



ANNUAL WORK PLAN and Budget 2017

for the

Bio-Based Industries Joint Undertaking

In accordance with the Statutes of the BBI JU annexed to Council Regulation (EU) No 560/2014.

The annual work plan and budget will be made publicly available after its adoption by the Governing Board.

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1. INTRODUCTION

1.1. ABOUT THIS DOCUMENT

This document establishes the 2017 Annual Work Plan (AWP) and Budget, outlining the scope and details of research and innovation activities prioritised for the Call for Proposals in 2017, as well as the governance and activities for 2017 of the Bio-Based Industries Joint Undertaking (BBI JU).

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 2017, BBI JU's support to operations, call and project management rules, and the activities that will take place during 2017 within the normal activity of IT infrastructure, human resources governance, internal control framework and finance and administration, including the public procurement foreseen for 2017.
3. BBI JU 2017 Budget.
4. A list of acronyms.

1.2. BBI JU BACKGROUND

The BBI JU 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.

The European Union is represented by the European Commission (EC). BIC is a non-profit organisation that was created to represent the industry group 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, European trade associations, and European Technology Platforms. The aim of BIC 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. It applies general principles of openness and transparency regarding membership, ensuring a wide industrial involvement.

BIC and the EC developed the 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.

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. The review of the bioeconomy strategy has started in 2016 and BBI JU will take into account the outcomes of this development closely.

The Commission Communication of 10 October 2012 entitled "*A Stronger European Industry for Growth and Economic Recovery*" confirms the strategic importance of bio-based industries for the competitiveness of Europe, as identified in the Commission Communication of 21 December 2007 entitled "*A lead market initiative for Europe*", and stresses the need for the BBI Initiative.

On 6 May 2014, the Council adopted Regulation (EU) No 560/2014 establishing the Bio-based Industries Joint Undertaking (BBI Regulation). According to Article 19 of the BBI Regulation, the Commission was responsible for the establishment and initial operation of the BBI Joint Undertaking until it reached the operational capacity to implement its own budget (accomplished on 26 October 2015).

1.3. BBI JU OBJECTIVES

The objective of the BBU 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.

The objective of the BBI JU should be achieved by means of supporting research and innovation activities by using resources from the public and private sectors. To this end, the BBI JU should organise calls for proposals for supporting research, demonstration and deployment activities.

To achieve 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 should be encouraged.

The objectives of the BBI JU are:

1. to contribute to the implementation of Regulation (EU) No 1291/2013 and in particular Part III of Decision 2013/743/EU.
2. to 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 2017

2.1. EXECUTIVE SUMMARY

The 2017 AWP is the fourth AWP in a total of seven between 2014 and 2020. The critical path towards 2020 is 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 2017 will refocus on the need to better integrate biomass feedstock suppliers on the front end of the chain to create a demand for biomass feedstock from biorefining processes. Similarly, the AWP will stimulate the formation of partnerships with end market actors to create a 'market pull' for bio-based products for identified applications.

As initiated in the AWP 2016, the AWP 2017 moves away from a strict biomass feedstock 'push' based on the traditional value chains, towards a demand for biomass to enable processing to respond adequately to a 'pull' from the end markets.

Strategic orientations for 2017 continue and expand (compared to previous years) by keeping four strategic orientations: Feedstock, Process, Products, and Market uptake.

2.2. OPERATIONS

2.3. OBJECTIVES AND INDICATORS OF AWP2017

In 2017 BBI JU will contribute to the targeted research and innovation objectives of the BBI JU Programme and to its overall and cross-cutting objectives. Tables 1 and 2 show how the planned actions in 2017 are expected to contribute to the targets.

Table 1: Specific research and innovation objectives of BBI JU Programme and related Key Performance Indicators (KPIs): Expected contributions of successful 2017 actions.

Objectives & KPIs		TARGET 2020	Addressed in AWP 2017			
			CSA	RIA	Demo	Flag
Objective	New cross-sector interconnections in bio-based economy (new bridges creating cooperation between the different sectors and actors)					
KPI 1	Number of new cross-sector interconnections in BBI projects	36	4	6	6	4
Objective	New bio-based value chains					

Objectives & KPIs		TARGET 2020	Addressed in AWP 2017			
			CSA	RIA	Demo	Flag
KPI 2	Number of new bio-based value chains created/ realised with BBI projects	10	0	7	6	4
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 projects	5	0	1	1	0
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 projects	50	0	5	5	3
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 projects	30	0	0	13	4
Objective	BBI 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	n/a	n/a	n/a	2

Note: The description of the specific BBI objectives and KPIs is provided in the Strategic Innovation and Research Agenda (SIRA) developed by the industry (SIRA Version 2013, Table 7 'BBI Key Objectives' page 28).¹ Please refer always to the latest revision of the SIRA (publication of the updated SIRA² version is envisaged for Q1 of 2017).

The monitoring of the above mentioned KPIs (table 1) will be based on data collected from the periodic project reporting. The quantitative KPI information will be completed by qualitative information, e.g. details on interconnected sectors and co-operations' modes for

¹ http://bbi-europe.eu/sites/default/files/documents/BBI_SIRA_web_0.pdf

² After the publication of the updated SIRA, this footnote will be automatically replaced with the web link to the official updated version of SIRA

KPI 1, details on what is new in a value chains (KPI 2), and details on final markets and bio-based applications (for KPIs 4-6). KPI 3 and KPI 7 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 will report on the progress against KPIs in the Annual Activity Report.

Table 2: Overall and cross-cutting objectives of BBI JU Programme and related monitoring indicators: Expected contributions of successful 2017 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 ³	
Objective	Private funding balancing public funding in all project types	Target at the end of BBI JU programme	Addressed in AWP 2017
KPI	PPP leverage: - in cash contribution already committed by private members in project selected for funding	Programme level: See article 4 of the BBI JU Regulation	Public funding: € 81 million. Private funding: - € 40 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

³ The participation will be monitored by 1) comparing the participation from a country in the current call with its participation in the previous BBI call as well as 2) analysing the evolution of its participation year by year.

Objectives & Indicators		Targets	
			and any other Union contribution to those costs. - € 0,5 million financial contribution by the members other than the Union to the BBI JU operational costs counting towards the € 182 500 000 set out in the BBI JU Regulation Statutes.
Objective	Reach an appropriate balance between research, innovation and deployment	Target at the end of BBI JU programme	Addressed in AWP 2017
KPI	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 44.4 % (€ 36 million); IA 53.1 % (€ 43 million); CSA 2.5 % (€ 2 million)

The indicators mentioned in Table 2 are part of a broader range of Horizon 2020 Performance Indicators⁴ and together with other indicators will also be subject of BBI JU Annual Activity Reporting. 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 by further details from on-going projects based on data collected from the annual and / or periodic project reporting (e.g. share SMEs introducing innovations new to the company or the market).

For certain cross-cutting objectives, such as broadening the SME participation and widening the participation of less active regions and countries, no quantitative objectives for the 2017 AWP have been set, as respective activities have a multiannual character and efforts to reach these objectives are part of the BBI JU communication strategy and action plan for 2017. For example, BBI JU developed “*A strategy to widen the participation of less active countries, regions and stakeholders*”, together with its founding members, BIC and the EC. The widening strategy was consulted and supported by the BBI JU States Representatives Group (SRG) and the BBI JU Scientific Committee (SC). The main objective of the strategy is to support inclusive growth in Europe and the development of the European Bioeconomy. Specific actions are part of Communication action plan 2017.

⁴ Based on Annex II (PERFORMANCE INDICATORS) and Annex III (MONITORING) to Council Decision 2013/743/EU.

BBI JU Office operational efficiency. Furthermore the BBI JU programme will continue close monitoring of the programme implementation to maintain the efficiency of all operations, such as proposals evaluation and selection, grant monitoring, etc. The operational monitoring is based on indicators common to the whole Horizon 2020 programme. Few example of those KPIs are: 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); Time to grant (TTG) measured from Call deadline to signature of grants (target, TTG < 243 days). As BBI JU operates under Horizon 2020 rules, it has also the legal obligation to monitor continually and systematically the implementation of BBI JU Programme, to report annually and to disseminate the results of this monitoring.⁵ The results of operational monitoring will be also included in the Annual Activity Report of BBI JU.

2.4. RISK MANAGEMENT BBI JU ANNUAL WORK PLAN 2017

The BBI JU has conducted a risk assessment within the scope of the objectives set in the AWP 2017. The analysis was steered by the management of BBI JU on the wider spectrum of activities needed to achieve such objectives. The risk identification and assessment considered the root causes of each risk and of their potential consequences by factoring in the controls already existing in BBI JU and the convergences and inter-dependencies between risks. This process has been documented into the internal Risk Register of the organisation, which incorporates a description of the plans of actions with action owners and individual deadlines.

At the time of drafting this AWP, a total of 21 risks have been identified and described in the Risk Register with different degrees of importance, convergence and inter-dependency. Risks whose management relies on the cooperation with the principal stakeholders of the JU, namely the European Commission, the members of the BIC consortium and the BBI JU advisory bodies, were communicated before the adoption of the AWP.

The current picture is normally evolving, thus the updating of the risk register, the monitoring of identified risks and of the implementation of the relevant actions will be continuously assured and regularly reported by the delegated management functions of the JU to the Executive Director for assurance purposes.

2.5. SCIENTIFIC PRIORITIES AND CHALLENGES

The scientific priorities and impacts for the year 2017 have been identified by BIC and the EC, in collaboration with BBI JU. They have been identified through a wide consultation, which targeted industry members of BIC, universities, RTOs, European Technology Platforms and European industry associations, and BBI JU's advisory bodies being the SRG and the SC.

Focus and impacts for 2017 to address the strategic orientations

The identified priorities continue to build on those for 2016, but add emphasis on products with new functionalities, and on supporting actions to better realise the associated expected

⁵ This legal requirement is set out in Article 31 of the Regulation (EU) No 1291/2013 establishing Horizon 2020.

impacts. In addition, the emphasis on sustainability, addressing the environmental, social and economic dimension, is increased.

The strategic orientations for 2017 and 2018 are⁶:

1. Fostering a sustainable biomass-feedstock supply to feed both existing and new value chains;
2. Optimising efficient processing for integrated biorefineries;
3. Developing innovative bio-based products for specific market applications;
4. Creating and accelerating the market uptake of bio-based products and applications.

1. Fostering a sustainable biomass feedstock supply to feed both existing and new value chains

Strategies: expand and diversify the biomass feedstock portfolio through improving utilisation of existing sources and tapping into new sources.

Focus areas for this strategic orientation and their anticipated impacts⁷ are:

Improve the utilisation of existing feedstock sources from the agro-, forest-, marine, chemical and waste industry sectors, also in geographical areas with currently low bio-based activities. This includes feedstock from the paper and pulp and the food production and processing industries.

Expected impacts include: rural development; increased employment (green jobs) and job security in rural areas; higher income for farmers and forest owners; lower environmental impact.

Contribution to KPIs 1, 2, 3, 4, 5 and 6.

- Expand the utilisation of the organic fraction of municipal solid waste (MSW), sludge from the urban wastewater treatment, industrial organic waste and residues from perennial crops as feedstock source for the bio-based industry.

Expected impacts include: rural development; increased employment (green jobs) and job security in rural areas; lower environmental impact; lower environmental impact; lower CO₂-emissions from landfilling and incineration.

Contribution to KPIs 1, 2, 3 and 4.

- Exploit the opportunities of aquatic biomass as feedstock for the bio-based industry.

⁶ It should be noted that not all priorities given in the lists below have been taken up in this Annual Work Plan 2017, as the given strategic orientations are valid for both 2017 and 2018.

⁷ The impacts refer to the Level 2 KPIs in the SIRA, measuring the effectiveness of implementing the BBI programme (see overview in Annex 1).

Expected impacts include: coastal development; increased employment (green jobs) and job security in coastal areas; lower environmental impact.

Contribution to KPIs 1, 2 and 3.

- Valorise co-products and residues from bio-based operations, including (existing) biorefineries.

Expected impacts include: lower environmental impact; lower CO₂-emissions.

Contribution to KPIs 1, 2 and 3.

2. Optimising efficient processing for integrated biorefineries

Strategies: improve efficiency and sustainability of 'biorefining biomass into compounds for chemicals (including food and feed ingredients) and materials' and develop new, breakthrough processes.

Focus areas for this strategic orientation and their anticipated impacts⁸ are:

- Improve the effectiveness of pre-treatment steps.

Expected impacts include: higher production capacity; higher yields of bio-based building blocks; higher competitiveness of the EU bio-based industry; lower environmental impact.

Contribution to KPIs 1, 2 and 3.

- Further increase the efficiency of chemo- and bio-catalysis targeting better product quality, higher selectivity, higher output, lower cost and/or lower energy consumption.

Expected impacts include: increased production capacity; lower time-to-market of up-scalable processes for integrated biorefineries; higher yields of bio-based building blocks.

Contribution to KPIs 1, 2, 3 and 4.

3. Developing innovative bio-based products for specific 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.

⁸ The impacts refer to the Level 2 KPIs in the SIRA, measuring the effectiveness of implementing the BBI programme (see overview in Annex 1)

Focus areas for this strategic orientation and their related anticipated impacts⁹ are:

- Bio-based materials that outperform fossil-based materials in comparable applications in the packaging, construction, agriculture, transportation, personal care and hygiene sectors.

Expected impacts include: efficient use of sustainable raw material; cost-effective, high added-value products with unmatched performance in desired applications.

Contribution to KPIs 1, 2, 3, 4, 5 and 6.

- Breakthrough bio-based chemicals that have no fossil-based counterpart or industrial scale production.

Expected impacts include: efficient use of sustainable raw material; cost-effective, high added-value products with unmatched performance in desired applications; higher competitiveness of the EU bio-based industry.

Contribution to KPIs 1, 2, 3 and 4.

- New bio-based chemicals and materials for high value applications meeting all safety and regulatory requirements.

Expected impacts include: new cooperation and business models with sustainable raw material; cost-effective, high added-value products with unmatched performance in desired applications.

Contribution to KPIs 1, 2, 3 and 4.

- Proteins and bio-based additives from plants, residual streams in the food production and other (waste) streams that are rich on protein and high value molecules.

Expected impacts include: new cooperation and business models with sustainable raw material; cost-effective, high added-value products; lower environmental impact; higher competitiveness of the EU bio-based industry.

Contribution to KPIs 1, 2, 3, 4, 5 and 6.

- Bio-based plastics that are biodegradable/compostable or suitable for recycling.

Expected impacts include: lower environmental impact; higher competitiveness of the EU bio-based industry.

Contribution to KPI s1, 2, 3, 4, 5 and 6.

⁹ The impacts refer to the Level 2 KPIs in the SIRA, measuring the effectiveness of implementing the BBI programme (see overview in Annex 1)

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.

Focus areas for this strategic orientation and related anticipated impacts¹⁰ are:

- Identify and propose solutions to remove (potential) hurdles to the increased use of the organic fraction of waste (specific co-products, side streams and residues from industrial and urban sources) for the bio-based industry.

Expected impacts include: accelerated establishment of regulatory framework to enable the expansion and diversification of biomass feedstock for the bio-based industry; higher competitiveness of the EU bio-based industry; lower environmental impact.

Contribution to KPIs 1, 2, 3, 4, 5, 6 and 7.

- Increase and improve communication and dialogue with all stakeholders on the benefits and possible risks of new bio-based products. These include materials for applications with food contact (such as nutraceuticals and packaging materials), in the pharmaceutical sector, and possibly also in the construction, agriculture, transportation, personal care and hygiene sectors.

Expected impacts include: higher awareness and acceptance of consumers and market sectors of bio-based materials and applications; higher competitiveness of the EU bio-based industry.

Contribution to KPIs 1, 2, 3, 4, 5, 6 and 7.

- Establish cooperation and partnership with brand owners and consumer representatives to improve market access of sustainable bio-based products.

Expected impacts include: higher awareness and acceptance of consumers and market sectors of bio-based materials and applications; larger spread of bio-based products and applications throughout the EU; higher competitiveness of the EU bio-based industry.

Contribution to KPIs 1, 2, 3, 4, 5, 6 and 7.

2.6. IMPLEMENTATION

- As demonstrated by the outcome of the BBI JU Calls 2014 and 2015, the participation of SMEs is essential in developing specific services/technologies and capturing their potential to help further develop the bioeconomy. SMEs are therefore an integral element in the call development, as well as in the resultant successful actions in the

¹⁰ The impacts refer to the Level 2 KPIs in the SIRA, measuring the effectiveness of implementing the BBI programme (see overview in Annex 1)

implementation phase.

- Other important aspects for the implementation of this AWP are (i) widening the participation of less experienced entities in less active Member States or regions and (ii) fostering synergies between BBI JU actions and regional spending activities under the European Structural and Investment Funds (ESIF), as well as catering for the opportunities given by public financial instruments like those of the European Investment Bank (EIB) to address the funding gaps in the bio-based economy and to boost private investment.

2.7. FOLLOW-UP OF THE 2016 CALL FOR PROPOSALS

The 2016 call was closed on 8 September 2016. A total of 103 eligible proposals were received. The 103 proposals were evaluated by independent experts, first remotely from 26 September and then centrally from 10 to 28 October 2016. A decision by the Governing Board on the list of projects to be funded is expected to be adopted on 15 December 2016. In accordance with the established procedures, the grant agreement preparation phase starts directly after the Governing Board Decision and is expected to be concluded by May 2017.

Activities for 2017

Finalisation of the 2016 call management process (*)	
Finalisation of evaluations (information on outcome of the evaluation)	Q4 – 2016 / Q1 2017
Preparation and signature of the grant agreements for the selected proposals	Q1/Q2 - 2017
Pre-financing payments	Q2 - 2017
Follow-up implementation of projects	Starting Q2 - 2017

(*) maximum 8 months from the final date for submission of completed proposals (8/09/2016), according to Horizon 2020 rules

2.8. THE 2017 CALL FOR PROPOSALS

Strategic Orientation 1 FEEDSTOCK

BBI 2017.R1 – VALORISATION OF GASEOUS SIDE STREAMS FROM BIO-BASED OPERATIONS INTO CHEMICAL BUILDING BLOCKS

Specific challenge:

Exhaust gases from bio-based operations (containing mainly CO₂) can serve as feedstock for different types of processing into valuable products. Integrating Carbon Capture and Utilisation (CCU) technologies within bio-based processes could minimise process efficiency losses, achieve a significant greenhouse gas emission reduction (potentially leading to negative emissions), and improve process economics by obtaining chemical building blocks for added-value products.

Technologies to convert gaseous feedstock have already reached a pilot and even an industrial scale in the petroleum and petrochemical industries. However, their use in bio-based operations still requires further research for successful replication and scale-up.

The specific challenge is to achieve sustainable and scalable conversion technologies for gaseous feedstock from bio-based operations into added-value products.

Scope:

Validate at pilot scale in an industrially relevant environment innovative technologies to efficiently convert gaseous feedstock from bio-based operations into useable chemical building blocks for products in added-value applications in various market segments.

Proposals should also aim at increasing the overall sustainability of bio-based value chains by stimulating industrial symbiosis with other sectors and creating conditions for the establishment of integrated biorefineries. This symbiosis could create new industrial sites or link existing sites to integrated biorefineries.

Proposals should focus on the valorisation of gaseous intermediate streams originating exclusively from bio-based operations. The technologies should enable capture and conversion of greenhouse gases (mainly CO₂) into chemicals. Applied and effective solutions in other industrial sectors such as chemical, steel, cement, etc. could serve as benchmarks.

Although sources of these gases can be all bio-based operations, proposals should not address 'purposely produced' gaseous streams, unless these streams can serve to prove significant reductions of cost and environmental footprint as compared with alternatives.

Proposals may consider any technologies such as electrochemical, chemo-catalytic and bio-catalytic technologies as well as combinations of different technologies.

The industry should actively participate to prove the potential for integrating the developed concepts into current industrial landscapes or existing plants so that deployment of the concepts can be accelerated and scaled up to an industrial level.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained. The developed solutions should prove their innovativeness, efficiency and a high yield of the targeted products to guarantee the sustainability of their subsequent scale-up to demonstration level. Proposals should include a preliminary techno-economic evaluation of the proposed concepts to check also the economic viability as compared with existing solutions.

The Technology Readiness Level (TRL)¹¹ at the end of the project should be 5¹². Proposals should clearly state the starting TRL. The proposed work should enable the technology to achieve TRL 5 within the timeframe of the project.

Proposals should include an environmental assessment using Life Cycle Assessment (LCA) methodologies, and a cost analysis. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches. They should also include a quantification of avoided greenhouse gas emissions. Moreover, proposals should also allow for pre- and co-normative research necessary for the needed product quality standards¹³.

Proposals should seek complementarity with the existing projects funded under Horizon 2020 to avoid overlap, promote synergies and advance beyond the state-of-the-art.

Indicative funding: *It is considered that proposals requesting a contribution of EUR 2 million to maximally EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: set the basis for at least 1 new bio-based value chain;
- contribute to **KPI 4**: create at least 1 new building block based on gaseous feedstock originating from European bio-based operations, while paving the way for further validation at demonstration scale;
- overall reduction of at least 20 % in the carbon footprint (mainly CO₂-emissions) of the proposed technology/technologies compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Research and Innovation Action.

¹¹ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

¹² TRL 5 requires that the technology be 'validated in [a] relevant environment (industrially relevant environment in the case of key enabling technologies).' For industry, this means at 'pilot scale' (meaning beyond and larger than 'at lab scale'), preferably at an industrial site.

¹³ The technical basis of a new standard is usually established through a programme of research termed Pre-Normative Research (PNR), i.e. research undertaken prior to standardisation (normalisation). Such research would be used to demonstrate the feasibility and reliability of the technique or process to be standardised and to investigate its limitations. Once the technique or process has been developed and its boundaries have been explored, then, for new and emerging areas of technology, it would be normal to prepare a 'pre-standard', such as a Publicly Available Specification (PAS) or Technical Specification (TS), to provide a document in a relatively short time frame for evaluation by potential users. The availability of a pre-standard provides a basis for further research, usually termed Co-Normative Research - i.e. research undertaken in conjunction with the standardisation process, to establish a statistical basis for the technique or process, in particular its reproducibility (same user), repeatability (different users) and uncertainty. (http://www.iec.ch/about/globalreach/academia/pdf/academia_governments/handbook-standardisation_en.pdf)

BBI 2017.D1 –VALORISATION OF LIQUID AND SOLID SIDE STREAMS FROM BIO-BASED OPERATIONS INTO HIGH ADDED-VALUE PRODUCTS TO CREATE NEW FEEDSTOCK FOR BIO-BASED PRODUCTS

Specific challenge:

Fully developed and sustainable biorefineries at an industrial scale require optimal valorisation of side streams generated during the different process steps. However, current practice is to divert these streams to low-value applications such as energy and fuels. Valorising these streams for higher-value applications requires further downstream processing steps. In some cases, within a cascading set-up of biorefining operations, the subsequent side streams could have a complex composition that makes it increasingly difficult to process them into valuable products.

The better this cascading operational set-up is at valorising subsequent liquid and solid side streams, the higher its competitiveness and sustainability will be. Resolving these challenges of downstream valorisation will potentially result in additional and new supplies of biomass feedstock for conversion into chemicals and materials.

This integrated approach will also create opportunities to enhance cooperation between different actors along and across the value chains, from biomass suppliers to biorefinery operators and market actors.

The specific challenge is to valorise liquid and solid biorefinery side streams with a composition that impedes their further processing into high added-value products beyond the state-of-the-art.

Scope:

Demonstrate sustainable and cost-efficient processing technologies for converting side streams and co-products from bio-based operations into high added-value products and hence increase the supply of biomass feedstock.

Proposals should focus on streams that are currently too expensive to convert (such as diluted streams that need to be concentrated) and/or those without an established conversion route to high-value products. Several kinds of bio-based operations could be considered within the scope of this topic, including biorefining in various sectors and at different industrialisation levels, as well as bio-waste treatment. Proposals should deliver a complete conversion set-up, which should be either separate and interconnected or integrated in the primary plant. Proposals should prove that the resulting products have a significant market value, high enough to justify the development of new value chains based on the exploitation of currently un- or under-exploited streams from bio-based operations. In this framework, proposals should show that the developed process is sustainable from an economic and environmental point of view and provide appropriate business models. The valorisation of the side streams and co-products should target chemicals and materials. Proposals should address side streams and co-products in liquid, solid, sludge or ash state (gaseous streams are the subject of topic BBI 2017.R1). Proposals should demonstrate the innovativeness of the proposed solutions, starting from technologies already proven at

smaller scales. These may differ depending on the feedstock to be treated and the type of the intended bio-based operation.

Proposals should specifically demonstrate the benefits versus the state-of-the-art processing schemes and existing technologies in terms of feedstock and energy efficiencies. This could be done by providing evidence of new processing solutions and new products obtained.

The Technology Readiness Level (TRL)¹⁴ at the end of the project should be 6-7. Proposals should clearly state the starting and target TRLs. The proposed work should enable the technology to achieve the target TRL within the timeframe of the project.

Proposals should include an environmental and economic assessment using Life Cycle Assessment (LCA) methodologies. Proposals should also include a viability performance check of the developed process(es) and products based on available standards, certification, accepted and validated approaches.

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: establish at least 1 new bio-based value chain;
- contribute to **KPI 6**: create at least 2 new demonstrated consumer products based on bio-based chemicals and materials that meet market requirements;
- 5-10 % reduction in side streams from the initial bio-based operation currently disposed of as 'waste';
- overall reduction of at least 10 % in the carbon footprint of the considered bio-based operation compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Innovation Action – Demonstration Action.

BBI 2017.D2 – INTEGRATED MULTI-VALORISATION OF ALGAE INTO ADVANCED MATERIALS AND HIGH ADDED-VALUE ADDITIVES

Specific challenge:

In a context of growing demand for resources, sustainably capturing the potential of the seas, oceans and inland waters is critical for Europe. Micro- and macro-algae represent an additional source of biomass that can be used for various applications. They also have the advantage of a low land requirement. The production of farmed aquatic plants, including

¹⁴ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

mostly macro-algae, is presently estimated at 23.8 million tonnes (wet weight 2012) and growing.¹⁵

Different cultivation systems to grow algae include open-sea, shallow-water, coastal areas and inland waters. There are specific systems for micro-algae like open ponds, photoreactors or bioreactors. Each system requires specific adaptation to its environment to maximise the biomass output, while minimising environmental impact (for example effluents, land use) and ensuring appropriate value chain logistics and conversion processes.

The specific challenge is to set up and operate a value chain for (micro- or macro-) algae production and logistics (harvest, transportation, storage) that can be used for their multi-valorisation into added-value chemicals and materials, through a cascading approach where applicable.

Scope:

Demonstrate the efficient operation of a full value chain based on micro- or macro-algae that produces valuable products (such as ingredients or additives, advanced materials, etc.).

Proposals should include:

- demonstration of efficient production systems, coupled with relevant pre-treatment steps to achieve a stable intermediate product ready for the conversion steps; and
- multi-valorisation of micro- or macro-algae into advanced materials and/or specialty products, or high-value bulk products for different application sectors.

Proposals should include fully efficient logistics solutions to minimise biomass losses and reduce costs associated with harvesting, first pre-treatment steps, storage and transportation of the algal biomass to the processing sites. Proposals should therefore achieve cost reductions in biomass production and harvesting in a sustainable way, since these are essential for the further development and scale-up of the algal bioeconomy sector. A thorough assessment of the ecosystem risk should be carried out if the harvest takes place in the wild. Resource efficiency should be high through valorising all fractions arising from biomass processing.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained. Proposals should include a techno-economic evaluation of the proposed concepts to check also the economic viability as compared with existing solutions, comprising also a supply chain analysis, a market analysis and appropriate business models.

The Technology Readiness Level (TRL)¹⁶ at the end of the project should be 6-7. Proposals should clearly state the starting and target TRLs. The proposed work should enable the technology to achieve the target TRL within the timeframe of the project.

¹⁵ FAO, 2014, The State of World Fisheries and Aquaculture

Proposals should include an environmental and economic assessment using Life Cycle Assessment (LCA) methodologies. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches.

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: establish at least 1 new bio-based value chain;
- contribute to **KPI 6**: create at least 1 new demonstrated consumer product based on bio-based chemicals and materials;
- increase the competitiveness of European biomass producers and industry by supporting new jobs, growth and investment while ensuring environmental sustainability and a low environmental impact;
- foster the inclusion of coastal or rural areas in a bio-based industry setting, increasing awareness of social and economic opportunities in marine regions and of actors in value chains based on aquatic biomass;
- overall reduction of at least 10 % in the carbon footprint of the considered bio-based operation (from biomass cultivation through the core processing) as compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Innovation Action – Demonstration Action.

¹⁶ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

Strategic Orientation 2 PROCESS

BBI 2017.R2 – INNOVATIVE TECHNOLOGIES FOR THE PRE-TREATMENT AND SEPARATION OF LIGNOCELLULOSIC FEEDSTOCK AND COMPLEX COMPOSITION STREAMS INTO VALUABLE FRACTIONS WHILE MAINTAINING KEY CHARACTERISTICS

Specific challenge:

Pre-treatment of biomass is a key step in implementing an economically viable biorefinery. The conventional methods of biomass pre-treatment mainly apply harsh conditions, consume much energy, require significant capital investments and generate inhibitors to the downstream biological processes. These methods can also harm many characteristics of naturally occurring polymers, often hindering their use for a large variety of applications. The ideal pre-treatment should lead to a higher 'usability' of the various biopolymers in the biomass feedstock (like cellulose and hemicellulose fractions in a lignocellulosic feedstock) in the subsequent steps, generate low amounts of inhibitory compounds, and limit biomass losses. This pre-treatment technology should also have a high efficiency when applied to different biomasses, require less energy and resources, have a low environmental impact and be economically viable.

The specific challenge is to develop pre-treatment technologies to separate and extract naturally occurring polymers and other useful fractions (for example extractives) of lignocellulosic and mixed biomass streams with complex composition, while keeping their structure essentially intact.

Scope:

Validate pre-treatment technologies at pilot scale in an industrially relevant environment to allow for the separation of natural bio-based polymers while keeping their main characteristics intact. The types of feedstock included in the scope are lignocellulosic biomass and mixed streams with a complex composition. Proposals should aim to develop technologies that:

- increase the 'usability' of the holocellulose and/or other useful biopolymer fractions in the biomass feedstock by recovering at least 80 % of each for direct valorisation in specific applications and/or in the subsequent step of enzymatic hydrolysis, with a low generation of inhibitory compounds;
- deliver 'naturally occurring polymers' with sufficient purity and quality for efficient processing in the following steps;
- require less energy and resources and have a lower environmental impact than benchmark technologies currently applied to the same type of feedstock.

Proposals could consider chemical, physical or biotechnological solutions or feasible and sustainable combinations thereof. The developed processing routes should ensure reduction of biomass losses and efficient separation and recovery of other fractions of the treated biomass. Applying the cascading operational concept, these fractions can then also be further exploited.

The industry should actively participate to prove the potential for integrating the developed concepts into current industrial landscapes or existing plants so that deployment of the concepts can be accelerated and scaled up to an industrial level.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained.

The Technology Readiness Level (TRL)¹⁷ at the end of the project should be 5¹⁸. Proposals should clearly state the starting TRL. The proposed work should enable the technology to achieve TRL 5 within the timeframe of the project.

Proposals should include an environmental assessment using Life Cycle Assessment (LCA) methodologies, and a cost analysis. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches.

Indicative funding: *It is considered that proposals requesting a contribution of EUR 2 million to maximally EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnections in bio-based economy clusters;
- contribute to **KPI 2**: set the basis for at least 1 new bio-based value chain;
- reduce operational costs by at least 30 % through lower overall energy consumption and cost as compared with benchmark pre-treatment processes in use for the same type of feedstock;
- overall reduction of at least 15 % in the carbon footprint of the considered bio-based operation as compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Research and Innovation Action.

¹⁷ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

¹⁸ TRL 5 requires that the technology be 'validated in [a] relevant environment (industrially relevant environment in the case of key enabling technologies).' For industry, this means at 'pilot scale' (meaning beyond and larger than 'at lab scale'), preferably at an industrial site.

BBI 2017.R3 – EXPLOITING EXTREMOPHILES AND EXTREMOZYMES TO BROADEN THE PROCESSING CONDITIONS TO CONVERT BIOMASS INTO HIGH-VALUE BUILDING BLOCKS

Specific challenge:

Extremophilic microorganisms can survive and perform under extreme conditions of temperature (thermophiles and psychrophiles), pressure (barophiles), pH (acidophiles, alkalophiles), salinity (halophiles) or a combination of these (complex extremophiles). The potential role of this kind of microorganisms in biotechnological and industrial applications is increasingly attracting attention. The utilisation of extremophilic microorganisms and/or of related extremophilic enzymes can support a significant increase in process performance by widening operational conditions and developing new processes and/or products. Moreover, it can enable the treatment of (residual) streams featuring extreme conditions that currently cannot be processed or require expensive pre-treatments.

The specific challenge is to develop sustainable processes in a wider range of operating conditions (pressure, temperature, acidity, etc.) by using extremophilic microorganisms and/or related enzymes to convert biomass into valuable components at high process yields. Successfully carrying out such processes at pilot scale can provide insight into the potential for these microorganisms at an industrial scale.

Scope:

Validate at pilot scale in an industrially relevant environment innovative processes that use extremophiles or extremozymes for the efficient conversion of biomass into useable chemical building blocks.

Proposals should address one or all of the following items:

- adaptation and selection of naturally occurring extremophiles;
- engineering of organisms to suit extreme working conditions or achieve specific performance targets;
- identification of specific extremozymes with high industrial potential for increasing process yields.

The industry should actively participate to prove the potential for integrating the developed concepts into current industrial landscapes or existing plants so that deployment of the concepts can be accelerated and scaled up to an industrial level.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained.

The Technology Readiness Level (TRL)¹⁹ at the end of the project should be 5²⁰. Proposals should clearly state the starting TRL. The proposed work should enable the technology to achieve TRL 5 within the timeframe of the project.

Proposals should include an environmental assessment using Life Cycle Assessment (LCA) methodologies, and a cost analysis. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches.

Proposals should seek complementarity with the projects funded under earlier topics (and in other programmes) to avoid overlap and promote synergies.

Indicative funding: *It is considered that proposals requesting a contribution of EUR 2 million to maximally EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: set the basis for at least 1 new bio-based value chain;
- improve process yields (weight of product obtained per dry weight of feedstock fed into the process) in the target building blocks by at least 20 % compared with benchmark processes for similar feedstock;
- improve the process efficiency compared with benchmark processes by avoiding or reducing additional steps like cooling or neutralisation to arrive at required operational conditions;
- overall reduction of at least 10 % in the carbon footprint of the considered bio-based operation compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Research and Innovation Action.

BBI 2017.F1 – INTEGRATED ‘ZERO WASTE’ BIOREFINERY UTILISING ALL FRACTIONS OF THE FEEDSTOCK FOR PRODUCTION OF CHEMICALS AND MATERIALS

Specific challenge:

Biorefineries converting feedstock into chemicals and materials will become the backbone of the future production of sustainable products. Such facilities combine several fundamental process steps, including the appropriate pre-treatment, conversion and downstream

¹⁹ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

²⁰ TRL 5 requires that the technology be ‘validated in [a] relevant environment (industrially relevant environment in the case of key enabling technologies).’ For industry, this means at ‘pilot scale’ (meaning beyond and larger than ‘at lab scale’), preferably at an industrial site.

processes. One challenge has always been the efficient integration of all process steps. Another significant challenge is to convert all fractions of the feedstock used in a biorefinery into chemicals and materials with the highest added value possible, to improve the profitability of the biorefinery.

The specific challenge is to utilise all fractions of the biomass feedstock to produce chemicals and materials, targeting 'zero waste' and a minimum diversion of carbon content streams to low-value uses.

Scope:

Demonstrate at industrial level a successful and profitable bio-based plant that converts all fractions of the feedstock primarily into chemicals and materials, through a cascading approach where applicable.

All biological and/or chemical routes or combinations of these routes are applicable, provided they have been already proven at a significant scale (preferably demonstration levels TRLs 6-7, but at least pilot plant level TRL 5). Proposals should target the complete utilisation of all fractions of the biomass feedstock, ideally leading to 'zero waste'. The minimum target for converting the biomass into chemicals and materials is 95 % of its initial carbon content. Proposals should apply state-of-the-art metrics to assess the efficiency of the conversion system in terms of mass and energy inputs and outputs (see also LCA below). Proposals should aim to achieve industrial operation of the innovative processing stages to achieve full feedstock valorisation, and their integration into existing facilities. This will benefit efforts to maximise the return on investment of current assets and minimise capital expenditure. This integration will also help generate the knowledge and information needed to reduce risk in investments in future industrial-scale installations.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained.

The Technology Readiness Level (TRL)²¹ at the end of the project should be 8. Proposals should clearly state the starting TRL. The proposed work should enable the technology to achieve TRL 8 within the timeframe of the project.

Proposals should include an environmental, an economic and a social assessment using Life Cycle Sustainability Assessment (LCSA) methodologies. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches. Furthermore, proposals should provide appropriate business models.

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 21 million would allow this specific challenge to be addressed appropriately.*

²¹ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.

Expected impacts:

- contribute to **KPI 1**: create at least 2 new cross-sector interconnections in bio-based economy clusters;
- contribute to **KPI 2**: establish at least 2 new bio-based value chains;
- contribute to **KPI 5**: create at least 3 new bio-based materials;
- contribute to **KPI 6**: create at least 2 new ‘consumer’ products produced from bio-based chemicals and materials;
- reduce ‘waste’ from a biorefining operation by at least 80 % compared with the state-of-the-art.

Type of action: Innovation Action – Flagship Action.

Strategic Orientation 3 PRODUCTS

BBI 2017.R4 – PROTEINS AND OTHER BIOACTIVE INGREDIENTS FROM SIDE STREAMS AND RESIDUES

Specific challenge:

Proteins and bioactive compounds, such as carotenoids, polyphenols, lipid compounds and prebiotics, have extensive use as ingredients and additives in the food, feed, flavouring, fragrance, cosmetics, chemicals, textile, nutraceutical and pharmaceutical industries. The projected global demand for proteins and bioactive compounds in 2030 exceeds current production capacities.²²

Residual biomass and side streams are potentially interesting sources of these ingredients. As proteins and bioactive ingredients have a typically high value per volume unit, recovering and commercialising them could achieve a sizeable economic benefit for the whole value chain. However, exploitation of these sources for obtaining proteins and bioactive ingredients is still at an early stage.

Some residual streams, such as the non-edible parts of plants, often contain anti-nutritional elements that are not easy to separate and consequently prevent their direct use in food. Other factors may also limit the regulatory compliance and consumer acceptance of food additives based on plant residues.

The specific challenge is to develop sustainable technologies to recover proteins and bioactive ingredients from feedstock or to convert residual biomass and industry side streams into ingredients for food, feed and other high-value markets. The challenge includes

²² http://www.who.int/nutrition/topics/3_foodconsumption/en/index4.html

achieving the separation/extraction and purification (where applicable) of the proteins and bioactive ingredients to meet the required market specifications and regulations.²³

Scope:

Validate (either at lab scale, or at pilot scale in an industrially relevant environment) a sustainable process to separate and/or convert proteins and bioactive compounds from residual biomass streams originating from biomass production (such as agriculture) and conversion (such as the food/feed industry and biorefineries). The proteins and targeted bioactive compounds have functional properties other than nutritional quality (in the case of food and feed) that are important for dedicated markets. In this context, separation/extraction and/or conversion processes must ensure that the products' quality and properties are conserved. Proposals need to achieve the appropriate purity of the target molecules and performance in specific application fields to at least match the benchmark technologies.

The industry should actively participate to prove the potential for integrating the developed concepts into current industrial landscapes or existing plants so that deployment of the concepts can be accelerated and scaled up to an industrial level.

Proposals should provide a preliminary assessment of the availability of the sustainably produced feedstock used in the project, considering the possible upscaling of the developed processes.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained.

The Technology Readiness Level (TRL)²⁴ at the end of the project should be 4-5²⁵. Proposals should clearly state the starting and target TRLs. The proposed work should enable the technology to achieve the target TRL within the timeframe of the project.

Proposals should include an environmental assessment using Life Cycle Assessment (LCA) methodologies, and a cost analysis. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches.

While the scope of this topic is to provide technical solutions to the challenge, results may contribute to establishing new standards for acceptability of products.

Proposals should include an analysis of the regulatory requirements and product specifications (like taste, nutritional value, genetic modification, solvent used) that may limit

²³ For an Innovation Action – Flagship Action on proteins see Topic BBI 2017.F2.

²⁴ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

²⁵ TRL 5 requires that the technology be 'validated in [a] relevant environment (industrially relevant environment in the case of key enabling technologies).' For industry, this means at 'pilot scale' (meaning beyond and larger than 'at lab scale'), preferably at an industrial site. TRL 4 is at 'lab scale'.

the market approval and acceptance of the targeted ingredients or additives. Proposals should also include specification of the health and safety aspects of the resulting products.

Indicative funding: *It is considered that proposals requesting a contribution of EUR 2 million to maximally EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: set the basis for at least 1 new bio-based value chain;
- contribute to **KPI 5**: set the basis for at least 2 different ingredients or additives with purity levels that enable their use in different application fields, such as the food, feed, flavouring, fragrance, cosmetics, chemicals, textile, nutraceutical and pharmaceutical industries;
- set the basis for further development of new or optimised value chains based on residual streams from the food or feed industry, agricultural activities or biorefineries;
- overall reduction of at least 10 % in the carbon footprint of the considered bio-based operation compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Research and Innovation Action.

BBI 2017.R5 – NOVEL BIO-BASED CHEMICAL PRECURSORS TO IMPROVE THE PERFORMANCE OF MASS CONSUMPTION PRODUCTS

Specific challenge:

Cost considerations are to date the prime hindrance to market penetration of bio-based chemical products. The maturity of the petrochemical industry makes purely cost-based competition unrealistic for most bio-based alternatives. Moreover, even the availability of bio-based products with equivalent performance and at the same cost would not per se be sufficient to drive acceptance and utilisation by consumers and brand owners. A better performance at an acceptable premium price would increase the marketability of bio-based products for mass consumption. Bio-based feedstock gives the opportunity to produce chemical precursors²⁶ that could outperform their fossil-based counterparts.

The specific challenge is to develop novel bio-based chemical precursors for mass consumption products that feature, at an acceptable cost, new functionalities or better performance than their fossil-based counterparts.

²⁶ In the context of this topic, a chemical precursor is a chemical compound that enables, facilitates or accelerates a chemical process as a reagent or as a reactant.

Scope:

Validate at pilot scale in an industrially relevant environment production routes to novel and innovative bio-based chemical precursors for mass consumption products, such as surfactants, detergents, lubricants, emulsifiers, foaming agents, sanitisers, disinfectants, binders, solvents and adhesives.

The resulting products must prove better performance than their fossil-based and bio-based state-of-the-art counterparts, and/or introduce new desired functionalities that are currently not available.

The industry should actively participate to prove the potential for integrating the developed concepts into current industrial landscapes or existing plants so that deployment of the concepts can be accelerated and scaled up to an industrial level.

Proposals should also include relevant end-users or brand owners to establish clear product requirements and to evaluate product performance.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained. Proposals should include a preliminary techno-economic evaluation of the proposed production route to show that upscaling is economically viable, while keeping the cost increase compared with available precursors to a minimum, if any.

The Technology Readiness Level (TRL)²⁷ at the end of the project should be 5²⁸. Proposals should clearly state the starting TRL. The proposed work should enable the technology to achieve TRL 5 within the timeframe of the project.

Proposals should include an environmental assessment using Life Cycle Assessment (LCA) methodologies, and a cost analysis. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches.

Indicative funding: *It is considered that proposals requesting a contribution of EUR 2 million to maximally EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: establish at least 1 new bio-based value chain;

²⁷ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

²⁸ TRL 5 requires that the technology be 'validated in [a] relevant environment (industrially relevant environment in the case of key enabling technologies).' For industry, this means at 'pilot scale' (meaning beyond and larger than 'at lab scale'), preferably at an industrial site.

- prove that at least 1 bio-based chemical precursor for mass consumption products is fully competitive in the market by providing new functionalities or better performance than the relevant fossil-based counterpart;
- overall reduction of at least 5 % in the carbon footprint of the considered bio-based operation compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Research and Innovation Action.

BBI 2017.R6 – COMPETITIVE BIODEGRADABLE, COMPOSTABLE AND/OR RECYCLABLE BIO-BASED PLASTICS FOR A SUSTAINABLE END-OF-LIFE PHASE

Specific challenge:

Plastics are an essential part of modern society, with applications in almost every product range. Currently only a small part of the plastics produced are bio-based, as bio-based polymers usually bear a higher cost than the competing fossil-based alternatives. Also, current bio-based plastics on the market do not offer a large enough functional improvement to justify a premium price.

Biodegradability, compostability and recyclability of bio-based plastics may offer a significant added value in terms of sustainability. However, associated performance and costs still hinder the full marketability and competitiveness of biodegradable, compostable or recyclable bio-based plastics compared with their fossil-based counterparts.

The specific challenge is to develop biodegradable, compostable or recyclable bio-based polymers that can compete with fossil-based counterparts in terms of price, performance and environmental sustainability on a cradle-to-cradle basis.

Scope:

Validate at pilot scale in an industrially relevant environment innovative production routes for bio-based polymers and related bio-based plastic products, following either of the following two options:

- production route from biomass streams to biodegradable or compostable bio-based plastics that can be competitive with fossil-based plastics in terms of performance and price when produced on a large scale;
- Production route from biomass streams to bio-based plastics that can be recycled at end-of-life into comparable products and that are competitive with fossil-based plastics on performance and price when produced on a large scale.

The industry should actively participate to prove the potential for integrating the developed concepts into current industrial landscapes or existing plants so that deployment of the concepts can be accelerated and scaled up to an industrial level.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained. Proposals should prove, at least at a preliminary level, the technical and economic feasibility of new or optimised value chains based on the valorisation of biomass streams of various origins.

The Technology Readiness Level (TRL)²⁹ at the end of the project should be 5³⁰. Proposals should clearly state the starting TRL. The proposed work should enable the technology to achieve TRL 5 within the timeframe of the project.

Proposals should include an environmental assessment using Consequential³¹ Life Cycle Assessment (LCA) methodologies, and a cost analysis. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches, as well as measurement and testing approaches allowing for coming regulatory compliance checks, such as biodegradability, compostability and/or recyclability lab and field testing. Moreover, proposals should also allow for pre- and co-normative research necessary for the needed product quality standards.³²

Indicative funding: *It is considered that proposals requesting a contribution of EUR 2 million to maximally EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

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

²⁹ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

³⁰ TRL 5 requires that the technology be 'validated in [a] relevant environment (industrially relevant environment in the case of key enabling technologies).' For industry, this means at 'pilot scale' (meaning beyond and larger than 'at lab scale'), preferably at an industrial site.

³¹ Only relevant when crop land based biomass is used as feedstock: 'Consequential LCAs seek to identify the environmental consequences of a decision or a proposed change in a system under study (oriented to the future), which means that market and economic implications of a decision may have to be considered'. See also: https://en.wikipedia.org/wiki/Life-cycle_assessment

³² The technical basis of a new standard is usually established through a programme of research termed Pre-Normative Research (PNR), i.e. research undertaken prior to standardisation (normalisation). Such research would be used to demonstrate the feasibility and reliability of the technique or process to be standardised and to investigate its limitations. Once the technique or process has been developed and its boundaries have been explored, then, for new and emerging areas of technology, it would be normal to prepare a 'pre-standard', such as a Publicly Available Specification (PAS) or Technical Specification (TS), to provide a document in a relatively short time frame for evaluation by potential users. The availability of a pre-standard provides a basis for further research, usually termed Co-Normative Research - i.e. research undertaken in conjunction with the standardisation process, to establish a statistical basis for the technique or process, in particular its reproducibility (same user), repeatability (different users) and uncertainty. (http://www.iec.ch/about/globalreach/academia/pdf/academia_governments/handbook-standardisation_en.pdf)

- contribute to **KPI 5**: set the basis for at least 2 bio-plastics with improved sustainability performance (in terms of biodegradability, compostability or recyclability) compared with existing benchmarks identified within the project;
- overall reduction of at least 10 % in the carbon footprint of the considered bio-based operation compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Research and Innovation Action.

BBI 2017.R7 – NOVEL SECONDARY BIO-BASED CHEMICALS WITHOUT SIGNIFICANT FOSSIL-BASED COUNTERPARTS BUT WITH HIGH APPLICATION POTENTIAL

Specific challenge:

Products derived from petrochemical feedstock have extensive downstream production routes, developed markets and an efficient infrastructure. Therefore, making the ‘same’ chemicals from biomass and ‘blending’ them into these existing value chains (known as ‘drop-in’ chemicals) is the quickest and most cost-effective way to implement bio-based value chains in the short term. However, there are some bio-based molecules without a ‘significant’ fossil counterpart³³ that industry and researchers regard as promising in the medium to long term, due to their special functional properties or possible derivatives.

While the production processes for bio-based chemicals with no significant fossil-based counterpart could be made more economical and sustainable, there is as yet no infrastructure for their further use, making them less attractive for now.

Like petrochemical building blocks such as benzene and p-xylene, these bio-based building blocks (for example levulinic acid, muconic acid and hydroxymethylfurfuraldehyde) do not have direct applications, but are the basis for a wealth of other chemicals that can bring renewability and sustainability in many markets.

Technically, the production of those ‘primary’ bio-based building blocks is in many cases already at TRL 4-5 (see topic BBI 2017.D3). However, their conversion into ‘secondary’ products is often still at TRL 2-3, as there is a low level of insight into their applicability in existing fossil-based value chains. Aside from providing the proof of principle of the new functionality and performance of new secondary bio-based products, industry also needs to develop and validate sustainable production routes.

The specific challenge is to validate at lab or pilot level the production routes from primary bio-based building blocks to breakthrough bio-based chemicals with no significant fossil counterpart, and to show a proof of principle for the added value they bring to the market.

³³ Molecules having no fossil-based production route, or whose fossil-based production route(s) – while technically possible – is not commercially pursued because of cost or sustainability issues.

Scope:

Validate (either at lab scale, or at pilot scale in an industrially relevant environment) a production process for bio-based chemicals with no significant fossil-based counterpart, resulting from primary bio-based building blocks. The primary building blocks must be obtained from sustainably sourced biomass of European origin.

Proposals should aim to validate a production route for at least one 'secondary' bio-based chemical building block that does not have a 'significant' fossil-based counterpart. The targeted building block should have the potential to drive the subsequent production of high added-value products in specific market sectors. In addition, proof of principle has to be shown for at least one application.

The new performance can be as a secondary building block for a variety of applications ranging from polymers and plasticisers to other intermediate building blocks. However, it can also have direct applications as lubricants, hydraulic fluids, solvents, pharmaceuticals and cosmetics.

Biotechnological processes could be effective for this purpose as microbial enzymes are highly selective and work in relatively mild conditions. This makes it possible to produce complex structures, while preserving existing functionalities. However, thermo- and chemo-catalytic processes also fall within the scope of this topic. They should ensure high reaction yields, high selectivity for the target product and high productivity levels. In this way, they will efficiently pave the way to a further scale-up of the developed process(es) to enable an expanding market entrance for products based on the chemical.

Proposals should justify the selection of the targeted molecules in terms of their intended application, with supporting economic quantification of the targeted markets. Proposals should also show the feasible, sustainable and economic supply of European biomass for these applications via the primary building block.

The industry should actively participate to prove the potential for integrating the developed concepts into current industrial landscapes or existing plants so that deployment of the concepts can be accelerated and scaled up to an industrial level.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained. Proposals should also deliver a preliminary economic feasibility study, providing the basis for upscaling the technology to an industrial level.

The Technology Readiness Level (TRL)³⁴ at the end of the project should be 4-5^{35, 36}. Proposals should clearly state the starting and target TRLs. The proposed work should enable the technology to achieve the target TRL within the timeframe of the project.

³⁴ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

The compliance of the target molecules with all standards and regulations (including the REACH regulation) should be assessed, taking also into account their potential final applications.

Proposals should include an environmental assessment using Life Cycle Assessment (LCA) methodologies, and a cost analysis. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches.

Indicative funding: *It is considered that proposals requesting a contribution of EUR 2 million to maximally EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: set the basis for at least 1 new bio-based value chain;
- contribute to **KPI 5**: set the basis for at least 1 new bio-based material with high potential for upscaling to demonstration level;
- develop processes and technologies that are more efficient (for example in terms of process yields and purity of the target products) and sustainable (for example lower energy requirements, milder operating conditions) than the state-of-the-art process to obtain the same target molecules.

Type of action: Research and Innovation Action.

BBI 2017.D3 – BREAKTHROUGH PRIMARY BIO-BASED CHEMICALS WITHOUT SIGNIFICANT FOSSIL-BASED COUNTERPARTS BUT WITH HIGH MARKETABILITY

Specific challenge:

Products derived from petrochemical feedstock have extensive downstream production routes, developed markets and an efficient infrastructure. Therefore, making the ‘same’ chemicals from biomass and ‘blending’ them into these existing value chains (known as ‘drop-in’ chemicals) is the quickest and most cost-effective way to implement bio-based value chains in the short term. However, there are some bio-based molecules without a

³⁵ TRL 5 requires that the technology be ‘validated in [a] relevant environment (industrially relevant environment in the case of key enabling technologies).’ For industry, this means at ‘pilot scale’ (meaning beyond and larger than ‘at lab scale’), preferably at an industrial site. TRL 4 is at ‘lab scale’.

³⁶ For an Innovation Action – Demonstration Action with a similar objective but TRL 6-7 see Topic BBI 2017.D3.

'significant' fossil counterpart³⁷ that industry and researchers regard as promising in the medium to long term, due to their special functional properties or possible derivatives.

While the production processes for bio-based chemicals with no significant fossil-based counterpart could be made more economical and sustainable, there is yet no infrastructure for their further use, making them less attractive for now.

Some of these bio-based building blocks have direct applications, but they can also serve to produce a broad variety of other chemicals that can bring renewability and sustainability in many markets. Among these 'primary' renewables are levulinic acid and muconic acid. These are building blocks for a variety of applications ranging from polymers and plasticisers and other intermediate building blocks, to lubricants, hydraulic fluids, pharmaceuticals and cosmetics. Since these molecules are (relatively) new on the chemical market, their production has not yet benefited from economies of scale and do not have well-developed value chains.

Technically, the production of those primary bio-based chemicals is in many cases already at TRL 4-5, as are some of their 'secondary' follow-up products. Industry now needs to demonstrate production routes for these chemicals at TRL 6-7.

The specific challenge is to demonstrate the technology of breakthrough bio-based chemicals with no significant fossil-based counterpart in a full demo-plant and to demonstrate its potential in at least one application at pre-commercial level.

Scope:

Demonstrate a production process for bio-based chemicals with no significant fossil-based counterparts, originating from sustainably sourced biomass of European origin and demonstrate one application in the market at pre-commercial level.

Proposals should demonstrate a production route for at least one bio-based chemical building block that does not have a 'significant' fossil-based counterpart and show its market potential by means of at least one application.

Biotechnological, thermo- and chemo-catalytic processes are within the scope of this topic. The processes should ensure techno-economic competitive routes. This will efficiently pave the way to a further scale-up of the developed process(es) to enable an expanding market entrance for products based on the breakthrough chemical.

Proposals should justify the selection of the targeted molecule(s) and validate the full value chain. Proposals should demonstrate that the resulting products have a high market pull and that the operation is economically and environmentally sustainable. Furthermore, proposals should provide appropriate business models. Proposals should also show the feasible, sustainable and economic supply of European biomass for these applications via the primary building block. Proposals should also deliver a preliminary economic feasibility study, providing the basis for upscaling the technology to commercial level.

³⁷ Molecules having no fossil-based production route, or whose fossil-based production route(s) – while technically possible – is not commercially pursued because of cost or sustainability issues.

The Technology Readiness Level (TRL)³⁸ at the end of the project should be 6-7.³⁹ Proposals should clearly state the starting and target TRLs. The proposed work should enable the technology to achieve the target TRL within the timeframe of the project.

Proposals should include an environmental and economic assessment using Life Cycle Assessment (LCA) methodologies. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches, as well as measurement and testing approaches allowing for coming regulatory compliance checks.

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: establish at least 1 new bio-based value chain;
- Contribute to **KPI 4**: create at least 1 new building block with no significant fossil-based counterpart;
- contribute to **KPI 5**: set the basis for at least 1 new bio-based material with high potential for upscaling to flagship level;
- contribute to **KPI 6**: create at least 2 new demonstrated consumer products based on bio-based chemicals and materials that meet market requirements;
- develop processes and technologies that are more efficient (for example in terms of process yields and purity of the target products) and sustainable (for example lower energy requirements, milder operating conditions) than the state-of-the-art process to obtain the same target molecules.

Type of action: Innovation Action – Demonstration Action.

BBI 2017.D4 – INNOVATIVE BIO-BASED FERTILISING PRODUCTS TO INCREASE THE SUSTAINABILITY OF FERTILISING PRACTICES IN AGRICULTURE

Specific challenge:

Farm commodity products such as fertilisers need to be made more sustainable and resource-efficient. This will help secure European arable land productivity while also boosting sustainability and resource efficiency of the farming practices. For many years,

³⁸ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

³⁹ For a Research and Innovation Action with a similar objective but TRL 4-5 see Topic BBI 2017.R7.

mineral fertilisers have been used to intensify crop production to meet the food demand of a growing population. Mineral fertilisers represent 80 % of the market value of all fertilisers in the EU: they are manufactured from feedstock (such as phosphate rocks) imported from third countries or are based on energy-intensive production processes (for example nitrogen fertilisers), all of which are non-renewable resources.

At the time of drafting this Annual Work Plan, a new EU regulation on fertilising products⁴⁰ was under discussion among the co-legislators with a view to setting common rules for CE-marked fertilising products and level the playing field between mineral and organic fertilising products. This regulation will offer an access to the single market to innovative fertilising products such as those derived from secondary raw materials, whereas they were until now limited to national markets. The legislative proposal also imposes safety requirements to all fertilising products and requires, for instance, coating materials used in certain controlled-release fertilisers to be bio-degradable.

The loss of nutrients with traditional fertilisers has indeed been combated by the introduction of Controlled-Release Fertilisers (CRFs), which can better match the plants' need for the nutrients over time. However, the use of these CRFs involves the use of plastic polymers, which are not biodegradable and lead to an accumulation of plastic impurities in soil. The new EU regulation on fertilising products addresses the degradability of the coatings of CRFs by stipulating a 90 % conversion of the organic carbon into CO₂ in maximum 24 months.

The specific challenge is therefore to concentrate on finding coating polymers that are compliant with the biodegradability parameter in compliance with law, while achieving the controlled release of nutrients in the best possible manner.

Improving the nutrient quality of soils can also be achieved by the application of plant biostimulants, including microorganisms. This could be done by either stimulating plant capacities to absorb nutrients present in the environment, including in air or in soils, by stimulating soil microbiota (known as the 'prebiotic approach'), or by introducing microorganisms into soil to transform *in situ* the non-available nutrients present into forms that plants can absorb (known as the 'probiotic approach'). However, these concepts need to be demonstrated in an industrially relevant environment for an efficient and expanded use throughout Europe.

Another specific challenge is to demonstrate the use of advanced bio-based fertilising products that meet EU rules and that increase the sustainability of fertilising practices and the productivity of the agriculture in Europe. These could be fertilisers from bio-based streams, fully biodegradable coatings for CRFs or the smart use of plant biostimulants, including microorganisms.

Scope:

Demonstrate the following three uses in value chains to improve the sustainability of fertilising products and practices in agriculture:

⁴⁰ <https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-157-EN-F1-1.PDF>

- component materials in more sustainable fertilising products from local bio-based waste streams and co-products that fully comply with the proposed revised EU rules mentioned above and that can help to replace less sustainable fertilisers, including those currently imported;
- efficient bio-based biodegradable coatings for CRFs that can meet the proposed regulatory requirements on biodegradability of coatings in soils;
- prebiotic and/or probiotic solutions for tailored soil nutrient improvement.

The consortium should be prepared to adapt its tasks (via an amendment to the Grant Agreement) to the final requirements laid down in the EU fertiliser regulation after its adoption, if applicable.

The new bio-based fertilising products should ensure and maintain the sustainability of the soil-plant system, be environmentally friendly and without adverse public health issues, and meet current and proposed regulations and standards.

Proposals should provide data showing evidence of the sustainable availability of the feedstock sources (for example agricultural and agro-industrial waste, animal by-products, by-products of the agro-food industry or sewage sludges), also in view of a further scale-up of the technologies and processes developed.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions with higher feedstock and energy efficiencies and new products obtained in terms of sustainability performance.

The Technology Readiness Level (TRL)⁴¹ at the end of the project should be 6-7. Proposals should clearly state the starting and target TRLs. The proposed work should enable the technology to achieve the target TRL within the timeframe of the project.

Proposals should include an environmental and economic assessment using Life Cycle Assessment (LCA) methodologies.

Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches, as well as measurement and testing approaches allowing for coming regulatory compliance checks.

Moreover, proposals should also allow for pre- and co-normative research necessary for the needed product quality standards⁴².

⁴¹ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

⁴² The technical basis of a new standard is usually established through a programme of research termed Pre-Normative Research (PNR), i.e. research undertaken prior to standardisation (normalisation). Such research would be used to demonstrate the feasibility and reliability of the technique or process to be standardised and to investigate its limitations. Once the technique or process has been developed and its boundaries have been explored, then, for new and emerging areas of technology, it would be normal to prepare a 'pre-standard', such as a Publicly Available Specification (PAS) or Technical Specification (TS), to provide a document in a relatively short time frame for evaluation by potential users. The availability of a pre-standard provides a basis

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: set the basis for at least 1 new bio-based value chain;
- contribute to **KPI 5**: create at least 1 new bio-based material with high potential for the sustainable intensification of fertilising products and practices in European agriculture;
- contribute to **KPI 6**: create at least 4 new demonstrated consumer products based on bio-based chemicals and materials that meet market and regulatory requirements;
- controlled release of nutrients (if applicable), lowering initial release kinetics of the developed coated fertilising products compared with their non-coated form, while still complying with the biodegradability criterion in the revised Fertilisers Regulation and without compromising soil fertility and productivity;
- overall reduction of at least 10 % in the carbon footprint of the considered bio-based operation compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Innovation Action – Demonstration Action.

BBI 2017.D5 – ADVANCED BIO-BASED FIBRES AND MATERIALS FOR LARGE-VOLUME APPLICATIONS

Specific challenge:

Current large-volume products for market applications include fossil-based (for example conventional plastics) or bio-based (for example bio-based plastics and cotton) products, and their production often occurs at relatively low sustainability levels.⁴³ Due to the high market share and strategic role associated with these products, industry is increasingly pursuing technical solutions aimed at improving sustainability during their whole life cycle including end-of-life. Also, consumers and brand owners are pushing to tackle safety and environmental issues related to several consumer goods.

for further research, usually termed Co-Normative Research - i.e. research undertaken in conjunction with the standardisation process, to establish a statistical basis for the technique or process, in particular its reproducibility (same user), repeatability (different users) and uncertainty.

(http://www.iec.ch/about/globalreach/academia/pdf/academia_governments/handbook-standardisation_en.pdf)

⁴³ <https://www.icac.org/getattachment/Home-International-Cotton-Advisory-Committee-ICAC/measuring-sustainability-cotton-farming-full-english.pdf>

Sustainably produced bio-based large-volume products for a variety of applications would be one of the key drivers for accelerating and performing an effective transition towards a low-carbon society. However, some barriers still hinder this process, mainly because of issues over the cost, performance and social and environmental sustainability of the bio-based value chains and related products.

The specific challenge is to produce bio-based fibres and other bio-based materials able to efficiently compete with current benchmark counterparts for large-volume applications through better technical performance, lower cost and higher sustainability levels.

Scope:

Demonstrate the efficient and viable production of bio-based fibres and materials with superior technical performance and sustainability levels, but at lower production costs, in a whole value-chain approach. Their superior performance should be proven in comparison with identified benchmark materials (fossil-based or bio-based) for large-volume applications, using clear and pre-defined criteria. Benchmark counterparts should be both fossil-based and traditional bio-based products.

Proposals should target relevant properties in any market sectors of large-volume bio-based products, such as packaging, textiles, construction, agriculture, the automotive industry and personal care and hygiene. Proposals should consider feedstock from different European sources, including residual streams of several origins to produce the target bio-based materials. Proposals should demonstrate solutions that comply with the relevant regulations, existing standardisation documents and validated approaches to achieve the products' subsequent marketability. The target product should comply with all safety, quality and purity requirements set by the EU and national authorities. Proposals should outline a strategy for deploying the targeted products on the market for large-volume applications. To this end, proposals should provide appropriate business models and marketing strategies. Proposals should also show the feasible, sustainable and economic supply of European biomass for these applications.

The Technology Readiness Level (TRL)⁴⁴ at the end of the project should be 6-7. Proposals should clearly state the starting and target TRLs. The proposed work should enable the technology to achieve the target TRL within the timeframe of the project.

Proposals should include an environmental and economic assessment using Consequential⁴⁵ Life Cycle Assessment (LCA) methodologies. Proposals should also include a viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches, as well as measurement and testing approaches allowing for coming regulatory compliance checks.

⁴⁴ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

⁴⁵ Only relevant when crop land based biomass is used as feedstock: 'Consequential LCAs seek to identify the environmental consequences of a decision or a proposed change in a system under study (oriented to the future), which means that market and economic implications of a decision may have to be considered'. See also: https://en.wikipedia.org/wiki/Life-cycle_assessment

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 7 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 1 new cross-sector interconnection in bio-based economy clusters;
- contribute to **KPI 2**: establish at least 2 new bio-based value chains;
- contribute to **KPI 5**: create at least 3 new bio-based materials with high potential marketability;
- contribute to **KPI 6**: create at least 4 new demonstrated consumer products based on bio-based chemicals and materials that meet market requirements;
- quantified benefits (for example better performances, lower costs, improved environmental sustainability) of the target bio-based materials compared with identified benchmarks for the same large-volume application;
- overall reduction of at least 10 % in the carbon footprint of the considered bio-based operation compared with the state-of-the-art (shown by an LCA taken up in one of the work packages).

Type of action: Innovation Action – Demonstration Action.

BBI 2017.F2 – LARGE-SCALE PRODUCTION OF PROTEINS FOR FOOD AND FEED APPLICATIONS FROM ALTERNATIVE, SUSTAINABLE SOURCES

Specific challenge:

The worldwide demand for protein is progressively expanding due to strong growth in the world's population. Improvements in the standard of living in large parts of the world are adding to the protein demand⁴⁶. Forecasts to 2050 show that current protein availability will not be sufficient to meet protein demand for food purposes. At the same time, Europe is highly dependent on imports of protein-rich material for feeding livestock: About 70 % of the total amount required is imported. Already 60-70 % of global arable land is used for animal feed to meet animal protein demand.

Consequently, the exploitation of new protein sources is necessary to meet the worldwide demand. European crops, together with residues and co-products from primary biomass cultivation, are valuable sources of proteins. Residues from animal processing, fisheries, aquaculture and algae industries also offer a potential, albeit currently underexploited, source of proteins. The bio-based industry could help to expand the production of protein-rich ingredients by valorising existing alternative sources from food/feed value chains and by taking full advantage of the successes of earlier (and ongoing) R&D and small-scale industrial operations.

⁴⁶ <http://www.fao.org/docrep/013/i2050e/i2050e.pdf>

The specific challenge is to demonstrate a large-scale, first-of-its-kind bio-based value chain producing sustainable, safe proteins sourced from alternative, sustainable sources (dedicated crops as well as residues), through a cascading approach where applicable.⁴⁷

Scope:

Produce on a large-scale food- and/or feed-grade proteins from sustainable alternative sources, such as residual streams from agriculture, other biomass production and related residual streams (like aquaculture, fisheries, or seaweed), or food industry side streams.

Proposals should include the whole value chain from the feedstock supply to processing and production steps for the targeted high added-value products. All relevant technologies in the different steps are applicable, provided they have been already proven at a significant scale (preferably demonstration levels TRLs 6-7, but at least pilot plant level TRL 5).

Proposals should focus primarily on proteins for food and feed applications. However, proposals could also consider functional proteins and other applications that may make it possible to generate new incomes and hence increase the overall sustainability of the value chains. Proposals should include extra valorisation steps through an integrated biorefinery setup.

Proposals need to take into account legislative limitations over the origin of the biomass feedstock when dealing with proteins for human or livestock nutrition. Proposals should include an assessment on safety, quality and purity for the target products, comparing them with the current (imported) proteins used for the same applications and end-products.

Proposals should also provide sound business models showing that sustainably produced feedstock streams are available in Europe, allowing to increase protein production in Europe and to reduce the imports of protein-rich products.

Proposals should specifically demonstrate the benefits versus the state-of-the-art and existing technologies. This could be done by providing evidence of new processing solutions and new products obtained. Proposals should demonstrate the techno-economic feasibility of the large-scale deployment of sustainable and efficient European value chains for proteins production.

The Technology Readiness Level (TRL)⁴⁸ at the end of the project should be 8. Proposals should clearly state the starting TRL. The proposed work should enable the technology to achieve TRL 8 within the timeframe of the project.

Proposals should include an environmental, an economic and a social assessment using Life Cycle Sustainability Assessment (LCSA) methodologies. Proposals should also include a

⁴⁷ For a Research and Innovation Action on proteins see Topic BBI 2017.R4.

⁴⁸ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

viability performance check of the developed process(es) based on available standards, certification, accepted and validated approaches.

Proposals need to build on existing standardisation documents and allow for the necessary pre-and co-normative research into the development of new standardisation documents and validated approaches.

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 21 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude the submission and selection of proposals requesting other amounts.*

Expected impacts:

- contribute to **KPI 1**: create at least 2 new cross-sector interconnections in bio-based economy clusters;
- contribute to **KPI 2**: establish at least 2 new bio-based value chains;
- contribute to **KPI 6**: create at least 2 new demonstrated consumer products based on bio-based proteins for food and feed applications that meet market requirements;
- reduce by at least 5 % the carbon footprint of the considered bio-based operation compared with the existing animal based protein.

Type of action: Innovation Action – Flagship Action.

Strategic Orientation 4 MARKET UPTAKE

BBI 2017.S1 – ESTABLISH COOPERATION AND PARTNERSHIP WITH BRAND OWNERS AND CONSUMER REPRESENTATIVES TO IMPROVE THE MARKET ACCESS OF SUSTAINABLE BIO-BASED PRODUCTS

Specific challenge:

The implementation of bioeconomy solutions and related value chains on large scale depends heavily on the market acceptance of bio-based products. The fact that the price of bio-based products generally tends to be higher than the relevant fossil-based counterparts is still hindering the widespread take-up of these products. In addition to developing more features and better performance for the bio-based products and justifying a potentially premium price, the bio-based industry also needs to further increase consumers' and brand owners' awareness of the sustainability of bio-based products.

Whereas Topic BBI 2016.S3⁴⁹ set out to build a 'think and do' platform to increase mutual knowledge of possibilities and opportunities between producers and potential users of bio-based products, this topic focuses on involving brand owners and consumer representatives in the 'targeting' of bio-based value chains. The aim is to deliver products for relevant and necessary applications in consumer markets.

The specific challenge is to provide routes and means to increase cooperation and partnership between the different actors to achieve the market uptake of bio-based products. Industry should cooperate with brand owners and consumer representatives since they have a strategic role in better understanding market behaviours and needs. Meeting this challenge will also accelerate the crossing of the 'valley of death' from the research phase to commercialisation of a new product.

Scope:

Proposals should develop the structure and procedures for and implement the cooperation of the bio-based industry and brand owners and consumers to incorporate their knowledge and expertise on market changes and trends. The aim would be to increase market acceptance of bio-based products.

Proposals should seek complementarity with the projects funded under other topics^{50,51} to avoid overlap and promote synergies.

⁴⁹ <http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/bbi-2016-s03.html>

⁵⁰ For example BBI.S2 – Communication and awareness (2015); <https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/bbi.s2-2015.html>

⁵¹ For example BB-05-2017 – Bio-based products: Mobilisation and mutual learning action plan; <https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/bb-05-2017.html>

Proposals should also involve other stakeholders who could accelerate the marketability and public acceptance of bio-based products through new policies and strategies, for example local communities, local authorities, and other industrial actors.

The industry should actively participate to help prove the benefits of the project results to the full bio-based sector.

Work should also build upon existing standardisation documents and allow for the necessary pre-and co-normative research for the development of new standardisation documents and validated approaches, including B2B and B2C communication.

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 1 million would allow this specific challenge to be addressed appropriately.*

Expected impacts:

- contribute to **KPI 1**: create at least 2 new cross-sector interconnections in bio-based economy clusters;
- higher brand owners' involvement in and commitment to the bioeconomy, increasing the marketability of bio-based products;
- higher consumer awareness of sustainability and of the opportunities associated with bio-based products with better features and improved performance compared with the relevant fossil-based counterparts.

Type of action: Coordination and Support Action.

BBI 2017.S2 – IDENTIFY OPPORTUNITIES FOR ICT TO INCREASE THE EFFICIENCY OF BIOMASS SUPPLY CHAINS FOR THE BIO-BASED INDUSTRY

Specific challenge:

The implementation of bio-based value chains on large scale, fed by a diversified feedstock portfolio, requires effective supply chains able to reduce biomass losses, limit costs and enhance the overall sustainability of the value chains.

Biomass suppliers and technology providers need to jointly provide significant improvements in logistical issues such as biomass supply, collection, storage and the preparatory steps towards biorefining. Introducing and/or increasing the application of information and communications technology (ICT) and tools could provide the desired efficiency improvements. These tools are already playing a role in forestry⁵² and this experience could serve as example for the bio-based industry supply chain.

Applying ICT will also provide links with 'the internet of things' and Industry 4.0 (the current trend for automation and data exchange in manufacturing technologies). Efficiency gains will result in the creation of sustainable value chains.

⁵² See <http://www.focusnet.eu/>

The specific challenge is to identify opportunities for the introduction of ICT to increase the efficiency and sustainability of biomass supply chains for the bio-based industry. Sustainable feedstock supply chains will permit the creation of sustainable bio-based value chains, which could serve as engines for the economic development of rural areas.

Scope:

Identify feasible opportunities for ICT to improve the efficiency and sustainability of supply chains through cooperation between biomass suppliers and technology providers.

Proposals should cover several supply chains handling different kinds of biomass coming from multiple sources. Proposals should include a description of the (combined) feedstock and its potential for sustainable value chains.

Proposals should also assess the efficiency and sustainability improvements of logistical supply chains by applying the proposed ICT solutions, including also biomass resource modelling.

Proposals should also address the assembly and financing of new and technically improved equipment possibly required to collect and store feedstock for the bio-based industry, in the short time window after harvesting.

The industry should actively participate to help prove the benefits of the project results to the full bio-based sector.

Indicative funding: *It is considered that proposals requesting a contribution of maximally EUR 1 million would allow this specific challenge to be addressed appropriately.*

Expected impacts:

- contribute to **KPI 1**: create at least 2 new cross-sector interconnections in bio-based economy clusters;
- reduced biomass losses and costs associated with feedstock supply logistics compared with similar existing benchmark supply chains;
- improved direct involvement and commitment of biomass suppliers and technology providers, and the resulting introduction of ICT in the biomass feedstock supply chain for the bio-based industry.

Type of action: Coordination and Support Action.

2.9. CALL MANAGEMENT

2.9.1. CONDITIONS OF THE 2017 CALL

Call identifier: H2020-BBI-JTI-2017

Publication date: 11 April 2017⁵³

Indicative deadline: 7 September 2017⁵⁴ 17:00:00 (Brussels local time) - (single stage call).

Indicative budget: 81 million euros^{55,56,57}

Estimated value of the in kind contributions by the members other than the Union or their constituent entities (BIC): Minimum 40 million euros.

Indicative budgets by type of actions

Topic	Indicative budget (million EUR)
Research and Innovation Actions	
BBI 2017.R1 – Valorisation of gaseous side streams from bio-based operations into chemical building blocks	36
BBI 2017.R2 – Innovative technologies for the pre-treatment and separation of lignocellulosic feedstock and complex composition streams into valuable fractions while maintaining key characteristics	
BBI 2017.R3 – Exploiting extremophiles and extremozymes to broaden the processing conditions to convert biomass into high value building blocks	
BBI 2017.R4 – Proteins and other bioactive ingredients from side streams and residues	
BBI 2017.R5 – Novel bio-based chemical precursors to improve the	

⁵³ The BBI JU Executive Director may decide to open the call up to one month prior to or after the envisaged date of opening.

⁵⁴ The BBI JU Executive Director may delay this deadline by up to two months.

⁵⁵ 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

⁵⁶ Subject to the adoption of the European Commission Financing Decision 2017 for the Bio-based Industries Joint Undertaking. The final total funding for projects includes EFTA contributions.

⁵⁷ 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.

Topic	Indicative budget (million EUR)
performance of mass consumption products	
BBI 2017.R6 – Competitive biodegradable, compostable and/or recyclable bio-based plastics for a sustainable end-of-life phase	
BBI 2017.R7 – Novel secondary bio-based chemicals without significant fossil-based counterparts but with high application potential	
Innovations Actions – Demonstration Actions	
BBI 2017.D1 – Valorisation of liquid and solid side streams from bio-based operations into high added-value products to create new feedstock for bio-based products	22
BBI 2017.D2 – Integrated multi valorisation of algae into advanced materials and high added-value additives	
BBI 2017.D3 – Breakthrough primary bio-based chemicals without significant fossil-based counterparts but with high marketability	
BBI 2017.D4 – Innovative bio-based fertilizing products to increase the sustainability of fertilising practices in agriculture	
BBI 2017.D5 – Advanced bio-based fibres and materials for large-volume applications	
Innovation Actions – Flagship Actions	
BBI 2017.F1 – Integrated ‘zero waste’ biorefinery utilising all fractions of the feedstock for production of chemicals and materials	21
BBI 2017.F2 – Large scale production of proteins for food and feed applications from alternative, sustainable sources	
Coordination and Support Actions	
BBI 2017.S1 – Establish cooperation and partnership with brand owners and consumer representatives to improve market access of sustainable bio-based products	2
BBI 2017.S2 – Identify opportunities for ICT to increase efficiency of biomass supply chains for the bio-based industry	

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

2.9.2. 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 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 are eligible for funding.

2.9.3. LIST OF COUNTRIES ELIGIBLE FOR FUNDING

Part A of the General Annexes⁵⁸ to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* to the actions covered by this Work Plan with the following derogation.⁵⁹

Coordination and Support actions (CSA) and Research and Innovation Actions (RIA)	<p>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 shall be eligible for funding from the Bio-Based Industries Joint Undertaking for actions in the area of bio-based industries other than innovation actions:</p> <ul style="list-style-type: none"> (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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⁵⁸ http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

⁵⁹ OJ L 174, 13.6.2014, p. 12).

2.9.4. STANDARD ADMISSIBILITY CONDITIONS AND RELATED REQUIREMENTS

Part B of the General Annexes to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* to the actions covered by this Work Plan.

2.9.5. STANDARD ELIGIBILITY CONDITIONS

Part C of the General Annexes to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* to the actions covered by this Work Plan.

2.9.6. TYPES OF ACTION: SPECIFIC PROVISIONS AND FUNDING RATES

Part D of the General Annexes to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* to the actions covered by this Work Plan with the following additions:

Research and Innovation Actions

R&I actions aim to fill the technological gaps within specific value chains. The impact for the whole value chain must be clearly shown. For R&I actions the Technology Readiness Level (TRL)⁶⁰ at the end of the project should be in the range of 4 to 5 (specified per topic).

Innovation Actions

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

A '**demonstration**' action moreover shall 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. For Demonstration projects, 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 European biomass is ensured. It also means that they need to include an exploitation plan, sustainability assessment and to address consumer engagement. Related costs at the level of the action are eligible for Horizon 2020 funding only within the limits of the applicable Horizon 2020 rules for innovation actions.

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 shall 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 shall address a complete value chain from procurement, growth, supply of feedstock material to the final product(s). It shall 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. Related costs at the level of the action are eligible for Horizon 2020 funding only within the limits of the applicable Horizon 2020 rules for innovation

⁶⁰ 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/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf

actions. Proposals should clearly state the starting and target TRLs. For Flagship actions, 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 proposals themselves.

Coordination and support actions

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

2.9.7. TECHNOLOGY READINESS LEVELS (TRL)

Part G of the General Annexes to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* to the actions covered by this Work Plan.

2.9.8. EVALUATION RULES

Part H of the General Annexes to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* to the actions covered by this Work Plan.

The evaluation criteria are applied as set out in the table below (different from Part H of the General Annexes):

Type of action	Excellence	Impact	Quality and efficiency of the implementation
Coordination and Support Actions (CSA)	<p>Clarity and pertinence of the objectives;</p> <p>Soundness of the concept and, credibility of the proposed methodology;</p> <p>Quality of the proposed coordination and/or support measures.</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;</p> <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 	<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;</p> <p>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> <p>Complementarity of the participants and extent to which the consortium as</p>

Type of action	Excellence	Impact	Quality and efficiency of the implementation
		<p>manage research data where relevant.</p> <ul style="list-style-type: none"> • Communicate the project activities to different target audiences 	<p>whole brings together the necessary expertise (if relevant);</p> <p>Appropriateness of the management structures and procedures, including risk and innovation management.</p>
<p>Research and Innovation Actions (RIA)</p>	<p>Clarity and pertinence of the objectives;</p> <p>Soundness of the concept and, credibility of the proposed methodology;</p> <p>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)</p> <p>Appropriate consideration of interdisciplinary approaches and, where relevant, use of stakeholder knowledge.</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;</p> <p>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 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. 	<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;</p> <p>Appropriateness of the management structures and procedures, including risk and innovation management</p> <p>Complementarity of the participants and extent to which the consortium as whole brings together the necessary expertise (if relevant);</p> <p>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>

Type of action	Excellence	Impact	Quality and efficiency of the implementation
		<ul style="list-style-type: none"> 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>	
Innovation Actions (IA)	<p>Clarity and pertinence of the objectives;</p> <p>Soundness of the concept and, credibility of the proposed methodology;</p> <p>Coverage of the value chain (raw materials, equipment and technology suppliers and end-users);</p> <p>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 of interdisciplinary approaches and, where relevant, use of stakeholder</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;</p> <p>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 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 	<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;</p> <p>Appropriateness of the management structures and procedures, including risk and innovation management</p> <p>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> <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</p>

Type of action	Excellence	Impact	Quality and efficiency of the implementation
	knowledge.	where relevant. • Communicate the project activities to different target audiences Extent to which the proposed consortium own contribution, including additional investments, will help maximising the impact of the action	implementation of the pilot phase, demonstration or flagship ⁶¹ .

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.

2.9.9. CALL BUDGET FLEXIBILITY

Part I of the General Annexes to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* to the actions covered by this Work Plan. Final budgets may change following evaluation. The final figures may change by up to 20 % compared to those indicated in this Work Plan, for the following budgeted activities:

- total expenditure for calls (up to 20 % of the total expenditure for each call);
- repartition of call budgets within a call (up to 20 % of the total expenditure of the call);

⁶¹ 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).

- evaluation and monitoring (up to 20 % of the total expenditure for all these activities);
- other individual actions not implemented through calls for proposals (up to 20 % for each one).

The cumulated changes above may not exceed 20 % of the maximum contribution provided for this Work Plan, as set out in Article 2 of the related Commission Implementing Decision for each year.

Changes within these limits shall not be considered to be substantial within the meaning of Article 94(4) of Delegated Regulation (EU, Euratom) No 1268/2012.

2.9.10. CONSORTIUM AGREEMENT

The legal entities wishing to participate in a project shall form a consortium and appoint one of its members to act as its coordinator. They will conclude a Consortium Agreement among themselves prior to the signature of the Grant Agreement.

2.9.11. DISSEMINATION AND INFORMATION ABOUT PROJECT RESULTS

The results of the projects from Call 2017 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 website.

2.9.12. OPEN ACCESS TO RESEARCH DATA AND RESEARCH DATA MANAGEMENT

As regards open access to research data, Part L of the General Annexes to the Horizon 2020 Work Programme 2016-2017 shall apply *mutatis mutandis* for the actions covered in this Work Plan.

2.10. SUPPORT TO OPERATIONS

2.10.1. COMMUNICATIONS PLAN FOR 2017

Introduction – Background

BBI JU's communication and stakeholder management strategy is aimed at ensuring political and public awareness of ongoing BBI JU projects and activities, in order to gain acceptance and support from various audiences at the European and national level.

In 2016 the BBI JU pursued its corporate communications activities along pre-existing commitments and as a newly autonomous body. During 2016 several preparatory workshops and consultations took place around developing the BBI JU communication policy and strategy. Those exercises have drawn on the knowledge and positioning of the BBI JU programme office, BBI's two founding members and its advisory governance bodies,

as well as tapping into relevant external expertise from large industry, digital communication specialists and media experts.

The communications policy sets out the overall approach on communicating key messages and facts to stakeholders.

There is a shared responsibility for communication and stakeholder management between BBI JU and its founding members. This calls for a coordinated, effective and resource-efficient implementation of the communication and stakeholder management strategy between the programme office, its founding members and its advisory bodies.

Cascading communications strategy through action plan

The communication and stakeholder management strategy promotes and supports the implementation of the communication policy.

The strategy supports the communication of the BBI JU programme objectives and achievements. It establishes the actions required to manage the establishment of the tools and channels and the operational structure needed by BBI JU as a fully autonomous EU body. It provides the framework for critical forward planning to achieve specific BBI communication goals.

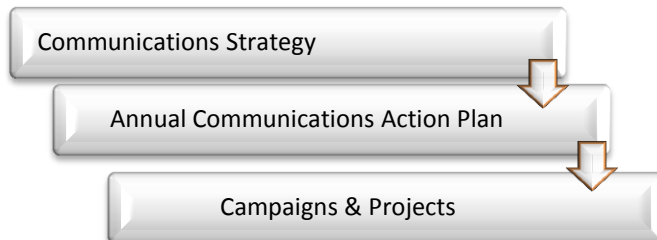


Figure 1: Communications Strategy ->Annual Communications Plan ->Campaigns and projects

Priority stakeholders – Mapping

BBI JU stakeholders are extremely diversified with manifold interests in or influence over the potential for BBI JU's success. BBI JU also has very different potential to influence the different groups of stakeholders. Managing their expectations through communication and outreach activities is essential to engage them. The stakeholders' power/influence and the resources BBI JU has to target these stakeholders were mapped into priority groups during a stakeholder management exercise, with the objective of identifying and prioritising BBI stakeholders.

Actions

The BBI JU programme office already initiated three actions in the field of widening participation, SME participation and synergies with other programmes. Each one of those actions has its own strategy. Support from communications to those actions will cover the

following:

1. Stakeholder participation widening strategy

- Support programme team in the development/communication of outreach activities;
- lead on developing targeted materials for the widening strategy via appropriate tools & channels.

2. SMEs strategy

- Develop the SME communication strategy to support the implementation of the SME initiative;
- lead on developing targeted materials for SMEs via appropriate tools & channels;
- support specific outreach activities defined in the SME action plan.

3. Synergies with other programmes and initiatives

- Lead on developing communication tools/channels for disseminating information about synergies for BBI JU stakeholders;
- support specific action plans for outreach including liaison with European Commission (EC) services, EU bodies (EIB), other initiatives e.g. BBI JU/SPIRE working group, Smart Specialisation programme, ESIF, the SME instrument and other SME initiatives.

Communication goals

The communication goals to be delivered through the process mentioned above are:

1. 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;
2. specifically to promote the BBI JU Calls for proposals, and explain potential synergies with the wider EU funding environment to all potential participant groups using a variety of channels and media;
3. to widen stakeholder engagement with the BBI JU programme by targeting priority stakeholders like SMEs and regions, currently underrepresented areas and sectors, using outreach activities with these groups;
4. to profile the programme to key influencers to widen support for the programme amongst policy makers using specific tailored and targeted actions;
5. to improve the visibility and recognition of the value of the bio-based industries through the dissemination of programme/project activities, impacts and results to the wider stakeholder audience identified using appropriate communication channels and tools.

Communication channels

BBI JU will use the following communication channels based on those that will be most effective. These are:

The press and other media

BBI JU will develop this channel by building up networks of media contacts via agencies and individual journalists. These will provide wider access to our target audiences. BBI JU will produce communication materials that can be used for immediate story-telling, which will facilitate the dissemination of BBI JU messaging and reduce the need of editing by journalists.

Multipliers and intermediaries

Multipliers and intermediaries represent an efficient way to reach out to targeted stakeholder groups. BBI JU multipliers range from motivated individuals who act as centres of influence with their networks to formal support networks like National Contact Points (NCPs) and the States Representatives Group (SRG).

Communication events

BBI JU organises its annual Open Info Day in Brussels to promote its Calls for proposals. BBI JU also organises at least one networking event per year in conjunction with this event. In addition BBI JU will organise an annual Stakeholder Forum to promote engagement between stakeholders and the BBI initiative. Although BBI JU is not obliged to hold this type of event, this type of event can raise awareness and ensure opportunities for dialogue with stakeholders.

Over the internet: Web site and social media

BBI's external website:

BBI's external website presents the public face of the organisation. BBI JU will use the website as its link to all stakeholders. BBI JU will use the website to disseminate general information about itself and the projects and to meet legal requirements for reporting and corporate governance.

Social media networks:

BBI JU will develop its presence/influence on social media. BBI JU will use social media to raise its visibility and to reinforce specific key messages while supporting its corporate identity. Using social management platforms and tools, BBI JU will plan digital campaigns for maximum impact and to supplement other activities taking place through other channels to augment and embed key messages for repetitive effect.

Public relations – direct approach

BBI JU will establish direct links with key individuals through advocacy and public relations actions. The Executive Director and Head of Programme will promote BBI JU as the main ambassadors for the initiative.

Communication tools

BBI JU will employ the following communications tools to execute the campaigns and projects for 2017:

- Visual Identity – development of logo, templates, linking ID to values;
- Customer Relationship Management (CRM) tool – coordinated targeted approaches to campaigns, events etc.;
- E- Newsletter tool – regular stakeholder contact with strong content/dissemination;
- Bio-based products collection – permanent office exhibition, mobile exhibition at events, walking exhibition, printed material to promote bio-based industries;
- Variety of digital/print materials tailored to campaign, event, messages etc.;
- Awards, prizes and studies/articles/papers – used to build stakeholder engagement;
- Partnering platform and mobile app – networking for Call promotion & participation;
- Webinars – for efficient dissemination/training;
- Business Intelligence.

From strategy to action

The communication action plan will cascade the objectives of the communication strategy into concrete campaigns and projects for 2017.

Timing for main communication tools development

1. Visual identity
Procurement for consultancy services for end of Q1 2017
Develop/implement a well-balanced visual identity that is clearly linked to BBI JU's corporate identity, mission, aims and objectives by end of Q2 2017.
2. CRM
Launch CRM and transfer existing databases
Establish customer relations tool management policy by end of Q1 2017.
3. BBI e-Newsletter
Identify/implement a suitable newsletter tool, define/launch the newsletter policy covering style, format, content, production process, frequency etc. by end of Q1 2017.
4. Variety of digital/print materials
Complete procurements for services and products to develop communications/promotional material tailored to campaigns. Ongoing throughout 2017.
5. Awards, prizes and studies/articles/papers
Sponsorship of EUCYS bio-based prize and identify/scope for studies/articles/reporting. Ongoing throughout 2017.

Campaigns

The following campaigns will be executed in 2017.

1. Social media campaigns (one per quarter in 2017) focused on specifically grouped projects along new strategic orientations (SO) in updated SIRA:
 - SO 1: Feedstock

- SO 2: Process
 - SO 3: Products
 - SO 4: Market uptake
2. Priority VIPs – direct public relations approach
 3. Promote the BBI JU 2017 Call for proposals
 4. Promote BBI project results and success stories
 5. Promote programme horizontal activities

Events for 2017 – Q1

BBI JU participates in various roles like organiser, co-organiser, sponsor, moderator and/or sends representatives as speakers or as an exhibitor to raise visibility and awareness to the BBI JU programme objectives. BBI JU will use speaking and exhibition opportunities to have direct contact with priority stakeholders. It will support this with online and printed material and use presentations, recordings and graphics to simplify, explain and reinforce the programme's messages.

Ad hoc opportunities will come up as well. And depending on perceived impact, sufficient availability of resources (human/financial) and adequate timelines, these may be added to the BBI event calendar.

Synergies must be found with events attended/organised by other organisations to fully exploit joint opportunities. This will maximise impact for BBI JU's outreach while achieving the communication goals.

BBI JU's resources for communication actions are limited by both budget and limited dedicated personnel, so these must be employed in the most efficient ways to give maximum return for the organisation.

- **BBI JU Info Day 2017**

In 2017 BBI JU will promote its 2017 Call for proposals with its annual Open Info Day on 28 April 2017 in Brussels. As part of the event there will be a brokerage event in the afternoon and an external organisations exhibition will take place throughout the day. The event will target potential applicants for BBI's 2017 Call for proposals.

- **BBI JU 2017 Stakeholder Forum**

In addition, for the first time in 2017, BBI JU will convene a Stakeholder Forum end Q4 in Brussels. The event – with high-level keynote speakers, a plenary session and participatory workshops, a project showcase/exhibition and a networking event to encourage dialogue with and between stakeholders – will target priority stakeholders identified for priority, proactive and reactive approaches.

- **Other priority events**

BBI JU has identified other key events for 2017 in consultation with its founding members and advisory bodies. It will consider others not included below in light of remaining financial/human resources.

Q1

BBI JU 2017 Call – SRG/NCP Participant preparation workshop (training for NCPs)

Date: Q1 2017

Place: Brussels

World Bio Market (WBM) 2017

Dates: 27 – 28 March

Place: Amsterdam NL

Q2

Member States/Regional Open Info Days

Dates: As advised by Member States/Associated countries

Place: Various

Q3

Bio World Congress

Date: 23-26 July

Place: Montreal, Canada

EUCYS price 2017

Date: 22 - 27 September

Place: Tallinn, Estonia

Q4

EFIB 2017

Date: 9-11 October

Place: Brussels

2.10.2. PROCUREMENT AND CONTRACTS

By the end of 2016 it will be evaluated whether BBI JU wishes to continue using the partnering platform, which allows entities interested in participating in BBI JU calls to identify and contact potential consortium partners. If the outcome of this evaluation is positive, BBI JU will launch by Q1 2017 a negotiated procedure for a mid-value contract.

It also envisaged that the need for procurement for communication activities will grow next year. BBI JU will launch the pertinent public procurement needed to cover all the communications activities not covered by the future Communication framework contract that will be concluded by DG RTD in 2017⁶².

Besides this indicative planning BBI JU may launch other public procurements to cover the needs of the Programme office and Programme implementation. All the information will be published in advance in BBI JU's webpage.

2.10.3. IT AND LOGISTICS

ICT Infrastructure – Migration to Cloud

The BBI JU shares its ICT infrastructure with the other Joint Undertakings located in the White Atrium building. The core of this system has reached the end of its useful life. The JUs agreed to move the servers into the cloud, utilising the current framework contract concluded

⁶² 2016/RTD/OP/PP-04281-2016

with RealDolmen. Their RDCloud solution offers Infrastructure-as-a-Service (IaaS) capabilities. The migration is foreseen for the summer months of 2017 to minimise the impact for the organisation.

ICT Infrastructure – Telephony Service Provider

The European Commission has concluded a framework contract to cover the fixed telephony services. This agreement is available for the Joint Undertakings as well. To align with the other European Union institutions, BBI JU decided to start utilising the services available under this new contract. It is therefore foreseen to replace the current provider with the new one.

Corporate IT Tools – HR Management / SYSPER

The BBI JU applied to participate and has since been accepted in the project covering the roll-out of the Commission’s corporate HR management application suite called “Sysper”. According to the planning the preliminary phase is going to be launched as of January 2017.

Corporate IT Tools – Records Management / ARES

Negotiations with the Commission have started in the context of the roll-out of ARES (the Commission’s records management tool) to the EU Agencies and JUs. If the feedback from the kick-off meeting(s) is positive, the implementation can be foreseen for 2017. Access to this IT tool is essential to be able to guarantee that key information is delivered by and to the European Commission.

Corporate IT Tools – Document Management / Collaboration

The BBI JU has launched a project with the aim of putting in place an integrated document management and internal collaboration platform. The preliminary phase has already started (analysis of business needs, technical platform and contractual requirements), and its adoption is expected for early 2017.

Business Continuity Test

The BBI will conclude its second test in the context of the Business Continuity Plan.

2.10.4. JU EXECUTIVE TEAM – HR MATTERS

Management of the programme office

The Programme Office will continue to implement 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.

Staff implementation

In 2016 BBI JU recruited additional staff, and by beginning of the year 2017 BBI JU will have 21 staff members, of which 13 temporary agents and 8 contract agents, thereby reaching

almost its complete Staff Establishment Plan. One contract agent position remains vacant in order to better allocate this position in 2017 according to the needs.

The total number of staff will remain within the Staff Establishment Plan despite the increased workload.

In order to cope with peak periods of work, BBI JU will recruit interim staff to provide occasional additional support as needed.

Given the success of the first traineeship Programme in 2016, BBI JU will give the opportunity in 2017 to additional trainees to acquire a unique and first-hand experience of the BBI JU and an understanding of its objectives and activities. With these traineeships BBI JU will benefit from the input of enthusiastic graduates, who can give a fresh point of view and up-to-date academic knowledge, which will enhance further the everyday work of the JU.

Administrative/legal matters

In 2017, BBI JU HR function will continue to develop its internal guidelines and strengthen its legal framework, paying particular attention to how EC implementing rules apply to the JU particularities.

In 2017 the HR function will organise the first annual appraisal exercise.

Learning and development opportunities for better efficiency and staff motivation

The BBI JU HR function will continue to develop in 2017 a learning and development policy. The BBI JU values the continuous development of its staff to ensure that they are competent in their roles and can respond to changing requirements. It is also an HR tool to motivate and retain the staff. The JU promotes opportunities for long-term career development where this meets individual and BBI JU needs.

In 2017, the HR function will implement a training impact assessment. The purpose of the training impact assessment consists in evaluating the extent to which knowledge/skills learned through training are individually applied and, ultimately, which is the consequent benefit for the JU and its staff as a whole.

2.10.5. DATA PROTECTION

The BBI JU data protection officer will continue to ensure and apply the data protection legal framework within the Joint Undertaking, as stated in Regulation 45/2001, “The Implementing Rules concerning the Data Protection Officer at the BBI JU” and the EDPS’ “Position Paper on the role of Data Protection Officers in ensuring effective compliance with Regulation (EC) 45/2001”.

In 2017 a specific training will be organised for staff with regard to their own rights and also in relation to the implementation of the accountability principle as requested by the European Data Protection Supervisor (EDPS), in order to effectively respect the fundamental right to data protection of both staff and citizens. BBI JU will ensure the follow-up of guidelines provided by the EDPS, of the Court of Justice of the European Union judgements impacting

the field of data protection in the context of BBI JU's activities, and of any change in the regulatory framework.

BBI JU will continue to participate in the data protection working groups of the EU institutions and bodies for the preparation of the necessary documentation relating to data protection in the framework of Horizon 2020, and, where necessary, further customise it for the BBI JU specificities.

2.11. GOVERNANCE

The Statutes of the Joint Undertaking clearly define the composition, procedures and responsibilities of the governance organs of the BBI JU.

2.11.1. GOVERNING BOARD

BBI JU's Governing Board has overall responsibility for the strategic orientation and the operations of the BBI Joint Undertaking and shall supervise the implementation of its activities in accordance with Article 7 of the Statutes⁶³.

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 2017. In addition, BBI JU sends monthly report and quarterly monitoring reports to keep a continuous information loop.

The key activities of the GB for the 2017 are listed below:

Key activities in 2017 – Timetable	
Approve the Additional Activities Plan 2016	Q1
Approve the Additional Activities Plan 2017	Q1
Adopt the Annual Activity Report 2016 and its assessment by the GB	Q2
Adopt an opinion on the final accounts 2016	Q2
Endorse 2016 Report on Certified Additional Activities	Q2
Approve the list of proposals selected for funding after the evaluation of Call 2017	Q4

⁶³ Annex to the Council Regulation (EU) No 560/2014 of 6 May 2014 establishing the Bio-based Industries Joint Undertaking ("BBI Regulation").

Adopt the AWP and Budget 2018	Q4
Approve the Additional Activities Plan 2018	Q4

2.11.2. 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 September 2016 the Executive Director presented to the Governing his proposals of priorities for the year 2017. The priorities are translated into yearly objectives for BBI JU Programme team and then cascaded into individual objectives for all staff members.

For the year 2016 the priorities and objectives were about building the organisation: the team, its tools, processes and procedure, while managing the grant agreement preparation of Calls 2015.1 and 2015.2 as well as the evaluation of Call 2016. A priority of 2016 was also to build a Communication and stakeholder management strategy while already performing communication activities to promote BBI and its calls.

For 2017, the executive Director and his management team proposed to the GB five priorities:

1. Operate successfully at full speed its operations;
2. Continue to build an effective and well balanced project portfolio;
3. Confirm the Industry commitment in the overall initiative;
4. Reinforce BBI operational excellence thanks to successful reporting and audits;
5. Move BBI JU image from awareness to reputation and recognition by our key stakeholders.

The Executive Director and his management team will cascade these priorities into BBI JU objectives and individual objectives for BBI JU team at the latest end January 2017.

2.11.3. 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 twelve members. It can be composed of no more than fifteen 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 2017 AWP in two stages:

- provision of input to the priorities for AWP2017 and 2018;
- provision of recommendations to the draft of the AWP2017 (including topic texts and budget).

During the year 2017, 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 2017 – Timetable	
<p>6th Meeting of the SC. The SC would:</p> <ul style="list-style-type: none"> - Provide advice on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI will provide information on the main achievements in the implementation of the 2016 annual work plan, participation in the call for proposals and evaluation results of the Call 2016, on-going projects, etc. - Provide advice on the scientific priorities to be addressed in the annual work plan 2018. A consultation will be organised before the SC meeting and the provided input will be discussed, and the advice communicated to the SRG and the funding partners (BIC and EC). 	Q2
<p>7th Meeting of the SC. The SC would:</p> <ul style="list-style-type: none"> - Provide advice on the draft of the Annual Work Plan 2018 - Provide advice on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI will provide information on the 2017 annual work plan implementation, participation in the call for proposals 2017, on-going projects, etc.. 	Q3/Q4

During 2017 it is planned to enlarge the SC to up to 15 members. The selection of the SC members will be advertised through a call for Expressions of Interest and according to the BBI JU rules defining the “Specific Criteria and Selection Process for the Composition of the Scientific Committee”. It is scheduled to involve the new SC members in the consultation process of the AWP 2018.

2.11.4. 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 Joint Undertaking 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 2017 Annual Work Plan in two stages: i) provision of input to the priorities for AWP2017 and 2018, (ii) provision of recommendations to the draft of the AWP2017 (including topic texts and budget).

The SRG also provides information to, and acts as an interface within, the BBI Joint Undertaking 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 2017, 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 2017 – Timetable	
<p>6th Meeting of the SRG. The SRG would:</p> <ul style="list-style-type: none"> - Election of a Vice-Chair (the 2 years election period of one of the current Vice-chair finishes on February 2017). - Provide recommendations on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI will provide information on the main achievements in the implementation of the 2016 AWP, participation in the call for proposals and evaluation results of the Call 2016, on-going projects, 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 questionnaire on national activities which will be updated. - 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. 	Q1/Q2
<p>7th Meeting of the SRG. The SRG would:</p> <ul style="list-style-type: none"> - Provide an opinion on the 2018 draft AWP - Issue recommendations on the BBI JU programme progress and achievement of targets and other strategic issues. The BBI will provide information on the 2017 annual work plan implementation, participation in the 	Q3/Q4

<p>call for proposals 2017, on-going projects, etc.</p> <p>- 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.</p>	
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2.12. INTERNAL CONTROL FRAMEWORK

BBI JU adopted in September 2015 its internal control framework in order to provide reasonable assurance to the Governing Board regarding the achievement of its objectives. This framework involves all the measures taken to 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 and avoiding misuse.
- Legal and regulatory requirements are met. BBI JU operates in full accordance with all legal and regulatory requirements.
- 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.
- 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. Main activities that will be performed in 2017 include the following:

- Ensure awareness and implementation of BBI JU Internal Control System (ICS) through yearly assessment;
- Report on compliance and effectiveness 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;
- 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.

In 2017 the focus will be put on a limited review of BBI JU ICS in cooperation with the Internal Audit Service. The aim will be to provide a higher degree of maturity of the system. Control gaps shall be detected and remediated timely; formal process documentation has been initiated and shall be completed; greater reliance shall be put on prevention versus detection controls; strong self-assessment of operating effectiveness by process owners will be promoted.

2.12.1. FINANCIAL PROCEDURES

The BBI JU has adopted and enforced a Manual of Financial Procedures as a requirement for its autonomy, which was provided in October 2015. These procedures have been revised in the course of 2016 in the light of EC DG Budget guidelines and better taking into account the risks and the specificities of the JU.

BBI JU will continue in 2017 to consolidate and improve its financial procedures, both on the administration and grant management side. For what concerns the implementation of the administrative budget, improved business procedures will be put in place in order to maximise the efficiency of financial performance and in order to provide consolidate rules.

For what concerns the financial procedures related to grant management, while some of the processes are managed via Horizon 2020 corporate tools, others remain to be dealt with via ABAC. While on one side it is important to provide training to staff on how to use the common IT tools, at the same time it is important to maintain and improve competence in processing complex transactions via ABAC. This will be done through specific trainings provided by DG Budget and DG RTD.

Staff needs also to be trained on guarantee fund operations – still not dealt with by SYGMA-COMPASS – which might impact heavily the project progress and are particularly complex and delicate.

A strong link between the Administration and finance unit and the programme unit will be established in order to ensure common understanding and implementation of financial rules of Horizon 2020 grants, in line with the practices of the DG RTD Common Support Centre.

2.12.2. EX-ANTE AND EX-POST CONTROLS

Ex-ante controls are those controls carried out before a payment is released and are performed by the Programme Office Unit and by the Administration and Finance Unit, while ex-post controls are those carried out after payments, mainly through audits.

Ex-ante controls:

Ex-ante controls are essential to prevent errors and avoid the need for ex-post corrective actions. Therefore the main objective of ex ante controls is to ascertain that the principle of sound financial management has been applied. Ex-ante controls will be implemented by BBI JU in the context of the Horizon 2020 ex-ante control strategy as approved by the Common Support Centre by the end of 2016. In order to enforce ex-ante controls, desk reviews are performed by BB JU Programme Office; mid-term reviews are carried out by external experts and ad-hoc technical reviews are launched when deemed necessary. BBI JU will develop internal procedures defining the ex-ante controls to be performed and taking into account risk-based and cost-effectiveness considerations.

During 2017, the Programme Office will continue to apply these procedures to its day to day activities of initiation, verification and payments of invoices and cost claims, creation of commitments, recovery orders, validation of financial and technical reports. These activities will be conducted in a timely manner that will be monitored through the defined set of KPIs, in particular, the time to pay, and work plan execution. Further training on financial verification will be provided to staff in order to add at least one financial verification function

to the team. For the operational expenditure BBI JU will align to the common ex-ante control strategy for interim and final payments in Horizon 2020 as approved by DG RTD Common Support Centre steering board by the end of 2016.

Ex-post controls:

Ex-post controls on operational expenditures are implemented through the Ex-Post Audit process. The main objectives of the ex-post audits are:

1. ensure the legality and regularity of the validation of cost claims performed by the Programme Unit;
2. provide an adequate indication on the effectiveness of the related ex-ante controls;
3. provide the basis for corrective and recovery activities, if necessary.

The Horizon 2020 Audit Strategy defines how the ex-post audits are to be carried out. The implementation of the Horizon 2020 Audit Strategy will be the responsibility of the Common Audit Service (CAS). The CAS serves the Horizon 2020 implementing entities like the BBI JU and strives 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.

For BBI JU the priority actions for 2017 are:

- to ensure a smooth launch of the first batch of ex-post Audit in BBI JU projects (target date May 2017);
- to ensure implementation of audit findings, the correction or recovery of funds unduly paid. Errors of a systematic nature will also be extended to cover unaudited financial statements of the same participants.

2.12.3. AUDITS

The audit environment is an assurance and 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.

The Internal Control and Audit Manager will coordinate the internal support given to the audits carried out by the internal audit service (IAS) and by the Court of Auditors (ECA) and will follow up and assess the implementation of the relevant recommendations with the objective to confirm their effective implementation.

The IAS will continue performing internal audit function and implement the Strategic Internal Audit Plan 2017-2019. Internal audit engagement in 2017 will focus on a limited review of the Internal Control Standards of BBI JU.

In parallel, during the year 2017, the Internal Control and Audit Manager will coordinate and support audit visits of the Court of Auditors and of the appointed external auditors and contribute to the overall corporate objective of receiving a positive statement of assurance. ECA will audit and issue opinions on the reliability of BBI JU 2016 annual accounts as well as the legality and regularity of the underlying transactions.



The Internal Control and Audit Manager will continue to examine and evaluate risk management, control and governance processes of the BBI JU in order to provide the Executive Director with independent assessment and advice aimed to add value and improve BBI JU operations. Priority is given to management support and advice throughout discharge process.

3. BUDGET 2017^{64,65}

3.1. BUDGET INFORMATION

Below is the draft budget for 2017. Please note that this 2017 BBI JU Budget is subject to the adoption of the EU General Budget for 2017 and may be updated accordingly. All figures are draft. Please see also the notes below each of the statements.

I - Statement of revenue⁶⁶:

Heading	Budget 2017 Commitment appropriations (in €)	Budget 2017 Payment appropriations (in €)	(Amended) Budget 2016 Commitment appropriations (in €)	(Amended) Budget 2015 Commitment Appropriations (in €)	Comments on 2017 figures
EU contribution (excl. EFTA)	81,174,465	69,172,903	158,082,500	201,908,289	
of which Administrative	2,285,155	2,285,155	1,946,263	1,412,372	Council regulation of 6 May 2014 establishing the Bio-Based Industries Joint Undertaking
of which Operational	78,889,310	66,887,748	156,136,237	200,495,917	Council regulation of 6 May 2014 establishing the Bio-Based Industries Joint Undertaking
EFTA contribution¹	1,980,657	1,687,819	4,315,652	5,941,622	
of which Administrative	55,758	55,758	53,133	47,042	Council regulation of 6 May 2014 establishing the Bio-Based Industries Joint Undertaking

⁶⁴ Subject to the availability of the appropriations provided for in the Union draft budget for 2017 after the adoption of the budget for 2017 by the budgetary authority, or if the budget is not adopted as provided for in the system of provisional twelfths.

⁶⁵ Subject to the adoption of the European Commission Financing Decision for the Bio-based Industries Joint Undertaking for 2017.

⁶⁶ The estimated amount related to the expert evaluators is included in the JU's Budget (in Revenue and in Expenditure chapter 28), but the BBI JU will not request the EU to transfer this amount in its Accrual Based Accounting system, since the contracting and payment of expert evaluators will be managed by the REA.

of which Operational	1,924,899	1,632,061	4,262,519	5,894,580	<i>Council regulation of 6 May 2014 establishing the Bio-Based Industries Joint Undertaking</i>
Industry (cash) contribution	3,115,280	3,365,280	2,943,315	1,572,886	
of which Administrative (incl. 3/6 compensation for 2014) ²	2,615,280	2,615,280	2,193,315	1,572,886	<i>Council regulation of 6 May 2014 establishing the Bio-Based Industries Joint Undertaking</i>
of which Operational ³	500,000	750,000	750,000	0	<i>Council regulation of 6 May 2014 establishing the Bio-Based Industries Joint Undertaking</i>
Re-entered appropriations from previous years	6,150,657	2,028,920	28,954,403	0	
of which administrative ⁴	1,700,000	1,700,000		0	
of which operational ⁵	4,450,657	328,920	27,846,292	0	
TOTAL REVENUES	92,421,059	76,254,922	194,295,870	209,422,797	

1. EFTA = 2.44% of EU contribution (excl. EFTA) for 2017
2. In 2014 only the Union contributed to the BBI JU administrative costs (581,758€). In 2015 an agreement was drawn up on the basis of which BIC (the members of the BBI JU other than the Union) agreed to reimburse the same amount in agreed annual instalments from 2015 to 2017. In 2017 this amount is reimbursed in full.
3. BIC's financial contribution to BBI JU 2017 appropriations for operational expenditure. The commitment appropriations are for the 2017 call, and the payment appropriations relate to the 2016 call contribution.
4. Prudent estimate of year-end surplus of administrative appropriations to be reactivated in 2017 as C2 appropriations via a budgetary amendment. As this estimate is not yet allocated across all the different budget chapters, the comparison between the 2017 and amended 2016 figures is distorted (as the 2016 budget includes the additional prior year C2 reactivated appropriations at the level of individual budget chapters). The same is true for the statement of expenditure.
5. Estimate of year-end surplus of operational appropriations to be reactivated in 2017 as C2 appropriations via a budgetary amendment, and composed of the following:

Commitment appropriations

Call 2015.1	258,765.37
Call 2015.2	1,094,757.18
Call 2016	<u>3,097,133.96</u>

4,450,656.51

Payment appropriations

Call 2014 (payment appropriations for operational expenditure of 2015)

328,920.00

II - Statement of expenditure

Title Chapter	Heading	Budget 2017 Commitment appropriations (in €)	Budget 2017 Payment appropriations (in €)	(Amended) Budget 2016 Commitment appropriations (in €)	(Amended) Budget 2016 Payment appropriations (in €)	(Amended) Budget 2015 Commitment appropriations (in €)	Comments on 2017 figures
1	Staff Expenditure	2,868,192	2,868,192	3,357,069	3,403,334	1,500,100	
1 1	Staff in active employment	2,544,200	2,544,200	2,966,572	2,978,572	1,243,200	Amongst which: basic salaries, family allowances, expatriation, insurances against sickness/accidents and occupational diseases for Temporary and Contractual agents; annual travel costs from the place of employment to the place of origin; SLA with PMO for administrative services
1 2	Staff recruitment / Miscellaneous expenditure	51,200	51,200	160,739	165,892	158,300	Amongst which: costs to cover potential replacement. All BBI staff establishment plan recruitment was completed in 2016
1 3	Mission and duty travels	95,000	95,000	168,798	171,565	60,000	Amongst which: mission expenses, duty travel expenses and other ancillary expenditure
1 4	Other staff costs (socio-medical structure)	167,792	167,792	52,960	78,853	33,600	Amongst which: medical services; mobility costs and other social expenses; training expenses
1 5	Entertainment and representation expenses	10,000	10,000	8,000	8,452	5,000	Amongst which: costs incurred by authorised staff in meeting the JU's obligations in respect of representation in the interests of the service
2	Other administrative expenditure	2,088,001	2,088,001	1,943,753	2,002,016	1,532,200	
2 0	Rental of buildings and associated costs	307,001	307,001	314,178	314,178	263,000	Amongst which: rent; provisions for charges
2 1	Administrative information technology	223,100	223,100	156,155	195,932	158,300	Amongst which: hardware purchases; software development & purchases; day-to-day maintenance;

							sTesta connection; various ABAC fees; printer-related expenses
2 2	Movable property and associated costs	14,000	14,000	55,099	55,099	25,000	Amongst which: purchase / maintenance of office equipment
2 3	Current administrative expenditure	42,000	42,000	28,889	42,524	16,100	Amongst which: Stationery and office supplies; petty expenditure; documentation and library expenditure, subscriptions;
2 4	Telecommunication s and postal charges	9,000	9,000	24,588	28,500	9,700	Amongst which: postage, telephones, internet and mobile communication expenses
2 5	Expenditure on formal meetings	115,700	115,700	170,388	147,921	100,300	Amongst which: Governing Boards, SRG meetings, SC meetings
2 6	External communication, information, publicity	525,000	525,000	356,445	379,153	190,000	Amongst which: all communication costs of the JU including the Stakeholder Forum
2 7	Service contracts/studies	100,000	100,000	110,000	110,000	10,000	Amongst which: ex-post audit costs, studies and consultancy
2 8	Experts contracts and evaluations	668,300 ⁶⁷	668,300 ⁶⁸	728,011	728,709	759,800	Amongst which: All expert and meeting costs for evaluations and project reviews
2 9	Expert reviewers	83,900	83,900				Amongst which: experts used to carry out projects' mid-term (technical) reviews
3	Operational expenditure	81,314,209	69,269,809	188,995,048	61,790,837	206,390,497	Amongst which: all operational costs of the JU
3 0	Previous years' calls		69,269,809		61,790,837		
3 1	Addition to call 2015.2			341,071			
3 2	Call 2016			188,653,977			
3 3	Call 2017	81,314,209					

⁶⁷ This is an indicative amount – which the BBI JU will not request the EU to transfer in its Accrual Based Accounting system – and there may be either reflows of unused appropriations transferred back to the BBI JU (to be then implemented by the BBI JU) or additional appropriations transferred by RTD to REA on behalf of the BBI JU (to be then implemented by REA) – in case the real needs are lower or higher than the estimated amount respectively. This will not result in any change of the total BBI JU budget and compensation of under/overused appropriations will be made through other parts of the BBI JU budget.

⁶⁸ This is an indicative amount – which the BBI JU will not request the EU to transfer in its Accrual Based Accounting system – and there may be either reflows of unused appropriations transferred back to the BBI JU (to be then implemented by the BBI JU) or additional appropriations transferred by RTD to REA on behalf of the BBI JU (to be then implemented by REA) – in case the real needs are lower or higher than the estimated amount respectively. This will not result in any change of the total BBI JU budget and compensation of under/overused appropriations will be made through other parts of the BBI JU budget.

4	Re-entered appropriations from previous years	6,150,657	2,028,920			0	
4 0	of which administrative 4	1,700,000	1,700,000				
4 1	of which operational 5	4,450,657	328,920				
	EXPENDITURE	92,421,059	76,254,922	194,295,870	67,196,187	209,422,797	

3.2. STAFF ESTABLISHMENT PLAN

Function group and grade	2017			
	Request of the Joint Undertaking		Draft Budget Request	
	Permanent posts	Temporary Posts	Permanent posts	Temporary Posts
AD 16				
AD 15				
AD 14		1		1
AD 13		1		1
AD 12				
AD 11		2		2
AD 10		2		2
AD 9				
AD 8		2		2
AD 7		2		2
AD 6				
AD 5				
AD total		10		10
AST 11				
AST 10				
AST 9				
AST 8				

Function group and grade	2017			
	Request of the Joint Undertaking		Draft Budget Request	
	Permanent posts	Temporary Posts	Permanent posts	Temporary Posts
AST 7		3		3
AST 6				
AST 5				
AST 4				
AST 3				
AST 2				
AST 1				
AST total		3		3
AST/SC 6				
AST/SC 5				
AST/SC 4				
AST/SC 3				
AST/SC 2				
AST/SC 1				
AST/SC total				
TOTAL		13		13
GRAND TOTAL		13		13

Staff resources also include 5 GF IV and 4 GF III contract agents.

4. LIST OF ACRONYMS

AWP	Annual Work Plan
BBI JU	Bio-Based Industries Joint Undertaking
BIC	Bio-based Industries Consortium
CAS	Common Audit Service
EC	European Commission
ECA	European Court of Auditors
EDPS	European Data Protection Supervisor
GB	Governing Board of the BBI JU
IAS	Internal Audit Service
NCPs	National Contact Points

SC	Scientific Committee of the BBI JU
SIRA	Strategic Innovation and Research Agenda
SRG	State Representatives Group
SMEs	Small and medium-sized enterprises