

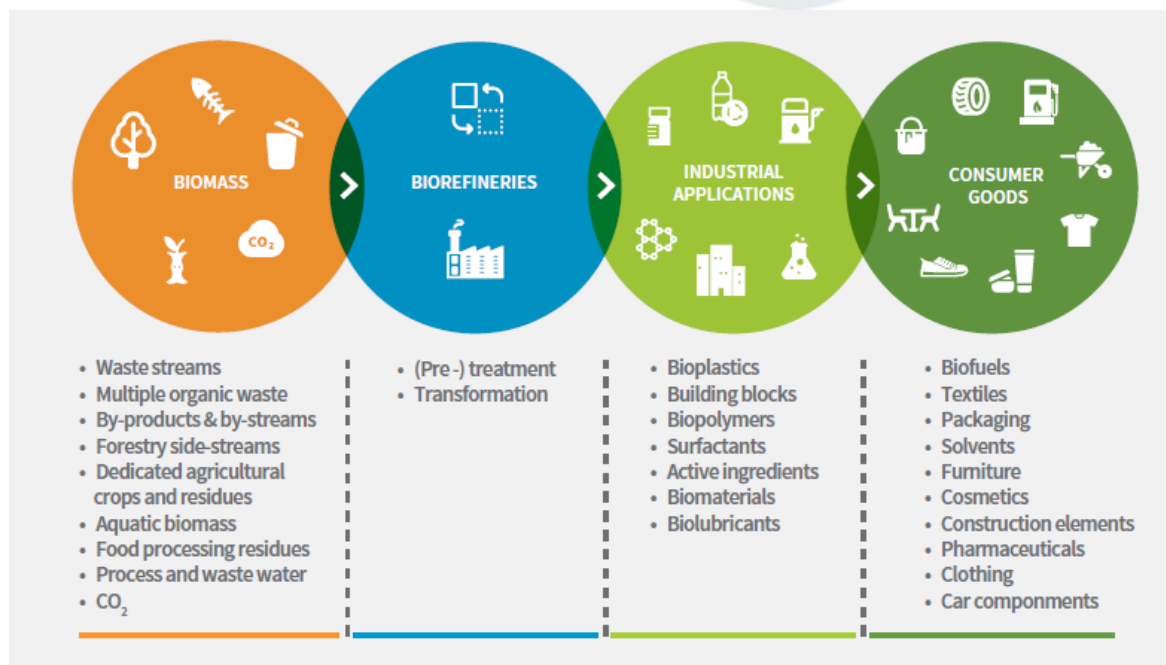
The BBI JU – An Institutional PPP supporting the Bioeconomy Strategy

A unique Joint Undertaking

In view of the move towards a post-petroleum society, the European strategy "Innovating for Sustainable Growth: A Bioeconomy for Europe (2012)"¹ calls for a bioeconomy as a key element for smart and green growth in Europe. The strategy aims to integrate 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. To make this happen the European Commission (EC) and the Bio-based Industries Consortium (BIC)² joined forces in the **Bio-Based Industries Joint Undertaking (BBI JU)**³ to keep investments in Europe and to deploy and create new markets for sustainable bio-based products such as bio-chemicals, materials and fuels. Innovative technologies and advanced⁴ biorefineries are at the heart of the bio-based economy concept, transforming biomass and wastes into green everyday products. De-risking this emerging but fragmented industrial sector, together with supporting the high costs for demonstration and deployment activities, are key drivers for this public-private intervention.

The BBI JU aims to **invest € 3.7 billion** in bio-based innovation between 2014 and 2020: € 975 million have been committed by the European Commission and € 2.7 billion by the private sector organised in BIC, guaranteeing a minimum of 1/2,8 public/private investment leverage upfront.

The BBI JU implements the Strategic Innovation and Research Agenda (SIRA)⁵ developed by BIC. The BBI JU invests in projects such as Research & Innovation Actions (RIAs), demonstration (demo), pre-commercial flagship projects and Coordination and Support Actions (CSAs). These types of actions are defined in annual Calls for Proposals, and are implemented across European regions (even beyond EU28). In line with Horizon 2020 rules, all stakeholders are invited to submit innovative proposals based on life cycle analyses (LCAs) and demonstrate progress beyond state-of-the-art.



1 <http://ec.europa.eu/research/bioeconomy/index.cfm?pg=policy&lib=strategy>

2 BIC represents the private sector, its members cover the entire bio-based value chain and consist of large industries, small and medium-sized enterprises (SMEs) and regional SME clusters. Associate members comprise Universities and RTOs, European trade associations, and European Technology Platforms.

3 More info about this Public-Private Partnership: <https://www.bbi-europe.eu>

4 Europe is gradually shifting the feedstock base to non-edible biomass.

5 <http://biconsortium.eu/about/our-vision-strategy>

Current and future impacts of the BBI JU⁶

Since 2014 BBI JU has substantially contributed to building the European bio-based economy sector

- **True innovation:** after the first 3 years, already 65 projects - including 20 demos and 6 flagships are running with a total of 729 participants from 30 countries for a total grant of € 414 million public funding and € 2.15 billion of private contribution announced by beneficiaries.
- **High mobilisation of SMEs:** 36% of current beneficiaries are SMEs (the Horizon 2020 target for e.g. the Societal Challenges being 20%). This level of participation results in a 29% share of BBI funding. SMEs provide valuable support to large industrial players as technology developers in tight cooperation with Research & Technology Organizations (RTOs). Bioreactor design, process optimisation, new biocatalysts for biomass processing, are some examples of areas where SMEs are deeply involved.
- **Leveraging public funding by at least factor 4.** Already today, for every euro of public funding BBI JU expects to leverage € 4,4 of private financial contributions: in the first 3 years, bio-based industries have reported € 192 million in-kind operational project contributions and € 1.95 billion of additional activities, which is well above the promised investments.

Bridging the gap between research and market: expected outputs by 2020 (from projects launched so far) are well above expectations

- **82 new or optimised bio-based value chains:** new or multi-feedstock, improved process technologies, new products or improved supply chain management.
- **46 new bio-based chemical building blocks** based on biomass from European origin: replacing fossil-based feedstock, improved environmental, economic and/or product performance.
- **106 new bio-based materials** such as breakthrough chemicals, fuels, fertilisers, fibres, plastics, bioactive ingredients and proteins.
- **47 new bio-based consumer products** based on bio-based chemicals.
- **146 new cross-sector interconnections proving that BBI JU is organizing partners along the value chains:** food & feed additives; agriculture; energy; forestry; packaging; health-, home & personal care; paper & pulp; automotive; pharmaceutical; textiles; construction; and the aquatic sector.
- **36 cooperation projects** through cross-industry clusters, creating new ecosystems by connecting parties that have never collaborated before.

BBI JU projects excel on both science and innovation, creating new economic activities.

BBI JU strategic ambitions for the bio-based economy by 2030⁷

- Reindustrialise Europe by creating a rural infrastructure for biomass production, mobilisation and processing in biorefineries, thus regenerating underdeveloped and/or abandoned regions
- Diversify & grow farmers' revenues
- Create 700.000 jobs on all levels of which 80% in rural and currently underdeveloped areas
- Increase biomass supply in Europe by 20% by increasing productivity and sustainable mobilisation
- Boost the mobilisation and valorisation of 25% of unused sources (by-products and biowaste), pursuing 'zero-waste' bio-based operations with subsequent closure of the biocycles
- Replace 30% of fossil-based chemicals & materials production in Europe
- Meet 6% of Europe's transport energy demand by sustainable advanced biofuels⁸
- Support the European market for bio-based fibres and polymers such as viscose, carbon fibres, nano-cellulose derivatives and bioplastics to grow rapidly
- Reduce EU dependency on imports of fossil-based raw materials, protein, phosphate and potash
- Reduce greenhouse gas emissions (GHG) of new BBI JU bio-based products on average by at least 50% compared to their fossil alternatives.

⁶ Results based on data reported by project coordinators in response to the BBI JU survey on KPIs organized in November 2016 and survey on socio-economic impact in January 2017.

⁷ The BIC Strategic Innovation Research Agenda (developed in 2013 and updated in 2017) sets ambitious long-term objectives for the bio-based economy <http://biconsortium.eu/about/our-vision-strategy/sira>

⁸ Together with an 50 % overall improvement in road transport system efficiency

Socio-economic impact: jobs & growth, reindustrialization, environment, market

Green growth for Europe: turnover and jobs

Europe's bioeconomy employs 18,3 million people, and has an annual turnover of € 2,3 trillion⁹. Bio-based industries contribute with a € 674 billion turnover and 3,3 million employees. Innovative and forward-looking sectors, such as industrial biotechnology, already contribute to the EU economy with approximately 500.000 jobs and € 30 billion¹⁰, a 1:4 job multiplier and significant growth rate foreseen until 2030. The first BBI JU calls have resulted in new cross-sectoral and industry-academia collaborations, increased cooperation across regions and countries, knowledge creation, technology transfer and increased industrial competitiveness. BBI JU flagship and demo projects help to keep new knowledge and innovation in Europe, boosting investments, growth and job creation.

Reindustrialisation and development of rural areas

Industry participates massively in BBI JU projects. Via its demo and flagship projects, BBI JU not only supports deployment, but also keeps investments in Europe and attracts investments in innovation from outside the EU. BIC's annual surveys show that its members had 2 billion euro investments in Europe in the pipeline in 2015 and up to 4 billion in 2016, demonstrating that the EU is back on the map, encouraging investment in bio-based industries. Biorefineries have to be close to their sources of biomass to be sustainable and economically viable. Setting up supply chains for biomass and networks of local and regional biorefineries creates new jobs and sources of revenue for local communities. Thanks to BBI JU investments, abandoned brownfields are reconverted and rural development is stimulated with new jobs for primary producers and process industries (see examples on p.4).

Environment - Towards a Circular and Low Carbon Economy

Several BBI JU projects have been launched that transform organic and Municipal Solid Waste and side-streams from the food industry into new bio-based products¹¹. Bio-based streams are part of the Circular Economy, but the Bio-based Economy itself goes far beyond the concept of Circular Economy¹², producing new chemicals, building-blocks and polymers with new functionalities. Bio-based industries make production processes more resource-efficient and environmentally friendly, and develop sustainable and competitive bio-based products and biofuels with lower GHG emissions and reduced energy consumption. Broader use of biorefineries will reduce the dependence on fossil resources and contribute to Europe's climate change targets for 2020 and move towards a competitive low-carbon economy in 2050.

Creating new markets - Brands implementing bio-based products

One of the strategic pillars of the BBI JU approach is to create and accelerate market uptake of bio-based products. Bio-based industries are increasingly engaging with brand owners in projects. This direct involvement is key to develop new applications for bio-based products that are appreciated by consumers and results in a market pull and shortens time to market for innovative bio-based products.

Creating investment opportunities by involving the regions - Synergies between financial instruments

BIC has reached out to European regions to exchange information and explore synergies and opportunities for joint financing and deployment of new bio-based value chains. BIC has partnerships¹³ with EIP-AGRI, ERRIN, and the Vanguard Initiative, and is engaged with 6 model demonstrator regions for sustainable chemistry and 8 Polish bioregions. BIC developed guidelines on synergies between ESIF and H2020 funding¹⁴ and invited the regions to showcase their specific bioeconomy.

Recently, the European Investment Bank (EIB) and the EC have agreed a set of actions aimed at facilitating access to finance for the Circular Economy and Bioeconomy sectors in Europe.¹⁵

⁹ Nova-Institute/BIC/BBI JU reporting 2017, based on 2014 Eurostat numbers

¹⁰ <http://www.europabio.org/sites/default/files/Full%20report%20for%20print%20%20under%20embargo%20until%2027%20September.pdf>

¹¹ The BBI projects can be found at <https://www.bbi-europe.eu/projects>

¹² <http://news.bio-based.eu/two-new-graphics-on-bio-based-and-circular-economy/>

¹³ <http://biconsortium.eu/about/our-partners>

¹⁴ http://biconsortium.eu/sites/biconsortium.eu/files/downloads/Guidelines_BBI-ESIF-Final.pdf

¹⁵ http://www.eib.org/attachments/pj/access_to_finance_study_on_bioeconomy_en.pdf

Some examples¹⁶ of BBI JU flagships

First2Run: Flagship demonstration of an integrated biorefinery for dry crops sustainable exploitation towards bio-based materials production – an agro-based value chain <http://www.first2run.eu>

The First2run project will demonstrate the environmental sustainability and economic profitability of an integrated biorefinery, namely the reconversion of the Porto Torres (Sardinia, Italy) petrochemical site into a biorefinery with an integrated production chain for chemical intermediates that are building blocks for high added value bioproducts (biolubricants, cosmetics, bioplastics, additives). The biorefinery will valorise every fraction (cascading use of biomass) of a low input and underutilised oil crop (i.e. cardoon, a thistle) grown in arid and/or marginal lands, not in competition with food or feed, to produce biochemicals and animal feed. The project estimates the creation of 60 new skilled jobs for every kton of produced bioplastics, taking into account the whole value chain, from agriculture to the end life of the final products.



BIOSKOH: Innovation Stepping Stones for a novel European Second Generation BioEconomy – a lignocellulose-based value chain <http://bioskoh.eu/>

The BIOSKOH project will demonstrate the first of a series of new second generation (2G) bio-refineries for Europe that are sustainable and financially sound. The project has identified four 'Innovation Stepping Stones' that will allow a breakthrough in the techno-economic viability of lignocellulosic bio-refineries, delivering a biomass to ethanol yield 15 – 20% higher than current state of the art processing. The project will transform an abandoned brownfield industrial site in eastern Slovakia. In addition, it will seek energy autonomy, converting side-streams into renewable energy that will make the bio-refinery self-sufficient in energy. Feedstock will be abundant, secure, ILUC¹⁷-free, low-cost biomass such as agricultural residues from conventional lands in combination with dedicated energy crops grown on marginal land, creating opportunities to farmers by introducing innovative ways to use biomass. Ultimately, BIOSKOH seeks to demonstrate that second generation bio-ethanol can be produced at a lower and more economically viable price with additional potential for further cost reduction in the current market context. It anticipates the creation of an estimated 160 direct and 500 indirect jobs.



EXILVA: Flagship demonstration of an integrated plant towards large scale supply and market assessment of microfibrillated cellulose – a forest-based value chain <http://www.h2020-exilva.com>

Microfibrillated cellulose (MFC) is a revolutionary product, with potential in a huge range of applications, including personal care, cosmetics, home care, pharmaceutical excipients, adhesives and sealants, composites and resins, agricultural chemicals, oil field, fish, bait, concrete, and CO₂ capture. It also has the potential to replace many fossil fuel-based products. However, commercialisation of MFC has proved challenging, particularly making industrial quantities with sufficient running efficiency and stability. In addition, drying the MFC fibres in a cost effectively manner without losing significant performance is a major challenge. The EXILVA project sets out to change this, by transferring technology from the existing pilot production in Sarpsborg, Norway, and eventually scaling up to commercial levels, setting up and running the first industrial scale plant for producing MFC.



About the Bio-based Industries Consortium

BIC represents a unique mix of sectors, including agriculture/aquaculture, agri-food, biotechnology/technology providers, forestry/pulp and paper, chemicals, energy and end-users. www.biconsortium.eu

¹⁶ More success stories: http://biconsortium.eu/sites/biconsortium.eu/files/downloads/BIC_Success_Stories_20170117-light.pdf

¹⁷ Indirect land use change impacts of biofuels