aspx.pdf>.

⁵⁸ <https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/land-use-change>.

⁵⁹ http://ec.europa.eu/environment/nature/conservation/species/pollinators/index_en.htm.



In the context of AWP 2020, depending on the type of impacts to be assessed, 'LCA methodologies' can refer to:

- life cycle assessment (LCA) to evaluate environmental impacts;
- life cycle costing analysis (LCCA) to evaluate economic impacts;
- social life cycle assessment (S-LCA) to evaluate social impacts.

LIFE CYCLE SUSTAINABILITY ASSESSMENT (LCSA) = assessment of the environmental, economic and social impacts of a product, process or service throughout its entire life cycle.

LIGNOCELLULOSE = a complex matrix made up of lignin, cellulose and hemicellulose mainly constituting the cell walls of woody plants.

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

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).

PLASTIC = any synthetic or semisynthetic organic polymer entailing the property of plasticity, i.e. the ability to deform without breaking. Thermoplastics and thermosetting polymers are the two types of plastic⁶⁰.

PLATFORM CHEMICAL = intermediate molecules which can be converted to a wide range of chemicals or materials.

PRE-NORMATIVE RESEARCH = the research carried out to establish the validity and reliability of the subject matter to be standardised.

STATE OF THE ART = the most recent developments of a product/process/service entailing the newest achievements and improvements in the related (application or technological) field.

SUSTAINABLE = refers to a product/process/value chain that enhances and creates benefits for the environment, economy and society.

⁶⁰ <https://www.thoughtco.com/plastic-chemical-composition-608930>.

2.1.8. Conditions of the 2020 Call

Call identifier: H2020-BBI-JTI-2020

Publication date: 15 April 2020⁶¹

Indicative deadline: 3 September 2020⁶² 17:00:00 (Brussels local time) - (single stage call).

Indicative budget: EUR 102 million^{63,64,65}

Estimated value of the in-kind contributions by the members other than the Union or their constituent entities (BIC): Minimum EUR 49 million.

Indicative budgets by type of actions

Topic	Indicative budget (million EUR)
Research and innovation actions	
BBI2020.SO2.R1 — Use enabling technologies to improve feedstock availability and sustainability for the bio-based industry	22
BBI2020.SO2.R2 — Develop integral fractionation of lignocellulose to produce components for high-value applications	
BBI2020.SO2.R3 — Develop bio-based solutions to recycle composites	
BBI2020.SO2.R4 — Extract bioactive compounds from new, under-exploited and/or recalcitrant residual bio-based streams for high-value applications	
BBI2020.SO3.R5 — Improve the sustainability of coatings	

⁶¹ The BBI JU Executive Director may decide to open the call up to one month prior to or after the envisaged date of opening.

⁶² The BBI JU Executive Director may delay this deadline by up to two months.

⁶³ In case the budget of a given line cannot be consumed (totally or partially) the corresponding budget will be allocated to the topics under the other budget lines.

⁶⁴ The final total funding for projects includes EFTA contributions.

⁶⁵ The call budget may be topped up by unused BBI JU appropriations from previous years within the limit set in the call budget flexibility section below.

Innovations actions – demonstration actions

BBI2020.SO1.D1 — Resolve supply-chain hurdles for turning residual waste streams into functional molecules for food and/or non-food market applications	28
BBI2020.SO1.D2 — Use biogenic gaseous carbon to increase feedstock availability for the industry	
BBI2020.SO2.D3 — Upscale the production of bio-based platform molecules for larger market applications	
BBI2020.SO3.D4 — Demonstrate superior bio-based packaging solutions with minimal environmental damage	

Innovation actions – flagship actions

BBI2020.SO1.F1 — Valorise the organic fraction of municipal solid waste through an integrated biorefinery at commercial level	15
BBI2020.SO1.F2 — Turn lignin into materials and chemicals for high-end applications	16
BBI2020.SO1.F3 — Produce food ingredients with high nutritional value from aquatic sources	16

Coordination and support actions

BBI2020.SO4.S1 — Help start-ups and spin-offs to gain access to finance	5
BBI2020.SO4.S2 — Provide insight on emerging technologies for bio-based value chains	
BBI2020.SO4.S3 — Create and interlink bio-based education centres to meet industry's needs of skills and competences	
BBI2020.SO4.S4 — Expand circular economy to include the underexploited circular bioeconomy	
Total	102

Indicative timetable for the evaluation and grant agreement

Information on the outcome of the evaluation	Indicative date for the signing of grant agreements
Maximum 5 months from the final date for submission	Maximum 8 months from the final date for submission



2.2. Call management rules

The BBI JU operates under the Horizon 2020 Rules for Participation, set out in Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in "*Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)*" and repealing Regulation (EC) No 1906/2006.

The only derogation from Horizon 2020 Rules for Participation is described in the Commission delegated regulation (EU) No 623/2014 of 14 February 2014 establishing a derogation from Regulation (EU) No 1290/2013 of the European Parliament and of the Council laying down the rules for participation and dissemination in 'Horizon 2020 — the Framework Programme for Research and Innovation (2014-2020)' with regard to the BBI JU. According to the applicable above mentioned delegated regulation, for Research & Innovation Actions (RIAs) and Coordination & Support Actions (CSAs), only the following are eligible for funding: SMEs; secondary and higher education establishments; non-profit legal entities, including those carrying out research or technological development as one of their main objectives; the JRC; and international European interest organisations.

2.2.1. List of countries eligible for funding

Part A of the General Annexes⁶⁶ to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan.

2.2.2. Standard admissibility conditions and related requirements

Part B of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan.

2.2.3. Eligibility conditions

Part C of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan with the following derogation:⁶⁷

⁶⁶ http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-ga_en.pdf

⁶⁷ OJ L 174, 13.6.2014, p. 12.



Coordination and Support Actions (CSA) and Research and Innovation Actions (RIA)	By way of derogation from Article 10(1) of Regulation (EU) No 1290/2013, with regard to the Bio-Based Industries Joint Undertaking only the following participants will be eligible for funding from the Bio-Based Industries Joint Undertaking for actions in the area of bio-based industries other than Innovation Actions: (a) small and medium-sized enterprises; (b) secondary and higher education establishments; (c) non-profit legal entities, including those carrying out research or technological development as one of their main objectives; (d) the Joint Research Centre; (e) international European interest organisations.
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2.2.4. Types of action: specific provisions and funding rates

Part D of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan with the following additions:

Research and Innovation Actions (RIA)

Research and Innovation actions aim to fill the technological gaps within specific value chains. The impact for the whole value chain must be clearly shown. The Technology Readiness Level (TRL)⁶⁸ at the end of the project should be in the range of 4 to 5 (specified per topic), except for some topics where another TRL is given.

Innovation Actions (IA)

Innovation Actions must address the whole value chain from feedstock sourcing to the market applications.

A '**demonstration**' action moreover has to include the establishment of a demo-scale production facility in Europe, being it a new installation, substantial modification of an existing facility, or use of existing demo facilities. Proposals should clearly state the starting and target TRLs. The TRL at the end of the project should be in the range of 6 to 7 (specified per topic). This requires that access to

⁶⁸ Technology readiness levels as defined in Part G of the General Annexes to the Horizon 2020 Work Programme:
http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-ga_en.pdf.



European biomass is ensured. It also means that they need to include an exploitation plan, sustainability assessment and to address consumer engagement.

A '**flagship**' action aims to support the first application/deployment in the market of an innovation that has already been demonstrated but not yet applied/deployed in the market due to market failure/barriers to uptake. Proposers for a flagship project have to provide clear evidence of previous validation of the proposed process at demonstration scale. 'First' means new at least to Europe or to the application sector in question. A flagship action must address a complete value chain from procurement, growth, supply of feedstock material to the final product(s). It has to include the establishment of a large-scale production facility in Europe or a substantial modification of an existing facility, or reconversion of old or abandoned industrial facilities. Proposals should clearly state the starting and target TRLs. The TRL at the end of the project should be 8. Projects may include limited research and development activities. Flagship initiatives are required to ensure deployment of technologies in biorefineries, and bring new bio-based products to the market, achieve the creation of new jobs and reduction of environmental impact.

It has to be understood that additional activities: (i) are outside the Work Plan and hence outside the scope of this call for proposals; (ii) may be taken into consideration in the context of the impact criterion, as part of the additional investments that can be made by any participant; (iii) should not be part of the proposal itself.

Coordination and support actions (CSA)

Coordination and Support Actions can address cross-sectorial challenges and supporting value chains through knowledge development (studies) and networking.

2.2.5. Technology readiness levels (TRL)

Part G of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the actions calls covered by this Work Plan.

2.2.6. Evaluation rules

Part H of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan, only as regards the selection criteria. It is complemented by the following rules.

1. Award criteria, scores and weighting

Grant proposals will be evaluated by experts, on the basis of the award criteria ‘excellence’, ‘impact’ and ‘quality and efficiency of the implementation’ (see Article 15 of the Horizon 2020 Rules for Participation Regulation No 1290/2013).

The aspects to be considered in each case depend on the types of action as set out in the table below (different from Part H of the General Annexes), unless stated otherwise in the call conditions:

Award criteria			
Type of action	Excellence	Impact	Quality and efficiency of the implementation
Coordination and Support Actions (CSA)	Clarity and pertinence of the objectives; Soundness of the concept and, credibility of the proposed methodology; Quality of the proposed coordination and/or support measures.	The extent to which the outputs of the project would contribute to each of the expected impacts mentioned in the work plan under the relevant topic; Quality of the proposed measures to: <ul style="list-style-type: none"> ▪ Exploit and disseminate the project results (including management of IPR), and to manage research data where relevant. ▪ Communicate the project activities to different target audiences 	Quality and effectiveness of the work plan, including extent to which the resources assigned to work packages are in line with their objectives and deliverables; Appropriateness of the allocation of tasks, ensuring that all participants have a valid role and adequate resources in the project to fulfil that role. Complementarity of the participants and extent to which the consortium as whole brings together the necessary expertise (if relevant); Appropriateness of the management structures and procedures, including risk and innovation management.
Research and Innovation Actions (RIA)	Clarity and pertinence of the objectives; Soundness of the concept and, credibility of the proposed methodology; Extent that the proposed work is beyond the state of the art, and demonstrates innovation potential (e.g. ground-breaking objectives,	The extent to which the outputs of the project would contribute to each of the expected impacts mentioned in the work plan under the relevant topic; Any substantial impacts not mentioned in the work plan, that would enhance innovation capacity, create	Quality and effectiveness of the work plan, including extent to which the resources assigned to work packages are in line with their objectives and deliverables; Appropriateness of the management structures and procedures, including risk

Award criteria			
Type of action	Excellence	Impact	Quality and efficiency of the implementation
	<p>novel concepts and approaches, new products, services or business and organisational models) Appropriate consideration of interdisciplinary approaches and, where relevant, use of stakeholder knowledge.</p>	<p>new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society; Quality of the proposed measures to:</p> <ul style="list-style-type: none"> ▪ Exploit and disseminate the project results (including management of IPR), and to manage research data where relevant. ▪ Communicate the project activities to different target audiences <p>Extent to which the proposed consortium own contribution will help maximising the impact of the action.</p>	<p>and innovation management Complementarity of the participants and extent to which the consortium as whole brings together the necessary expertise (if relevant); Appropriateness of the allocation of tasks, ensuring that all participants have a valid role and adequate resources in the project to fulfil that role.</p>
Innovation Actions (IA)	<p>Clarity and pertinence of the objectives; Soundness of the concept and, credibility of the proposed methodology; Coverage of the value chain (raw materials, equipment and technology suppliers and end-users); Extent that the proposed work is beyond the state of the art, and demonstrates innovation potential (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organisational models) Appropriate consideration</p>	<p>The extent to which the outputs of the project would contribute to each of the expected impacts mentioned in the work plan under the relevant topic; Any substantial impacts not mentioned in the work plan, that would enhance innovation capacity, create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society;</p>	<p>Quality and effectiveness of the work plan, including extent to which the resources assigned to work packages are in line with their objectives and deliverables; Appropriateness of the management structures and procedures, including risk and innovation management Appropriateness of the allocation of tasks, ensuring that all participants have a valid role and adequate resources in the project to fulfil that role.</p>

Award criteria			
Type of action	Excellence	Impact	Quality and efficiency of the implementation
	of interdisciplinary approaches and, where relevant, use of stakeholder knowledge.	<p>Quality of the proposed measures to:</p> <ul style="list-style-type: none"> ▪ Exploit and disseminate the project results (including management of IPR), and to manage research data where relevant. ▪ Communicate the project activities to different target audiences <p>Extent to which the proposed consortium own contribution, including additional investments⁶⁹, will help maximising the impact of the action</p>	<p>Complementarity of the participants and extent to which the consortium as whole brings together the necessary expertise (if relevant);</p> <p>Soundness of the business case and business plan;</p> <p>Readiness of the technology for the implementation of the pilot phase, demonstration or flagship⁷⁰.</p>

2. Scoring and weighting

Unless otherwise specified in the call conditions:

- a. Evaluation scores will be awarded for the criteria, and not for the different aspects listed in the above table. For full proposals, each criterion will be scored out of 5. The thresholds for the criteria 'excellence' and 'implementation' 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.
- b. For Innovation Actions, to determine the ranking, the score for the criterion 'impact' will be given a weight of 1.5.

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

⁶⁹ Additional investments related to the action, not to be confused with 'additional activities' referred to in Article 4(2)(b) of the BBI JU Regulation.

⁷⁰ Applicants should demonstrate the readiness of the technology for the implementation of the pilot phase. In particular, for flagships applicants must demonstrate that by the time of the submission of their application they have been operating relative demonstration scale plants at a significant production capacity (justification shall be provided in the proposal).



3. Priority order for proposals with the same score:

Priority order as reflected in Part H of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan.

Evaluation procedure

Evaluation procedure as reflected in Part H of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan.

2.2.7. Budget flexibility

Part I of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* to the call covered by this Work Plan.

2.2.8. Consortium agreement

Legal entities participating in a project must form a consortium and appoint one of its members to act as its coordinator. Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

2.2.9. Dissemination and information about project results

The results of the projects from Call 2020 proposal evaluation will be disseminated by BBI JU via press releases, presentations at internal (EC, BIC, Governing Board, Scientific Committee, States Representatives Group) and external (e.g. info day) stakeholder events, Twitter, as well as the BBI JU website. BBI JU will ensure that the requirement of the grant agreement regarding dissemination and exploitation are met, monitoring the dissemination activities related to the projects performed by the beneficiaries, during their implementation, according to the applicable periodicity and certainly at the final reporting.



2.2.10. Open access to research data and research data management

Part L of the General Annexes to the Horizon 2020 Work Programme 2018-2020 shall apply *mutatis mutandis* for the call covered in this Work Plan.

2.2.11. Horizontal actions to support the implementation of the Programme

The implementation of the BBI JU Work Plan is further supported by key horizontal activities in the following main areas:

- SME participation
- Widening participation
- Synergies with other relevant funding programmes
- Business Intelligence and impact monitoring.

The related action plans are discussed with the two advisory bodies SC and SRG. For 2019 and beyond they are also based on the recommendations of the BBI JU interim evaluation report published on 9 October 2017, as well as on the action plan developed in response to the recommendations of the BBI JU interim evaluation, which was published on its website on 14 May 2018.

The overall objective of the work undertaken in the context of the above-mentioned activities is to ensure the successful implementation of BBI JU's core operations, in line with the objectives set out in the 'BBI JU Regulation' as well as with the overall objectives for the initiative set out in the SIRA.

The activities related to SME participation and widening participation entail thorough monitoring and analysis of the participation of SMEs as well as underrepresented countries in BBI JU calls.

BBI JU will continue to analyse the impact of its consolidated portfolio focusing on the aspects and indicators that are most relevant to the BBI JU, such as environmental and socio-economic impacts, development and trends of bio-based industrial sectors, new products and markets, engagement of the primary sector and regional potential. In addition, BBI JU will continue to analyse the innovation potential and outputs of its portfolio, reporting on progress through consolidated and/or ad-hoc reports as needed. This will be achieved based on internal analyses and/or with the support of external resources via experts or procured studies.

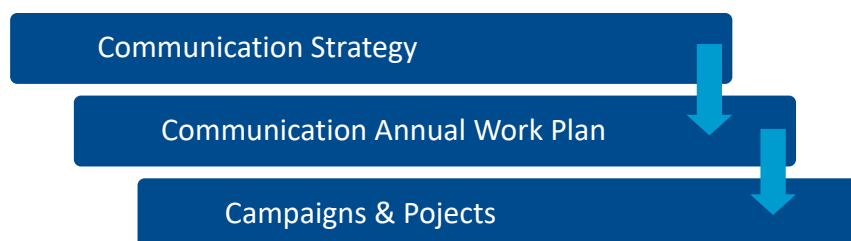
Finally, in order to achieve maximum impact, the BBI JU together with the European Commission and BIC, will continue to work on promoting synergies with other initiatives that also offer opportunities for the growth of the bio-based industrial sector in Europe.

These activities are closely monitored by the BBI JU advisory bodies and Governing Board, to which regular progress updates will be reported.

2.3. SUPPORT TO OPERATIONS

2.3.1. Communication activities

The BBI JU communication activities are developed and executed in line with its communication strategy. Similarly to the previous years, all relevant actions will follow the roadmap developed in cooperation with the EC and BIC while taking into careful consideration BBI JU's resources in order to ensure efficiency and to obtain a maximum return for the BBI JU initiative.



The communication objectives for 2019 were based on the BBI JU communications strategy goals, and were overall, to raise awareness on bio-based industries, increase knowledge of BBI JU, and promote participation in the BBI JU programme by engaging with all prioritised stakeholder groups.

Additionally, as the BBI JU project portfolio is maturing and the organisation is moving from 'recognition' to 'reputation', the 2019 communication action plan had focused on communicating the socio-economic and environmental impact of the BBI JU initiative as the key instrument for the development of a sustainable bio-based industry in the EU. For example, a significant emphasis was on communicating BBI JU projects success stories.

As more BBI JU projects draw to a close, the 2020 work plan will further build on the results obtained, and elaborate on the dissemination of the achievements and impact of completed (and ongoing) BBI JU projects with a specific focus on the scientific advancements and their market uptake potential. The vision of the current initiative and of the Joint Undertaking itself will be communicated via campaigns that will concentrate on its concrete added value in the daily lives of the EU citizens. As in 2019, we

will also continue working on BBI JU brand recognition, as well on promoting its core activities, such as the 2020 Call for proposals.

The selective and strategic use of the right tools is critical for achieving BBI JU's long-term communication goals also with regards to its wide array of stakeholders. The 2020 action plan will continue the development of relations with targeted stakeholders to further consolidate its recognition in an impactful way. More specifically, BBI JU will continue engaging with these stakeholders that have been mapped and identified according to their priority for achieving BBI JU's mission. The stakeholder action plan will be focussed on tailored and strategic messages and all available tools and communication channels will be used to that purpose.

In conclusion, it needs to be noted that the actions to implement the communication action plan for 2020 will continue to place a strong emphasis on ensuring a coordinated and collaborative approach, taking advantage of complementarities and avoiding duplication with other initiatives.

Communication channels

Communication channel	Description	Action
Press and media	Media and press relations, communication materials	Engage with the wider public and key individuals, storytelling, disseminate key messages and achievements
Communication events	Refer to the " <i>Indicative list of events involving BBI JU participation in 2020</i> " below for more details	Highlight impact and achievements of the programme, maximise impact of the BBI JU's outreach, promote the BBI JU Call
Digital platforms and social media	Website redesigning, partnering platform, social media, e-newsletter	Improve project dissemination, favour networking, keep up the growing presence/influence on social media, raise visibility, storytelling
Public relations and advocacy	Bilateral meetings, presentations, networking	Widen stakeholder engagement and support, improve the visibility and recognition of the programme with a particular focus to key individuals

Horizontal activities in support of the implementation of the programme

In addition to the main activities outlined above, the BBI JU communication team will provide support to the horizontal actions related to the implementation of the programme as described under section 2.3.11.

Communication Action Plan for 2020

The communication action plan for 2020 (mainly, but not exclusively) will entail the following:

- BBI JU will continue the development of communications tools, such as **publications** and **short promotional videos** to tell the success stories about the programme.
- **Following the results of the 2019 website survey**, subsequent improvements and redevelopment of the BBI JU **public website** are planned, procuring the services of expert consultants for the technical support and design.
- **Organisation and sponsorship of targeted events**, including advertising, sponsorship of awards and marketing activities which build BBI JU's corporate reputation in line with its mission and objectives.
 - The **Info Day** and Networking event to support the annual Call for proposals. The event will be held in the EC premises (Charlemagne building) and relevant supporting communication materials will be developed for the actual day of the event but also for events following that, i.e. national info days, webinars, etc.
 - In the context of BBI JU's stakeholder management plan priorities for 2020, BBI JU will also participate in the **sponsorship** of awards, prizes and events with a strong link on the bio-based sector, bioeconomy and the wider R&I policy. To that end, BBI JU will sponsor the EUCYS 2020 bioeconomy prize, World Bio Markets 2020 and other events of similar scope and focus.
 - As on-going policy developments closely impact BBI JU's current and future activities, the target will remain the EU institutions through the **participation in events** like the European Research and Innovation Days and others of similar nature and focus.

BBI JU indicative list of events in 2020:

Event	Date(s)	Place	BBI JU role
EU Industry Days	TBC	Brussels, Belgium	Session organiser, Speaker (TBC)
Common JU event in the European Parliament	16-19 March (TBC)	Brussels, Belgium	Co-organiser
BIOKET 2020: Processes and Technologies applied to Biomass	10 – 12 March	Lille, France	Speaker
World Bio Markets 2020	March	Amsterdam, the Netherlands	Sponsor, speaker
BBI JU Info Day	27 April	Brussels, Belgium	Organiser
Member States Info Days	Various	Various	Speaker

EUBCE 2020	TBC	Paris, France	Session organiser, speaker, exhibitor
ESOF 2020	5 – 9 July	Trieste, Italy	Session organiser, speaker
BIO World Congress on Industrial Biotech 2020	20 – 23 September	Raleigh, NC, USA	Session organiser, speaker (tbc)
R&I Days	TBC	Brussels, Belgium	Session organiser, exhibitor, speaker
EUCYS	TBC	TBC	Sponsor of the bioeconomy award
EFIB 2020	TBC	TBC	Speaker, exhibitor
IFIB 2020	TBC	Italy	Speaker
Ecomondo 2020	TBC	Italy	Speaker

Overview of the 2020 activities and indicative budget

The table below provides an overview of the activities outlined above. The timeline and the relevant allocated budget are indicative⁷¹.

Activity	Timeline	Budget	Expected procurement procedure
Media campaigns and media publications	Q1-Q4	EUR 55 000	FWC/SLA and public procurement
Public relations	Q1-Q4	EUR 90 000	FWC/SLA and public procurement
Communications materials: publications, leaflets, posters, banners, etc.	Q1-Q4	EUR 50,000	FWC/SLA and public procurement
Promotional videos	Q2-Q4	EUR 120 000	FWC/SLA or public procurement
Public website	Q3	EUR 120 000	FWC/SLA or public procurement
Info Day	Q2	EUR 55 000	Public procurement and FWC

⁷¹ With regards to the budget please note it may be subject to modifications in the EU General Budget for 2019, if any, and would thus be updated accordingly.

2.3.2. Procurement and contracts

For the year 2020 BBI 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 rules⁷². It is essential that BBI JU makes the most efficient use of its resources by using existing framework contracts and service level agreements (SLA) 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, BBI 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 2020 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 media publications	Up to 55 000	FWC/SLA and public procurement	Q1-Q4
Communications Materials	Up to EUR 50 000	FWC/SLA and public procurement	Q1-Q4
Promotional videos	Up to 120 000	FWC/SLA or public procurement	Q2-Q4
Public website	Up to EUR 120 000	FWC/SLA or public procurement	Q3
Info Day	Up to EUR 55 000	Low value public procurement and FWC	Q2
Public relations including media support	Up to EUR 90 000	FWC/SLA and public procurement	Q1-Q2
Audit of accounts for the period 2020-2021	Up to EUR 70 000	Middle value public procurement	Q3
Study on the environmental impact and biodiversity issues in the BBI JU projects⁷³	Up to EUR 200 000	Open Procedure	Q3-Q4

⁷² https://www.bbi-europe.eu/sites/default/files/bbi_ju-financial_rules.pdf

⁷³ The implementation of this procurement procedure is subject to a consensus to be reached at working level on the related Terms of Reference

Study on the valorisation of the BBI JU portfolio⁷⁴	Up to EUR 144 000	Mid value negotiation procedure	Q1-Q3
Organisation of a communication event	Up to 135 000	Mid value negotiation procedure	Q1-Q2

2.3.3. IT and logistics

Cloud/Office 365/Intranet

The BBI JU continues the roll-out of cloud-based services. In 2020, the BBI JU will be evaluating the impact of migrating the email and file services to online services, to improve availability and accessibility of these two essential IT services.

The BBI JU's Intranet will also be going through improvements, as part of its continuous evolution.

Unified Communications

Related to the previous point, a cloud-based unified communications solution (Microsoft Teams) will be put in place to improve collaboration and teamwork while keeping a high level of security. During the course of 2019, a pilot project has been launched within the Communications team. Depending on the results of this project, this tool would be integrated with the Intranet, providing a flexible platform to share and discuss work-related documents, facilitate knowledge transfer, enable easy-to-setup online meetings internally and also involving external participants, and more.

Renewal of the ICT Network

The network components currently installed in the White Atrium building have reached their end of life, their maintenance is no more economical, and their performance capabilities don't meet anymore the requirements of a modern office.

Therefore, a complete renewal of the wired and wireless infrastructure is required. The project will also aim to improve management of guests' Internet access to render a hassle-free user experience. Security will be a key design element as well, throughout the project.

⁷⁴ Study coming from the BBI JU AWP 2019



Paper-less office

With the implementation of ARES (the European Commission's records management and workflow system) in 2019, the BBI JU has already taken a big step towards reducing the paper-based files during the Support Office's everyday work. However, when it comes to signing contracts with external entities (service providers, suppliers, etc.), a blue-ink signature is still required.

The BBI JU is looking into possibilities to obtain Qualified Electronic Certificates and integrate them with ARES, to allow for a full paper-less signatory chain.

2.3.4. JU Executive Team – HR matters

MANAGEMENT OF THE PROGRAMME OFFICE

The 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 BBI JU in accordance with the decisions of the Governing Board.

In the HR domain, BBI 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.

This objective will be implemented in four main HR areas:

STAFF IMPLEMENTATION AND RECRUITMENT

In 2020, the BBI JU will have 23 staff members reaching its full Staff Establishment Plan. Therefore, no additional recruitment of statutory staff is foreseen. However, since staff turnover and inter agency mobility are expected to increase, recruitment needs will be closely monitored by the HR function.

BBI JU will be in the core phase of its mandate and the workload will significantly increase while the total number of staff will remain the same. In order to cope with these peak periods of work, BBI JU might recruit interim staff to provide occasional additional support and guarantee business continuity for critical periods.

Given the increased success of its traineeship programme, BBI JU will give the opportunity to additional trainees to acquire a first-hand experience of the BBI JU as well as an understanding of its objectives and activities. With these traineeships, BBI 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.

The HR function performed/made a market analysis for a new IT recruitment tool for the publication of its external vacancies in 2019 and in 2020 the BBI JU might start with the implementation of the SYSTAL talent acquisition tool developed by Oracle for EU Agencies and Joint Undertakings.

LEGAL MATTERS AND HR MANAGEMENT

In 2020, BBI JU will continue 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 by the GB in 2020 in consultation with DG HR and the Standing Working Party⁷⁵.

LEARNING AND DEVELOPMENT OPPORTUNITIES FOR BETTER EFFICIENCY AND STAFF MOTIVATION

The BBI 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 BBI JU human resources policy and serves the interests of both the individual and the organisation. Therefore, in 2020 HR 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.

⁷⁵ 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.



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. 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 BBI staff started using in 2019 (e.g.: ARES, SYSPER,...).

The HR function will also continue to improve the BBI 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 BBI agreed corporate values and these values will be integrated in the staff assessment process.

COOPERATION WITH OTHER JUS/AGENCIES NETWORK/EC

In 2020, BBI JU will continue to collaborate with the other JUs, the agency network and the EC HR support services (DG HR and PMO).

2.3.5. Data protection

The BBI JU, and specifically its Data Protection Officer (DPO), continues to ensure and apply the data protection legal framework within the Joint Undertaking, taking into account the entry into force of the new Regulation (EU) 2018/1725, which replaced on 11 December 2018 Regulation (EC) No 45/2001.

For this purpose, the BBI JU will continue implementing the following tasks:

- Plan, provide advice and report to the Controller on accountability at three levels.
- New system of records replacing the previous notification system. The priority setting for reformatting from notification into record has been based on the assessment of the risk of the processing operations. During the second quarter of 2019, the BBI JU participated in a joint procurement procedure with the other Joint Undertakings, for the development and maintenance of an on-line data protection register tailor made to the needs of a Joint Undertaking. This IT system was put in place in October 2019, and will be further developed and fine-tuned during the first quarter of 2020.
- Follow up on the new or updated guidance to be issued by the European Data Protection Supervisor



2.4. Governance

2.4.1. Governing board

BBI JU's Governing Board has overall responsibility for the strategic orientation and the operations of the BBI JU and shall supervise the implementation of its activities in accordance with Article 7 of the Statutes⁷⁶.

The GB is composed of 5 representatives of the European Commission on behalf of the EU, and 5 representatives of BIC.

The GB is planning to hold four ordinary meetings (every quarter) during 2020. In addition, BBI JU sends monthly reports to the GB members to keep a continuous information loop.

The key activities of the GB for the 2020 are listed below:

Key activities in 2020 – Timetable	
Adopt the Annual Activity Report 2019 and its assessment by the GB	Q2
Adopt an opinion on the final accounts 2019	Q2
Approve the list of proposals selected for funding after the evaluation of Call 2020	Q4
Adopt the AWP and Budget 2021 ⁷⁷	Q4
Approve the Additional Activities Plan 2021 ⁷⁷	Q4

2.4.2. Executive Director

The Executive Director is the chief executive responsible for the day-to-day management of the BBI JU in accordance with the decisions of the Governing Board. In June 2019 the Executive Director presented to the Governing Board the BBI JU priorities for the year 2020. These priorities are translated into yearly objectives for BBI JU Programme Office team and then cascaded into individual objectives for all BBI JU staff members during the months of January – February 2020.

⁷⁶ Annex to the Council Regulation (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking ("BBI JU Regulation").

⁷⁷ Subject to future decisions on an institutionalised partnership under Horizon Europe in the sector.



For the year 2019 the priorities were to:

1. Keep BBI JU operational standards at the highest quality and ensure efficiency to absorb the increase of workload.
2. Analyse and communicate the impact and the added value of the BBI JU iPPP and its project portfolio to a wide audience of stakeholders.
3. Implement the adjustments to the project portfolio following the recommendations of the BBI JU interim evaluation, while maintaining all its recognised key strengths.
4. Contribute to the discussions on Horizon Europe in terms of Missions and Objectives and in terms of operational functioning of the BBI JU as implementing body, by building on the lessons learnt from the implementation of Horizon 2020.

For 2020, the Executive Director and the management team presented on 20 June 2019 to the BBI JU GB the priorities for 2020, they were adjusted after the GB feedback, and those below are the final ones based the following considerations:

- The future of the initiative will have a great impact on the further definition of these objectives
- BBI JU is a mature organisation. A challenge will be consolidating the current strengths, while maintaining the performance level during the transition phase.
- Throughout a culture of continuous improvement, the programme office continues to consolidate some processes while implementing corrective actions where needed. In addition, the reporting landscape is further elaborated to ensure effective demonstration of and communication around the achievements and impact of the initiative.
- BBI JU continues to be faced with the challenge of absorbing growing workload while keeping high quality standards
- Considering BBI JU has one more call to implement and the fact that 2021 could be the first year of Horizon Europe implementation, whatever the form of the future partnership around bio-based industries, 2020 could be an important year of transition.

For the year 2020 the priorities are to:

1. Keep BBI JU operational standards at the highest quality and ensure efficiency to absorb the peak of workload;
2. Prepare the transition of BBI JU towards Horizon Europe whatever is the future of a partnership around bio-based industries;
3. Continue to analyse and amplify the communication on the actual and expected impact of BBI JU and its project portfolio to a wide audience of stakeholders;



4. Contribute to the discussions on Horizon Europe from the perspective of the operational functioning of BBI JU as implementing body by building on the lessons learnt from the implementation of Horizon 2020.

The AWP 2020 has been built around those priorities and their related objectives.

2.4.3. Scientific Committee

According to Article 4(2) of the BBI JU Statutes, the Scientific Committee is an advisory body to the Governing Board. It was established at its first meeting on 1 September 2014. It conducts its activities in close liaison and with the support of the BBI JU Programme Office.

The members reflect 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 BBI JU. At present, the Scientific Committee consists of fourteen members. The SC members have elected a chair and a vice-chair.

The Scientific Committee carries out the following tasks:

- advise on the scientific priorities to be addressed in the annual work plans;
- advise on the scientific achievements described in the annual activity report.

The Scientific Committee was consulted on this 2020 AWP in two stages:

- provision of input to the first draft of the AWP 2020, including topic texts
- provision of recommendations to the pre-final version of the AWP2020, including topic texts and budget.

During the year 2020, at least two meetings of the Scientific Committee are planned (Q2 and Q3/Q4). Additional meetings could take place to address major issues.

Key activities in 2020 – Timetable

12th Meeting of the SC. **The SC would:**

- Provide advice on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI JU will provide information on the main achievements in the implementation of the 2019 annual work plan, participation in the call for proposals and evaluation results of the Call 2019, on-going projects, etc.
- Provide SC position on Horizon Europe and BBI JU related issues

Q2



<p>13th Meeting of the SC. The SC would:</p> <ul style="list-style-type: none">▪ Provide advice on the draft of the Annual Work Plan 2020▪ Provide advice on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI JU will provide information on the 2020 annual work plan implementation, participation in the call for proposals 2020, on-going projects, etc.	<p>Q3/Q4</p>
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2.4.4. States Representatives Group

The States Representatives Group (SRG) was established at its first meeting on 3 September 2014. According to Article 11 of the BBI JU Statutes, the SRG consists of one representative of each Member State and of each country associated to Horizon 2020. It has elected a chair and two vice-chairs from among its members.

The SRG is being consulted and, in particular, reviews information and provides opinions on the following matters:

- programme progress of the BBI JU and achievement of its targets, including the calls for proposals and proposals evaluation process;
- updating of strategic orientation;
- links to Horizon 2020;
- annual work plans;
- involvement of SMEs.

The States Representatives Group was consulted on this 2020 Annual Work Plan in two stages: (i) first draft of AWP with the list of topics in May 2019, (ii) pre-final full version to the draft of the 2020 AWP in September 2019.

The SRG also provides information to, and acts as an interface within, the BBI JU on the following matters:

- the status of relevant national or regional research and innovation programmes and identification of potential areas of cooperation, including deployment of relevant technologies, to allow synergies and avoid overlaps;
- specific measures taken at national or regional level with regard to dissemination events, dedicated technical workshops and communication activities;
- specific measures taken at national or regional level with regard to deployment activities in relation to the BBI Initiative.



The States Representatives Group may issue, on its own initiative, recommendations or proposals to the Governing Board on technical, managerial and financial matters as well as on annual plans, in particular when those matters affect national or regional interests.

During the year 2020, at least two meetings of the States Representatives Group are planned (Q2 and Q3/Q4). Additional meetings could take place to address major issues.

Key activities in 2020 – Timetable

<p>12th Meeting of the SRG. The SRG would:</p> <ul style="list-style-type: none"> ▪ Provide recommendations on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI JU will provide information on the programme progress and main achievements since the last meeting, participation in the call for proposals and evaluation results of the Call 2019, impacts and achievements, on-going projects, communication activities, synergies with other initiatives, etc. ▪ Provide updated information on regional and national research and innovation programmes in order to ensure synergies with BBI JU. Discussion on the basis of the Joint JRC-BBI JU-IEA Bioeconomy survey on national activities. ▪ Discuss initiatives to improve the promotion, dissemination and communication of the BBI Initiative and the participation of national stakeholders in BBI JU call for proposals. ▪ Provide advice on potential activities related to BBI JU under Horizon Europe 	Q2
<p>13th Meeting of the SRG. The SRG would:</p> <ul style="list-style-type: none"> ▪ Issue recommendations on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI JU will provide information on the 2020 annual work plan implementation, participation in the 2020 call for proposals (submission statistics), on-going projects, etc. ▪ Provide updated information and discuss initiatives on: regional and national research and innovation programmes to allow synergies; dissemination and communication activities; and deployment activities in relation to BBI JU. ▪ Provide SRG position on Horizon Europe and BBI JU-related issues. 	Q3/Q4

2.5. Internal Control framework

In 2019 BBI JU adopted a new Internal Control Framework (ICF) in line with the one that was gradually introduced in the other EU institutions since 2017. The ICF provides reasonable assurance to the Governing Board regarding the achievement of BBI JU's objectives. In line with the requirements expressed in the BBI JU Financial Rules and in the EU Financial Regulation, it shall:

- Ensure that operational activities are effective and efficient. The BBI JU meets its objectives defined in the Annual Work Plan using the adequate human and financial resources.



- Ensure that legal and regulatory requirements are met. BBI JU operates in full accordance with all legal and regulatory requirements.
- Ensure that reporting is reliable. BBI 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. BBI 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 BBI JU management process and functions concur to these four objectives granting the largest possible preventive, detective and corrective controls in line with the available resources.

In 2020 BBI 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 BBI 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 BBI JU beneficiaries.

2.5.1. Financial procedures

In 2020 BBI 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 BBI 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 improved business procedures already in force in 2019 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.

In 2020 the volume of financial transactions will increase significantly compared to prior years, particularly on the grants side. 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, in line with the practices of DG RTD. 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:

BBI JU has already adopted a full set of processes and procedures whose regular application in 2019 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 BBI JU in line with the adopted Horizon 2020 ex ante control strategy.

In order to implement ex ante controls, desk reviews are performed by BBI 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. BBI 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 2020 BBI JU will continue to cooperate with the Fraud and Irregularities network of Horizon 2020 research family. 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 BBI JU.

For what concerns the prevention of possible double funding, BBI 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 plans. Regarding possible double funding controls during the project implementation, the Programme Office will follow closely the development of tailored Horizon 2020 corporate IT tools and will employ them according to its own resources.

Ex post controls:

Ex post controls of operational expenditure will continue to be implemented in line with the Horizon 2020 Audit Strategy. The Horizon 2020 Common Implementation Centre (CIC) of the European Commission developed this audit strategy in cooperation with all its clients (i.e. the entities that implement 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 2020 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.

BBI 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 2020, BBI 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 BBI 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 2020, BBI 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 BBI JU accounts. BBI JU will also continue to follow up and confirm the implementation of the relevant recommendations.



3. BUDGET 2020



3.1. Budget information

Please note that the BBI JU 2020 budget may be subject to modifications in the EU General Budget for 2020, if any, and would thus be updated accordingly.

The draft budget is based on the preliminary budget presented in the Fiche Financière as well as the draft budget sent to GB members on 14/11/2019. The only updates relate to the amounts of unused budget appropriations from prior years, to be reactivated in the 2020 budget, based on the most recent information available in this respect. The EFTA rate in use is 2.41%.

I STATEMENT OF REVENUE

Heading	Budget 2020 CA (in €)	Budget 2020 PA (in €)	Amendment 2020 CA	Amendment 2020 PA	Amended.1 2020 CA	Amended.1 2020 PA	Amended Budget 2019 CA (in €)	Amended Budget 2019 PA (in €)	Amended Budget 2018 CA (in €)	Amended Budget 2018 PA (in €)
EU contribution (excl. third countries contribution/EFTA)	67,604,259	184,010,322	0	0	67,604,259	184,010,322	133,608,895	145,833,500	112,487,038	111,138,458
of which Administrative	2,286,218	2,286,218	0	0	2,286,218	2,286,218	1,184,579	1,184,579	2,223,726	2,223,726
of which Operational	65,318,041	181,724,104	0	0	65,318,041	181,724,104	132,424,316	144,648,921	110,263,312	108,914,732

Heading	Budget 2020 CA (in €)	Budget 2020 PA (in €)	Amendment 2020 CA	Amendment 2020 PA	Amended.1 2020 CA	Amended.1 2020 PA	Amended Budget 2019 CA (in €)	Amended Budget 2019 PA (in €)	Amended Budget 2018 CA (in €)	Amended Budget 2018 PA (in €)
Third countries contribution (including EFTA)⁷⁸	1,929,263	4,517,749	0	0	1,929,263	4,517,749	3,479,892	4,199,237	2,820,948	2,789,526
of which Administrative EFTA	55,098	55,098	0	0	55,098	55,098	28,193	28,193	51,813	51,813
Of which administrative third countries excluding EFTA	300,000	300,000	0	0	300,000	300,000	300,000	300,000	200,000	200,000
of which Operational EFTA ⁷⁹	1,574,165	4,162,651	0	0	1,574,165	4,162,651	3,151,699	3,871,044	2,569,135	2,537,713
Industry (financial) contribution	2,641,316	2,641,316	0	0	2,641,316	2,641,316	1,512,772	3,512,772	4,475,539	2,975,539
of which Administrative	2,641,316	2,641,316	0	0	2,641,316	2,641,316	1,512,772	1,512,772	2,475,539	2,475,539

⁷⁸ The rate used for the EFTA contribution computed on the EU contribution (excl. third countries not attracting EFTA) to the BBI JU administrative and operational expenditure is 2.41 %.

⁷⁹ For 2020 operational PA the EFTA is calculated on a net amount of €172,724,104. The extra €9 million added to this amount results from a reduction of €18mio in the EC operational PAs of 2019, 50% of which has been used to supplement the net budget for 2020 (the other 50% will increase the operational PA budget foreseen for 2021)

Heading	Budget 2020 CA (in €)	Budget 2020 PA (in €)	Amendment 2020 CA	Amendment 2020 PA	Amended.1 2020 CA	Amended.1 2020 PA	Amended Budget 2019 CA (in €)	Amended Budget 2019 PA (in €)	Amended Budget 2018 CA (in €)	Amended Budget 2018 PA (in €)
of which Operational	0	0	0	0	0	0	0	2,000,000	2,000,000	500,000
SUB-TOTAL revenues	72,174,838	191,169,387	0	0	72,174,838	191,169,387	138,601,559	153,545,509	119,783,525	116,903,523
C2 reactivation of unused appropriations from administrative expenditure⁸⁰	949,181	1,156,594	896,000	500,000	1,845,181	1,656,594	3,022,640	3,081,421	622,497	728,744
of which from 2017	0	0	396,000	0	396,000	0	2,564,292	2,781,421	622,497	728,744
of which from 2018	949,181	1,156,594	113,417	0	1,062,598	1,156,594	458,348	300,000	0	0
of which from 2019	0	0	386,583	500,000	386,583	500,000	0	0	0	0

⁸⁰ 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

Heading	Budget 2020 CA (in €)	Budget 2020 PA (in €)	Amendment 2020 CA	Amendment 2020 PA	Amended.1 2020 CA	Amended.1 2020 PA	Amended Budget 2019 CA (in €)	Amended Budget 2019 PA (in €)	Amended Budget 2018 CA (in €)	Amended Budget 2018 PA (in €)
C2 reactivation of unused appropriations from operational expenditure⁸¹	20,443,582	28,779,556	17,347,1840	0	37,790,766	28,779,556		25,486,657	825,798	486,657
of which from 2016	0	0					0	0	825,798	0
of which from 2017	602,874	0	0	0	602,874	0	0	0	0	486,657
of which from 2018	12,776,650	7,779,556	0	0	12,776,650	7,779,556	0	0	0	0
of which from 2019	7,064,058	21,000,000	17,347,1840	0	24,411,242	21,000,000	0	0	0	0
SUB-TOTAL reactivations	21,392,763	29,936,150	18,243,184	500,000	39,635,947	30,436,150	3,022,640	28,568,078	1,448,295	1,215,401
TOTAL REVENUES	93,567,601	221,105,537	18,243,184	500,000	111,810,785	221,605,537	141,624,199	182,113,587	121,231,820	118,118,924

⁸¹ Unused budgetary commitment and payment appropriations from prior years' operational budget, which can be reactivated in the budgets of up to 3 subsequent year following the year of origin, in accordance with the "N+3" rule applicable to Joint Undertakings

II STATEMENT OF EXPENDITURE

Titl Cha	Heading	Budget 2020 CA (in €)	Budget 2020 PA (in €)	Amend.1 2020 CA	Amend.1 2020 PA	Amended 1 2020 CA	Amended 1 2020 PA	Amended Budget 2019 CA (in €)	Amended Budget 2019 PA (in €)	Amended Budget 2018 executed CA (in €)	% ratio 2018 CA to 2020	Amended Budget 2018 executed PA (in €)	% ratio 2018 PA to 2020
1	Staff Expenditure	3,119,972	3,119,972	0	0	3,119,972	3,119,972	3,053,852	3,154,012	2,433,820	78.04 %	2,372,457	76.04 %
1 1	Staff in active employment	2,692,372	2,692,372	0	0	2,692,372	2,692,372	2,611,933	2,758,350	2,128,965	79.11 %	2,100,885	78.03 %
1 2	Staff recruitment / Miscellaneous expenditure	90,000	90,000	0	0	90,000	90,000	107,508	92,471	17,460	19.40 %	15,455	17.17 %
1 3	Mission and duty travels	80,000	80,000	0	0	80,000	80,000	71,025	60,000	85,000	106.2 5%	80,403	100.5 0%
1 4	Other staff costs (socio- medical structure)	247,600	247,600	0	0	247,600	247,600	246,953	233,191	191,001	77.14 %	163,848	66.17 %
1 5	Entertainment and representation expenses	10,000	10,000	0	0	10,000	10,000	16,432	10,000	11,394	113.9 4%	11,866	118.6 6%
2	Other administrative expenditure	2,162,660	2,162,660	896,000	500,000	3,058,660	2,662,660	2,994,331	2,952,953	1,890,574	61.81 %	1,850,771	69.51 %
2 0	Rental of buildings and associated costs	325,000	325,000	0	0	325,000	325,000	318,974	316,184	303,417	93.36 %	268,900	82.74 %

Titl	Heading	Budget 2020 CA (in €)	Budget 2020 PA (in €)	Amend.1 2020 CA	Amend.1 2020 PA	Amended 1 2020 CA	Amended 1 2020 PA	Amended Budget 2019 CA (in €)	Amended Budget 2019 PA (in €)	Amended Budget 2018 executed CA (in €)	% ratio 2018 CA to 2020	Amended Budget 2018 executed PA (in €)	% ratio 2018 PA to 2020
Cha													
2 1	Administrative information technology	254,160	254,160	0	0	254,160	254,160	254,721	256,369	202,833	79.81 %	187,432	73.75 %
2 2	Movable property and associated costs	5,000	5,000	0	0	5,000	5,000	5,000	11,319	9,421	188.42 %	8,087	161.74 %
2 3	Current administrative expenditure	23,000	23,000	0	0	23,000	23,000	38,347	40,620	24,070	104.65 %	12,212	53.10 %
2 4	Telecommunications and postal charges	16,300	16,300	0	0	16,300	16,300	17,520	14,800	12,240	75.09 %	3,811	23.38 %
2 5	Expenditure on formal meetings	113,000	113,000	0	0	113,000	113,000	160,104	113,000	61,388	54.33 %	58,740	51.98 %
2 6	External communication, information, publicity	490,000	490,000	113,417	500,000	603,417	990,000	853,209	838,572	218,480	36.21 %	308,553	31.17 %
2 7	Service contracts	75,000	75,000	386,583	0	461,583	75,000	155,000	155,000	55,535	12.03 %	25,795	34.39 %
2 8	Experts contracts and evaluations	700,000	700,000	396,000	0	1,096,000	700,000	900,000	900,000	773,190	70.55 %	773,190	110.46 %
2 9	Expert reviewers	161,200	161,200	0	0	161,200	161,200	291,455	307,089	230,000	142.68 %	204,051	126.58 %

Titl		Budget	Budget	Amend.1	Amend.1	Amended 1	Amended 1	Amended	Amended	Amended	% ratio	Amended	% ratio
Cha	Heading	2020 CA (in €)	2020 PA (in €)	2020 CA	2020 PA	2020 CA	2020 PA	Budget 2019 CA (in €)	Budget 2019 PA (in €)	Budget 2018 executed CA (in €)	2018 CA to 2020	Budget 2018 executed PA (in €)	2018 PA to 2020
	Reactivations of prior year unused administrative budget	949,181	1,156,594	896,000	500,000	949,181	1,656,594	0	0	0		0	
3	Operational expenditure (including reactivations)	87,335,988	214,666,311	17,347,184	0	104,682,972	214,666,311	135,576,015	176,006,622	115,658,245	132.58%	79,172,889	44.76%
30	Previous years' calls	0	185,886,755	0	0	0	185,886,755	0	176,006,622	0		79,172,889	44.76%
31	Current year's call (s)	66,892,206	0	0	0	66,892,206	0.00	135,576,015	0	115,658,245	132.58%	0	
	Reactivations of prior year unused operational budget	20,443,582	28,779,556	17,347,184	0	37,790,766	28,779,556	0	0	0		0	
	TOTAL EXPENDITURE	93,567,601	221,105,537	18,243,184	500,000	111,810,785	221,605,537	141,624,199	182,113,587	119,982,639	104.63%	83,396,117	37.72%

SUMMARY SCHEDULE OF PAYMENTS

Multiannual estimated payment schedule on the operational budget.

Year	2014	2015	2016	2017	2018	2019	2020
Total awarded grants	Grant amount €49,653,708	Grant amount €178,849,527	Grant amount €185,070,932	Grant amount €85,161,992	Maximum Grant amount €102,910,811	Maximum Grant amount €135,576,015	Maximum Grant amount €87,333,988
Pre-financing		€ 17,713,972	€ 61,790,837	€ 62,487,741	€ 34,064,797	€ 82,328,649	€ 108,460,812
Interim payments				€ 21.323.120	€ 44,942,912	€ 49,539,397	€ 84,931,933
Final payments					€ 165,181	€4,493,025	€ 21,273,567
					€ 79,172,889	€135,578,491	€ 214,666,312

Call 2014	2014	2015	2016	2017	2018	2019
Total awarded grants	€ 49,653,707					
Pre-financing		€ 17,713,972				
Interim payments				€ 21,323,121	€ 1,906,954	
Final payments					€ 165,181	€ 3,726,458

Call 2015.1	2015	2016	2017	2018	2019	2020	2021	2022
Total awarded grants	€ 73,740,645							
Pre-financing		€ 27,609,092						
Interim payments				€ 12,206,499	€ 909,132	€ 15,129,052	€ 5,237,404	
Final payments						€ 2,743,361		€ 9,906,104

Call 2015.2	2015	2016	2017	2018	2019	2020	2021	2022
Total awarded grants	€ 105,108,882							
Pre-financing		€ 34,181,745						
Interim payments				€ 29,082,911	€ 6,600,698	€ 16,906,608	€640,530	
Final payments					€ 208,633	€ 9,084,728	€ 8,670,175	€ 429,515

Call 2016	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total awarded grants	€182,873,402								
Pre-financing		€ 62,487,741							
Interim payments			€ 1,746,548	€ 45,004,975	€ 17,168,243	€ 18,016,645	€ 2,749,957		
Final payments				€ 282,580	€ 8,932,860	€ 10,025,871	€ 11,761,982	€ 2,420,872	€ 2,499,961

Call 2017	2017	2018	2019	2020	2021	2022	2023
Total awarded grants	€ 85,161,992						
Pre-financing		€ 34,064,797					
Interim payments			€ 1,454,533	€ 38,347,877	€ 1,626,538	€ 560,547	
Final payments				€ 123,459	€ 2,028,182	€ 5,833,323	€ 1,122,736

Call 2018	2018	2019	2020	2021	2022	2023	2024	2025
Total awarded grants	€ 102,910,811							
Pre-financing		€ 82,328,649						
Interim payments				€ 10,096,502		€ 3,870,121		
Final payments			€ 389,159		€ 3,155,446	698,481	€ 678,708	1,693,746

Call 2019	2019	2020	2021	2022	2023	2024	2025	2026
Total awarded grants	€ 135,576,015							
Pre-financing		€ 108,460,812						
Interim payments			€ 1,355,760	€ 8,297,509	€ 6,339,740	€ 19,9780		
Final payments				€ 379,356	€ 303,485	€ 4,725,181	€ 2,711,520	€2,982,672

Call 2020	2020	2021	2022	2023	2024	2025	2026	2027
Total awarded grants	€ 87,333,988							
Pre-financing		€ 61,133,792						
Interim payments			€ 873,340	€ 8,838,365	€ 3,279,671	€ 2,632,890		
Final payments				€ 244,370	€ 2,746,374	€ 3,043,819	€2,620,020	€ 1,921,348

3.2. Staff Establishment Plan

Grade	Establishment Plan 2019						Establishment Plan 2020		
	Authorised budget			Filled in position as of 01/01/2020			Authorised budget		
	PERM	TA	TOTAL	PERM	TA	TOTAL	PERM	TA	TOTAL
AD16									
AD15									
AD14		1	1		1	1		1	1
AD13									
AD12		1	1		1	1		2	2
AD11		1	1		1	1			
AD10									
AD9									
AD8		3	3		3	3		4	4
AD7		4	4		4	4		3	3
AD6									
AD5									
Total AD		10	10		10	10		10	10
AST11									
AST10									
AST9									
AST8									
AST7									
AST6									
AST5		1	1					1	1
AST4		1	1		1	1		1	1
AST3								1	1
AST2		1	1		1	1			
AST1									
Total AST		3	3		2	2		3	3
SC6									



SC5									
SC4									
SC3									
SC2									
SC1									
Total SC									
Overall Total		13	13		12	12		13	13

Contract Agents Grade	Authorised budget 2019	Filled in position as of 01/01/2020	Authorised budget 2020
FGIV	5	5	5
FGIII	5	5	5
FGII	0	0	0
FGI	0	0	0
Total CA	10	10	10



4. LIST OF ACRONYMS





AAR	Annual Activity Report
AWP	Annual Work Plan
BBI JU	Bio-based Industries Joint Undertaking
BIC	Bio-based Industries Consortium
CA	Commitment Appropriations
CAS	Common Audit Service
CEN	European Committee for Standardization
CSA	Coordination and Support Action
CSC	Common Support Centre
DEMO	Demonstration Action
EC	European Commission
ECA	European Court of Auditors
EFTA	European Free Trade Association (Iceland, Liechtenstein, Norway, and Switzerland)
EDPS	European Data Protection Supervisor
FP7	European Framework Programme 7 (2007-2013)
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 Operational Activities
iPPP	Institutional Public-Private Partnership



KPI	Key Performance Indicator
LCA	Life-Cycle Assessment
LCSA	Life-Cycle Sustainability Assessment
NCPs	National Contact Points
MEP	Member of the European Parliament
MSW	Municipal Solid Waste
PA	Payment Appropriation
PPP	Public-Private Partnership
RIA	Research and Innovation Action
SC	Scientific Committee
SIRA	Strategic Innovation and Research Agenda
SLA	Service Level Agreement
SO	Strategic Orientation
SRG	States Representatives Group
SMEs	Small and medium-sized enterprises
TA	Temporary Agent
TRL	Technology Readiness Level
TTG	Time To Grant
TTI	Time To Inform
TTP	Time To Pay



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