BioReCer

Policy Brief

How EU Policy can Support the Valorisation and Certification of Biological Waste and By-products

Introduction

As the European Union (EU) accelerates its transition towards a more sustainable and competitive economy, the certification and tracking of biological resources is key. This policy brief, developed through the BioReCer project, consolidates actionable recommendations and best practices to enhance the uptake and impact of certification schemes and labels (CSLs) in the EU.

The BioReCer (Biological Resources Certifications Schemes) project represents a comprehensive Horizon Europe initiative aimed at enhancing certification schemes for biological resources to support the European bioeconomy transition. Through a three-year work effort, the consortium has identified several challenges and research gaps in current certification approaches. This policy brief aims at summarising the most relevant issues and to provide evidence-based solutions to strengthen bio-based value chains across multiple sectors including agriculture, forestry, fisheries, and municipal waste management.

Currently, most CSLs, while valuable for the development of the bio-based economy, often do not adequately capture the unique characteristics of bio-based materials and their complex supply chains. These gaps manifest in several critical areas that require urgent policy attention:

Contents

Variability of Feedstocks

Unlike manufactured goods, biological materials undergo natural processes of growth, decay, and nutrient recycling, requiring assessment frameworks that recognise these unique characteristics. Traditional metrics fail to account for the inherent variability of biological feedstocks, their seasonal availability, and the distinct differences between technical and biological cycles. The current approach treats bio-based materials through the lens of conventional industrial systems, missing opportunities to optimise their contribution to circular economy objectives.

Supply Chains Complexity

Supply chain complexity presents another significant challenge. Bio-based value chains often involve multiple stakeholders across different regions, from primary producers like farmers and forest managers to intermediate processors, manufacturers, and final distributors. Each stage introduces variability in data collection, quality standards, and regulatory compliance requirements. The fragmentation of information systems across these stakeholders creates data silos that impede comprehensive traceability and accountability.

Regulatory Landscape Discrepancies

Regulatory discrepancies across European member states further complicate the landscape. While EU directives emphasise circularity and sustainability goals, implementation varies significantly between member states, creating administrative burdens for companies operating across borders. This regulatory patchwork undermines the potential for harmonised approaches to bio-based product certification and limits the development of truly integrated European markets.

To ensure practical relevant, the project's insights were tailored to three core stakeholders' groups as follows:

1. Businesses and users of CSLs who apply certification schemes and labels within their operations and drive innovation across bio-based value chains.
2. Certification schemes and labels owners and stakeholders who develop the standard themselves and for the core of credible sustainability assurance systems.
3. Policy makers and governments who have the capacity to influence and develop regulatory frameworks and market incentives.

Nonetheless, it is worth noting that some challenges are cross-cutting while others are stakeholders specific. Therefore, for the cross-cutting challenges, stakeholder-tailored recommendations are provided.

Recommendations for increasing the uptake of CSLs

This section presents stakeholder specific recommendations developed throughout the three years of the BioReCer project. The objective of these recommendations is to identify potential solutions to the challenges and barriers that are faced by all stakeholders of the bio-based economy that limit the uptake of CSLs (Table 1). These findings were categorised according to the key targets groups to which they are addressed, namely (1) Businesses and CSLs users, (2) Certification schemes and labels owners and stakeholders and (3) Policy makers and government officials.

Businesses and CSLs users

The BioReCer project has identified that a significant number of businesses, in particular SMEs, encounter significant barriers when engaging with CSLs for bio-based products and value chains. The main challenges include the complexity of differentiating bio-based from non-bio-based feedstocks and products, the difficulty of navigating a fragmented and sometimes overwhelming certification landscape, and uncertainty regarding the economic benefits that CSLs can deliver. Together, these challenges create a situation in which the uptake of certification remains limited, thereby undermining incentives for sustainable production and weakening the credibility of sustainability claims in the European market.

One of the main obstacles faced by businesses is the lack of traceability and monitoring systems that allow them to verify whether a product or feedstock is genuinely bio-based. This lack of traceability has significant implications for regulatory alignment, market trust, and international competitiveness. From a policy perspective, addressing these gaps is critical not only to support individual businesses but also to ensure the credibility of the wider bio-based economy. In this context, the BioReCer project recommends an early adoption of integrated Tracking and Traceability (T&T) systems as a baseline measure. T&T systems can create a reliable data infrastructure for collecting and managing sustainability-related information across the value chain, thereby improving transparency and trust. Additionally, the integration of certification-ready Electronic Identification Passports can simplify and

streamline the audit process (also reducing costs). It is also relevant to consider that the adoption of these passports can have multiplier effects and encourage others.

In addition to the lack of traceability and monitoring systems, businesses also face difficulties when selecting the appropriate CSLs for their operations. This is due to the large number of CSLs available. To help companies make the right decision, EU certification navigation tools (such as the BIT platform) were developed. These tools help businesses to understand the available landscape and identify which CSLs align better with their products. Additionally, prioritising the selection of CSLs recognised in public procurement legislation or local legislation can significantly reduce the available options, not only simplifying the decision, but also policy alignment and coherence.

One way businesses can reduce the costs of adopting CSLs include the use of digital traceability tools, such as the BIT tool suggested and envisioned by the BioReCer project, that allow businesses to gather the required information and documentation. Digital traceability tools provide an easier, faster and guided way to compile the required documentation thus reducing costs and potentially reducing audit days. In addition, the incorporation of CSLs to the business strategy can significantly reduce costs by anticipating regulatory requirements and by reducing short-term compliance costs as the company is set to be audited from the beginning. Benefits can also be reaped, as the company demonstrates accountability, strengthening its competitive positioning.
For a summary of challenges and recommendations for businesses please see Table 1.

Table 1: Key Challenges and Recommendations for Businesses

Challenges	Recommendations by BioReCer
Difficulties in quantifying, monitoring and distinguishing between bio-based and non-bio-based feedstock and products.	• Early adoption of a Tracking and Traceability system to collect sustainability data is advisable. • Integrate a certification-ready Electronic Identification Passport that links product attributes with relevant sustainability standards, simplifying audit readiness and label alignment.
Difficulties to select appropriate certification schemes and labels for bio-based value chains	• Use a tool that presents an overview of all relevant CSLs for businesses to rapidly screen which CSLs are most appropriate. • Use a centralised EU certification navigator tool such as the BioReCer BIT platform • Make use of CSLs recognised in public procurement legislation
Cost-benefit of certification difficult to estimate	• The use of digital traceability tools (such as the BIT) can contribute to the reduction of certification costs by pre-compiling documentation and reducing audit days • Incorporate CSLs in the company strategy

CSLs owners and stakeholders

The BioReCer project has highlighted several critical challenges faced by certification scheme and label (CSL) owners and stakeholders in the bio-based economy alongside concrete recommendations to strengthen the role of CSLs as enablers of sustainable market development and regulatory alignment. Addressing these challenges is essential to enhance trust, improve uptake of certification, and ensure that CSL frameworks remain relevant in a fast-evolving policy and innovation landscape.

As mentioned above, one key challenge for companies is to estimate the cost-benefit of CSLs. To address this from the perspective of CSL owners and stakeholders, BioReCer recommends the development of certification packages and progressive certification pathways. These would allow companies to start with basic, cost-effective modules and gradually add more complex ones, such as life-cycle assessment or social impact assessment, as their business matures and resources permit. To further lower entry barriers, certification systems could provide opportunities for cost-sharing, especially at early stages, thereby making participation more feasible for smaller market actors.

Another pressing issue is the difficulty of consistently supplying bio-based feedstocks in terms of both quantity and quality. Variations in sourcing practices, logistical constraints, and market volatility pose significant risks to value chain stability. To mitigate these risks, CSLs should evolve to include specific mechanisms such as regionally managed biomass registries or hubs. By creating standards that define measurable criteria for feedstock quality, sourcing practices, and traceability, CSL owners can contribute to greater transparency and reliability within supply chains. The integration of digital tools is central to this effort. Instruments such as BioReCer's BIT tool demonstrate how traceability solutions

can be used to monitor feedstock flows, availability, circularity, and supply chain elements in real time, fostering both consistency and auditability.

A further challenge lies in the underutilisation of innovative biomaterials and biogenic waste streams as feedstocks. These materials remain insufficiently recognised in certification systems, even though they hold vast potential for promoting a more circular bioeconomy. BioReCer recommends that new certification modules — sometimes framed as "circularity criteria" — be developed to reward the integration of residues and wastes into material streams for non-energy uses, encouraging resource efficiency and cascading use. In addition, CSLs should broaden their scope to include emerging feedstocks and collaborate more directly with rapidly evolving bio-based industries. Multi-stakeholder platforms such as the BioReCer Stakeholder Platform (BRSP) can play a pivotal role in fostering dialogue, sharing knowledge, and helping emerging sectors understand certification requirements from an early stage, thus accelerating their market readiness.

The lack of adequate infrastructure for biomass sourcing and processing presents another barrier. In many regions, the absence of local collection systems or the long distances required to transport feedstock undermine both the economic and environmental viability of certification. To bridge this gap, BioReCer suggests that infrastructure-readiness scores could be incorporated into certification assessments. Such scores could evaluate factors like proximity to processing hubs or the robustness of collection systems, providing a more realistic assessment of feedstock accessibility and supply chain efficiency.

Finally, there is an overarching need to improve the alignment of CSLs with EU policy frameworks. While CSLs provide valuable tools for companies and consumers, they often lag behind or remain insufficiently integrated with existing and emerging EU regulations. Addressing this gap requires promoting the harmonisation of CSLs with the objectives of the Circular Economy Action Plan, in part by integrating circularity metrics such as recyclability, durability, biodegradability, repairability, and modularity. BioReCer further recommends launching a dedicated circularity certification module in direct alignment with the Ecodesign for Sustainable Products Regulation (ESPR). Beyond technical adjustments, CSL stakeholders should actively engage with EU institutions, regulatory dialogues, and standardisation bodies. By positioning themselves as proactive contributors to regulatory development, CSL owners can help influence future policy, ensure compatibility with EU market instruments, and strengthen their role as a credible link between sustainable innovation, consumer trust, and regulatory compliance.
For a summary of challenges and recommendations for businesses please see Table 2.

Table 2: Key Challenges and Recommendations for Sustainability Certification and Labels makers and stakeholders

Challenges	Recommendations by BioReCer
Cost-benefit of certification difficult to estimate	• Develop certification packages and progressive certification schemes, from basic modules up to more advanced and costly modules (LCA; social impact, etc.) • Allow for cost-sharing schemes at early stages
Supplying bio-based feedstock consistently in terms of quantity and quality	• Develop specific CSLs for regionally managed biomass registries or hubs • Set standards with measurable criteria for feedstock quality, sourcing practices, and traceability • Integrate digital tools to track feedstock flows, availability, supply chain elements, circularity, etc to enhance real-time transparency, consistency, and auditability across the supply chain. BIT tool developed by BioReCer is a good example demonstrating it.
Material innovations and opportunities of biogenic waste as feedstock often unknown	• Develop certification modules with “circularity” criteria to reward the use of bio-based waste and residues for non-energy purposes. • Expand the scope of the CSL for including emerging feedstocks. • Collaborate with emerging biobased industries to support them in understanding the certification needs. BRSP can serve as a multistakeholder platform to foster the collaboration and knowledge sharing
Insufficient infrastructure, e.g. lack of hubs, long distance transportation, collection systems etc.	• Integrate infrastructure-readiness scores into certification assessments (e.g., proximity to processing hubs).
Limited alignment of CSLs and EU Policy	• Promote the alignment of CSL frameworks with the EU Circular Economy Action Plan by integrating key circularity metrics such as recyclability, durability, biodegradability, repairability, and modularity. • Launch a dedicated circularity certification module aligned with the Ecodesign for Sustainable Products Regulation (ESPR) • Participate in EU policy dialogs and engage with EU institutions and standardisation bodies which will help to influence future policy development and align certification standards with emerging regulations and market instruments

Policy makers and government officials

BioReCer has identified a range of structural challenges facing policymakers and government officials who seek to enable effective certification, traceability, and market uptake of bio-based products across Europe. For these challenges, BioReCer has also identified targeted recommendations.

Policy makers also face the challenge of accurately quantifying, monitoring, and distinguishing bio-based from non-bio-based feedstocks and products thus hindering the development of an effective policy framework, i.e. through targets, that is supportive of the bio-based economy. To address this, BioReCer recommends developing a harmonised product coding extension such as a “green-tag” linked to HS/CN codes, managed through an EU-wide registry. This would allow customs and certification bodies to quickly identify bio-based origin while supporting traceability at scale. In parallel, updating existing statistical databases – such as EUROSTAT – so they incorporate bio-based content indicators and traceability information will provide the necessary data foundation for policy monitoring and market development. Policy makers are encouraged to fund and mandate the deployment of Digital Product Passports (as suggested in the Ecodesign for Sustainable Products Regulation) and feedstock traceability platforms, with particular attention to sectoral diversity and the practical needs of businesses of all sizes.

Lack of harmonisation among certification schemes and labels (CSLs) is another persistent issue, resulting in overlap, inconsistency, and confusion for both industry and regulators. BioReCer suggests the establishment of publicly funded sector-based technical committees or working groups among EU certification bodies to systematically cross-reference indicators and eliminate redundancies. The creation of an EU Bioeconomy Certification Observatory would allow continuous tracking and benchmarking of certification uptake, quality, and impacts, thereby informing both policy design and implementation across Member States.

Quantifying the cost-benefit of certification remains difficult, especially for SMEs and emerging sectors. Fiscal incentives for certified bio-based products would help offset initial costs and signal clear policy support. Allowing for transitional and progressive certification solutions – where businesses can gradually meet more advanced sustainability criteria – reduces barriers to entry and expands market accessibility.

At present, there is no unified framework for evaluating CSLs within the bio-based industry. BioReCer recommends developing an institutionalised EU CSL Benchmarking Framework based on key criteria such as transparency, robustness, scope, and enforcement. This would empower policymakers and market actors to make informed choices, creating a level playing field for both established and emerging certification schemes.

Companies also face uncertainty regarding consistent supply and quality of bio-based feedstock. Policymakers should develop frameworks supporting regional biomass management registries and hubs, standardising sourcing and quality criteria while facilitating logistical efficiency.

Opportunities for valorising biogenic waste and innovative bio-based material streams are often missed. BioReCer advises the development of knowledge-sharing platforms and technical reference libraries – with life-cycle assessments and success cases as anchors for innovation. Creating targeted financial incentives for upcycling and integrating circular economy criteria into bioeconomy strategies encourages resource efficiency and reduces dependence on fossil inputs. Policymakers should ensure stability in these frameworks to maintain investor confidence, and expand support for platforms such as the BioReCer Stakeholder Platform, which foster multi-sector collaboration. Funding dedicated schemes for valorising waste and enabling circular business models will strengthen systemic change.

Consumer perceptions of products made from bio-waste remain a hurdle for market acceptance. BioReCer recommends that governments support education campaigns and targeted public-perception initiatives, helping to shift attitudes and improve uptake of sustainable products.

Infrastructure gaps – including collection hubs, transport, and certification-ready processing facilities – are a key barrier to system-wide circularity. Investment in circular economy-friendly infrastructure, alongside encouragement for public-private partnerships, will be instrumental for overcoming logistical constraints and strengthening certification compatibility.

The absence of binding EU-wide regulatory frameworks for bio-based products has led to reliance on voluntary schemes, causing ambiguity and undermining regulatory certainty. Policymakers should introduce clear, binding standards for bio-based products that align regulatory frameworks and certification systems – particularly around the classification and valorisation of waste streams. Developing EU-recognised meta-labels or mutual recognition frameworks will foster greater market clarity and enable cross-border acceptance.

Finally, differentiating between bio-based secondary feedstocks and bio-waste remains unresolved. There is a need for clear legal standards and harmonised regulatory definitions within EU legislation – Including the Waste Framework Directive and the REACH interface – to consistently classify materials, clarify “end-of-waste” criteria, and directly support circular valorisation. Embedding circularity metrics and scores within EU policy will further reinforce the alignment of certification systems with policy goals and sustainability objectives.
For a summary of the BioReCer recommendations for policy makers see Table 3.

Table 3: Key Challenges and Recommendations for Policy Makers and Governments

Challenges	Recommendations by BioReCer
Difficulties in quantifying, monitoring and distinguishing between bio-based and non-bio-based feedstock and products.	• Develop a harmonised product coding extension (e.g., "green-tag") linked to HS/CN codes that identifies bio-based origin, managed via an EU-wide registry accessible to customs and certification bodies. • Update existing databases such as EUROSTAT to include bio-based content indicators and traceability information. • Fund and mandate EU-wide deployment of interoperable digital product passports and feedstock traceability platforms across key sectors taking into account different business sizes
Lack of harmonisation in CSLs	• Establish a technical committee or working group among certification bodies by sector per country in order to cross-reference indicators and eliminate overlaps. • Establish an EU Bioeconomy Certification Observatory to track the uptake, quality, and impacts of certification schemes across sectors and Member States.
Cost-benefit of certification difficult to estimate	• Develop fiscal incentives for certified bio-based products. • Allow for transitional and progressive certification solutions, especially for SMEs
Lack of a structured unified framework for assessing different CSLs in bio-based industry	• Develop and institutionalise an EU CSL Benchmarking Framework that evaluates certification schemes based on key criteria such as transparency, robustness, scope, and enforcement.
Supplying bio-based feedstock consistently in terms of quantity and quality	• Develop frameworks to support regional biomass management registries and hubs.
Material innovations and opportunities of biogenic waste as feedstock often unknown	• Develop knowledge-sharing platforms and technical reference libraries (e.g. with LCAs) for lessons learned and success cases to use as a starting point. • Create financial incentives and supportive tools to promote upcycling and reduce reliance on fossil inputs. • Integrate circular economy criteria into national and regional bioeconomy strategies • Ensure policy stability to maintain investor confidence and support innovation in the valorisation of organic residues. • Establish multi-stakeholder platforms such as the BRSP developed in BioReCer to foster collaboration and knowledge sharing. • Develop schemes for targeted financial support for waste valorisation and circular business models.
Consumer negative perception of products made from bio-waste	• Create public-perception campaigns to change how these products are perceived. • Fund targeted education efforts

Challenges	Recommendations by BioReCer
Insufficient infrastructure, e.g. lack of hubs, long distance transportation, collection systems etc.	• Build circular economy friendly infrastructure and hubs • Encourage certification-compatible infrastructure development through public-private partnerships (PPPs)
Limited binding regulations for bio-based products, with over-reliance on voluntary schemes.	• Introduce clear, binding EU standards for bio-based products to strengthen market consistency, accountability, and investor confidence. • Align regulatory frameworks with certification systems to reduce ambiguity, especially around waste classifications and valorisation. • Support the development of EU-recognised meta-labels or mutual recognition frameworks that align core CSL criteria across existing schemes.
Unclear differentiation between bio-based secondary feedstock and bio-waste	• Define and standardise the legal distinction between “bio-based secondary raw materials” and “waste” across EU legislation, including the Waste Framework Directive and REACH interface. • Harmonise regulatory frameworks to ensure consistent classification across environmental, economic, trade, and innovation policies. • Clarify “end-of-waste” criteria to support circular use and valorisation of bio-based materials.
Limited alignment of CSLs and EU Policies	• Embed circularity scores in EU policy

Conclusion

The BioReCer project has shown that CSLs are fundamental for supporting a sustainable and circular economy in Europe. BioReCer underscores the relevant role that CSLs have in building market trust, enabling regulatory compliance, and unlocking value across bio-based sectors. However, there are persistent challenges that need to be addressed, namely fragmented traceability systems, uncertainty regarding cost-benefit, supply chain inconsistencies, insufficient infrastructure, and limited policy alignment. These issues affect policy makers, CSL owners, and businesses alike, risking slow adoption and undermining the sector’s credibility and competitiveness.

To accelerate the uptake and impact of CSLs, BioReCer offers a comprehensive set of recommendations for each core stakeholder group. Businesses are called to treat certification as a strategic asset, and not just as a compliance exercise. By implementing robust T&T systems, integrating digital audit tools, and aligning with recognised certification schemes, companies can both reduce costs and gain a competitive edge in green markets. Strengthening supply chain transparency and leveraging group certification and modular

solutions will especially benefit SMEs by lowering entry barriers. However, this last recommendation should be done in joint collaboration with CSL owners.

In this regard, CSL owners must lead innovation by developing these modular solutions, including criteria to capture circularity, traceability, and the use of biogenic waste and new, emerging, feedstocks. Enhancing cooperation with industries and fostering multi-stakeholder platforms will make certifications more relevant, inclusive, and impactful. Streamlining infrastructure assessments and promoting digital tools will further improve real-time auditability and supply chain consistency.

Finally, all these recommendations are underpinned in the existing legislative framework, for this reason, policymakers are urged to embed CSLs more firmly into EU regulatory, data, and economic frameworks through harmonised product coding, traceability platforms, fiscal incentives, and unified benchmarking standards. Supporting market actors with clear, binding criteria and cross-sector observatories will streamline practices and reduce administrative burdens.

The unified roadmap outlined by BioReCer equips businesses, CSL owners and policy makers to overcome systemic barriers together. By implementing these measures, CSLs can transform from fragmented tools into pivotal drivers of systemic change. This will accelerate the EU's transition to a more resilient, fair, and sustainable bioeconomy.

Imprint

Image rights:
Fish cans: Anfaco-Cecopesco
Others: Adobe Stock

Authors:
nova-Institut GmbH (Luciano Proto Cassina, Anke Schwarzenberger)
with support from the BioReCer consortium)

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.