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# Towards a sustainable European forest- based bioeconomy

– assessment and the way forward

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# Executive Summary

The current global economic model which relies on fossil raw materials is not sustainable in the long term. This is especially true as megatrends of demographic growth and climate change continue. This situation makes it necessary to explore alternative models that minimise the overall consumption of energy and material and maximise the share of renewable resources in the economic system.

The bioeconomy is one such alternative model. It offers both opportunities and challenges for Europe's forest resources. Forests are Europe's biggest renewable natural resource in terms of energy and material supply. At the same time, they provide much more than only biomass. They support a rich portfolio of other ecosystem services that range from protective functions (eg preventing soil erosion) to cultural services (eg recreation) and the provision of goods such as game and mushrooms.

This situation offers great opportunities for a holistic forest-based bioeconomy through the intelligent use of biomass as well as through developing innovations relating to the entire spectrum of forest ecosystem services. However, an increased use of renewable biological resources needs to consider planetary (sustainability) boundaries, eg by taking care of biodiversity and climate change mitigation.

This science-based study provides a synthesis of existing knowledge for policymakers on the prospects for a sustainable, inclusive forest-based bioeconomy in Europe, including:

- The importance of forests and the forest-based sector in contributing to a European bioeconomy;
- The assessment of a forest-based bioeconomy in view of innovation and economic, social and environmental sustainability;
- Future issues that may affect the development of a forest-based bioeconomy.

## A new policy narrative

The bioeconomy has mobilised significant investments in technology, research and innovation. New and innovative bio-products and related services have emerged, and related niche markets show dynamic growth. However, the biomass-based sectors are affected by the major 20<sup>th</sup> century transition away from the primary and secondary sectors towards services in Europe. This historic transition has been accompanied by a significant loss in relative importance for these sectors, despite many innovations and the dynamic growth of some branches. In this regard, the bioeconomy reality shows a mixed picture. There is much work to be done to reach the vision of the bioeconomy as a crucial pillar of a more sustainable future economy.

The starting point to better connect the vision to reality may lie in a new **policy narrative** for the forest-based bioeconomy. **This narrative should emphasise a sustainable and socially inclusive forest-based bioeconomy.** It envisions a bioeconomy that recognises

and mobilises the entire spectrum of ecosystem services that Europe's forests can provide for the benefit of Europe's societies. It outlines a bioeconomy that combines responsible primary production of ecosystem services with innovative industries, and a creative and dynamically growing manufacturing and service sector.

Cross-sectoral collaboration to exploit untapped potential and synergies is needed to substantiate this narrative. It needs to tackle sustainability-related conflicts and maximise sustainability-related synergies, to green the greenest part of the bioeconomy – the forest-based bioeconomy. Substantial intellectual, political and economic investments are needed to underpin this narrative. These include:

### **Build upon the entire spectrum of ecosystem services**

Current bioeconomy policy emphasises biomass production-related activities. However, there is a huge variety of societal demands towards Europe's forests, which correlate to various economic activities. Other ecosystem services and related products are of increasing importance, and at regional scales sometimes of primary relevance. Consequently, this study argues that a definition of a **forest-based bioeconomy should encompass economic activities relating to all forest ecosystem services**, ranging from forest biomass to tourism, recreation and non-wood products. Such a definition could be established at the **(pan-) European or EU level**.

### **Take a multi-level policy approach**

Regional differences in Europe are crucial for the forest-based bioeconomy. Consequently, a European policy to support the development of the forest-based bioeconomy should take a multi-level approach.

- At the EU level, **the concept and basic rules for European forest-based bioeconomy markets** should be defined. The set of innovation policy tools needs to be boosted, building on existing tools such as Horizon 2020 and the European Investment Fund (EIF).
- At national and subnational levels, existing **bioeconomy strategies** provide the natural framework to set regional priorities.
- In addition, **forest-based bioeconomy clusters in transnational regions** could be established. These clusters could bundle activities in 'bioeconomic regions' with similar ecological and socio-economic conditions to prioritise objectives for bioeconomy development.

### **Become sustainable in all dimensions**

A key argument to further develop the bioeconomy is the need to move from a non-sustainable economy built on non-renewable resources. The forest bioeconomy can help to contribute to this objective. However, this does not mean per se that a forest-based bioeconomy is sustainable. The entire sustainability dimension of the forest-based bioeconomy needs attention for it to be perceived as a major sustainability transition project by broader society:

- The forest-based bioeconomy must not only focus on rural communities, but also increase its legitimacy and acceptance in urbanised societies, as well as its competitiveness on world markets which serve their needs.
- A comprehensive and proactive approach to sustainability which exploits the synergies and regulates the conflicts between the different dimensions of sustainability is in the long-term the precondition for both societal legitimacy and competitiveness.

### Tackle untapped synergies and resources

Developing a sustainable forest-based bioeconomy means **searching for and exploiting untapped synergies**, and developing **‘win-win’ development options**:

- There is significant, but regionally distinct, potential to boost a forest-based bioeconomy via tapping into **unused biomass potential**, at the same time having a positive effect on other sustainability aspects, e.g. **fire safety, employment and rural economies**.
- The relationship between biomass harvest and biodiversity conservation needs attention but is not black and white. There is **significant potential to better align forest biomass harvest and biodiversity conservation** through wise allocation of harvesting activities at the landscape level.
- There is significant, and often hidden, potential for forest-based bioeconomy developments focusing on **non-wood forest products**, as well as **cultural/recreational forest ecosystem services**. These often have synergies with biodiversity and the demands urbanised societies have towards forests.
- Expectations of **private forest owners** towards their forests are diverse and mirror the multiple demands of **pluralistic societies**. This could align producer and consumer interests.

### Enhance cross-sectoral cooperation

The forest-based bioeconomy touches several issues that go beyond the traditional ‘forest sector’. A large number of policies affect distinct stages of the forest-based value chain (and its respective sub-sectors) in different ways.

- **Cross-sectoral policy coordination** must address two types of coordination challenges: a ‘silo’ mentality preventing the exploitation of synergies, and conflicting sectoral interests. Actively integrating bio-based production with elements of climate mitigation, biodiversity conservation, nature-based tourism and recreation, as well as non-wood forest products, will increase the cross-sectoral support for a forest-based bioeconomy.
- **Value chain-specific assessments** are critical to address inter-sectoral policy inconsistencies and advance a more integrated policy framework.

### Create a stable and level playing market and innovation policies to nurture emerging markets

A key question relating to the governance of a future forest-based bioeconomy is what an enabling policy framework should look like, specifically in the interplay with markets.

- Specific market interventions that favour the use of one forest ecosystem service over another are often problematic. Rather than subsidising specific value chains, the creation of a **level playing field** is advisable. The rationale should be to internalise sustainability effects into markets.
- **Economic instruments** at the level of the common market can incentivise sustainable production and consumption. Reviewing existing experiences at national levels and gradual implementation over the long-term would allow testing and iterative adaptation.
- **Innovation policies** are needed to kick-off and support innovations relating to the forest-based bioeconomy. **Forest-based bioeconomy clusters in transnational regions** can identify priorities for such policy tools.

- A **reliable and stable policy framework** is important to incentivise investments in the forest-based bioeconomy. '**Minimum durations**' could be agreed upon for policy instruments, or at least **defined criteria for evaluation and adjustment**, to provide more stability for investment decisions.

### **Provide better information**

**Knowledge is a key resource** for developing the forest-based bioeconomy. Information is incomplete, or even non-existent, for key aspects such as new and innovative forest products, changing employment or many economic activities based on ecosystem services other than biomass. This may lead to incorrect assessments of forest-based bioeconomy development, including a significant underestimation of its social and economic importance. A **renewed system of indicators** for the forest-based bioeconomy could serve as the backbone for gathering this information at European level.

### **Encourage inclusivity**

Societal inclusiveness is a crucial component for the forest-based bioeconomy in Europe. Human attitudes, interests and actions are critical for the entire forest-based value chain, from the forest owner to bioeconomy entrepreneurs to the consumer/citizen demanding forest-related products and services.

- **Environmental sustainability** is essential for approaching the urban population (c. 70% of the entire population of Europe).
- Most of the primary production and a part of the value added for products and services takes place in **rural areas**. This provides new opportunities for the inclusion of these areas in the European economy.
- **Social sustainability** requires bioeconomy politics to engage with the demands of a broader society to gain societal legitimacy. This needs to go beyond 'creating acceptance' and 'convincing consumers'.

A sustainable forest-based bioeconomy holds great promise to contribute to a transformation of the entire economic system, moving away from fossil-based production and consumption. To fully unfold its potential, a much larger transition is needed at the level of the entire society. This means expanding the bioeconomy beyond the current understanding to include a much broader vision: a **European bio-society** with sustainable consumption patterns, sustainability-related innovations, and informed participation by all citizens.

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