BioEconomy in the European Union
Bioeconomy encompasses all sectors and associated services and investments that produce, use, process, distribute or consume biological resources, including ecosystem services. From the food we eat to the furniture in our house and the clothes we wear, the bioeconomy, as one of the Union’s largest sectors, is already present in our daily lives. Bioeconomy can be the natural enabler and result of the European Green Deal transformation.

Source: EU Bioeconomy Strategy Progress Report (2022)
EU BioEconomy Strategy: Time Line

2012
- First Bioeconomy Strategy
  - Efficient use of renewable resources
  - Focus on R&I

2018
- Updated Bioeconomy Strategy
  - Substitution of harmful products
  - Regional development
  - Understanding ecological limits

2019
- Council Conclusion

2022
- Bioeconomy Progress Report

Three sustainability dimensions:
1. Management of land and biological resources within ecologic boundaries
2. Sustainable value chains and consumption
3. Social fairness and just transition

Source: EU Bioeconomy Strategy Progress Report (2022)
1996 to 2007: Research Directorate of the European Union, Programme Director for Biotechnology, Agriculture and Food, agricultural research framework of the EU.

Christian Patermann, “Father” of the EU BioEconomy

Scholars from Brazil, Canada, EU: promote and stimulate improvement in the quality and relevance of international bioeconomy research and policy analysis.

Cologne Paper “En Route to the Knowledge-Based Bio-Economy”, KBBE

KBBE was defined as the process of “transforming life science knowledge into new, sustainable, eco-efficient and competitive products”.

1. GBS in Germany, International Advisory Council on Global Bioeconomy (IACGB)

Taxonomy Regulation: classification system, establishing a list of environmentally sustainable economic activities.

Source: Lang (2022); ICABR, GBS, IACGB
“Climate change and environmental degradation are an existential threat to Europe and the world. To overcome these challenges, the European Green Deal will transform the EU into a modern, resource-efficient and competitive economy, ensuring:

- no net emissions of greenhouse gases by 2050
- economic growth decoupled from resource use
- no person and no place left behind”

0.6 trillion euro investments from the NextGenerationEU Recovery Plan, and the EU’s seven-year budget.

1.0 trillion in total with private sector.
EU BioEconomy Strategy Objectives

- **ensure** food and nutrition security
- **mitigate** and adapt to climate change
- **reduce** dependence on non-renewable, unsustainable resources
- **manage** natural resources sustainably
- **strengthen** European competitiveness and create jobs.
• **10 Member states** with dedicated bioeconomy strategies at national level (AT, DE, ES, FI, FR, IE, IT, LV, NL, PT)

• **6 MS** in the process of developing their respective dedicated national strategies (CZ, HR, HU, LT, PL, SK)

• **7 MS** are involved in other macro-regional (BG, DK, EE, RO, SI, SE) or sub-national (BE) policy initiatives dedicated to the bioeconomy.

• **4 MS** have bioeconomy related strategies (CY, EL, LU, MT)

Source: Robert M’Barek (2022)
Current and expected integration across biotechnology application (size of arrows indicate quantities)


Source: European Commission, 2012
EU BioEconomy Integration

**Primary Sectors:**
- Agriculture, Forestry and Fishery (A01-03)
- Food, beverages and tobacco (C10-12)
- Wood and wood products (C16)
- Paper and paper products (C17)

**Partly Bioeconomy:**
- Part of Manufacturing (C13-15, C19-22, C31)
- Electricity, gas, steam, air cond. supply (D35)
- Construction of buildings, civil engr. (F41, F42)
- Part of Wholesale and retail trade (G46, G47)
- Accommodation, food and bev. serv. act. (I55, I56)
- Research and exp. dev. on biotech. (M7211)
• EU Member States Bioeconomy 2005–2015

Source: Cingiz et al. (2021)
### EU Green Deal and the BioEconomy

**Table 1.** Assessment of EU Green Deal initiatives in relation to bioeconomy sustainability objectives. The table shows how the European Green Deal initiatives focus on (‘dark green’) or support (‘medium green’) the sustainability objectives of the EU Bioeconomy Strategy or if specific attention is required to maintain overall coherence (‘light green’).

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Ensuring Food and Nutrition Security</th>
<th>Managing Natural Resources Sustainably</th>
<th>Reducing dependence on non-renewable unsustainable resources, whether sourced domestically or from abroad</th>
<th>Mitigating and adapting to climate change</th>
<th>Strengthening European competitiveness and creating jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm to Fork Strategy</td>
<td>[15]</td>
<td>[16]</td>
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<td>Renovation Wave</td>
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<td>European Climate Law</td>
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<td>[25]</td>
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<td>Chemicals Strategy for Sustainability</td>
<td>[27]</td>
<td>[28]</td>
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<td>Adaptation Strategy</td>
<td>[31]</td>
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<td>Sustainable Financing</td>
<td>[35]</td>
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<td>Zero Pollution Action Plan</td>
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<td>LULUCF</td>
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<td>Renewable Energy</td>
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<td>Forest Strategy</td>
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<td>[54]</td>
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<tr>
<td>Sustainable Carbon Cycles</td>
<td>[55]</td>
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</tr>
</tbody>
</table>


Source: EU Bioeconomy Strategy Progress Report (2022)
EU Policy Challenges: Complexity

Source: Kardung et al. (2021)
EU Policy Challenges: Trade-Offs

F2F changes in global warming potential based on Henning et al. (2021) excluding leakage and LULUCF

Source: Wesseler (2022)
More Needs to Happen

• Complexity of the BioEconomy: Energy, 4Fs, Biobased Materials

• Taxonomy: Sustainable Investment

• Indicators: Measuring/Illustrating Progress

• Indicators: Consistent Set Needed
Many Thanks!

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