BE-Rural

POWER4BIO
REGIONS FOR
BIOECONOMY

SMALL-SCALE TECHNOLOGIES AND BUSINESS MODELS FOR REGIONAL BIOECONOMIES

JOINT GUIDANCE DOCUMENT FOR STAKEHOLDERS

ACKNOWLEDGEMENT & DISCLAIMER

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CONTENT

1 AIM OF THIS JOINT GUIDANCE DOCUMENT

The bioeconomy carries the promise to offer important opportunities for rural employment and regional added value. The transition towards a more sustainable, bio-based regional economy and society requires the active involvement of a broad spectrum of stakeholders and citizens in the design of strategies, which promote a sustainable use of agricultural, forest and marine ecosystems.

Photo: Jeden Hotse/Pixabay

The two Horizon 2020 projects BE-Rural and POWER4BIO were funded under the same topic, RUR-09-2018 – *https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/rur-09-2018*. They are communication and support actions (CSAs) and foster activities such as proactive stakeholder engagement, networking and cross-border exchange of knowledge. Both projects aim at facilitating the development of regional bioeconomy strategies and roadmaps.

The projects operate in different but adjacent regions. Consequently, the outputs of one project will be of relevance for the other. Also, the recommendations for policy makers derived for one region are of great interest for neighbouring regions. The aim of this guidance document is to join forces and to highlight synergies between BE-Rural and POWER4BIO, thereby increasing the impact and amplifying the reach and the relevance of both projects.

Within BE-Rural and POWER4BIO, a broad spectrum of dedicated outputs will be created. The focus of this joint guidance document is on selected project deliverables surrounding bio-based solutions and technologies, as well as business models and best practices. In both cases, these deliverables lay the foundation for further works, which will culminate in the participatory development of regional bioeconomy strategies and roadmaps. Further information on the two projects is available in the following section, and additional material/outputs are available through the POWER4BIO and BE-Rural project websites.

Section 3 of this document presents the guidance for policy makers and forms the core of this document. This is intended to help orient decision-makers in navigating the various project outputs by comparing and contrasting the BE-Rural and POWER4BIO deliverables, with the aim of guiding the reader towards the most relevant project outputs for their given context. Based on this guidance, the final section of this document provides detailed summaries of the six deliverables for further reference.

2 THE BE-RURAL AND POWER4BIO PROJECTS

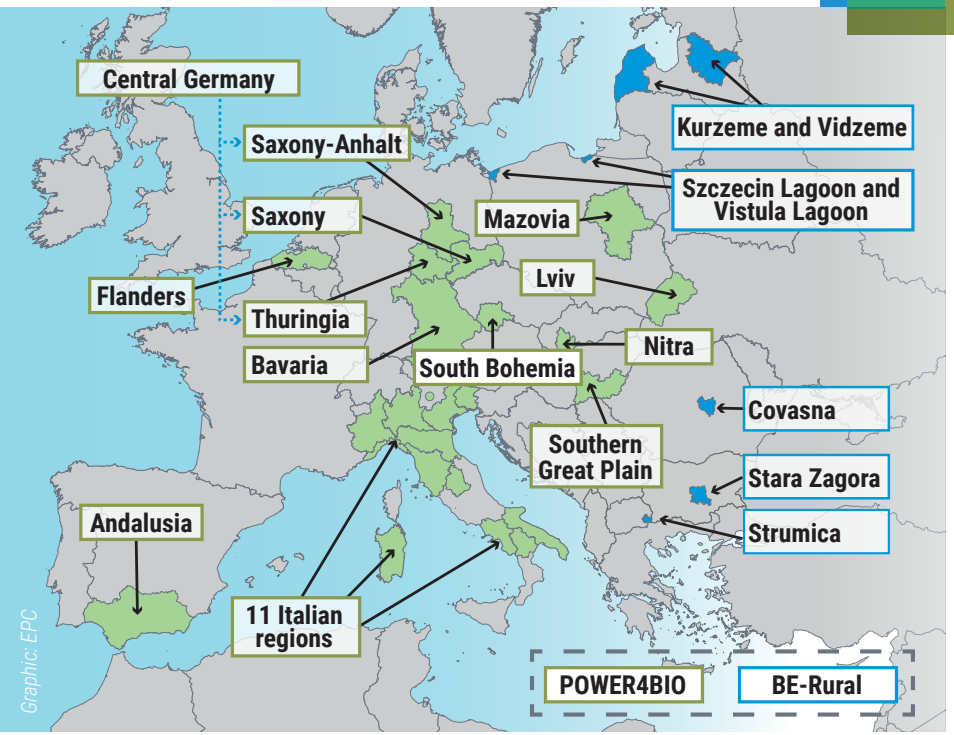


Figure 1: Geographic coverage of BE-Rural and POWER4BIO

2.1 BE-Rural

The overall goal of the BE-Rural project is to explore the potential of regional and local bio-based economies by supporting relevant actors in the participatory development of bioeconomy strategies, roadmaps and business models. The project focuses on selected regions in five modest and moderate innovator countries: Vidzeme and Kurzeme (Latvia), Szczecin Lagoon and Vistula Lagoon (Poland), Covasna (Romania), Stara Zagora (Bulgaria) and Strumica (North Macedonia).

As a first step, new, sustainable technology options suitable for local deployment and the biomass potential of the regions were identified. Parallel to this, BE-Rural established five regional Open Innovation Platforms (OIPs) to kick-start the co-creation process, bringing together key stakeholders from academia, policy, business and civil society to develop ideas and capitalise on the identified bioeconomy potential. Furthermore, BE-Rural's aim is to raise awareness of the bioeconomy among citizens and stakeholders in the regions and promote broad engagement. In this regard, activities include research & innovation capacity-building workshops, educational seminars and webinars, summer schools, and bio-based pop-up stores. Building from this, BE-Rural will establish a 'Network of Knowledge' to share knowledge and lessons learned from the OIPs at an inter-regional level, further disseminating best practices, closing the information gap on issues related to sustainability, and increasing regional capacities of authorities and stakeholders. Finally, BE-Rural will link the identified bio-based business models to the regional context, will assess their market potentials and develop regional bioeconomy strategies and roadmaps.

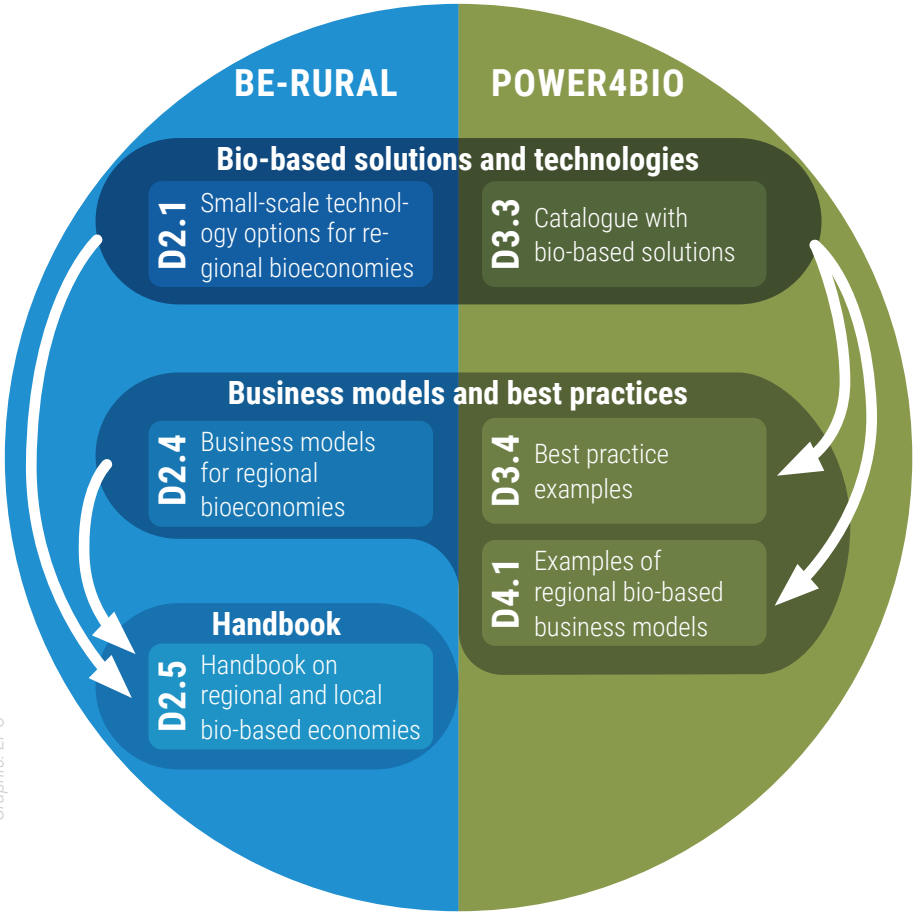
2.2 POWER4BIO

The POWER4BIO project aims at increasing the capacity of regional and local policy makers and stakeholders to structure their bioeconomy and to support the emergence of a thriving bio-based sector. The project will encourage adequate knowledge and best practice exchange and networking within and among regions, across the EU.

The project aims at empowering regional stakeholders to boost the transition towards bioeconomy regions in Europe by providing them with the necessary tools, instruments and guidance to develop and implement sound sustainable bioeconomy strategies. In particular, POWER4BIO will define a methodology to guide European regions when preparing and reviewing their regional bioeconomy strategy. All collected information and the most relevant existing bioeconomy tools will be integrated in the Bioregional Strategy Accelerator Toolkit (BSAT) that will be available in early 2021.

POWER4BIO fosters mutual learning and intra- and interregional collaboration and networking among regional stakeholders to ensure knowledge transfer across sectors and regions. Sustainable bioeconomy value chains are jointly developed within ten participant regions. The regions participating in POWER4BIO are Lviv (Ukraine), South Bohemia (Czech Republic), Mazovia (Poland), Nitra (Slovakia), Southern Great Plain (Hungary), Andalusia (Spain), eleven regions from Italy, Flanders (Belgium), Central Germany and Bavaria (Germany).

3 GUIDANCE FOR POLICY MAKERS



Graphic: EPC

Figure 2: Interrelations between the BE-Rural and POWER4BIO outputs.

BE-Rural and POWER4BIO have produced a number of outputs regarding small-scale business models for regional bioeconomies. The outputs include factsheets of bio-based solutions and technologies, reports on business model case studies, as well as a handbook that has been designed for a broad target audience. The six deliverables – three from each project – are summarised according to their main topics and interrelationships in the diagram below *(Figure 2)*

With a range of deliverables covering similar issues, but with differing research approaches and thematic foci, the question emerged as to how to orient policy makers and other interested stakeholders towards the most relevant deliverables for their given context. To this end, the six deliverables are assessed according to their:

- Implementation level: local, regional, national
- Level of application: small-scale/SMEs, large industry
- Biomass feedstock: types of biomass waste and residues, from agriculture, forestry, fisheries, and more
- Target audience: policy makers, general public, industry, research, education
- Format of deliverable: catalogue, report, handbook, case studies, factsheets

This assessment is summarised in the table below and aims to point the reader towards the most relevant project outputs for a given context. In the final section of this document (Chapter 4), detailed summaries and weblinks to the deliverables are included.

3 GUIDANCE FOR POLICY MAKERS

Project	Implementation level	Level of application	Biomass feedstock	Target audience	Format of deliverable
BE-Rural	**BE-Rural D2.1 Small-scale technology options for regional bioeconomies** This deliverable provides an overview of small-scale technology options, which are considered good practice examples when it comes to facilitating the transition to a regional bio-based economy. The deliverable includes 16 selected factsheets for technologies and good practice. The factsheets cover general background information, technological and economic descriptions, the motivation behind the technology, as well as an outline of the environmental and socioeconomic impacts.				
	Regional; local	Small-scale/SME	Crop residues; nanocellulose vegetable fibers; hemp; flax; grass; water plants; sheep's wool; wood; sewage sludge; forestry residue; fish processing residues; dairy residues	Industry; research	Catalogue; factsheets
	BE-Rural D2.4: Business models for regional economies This report focusses on small-scale businesses that are suitable for rural areas and addresses the business opportunities of BE-Rural's OIP regions. Four exemplary small-scale businesses were selected and analysed with the Business Model Canvas tool, and their suitability for the OIP regions was assessed. In addition to that assessment, the economic, social and environmental impacts of each business were analysed.				
	Regional; local	Small-scale/SME	Agricultural residue; forestry residues; fish processing residues	Industry; research; policy makers	Report; case studies
	BE-Rural D2.5 Handbook on regional and local bio-based economies The concept behind the BE-Rural handbook is to address a wide range of target groups in the project regions, in seven national languages. The content is based on an extensive desk research as well as questionnaires and email exchange with bioeconomy stakeholders and businesses, and provides a comprehensive view on: basics about the regional bioeconomy, options for the use of biomass in a regional bioeconomy, business models for a regional bioeconomy, and sustainability impacts of the bioeconomy.				
	National; regional; local	Small-scale/SMEs to large industry	A wide range of biomass feedstocks are covered in this deliverable	Policy makers; research; industry; education; general public;	Report; handbook

Table 1: Overview of selected outputs from BE-Rural and POWER4BIO presented in this document

3 GUIDANCE FOR POLICY MAKERS

Project	Implementation level	Level of application	Biomass feedstock	Target audience	Format of deliverable
POWER4BIO	**POWER4BIO D3.3 Catalogue with bio-based solutions** This deliverable describes the activities performed to fill the database of the online catalogue of bio-based solutions with information. The searchable online catalogue contains factsheets on existing bio-based solutions with tested potential for market uptake and a high technical readiness level (TRL) for bioenergy production, biomaterials, biochemicals, food and feed.				
	Regional; local	Small-scale/ SMEs to large industry	A wide range of biomass feedstocks are covered in this deliverable	Industry; policy makers	Catalogue; factsheets
	POWER4BIO D3.4 Best practice examples In total, 12 EU best practices, three of each of the four categories bioenergy, biochemicals, feed & food and biomaterials, were illustrated to show their potential for replicability in rural areas. All cases have been harmonised content-wise to facilitate the understanding and comparison of examples.				
	Regional; local	Small-scale/SMEs; focused on the suitability and adaptability of industrial solutions to the rural environment at small scale	Grass; hemp, woody biomass; insects; coffee ground residues; olive oil by-products; agricultural residues; sewage sludge	Industry; policy makers	Report; case studies
	POWER4BIO D4.1 Examples of regional bio-based business models 19 practical examples of good practice business cases were investigated by the so-called Business Model Canvas adapted to the special characteristics of bio-based solutions.				
	Regional and local, from industrial perspective; national, from policy perspective	Small-scale/ SMEs to large industry	Agricultural residues; forestry residues; energy grasses; lignocellulosic biomass; hemp; wood; sewage sludge; oil residues; food waste; meadow grass silage; industrial waste gases	Industry; regional and national policy makers	Report; case studies

Table 2: Overview of selected outputs from BE-Rural and POWER4BIO presented in this document

4 PROJECT OUTPUTS


Photo: stock.adobe.com/Freesurf

4.1 Summaries of relevant BE-Rural outputs

BE-Rural D2.1 Small-scale technology options for regional bioeconomies

Link: *https://be-rural.eu/wp-content/uploads/2019/10/BE-Rural_D2.1_Small-scale_technology_options.pdf*

This report provides an overview of technology options, which are considered good practice examples when it comes to facilitating the transition to a regional bio-based economy, looking at the five Open Innovation Platform (OIP) regions covered in BE-Rural and beyond. The five OIP regions are Stara Zagora (Bulgaria), Vidzeme and Kurzeme (Latvia), Strumica (North Macedonia), Szczecin Lagoon and Vistula Lagoon (Poland) and Covasna (Romania). Inspired by their bioeconomy potentials, a set of small-scale technology options and good practices was compiled and discussed with representatives from the OIP regions. A selection procedure intended to reduce the pool of different technologies and good practices to a final set of 16, which this report presents in a factsheet format. The factsheets include general background information, technological and economic descriptions, the motivation behind the technology, as well as an outline of the environmental and socioeconomic impacts. Furthermore, advantages and disadvantages of small-scale technology options compared to larger and more complex systems, such as large-scale biorefineries, are discussed.

The overview of technology options presented in this report focusses on small-scale technologies that are considered suitable for the development of regional and rural bioeconomies. A definition of suitable technologies was drawn up taking into account the overall scope of BE-Rural. The feedstocks considered are originating mainly from the agricultural, forestry, fishery and water sectors. The diversity of this set of technology options reflects the nature of the growing bioeconomy – in the context of BE-Rural's OIP regions and beyond. Since there is no single blueprint for developing and implementing the bioeconomy, this overview aims to inspire stakeholders in the aforementioned sectors.

4 PROJECT OUTPUTS


Photo: Paweł Englender/Pixabay

4.1 Summaries of relevant BE-Rural outputs

BE-Rural D2.4: Business models for regional bioeconomies

Link: *https://be-rural.eu/wp-content/uploads/2019/12/BE-Rural_D2.4_Regional_business_models.pdf*

The shift towards a bioeconomy became an essential development for political, industrial and societal initiatives that want to ensure that today's society and future generations can rely on renewable resources without foregoing economic growth. Therefore, business models and ideas are needed that contribute to economic growth, wealth generation and at the same time create societal and environmental value by addressing some of humanity's great challenges. Rural areas with abundant biomass resources are expected to play a crucial role in developing and establishing bioeconomy businesses and strategies. Thus, biomass producing sectors can contribute significantly to the development of a bioeconomy, stimulate rural development (job creation, generation of new income streams, etc.) and create new markets for advanced bio-based products and services. Therefore, private initiatives are needed, as much as governmental interventions, for the creation of a fruitful framework. In fact, there are already plenty of bioeconomy businesses running worldwide. Nevertheless, this report focusses on small-scale businesses that are suitable for rural areas and addresses the business opportunities of BE-Rural's OIP regions (Stara Zagora, Bulgaria; Szczecin Lagoon and Vistula Lagoon, Poland; Strumica, North Macedonia; Covasna, Romania; Vidzeme and Kurzeme, Latvia). Four exemplary small-scale businesses were selected and analysed with the Business Model Canvas (a tool for developing and analysing business models) and their suitability for the OIP regions was assessed. It became obvious that the OIP regions have different prerequisites, chances and challenges that affect the development of new bioeconomy businesses. In addition to that assessment, the economic, social and environmental impacts of each business were analysed. While the overall analysis demonstrated that the OIP regions cannot just replicate the analysed businesses as they are, the results are of relevance for the development and establishment of future bioeconomy businesses and strategies in the five regional contexts.

4 PROJECT OUTPUTS


Photo: steveph/Pixabay

4.1 Summaries of relevant BE-Rural outputs

BE-Rural D2.5 Handbook on regional and local bio-based economies

Link: *https://be-rural.eu/wp-content/uploads/2020/03/BE-Rural_D2.5_Handbook.pdf*

One of the objectives of the BE-Rural project is to develop a nicely designed and easy to understand handbook that is freely accessible in seven national languages, aiming to overcome the current lack of bioeconomy information in the project's target regions. Therefore, the handbook addresses different target groups, such as decision-makers, investors, farmers, foresters, landowners, small bioeconomy industries, science and academia, and the civil society representatives who are interested in bioeconomy topics.

The content of the handbook is based on an extensive desk research as well as on outcomes of BE-Rural Deliverables D2.1 (Small-scale technology options for regional bioeconomies) and D2.4 (Report on business models for regional bioeconomies), where content was also collected through questionnaires and email exchange with bioeconomy stakeholders and businesses. The handbook aims to provide a comprehensive view on:

1. Basics about the regional bioeconomy (bioeconomy concepts, bioeconomy principles, strengths, challenges, opportunities, limitations, biomass feedstocks and conversion)

2. Options for the use of biomass in a regional bioeconomy (a catalogue of several conversion technologies and pathways, supplemented with concrete and existing technology and business examples)

3. Business models for a regional bioeconomy (comprehensive compilation of several elements and tools and general information on business models that are relevant for developing business models in a regional bioeconomy)

4. Sustainability impacts of the bioeconomy (environmental, social and economic impacts)

Linkages between the different sections are made in order to show the complexity of the bioeconomy. This applies to both strengths and weaknesses. It is clear that the bioeconomy must be understood as a versatile concept that has to be adapted to regional circumstances. It is not possible to impose predefined and fixed technology options or business models on regions without having a comprehensive knowledge on the local prerequisites (political framework, biomass feedstocks, SME landscape, infrastructure and logistics, environmental conditions, financing opportunities, social acceptance, etc.). This creates significant challenges but also opportunities for developing and implementing regionally tailored bioeconomies.

4 PROJECT OUTPUTS


Photo: FelixMittermeier/Pixabay

4.2 Summaries of relevant POWER4BIO outputs

POWER4BIO D3.3 Catalogue with bio-based solutions

Link: *https://power4bio.eu/wp-content/uploads/2020/05/POWER4BIO_D3.3_Catalogue_with_bio-based_solutions.pdf*

One of the aims of the POWER4BIO project is to compile a catalogue containing factsheets on existing bio-based solutions towards resource-efficient biorefineries with tested potential for market uptake (high technical readiness level ≥ 6) for bioenergy production, biomaterials, biochemicals and food and feed. The catalogue intends to be used by stakeholders in a region to get an overview of available promising options to convert a wide range of biomass feedstock into an array of bio-based products.

The factsheet information is stored in an online accessible database which has been developed in POWER4BIO as well. The list of most relevant content topics to be addressed in the factsheets has been jointly established by all partners of the project, keeping regional policy makers, industry (associations) and consultants in mind, and by actually involving stakeholders from these targeted end-user groups. The selected content topics of the factsheets were combined into the following sections/themes: General, Feedstock, Technology, Products, Environment and Impacts. The factsheets contain a short description and several characteristics of the solution, as well as info regarding suitability of biomass feedstock for production of the target product, benefits of the solution related to the value chain and specific constraints for implementation.

This deliverable report describes the activities performed to fill the catalogue database with the info for the selected bioeconomy solutions, that mainly come from the regions participating in POWER4BIO, but also from other EU regions. Info and data for key topics per solution has been collected from online sources, bibliographic references and expert knowledge from project partners, as well as from solution owners. The info has been stored in the online catalogue database.

The online catalogue is designed to be of interest to policy makers, industry and other interested parties and is available via a simple interface at *www.bio-based-solutions.eu*. At present, it contains 30 solutions which can be searched by the following fields: Feedstock, Technology, TRL and Products, as well as via words in the Summary and Technology Description.

4 PROJECT OUTPUTS

Photo: Pexels/Pixabay

4.2 Summaries of relevant POWER4BIO outputs

POWER4BIO D3.4 Best practice examples

Link: *https://power4bio.eu/wp-content/uploads/2020/04/POWER4BIO_D3.4_Best_practices_of_bio-based_solutions.pdf*

The bioeconomy transition is routed in new opportunities with high potential of replication at EU level. To this end, it is important to identify which measures could potentially have a high impact on the bio-based economy.

The POWER4BIO project counts on learning from experiences. Examples and references might speed up the decision made at national and regional level, which will enable a stronger commitment towards solutions under the concept of bioeconomy. To this end, policy makers urge to gain access to reliable reference sources of information to use these sources in their internal procedures. Furthermore, the detailed description of existing cases is an instrumental key to learn and inspire new initiatives. The regions oversee the state of the art and point out the value of being informed of initiatives which are successful with new business model. As a matter of fact, the POWER4BIO regions have arisen the need of a catalogue of technologies in real production cases (task 3.3) but in some specific cases, more technical information is required to foster and boost regional bioeconomy actions. This is the aim of task 3.4 explained in Deliverable 3.4, were a thorough analysis, selection and description of the best practices of biorefineries worldwide is included.

In the context of the POWER4BIO project, best practices are industrial production sites, which use specific biomass sources to produce bio-based products. This deliverable pays special attention to two elements: rural application of the selected biorefineries and their competitiveness. Furthermore, aligned with related tasks 3.3 and 4.1 of the project, the solutions are classified in four categories, in view to its application, such as, bioenergy, biochemicals, feed & food and biomaterials. This classification allows for an easy to understand and use of the cases detailed depicted in this document. In total, 12 EU best practices, three of each of the four categories are included in this report. The information per best practices include the minimum information to illustrate the cases. They provide the reader with information to consider its potential for replicability. Lastly, all the cases have been harmonised content-wise so as to facilitate the understanding and comparison of examples.

4 PROJECT OUTPUTS


Photo: RitaE/Pixabay

4.2 Summaries of relevant POWER4BIO outputs

POWER4BIO D4.1 Examples of regional bio-based business models

This deliverable is confidential and not publicly available. Information about the deliverable can be found in the news section of POWER4BIO: *https://power4bio.eu/new-deliverable-examples-of-regional-bio-based-business-models*

Based on pre-defined criteria, the most promising solutions from the collection of good practice cases set up previously in the POWER4BIO project (see D3.3) were selected. The business models behind these technical solutions and the way these models have been deployed were further characterised in this deliverable.

19 practical examples of business cases were investigated in terms of business value and described in detail, using the POWER4BIO Business Modelling Methodology which was defined by adapting the so-called Business Model Canvas (BMC) format to the special characteristics of bio-based solutions. Six out of nine countries where POWER4BIO regions are located are covered by this business model collection, and the four product groups used for the project activities (bioenergy, biochemicals, biomaterials, feed & food) are also equally covered.

The elaboration of the business models based on the BMC methodology was supported by the fact that information collection was also made by the same methodology, following the same content-wise elements. Besides, intensive desk research was performed and, where possible, further information was accessed by personal interviews with representatives of the companies. The business models are elaborated by a detailed description following the nine elements of the BMC (value proposition, key partners, key activities, key resources, customer relationships, channels, customer segments, cost structure and revenue streams). For the solutions where data of sufficient quality and quantity could be obtained, the most important information of the business model were summarised on a "classic" one-page BMC format as well, besides the detailed descriptions.

The collection is expected to ensure benefits for market actors by providing information on specific bio-based business models and new insights for the relevant bio-based economy sectors and future impacts on the markets. However, any business model always needs to be individually tailored for each case of deployment, even if the replicability is good for the bio-based solution applied. The business models in the POWER4BIO collection are described in a fairly general way and have to be elaborated much more in detail for this tailoring, which process has to be initiated by companies or investors interested in a certain solution.

IMPRINT

Photo: Anemone123, Pixabay

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