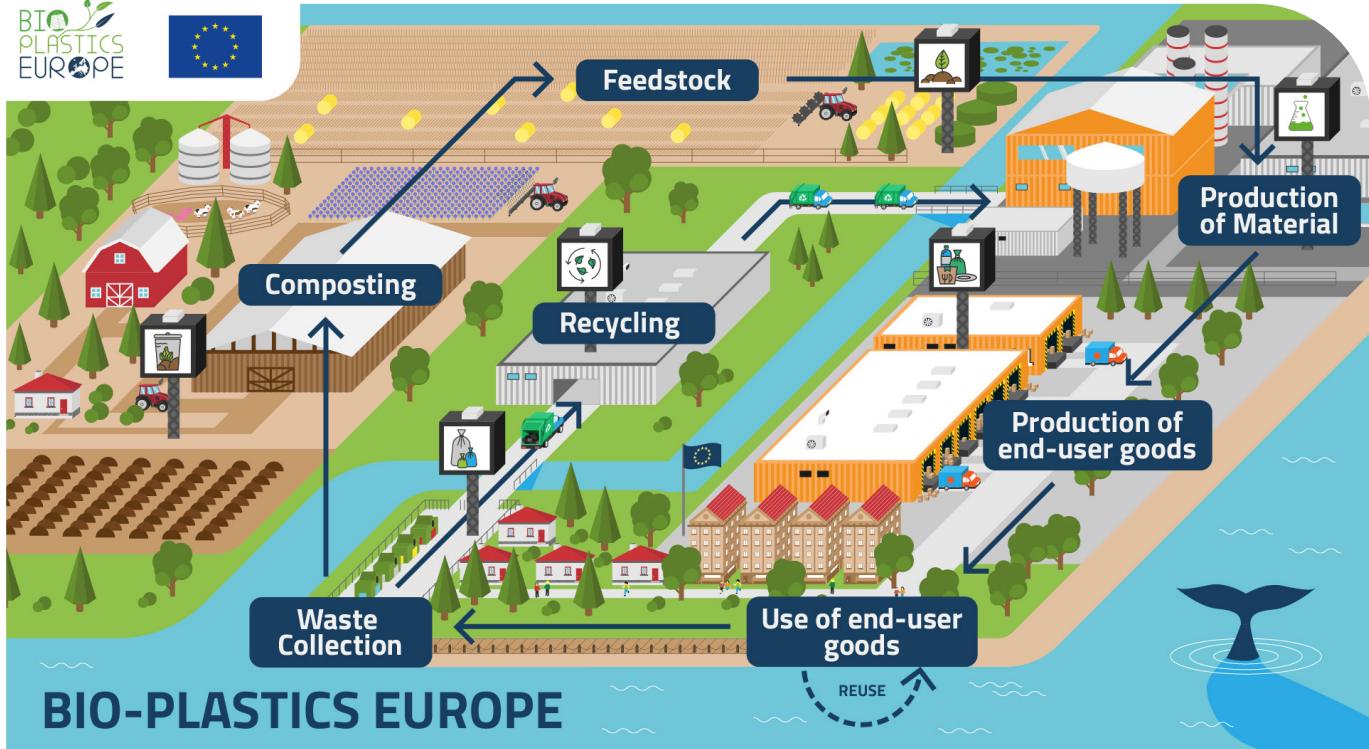


Developing and implementing sustainability-based solutions for bio-based plastic production and use to preserve land and sea environmental quality in Europe



VISION

Sustainable bio-based plastics for circular economy:

- Transferring knowledge into practice through technical, policy and business model innovations

GOAL

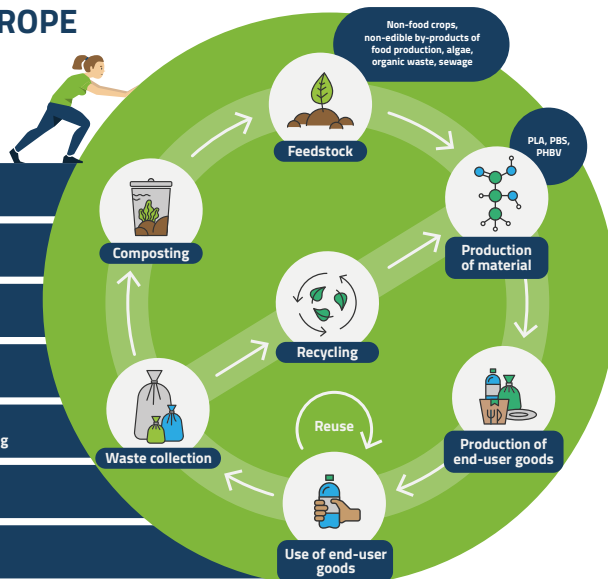
Develop sustainable strategies and solutions for bio-based products by:

- Including innovative product design and business models facilitating efficient reuse and recycling strategies
- Ensuring the safety of recycled materials when used for toys or food packaging
- Developing approaches that focus on circular innovation for the whole bio-based and biodegradable system

BIO-PLASTICS EUROPE

Sustainability-based solutions for bio-based plastics

- WP3 Identification and test of innovative product design
- WP4 Plastic waste collection, recycling and littering
- WP5 Prenormative research and field tests
- WP6 Health and environmental safety
- WP7 Replication, policy-making, capacity-building and upscaling
- WP8 Life cycle assessment environmental and economic
- WP9 Information, communication, and dissemination of results



Focus Cutlery,
Soft and Rigid Packaging

Agricultural Mulch Film,
Toys and Aquatic Materials

HANDBOOK ON THE IMPACTS OF BIO-BASED AND BIODEGRADABLE PLASTICS ON EXISTING WASTE MANAGEMENT FRAMEWORKS

Produced to ensure capacity building to develop sustainable strategies and solutions for bio-based plastic products, as well as the development of approaches, focused on circular innovation for the whole bio-based plastics system.

This handbook brings together a number of key bio-based and biodegradable plastics topics in one place for a broad audience of decision-makers, business representatives, scientists, and society. Topics covered include the concepts of bio-based and biodegradable plastic, Life Cycle Assessment and Circular Economy, analysis of the impact of bio-based, biodegradable, and compostable plastic on waste management technologies and systems, legal and policy framework. Also, the most promising business cases are provided.



Handbook on the impacts of bio-based and biodegradable plastics on existing waste management frameworks



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 900407

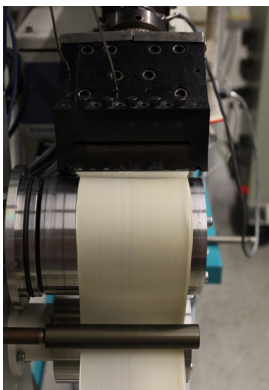
In October 2021, the teams of Kaunas University of Technology and Prospex Institute together hosted a hybrid stakeholders' event dedicated to the analysis and review of the Draft Handbook. Invitees came from different countries and represented various sectors: governmental bodies, manufacturers and producers, research and academia, experts for labeling and waste management, etc. During the Workshop, the stakeholders shared their views on the relevance of the Handbook, topics covered and needed further development, priority areas, ease of use, etc.

Upon the release of the Handbook in digital & printed versions, and as a continuity of its development, another Workshop will be held in November 2022.

The Handbook & related workshops also complement the activities within the HISCAP (Historic Cities against Plastic Waste) Network, as the members thereof are not only active contributors to the relevance of their content, but moreover to applying it in practice.

REFINING DESIGN THROUGH TESTS

Why and how material testing improves BPE's compound designs

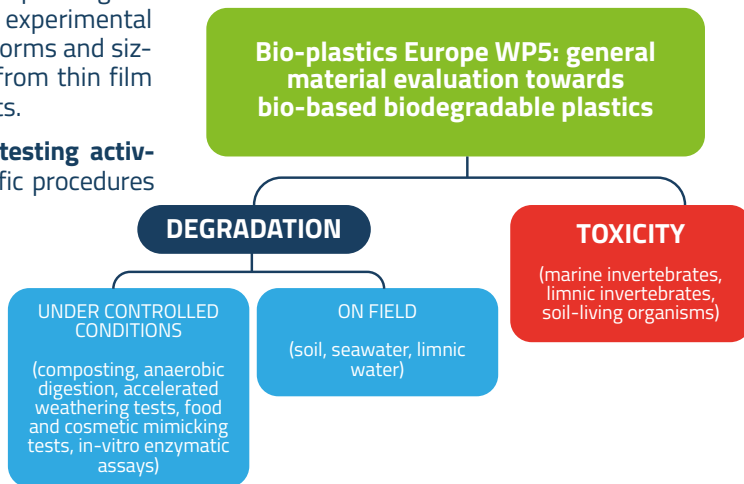


Decision makers and consumers need to know: which bio-based plastics are biodegradable? And if so, under which conditions? To answer these questions, WP5's first set of experimental activities (round I) was designed on WP3 inputs in terms of materials features, innovation and marketing goals, and focusing on the following application domains: **cutlery** (PLA-based reusable outdoor cutlery), **mulch films** (PLA-based for agricultural applications), **rigid packaging** (PLA-based containers for cosmetics and food), **soft packaging** (PBS-based food packaging) and **toys** (PHBV-based beach toys).

All samples were provided by the producers involved (Arctic Biomaterials and NaturePlast), or Fraunhofer Institute LBF. Depending on the later application and the experimental setup, samples in different forms and sizes were produced, ranging from thin film to thick mechanical test parts.

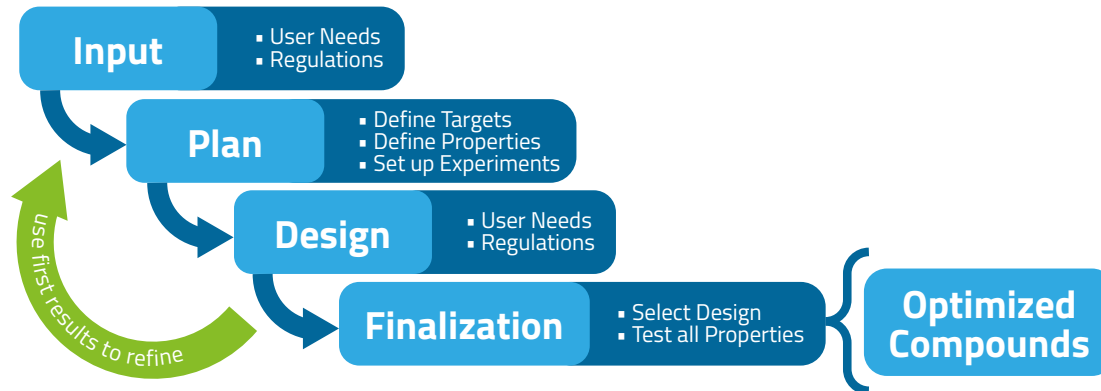


Throughout **16 months of testing activities** clear, shared and specific procedures were followed, including standard testing protocols. Where available, existing standards were used or adapted. Tests related to degradation and ecotoxicity were devised as shown, furthermore a base characterization was performed in WP3.



IMPROVING MATERIALS THROUGH FEEDBACK

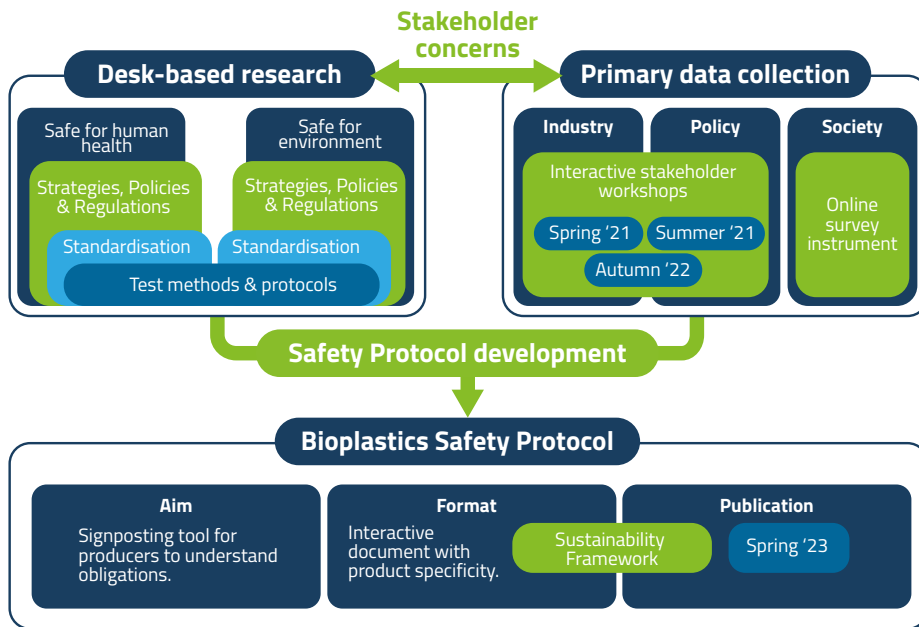
- Every product serves a purpose. For our polymer compounds this includes the needs of plastic converters, the end-users and sustainable end-of-life scenarios.
- BPE features a high level of detail in material testing, to support the development: basic material properties, recyclability, industrial composting, degradability and ecotoxicity.
- The graph below shows our design thinking-approach, which includes loops to utilize knowledge generated through our own testing programme.
- One feature of all compounds developed in BPE is the high level of knowledge ranging from processing over degradation properties up to LCAs. This knowledge can also inspire new and different applications beyond the demonstrators made in the project.



SAFE AND SUSTAINABLE IN PRODUCTION, USE AND DISPOSAL

WP6 (on safety components) was tasked with developing a way to ensure the safe and sustainable utilisation of bio-based and biodegradable plastics. To that end, a wide range of literature was consulted in order to identify the strategies, policies, and regulations (and associated standards and test methods) that already underpin the safe and sustainable production, use, and disposal of all products.

Using this information as a springboard, safety aspects (i.e., fit for purpose, compatibility, durability, potential hazardousness/toxicity, etc.) specifically applicable for bio-based and biodegradable plastic products were also considered. In addition, a range of stakeholders were engaged with to understand key concerns, collect ideas, and gather critique.



Taking all of this into account, the 'Bioplastics Safety Protocol' will be developed for release in Spring 2023 alongside the 'Sustainability Framework for Bio-based and Biodegradable Plastics'.

UPSCALING AND REPLICATION

Business cases based on testing compounds, redesigning and validating business models in a circular and sustainable way are ongoing. Specifically, the University of Bologna, together with NaturePlast, Fraunhofer LBF and the Austrian Centre of Industrial Biotechnology, started a collaboration with

- EKOALA, Italian small manufacturer of toys
- REYENVAS - Armando Alvarez group, a key player for biodegradable mulch film in Spain



CAPACITY BUILDING

Education covers a pivotal role in managing the confusion that characterizes bio-based and biodegradable plastics. The aim of this course is to improve learning capacity and professional skills of students, researchers, young entrepreneurs, managers, and practitioners operating in the plastic value chain. A post-vocational training programme is going to be established by UNIBO, with 17 BPE partners and many guest speakers.

POST-VOCATIONAL TRAINING PROGRAMME:

“The new plastic economy: circular business models and sustainability”

IMPORTANT DATES:

- 23 September 2022 MOOC launch
- 10-14 July 2023 Summer school establishment

A detailed programme will be available at: <https://bioplasticseurope.eu/>

MASSIVE ONLINE OPEN COURSE (MOOC)

5 weeks | 20 modules | + 40 units | + 20 stakeholders involved

SUMMER SCHOOL

5 days | 5 challenges | + 2 Site visits | + 2 Mentoring & tutoring sessions

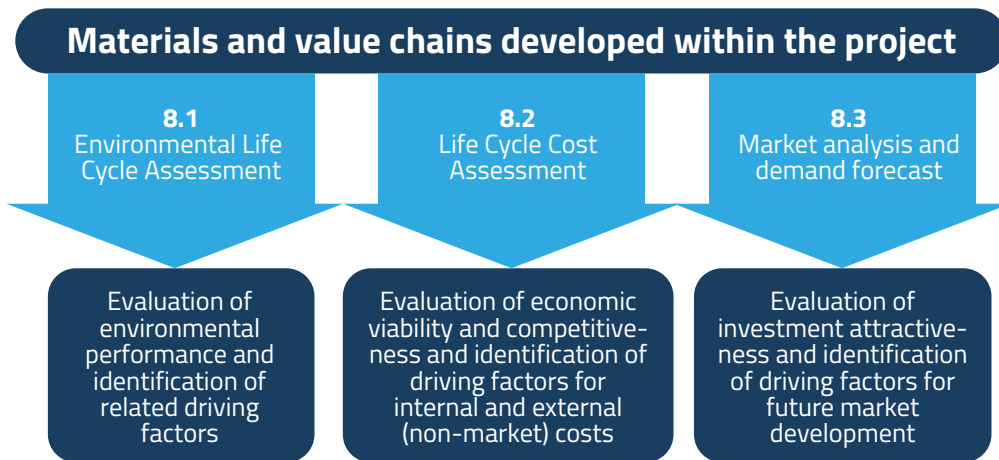
ENVIRONMENTAL EVALUATION AND ECONOMIC VIABILITY

WP8 deals with the economic assessment of the developed materials and business cases.

To assure a holistic analysis, the environmental impacts of the materials are evaluated by an Environmental Life Cycle Assessment. First results of a screening analysis indicate that effects are heterogeneous and complex since they depend on various conditions along the supply chain.

The second task encompasses a Life Cycle Cost Assessment of developed materials which outlines all costs related to their production, usage and end-of-life treatment. A preliminary analysis showed that PLA production costs depend on a wide range of factors.

The third task covers a market analysis and a market forecast for bio-based biodegradable plastics to support the future marketability of the materials developed in the project.





HISTORIC CITIES AGAINST PLASTIC WASTE

The Network of Historic Cities against Plastic Waste (HISCAP) is a close-knit group of municipal authorities pledging against plastic waste and implementing project results and recommendations towards bio-based plastics. This engagement facilitates the uptake of project results by civil society and public authorities. This network congregates historical cities from Europe, whose aged infrastructure makes them especially vulnerable to the many problems caused by plastic pollution.

The network fosters the sharing of cooperative knowledge of Best Practices and Lessons Learned among the participating cities and addresses many problems plastics pose to their environment and infrastructure, with the specific purpose of pursuing the use of bio-based plastic alternatives. So far, HISCAP counts over 81 committed members. The network organized five online events with municipalities and the HISCAP LinkedIn group to facilitate communication between the municipalities and experts.



EUROPEAN BIOPLASTICS RESEARCH NETWORK

The European Bioplastics Research Network (EBRN) is an active community of researchers, executives, enthusiasts and activists gathered to discuss and spread cutting-edge knowledge in the field of bio-based plastics. BIO-PLASTICS EUROPE aims to provide strategic networking and research, coordinating knowledge across Europe. This is a technical network, encompassing engineers, biologists, planners and economists, which focuses on the technicalities of bio-based plastics development, applications and uses.

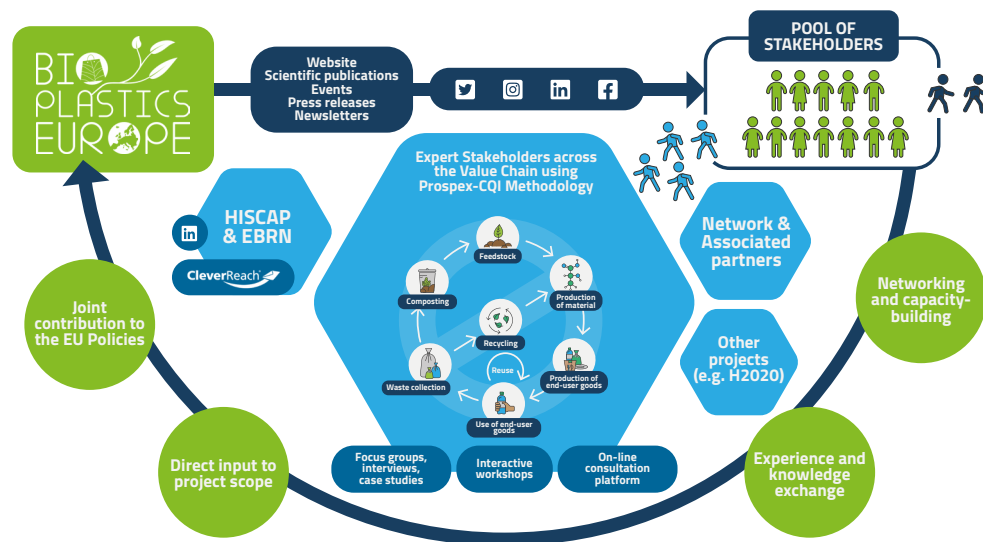
Regular meetings and relationships established with other organisations in this field help to reach synergies and avoid duplications. Besides fostering communication among researchers, producers and consumers, EBRN emphasises communication among relevant projects in order to contribute to joint contributions to the EU Policies. The 6th EBRN event was organised as an active dialogue between EU Policy Officers and Horizon projects, identifying the needs of both side for more productive future work. The EBRN LinkedIn group counts over 700 members.

ENGAGING ALL AUDIENCES WITH TARGETED COMMUNICATION CHANNELS

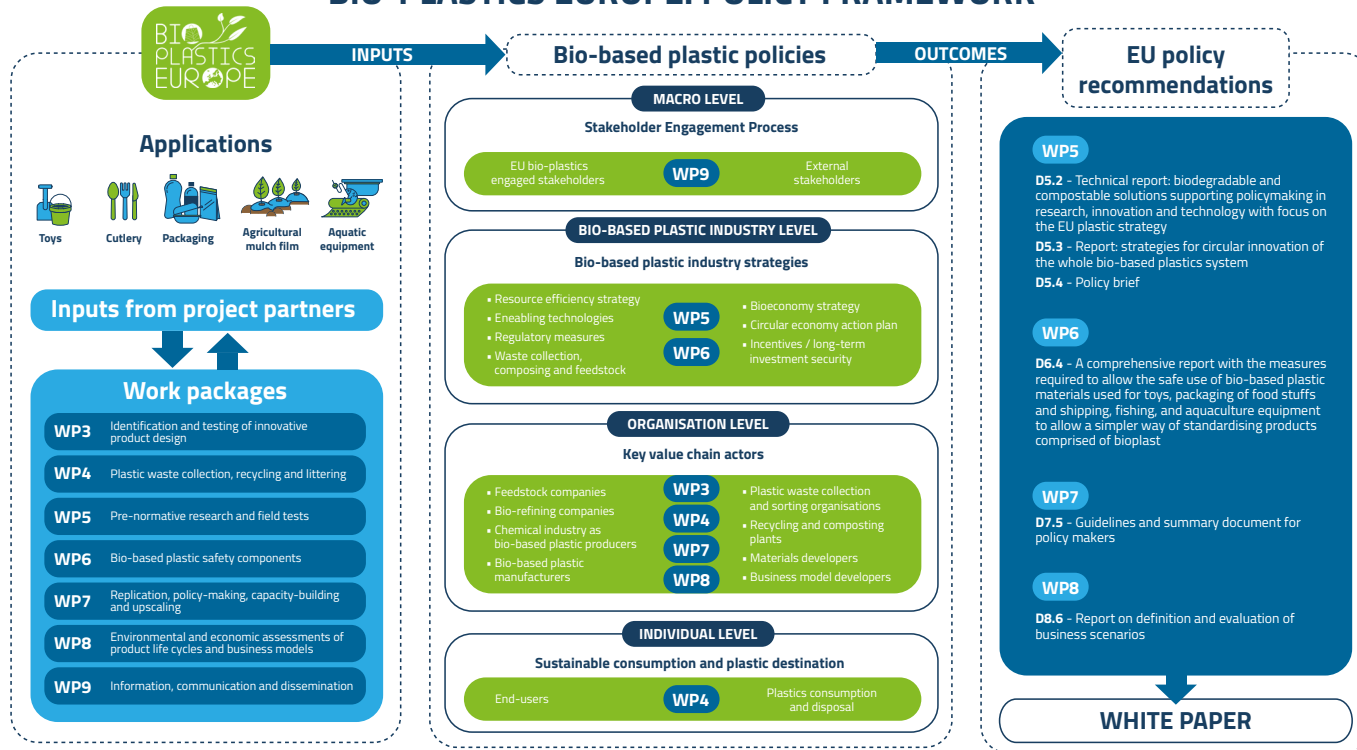
BIO-PLASTICS EUROPE communicates with different target audiences via a website, scientific publications, events, press releases, newsletters and social media. In this way information from the project is available to different stakeholders (pool of stakeholders) who stay informed (green), leave the project (dark blue) or engage with the project (cyan).

Engaging with the project is possible by becoming an associate or network partner (mainly for companies), as another project, or as a member of HISCAP or EBRN networks. In addition, across the value chain, using Prospex-CQI methodology expert stakeholders are strongly engaged with the project, working together with the project to create direct inputs to the EU policies. Read more and become our stakeholder: www.bio-plasticseurope.eu/stakeholderengagement

Stakeholder Engagement BIO-PLASTICS EUROPE



BIO-PLASTICS EUROPE: POLICY FRAMEWORK



For more information, go to our website www.bioplasticseurope.eu/policy-framework

Find us on Social Media:

-  <https://www.facebook.com/Bioplastics-Europe-104251307904134/>
 https://twitter.com/bioplastics_eu
 <https://www.linkedin.com/groups/8848234/>
<https://www.linkedin.com/groups/9044005/>
 https://www.instagram.com/bioplastics_eu/



CONTACT INFO

Hamburg University of Applied Sciences
Research and Transfer Centre "Sustainability
and Climate Change Management" (FTZ-NK)
Ulmenliet 20, 21033 Hamburg, Germany
E-mail: bioplastics@ls.haw-hamburg.de,
www.bioplasticseurope.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 860407