

Flows of Bio-Resources into Mixed Industrial Sectors in Slovakia

Policy Brief

Introduction

- Policies in the EU support transition to a bioeconomy, an economy utilizing renewable biological resources.

European policies (the Bioeconomy Strategy) provide strategic guidance and funding to encourage the use of renewable biological resources across industries, promoting sustainability and reducing dependence on fossil-based materials. These initiatives aim to foster innovation, create new value chains, and support the development of environmentally friendly technologies.

- Empirical insights on the size bio-based activities are in particular relevant for mixed sectors, such as textiles, chemicals, pharmaceuticals, plastics manufacturing, furniture production, and energy supply.

Understanding the extent and flows of bio-resources in these sectors helps policymakers and industry stakeholders identify opportunities for efficiency, value addition, and sustainable growth. Detailed data on bio-based inputs also support strategic planning, resource management, and the design of incentives to strengthen the circular bioeconomy.

- Mapping bio-resource flows is essential for optimizing resource use and supporting industrial competitiveness.

Monitoring the quantity of biomass consumed by different sectors and how its share changes over time provides valuable insights into trends, growth opportunities, and areas for efficiency improvement. This information supports evidence-based policy decisions and helps industries optimize resource allocation while advancing the transition to a sustainable bioeconomy.

Key Findings I

- **Pharmaceutical industry:** significant progress towards bio-based inputs between 2010 and 2020 (share of bio-based inputs in mass terms increased from 12.5% to 22.6%).

The pharmaceutical sector has steadily increased its reliance on bio-based inputs, reflecting successful adoption of renewable materials, green processing practices a consumer demand for sustainable healthcare solutions.

- **Textile sector:** shows modest improvement (from 9.5% to 13.2%) but is simultaneously experiencing a dominance of synthetic, fossil-based inputs.

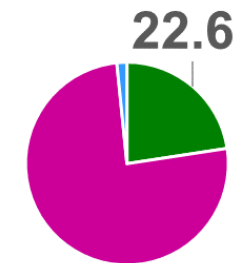
Although the use of bio-based materials in textiles is gradually increasing, the sector remains heavily dependent on synthetic fibres derived from fossil resources. This dual trend underscores the challenges of transitioning traditional manufacturing processes toward more sustainable, bio-based alternatives.

- **Chemical industry:** stagnates, with bio-based inputs at around 12%.

The chemical sector has seen little change in its use of bio-based inputs over the past decade, indicating limited uptake of renewable materials. Without stronger incentives or technological shifts, this stagnation may slow the overall development of bio-based value chains in Slovakia.

Share of biological inputs in sectors of the Slovak economy, 2020
(% share in total mass of inputs)

Pharmaceutical industry



Textile industry



Chemical industry



input categories:

- biological inputs,
- dual-origin inputs,
- fossil-/mineral-based inputs.

Key Findings II

- Plastics manufacturing: remains strongly dependent on fossil and dual-origin feedstock (bio-share declined from 3.9% to 2.4%).

The plastics sector shows a declining trend in the use of bio-based inputs, reflecting ongoing reliance on conventional fossil-derived materials and limited adoption of sustainable alternatives. This highlights the need for stronger incentives, innovation, and technological solutions to increase the share of renewable feedstock.

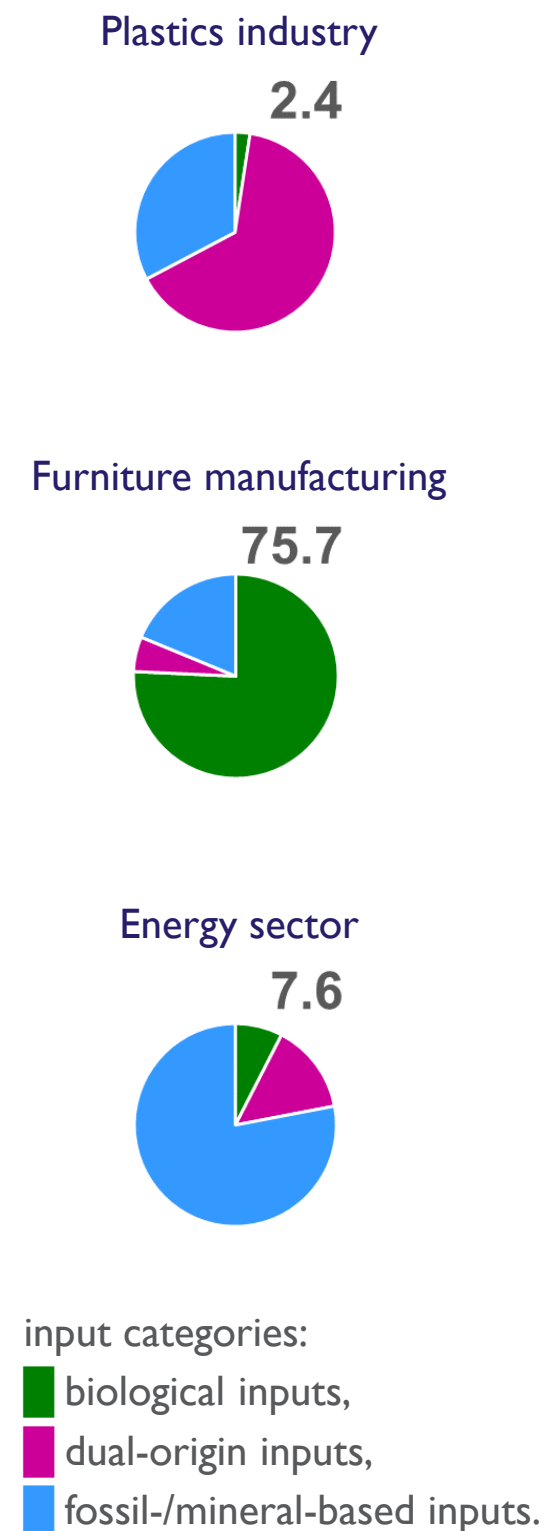
- Furniture sector: remains the most bio-based (75% renewable inputs in 2020, a decline from 90% in 2010).

Although still heavily reliant on renewable materials, the furniture sector has experienced a notable reduction in bio-based inputs over the decade, signalling pressures from cost, supply, or material substitution. Maintaining high levels of bio-based content requires continued attention to sustainable sourcing and circular production practices.

- Energy supply: continues to rely on fossil fuels (biological inputs account for only 7–9% of the total mass of inputs).

The energy sector has made only limited progress in integrating biomass and other biological resources, with fossil fuels remaining dominant in energy production. Expanding the use of bio-based energy sources could enhance energy security, reduce greenhouse gas emissions, and support Slovakia's renewable energy targets.

Share of biological inputs in sectors of the Slovak economy, 2020 (% share in total mass of inputs)



Policy Recommendations

- Policy measures: need for differentiated, sector-specific measures, targeted innovation and R&D support.
- Financial incentives: tax breaks or subsidies for companies increasing their share of bio-based inputs.
- Consumer dimension: promote demand for bio-based products through labelling, green public procurement, and information campaigns.
- Regulatory framework improvements: ensuring standards, certifications, and permits encourage the use of bio-based inputs while maintaining safety and quality.
- The chemical industry plays a multiplier role – supporting its transition to bio-based inputs enables progress in downstream sectors such as textiles, plastics, and pharmaceuticals.
- Current evidence may underestimate the actual share of bio-materials due to the insufficient classification of dual-origin inputs, improved monitoring would strengthen material flow accounting.

Conclusion

- The flow of bio-resources into Slovakia's mixed industrial sectors remains uneven, with some industries successfully increasing their bio-based inputs while others continue to rely heavily on fossil-based materials. Strengthening these flows through targeted innovation, sector-specific strategies, and market incentives is essential to support the growth of a sustainable, competitive bio-based economy.

Acknowledgement

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