JOINT
POLICY RECOMMENDATIONS
FOR THE TRANSITION TO
CIRCULAR BIOECONOMY
IN EU REGIONS AND CITIES

BIOTRANSFORM
TRANSITION PATHWAYS TO CIRCULAR BIO-ECONOMY

ROBIN
DEPLOYING CIRCULAR BIOECONOMIES AT REGIONAL LEVEL WITH A TERRITORIAL APPROACH

BIOMODEL 4REGIONS

SUSTRACK

INTRODUCTION

The report formulates general policy recommendations targeting the European Union (EU) and national levels, to streamline the uptake of circular bioeconomy in European regions.

The objective of these joint policy recommendations is to accelerate the transition of EU regions from linear to circular bioeconomy (CBE). The following joint policy recommendations were mainly based on the research of the **BIOTRANSFORM** project, with the collaboration of other EU projects - **SUSTRACK**, **ROBIN** and **BIOMODEL4REGIONS**.

The recommendations are based on the challenges and opportunities found in the studies conducted in the projects' pilot areas. The target audience is defined as decision-makers at EU level and national policy makers, and focus on regulation, economic instruments, and technical support.

The recommendations are divided into four main areas and are the following:

Data for Decisions

- Enable postal code-based resource flow tracking;
- Develop EU-wide standardised guidelines for collection and analysis of data on secondary streams;
- Establish publicly available regional databases for feedstock availability and utilisation;
- Support regional resource mapping initiatives;
- Support regions in the definition of sets of indicators to monitor the progress of regional strategies

Financing and Business Opportunities

- Introduce market incentives to promote bio-based products;
- Strengthen public procurement for secondary bio-based products, guided by EU recommendations for bio-based products;
- Create and/or ease access to dedicated financial mechanisms for scaling bioeconomy projects

Governance

- Support the creation of regional coordination mechanisms;
- Build regional knowledge and awareness;
- Support the creation of transition broker role at regional level

Knowledge Sharing and Education

- Establish regional bioeconomy training hubs;
- Develop EU-funded bioeconomy education programmes;
- Integrate bioeconomy into existing curricula;
- Create a bioeconomy skills certification system

These recommendations are to be implemented at either the national or EU level, as denoted by the following pictograms:

National **EU**

DATA FOR DECISIONS

Context

While transitioning to circular bioeconomy, several environmental and socio-economic challenges are to be considered, such as addressing climate change and managing natural resources in a sustainable way, including preserving biodiversity. This is well illustrated in the case of **Northern Burgenland (AT)**, where taking all pruning material from vineyards for bio-based applications can deplete soil organic carbon, making it more difficult to restore already degraded soils. This highlights the need for sustainable practices that leave or return some carbon and nutrients in a cascading utilisation to the field to maintain soil health.

From an impact perspective, the shift from a fossil to a biobased economy can also generate socio-economic challenges, as biobased value chains rely on interdependent actors, creating systemic risks. For instance, feedstock shortages or policy shifts in one sector can disrupt entire supply chains for other sectors.

These trade-offs underline the need for careful sustainability assessment by combining environmental and socio-economic aspects to make informed decisions that balance bioeconomy goals with biodiversity conservation, ecosystem restoration and addressing socio-economic limitations. To conduct robust assessment, data on regional feedstock types, volumes, locations need to be available and easily accessible.

Understanding resource flows, such as where materials go and how they are used, does not only allow to detect trade-offs, but is also essential to optimise systems and close resource loops. Additionally, data on logistics and infrastructure is crucial to link decentralized processing with centralized conversion systems efficiently.

Data on workforce composition, sectoral employment trends, and regional skill gaps is also critical for mitigating unemployment risks and designing training programmes. Harmonisation across Europe is vital for enabling cross-regional collaboration and providing entrepreneurs with reliable information on feedstock availability, labour market, product demand and funding schemes.

Open access to harmonised data can support policymakers and entrepreneurs in making informed decisions, while addressing emerging gaps for new feedstocks and processes will further strengthen bioeconomy strategies.

DATA FOR DECISIONS

Recommendations

◆ Enable postal code-based resource flow tracking

Introduce a postal code system at the NUTS3 level to enable precise tracking of resource flows. This would allow policymakers and entrepreneurs to understand where resources are generated, processed, and utilized, facilitating better decision-making and planning.

◆ Develop EU-wide standardised guidelines for collection and analysis of data on secondary streams

Create harmonised guidelines, for collecting, analysing, and reporting data on secondary streams, as a separate and additional reference to those related to waste and products already published in the Official Journal of the European Union (OJEU). Guidelines should cover all types of feedstocks, including forestry residues, agricultural by-products, industrial organic waste, and biowaste. They should also ensure compatibility across regions to enable cross-border collaborations and scalability.

◆ Establish publicly available regional databases for resource availability and utilisation

Mandate national-level legislation to create and maintain annually updated, comprehensive, and freely accessible databases to support sustainability assessments of bioeconomy practices. These databases should be as transparent and as easily accessible as possible, to foster technical innovation for their valorisation and to ensure the materialization of the related environmental and socio-economic benefits. They should capture:

- Quantities, locations, and quality of available feedstocks
- Current uses and destinations of resources
- Seasonal and logistical fluctuations in supply
- Regional skill mapping

In addition, integrate feedstock flows into national electronic waste management systems to monitor performance at both national and regional levels.

Good practice from Finland: *Biomass Atlas is an online service for mapping, analysing and reporting biomasses from forestry and field, as well as manure and waste biomasses.*

DATA FOR DECISIONS

Recommendations

◆ Support regional resource mapping initiatives

Encourage regions to develop resource maps (local biomass, industries, and workforce strengths) at the local level, supported by EU and national funding. These maps should highlight potential feedstock hotspots, infrastructure availability, and logistics pathways, and several stakeholders, such as municipalities and industry players, should be involved in their design to ensure accuracy and relevance.

Good practice from North Rhine Westphalia (DE): *The Ministry of Environment tendered a study which analysed biomass availability in the Rhenish mining region.*

◆ Support regions in the definition of sets of indicators to monitor the progress of regional strategies

Via guidelines and in the establishment of regional observatories to track bioeconomy deployement progress.

FINANCING AND BUSINESS OPPORTUNITIES

Context

A transition to circular bioeconomy requires both public and private financial support for setting up and bringing bio-based projects to market scale. However, the analysis of the pilot regions has highlighted that one recurrent challenge is the **lack of funding to support circular bioeconomy.**

This is largely due to the difficulty of **finding a sustainable business model** for many bio-based industries, caused among others, to possible fluctuations in the availability of input biomass (i.e. the case of **Charles SPA (CZ)**, where the input is food waste, the volume of waste is subject to fluctuations due to seasonality of tourism), and the low demand of bio-based products compared to mainstream products (i.e. in the case of the Rhenish region, new bio-based flows for chemical industry compete with long established and well-functioning and optimised systems). In addition to the challenges above, the novelty of circular biobased business models generates a higher risk perception than conventional businesses, thus discouraging private investors from providing financial support. In some regions, such as **Andalusia (ES)** and **North Rhine Westphalia (DE)**, circular bio-based projects often face significant barriers when transitioning from the development or pilot phase to commercialization.

These challenges include high capital expenditure (CAPEX) requirements for scaling technologies, limited access to financing, and uncertainties in market demand for bio-based products. Additionally, the lack of supportive legal frameworks, standardized certification systems, and established supply chains further complicates this transition. Without clear pathways for scaling and financial backing, many innovative projects fail to achieve long-term economic viability.

FINANCING AND BUSINESS OPPORTUNITIES

Recommendations

◆ Introduce market incentives to promote bio-based products

Introduce financial incentives for the production, marketing, and adoption of secondary bio-based materials (e.g., extracts, 2nd generation bioplastics, biochemicals, compost) and only after established utilisation cascades also bioenergy (EU Level). Such incentives could for instance consist in Value Added Tax (VAT) reductions for environmentally friendly secondary bio-based products produced within the EU, or direct investment subsidies for small and medium-sized enterprises (SMEs) transitioning from pilot to commercial scale.

These incentives should be linked to overall sustainability assessments (including Life Cycle Assessment and socio-economic assessments), prioritizing materials with demonstrable environmental benefits.

◆ Strengthen public procurement for secondary bio-based products, guided by EU recommendations for bio-based products

- Set mandatory percentages of secondary bio-based materials in public projects, such as construction, landscaping, and waste management.

- Encourage local governments to prioritise regional bio-based products to stimulate local markets.

◆ Create and/or ease access to dedicated financial mechanisms for scaling bioeconomy projects

- Establish easy access to bioeconomy-specific funds to provide low-interest loans or grants for the commercialisation of bio-based projects. Such funding should foresee programmes for specific Technology Readiness Levels (TRLs). It should also be accompanied by ad-hoc advice and counselling service, to guide and help circular bioeconomy companies effectively scale-up and establish a sustainable business model.

- Develop regional venture capital funds or public-private partnerships to reduce risks for investors in bioeconomy technologies and innovative solutions.

- Offer guarantees for bioeconomy start-ups and SMEs to help them secure loans for scaling their operations.

GOVERNANCE

Context

The transversal nature of circular bioeconomy entails that several policy departments in local and regional administrations are participating in the design and implementation of a circular bioeconomy strategy aiming at exploiting the local and regional potentials and innovations. This requires the alignment of their priorities and already existing sectoral regulations, resulting in a time and resource-consuming process that not all public administrations are willing to undertake. Inclusive internal governance and interservice cooperation are thus key to bring around the table the relevant public administrations and departments at local or regional level, and particularly those in charge of economic development, agriculture and rural affairs, environment and waste, as well as research and innovation.

For instance, this challenge has the potential to limit the impact of the BIOTRANSFORM project in **Western Macedonia (GR)**. One of the primary issues is fragmented governance and stakeholder engagement. Sectors such as agriculture, forestry, waste management, and energy may operate independently, without unified communication channels or shared objectives. This fragmentation reduces the efficiency and effectiveness of the project, making it difficult to achieve the systemic change necessary for a successful circular bioeconomy. On the other hand, pilot regions **Finland**, **Andalucia (ES)** and **Baden-Württemberg (DE)** constitute a good practice, as they have succeeded in overcoming this challenge and drafting a regional strategy, developed by interministerial steering committees and implemented by several ministries.

GOVERNANCE

Recommendations

◆ Support the creation of regional coordination mechanisms

- Support the creation of a dedicated position, body, or network at the NUTS3 level, while involving already active players or supportive organizations in the region to ensure coordination across bioeconomy-related departments. At national and EU level, such kind of support could be provided through specific guidelines linked to the national bioeconomy strategy (if any) describing the main features and functions of this coordination body and providing examples of good practices at EU and national level.

- Support the establishment of innovative governance and collaboration models at local and regional level to achieve better-informed decision-making processes, social engagement and innovation. This will help support and strengthen EU and international science policy interfaces to achieve the Sustainable Development Goals.

- If a circular economy organization is already active and operating in the region, like in the case of **Finland**, a dedicated department to circular bioeconomy should be established within this entity, which can act as coordination body.

Good practice from Finland: *Finland has formulated the Finnish Bioeconomy Strategy. It is continued by Circular Economy Green Deal where voluntary commitments from organisations are collected aiming to reduce use of natural resources and enable circular economy. Implementation of the strategy is divided between several ministries, and it is carried out in cooperation with many actors. The regions having their own focus areas play a key role in achieving the objectives of the Bioeconomy Strategy, and the ministries hope that the regions will draft their own implementation plans. The Ministry of Economic Affairs and Employment will appoint a steering group for the implementation of the updated Bioeconomy Strategy. In addition, Finland's biodiversity policies are based on the National Biodiversity Strategy and an action plan to 2030, which is still underway. In addition to national objectives, the strategy considers the objectives of the UN Convention on Biological Diversity and the new EU Biodiversity Strategy and the Nordic Council of Ministers' Forest research strategy. The aim of the strategy is to halt the loss of biodiversity by 2030 and turn the trend towards recovery by 2035. Alignment between biodiversity, bioeconomy and climate targets needs to be found at national level first, to enable similar alignment at regional and local levels.*

GOVERNANCE

Recommendations

◆ Build regional knowledge and awareness

- Organise training sessions and awareness campaigns targeted at farmers, SMEs, and policymakers to improve understanding of bioeconomy opportunities and benefits.

- Peer learning platforms: At national level, promote spaces for regions to share best practices. These platforms would also be a space for highlighting successful case studies, such as developed cases within BIOTRANSFORM and other circular bioeconomy projects.

- Develop best practice guidelines for local operators and innovation developers, supporting climate-neutrality and low environmental footprint improvements of bio-based products and services.

Good practice from Baden-Württemberg (DE): *The "Baden-Württemberg Bioeconomy Congress" is a cross-department and cross-sector event taking place every two years. It involves German/Baden-Württemberg stakeholders but also foresees an international exchange.*

◆ Support the creation of transition broker role at regional level

Support the creation of specialised roles at regional level to facilitate collaboration and alignment between local biomass, industries, and workforce strengths. Transition brokers are specialized roles/profiles facilitating the collaboration among sectors, by developing a territorial knowledge on available resources and users.

From EU and national level, support to establish this role could be provided through:

- Specific funds and training programs to establish this professional profile

- Direct support to regions in defining the tools and instruments for the appointment of transition brokers (i.e. through a dedicated national info point for advisory services, national/EU guidelines)

KNOWLEDGE SHARING AND EDUCATION

Context

There is a general lack of specialised courses and trainings on complex and transversal topics such as bioeconomy. This is even more true in regions where opportunities for higher education are already limited. Here, the younger population and educated workforce tends to migrate outside of the region, in turn reducing the potential of creating a pool of entrepreneurs willing to innovate and test new solutions in this area.

This is for instance the case of **Charles SPA** region (CZ), where qualified workforce, especially in the technical sectors, is lacking; in 2018, 19% of inhabitants had only attained basic education and 11.7% had university education. This may be partly due to the lack of technical universities in the region, despite the concentration of industry. The region is also trying to move away from coal-based activities, which has a significant impact on employment.

The establishment of trainings on bioeconomy to consolidate knowledge in the region is thus an opportunity to create employment, while supporting the region in addressing its economic transformation challenges and revitalizing the economy.

KNOWLEDGE SHARING AND EDUCATION

Recommendations

◆ Establish regional bioeconomy training hubs

Create specialised hubs within existing institutions such as universities, vocational or agricultural schools. Companies in the relevant sectors should also be involved. Training hubs would include a curriculum for bioeconomy transition brokers. They should align with regional needs and include practical courses on biomass utilisation and bioproduct development. They should also include remote options to avoid brain drain in the region.

Foster collaborative learning among different bioeconomy stakeholders bringing groups with different knowledge perspectives together and strengthening their capacity to create and govern the bioeconomy clusters.

◆ Develop EU-funded bioeconomy education programmes

Expand initiatives in e.g., Erasmus+ to include bioeconomy-specific curricula.

◆ Integrate bioeconomy into existing curricula

- Add bioeconomy modules to schools (i.e. in agronomy, engineering and business curricula) and vocational training, based on prior analyses of local labor market, to align with regional bioeconomy needs.

- Focus on practical skills and advanced training for professionals (such as the Master's Degree Programme in Chemistry and Analytics for Circular Economy (CACE) in Finland).

◆ Create a bioeconomy skills certification system

Develop an EU-wide certification to standardise skills and improve mobility that covers key areas like biomass processing and circular design.

Good practice from Andalusia (ES): *In the regional strategy for circular bioeconomy there is a specific measure that addresses this issue: "**Measure b.3. promoting the introduction of bioeconomy into educational programs, curricular pathways, and professional training**". This measure aims to integrate bioeconomy into the comprehensive education of individuals by introducing it into schools, as well as incorporating it into post-compulsory, higher, and professional training programs. This measure includes two main actions: **B.3.1. Introducing bioeconomy and/or its related fields into the curricular content of compulsory education, vocational training programs, relevant university degrees, as well as training courses focused on professional performance and practical skills for workers in related sectors** and **B.3.2. Assessing the state of the art of master's programs related to bioeconomy** and, if necessary, promoting the establishment of a specialized master's degree in bioeconomy.*

BIOTRANSFORM provides European policymakers with an adequate assessment and policy development framework, knowledge base and expert support ecosystem to accelerate the transition from linear fossil-based systems to circular bio-based systems. It is therefore operating at the interface between the circular economy and the bioeconomy transition.

www.biotransform-project.eu

The BIOMODEL4REGIONS project aims to support the establishment of the innovative governance models at local/regional level to achieve better-informed decision-making processes, social engagement and innovation to support and strengthen EU and international science-policy interfaces to achieve the Sustainable Development Goals.

www.biomodel4regions.eu

ROBIN aims to empower Europe's regions to adapt their governance models and structures in ways that accelerate the achievement of their circular bioeconomy targets while promoting social innovation and accounting for different territorial contexts.

www.robin-project.eu

SUSTRACK is a three year project aimed at supporting policymakers in their efforts to develop sustainable pathways to replace fossil and carbon-intensive systems with sustainable circular biobased systems at the EU and regional scale, contributing to achieving the European Green Deal's objectives.

www.sustrack.eu

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