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Evidence for a new EU Bioeconomy Strategy
GO!PHA Inputs and Recommendations

Why renewable/biobased materials and products must be a central theme in the Bioeconomy Strategy

Advances in technology have vastly improved the ability to harness renewable resources including renewable carbon feedstock, aligning innovation with the principles of a circular bioeconomy. A major circular economy and bioeconomy principle and goal needs to be the transition to renewable carbon based substitutes and alternatives to plastics to reduce fossil-fuel reliance. These biobased materials include naturally occurring biopolymers that are produced industrially via bioprocessing, involving a redesign of the sources and systems commonly used to produce materials for the economy. Not only do the resulting products offer sustainable alternatives to currently linear and established products but also enable new technological pathways for resource utilization and waste valorisation.

Strategic role in enhancing EU's competitiveness and decarbonization (defossilisation) efforts

Biotechnology advancements and material innovations for scaling use of biosynthesized materials found in nature – like PHA biopolymers – are increasingly relevant in sustainability dialogues such as defossilization in a circular economy, and transition towards renewable sources. However, since they do not always fit legacy definitions and approaches of assessment, they are being subjected to regulatory ambiguity, skepticism, and misinformation. Which is why, biotech companies typically face high technology costs, limited economies of scale and regulatory gaps, impeding widespread adoption of bioeconomy products. Examples include naturally occurring polymers made from agricultural and marine biomass, green house gas emissions (methane, CO_2), non-food organic waste e.g., polyhydroxyalkanoates (PHA). There is an urgent need to embed clear guidance for the recognition, use and scaling of these solutions and the European Commission must enable and promote safe and sustainable material systems needed to drive sustainable, nature-based material innovations and incentivize their development and promote adoption.

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Need for regulatory support to proliferate biobased materials and products

There is a systemic lack of incentives or policy-driven communication to promote the uptake of bio-based materials. In contrast, persistent fossil-based plastics continue to benefit from strong policy support through recycling targets that experience has shown is unattainable and existing infrastructure. This creates an imbalance hindering market development of bio-based, biodegradable materials, despite their acceptable functionality, superior environmental performance and alignment with EU decarbonization, competitiveness, fit with existing waste management infrastructure and circular economy goals. Europe needs enabling regulatory frameworks, access to finance, and infrastructure for scale-up to realize the potential of bio-based and biodegradable materials.

Key Elements to Address for a Circular Bioeconomy Strategy

- **Establish a level playing field for biobased materials and productions via**
    a. **Regulatory Support & Incentives:** Dedicated regulatory support is essential to create predictable, transparent, and enabling conditions for scaling biobased materials and products. It can help address regulatory ambiguity, remove systemic biases in favour of fossil-based plastics, and provide clarity for investors and innovators. The current policy landscape ends-up favouring fossil-based materials by not innovating policy landscape and relying on outdated methods for classifications.
        - Develop clear, harmonised criteria for assessing biobased, biodegradable, and compostable materials that reflect their origin, functionality, safety, and environmental impact.
        - Develop harmonized standards for biodegradability in natural environments, including marine, and home-composting to build market confidence and enhance global competitiveness.
        - Prioritise biobased materials in upcoming frameworks and regulations, like the circular economy and in priority sectors (e.g., packaging, agriculture, textiles) to drive demand.
        - Ensure alignment of existing policies (like PPWR, SUPD, REACH) to enable use of biobased materials for products across priority sectors and value chains (e.g., packaging, agriculture, textiles).

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b. **Financial Support**: The biobased materials sectors face underinvestment and fragmented funding that inhibits their scale-up. There is a need for long-term investments as well as de-risking mechanisms to enable scaling up along with increased systematic programs to close the funding gap.
    - Introduce finance incentives for production, use, and processing of biobased materials and products
    - Create financial value across systems and entire value chains - including for collection, and end-of-life management systems.
    - Create long-term investment conditions to bridge the gap for scaling biobased production

c. **Market Uptake Mechanisms:** Market distortions, including direct and indirect fossil-fuel subsidies, artificially lowering cost of conventional plastics while creating unfair competition for biobased materials. Market-based tools must correct these imbalances to incentivise adoption.
    - Identify and phase-out direct and indirect subsidies fossil-fuel industries currently benefit from, and design incentives that support nature-compatible, and safe biobased solutions.
    - Introduce market-based mechanisms that reward environmental considerations, support defossilization and contribute towards a shift to circular bioeconomy with the uptake of biobased materials.

d. **Biomass Access:** Biowaste and organic waste are recognised in EU policy as valuable feedstocks, but access for material applications is underutilised. Current frameworks and the RED III biomass prioritisation principle risk favouring bioenergy over biobased materials, undermining circularity goals. Biomass should be allowed use for the highest value, including biomaterials, and not be mandated solely for generating bioenergy.
    - Introduce a sustainability criteria for all biomass end-uses—including for materials—as it does for biofuels.
    - Simplify access of biowaste and organic waste streams for high-value biobased material production and contribute towards EU circularity goals.

- **Recognise challenges of using a scientifically inaccurate definition of "Natural" polymers**

  This definition excludes polymers biosynthesized through industrial bioprocesses, even when they are chemically identical to natural ones. Biopolymers are misclassified as

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"plastics," making them subject to the same bans and compliance burdens as fossil-based materials. This increases costs, delays development, limits access, and harms consumer perception. These issues affect EU policies such as PPWR, Food Contact Materials, Microplastics in Drinking Water, and Fertilising Products Regulations.

- Shift from a place-based to a criteria-based approach—considering origin, properties, impact, and safety as opposed to relying on legacy definitions. This approach is critical to avoid blanket plastic policies for bioeconomy derived solutions.
- Align REACH regulation and guidance with modern approaches, as in the Flavourings Regulation (EC 1334/2008), to recognize fermentation and enzymatic processes as natural.

- **Update LCA methodologies & frameworks assessing biobased materials**
  Existing life cycle assessment methodologies—such as JRC's plastics LCA and the Product Environmental Footprint (PEF)—do not adequately capture the distinct environmental benefits of biobased and compostable materials compared to fossil-based plastics. They overlook key indicators such as biodegradability, microplastic persistence, and biogenic carbon contributions, resulting in inadequate assessments unable to reflect the real-world circularity and climate advantages of materials. Updated LCA frameworks can enable fair comparisons between biobased and fossil-based materials, tailored to sector-specific contexts.
  - Incentivize climate-positive innovations by expanding the scope of the Emissions Trading System (ETS) and Carbon Border Adjustment Mechanism (CBAM) to include biobased materials and downstream organic chemicals. Enabling low-carbon, biotechnological solutions to fully benefit from carbon pricing and border carbon adjustment policies could spur broader commercial adoption.
  - Include metrics for biodegradability, toxicity, land use, and microplastic impact guidance to demonstrate non-persistence and environmental benefits of biopolymers. We recommend use of biogenic carbon accounting using a -1/+1 approach instead of the 0/0 approach used in RED III and PEF.

- **Address the limited scope of compostable biobased materials in existing regulations**
  As seen with the approach in EU PPWR (2025), a positive list for compostable materials use restricts use and limits adoption, even when biobased materials meet rigorous

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standards and criteria. This is a significant barrier especially in packaging, where scalable impact is critical.

- Support biotech-derived compostable materials through regulatory inclusion to foster innovation-friendly markets. For example, reassess Article 9(5) of EU PPWR or expand the existing product list of compostable material to include all organic and food waste packaging.
- Create systemic support for compostable materials, by ensuring inclusion in regulations and strengthening their end-of-life management (e.g., separate biowaste collection, harmonized composting standards, and composting infrastructures).

- **Create awareness among users and general public**
  A noted barrier to the adoption of biobased, biodegradable, and compostable materials is the widespread lack of public awareness and understanding of their benefits, proper use, and disposal. This knowledge gap contributes to misconceptions, and greenwashing attempts, leading to low consumer confidence in novel material and products. A new Bioeconomy Strategy must embed a coherent approach to public communication, awareness-building, and labelling to build understanding of the overall environmental benefits, proper use, and correct end-of-life disposal of biobased products.
  - Develop communication campaigns to promote understanding of biobased, biodegradable, and compostable materials, including their environmental benefits and appropriate end-of-life management. (e.g., Italy's comprehensive approach for city-level and regional cooperation).
  - Strengthen collaboration between stakeholders like retailers, municipalities, and educational institutions to create and disseminate credible, accurate, science-based information about biobased materials and resulting products.

There is a systemic need for market-based incentives and policy-driven initiatives to support uptake of bio-based materials. This Strategy must address challenges that hinder growth of novel, biobased materials —a key component of the EU's bioeconomy in driving competitiveness and enabling a sustainable shift towards circularity.

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About GO!PHA

GO!PHA is a diverse network of innovators in academia, industry and policymaking with a mission to promote the use of biodegradable and compostable materials such as PolyHydroxyAlkanoate (PHA) biopolymers.

Renewable, biodegradable, and compostable materials provide a unique opportunity to reduce greenhouse gases and environmental plastic pollution while establishing circularity in materials used by offering sustainable, functional, and natural materials that are renewable and offer diverse end-of-life options.

GO!PHA provides a knowledge-sharing platform, organizes experiences, and facilitates joint development initiatives with these natural, unique, and innovative materials.

GO!PHA is a UNEP-accredited organization, actively involved in global dialogues for advancing UN SDGs with science-based insights and evidence.

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