Bioeconomy and the UN Sustainable Development Goals

A view from the Bio-based Industries Consortium – July 2018

The United Nations Sustainable Development Goals (SDGs) aim to tackle global challenges related to social, economic and environmental aspects. In November 2016, the European Commission published its Communication on "Next Steps for a sustainable European future" as a first step towards the implementation of the SDGs in the EU.

Research and Innovation (R&I) are expected to make a bigger contribution to achieving EU policy priorities in the future, in particular for the SDGs. The circular bioeconomy can bring huge opportunities in achieving the SDGs if managed sustainably and policy coherence is achieved.

This paper provides a summary, examples and an outlook on the contribution of the Bio-Based Industries to the SDGs.

Strong link between the SDGs, the bioeconomy and the Bio-Based Industries

As global goals for people and planet, the SDGs provide a powerful aspiration for improving our world — laying out where we collectively need to go and how to get there. Fulfilling the SDG ambitions will take an unprecedented effort by all sectors in society — and business has to play a very important role in the process.[1]

The bioeconomy is at the centre of sustainable development strategies worldwide and contributes to many SDGs[2]. One of the bioeconomy stakeholders in the EU is the Bio-based Industries Consortium (BIC), representing the private sector in a Public-Private Partnership with the European Union since 2014, known as the Bio-Based Industries Joint Undertaking[3] (BBI JU), which kick-started the European bioeconomy by supporting innovative bio-based demonstration and flagship projects.

The BBI JU is an example of SDG 17 "Partnerships for the Goals", where industry works alongside the public sector to develop more integrated solutions to global challenges. The BBI JU is dedicated to enabling and mobilizing the different bioeconomy stakeholders along cross-sectorial value chains to develop innovative bio-based solutions and bring sustainable alternatives to fossil-based products to the market.

In our view, BBI JU projects currently contribute through breakthrough innovation of sustainable bio-based products and processes to SDGs 2, 3, 6, 7, 8, 9, 11, 12, 13, 14 and 15. Several BBI JU projects contribute to more than one SDG and, vice versa, for each SDG there are many project examples. By way of illustration, we provide one example per SDG.

SDG 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture[1] – A sustainable bioeconomy can contribute to sustainable yield increase, investments in agriculture, improved food and nutrition security.[4]

BBI JU project: GreenProtein Innovation action - Demonstration, 2016-2021, coordinated by Provalor (The Netherlands)
Relevance to this SDG: The GreenProtein project contributes to overcoming the European scarcity of high-quality protein for human consumption by producing high-added value, food-grade and fully functional proteins and other food ingredients, out of vegetable residues from the packed salad processing. The GreenProtein project aims to process 1000 kg/h of green residue raw material into 128 kg of protein gel per hour. The protein gel has many valuable food industry applications such as gelling, foaming and emulsifying, with excellent market projection in growing markets such as high protein, vegan and halal foodstuff.

SDG 3: Ensure healthy lives and promote well-being for all at all ages[1] – The bioeconomy can contribute by reducing air, water and soil pollution with hazardous fossil-based products and by developing biopharma and functional foods.[4]

BBI JU project: SUSBIND; Research & Innovation action 2018-2022, coordinated by RTDS (Austria)
Relevance to this SDG: SUSBIND will develop novel bio-based binders as an alternative to fossil-based binders currently used in the production of wood-based panel board.

[1] https://www.unglobalcompact.org/sdgs/about
[2] UN Paper on SDG and bioeconomy
[3] https://www.bbi-europe.eu
[4] Presentation Olivier Dubois, FAO. http://www.norden.lv/Uploads/2017/03/10/1489139587_.pdf

The wood board industry currently relies on the use of fossil-based binders, mainly formaldehyde-based binders. Upcoming regulations foresee reduced formaldehyde emissions or its elimination from furniture due to its effects on indoor air-quality.

SDG 6: Ensure access to water and sanitation for all[1] – Cleaner water and reduced uses through the use of sewage water to produce bioenergy and bio-based materials.[4]

BBI JU project: AFTERLIFE; Research & Innovation action 2017-2021, coordinated by Eggplant Srl (Italy)
Relevance to this SDG: AFTERLIFE proposes a flexible, cost- and resource-efficient process for recovering and valorising the relevant fractions from wastewater. The AFTERLIFE process will separate out the different components of value using a series of membrane filtration units that will separate all the solids in the wastewater. These will then be treated to obtain high-pure extracts and metabolites or, alternatively, to be converted into value-added biopolymers; polyhydroxyalkanoates (PHAs). In addition to the value extracted from the solids, the remaining outflow of the water will be ultra pure and ready for re-use.

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all[1] – Bioenergy to improve access to modern energy services and reduce the use of fossil fuels, in particular in the transport sector.[4]

BBI JU project: BIOSKOH; Innovation action – Flagship, 2016-2021, coordinated by Energochemica Trading (Slovakia)
Relevance to this SDG: BIOSKOH uses lignocellulosic biomass from agri-forest residues and dedicated crop cultures to produce second generation bioethanol to be used as transport fuel, thereby increasing the share of renewable energy and helping to meet European biofuel mandates without interfering with the food chain. The plant, located in a rural area of Slovakia, helps the local economy by making use of a dismissed industrial facility and giving farmers an option for diversifying their cultures on lands with low productivity.

SDG 8: Promote inclusive and sustainable economic growth, employment and decent work for all[1] – Opportunities for more jobs and additional income – contributing to local economy, and to export value-added bio-based products.[4]

BBI JU project: First2Run; Innovation action – Flagship, 2015-2019, coordinated by Novamont (Italy)
Relevance to this SDG: First2Run, based in a rural area of Sardinia, uses feedstock from responsibly sourced indigenous crop (cardoon), cultivated on unproductive land, to produce monomers for bioplastics, cosmetics, lubricants, fertilisers, herbicides and animal feed. The project has established a local value chain involving farmers as biomass suppliers and as end-users of fertilisers, herbicides and animal feed. It has also refurbished an abandoned petrochemical plant as biorefinery. It is estimated that around 600 jobs will be directly and indirectly created by the project in an area with a high unemployment rate due to the progressive marginalisation of fields and shutdown of the petrochemical plant.

SDG 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation[1] – Industrial technologies as growth factor for bio-based industry and stimulator of innovations.[4]

BBI JU project: SWEETWOODS; Innovation action – Flagship 2018-2022, coordinated by Graanul Biotech (Estonia)

Relevance to this SDG: SWEETWOODS will establish a completely unique wood fractionation flagship plant demonstrating several new-value chains to convert currently poorly valorized hardwood residues into high purity intermediate building blocks of cellulosic sugars and high-quality lignin. These wood-based materials can be used to replace fossil-based materials in various everyday applications: biocomposites, bio-based foams, coatings, biochemicals and biofuels. The establishment of this wood fractionation plant in Estonia opens an avenue to a diversity of new industrial intermediates and end-use applications. The flagship plant modular design allows smaller economy of scale, minimized regional environmental impact and sustainable resource use while supporting regional development and employment.

SDG 11: Make cities inclusive, safe, resilient and sustainable sustainable[1] – Linking rural areas to urban centers through bio-based products and bioenergy for urban consumption. Sustainable buildings with bio-based materials.[4]

BBI JU project: URBIOFIN; Innovation action – Demonstration, 2017-2021, coordinated by IMECAL (Spain)
Relevance to this SDG: URBIOFIN is setting up an integrated and innovative biorefinery for the transformation of the organic fraction of municipal solid waste into new marketable bioproducts, chemical building blocks, biopolymers and additives. The project results will help meet the European target of recycling 65 % of municipal waste by 2030, developing a more sustainable and profitable organic waste management aligned with the objectives of the new Waste Management Directive and the circular economy, reducing of fossil resource dependence in energy and products and boost competitiveness and fostering sustainable economic growth and improve life conditions of the citizens.

SDG 12: Ensure sustainable consumption and production patterns[1] – Raising consumer awareness. Reduction and/or better use of biomass losses and waste. Decoupling production and consumption from use of fossil-based products.[4]

BBI JU project: BIOWAYS; Coordination & Support Action, 2016-2018, coordinated by Q-PLAN INTERNATIONAL ADVISORS PC (Greece)
Relevance to this SDG: BIOWAYS will provide materials and events to engage the society and excite stakeholders about the potential of the bioeconomy. The actions address all stakeholders and develop added-value teaching materials for use in educational systems aiming at enhancing citizens' awareness of bio-based products and applications. The project has created an online platform to showcase results from R&I projects, analyse their impact on society and provide recommendations to citizens and policy makers.

SDG 13: Take urgent action to combat climate change and its impacts[1] – Use of biomass to produce goods reduces the use of fossil-based products and related greenhouse gas (GHG) emissions.[4]

BBI JU project: GreenSolRes; Innovation action – Demonstration, 2016-2021, coordinated by GFB Europe BV (The Netherlands)
Relevance to this SDG: GreenSolRes aims to demonstrate the commercial viability of converting lignocellulosic biomass to levulinic acid for the manufacturing of solvents and adhesive resins with added-value and/or functionalities. Levulinic acid has been identified as a versatile 'green' chemical precursor for many applications. It is a platform substance for chemical synthesis and is seen as a key element in moving Europe towards bio-based manufacturing. GreenSolRes demonstrates the sustainable use of renewable resources for the manufacturing of bio-chemicals targeting to replace fossil-based chemicals. Levulinic acid and related products at competitive prices compared to their

C4-counterparts will boost the bio-based market as they have a high greenhouse gas (GHG) avoidance of at least 70% and an additional value to society via better health and safety properties.

SDG 14: Conserve and sustainably use the oceans, seas and marine resources[1] – Blue bioeconomy: better use of the marine fauna (fish) and flora (algae) for high value bio-products such as food/feed, cosmetics and bio-pharma.[4]

BBI JU project: MACROCASCADE; Research & Innovation action, 2016-2020, coordinated by DTI (Denmark)
Relevance to this SDG: MACROCASCADE addresses cultivation and harvesting of various seaweeds and their use in cascading biorefinery concept for production of food and feed products, as well as chemical, pharmaceutical and nutraceutical products. The project aims at reducing cultivation costs by more than 50 % by employing a modular and scalable concept. Through a cascading process it extracts valuable products from all fractions of the seaweeds and from residues of each conversion step, increasing efficiency and thereby helping to reduce pressure on natural resources.

SDG 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss[1] – Enhanced value of biodiversity as a bioeconomy asset. Promote sustainable natural resources management, halt and reverse land degradation.[4]

BBI JU project: EFFORTE; Research and innovation action, 2016-2019, coordinated by LUKE (Finland)
Relevance to this SDG: EFFORTE establishes improved and knowledge-based precision forestry practices to keep productivity high while preventing overexploitation. Sustainability, biodiversity and soil conservation are enabled by customising forest management according to the specific local conditions, mechanisation of harvesting and planting operations and geo-referencing at single tree level.

Outlook: Bio-Based Industries and the SDGs

A continuation of the current BBI JU under HORIZON EUROPE (2021-2028) will underline the EU commitment to the SDGs. It will be crucial to have a clear understanding of the role of R&I in achieving EU policy priorities such as the SDGs, and in light of the up-coming up-date of the EU bioeconomy strategy[5]. BIC is committed to continue making a contribution to the SDGs, but fully building the bio-based sector in Europe requires strong R&I and it is a task that cannot be done by HORIZON EUROPE, a national funding scheme or the industry alone.

Public Private Partnerships and policy coherence will be key to enable the huge opportunities that the circular bioeconomy can bring in achieving the SDGs.

About the Bio-based Industries Consortium

The Bio-based Industries Consortium (BIC) is a non-profit organisation based in Brussels. It represents the private sector in a public-private partnership (PPP) with the EU on Bio-based Industries (BBI). Worth €3.7 billion, the partnership mobilises investment in innovative facilities and processes that manufacture high-quality bio-based products as well as in biorefining research and demonstration projects.
BIC is host to a unique mix of sectors that currently covers agriculture, agro-food, forestry, pulp and paper, chemicals, aquatic, waste, energy and other sectors. With over 200 industry members including large companies, SMEs and SME Clusters spread across Europe, BIC brings together an authoritative pool of cross sector and multi-disciplinary expertise in the field of bio-based industries.
www.biconsortium.eu

[5] BIC position on FP9 as well as BIC position on bio-economy strategy update