Policy Paper

Digital solutions to accelerate the bioeconomy transition

December 2024

Executive Summary

While the European Commission has announced the revision of the EU Bioeconomy Strategy, there are still European countries that need to develop their national strategies and start investing into bioeconomy as one of the main responses to environmental and biodiversity challenges. The CEE2ACT project is deploying a bottom-up approach to increase local support for national bioeconomy strategies in 10 Central and Eastern European countries. Through an open dialogue, CEE2ACT connects a diverse coalition of engaged and motivated bioeconomy stakeholders, industry players, ministries, and decision makers committed to achieve national bioeconomy goals.

To facilitate this process, CEE2ACT encourages policy makers to invest in and utilize digital solutions that will help them assess the state of bioeconomy in their country and make knowledge-based decisions on how to develop a tailored national bioeconomy strategy. For this purpose, CEE2ACT has developed four digital tools that include:

1. **The CEE2ACT online inventory of good practices** that promotes existing projects and initiatives to inspire potential new ideas for the development of policy documents, new projects, and cooperation.
2. **The CEE2ACT self-assessment tool for bioeconomy promotion** that supports administrative bodies to evaluate the current state of the bioeconomy in their region and provide them with recommendations and additional information to support bioeconomy initiatives implementation. This will help to allocate resources and efforts to the most promising value chains.
3. **The CEE2ACT e-learning platform** that promotes bioeconomy and sustainable governance practices for capacity building and knowledge transfer, through interactive exercises classified in thematic training modules.
4. **The CEE2ACT matchmaking online tool** that fosters business collaboration aimed at bringing together relevant stakeholders from different European regions and countries.

CEE2ACT has the following recommendations for policymakers regarding the use of digital tools in the bioeconomy sector:
- **It is recommended to utilize available digital tools to gather new knowledge, identify relevant information, and adopt good practices;**
- **Encourage all bioeconomy stakeholders to use digital tools;**
- **Continuously develop stakeholders' digital skills;**
- **Effectively implement digital tools for assessments and decision-making;**
- **Invest into the digitalisation of the bioeconomy sector.**

Introduction

In line with the Sustainable Development Goals and the European Pillar of Social Rights, the European Union promotes fairness as one of the key objectives and guiding principles of both the European Green Deal and the Digital Decade Policy Programme. The concept aims to put citizens at the heart of the green and digital transition, ensuring a fair path toward climate neutrality and addressing the digital divide. The development of digital technologies has a massive impact on the labour market, driving innovation and scaling up of digital solutions in everyday jobs. Digital solutions can foster social inclusion and active participation in the labour market and society.

The European bioeconomy employs 18 million people in sectors which are under constant pressure to become more competitive, while also addressing environmental and climate challenges. One of the possible paths to unlock the full potential of the bioeconomy and support the competitiveness of agriculture, forestry, bio-based production, value chains and green chemistry is to invest into digitalisation. Digital solutions are not limited to the production processes and manufacturing, as they can also support the development of technical capacities in developing bioeconomy strategies and action plans, foster cooperation between different stakeholders and enhance bioeconomy-related skills such as collaboration, access to funding, governance and process optimization. Digital tools can also help develop the skills necessary to tackle priorities identified by the EU Bioeconomy Strategy, namely, strengthening and scaling up the bio-based sectors, unlocking investments and markets, deploying local bioeconomies rapidly across Europe, and understanding the ecological boundaries of the bioeconomy.

These digital solutions can support policy makers responsible for developing national bioeconomy strategies, scientists working in research and innovation in bioeconomy, private entrepreneurs investing into new bio-based products, and diverse organisations specialised in education and public awareness for the transition towards sustainable practices. CEE2ACT empowers policy makers and bioeconomy stakeholders in Central and Eastern Europe (**Bulgaria, Croatia, Czech Republic, Greece, Hungary, Poland, Romania, Serbia, Slovakia, and Slovenia**) to co-create roadmaps for bioeconomy strategies, using for example tailored digital solutions. These solutions aim to accelerate the bioeconomy and the promotion of its benefits for the green transition and support the decision-making process in an objective way.

This policy paper explains how the four e-tools developed within the CEE2ACT project accelerate knowledge transfer and awareness raising, promote the environmental, social and economic impacts of the bioeconomy sector, and help policy makers reach objective and well-informed decisions on bioeconomy in their countries.

Digitalisation in the bioeconomy:
Current challenges and European policy framework

The Digital Decade Policy Programme is the European Union's agenda to develop basic and advanced digital skills and competencies that are necessary to drive the digital transformation of the European society. To successfully navigate the digital transition, the ambitions of the European Union are high, requiring at least 80 percent of the European citizens to have basic digital skills by 2030.

Significant work is required to meet the 2030 digital skills targets, since only 55.6 percent of the current EU population has basic digital skills, and information and communications technology (ICT) specialists are projected to reach just 12 million by 2030, instead of the targeted 20 million. In 2023, almost 10 million people worked as ICT specialists across the European Union (Eurostat). The European Commission has developed a range of policies and initiatives to tackle the digital skills gap and is investing into upskilling and reskilling initiatives to provide the workforce with the necessary digital skills. Some initiatives include promoting and investing into digital education and training, for example the Cybersecurity Skills Academy and the European Digital Skills Awards.

Finally, there is a one-stop shop Digital Skills and Jobs Platform which offers open access to a repository of learning opportunities, learning pathways, career guiding, skills mapping, job trends, funding opportunities and best practices. The European Commission also supports the National Digital Skills and Jobs Coalitions, which bring together a range of partners to develop concrete measures to deliver digital skills to every level of society in their countries.

Apart from raising the digital competences of citizens, the European Commission also encourages the digital transformation and digitalisation of dynamic sectors, such as the bioeconomy.

This sector cannot be separated from a sustainable workforce, natural resource management, promotion of renewable resources, mitigation of climate change and ensuring food security.

To fully exploit the opportunities of the bioeconomy for job creation and economic growth, it is crucial that the workforce is equipped with the necessary multidisciplinary skills, including digital skills.

In recent years, digitalisation has become a very important feature of the bioeconomy as different operations in this sector are related to data collection, electronic processing, data exchange and data monetization. The EU Bioeconomy Strategy defines that service activities, such as scientific research and development, digitalisation and logistics are important elements in a bioeconomy and could more than double its size and employed workforce (EU Bioeconomy Strategy Progress Report, 2022).

One of the strategy's objectives is to develop integrated digitalised solutions to facilitate the transfer of environmental life cycle base information throughout the supply chains. Furthermore, digital tools are particularly applicable in the primary sector of the bioeconomy. For example, digitalisation plays a central role in smart farming, mechanisation, automation and livestock breeding, and can help agricultural development in those areas where there is a lack of skilful workforce.

Lastly, digitalisation is not only important in the agricultural sector or bio-based production. Digital tools play a crucial role in supporting bioeconomy decision-making processes. The CEE2ACT project has developed digital tools to assist decision makers in making informed and knowledge-based policy decisions.

How are the digital tools developed in line with the CEE2ACT bottom-up approach?

The main idea behind developing digital solutions for a green transition within the CEE2ACT project is to provide target countries and their National Bioeconomy Hubs with instruments to build capacities on bioeconomy, by giving them the access to information in 10 local languages and diversifying sources of information.

Four e-tools developed within CEE2ACT are designed to support not only the Hub members, but also a wider network of users to boost their opportunities for new bio-based value chains, future projects, cooperation and investment. The following e-solutions are enabling the process of capacity building and help reach evidence-based decisions, that is one of the key values of the bioeconomy strategy development promoted by CEE2ACT.

For example, the **CEE2ACT online inventory** of good practices by sector serves to promote existing projects and initiatives and inspires the potential new ideas for development of policy documents or new projects and cooperation.

Moreover, the **self-assessment tool** for bioeconomy promotion is created to support administrative bodies at national, regional or local level to evaluate the current state of the bioeconomy in their region and to provide them with the recommendations and additional information to support bioeconomy initiatives implementation.

Bioeconomy stakeholders and the wider public can also use the **e-learning platform** to promote the bioeconomy and sustainable governance. This platform focuses on capacity building and knowledge transfer, via interactive exercises divided into thematic training modules.

The **B2B matchmaking tool** aims to foster business collaboration and bring together relevant stakeholders from different regions and countries of the CEE2ACT area. This tool enables interested stakeholders (SMEs, large companies, R&D institutions, universities) to present themselves and build partnerships that will result in concrete projects or cooperation, such as R&D projects or commercial partnerships. The platform serves as a "marketplace", where bioeconomy players can search and meet potential partners from other regions, thus, it will encourage transnational collaboration and build new bio-based value chains.

Since the CEE2ACT project strongly encourages the bottom-up approach, the e-tools were developed based on bottom-up principles. The content for all e-solutions were created in close cooperation with the national Hub members, who tested and validated these solutions following the participatory bottom-up approach.

These co-creation principles applied throughout the project give a strong sense of ownership of the whole process to the stakeholders involved in the National Bioeconomy Hubs, encouraging them to participate in creating the roadmap to the national bioeconomy strategy, which is the final objective of the CEE2ACT project.
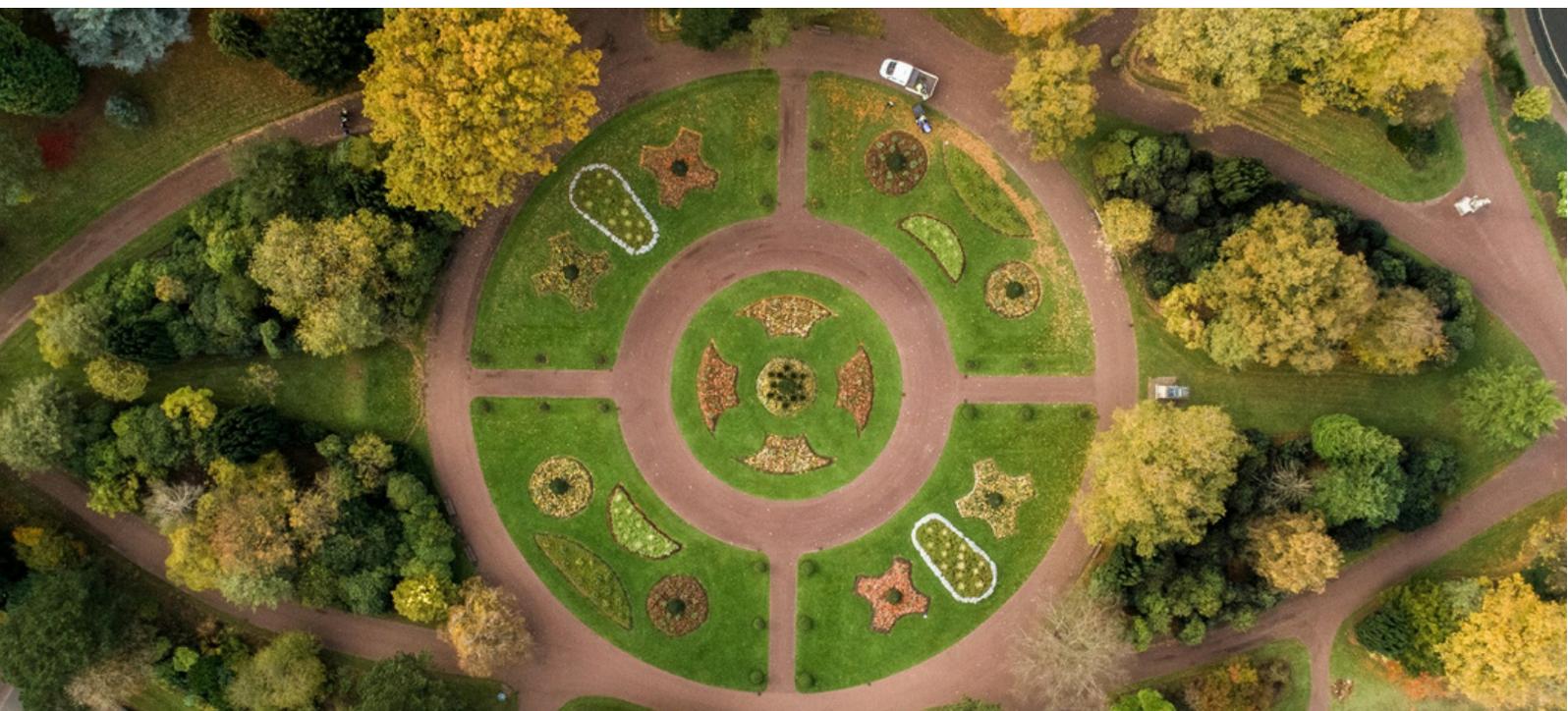
Another important aspect of this project, reflected in the developments of e-tools, is the ongoing knowledge transfer from contributing countries that have national bioeconomy strategies (Germany, The Netherlands, Spain, Finland and Austria) towards 10 countries in Central and Eastern Europe. The contributing countries have managed to transform their experience in stakeholder engagement, bioeconomy knowledge and competence assessment into well-developed elements in the e-solutions.

These tools enable Central and Eastern European partners involved in CEE2ACT to enhance their skills and competences, while empowering Hub members to draft quality roadmaps to present them to the policy makers developing national bioeconomy strategy. Finally, e-solutions serve as tools to strengthen digital skills and competences of the stakeholders involved in the bioeconomy sector and prepare them for their digital transition. The tools are an excellent asset to help raise awareness and knowledge about the bioeconomy by using the innovative technologies in line with the EU Bioeconomy Strategy requirements.

How can the tools contribute to the bioeconomy strategy development?

The CEE2ACT approach to national bioeconomy strategies relies on several elements. Firstly, the importance of sharing experiences and learning from the countries that have already developed their bioeconomy strategies. Secondly, applying a bottom-up approach and gathering bioeconomy stakeholders in national bioeconomy hubs to discuss priorities and develop roadmaps to national bioeconomy strategies. Thirdly, the innovative technique of using digital solutions that will help Hub coordinators and members build up their own competences, by assessing and increasing their knowledge to prioritise and lead the process of roadmap to bioeconomy strategy development. The two CEE2ACT tools that mostly aim to contribute to bioeconomy strategy development are the self-assessment tool for bioeconomy promotion and the e-learning platform for bioeconomy and sustainable governance.
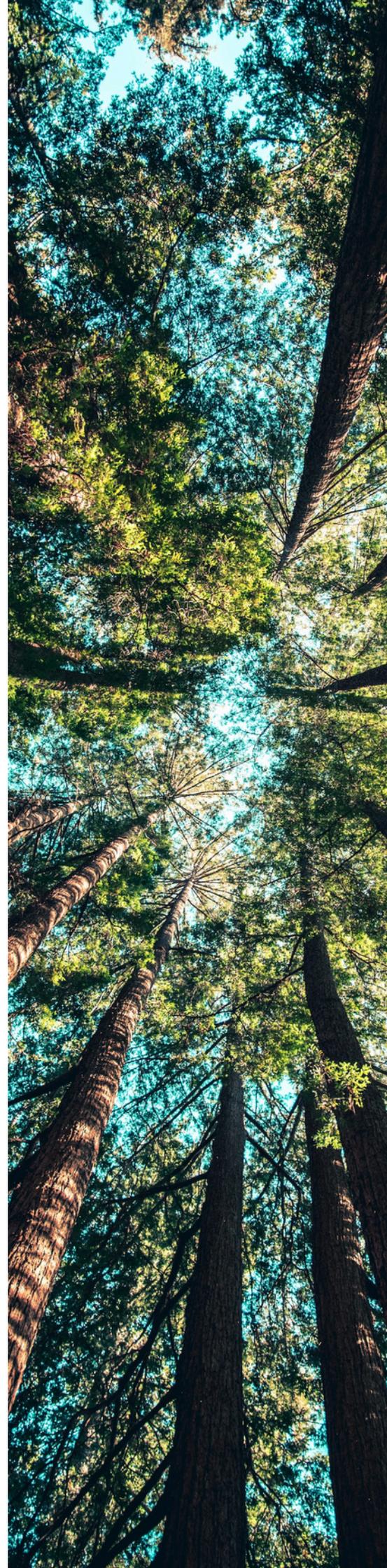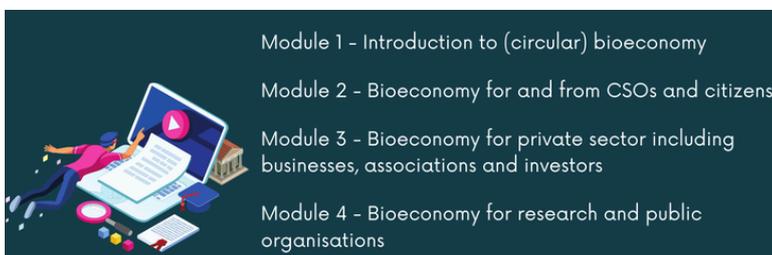
The objective of the **self-assessment tool** is to facilitate better-informed decision-making in national, regional or local bioeconomy strategy development and increase awareness of the benefits of the bioeconomy among key decision makers and the public. The primary target audience of the self-assessment tool are policymakers, as it enables them to conduct the first assessment of the bioeconomy status in their local, regional or national area, and decide what actions need to be undertaken. This assessment serves as a starting point for further discussion on how to design better strategies.
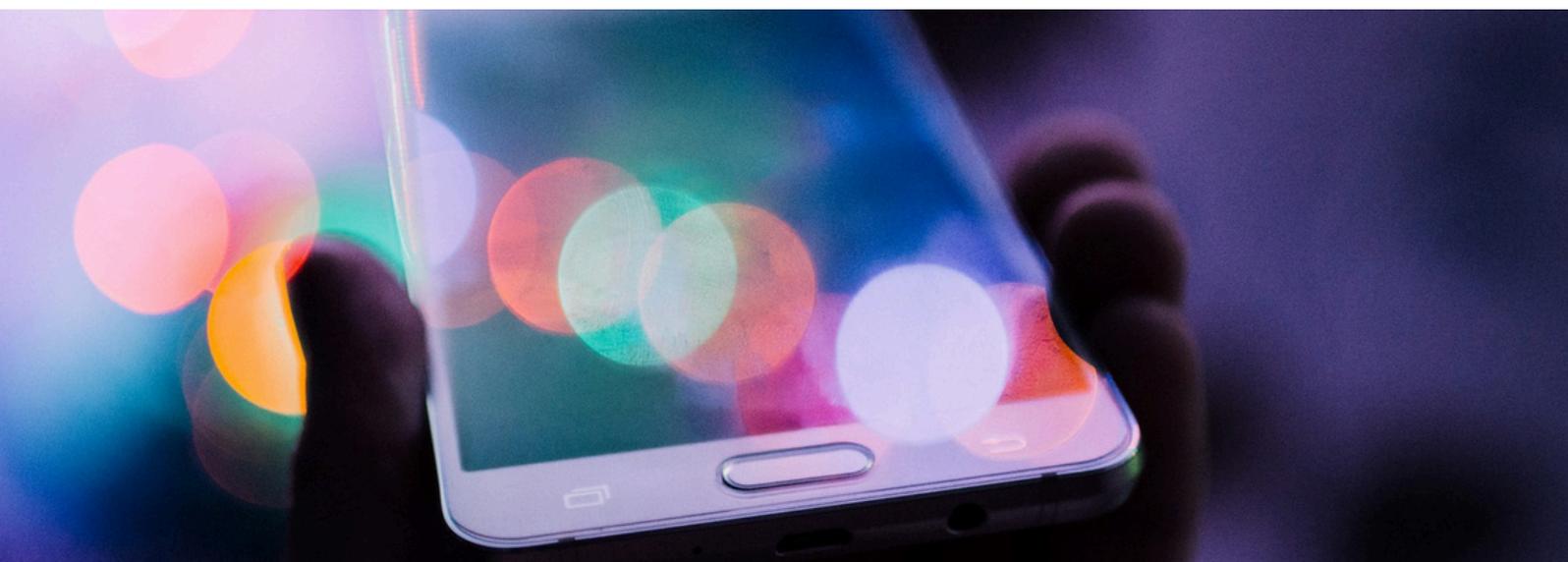
It consists of an online questionnaire that examines key aspects of bioeconomy: biomass potential and availability of feedstock, industrial development, entrepreneurship, biorefinery potential, infrastructures to handle feedstocks and production, access to finance, skilled workforce, supporting institutions, regional markets, policy framework, and social performance. Once the evaluation is completed, the e-tool provides recommendations that support policymakers in their next steps towards the bioeconomy strategy development. It is important to note that the assessment can be carried out over different time periods. At the beginning of the process, the first assessment can serve as the baseline assessment. Later, once specific bioeconomy measures have been taken, the assessment can be repeated to track changes and developments and receive new recommendations.

Therefore, the **self-assessment tool** serves the policymakers to track the progress and analyse the decisions based on objective and evidenced indicators. The tool enables the administration bodies to monitor the improvements over time, once the improving measures have been implemented. This will help to allocate the limited natural resources and the efforts to the initiatives that have the greatest benefits and potentials.

The **e-learning platform** is a tool with practical modules and interactive exercises, including a set of online courses divided into four thematic training modules and downloadable reference documents. The first module introduces the circular economy in Europe and all the important aspects that need to be considered when developing bioeconomy strategies. The second module addresses key concepts of bioeconomy relevant for the civil society, citizens and the wider public, with a specific focus on how these stakeholder groups can contribute to the implementation of EU sustainable bioeconomy. The third module aims to provide guidance and opportunities for the private sector within bioeconomy. The fourth module provides key concepts of bioeconomy relevant for the public authorities and policy makers from local, regional and EU levels. It also focused on international strategies, regulations, best practices and relevant national bioeconomy strategies, available in the member states of the CEE2ACT project partners countries.

Module 1 - Introduction to (circular) bioeconomy

Module 2 - Bioeconomy for and from CSOs and citizens

Module 3 - Bioeconomy for private sector including businesses, associations and investors

Module 4 - Bioeconomy for research and public organisations

The EU Bioeconomy Strategy recommends using inventories of best practices. These inventories are designed as an open platform that guides decision-makers and stakeholders in developing their bioeconomy strategies. by building upon the existing good practices. Such online inventories provide guidance, identify enabling projects, and inspire potential synergies and collaborations.

The main objective of the **CEE2ACT online inventory** is to map and showcase innovative and inspiring examples of bioeconomy development and implementation practices, taking place in similar projects, initiatives, online facilities and industrial cases. The CEE2ACT project partners provided continuous effort in identifying interesting examples to make the inventory a lively and open-source tool as a source of inspiration and evidence-based learning.

The target audiences of the inventory are policy and decision-makers, public administrators, bio-based value chain actors (primary sector, industrial and waste sector), investors, SMEs, research institutions, academia, environmental organisations and non-government organisations. There are five areas of best practices:
1)   Development and implementation of bioeconomy strategies and action plans;
2)   Inter-institutional cooperation, governance and coordination in bioeconomy;
3)   Examples of efficient bio-based industry good practices;
4)   Efficient monitoring and evaluation indicators in bioeconomy;
5)   Good practices on capacity building in bioeconomy.

Finally, **the B2B matchmaking tool** connects different stakeholders through one online platform with the purpose of finding potential matches between businesses. Newly bonded partnerships can advance circular bioeconomy through collaboration projects. The tool is designed to gather interested stakeholders to register their business in the matchmaking platform and have a 30-minute consultation meeting provided by consultants from Anteja to better understand its needs and provide a tailored matchmaking service.

The target groups of the matchmaking tool are policy makers, non-governmental organisations, technology providers, service providers, technology institutes, research organisations, universities, industrial actors, and other bioeconomy stakeholders.

Recommendations for policy makers

The following recommendations for policy makers are designed to encourage the use of digital tools in the bioeconomy sector:

1.   Make digital tools widely available to gather new knowledge, find relevant new information and highlight good practices in the bioeconomy sector.
Digital tools, online libraries and inventories, developed in various bioeconomy projects are valuable sources of information and they can serve as inspiration for ideas and as a pool knowledge.

2.   Encourage bioeconomy stakeholders to implement digital tools that can help unlock the bioeconomy potential in Central and Eastern Europe.
Since CEE2ACT promotes participatory bottom-up approach, the policymakers should encourage other bioeconomy stakeholders to use digital resources, thereby raising the level of knowledge in discussions regarding the bioeconomy strategy.

3.   Bioeconomy actors across the value chains must continuously develop their digital skills.
The bioeconomy and digitalisation go side by side both contribute to green and digital transformation and a competent bioeconomy workforce is a digitally skilled workforce.

4.   Mainstream digital tools to implement assessments and reach informed decisions to accelerate the bioeconomy transition is required.
Digital tools, particularly those that include knowledge databases, can support data-driven decision-making processes in view of developing national bioeconomy strategies.

5.   Public and private sectors should invest into digitalising the bioeconomy sector.
The development of the bioeconomy strategy requires defining digitalisation as a priority and ensure sufficient funding resources are devoted to projects on the digitalisation of the bioeconomy sector.

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