



Bio-based strategies and roadmaps for enhanced rural and regional development in the EU



## Briefing paper: Analysing market conditions and designing business models within BE-Rural's OIPs

October 2020

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818478.

Document information	
<b>Project name:</b>	BE-Rural
<b>Project title:</b>	Bio-based strategies and roadmaps for enhanced rural and regional development in the EU
<b>Project number:</b>	818478
<b>Start date:</b>	1 <sup>st</sup> April 2019
<b>Duration:</b>	36 months

<b>Report:</b>	D5.1: Briefing paper on business model design
<b>Work Package:</b>	WP5: Regional strategies & roadmaps
<b>Work Package leader:</b>	ECO
<b>Task:</b>	Task 5.3: Developing business models and analysing market potentials
<b>Task leader:</b>	ECO
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<b>Internal peer review:</b>	Felix Colmorgen (WIP), Holger Gerdes (ECO)
<b>Planned delivery date:</b>	M19
<b>Actual delivery date:</b>	M19
<b>Reporting period:</b>	RP2

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## EXECUTIVE SUMMARY

This briefing paper on business model design is addressed to the BE-Rural OIP facilitators and to those members of the five regional Stakeholder Working Groups who will be actively involved in Task 5.3 of the project. It is intended as an impulse and guidance document to prepare the OIP facilitators and the regional stakeholders to engage in a focused, collaborative and iterative analysis of market conditions in their region, and in the design of business models for regionally-relevant bio-based products and services.

The BE-Rural OIPs are forums where incumbents of regional bio-based supply chains come together. OIP members may include biomass producers/owners/distributors, developers of bio-based products and services, developers/distributors of enabling technologies and equipment, potential and/or existing paying customers and end-users, and the relevant public authorities. By involving all these stakeholders, the OIP structures can become highly effective sources of market intelligence as well as “resonance boxes” for bio-based product developers to gather direct feedback from potential end-users and paying customers. The main intention of Task 5.3 is to ensure that these advantages are exploited by the OIPs to trigger more user-centric product development. The procedure to do this is presented in this document and is founded on the establishment of a *Task Force on Market Assessment and Business Model Design* within each OIP. The Task Forces will be integrated by organizations and individuals that, due to their specialized knowledge of the region, experience, and/or access to specific data, information and contacts, could make significantly valuable contributions to the task. The purpose of setting up such a group is to allow for a more agile conduction of the regional market assessment and a better-informed development of the business strategy for bio-based products and services deemed relevant by the region's stakeholders.

The first part of this document (Chapters 2 and 3) aims at setting the backdrop for the market assessment and business model design activities. It compiles key outputs of the project's first year into synthesized graphic summaries for each OIP. These provide a snapshot of the situation in each region as regards political, economic, social, technological, environmental and legal conditions as well as biomass potential and foreseeable barriers to its exploitation. They also present an overview of examples of suitable technologies for each region, details of their business models, and enabling factors (i.e. the financial, infrastructure and other outstanding conditions). The stand-alone sub-chapters will thus serve as background documents to engage the regional stakeholders in initial discussions on market conditions and suitable business models.

The second part of the paper (Chapters 4, 5 and 6) provides detailed guidance for OIP facilitators on how to set up the structures necessary to run the procedure for the upcoming work on Task 5.3 and presents the methodology and guiding templates to be used. Chapter 4 gives justification for the whole process and highlights the relevant considerations to make when establishing a Task Force. Foreseeing the risk that work in such a group could result in involuntary exclusion of the views and opinions of other OIP members, it presents specific measures that the OIP facilitator should take to avoid this. Chapter 5 introduces a methodology designed to support product developers in identifying market opportunities, tune their innovative ideas to meet actual end-user needs, and develop a well-informed business strategy. It also collects a series of templates that have been adapted to include brief, BE-Rural relevant introductions to the assessment exercises, instructions and worked examples illustrating how to complete them, and input forms to compile the information. Both the methodology and the templates have been developed and verified through their practical application in three previous European research and innovation projects. Lastly, Chapter 6 outlines the importance of identifying and activating the linkages between the Task 5.3 work and the formulation of the regional bioeconomy strategies in Task 5.4 early on. It also proposes a procedure to systematically reflect upon –and document– the lessons learned from the process.

**A note of caution:** Task Force members and other incumbents should keep in mind that the assessment framework presented in this document is meant to support and guide the identification of business opportunities and lay the groundwork for market entry. However, it cannot guarantee success—there is not one “golden formula” for this as there are many internal and external factors at play. Furthermore, the usefulness of the assessment ultimately depends to a great extent on the level of commitment and effort that the team put into it as well as on the enthusiasm of the owners of the idea for developing their business. Task 5.3 is to be understood as a capacity building and

support program and the activities contemplated therein conclude with the finalization of the Business Model Canvas (presented in Section 5.2.7). In this sense, BE-Rural and the project partners are not responsible for the commercialization of the bio-based products and services evaluated.

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## Abbreviations

<b>CHP</b>	Combined Heat Power Plant
<b>CNC</b>	Computer Numerical Control
<b>DIY</b>	Do-it-yourself
<b>GDP</b>	Gross Domestic Product
<b>GVA</b>	Gross Value Added
<b>H2020</b>	Horizon 2020
<b>FLAG</b>	Fishery Local Action Group
<b>IPA</b>	Instrument for Pre-Accession Assistance
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>KPR</b>	Kurzeme Planning Region
<b>LAG</b>	Local Action Group
<b>LI-BRA</b>	Latvian National Bioeconomy Strategy
<b>NAPCC</b>	National Action Plan on Climate Change of Bulgaria



<b>MW</b>	Mega Watt
<b>NDC</b>	Nationally Determined Contribution
<b>NDP</b>	National Development Program
<b>NGOs</b>	Non-governmental organizations
<b>OIP</b>	Open Innovation Platform
<b>RIS3</b>	Research and Innovation Strategy for Smart Specialization
<b>SME</b>	Small or Medium-sized enterprise
<b>SRC</b>	Short rotation crops
<b>UNEP</b>	UN Environment Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VPR</b>	Vidzeme Planning Region

# 1 Purpose and target audience of this briefing paper

This document is addressed to the BE-Rural OIP facilitators and to those members of the five regional Stakeholder Working Groups who will be actively involved in Task 5.3 of the project (titled: *Developing business models and analyzing market potentials*). It precedes a focused, collaborative and iterative analysis of market conditions<sup>1</sup> at each of the five project regions and sets the stage for the design of business models for regionally-relevant bio-based products and services.

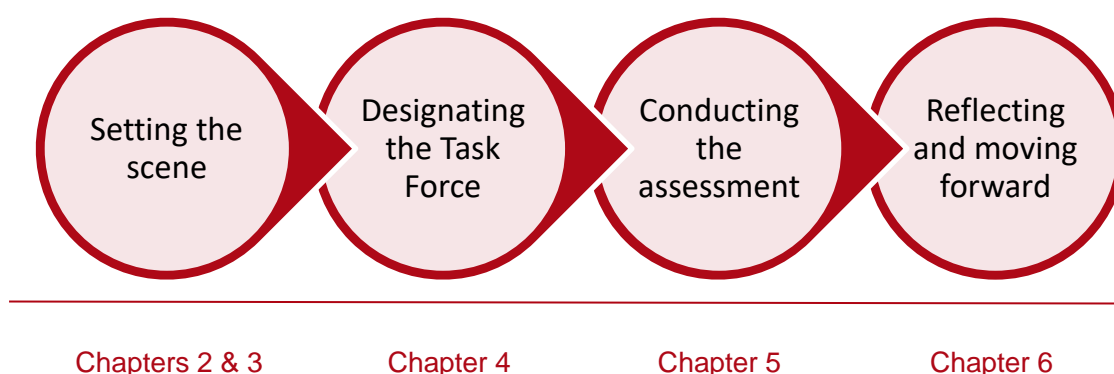
Within BE-Rural, the OIP facilitator is the leader and independent coordinator of a regional stakeholder process aimed ultimately at developing and rolling out a regional bioeconomy strategy and road map. In this context, Task 5.3 aims to build the capacity of the OIP facilitators in conceiving suitable, locally-adapted business models for bio-based products and services. Concretely this means providing guidance on:

- Reviewing and exploiting the information produced during the first year of the project (mainly the outputs from Work Package 2);
- Setting up a team for the business strategy development (referred to from here on as *Task Force on Market Assessment and Business Model Design*, or simply *Task Force*);
- Updating any obsolete information and filling in any gaps regarding the information produced during the first year of the project;
- Conducting a market analysis and identifying promising business opportunities;
- Elaborating a Business Model Canvas for each of the business ideas that emerge.
- Preparing to incorporate the results into the regional bioeconomy strategy and reflecting on the lessons learned.

The main aim of this briefing paper is to introduce the methodology to be followed in Task 5.3 and give an initial impulse in the form of background information synthesized from the project's previous research on local conditions, technology options and business models. Apart from the briefing, it includes the templates which the OIP facilitators and the Task Force will employ to retrieve and collect market intelligence via desk research, brainstorming and interviews with third parties (e.g. biomass suppliers, potential clients, public authorities).

Figure 1 below provides a schematic view of the structure of this document.

**Figure 1: Schematic overview of this briefing paper**



<sup>1</sup> It is *focused* as it is framed by the supply of biomass and demand for bio-based products and services identified in each respective region. It is *collaborative* as it entails the active involvement of regional stakeholders within an environment of open innovation. It is *iterative* as it is an open ended process intended to be continuously fed and updated as new information becomes available.

## 2 Context framing: local conditions and bioeconomy potential

This chapter presents the main outcomes of the PESTEL Analysis (D2.2) and the bioeconomy potential analysis (D2.3) conducted in WP2 of BE-Rural. Through synthesized graphic summaries for each OIP region, it provides a snapshot of the situation as regards political, economic, social, technological, environmental and legal conditions as well as biomass potential and foreseeable barriers to its exploitation. The objective of this material is to set the backdrop for the market assessment and business model design activities. The stand-alone sub-chapters will thus serve as background documents to engage the regional stakeholders involved in Task 5.3 and initiate the discussions of the Task Force on Market Assessment and Business Model Design.

### 2.1 OIP Stara Zagora, Bulgaria

Political Conditions	Economic Conditions	Social Conditions	Technological Conditions
<ul style="list-style-type: none"> <li>There is currently no national bioeconomy strategy for the Republic of Bulgaria</li> <li>A Bioeconomy Strategy for Stara Zagora region is currently being drafted</li> <li>The <b>National Development Programme (NDP) Bulgaria 2020</b> and <b>Regional Development Strategy 2014 - 2020</b> of Stara Zagora are well aligned with the concept of the bioeconomy and could serve as a framework for action, even though the bioeconomy is not specifically addressed</li> <li>Stara Zagora's regional development's political target lies on vertical integration of the agricultural sector and processing industries to increase value generation and to strengthen their competitiveness</li> <li>Other policies with positive influence on bioeconomy uptake, for instance in the fields of climate change mitigation and adaptation, as well as innovation: <b>National Action Plan on Climate Change (NAPCC)</b> of 2012 and <b>Smart Specialization Strategies (S3)</b> of 2015</li> </ul>	<ul style="list-style-type: none"> <li>Gross Value Added (GVA) is largest in Stara Zagora's industrial sector (65.6%), followed by services (31%), and agriculture (3.4%) – potential for improvement in share of agriculture and services</li> <li>Most important sectors: agriculture, food processing and canning, textile, wood-processing, wine, and military industries. Balanced mix of small-, medium and large enterprises</li> <li>Agriculture is the most important bioeconomy sector: About 56% of the area's farmland is cultivated, mainly in the southern plains</li> <li>Main crops: cereals, sunflowers, cotton, vegetables, fruit and grapevines</li> <li>Production of <b>oil-giving and medicinal plants &amp; herbs</b> (e.g. rose, lavender, mint and valerian) have high (bio)economic importance: mainly exported and used for the production of ethereal oils, in cosmetics, pharmaceuticals, and the food processing industry</li> <li>Gross Domestic Product (GDP) is 23% above; the unemployment rate is 1.7% below national average</li> </ul>	<ul style="list-style-type: none"> <li>Stara Zagora, as well as the rest of Bulgaria, is experiencing a sharp demographic decline since 1990s, driven by emigration and low birth rates</li> <li>The district has favorable living conditions, including relatively higher education and health levels</li> <li>Environmental awareness is increasing among the population, especially regarding food quality and among the younger generations. Public awareness of the bioeconomy concept (and environmental concerns in general) is nevertheless still quite low</li> <li>The energy sector (lignite) still employs a large portion of population. While the future of the coal-fired energy sector in Bulgaria is uncertain, major changes will be necessary in the upcoming years in order to deal with the social consequences of coal phase out (job loss and obsolescence)</li> </ul>	<ul style="list-style-type: none"> <li>Stara Zagora has several educational and research institutions needed for appropriately processing raw materials into value-added goods:</li> <li>Investment in R&amp;D has increased in 2017, though not in percentage of GDP</li> <li>History of coal mining and electricity production in the region provides technological know-how relevant for an emerging bioeconomy, particularly for bioenergy, but also in terms of logistics</li> </ul>

Environmental Conditions	Legal Conditions	Biomass Potential	Barriers to Biomass
<ul style="list-style-type: none"> <li>• Relatively mild climate: transcontinental with influence from the Mediterranean Sea. This allows for exotic, otherwise rare woody species to grow in the region</li> <li>• Flat land and fertile soils, favorable for producing varied strains of agriculture, including oil-giving plants and herbs</li> <li>• Abundant water resources</li> <li>• Strong fluctuation in weather patterns are expected in the context of climate change, such as an increase of precipitation in the winter and decrease in summer, leading to an increased risk for agricultural and forestry activities in Bulgaria</li> <li>• Area used for certified <i>organic</i> crops has increased by more than 18% between 2017 and 2018</li> <li>• Environmental policies have focused since 1989 on stopping harm to ecosystems, e.g. by regulating polluting industries. Prevention and control of environmental impacts is still being developed and deployed (i.e. with support from EU)</li> </ul>	<ul style="list-style-type: none"> <li>• Bulgaria's Public Procurement Act of 2001, last amended in 2016, requires the "application of environmental, social, and innovative requirements", which could apply to bio-based products and services and thus increase demand</li> <li>• Bulgaria's Environmental Protection Act of 2002 contains provisions that can affect bio-based business models and technologies, including e.g. the conservation of biodiversity prevention and limitation of pollution</li> <li>• Waste Management Act of 2003 (last amended in 2012 to address e.g. use of plant residues) regulates waste generation and promotes circular economy concepts like reuse of waste products in other parts of their value chain</li> </ul>	<ul style="list-style-type: none"> <li>• Waste from the agri-food sector, farming sector and pulp and paper industries offer a high potential for the bioeconomy. Generated residues are mostly used for compost although they are rich in various elements and could be further processed by applying new technologies</li> <li>• Substantial potential in the application of essential oils and herbal plants in the cosmetics and pharmaceutical industry. The combination of such production with tourism is very promising</li> <li>• Collaboration already exists among some key bioeconomy stakeholders such as educational institutions, research and development units, and local businesses. Regional authorities appear to acknowledge co-responsibility for the implementation of a regional bioeconomy strategy</li> <li>• Development of a bioeconomy in Stara Zagora bears great potential for the energy transition, as it offers opportunities in agriculture and tourism for those leaving the phased-out coal sector, as well as potential for the bioenergy sector</li> <li>• As the region has a strong chemical manufacturing sector, there seems to be potential for new business models for the production of bio-based chemicals</li> <li>• Road infrastructure for transporting biomass is adequate, but investments in logistic centers must be foreseen</li> </ul>	<ul style="list-style-type: none"> <li>• With locally processed rose and lavender oil, medical crops and dried herbs being a main area for expansion of the region's bioeconomy, further knowledge about climate change effects on these plants is critical</li> <li>• There is not enough forest and agricultural residue biomass available for a large-scale biorefinery concept, only for small-scale bio-based industries and bioenergy installations</li> <li>• It is currently not easy to get financing for bio-based projects, especially from the public sector. Thus, attracting foreign investment is crucial</li> <li>• NAPCC foresees natural gas as a bridging technology. Biogas could provide a portion of this transition, but depending on the feedstock (waste only, or e.g. corn-based ethanol) it could increase the pressure on land use in the region</li> <li>• The region boasts a diverse economy, but the business potential of the circular economy is still not well explored</li> </ul>

## 2.2 OIP Strumica, North Macedonia

Political Conditions	Economic Conditions	Social Conditions	Technological Conditions
<ul style="list-style-type: none"> <li>Neither the country of North Macedonia nor the Strumica region have published bioeconomy strategies</li> <li>The bioeconomy concept lines up with North Macedonia's priorities, especially those related to regional development and climate change, such as the <b>National Strategy for Agriculture and Rural Development for the Period 2018-2022</b>, as well as the Macedonian <b>Nationally Determined Contribution (NDC)</b> for the UNFCCC</li> <li>The existing local strategies for economic development programs focused on building clusters align well with the bioeconomy. For instance, the <b>Regional plan for an integrated system of waste management in the South-East Planning Region</b> and the <b>Strategy for Local Economic Development of the Municipality of Strumica 2016-2020</b> which includes various sustainability aspects among its strategic goals</li> <li>Strong political will for EU integration and an ongoing process of structural reforms aimed at adopting EU policies, standards and best practices - including those related to bioeconomy</li> </ul>	<ul style="list-style-type: none"> <li>The main economic activity in the Strumica region is agriculture, especially the production of vegetables in greenhouses (country's largest producer and exporter)</li> <li>Important bioeconomy sectors: animal husbandry, viticulture, vegetable and fruit cultivation, livestock breeding and forestry industries</li> <li>Around 900 business entities related to the bioeconomy and rural development operate in the region: mostly individual farmers, but also other enterprises in agriculture, hunting and forestry</li> <li>The economy is composed mainly of SMEs, although the informal sector prevails in the country</li> <li>While direct investment in such businesses has been lacking and public agricultural subsidies have not been very effective, other funding streams such as international grants and loans for renewable energy have been available for bio-based businesses. Examples: the WeB-SEFF Program and the Green Growth Fund for southeast Europe</li> <li>Strumica region has also successfully implemented EU funding (IPA funds) with notable involvement of public enterprises and other local actors</li> <li>There are currently a total of nine industrial zones distributed in the four municipalities. Therefore, business incubators foster entrepreneurship and support</li> </ul>	<ul style="list-style-type: none"> <li>Socio-economic data is relatively outdated, as the latest census dates from 2002</li> <li>Rate of unemployment is relatively high, ranging from 31.42% to 47.39 % across the four municipalities. The GDP per capita is relatively low</li> <li>A prominent social problem is population decrease due to low birth rates and migration abroad, particularly of young and educated individuals</li> <li>In 2002, 4.4% of the population held a graduate degree, while 5% had no school education</li> <li>There is insufficient cooperation among bioeconomy-relevant stakeholders in Strumica. However, cooperation and coordination between educational institutions and business sector has improved recently</li> </ul>	<ul style="list-style-type: none"> <li>Outdated agricultural practices, underdeveloped infrastructure and limited inter-regional connectivity slows the modernization and the uptake of new technologies for processing agricultural products</li> <li>Water and electricity supply for the region is provided by a dam at the Turija river. A waste water treatment plant exists in the region and further smaller treatment facilities are under construction</li> <li>Strumica's industry, service, energy, and transport sectors rely primarily on fossil fuels. New concepts for renewables are being explored, including geo-thermal energy (steam and hot water) and (partial) replacement of feedstock in existing thermal plants and or/boilers with biomass</li> </ul>

	start-up companies by sharing resources and services such as management advice & training		
Environmental Conditions	Legal Conditions	Biomass Potential	Barriers to Biomass
<ul style="list-style-type: none"> <li>The climate in the region is very favorable for agriculture, at the intersection of sub-Mediterranean and eastern-continental climates</li> <li>Abundant rainfall (average 459 mm/a)</li> <li>Agricultural area in the Southeast region (mostly privately owned) only makes up 8.8% of North Macedonia's territory</li> <li>Wood is the most used biomass for heating of households and greenhouses in the region. However, renewable energies such as biomass, geo-thermal or hydro are still not very widespread</li> <li>Next to mining, agriculture is the second largest producer of solid waste in the region</li> </ul>	<ul style="list-style-type: none"> <li>The <b>Law on Waste Management</b> assigns municipalities the responsibility of managing certain waste types, from collection to disposal</li> <li>Water quality assessment is defined by the <b>Legislation of the Water-economy Basis of Macedonia</b>, while the management of forests is regulated by the national <b>Law on Forests</b></li> <li>The <b>Law on agriculture and rural development</b> regulates the agricultural and rural development, and national agricultural policy objectives</li> <li>The municipality of Strumica, the largest municipality in the region, has various regulations and plans related to the management of areas relevant to the bioeconomy. However, this is not the case in the other three, less populated municipalities</li> </ul>	<ul style="list-style-type: none"> <li>A great potential for the bioeconomy and creating added value in the region lies in the utilization of agricultural residues and forest biomass as a source of energy, e.g. through pelletizing, briquetting, gasification, pyrolysis or anaerobic biodigestion (mainly of manure)</li> <li>Also, there is some potential in the extraction of nanocellulose fibers from root vegetables for production of bio-based additives.</li> <li>There is not enough feedstock for large-scale applications, but there are enough resources for small-scale bio-based applications, as there is no competition for residues as raw material</li> <li>The region is accessible by road infrastructure of sufficient quality to transport biomass to the rest of the country, as well as to Bulgaria and Greece</li> <li>Awareness raising and direct dissemination activities are crucial for its development, especially for farmers throwing out or burning the agriculture residues in the fields, instead of exploiting them</li> </ul>	<ul style="list-style-type: none"> <li>Lack of skilled workers, education and trainings in the field of bioeconomy</li> <li>Lack of public support institutions, especially financial ones</li> <li>Lack of logistics centers to handle the feedstock, regardless of their purpose</li> <li>Better use of the available resources and development of new technologies will only be possible if the region establishes a solid network and collaboration between stakeholders, companies, government and the population</li> <li>Difficulties in financing and loan facilities to cover investment costs, lack of subsidies</li> <li>Lack of awareness about the opportunities that the bioeconomy can bring, particularly among farmers with respect to generated residues</li> </ul>



## 2.3 OIP Baltic Lagoons, Poland

Political Conditions	Economic Conditions	Social Conditions	Technological Conditions
<ul style="list-style-type: none"> <li>There is no national bioeconomy strategy for Poland</li> <li>The <b>Polish National Spatial Development Concept 2030</b>, the main national spatial planning strategic document, establishes the development of regional, sub-regional and local centers and strengthening the potential of rural areas. However, with the exception of the harbors area (Elbląg in the Vistula Lagoon and Szczecin, Świnoujście and Police in the Szczecin Lagoon), which are not part of the area covered in BE-Rural, plans do not allow for investments in dense industrial developments.</li> <li>The <b>Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries for the years 2012–2020</b> aims at improving the quality of life in rural areas and the effective use of their resources, including agriculture and fisheries</li> <li>According to Poland's <b>Transport Development Strategy until 2020</b> (with a perspective to 2030), since developing ports influence coastal regions by limiting other activities, they should compensate for this by increasing their share in the socio-economic development of coastal regions</li> <li>Poland's <b>National Strategy for Regional Development 2010-2020: Regions, Cities, Rural Areas</b> combines strategies defined at the national and regional level that are favorable for the bi-</li> </ul>	<ul style="list-style-type: none"> <li>The main economic activities in the regions are tourism and related services, as well as fisheries (mainly for export). The season is short (beginning of May to the middle of September), which increases the economic relevance of fishing in the remaining months</li> <li>Other relevant activities for the bioeconomy are agriculture and forestry</li> </ul> <p><i>Szczecin Lagoon</i></p> <ul style="list-style-type: none"> <li>GDP per capita of the West Pomeranian Voivodeship was ca. 25 % below the national average in 2017. The reason for this is the collapse of the ship building industry in 2000 – 2005. However, there is a growth tendency</li> <li>Entrepreneurs account for most of the region's economy (the average share of fiscal revenue coming from entrepreneurs in the entire region is 38 %)</li> <li>The communes of Świnoujście and Międzyzdroje show higher urbanization and income due to the revenues derived from port activities and/or tourism</li> <li>The fishing industry is socially and culturally important, but it is being gradually displaced by tourism</li> </ul> <p><i>Vistula Lagoon</i></p> <ul style="list-style-type: none"> <li>The Pomeranian Voivodeship has a large urban agglomeration (Gdańsk-Sopot-Gdynia) and better developed industry &amp; services and thus, higher GDP per capita than the Warmian-Masurian Voivodeship</li> </ul>	<ul style="list-style-type: none"> <li>Both regions are located in coastal areas on the periphery of relatively large cities (Szczecin and Elbląg, respectively)</li> <li>Overall, more than 200,000 people inhabit the rural areas who mainly work in fisheries or tourism</li> <li>Fishing is the traditional activity of the region, but is losing relevance to increasing tourism, partially because it is not very attractive for younger workers</li> <li>Good social infrastructure and public services exist</li> <li>Vocational education and craftsmanship are disappearing, e.g. due to migration</li> <li>Population is aging in most communes</li> </ul> <p><i>Szczecin Lagoon</i></p> <ul style="list-style-type: none"> <li>However, average unemployment rate in 2017 was relatively low, ranging from 4.5% to 9.6% across the four municipalities</li> </ul> <p><i>Vistula Lagoon</i></p> <ul style="list-style-type: none"> <li>Unemployment rate of 9.3% (average) is higher than national average and professional activity rate is low. Communes with low tourism especially affected</li> </ul>	<ul style="list-style-type: none"> <li>Small-scale fishing still uses traditional technologies. Technological development in fishing gear has rather aimed at ensuring adequate selectivity than efficiency of fishing</li> <li>The availability of desirable species has been satisfactory enough that by-catch has been basically treated as waste, due to very low demand, but changes in the stocks of desirable species have started to alter this</li> <li>New fish processing technologies are focused on most commonly used fish species</li> <li>Uses for low-value fish have been assumed to be rather raw material for diverse industries, such as animal feed, fish oils, fertilizers or feedstock in biogas production. Some of these uses have proved to be ineffective at the actual volume of catch</li> <li>At present, the most cost-effective use of low-value fish is as animal feed, using mainly lyophilisation (freeze-drying) to improve shelf life and transport</li> <li>The qualification of the entire OIP area for Natura 2000 has significantly limited the technologies that can be applied</li> </ul>

Political Conditions	Economic Conditions	Social Conditions	Technological Conditions
<p>oeconomy, e.g. increasing competitiveness and territorial cohesion and cooperation</p> <p><i>Szczecin Lagoon</i></p> <ul style="list-style-type: none"> <li>Bioeconomy development is mentioned in the <b>Regional Strategy of Smart Specialization Development in West Pomeranian Voivodeship</b> (Szczecin Lagoon)</li> <li>The lagoon's fishing area is shared with Germany (border with region of Mecklenburg-Western Pomerania)</li> </ul> <p><i>Vistula Lagoon</i></p> <ul style="list-style-type: none"> <li>Half of the lagoon belongs to Russia. At the moment there is no joint transboundary water management plan and accessibility to the lagoon is severely limited due to Russia's control over the Strait of Pilawa (a channel on the Polish side is under construction)</li> <li>The <b>2020 regional strategy of Vistula Lagoon's area</b> (Warmian-Masurian Voivodeship) focuses on water economics and high-quality food, rather than tourism and cultural heritage</li> </ul>	<ul style="list-style-type: none"> <li>All participating communes of the Vistula Lagoon are considered dependent on fisheries</li> <li>There is low industrialization and a low share of services (apart from tourism in some municipalities). Generally, there is relatively low economic development</li> <li>Tourism is also very important in some of the municipalities, where for instance real estate and rental services also contribute to the economy</li> </ul>		



Environmental Conditions	Legal Conditions	Biomass Potential	Barriers to Biomass
<ul style="list-style-type: none"> <li>• The waters of the Polish lagoons are mainly fed by rivers with low exposure to open sea water, making them rich in nutrients but low in oxygen. Thus, their quality level is defined as poor, i.e. indicating the need for corrective action</li> <li>• The main drivers of this eutrophication are anthropogenic: release of fertilizers and untreated sewage</li> <li>• With higher temperatures, the concentration of bacteria (<i>E. coli</i>) increases, sometimes leading to a ban on swimming. This issue could be exacerbated by climate change</li> <li>• Fish resources in the lagoons are over-exploited, which is why fishing of economically important species is subject to time and area limitation rules</li> <li>• The lagoons used to be covered with ice in the winter, but in the past two decades these periods have been short or non-existent</li> </ul>	<ul style="list-style-type: none"> <li>• The Polish lagoons contain four designated Natura 2000 areas, two for birds and two for habitats protection (one of each in both lagoons)</li> <li>• Natura 2000, the Habitats Directive and the Birds Directive prevent any industrial activity - even fish processing - in the region. However, artisanal production is allowed</li> <li>• Poland's <b>Act on Sea Fisheries of 19 December 2014</b> regulates fisheries management in lagoon waters, including quotas, protected areas and permitted fishing gear</li> <li>• As per the <b>Act of December 16, 2005 on animal products</b>, all fishery or aquaculture production, processing or selling entities must be under the supervision of a county veterinary inspector. The fish placed on the market must be properly labelled according to <b>EU regulation No 1379/2013</b> and offered to final consumers according to <b>EU regulation No 1169/2011</b></li> </ul>	<ul style="list-style-type: none"> <li>• The main potential of the bioeconomy is related to the management of low-value fish stocks (seen by the fishers as by-catch), currently used to a minimum extent or treated as waste</li> <li>• Promotion of traditional, often forgotten recipes and the application of innovative technologies such as freeze-drying to bring undervalued, underused fishery resources back into the mainstream</li> <li>• Marketing the products of small-scale fisheries to increasingly environmentally aware customers as a more sustainable option, allowing for larger profits from sale of the fish itself rather than indirect tourism benefits</li> <li>• New fish processing technologies for the utilization of fish waste in the cosmetics and pharmaceutical industries</li> <li>• Cooperation between the relevant administrative units and interested entrepreneurs, as well as scientific entities, already exists at the local level</li> <li>• Fishery Local Action Groups (FLAGs) exist in both regions and provide an excellent starting point for a closer cooperation to further develop bioeconomy. For instance by engaging in close collaboration to avoid detrimental competition between economic sectors and for attracting investment</li> <li>• Communication and dissemination can potentially increase the interest of younger generations and the authorities in bioeconomy</li> </ul>	<ul style="list-style-type: none"> <li>• Dependence of the regions' economy on tourism and reluctance to innovate in the use of fish resources</li> <li>• Relatively small amount of fishing in the lagoons and the inability to plan and ensure sustainability is a threat to potential investors</li> <li>• Lack of public support for research, finance or entrepreneurship, also in local administrations</li> </ul>

## 2.4 OIP Vidzeme and Kurzeme, Latvia

Political Conditions	Economic Conditions	Social Conditions	Technological Conditions
<ul style="list-style-type: none"> <li>In 2017, the Latvian government published a dedicated national bioeconomy strategy 2030 (LI-BRA), making it the first country to do so in the EU-13</li> <li>The main bioeconomy development goals of the <b>Latvian Bioeconomy Strategy 2030</b> are: <ul style="list-style-type: none"> <li>Advancement and retention of employment in the bioeconomy sectors</li> <li>Increasing the value added of bioeconomy products to at least EUR 3.8 billion in 2030</li> <li>Increasing the value of bioeconomy product exports to at least EUR 9 billion in 2030</li> </ul> </li> <li><b>The Smart Specialisation Strategy (RIS3) of Latvia</b> contains <b>Guidelines for the development of forestry and related sectors 2015-2020</b> which promote and support technological progress specialization areas such as: sustainable wood production in changing climate conditions, the full use of biomass for chemical processing and energy, and high value-added wood niche products</li> <li>Other relevant policies for the bioeconomy: <b>Sustainable Development Strategy of Latvia until 2030</b>, <b>National Development Plan of Latvia for 2014–2020</b> and the <b>Latvian National Plan for Adaptation to Climate Change until 2030</b></li> <li>There are five planning regions in Latvia, which are not administrative territorial divisions, but align with the boundaries of</li> </ul>	<ul style="list-style-type: none"> <li>In Latvia, 128,000 people were employed in bioeconomy-related sectors in 2015</li> <li>Traditional bioeconomy sectors –agriculture, forestry, fisheries, food industry, as well as woodworking– accounted for 54% of the gross value added (GVA) of all manufacturing in Latvia in 2015</li> <li>Bioeconomy industries account for about 55-60% of Latvia's total exports of goods</li> <li>Rapid growth in production of pre-treated wood products and increase in demand for local processing of timber are expected in Latvia through 2030</li> </ul> <p><u>VPR</u></p> <ul style="list-style-type: none"> <li>Region with the highest primary sector share (agriculture, forestry, fishery) in the country</li> <li>Highest added value in region is generated from manufacturing, agriculture, forestry, fishing, wholesale and retail industries</li> <li>VPR accounts for 11% of Latvia's manufacturing added value</li> <li>Monthly salaries are about 20% below national average</li> </ul> <p><u>KPR</u></p> <ul style="list-style-type: none"> <li>Main economic sectors in the region are agricultural production and processing, forestry and woodworking, tourism and fishing, transport and logistics. There are also metalworking and mechanical engineering companies in the region</li> </ul>	<ul style="list-style-type: none"> <li>The population of Latvia is declining since the shift to a market economy in the early 1990s and the trend is expected to continue</li> <li>Emigration levels over the last 15 years have been considerable among the younger segments of the population and in rural areas. This has led to significant changes in the overall age structure of the country and age structure imbalances between rural areas and larger cities.</li> <li>Among Latvians between the ages of 15 and 74, about 29% have a higher education degree. For Vidzeme it is 22% and Kurzeme 21%</li> <li>There is a downward national trend for university education graduation, particularly regarding mathematics, science and technology subjects</li> <li>The unemployment rate in VPR is 9.0%, while in KPR it is 7.7%</li> <li>36.2% of all people in KPR live in rural areas</li> </ul>	<ul style="list-style-type: none"> <li>Human resources and worker's skills related to new technologies are among the most important factors in bioeconomy development. In Latvia, higher education institutions already offer related study courses, making it ready and capable to adopt or develop new technologies</li> <li>Latvia's RIS3 lay the ground for increasing innovation capacity and creating an innovation system that promotes and supports technological progress in the country's economy, where bio-based sectors play a key role</li> <li>The top-priority technologies for Latvia are those used in processing of sawn timber and slabs. These are employed to increase domestic production of e.g. solid wood panels and prefab wood products, thus increasing value added production in Latvia's furniture and construction industries</li> <li>Technologies that enable more efficient forest management and forest resource accounting in the context of climate change are also crucial</li> </ul>

Political Conditions	Economic Conditions	Social Conditions	Technological Conditions
<p>existing municipalities. However, administrative units are currently undergoing a process of reform</p> <ul style="list-style-type: none"> <li>In general, the political conditions in the Vidzeme Planning Region (VPR) and the Kurzeme Planning Region (KPR) are the same because they are defined at the country level. However, VPR has a dedicated bioeconomy action plan</li> <li>The <b>Action Plan for Development of a Knowledge-Driven Bioeconomy Innovation Ecosystem in Vidzeme Region in Latvia</b> aims at establishing the pre-conditions for knowledge-driven bioeconomy innovation and to provide support to innovators particularly in following areas: value-added wood products, smart materials, and healthy food and beverage production</li> </ul>	<ul style="list-style-type: none"> <li>Monthly salaries are about 20% below national average</li> </ul>		

Environmental Conditions	Legal Conditions	Biomass Potential	Barriers to Biomass
<ul style="list-style-type: none"> <li>Climate change is projected to have a considerable impact on Latvia. This includes increasing the length of the vegetation period, which is actually expected to have positive effects on tree growth. However, it is also expected to drive changes in the distribution of precipitation, leading to more extreme drought periods, wildfires, and storms. These represent key risks in forest management cycles.</li> <li>Climate change is also expected to induce the need to change management practices in forests, as it is predicted to impact wind and pervasiveness of den-</li> </ul>	<ul style="list-style-type: none"> <li><b>Environmental Policy Guidelines 2014-2020</b> are medium term policy planning documents designed to parallel priorities of the country's <b>National Development Plan 2014-2020</b> aims, among other, at ensuring sustainable use of natural resources, promoting public participation in decision-making and environmental awareness</li> <li>The <b>National Forest Law</b> of 2000 promotes economically, ecologically, and socially sustainable management and use of the forest by ensuring ownership rights</li> </ul>	<ul style="list-style-type: none"> <li>The bioeconomy is on the radar of politicians at the national level in Latvia, and a national bioeconomy strategy through 2030 is already formulated</li> <li>There is potential to exploit by-products of forest management (such as young forest stand thinning and short rotation coppice) and agroforestry systems (perennial grasses, the production of hay or grass seeds, and herbs for pharmaceutical and cosmetics applications)</li> <li>Both regions' economic focus on primary resource sectors (primarily agriculture and forestry) favors the building of ties</li> </ul>	<ul style="list-style-type: none"> <li>There is a focus on the production of premium quality and second- to third generation products. There is a lack of attention given to the use of all harvested material, small and damaged timber and branches, and of less demanded tree species which are not suitable for the production of high added value products but could be transformed into simple products.</li> <li>No logistic centers to handle and pre-treat biomass. Thus, bio-based industries or bioenergy installations would have to invest in that infrastructure</li> </ul>

Environmental Conditions	Legal Conditions	Biomass Potential	Barriers to Biomass
<p>drophagic insects, reducing the likelihood of damage from increased high winds</p> <ul style="list-style-type: none"> <li>• The increase in the duration of heat periods is considered to be one of the most dangerous phenomena in the region</li> <li>• The VPR is characterized by a low building density and a high proportion of natural landscapes with low human impact</li> <li>• The KPR has a very long coast line (over 350km) with a variety of natural and cultural landscapes</li> <li>• Both regions are highly forested and thus susceptible to forest fire risks</li> </ul>	<ul style="list-style-type: none"> <li>• Latvia's <b>Agriculture and Rural Development Law</b> of 2004 specifies for instance that investments in rural areas must preserve the rural environment and support producers of agricultural products</li> </ul>	<p>among businesses and other relevant institutions in the bioeconomy value chains</p> <ul style="list-style-type: none"> <li>• Market for biomass for energy and material applications are projected to increase locally and also globally. The export of bioeconomy industries' products are critical to ensuring balanced development in the country</li> <li>• Both regions have enough feedstock, especially from forest and agricultural resources, to develop a small-scale bio-based industry or bioenergy installations (pellets, wood chips, biogas, food, etc.)</li> <li>• They have a good infrastructure for biomass transportation and the required qualified workforce to implement and manage bio-based industries and bioenergy installations</li> <li>• Financing for required infrastructure is available and is supported by private and public bodies</li> </ul>	<ul style="list-style-type: none"> <li>• Even though some policies to support the bio-based sector exist, they are not optimal on all levels and need to be adapted to play in favor of the sector</li> </ul>

## 2.5 OIP Covasna, Romania

Political Conditions	Economic Conditions	Social Conditions	Technological Conditions
<ul style="list-style-type: none"> <li>There is no specific national or regional bioeconomy or bio-based industry strategy.</li> <li>The National Strategy for competitiveness 2014-2020 and the National Research Development and Innovation Strategy 2014-2020 stipulate the bioeconomy as a smart specialization sector.</li> <li>Romania's Smart Specialization Strategy for 2014-2020, the Regional Smart Specialization Strategy (RIS3) of the Central Region and the 2010 Master Plan for Biomass and other policies in preparation, have links to bioeconomy.</li> <li>The Sustainable Development Strategy of Romania 2030 contains chapters with measures for climate change, circular economy, waste management, protection and conservation of forestry ecosystems.</li> <li>The National Plan for Rural Development 2014-2020 focuses on the forestry and agriculture sectors.</li> <li>At the Covasna county level, the bottom-up initiative "1 village 1 MW" aimed to implement small scale bioenergy projects to supply local public buildings</li> <li>Public subsidies favor projects related to e.g. bioenergy production and use of local bioresources</li> </ul>	<ul style="list-style-type: none"> <li>Most important bioeconomy sectors in Covasna: forestry, followed by agriculture (rapeseed, grains)</li> <li>Most important industrial sectors: wood manufacturing, automotive components, textile, green energy, metalworking, mechanical engineering and tourism</li> <li>Other promising sectors: agro-foods, forestry products, and textiles</li> <li>GDP per capita and GVA of Covasna in upward trend, roughly in line with the Centru Region and Romania.</li> <li>Changes in the forestry code (2018) have had an impact on the quantities of harvested wood and on its price. Consequently, the wood industry has begun importing logwood from neighboring countries. Overall it has had a negative effect on the price of Romanian wood panels</li> <li>Most promising sector for the future is bioenergy (heat &amp; electricity), particularly from wood industry's waste and shrub (or energy) willow, for use in domestic companies and at national level.</li> <li>Covasna is already home to Romania's largest combined heat power plants (CHP) in Reci with a total of 60 MW (15 MW electricity, 45 MW heat)</li> <li>Strong cooperation among bio-economy relevant stakeholders in the region (clusters-universities-local public authorities-educational institutions-civil society)</li> </ul>	<ul style="list-style-type: none"> <li>Covasna is predominantly rural: &gt;50% of the population lives in rural settlements with no significant core urban area for industry. As such, the region faces challenges such as low investment in basic infrastructure, inefficient supportive and advisory structures and emigration (national and abroad)</li> <li>Low population density, though relatively younger than other areas of Romania: 59% between 15 and 59 years</li> <li>Demographic decline is predicted to continue until 2050, leading to an aging population and associated social problems such as a higher demographic dependency and further reduction of educational services for the young</li> <li>Share of higher education graduates is trending upwards, while the percentage of illiteracy has decreased.</li> <li>High unemployment rate of roughly 50% (ca. 20% above national average, downward trend), closely linked to layoffs in nearby mines</li> <li>Civil society organizations in every settlement; well-developed networks between them</li> </ul>	<ul style="list-style-type: none"> <li>Most relevant technologies related to forestry and biomass: e.g. modern biomass boiler technologies (households and business)</li> <li>Innovations in the agri-food sector have resulted from research in the Covasna County: a whey-based energy drink and a fiber-rich, gluten free drink</li> <li>CNC-Technology used in the auto-part and wood manufacturing, as well as furniture industry</li> <li>Six clusters of different sectors present in the region: renewable energy and environmental technologies, forest-based industry, agriculture and food industry, clothing and fashion, and mechanical engineering</li> </ul>

Environmental Conditions	Legal Conditions	Biomass Potential	Barriers to Biomass
<ul style="list-style-type: none"> <li>• Covasna is covered by different types of forest</li> <li>• Wood is the most widely used biomass for household heating in the region.</li> <li>• In spite of existing efforts and regulations, illegal logging of public or protected forests is increasing both in number of cases and volume. With this, deforestation is becoming a concerning issue in Covasna County.</li> <li>• Awareness of population regarding illegal logging is increasing and online reporting mechanisms allow for public participation in the enforcement of policies</li> <li>• Environmental state of public forests (ca. 50% of total) monitored and controlled by state-owned Romsilva company</li> </ul>	<ul style="list-style-type: none"> <li>• Diversification of agriculture supported by Agriculture Ministry. However, legislation regarding energy willow plantations has been updated in 2018. Since then, short rotation crops (SRC) are only allowed in degraded soils. Thus, biomass production is not allowed in agricultural land</li> <li>• Harvesting is limited or banned in Romania for high conservation value forests. However, illegal logging is very widespread due to low enforcement</li> <li>• The National Plan for Waste Management approved in 2017 regulates waste generation and promotes circular economy concepts.</li> </ul>	<ul style="list-style-type: none"> <li>• Most bioeconomy potential in forestry sector</li> <li>• Waste from agri-food sector also relevant: already being used as a source for fertilizers, but it could also be used for the production of chemicals with a wide range of applications</li> <li>• Enough biomass resources are available for small-scale bio-based industries: while biomass is already used for pellet and wood chip production (energy production), unused feedstocks can be available for other such industries, e.g. textiles</li> <li>• Regional grant programs are supporting innovative start-ups</li> <li>• Relatively easy access to finance by private companies through banks (public and private)</li> <li>• Existing clusters in biomass sector offer good potential for networking and strengthening entrepreneurship</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure for biomass transport and handling has room for improvement</li> <li>• Skilled workforce for biomass procurement activities exists. However, due to a lack of vocational training in the region, it is challenging to find skilled personnel for the implementation of bio-based industries</li> <li>• Public support policies for new businesses in this field is lacking at different levels</li> <li>• Entrepreneurship seems generally to be weak and the biomass market is still not fully developed, although there are several biomass suppliers from forestry and agriculture</li> </ul>

### 3 First outlook: technology options and business models

This chapter provides graphic summaries of the recommendations and examples of suitable technologies and business models that were documented in the report on new technology options (D2.1) and the report on business models (D2.4) of the BE-Rural project.

The table for each OIP region provides additional detail on biomass streams available and presents an overview of enabling factors (i.e. the financial, infrastructure and other outstanding conditions). The financial category identifies the conditions for attaining financing for bioeconomy businesses in the region, including the availability of public or private funds and any obstacles to financing. The infrastructure category is primarily focused on the availability of transportation networks for biomass in the region. A more general “other” column is included to address any outstanding issues, such as technical expertise available, stakeholder collaboration, and employment issues. Finally, brief descriptions of the relevant technologies and highlights of their business models are presented. This covers the key activities of the business and the key resources they require, the value proposition they offer, and the cost structure and revenue streams.

Together with the previous chapter, its purpose is to set the scene for the initial engagement and discussions with the OIP and the Task Force as preparation for the market assessment and business model design activities described in Chapter 5.



### 3.1 OIP Stara Zagora, Bulgaria

<b>Biomass streams</b>	There is significant biomass potential from the agricultural sector, especially for energy purposes and to produce bio-based products. There is also potential for the use of forest biomass, but it is limited. Further studies are required to assess the region's capacities on both fronts. Businesses using both agricultural and forestry biomass are especially attractive for the region. Finally, there is also high biomass potential from the pulp and paper industry.		
<b>Enabling conditions</b>	<b>Financial</b>	<b>Infrastructure</b>	<b>Other</b>
	Though the region is economically attractive (growth rate above the national average) and SMEs offer good opportunities, financing systems for businesses are available but rather weak. Interest rates, for example, remain high.	The region already has transportation infrastructure for biomass materials in place.	Collaboration among stakeholders in the area already exists, including education institutions, R&D units, and local businesses. Furthermore, fossil-based jobs in the region will be declining, which could facilitate the development of the bioeconomy by offering employment opportunities in a new field, though trainings would be required.
<b>Challenges</b>	Financing will be particularly challenging, meaning that businesses with less investment needs are more attractive for the area at the moment (2019). Furthermore, the professional expertise in the relevant fields does not exist, so specialized trainings and courses would be needed. Additionally, the development of a strategy for R+D+I in the region would be very beneficial.		
<b>Suitable technologies</b>	<p>Briquetting, pelletizing, anaerobic digestion and pyrolysis are all relevant for the area. The business models of Spawnfoam, Spinnova, and Bio-lutions are especially interesting here.</p> <ul style="list-style-type: none"> <li>Bio-lutions is a start-up offering sustainable packaging and disposable tableware made from agricultural residues. The technology uses the shortest fibers (e.g. flax and hemp), making it suitable for agricultural residues and regional bioeconomies anywhere. The processes involved are all monitored for efficiency, and are resource efficient and environmentally friendly (i.e. no use of chemicals, temperatures are kept low). Key resources for Bio-lutions include the financial resources that allowed them to develop the technology and run the business, as well as the availability of local raw material and labor, the latter of which does not require specific expertise. The use of agricultural residues can create additional income for farmers, which facilitates economic development in rural areas. Further, the company hopes to raise awareness on issues of plastic waste through its products. Potential customer segments for the products include online supermarkets, cafes, online food delivery services, and hospitals. The cost structure includes: wages, marketing, rents, logistics, and storage and energy needs. Revenue streams come from selling the sustainable packaging and disposables, and in 2019 Bio-lutions was generating around €7.2 million annually.</li> <li>Spawnfoam is a company that turns organic and agroforestry residues into a renewable biocomposite for manufacturing plant pots, construction boards, and ornamental vases. The company is focused on extending the life cycle of untapped agroforestry residues in surrounding areas. Other key activities include the sale of the product, as well as communication and relationship building with key partners. Resources required by Spawnfoam include skilled labor, appropriate research infrastructure, financing, and of course the biomass resources required to make the product. The sustainable and biodegradable biocomposite Spawnfoam produces can be used for a range of applications to replace fossil-based alternatives, with multiple target customer segments. Tree and plant nurseries can use plant pots as pots as well as organic fertilization afterwards. In the construction industry, the biocomposite can be used as acoustic or thermal isolation, for example. Finally, the retail sector, including DIY and online shops, can sell these products to environmentally conscious consumers and households. The cost structure includes: wages for skilled labor for development and marketing, the biomass cost, as well as logistics and rent. Revenues come from selling the biocomposite products; awards and prices support Spawnfoam through promoting the products and generating further revenue.</li> <li>Spinnova is a company that turns wood fibers into yarn without the use of harmful chemicals. The technology uses micro fibrillated cellulose from wood residues to produce the fibers. The product is a fluffy wool-like material, suitable to spin into yarn or for producing other textiles. Additionally, the product is fire retardant, antimicrobial, warm, and biodegradable, which can open a range of potential uses beyond the textile industry.</li> </ul>		



### 3.2 OIP Strumica, North Macedonia

<b>Biomass streams</b>	Primarily agricultural products, including residues and waste from agri-food industry, but also raw material from the forest industry for small-scale processing. Further studies are required to determine the region's capacities for both of these biomass streams.		
<b>Enabling conditions</b>	<b>Financial</b>	<b>Infrastructure</b>	<b>Other</b>
	Financing is available, but in general through a financial intermediary. Farmers as individuals could experience difficulties in obtaining proper financial support. The region is not able to provide direct financing for these types of initiatives, though public funding can be accessed through national agencies. Furthermore, the banking sector is strong and credit is available.	It is likely that new investment in transportation infrastructure (including roads and railways) might be needed.	The region has the skilled workforce required for the implementation of a biomass supply chain, but there is room for improvement of high-level training and education in the field.
<b>Challenges</b>	While financing is available, there is a lack of direct investments, which could be a roadblock to the development of bioeconomy businesses. Further, better collaboration between stakeholders in the region will be required. Additionally, the development of a strategy for R+D+I in the region would be very beneficial.		
<b>Suitable technologies</b>	<p>Pelletizing and briquetting, gasification or pyrolysis, anaerobic digestion and composting. The Spawnfoam business model is particularly relevant, and is outlined below.</p> <ul style="list-style-type: none"> <li>Spawnfoam is a company that turns organic and agroforestry residues into a renewable biocomposite for manufacturing plant pots, construction boards, and ornamental vases. The company is focused on extending the life cycle of untapped agroforestry residues in surrounding areas. Other key activities include the sale of the product, as well as communication and relationship building with key partners. Resources required by Spawnfoam include skilled labor, appropriate research infrastructure, financing, and of course the biomass resources required to make the product. The sustainable and biodegradable biocomposite Spawnfoam produces can be used for a range of applications to replace fossil-based alternatives, with multiple target customer segments. Tree and plant nurseries can use plant pots as pots as well as organic fertilization afterwards. In the construction industry, the biocomposite can be used as acoustic or thermal isolation, for example. Finally, the retail sector, including DIY and online shops, can sell these products to environmentally conscious consumers and households. The cost structure includes: wages for skilled labor for development and marketing, the biomass cost, as well as logistics and rent. Revenues come from selling the biocomposite products; awards and prizes support Spawnfoam through promoting the products and generating further revenue.</li> </ul>		

### 3.3 OIP Baltic Lagoons, Poland

<b>Biomass streams</b>	The focus in this region is on cyprinid fish as a biomass source for valorization. These can be used in two ways: either as food for human consumption, or processed into bio-based products for the cosmetics and pharmaceutical industries. The most cost-effective application currently seems to be the production of animal feed, but there is a desire to diversify processing options. Most of the regions' catch is exported to other Eastern European countries, but it would be beneficial to process and sell it locally.		
<b>Enabling conditions</b>	<b>Financial</b>	<b>Infrastructure</b>	<b>Other</b>
	No apparent obstacles to funding, with potential financiers including the European Maritime and Fisheries Fund line and the local FLAGS.	There is a well-developed infrastructure for the gastronomy and hospitality sector in the region. The logistics associated to the exploitation of low value fish are short chain (fishers – consumers) or local regular chain (due to sanitary law: fishers – processors – restaurants – consumers), meaning there is no need for special infrastructure. The flow of tourists is ensured by routes that are well-connected to the country road system.	Local FLAGS connect stakeholders and other entities, and there is an existing pool of knowledge as a result.
<b>Challenges</b>	A challenge will be establishing a two-layered approach, i.e. many small entities offering similar goods (dishes featuring local fish) and in parallel marketing the whole region as a fish area. Developing the catering industry further while rebranding the region could potentiate synergies for regional development. Additionally, the development of a strategy for R+D+I in the region would be very beneficial.		
<b>Suitable technologies</b>	<p>The technology and business model of the Hédinn processing plant are particularly relevant since it can help diversify fisheries income.</p> <ul style="list-style-type: none"> <li>Hédinn is an engineering company that offers a transportable plant for protein production from fish waste. This extends the life cycle of fish processing waste while creating a natural and sustainable product. Additionally, the plant can create additional local income, which can encourage rural economic development. Key activities for the processing plant include the transportation and processing of the biomass to an adequate location, but also relationship building with partners, customers and suppliers. The plant comes in three different sizes, for a variety of different production scales, including small-scale and local. It can also be operated by fisheries, fish farms, and co-operatives, making it suitable for a wide range of settings. The willingness of the local fishery sector is key to successful implementation, as well as the necessary financial resources and the required biomass. The target customer segments for the product include food and feed producers, cosmetics manufacturers, and the pharmaceutical industry. The cost structure for the Hédinn plant includes: investment costs, feedstock, wages, logistics, and operation and maintenance. Revenue comes in the form of sales of the fish protein products.</li> </ul>		

### 3.4 OIP Vidzeme and Kurzeme, Latvia

<b>Biomass streams</b>	Biomass potential in the two regions of Latvia comes mostly from agriculture and forestry, as well as related industries like woodworking. The region also features fisheries, food industry, and pulp and paper manufacturing.		
<b>Enabling conditions</b>	<b>Financial</b>	<b>Infrastructure</b>	<b>Other</b>
	The banking system and the ALTUM programme provide initial financing opportunities for bio-based businesses. There is also a regional programme supporting new businesses with investments. Further, research funding is available through H2020, generally for larger players, while small rural companies can access European Innovation Platform funding being managed by local the Rural Support Centre.	Both regions have good infrastructure connecting producers and consumers, with established transport companies working with biomass.	There is enough manpower in the country with the technical expertise required to develop and work on bioeconomy projects, however entrepreneurship remains limited. This is partly addressed by educational institutions offering programs for start-ups as well as courses relevant to the bioeconomy.
<b>Challenges</b>	A challenge for the regions will be the coordination of the various stakeholders. Finding the balance between openness for all interested parties, as well as restricting the stakeholder pool for efficiency, will be crucial. Additionally, the development of a strategy for R+D+I in the region would be very beneficial.		
<b>Suitable technologies</b>	<p>The focus here is on biomass coming from forestry and wood-related industries. Business models for pelletizing and briquetting may be relevant, and the Spawnfoam model is especially interesting.</p> <ul style="list-style-type: none"> <li>Spawnfoam is a company that turns organic and agroforestry residues into a renewable biocomposite for manufacturing plant pots, construction boards, and ornamental vases. The company is focused on extending the life cycle of untapped agroforestry residues in surrounding areas. Other key activities include the sale of the product, as well as communication and relationship building with key partners. Resources required by Spawnfoam include skilled labor, appropriate research infrastructure, financing, and of course the biomass resources required to make the product. The sustainable and biodegradable biocomposite Spawnfoam produces can be used for a range of applications to replace fossil-based alternatives, with multiple target customer segments. Tree and plant nurseries can use plant pots as pots as well as organic fertilization afterwards. In the construction industry, the biocomposite can be used as acoustic or thermal isolation, for example. Finally, the retail sector, including DIY and online shops, can sell these products to environmentally conscious consumers and households. The cost structure includes: wages for skilled labor for development and marketing, the biomass cost, as well as logistics and rent. Revenues come from selling the biocomposite products; awards and prizes support Spawnfoam through promoting the products and generating further revenue.</li> </ul>		

### 3.5 OIP Covasna, Romania

<b>Biomass streams</b>	The biomass potential in the Covasna region comes primarily from the forestry sector – including wood manufacturing and furniture production. Agriculture is a secondary industry, though also offers significant biomass potential. Further studies are required to determine the region's capacities for both of these biomass streams. Most woody biomass is currently used for fuel, though other applications are desirable.		
<b>Enabling conditions</b>	<b>Financial</b>	<b>Infrastructure</b>	<b>Other</b>
	There is a strong private banking sector in the region, offering easy access to financial resources. Public subsidies may become more available due to the increasing attention in national policymaking.	Transportation infrastructure is already in place in the region. Construction of industrial parks is attractive to investors, while also stimulating cooperation and collaboration in the field.	R&D is already fairly prominent in the area through clusters, universities and companies. Initiatives and programs to support start-ups also exist.
<b>Challenges</b>	Despite the robust financial systems, investment is still lacking. Collaboration and coordination between stakeholders will need to be carefully managed, particularly with the transport sector, but also SMEs, clusters, and R&D institutions. Further government support is also required for the development of new local businesses. Additionally, the development of a strategy for R+D+I in the region would be very beneficial. Finally, it seems the region is lacking the skilled workforce needed for the development of a biomass supply chain, and so trainings and courses may be necessary.		
<b>Suitable technologies</b>	<p>Businesses in both the forestry and agriculture sector could be relevant here. Pelletizing and briquetting may be applicable here, and the business models from Spawnfoam and Spinnova may be especially interesting to stakeholders.</p> <ul style="list-style-type: none"> <li>Spawnfoam is a company that turns organic and agroforestry residues into a renewable biocomposite for manufacturing plant pots, construction boards, and ornamental vases. The company is focused on extending the life cycle of untapped agroforestry residues in surrounding areas. Other key activities include the sale of the product, as well as communication and relationship building with key partners. Resources required by Spawnfoam include skilled labor, appropriate research infrastructure, financing, and of course the biomass resources required to make the product. The sustainable and biodegradable biocomposite Spawnfoam produces can be used for a range of applications to replace fossil-based alternatives, with multiple target customer segments. Tree and plant nurseries can use plant pots as pots as well as organic fertilization afterwards. In the construction industry, the biocomposite can be used as acoustic or thermal isolation, for example. Finally, the retail sector, including DIY and online shops, can sell these products to environmentally conscious consumers and households. The cost structure includes: wages for skilled labor for development and marketing, the biomass cost, as well as logistics and rent. Revenues come from selling the biocomposite products; awards and prices support Spawnfoam through promoting the products and generating further revenue.</li> <li>Spinnova is a company that turns wood fibers into yarn without the use of harmful chemicals. The technology uses micro fibrillated cellulose from wood residues to produce the fibers. The product is a fluffy wool-like material, suitable to spin into yarn or for producing other textiles. Additionally, the product is fire retardant, anti-microbial, warm, and biodegradable, which can open a range of potential uses beyond simply the textile industry.</li> </ul>		

## **4 Designating the Task Force on Market Assessment and Business Model Design**

The BE-Rural OIPs are forums where incumbents of regional bio-based supply chains come together. OIP members may include biomass producers/owners/distributors, developers of bio-based products and services, developers/distributors of enabling technologies and equipment, potential and/or existing paying customers and end-users, and the relevant public authorities. By involving all these stakeholders, the OIP structures can become highly effective sources of market intelligence as well as “resonance boxes” for bio-based product developers to gather direct feedback from potential end-users and paying customers.

Within each OIP, it is envisioned that a subset of stakeholders will integrate a Task Force in charge of conducting a market assessment and designing adequate business models for their region using the methodology presented in Chapter 5 and the templates provided therein. Building on the results of stakeholder mapping activity conducted in BE-Rural (Task 5.1), this section explains the need for –and suggests a procedure to– identify the specific organizations and individuals that should be invited to engage actively in the business strategy development work. It provides instructions to the OIP facilitators on how to combine the information on regional conditions and suitable tech options presented in the two previous chapters with the information on stakeholder interest/influence gathered in Task 5.1 to decide (providing adequate justification) who the members of the Task Force should be.

### **4.1 Why do we need to establish a Task Force?**

The purpose of setting up such a group is to allow for a more agile conduction of the regional market assessment and a better-informed development of the business strategy for bio-based products and services deemed relevant by the region's stakeholders. The setup of this Task Force does not intend to exclude the views and opinions of other OIP members who wish to participate. The intention is to establish a structure and work plan that enables a highly efficient market assessment and an effective business model design process. Within this initial frame, the contributions from additional stakeholders should be collected, discussed and incorporated at specific and pre-defined points in time (see section 4.3). Nevertheless, regional stakeholders are allowed and encouraged to make specific inquiries on their own initiative throughout the whole process.

A key factor is identifying the stakeholders who, due their specialized knowledge, experience, and/or access to specific data, information and contacts, could make significantly valuable contributions to the task. This should result in a more thorough consideration of the regional dynamics, market needs and gaps, and potential barriers to commercialization. Ultimately, this is expected to yield more realistic business models with higher chances of success. For these reasons, the OIP facilitators should invite the stakeholders to participate in the Task Force and aim at gaining their interest and commitment early on.

In order to guarantee the protection of the Intellectual Property Rights of the owner(s) of the business idea that will be evaluated in the process, all Task Force members are required to sign a Non-Disclosure Agreement (NDA). The same will apply to other OIP members whom the Task Force decides to grant access to sensitive information from the assessment. The NDA should be drafted by the owner of the business idea.

### **4.2 Relevant considerations for selecting the Task Force members**

#### **4.2.1 Defining the bio-based products/services and enabling technologies that will be investigated**

As presented in Chapter 3, the bioeconomy potential in the regions has already been explored (Khawaja, Colmorgen & Rutz, 2019), as have been the business models of some potentially relevant bio-based products and technologies (Colmorgen & Khawaja, 2019). These insights are used here as impulse to the task of identifying bio-based products and services that address the actual needs of

each region's market, and the possible arrangement of revenue streams and cost structures associated with commercializing such offers.

To facilitate the design of business models that are customized to the OIP region's conditions, a first logical step is to update the available information on current biomass supply and potential as well as on the needs and wants of regional stakeholders. For this purpose, a short survey questionnaire has been prepared for OIP facilitators to expand, translate and circulate among the OIP members (see Annex for the sample questionnaire). The questionnaire has been formulated on the basis of previous project results and has as its main objectives: a) to gather direct inputs that can be used to update and/or expand on the previous project insights, and b) to guide and validate the selection of bio-based products and services for which the market assessment described in Chapter 5 will be conducted. The survey results, combined with their own knowledge of the region's dynamics, will enable the OIP facilitators to identify bio-based products and services with high commercial potential in their region that can be produced and consumed within safe ecological limits. This will in turn allow them to define who the members of the Task Force should be.

#### 4.2.2 Determining the position and potential contributions of regional stakeholders

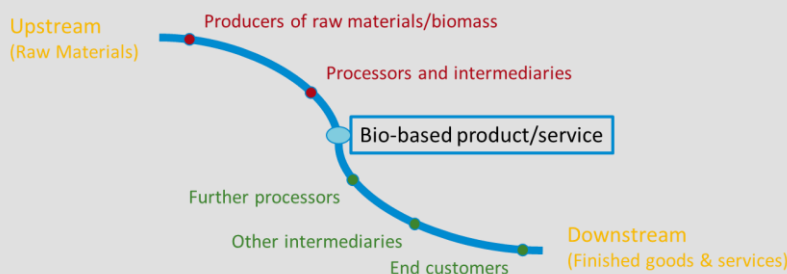
The stakeholder mapping developed in Task 5.1 offers initial orientation regarding the influence and interest that previously identified stakeholders have regarding the regional bioeconomy. When setting up the Task Force on Market Assessment and Business Model Design, it can be helpful to consider the position that particular stakeholders have in the value chain of the bio-based product or service that has been selected for investigation in the previous step, and the contributions that they could provide during the assessment.

##### Box 1: Determining stakeholders' position in the value chain:

The value chain of a product or service is often compared to a river that starts with the extraction of raw materials (in this case, biomass) from the environment and "flows" to end-consumers through commercialization. Here it can be helpful to identify which processes occur upstream and downstream along the value chain.

In this river metaphor, upstream generally refers to the material inputs needed for production, as well as the activities required for obtaining them. On the other hand, downstream refers to the process of producing finished goods and services through to their distribution and commercialization (Quain, 2019). However, the scopes of upstream and downstream sections of the value chain depend on where the observer is situated. A biomass producer, for instance, is situated at the origin of the value chain. Thus, from her viewpoint, every other actor and process operate downstream. In a circular bioeconomy, we would also consider the end of life (disposal or recirculation) of a product, which basically connects the downstream with the upstream (also of other value chains). In this model, the waste generated by one value chain can become raw material again (Lokesh et al. 2018).

**Figure 2: General overview of a generic linear value chain**



Source: own elaboration

Each particular product has its own value chain, but can be also a part of another one. Thus, the particular product or service being considered can be rather upstream or downstream of a given value chain relative to the point of view from which it is being assessed. For example, if you are a forest owner and your main product is wood (with minimal processing), you will be located upstream of a number of other products that require your biomass for their own production. However, as you use machinery for the management of your forest, you are downstream of the value chain of these machines. Therefore, it is important to define exactly which value chain (of which product or service) will be analyzed, so that you can also identify who will be your potential suppliers (upstream) and direct customers (downstream).

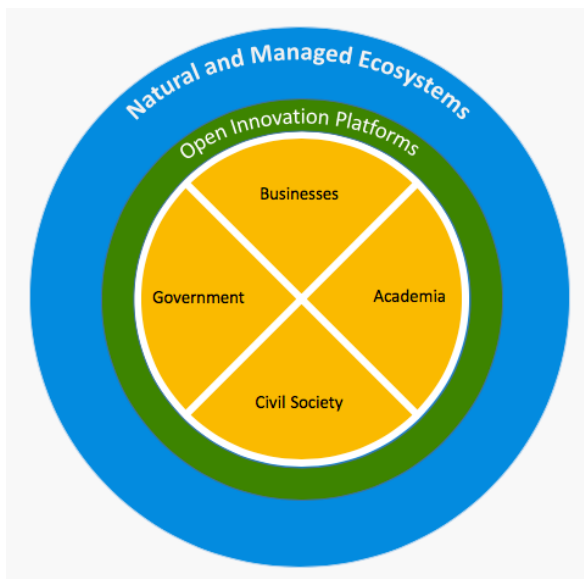
As previously mentioned, OIP members may include suppliers of production inputs (e.g. materials, knowledge, technology, work force), distributors and marketers, paying customers, end-users, and regulators, to name a few examples. Based on their position along the value chain, their specialized knowledge and their network, different stakeholders would be able to contribute distinctly to the market assessment and business model design activities.

Not all stages of the value chain need to be represented in the Task Force, but as a minimum requirement, the owner of the business idea should be involved and collaborate with the OIP facilitator in the market assessment and business model design activities. In order to increase the access to information and networks, and thereby the chances of success from carrying out the exercises, it is advised that a wider range of stakeholder groups is engaged (see next section). Further, the selection of the Task Force members is not limited to considering only stakeholders that have been previously identified in Task 5.1 or in other activities of the stakeholder process, but may also include newly identified incumbents from this stage. In some cases, the results of the stakeholder survey mentioned above might point to organizations or individuals that have not been previously considered or engaged.

### 4.2.3 Getting all stakeholder groups represented in the Task Force

A final consideration to orient the selection of Task Force members is the pursuit of the Quintuple Helix Innovation Model. The BE-Rural conceptual approach builds on this model, which combines knowledge and innovation generated by key stakeholders from policy, business, academia and civil society within the frame of the environment (Carayannis & Campbell, 2010).

**Figure 3: Quintuple Helix Innovation Model as applied in BE-Rural**



Source: Abhold et al., 2019

In the context of Task 5.3, this essentially means that the business model design process followed by the Task Force should not only aim for commercial viability, but dedicate serious reflection to the notions of safe ecological limits and environmental impacts. This applies to the production and consumption of the bio-based products and services as well as to their associated enabling technologies. It also calls for the involvement of stakeholders with specialized knowledge, skills and/or access to information that would allow to incorporate these wider considerations into the process.

: Initial examples of potential Task Force members for each helix in each OIP lists and describes some examples of organizations pertaining to the stakeholder categories represented in the Quintuple Helix model of innovation.



**: Initial examples of potential Task Force members for each helix in each OIP: Initial examples of potential Task Force members for each helix in each OIP<sup>2</sup>**

Element of the Quintuple Helix Model of Innovation	Generic Examples	Examples from the BE-Rural OIPs				
		Stara Zagora	Strumica	Baltic Lagoons	Vidzeme & Kurzeme	Covasna
<b>Businesses</b> <p>The exploration of potential revenue sources and cost structures will only be relevant if there is at least one entity willing to engage in the commercialization of the bio-based product or service being investigated. Therefore, it is essential that at least one business entity is involved in the Task Force as owner of the business idea.</p>	<p>Established companies (e.g. SMEs or larger enterprises seeking to expand their portfolio); start-ups or university spin-offs willing to enter the market; marketers and distributors.</p>	<ul style="list-style-type: none"> <li>• DERONI</li> <li>• Domain Menada</li> </ul>	<ul style="list-style-type: none"> <li>• Center for Promotion of Sustainable Agricultural Practices and Rural Development - CeProSARD</li> </ul>	<ul style="list-style-type: none"> <li>• Rybak Ltd. (association of fishermen from Tolkmicko)</li> <li>• Piast Ryb (processor)</li> <li>• Guild of Various Crafts in Świnoujście</li> <li>• Marinus Ltd.</li> </ul>	<ul style="list-style-type: none"> <li>• Investment and Development Agency of Latvia (LIAA)</li> <li>• JSC "Latvia's state forests"</li> <li>• Latvian forest industry federation</li> <li>• Latvia furniture association</li> </ul>	<ul style="list-style-type: none"> <li>• GOSCOM - Regional Operator of the Communal Household</li> <li>• PROWOOD CLUSTER (among several other clusters)</li> <li>• SC MEOTIS SRL</li> <li>• SC WEGA INVEST SRL</li> </ul>
<b>Academia</b> <p>Research institutions and development centers are important purveyors of scientific knowledge and can facilitate access to infrastructure and equipment necessary for testing and demonstration of new products and technological applications. They are often also the ones best fit to provide the specialized knowledge on natural sciences necessary to ensure the environmental sustainability of the business</p>	<p>Universities, research institutes, technology development centers, vocational schools.</p>	<ul style="list-style-type: none"> <li>• Institute of Roses, Essential and Medical Cultures</li> </ul>	<ul style="list-style-type: none"> <li>• University Ss. Cyril and Methodius - Skopje, Faculty for Agricultural Sciences and Food</li> </ul>	/	<ul style="list-style-type: none"> <li>• Vidzemes augstskola</li> <li>• Liepājas universitāte</li> <li>• Ventspils augstskola</li> <li>• Latvia University and Riga Technical University local structures</li> </ul>	<ul style="list-style-type: none"> <li>• Transylvanian University of Braşov</li> </ul>

<sup>2</sup> **Note:** The examples from the OIPs shown here are presented merely for illustrative purposes and are **not to be understood as a pre-selection or indication of stakeholders that should be included**. The information has been extracted from the Stakeholder Mapping conducted in Task 5.1, where regional stakeholders have been evaluated according to their influence and interest in the bioeconomy. Here they have been categorized according to the Quintuple Helix Model. The fields of the table where no organization example can be provided also reflect areas where the OIP might potentially have to focus its efforts on actively seeking the engagement of relevant stakeholders to become part of the Task Force.



Element of the Quintuple Helix Model of Innovation	Generic Examples	Examples from the BE-Rural OIPs				
		Stara Zagora	Strumica	Baltic Lagoons	Vidzeme & Kurzeme	Covasna
and that ecological standards are adequately met.					<ul style="list-style-type: none"> <li>• Independent research institutes on forestry and agronomy.</li> </ul>	
<b>Civil Society</b> Social acceptance is as relevant as the technical effectiveness and economic feasibility of innovative solutions. Incorporating the viewpoint of civil associations and the general public in the product development process is a way of effectively identifying fears and concerns to be addressed as well as interests and affinities to be leveraged.	Civil associations, community groups, NGOs.	/	<ul style="list-style-type: none"> <li>• Rural Development Network of RM</li> <li>• Centre for Education and Sustainable Development</li> </ul>	<ul style="list-style-type: none"> <li>• The circle of housewives in Bogdany</li> <li>• The circle of housewives in Marzęcino</li> </ul>	<ul style="list-style-type: none"> <li>• NGOs funded by local municipalities:               <ul style="list-style-type: none"> <li>- Vidzeme plan-ning region</li> <li>- Kurzeme plan-ning region</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Local Action Groups (GAL), NGOs, business incubator</li> </ul>
<b>Government</b> Through their wide overview of framework conditions for economic development and knowledge of policies and regulations at different administrative levels, public authorities can expedite the identification of barriers and opportunities at different points of the value chain.	Local authorities, regional agencies, national ministries.	<ul style="list-style-type: none"> <li>• Stara Zagora Regional Economic Development Agency</li> </ul>	/	/	<ul style="list-style-type: none"> <li>• Ministry of Agriculture</li> <li>• Ministry of Environmental Protection and Regional Development</li> <li>• Ministry of Economics</li> </ul>	<ul style="list-style-type: none"> <li>• Local authorities, regional development agency</li> </ul>

/: No organization with high influence and high interest identified in the stakeholder mapping of Task 5.1.

### 4.3 Timeline, consultation checkpoints and feedback sessions

At the time of setting up the Task Force, as well as during the market assessment and business model design, several consultation checkpoints are planned. At these checkpoints, the Task Force is advised to consult the wider group of regional stakeholders in the OIP to gather valuable feedback and inform the process. Based on their own considerations, the Task Force may decide to incorporate additional checkpoints throughout the procedure.

Two pre-defined checkpoints are scheduled at the beginning of the process, namely during the formation of the Task Force (see previous section) and during the market segmentation exercise (see chapter 5.1). A third checkpoint is envisioned towards the end of the business development process when elaborating the Business Model Canvas (see chapter 5.7). An optional checkpoint is suggested in the middle of the process, after the Task Force has completed the SWOT analysis (see chapter 5.5).

In addition to the consultations with the OIP members, it will be important to organize internal feedback sessions for the Task Force members to reflect upon how the process is going, extract lessons learned and identify necessary adjustments (see Chapter 6.2). At least two such sessions should be organized, one early enough in the process so that necessary adjustments can still be incorporated, and one after the process has been completed, to document the lessons learned.

Once the Task Force has been formed, a full iteration of the market assessment and business model design process should take around three months (twelve weeks) for completion. Figure 4

Figure 4: Timeline of business development exercises and consultation checkpoints provides an overview of the envisioned timeline.

**Figure 4: Timeline of business development exercises and consultation checkpoints.**

Work Plan for Task 5.3	W0*	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13
Identifying linkages between Task 5.3 and Task 5.4**														
Setting up the task force	CH													
Exercises 1 & 2 (Market Segmentation & Target Group Selection)		CH												
Exercise 3 (Market Size Estimation)														
Exercise 4 (Market Growth Rate Estimation)							FB							
Exercise 5 (SWOT Analysis)									(CH)					
Exercise 6 (SWOT Priority Score)														
Exercise 7 (Business Model Canvas)													CH	FB

\*The W0 field is for illustration purposes only. The exact time required for setting up the Task Force will vary between OIPs and will expectably be longer than one week; \*\*This will include identifying foreseeable barriers and opportunities, defining the necessary steps to activate the links between tasks, and drafting a preliminary timeline. CH = Consultation checkpoint; (CH) = Optional consultation checkpoint; FB = Internal Feedback Session.

## 5 Conducting the market assessment and designing business models

This chapter presents the methodology and guiding templates that the OIP facilitators and the Task Force will use to complete the business strategy development activities. All templates include a brief introduction to the exercise, instructions on how to complete it, and an input form to compile the assessment information.

### 5.1 Proposed methodology

Developing a new product or service can be a stimulating and inspiring activity, as it entails the balanced combination of technical and analytical skills, creativity, and strategic thinking. However, working on an offering without having a clear notion of who the end user will be and what specific needs it will cover can be risky. In other words, successful innovations require more than a great idea and technical expertise – they need a market. The methodology introduced in this section is an adaptation of the original from Anzaldúa et al. (2014) which was designed to support developers in identifying market opportunities, tune their innovative ideas to meet actual end-user needs, and develop a well-informed business strategy. It has been developed and verified through its practical application in three large-scale European research and innovation projects entailing over 40 case assessments.

The original methodology and guidance templates have been adapted to fit the context of the BE-Rural project. Specifically, this required a reorientation of the full assessment framework to achieve a wider, composite aim: a) helping to structure and guide the development of business models for regional bioeconomy innovations within the OIP regions; and b) providing building blocks for OIP facilitators and their Stakeholder Working Groups to develop bio-based strategies and roadmaps. It also demanded reformulation and careful editing of the guiding templates, as these are addressed here to a wider audience, i.e. the Task Force (as opposed to their original version, which addresses individual solution developers and management teams within a single organization). Ultimately, the underlying objective of the adapted methodology is to facilitate the incorporation of local knowledge from multiple stakeholders and the consideration of concrete user needs in the process of developing strategies, products and services for a regional bioeconomy.

#### 5.1.1 Structure of the assessment framework

The assessment framework to be used by the Task Force is structured as a collaboration system consisting of seven market analysis and business development exercises. These are designed to be completed by non-specialists in these topics with guidance and support from Ecologic Institute and WIP. Each exercise supports Task Force members on the path towards evolving an identified gap in the market into a bio-based business. Succinct text explains each exercise's purpose, provides step-by-step instructions, and features relevant examples.

The assessment uses the Work Package 2 outputs summarized in Chapters 2 and 3 of this document as preamble and as impulse for the Task Force members to reflect on the external conditions that influence their region's market. It then helps define and prioritize market segments, and supports in estimating their size now and in the future. After this first stage, which represents the market assessment, the framework shifts to business model design. Here, it deals with identifying the relative strengths and weaknesses of the bio-based product or service and their provider, and consolidating the information gathered into a Business Model Canvas (for a thorough description of the latter, please refer to Osterwalder & Pigneur, 2010).

Due to their format, the exercises will help the Task Force to produce practical outputs that can feed directly into a business plan, marketing, and strategic planning documents. At the same time, there is an intention to build the Task Force's capacity by getting members who are not acquainted with marketing and business concepts to learn about them through practice.

**A note of caution:** Task Force members and other incumbents should keep in mind that the assessment framework is meant to support and guide the identification of business opportunities and

lay the groundwork for market entry. However, it cannot guarantee success—there is not one “golden formula” for this as there are many internal and external factors at play. Furthermore, the usefulness of the assessment ultimately depends to a great extent on the level of commitment and effort that the team put into it as well as on the enthusiasm of the owners of the idea for developing their business. Task 5.3 is to be understood as a capacity building and support program and the activities contemplated therein conclude with the finalization of the Business Model Canvas (presented in Section 5.2.7). In this sense, BE-Rural and the project partners are not responsible for the commercialization of the bio-based products and services evaluated.

### 5.1.2 Roles and responsibilities in conducting an assessment

There are various roles that the Task Force members and the wider BE-Rural consortium partners can play during an assessment. In broad terms, the framework is designed with four user types in mind: the OIP facilitator, the owner of the business idea (e.g. the developer of the bio-based product or service), the other members of the Task Force, and the Supporting Partner from Ecologic Institute or WIP. These user types were defined on the basis of the necessary roles and responsibilities in an assessment (Table 1). OIP facilitators, as coordinators of the process in their region, may define additional roles and their associated responsibilities. It is important that any modifications to the scheme below are communicated in due time to Ecologic Institute, who coordinates the activities at the project level.

**Table 1: Roles and responsibilities in the assessment**

Responsibility	Partner			
	OIP facilitator	Owner of the business idea	Other Task Force Members	Supporting Partner (ECO / WIP)
Main responsibility in the coordination of the assessment	✓			
Main responsibility in the completion of the exercises	✓	✓		
Engaging in the process by providing feedback, relevant information and contacts			✓	
Providing support and guidance in the application of the assessment framework				✓
Conducting additional desk research	✓	✓	(✓)	
Elaborating a brief synthesis of the results	✓			✓

The OIP facilitator is the main party responsible for the coordination of the assessment activities at the regional level. Together with the owner of the business idea, the OIP facilitator also holds the main responsibility for completing the assessment exercises. Facilitators and owners are given this central role for two main reasons. First, together they possess in-depth knowledge on the dynamics of the regional market; the features and specifications of the bio-based product or service being examined; and the assets, competences and goals of the firm that would be commercializing it. This insight is key to run the exercises and obtain results that are meaningful and actionable from the organization's perspective. The assessment exercises are designed to build upon this existing knowledge and potentiate it through the advice provided by the other Task Force members and the Supporting Partners from BE-Rural. Second, an ancillary objective of the assessment is to empower regional stakeholders and increase their interest and influence on the bioeconomy by getting them acquainted with business development and marketing concepts. The premise is that getting the stakeholder to know and use these concepts will result in a more conscientious consideration of real market needs and gaps during the process of strategy development. The expected outcome is an increased awareness of the importance of demand-driven innovation that can ultimately result in products better responding to market needs.

The third user type, Other Task Force Members, are not only supposed to follow the progression of the assessment and its results closely, but should engage actively in it by providing specialized feedback to enrich the discussions and results. They may also contribute by facilitating access to relevant information, infrastructure, and networks.

As briefly pointed out above, the main role of the Supporting Partner is to potentiate the knowledge held by the Task Force and streamline the efforts that are fed into the assessment. This is done by providing advice and guidance on how to complete the individual exercises and interpret the results. Supporting Partners have received specialized training on the application of the assessment framework and in some cases have been involved in the framework's development.

## 5.2 Assessment templates

The following sections are the templates for each of the seven exercises of the assessment framework. They include a brief introductory text, instructions and a user input form to collect the assessment data. They are intended for direct use by the Task Force.

### 5.2.1 Exercise 1: Market Segmentation

#### Introduction and instructions

The objective of this exercise is to split the regional market for bio-based products and services into clearly defined groups of actual and potential customers. These groups, also called market segments, can be defined based on similarities in their wants and needs, geographic location, socio-economic profile and other characteristics. These market segments can then be examined in further detail.

In this exercise, a non-exhaustive list of stakeholder groups associated with the market for biomass-based products and services, e.g. those generated from agricultural, forestry and fisheries by-products, is presented. The Task Force is asked to carefully go through the list and select those groups which, based on their own expectations, could have an interest or need for the product or service in question<sup>3</sup>. The shortlisted groups will then be analyzed using the Group Attractiveness Scorecard in the next exercise.

Descriptions and examples are given to facilitate the identification of relevant groups. The Task Force should include any relevant groups that are missing in the list (including their description and examples).

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<sup>3</sup> Hint: When selecting the relevant stakeholders, it will be helpful to consider the location of the product or service within the value chain (see Section 4.2.2).

**Table 2: User Input Form for Market Segmentation**

Category	Stakeholder Group	Description	Examples	Selection
<b>Public</b>	<b>Local authorities and institutions</b>	The administrative offices of local public authorities can play a particularly important role in the local bioeconomy as a consumer of bio-based products and services through their procurement activities. These can entail for instance food (e.g. canteens and caterings), furniture & office supplies, merchandising & communication material, or larger projects like construction or refurbishing of public buildings or infrastructure (Latvian Food Bioeconomy Cluster, 2019).	Municipality of Sfântu Gheorghe, Municipality of Bosilovo, Municipality of Strumica, Municipality of Novo Selo, Municipality of Stara Zagora, City of Valmiera Administration, FLAG "Rybacka Brać Mierzei" and FLAG "Zalew Wiślany".  Also, municipal water and energy utilities such as the enterprise Turija in the Municipality of Vasilevo.	<b>X</b>
	<b>Regional authorities and institutions</b>	The administrative offices of regional public authorities can play a particularly important role as a consumer of bio-based products and services through their procurement activities. These can entail for instance food (e.g. canteens and caterings), furniture & office supplies, merchandising & communication material, or larger projects like construction or refurbishing of public buildings or infrastructure.	Regional development agencies (e.g. Regional Development Agency of the Centru Region, Stara Zagora Regional Economic Development Agency), West Pomeranian Voivodeship administration, Warmian-Masurian Voivodeship administration, Kurzeme planning region administration, Vidzeme Planning Region administration, Stara Zagora County administration, Centru Region administration, Covasna County Council administration, Stara Zagora District Administration.	
	<b>National authorities and institutions</b>	The administrative offices of ministries and other government institutions or agencies can act as a consumer of bio-based products and services through their procurement activities. These can entail for instance food (e.g. canteens and caterings), furniture & office supplies, merchandising & communication material, or larger projects like construction or refurbishing of public buildings or infrastructure.	Ministry and agency administrations (e.g. Public Procurement Agencies within the Bulgarian Ministry of Economy, Energy and Tourism; North Macedonian Ministry of Agriculture, Forestry and Water Economy).	

Category	Stakeholder Group	Description	Examples	Selection
	<b>International and supranational authorities</b>	Through their financing of infrastructure, research and development projects and service contracts, supranational institutions may act as indirect customers for bio-based product and service suppliers. Even if they are not directly involved in the final transaction, they may have strict procurement rules and requirements in place that the implementing organizations must comply with.	The European Commission, the European Agricultural Fund for Rural Development, the European Bank for Reconstruction and Development, the European Investment Bank, the World Bank, UNEP.	
	<b>Hospitals and other healthcare facilities</b>	Hospitals have a high demand for single-use products, mainly made out of plastics, and require an adequate temperature regulation the whole year long. Moreover, they can be interested in including bio-based personal care or food and beverages.	Hospitals, rural clinics and assistance centers, touristic first aid facilities.	
	<i>[Missing groups may be inserted by the Task Force]</i>	<i>[Descriptions to be inserted by the Task Force]</i>	<i>[Examples to be inserted by the Task Force]</i>	
<b>Private</b>	<b>Retail (online/of-fline)</b>	Retailers are shops that sell directly to customers and are therefore the main commercialization channel to reach end-consumers, be it online or through physical stores. Retailers can either have a broad product palette or be very specialized one. Hence, most products can be commercialized by retailers, from food & beverages to cosmetics to construction materials. Most of the finished bio-based products can be either directly sold by retailers or used in the packaging they use for storing & sending their products (applies mainly to online retailers). Especially bigger retailers also produce large quantities of bio-waste and they are increasingly looking for ways to utilize it productively instead of discarding it. Through this, they can also become an important source of feedstock for bio-based products (Istudor and Suciu 2020).	Supermarkets, town stores, online shops, DIY stores, hardware stores.	

Category	Stakeholder Group	Description	Examples	Selection
	<b>Households</b>	In the case of finished products and some services, a direct sale to private households could be possible. This includes rural households in the vicinities of the production site or sales in the urban context.	Either rural or urban households (or both) – all levels of income. For example those who require materials for a construction or those who have a home oven for heating.	
	<b>Gastronomy sector</b>	Businesses that provide customers with food & beverages may have an interest in local ingredients, be it traditional such as fish or more innovative such as bio-based drinks and sweets. Such businesses often also produce their own heat or have to make use of disposable containers or cutlery for take-away or delivery options – which are generally made out of plastic but could be substituted by bio-based alternatives.	Cafés, restaurants, (online) food delivery services.	
	<b>Building sector</b>	The building sector, which is responsible for researching, planning, building, and renovating structures could be interested, next to wood, in other innovative bio-based products as construction materials.	Individual builders and building companies, material providers, engineers, architects, plumbers, electricians, associations representing them, and related regulators.	
	<b>Tourism sector</b>	The tourism sector, which provides consumption goods and services to tourists could be interested in procurement of more sustainable goods, for instance in substituting synthetic with bio-based products. Moreover, they can have an interest in turning innovative business activities into tourist attractions.	Local tourism activity providers or tour operators.  Accommodation establishments, including hotels, guesthouses and camping grounds.  Tourist transport operators (at local level).	
	<b>Energy sector</b>	Biomass, if produced sustainably, can be a renewable source of energy which helps member states to meet the emission reduction targets set on their Nationally Determined Contributions (NDCs) in the context of the Paris Agreement. Energy producers may therefore be forced by regulations, or simply become increasingly interested in using biomass instead of fossil fuels. Moreover, biomass is a source of energy that can provide energy autarchy in rural areas and therefore of high importance for further rural development.	Electricity generators (thermal power plants), combined heat power plants (also for the production of heat).	



Category	Stakeholder Group	Description	Examples	Selection
	<b>Industry/agricultural producer associations</b>	In some cases, apart from acting as representatives of a community, such associations also supply their members with production inputs (e.g. equipment, seeds, fertilizers, etc.), and thus could become a customer for bio-based products and services.	Association of Fishermen - Boat Owners "Mierzeja", Wolin Fishermen Association, Latvian Forest Owners Association, ASIMCOV – Association of Small- and Medium Size Enterprises of Covasna County, Association of ESCO type Energy Services Companies in Romania, Bulgarian Bio-Products Association, National Association of Biofuels in Bulgaria.	
	<b>Agriculture</b>	The agricultural sector may require biomass or bio-based products for instance for covering their crops (bio-plastics) or for generating heat to dry their produce. It can also serve as the feed for animals and, after composting, as a natural fertilizer. Also, some manufacturers and distributors of products for managing crops, e.g. pest control agents, can also become interested in bio-based alternatives. Agricultural production also generates large quantities of bio-waste which can be utilized productively instead of being discarded. By doing this, agricultural producers can also become an important source of feedstock for bio-based products	Local individual farmers, large agricultural landowners, cooperatives, dairy, meat, and produce companies, fertilizer companies, (local, national, and European).	
	<b>Forestry sector</b>	The forestry sector is an important source of biomass for other sectors. As a customer of bio-based products and services, it may require biomass or bio-based products for instance for generating heat to dry their produce. Composted agricultural waste/manure can also serve to fertilize the soil.	Forest owners, forest cooperatives (e.g., Forest owner cooperative L.V.Mežs, Forest owner cooperative Mežsaimnieks), forest planners, forest managers and fire managers.	
	<b>Fisheries</b>	Fisheries may require biomass or bio-based products for instance for packing and storing their produce or for generating heat/smoke to process (drying or smoking) it. It can also serve as the feed for animals (in case of aquaculture). Fisheries also generate large quantities of bio-waste which can be utilized productively instead of being discarded. By doing this, fisheries producers can also become an important source of feedstock for bio-based products. Moreover, fishing gear can also be increasingly made of or contain bio-based products.	Ship owners, captains, fishing companies, gear and equipment manufacturers, safety officers, aquaculture farm operators.	

Category	Stakeholder Group	Description	Examples	Selection
	<b>Transport sector</b>	The operators of transport services for persons often offer their customers food & beverages and may have an interest in local ingredients, be it traditional such as fish or more innovative such as bio-based drinks and sweets. They also regularly use disposable containers or cutlery for serving, which are generally made out of plastic but could be substituted by bio-based alternatives.	Commercial person transport service providers, e.g. buses, trains, airplanes or ships that offer food & beverages for their passengers.	
	<b>Paper Industry</b>	The paper industry requires wood pulp or other biomass as fibers for producing paper and other finished products based on paper. Moreover, it can use biomass or the bio-based products <sup>4</sup> as a source of energy.	Manufacturers of paper and paper derived products.	
	<b>Bio-refineries</b>	Bio-refineries convert biomass from different sources through bio-chemical processes into beneficial by-products, such as chemicals or energy. For this, they can require a variety of feedstocks that can be for instance the by-products of agriculture, forestry or fisheries. Moreover, it can use biomass or the bio-based products <sup>4</sup> as a source of energy.	Manufacturers of bio-plastic and other innovative bio-based materials,	
	<b>Cosmetic industry</b>	The cosmetic industry, particularly high-quality or artisanal producers, often rely on bio-based products such as natural oils/fats (plant or animal based), extracts and essences (e.g. etheric oils) for manufacturing their products. The packaging of these products can also be made out of bio-based materials. Moreover, it can use biomass or the bio-based products <sup>4</sup> as a source of energy.	Manufacturers of creams, soaps, perfumes	

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<sup>4</sup> Biomass is considered unprocessed (e.g. agricultural and forestry by-products or waste) whereas bio-based products is considered already processed (e.g. biomass that has been dried industrially, pellets or bricks)

Category	Stakeholder Group	Description	Examples	Selection
	<b>Food &amp; Drink industry</b>	Food and drink industries normally process agricultural and fishery products into ready to consume products. By-products from these sectors can also be used for this production. The packaging of these products can also be made out of bio-based materials. Moreover, it can use biomass or the bio-based products <sup>4</sup> as a source of energy.	Vegetable/meat/fish processing and packaging companies; beverage manufacturers and bottlers.	
	<b>Textile industry</b>	The production of fabrics may require high quality natural fibers. With new technological advances and changing consumer preferences, can also come increasingly sourced from more sustainable practices, for instance from plants that are grown in the region. The international clothing and textile (e.g. for home uses) industries can incorporate these new textiles into the design. Moreover, it can use biomass or the bio-based products <sup>4</sup> as a source of energy.	Manufacturers of textiles, clothing/home textile manufacturers.	
	<b>Automotive Industry</b>	The automotive industry is increasingly demanding bio-based materials for the manufacture of parts and components of vehicles, for instance for the interior panels and accessories. The packaging used for shipping these products can also be made out of bio-based materials. Moreover, it can use biomass or the bio-based products <sup>4</sup> as a source of energy.	Manufacturers of car components.	
	<b>Other manufacturing industries</b> (please specify below)	The manufacturing industry can use biomass or products either as a raw material and processes them further into for finished goods, or use it as a source of energy. Depending on the bio-based product, different specific manufacturing sectors could have an interest in using it.	Manufacturers of single-use products such as cutlery or cups, manufacturers of office supplies.	
	<i>[Missing groups may be inserted by the Task Force]</i>	<i>[Descriptions to be inserted by the Task Force]</i>	<i>[Examples to be inserted by the Task Force]</i>	

Category	Stakeholder Group	Description	Examples	Selection
Other	<b>Researchers (universities or extramural research institutions)</b>	Researchers work in universities or extramural research institutes. They develop new technologies and processes for transforming biomass into products. For this purpose, they also require bio-based materials and products themselves to use for experimentation, etc.	Universities and other research institutions, scientists.	
	<i>[Missing groups may be inserted by the Task Force]</i>	<i>[Descriptions to be inserted by the Task Force]</i>	<i>[Examples to be inserted by the Task Force]</i>	

## 5.2.2 Exercise 2: Target Group Selection

### Introduction and instructions

Once the market segments have been assessed, it is important to clearly define what the target group for the specific bio-based product or service will be. A target group is simply a market segment at which the business will direct its marketing and communication efforts.

The main objective of carefully selecting a target group is twofold: 1) to ensure that the market segment (identified in the previous exercise) being addressed is the most appropriate one; and 2) to allow for the preparation of a more customized marketing and communication strategy.

According to Aaker and McLoughlin (2010) there are three main issues to be considered when selecting a target group:

1. Are you capable of creating a product that is appealing to the individual target group?
2. Could this appeal be sustained even after competitors react to your market actions?
3. Do you estimate that the return (i.e. benefit) is higher than the investment (i.e. cost) required to provide an appealing, customized product?

These issues have been reformulated and included as criteria within a so-called "Group Attractiveness Scorecard" that can be found below. This scorecard can be used to support the selection of a target group by allowing, as its name suggests, the evaluation and comparison of the attractiveness of different market segments.

In this exercise the Task Force is asked to take a closer look at the shortlist of stakeholder groups that were selected in the previous exercise and evaluate them using the Group Attractiveness Scorecard presented below. Based on their previous experience and knowledge of the regional market dynamics, potential clients and their own position in the market, members of the Task Force are asked to rate the potential customer groups according to the predefined criteria in the scorecard. The ratings are then used to calculate a total attractiveness score. Using this score, the Task Force can make a more informed decision about the group(s) that they want to address their bio-based products and services to. Please score each segment in relation to the five questions below. Please also provide comments explaining your reasoning.

The highest scoring segment will be your "main target market", and should be your focus in all the following exercises. The second highest scoring segment will be your "key growth opportunity", and it should be the first one considered for future evaluations.

(with examples in red font)

Market Segment	Criteria	Comments	Rating*					Total Score
			1	2	3	4	5	
<b>Segment 1:</b> <b>Regional tourism sector</b>	[C1] The customer group has a pressing need and is willing to act upon it.					4		19
	[C2] Our offering can satisfy that need.					4		
	[C3] We can easily communicate/access the customer group.		2					
	[C4] There are no known competitors addressing this need.				4			
	[C5] The customer group is substantial and potentially profitable.						5	

\*A rating of 1 denotes the statement is totally inaccurate, a rating of 5 denotes the statement is totally accurate.

### 5.2.3 Exercise 3: Market Size Estimation

#### Introduction and instructions

Once a target group has been selected based on the results of the Attractiveness Scorecard (previous exercise), the next step is to estimate its potential size. This is done by estimating the number of potential clients within the geographical area of interest and translating that into monetary values.

The aim of this exercise is to approximate the potential value (in economic terms) of the market for your bio-based product or service. This will be important information to help you work out the profitability and viability of the business later on.

This is completed in three steps:

#### 1. Estimating the number of clients in your target group (C)

This can be done in two ways, both of which will require you to research your potential market:

- If you are developing a very specialized product or service aimed at a narrow group of clients, a bottom-up method is recommended. A **bottom-up** estimate requires you to identify your customers in a particular geographic region (e.g. a local region or a country that you know well) and then extrapolate from this to estimate the size of the worldwide market for your offer.

- If your innovation is to be a mass-produced product or widely available service, a top-down method is recommended. A **top-down** estimate requires you to use appropriate EU or country economy-wide statistics and then scale that down to estimate a realistic target group size. Depending on the nature of your target group, the necessary information could be found in the following sources:

- 1) EU/National/Regional or statistics (For example [Eurostat](#), national statistics websites, [World Bank](#)) – to find out the size of a particular population
- 2) Industry association reports, private company information (such as annual reports) – to find out the size of the market for similar/related products/services
- 3) The online resources directory that accompanies this exercise (see Annex II)

#### 2. Assuming a market penetration rate (R)

The market penetration rate is the percentage of the target market you identified in step one that might be expected to buy your product or service. The market penetration rate will be higher, e.g. if customer demand for your product or service is higher; and lower, e.g. if the existing competition is strong. Estimating the market penetration rate is a judgment call, but can be simplified by asking yourself a series of linked questions and then multiplying the answers together. The example below shows the case of a target group that is made up by a total of 100 individuals. As is shown, the market penetration rate can get small very quickly:

a)	How many individuals within the target group identified in step one will have a real and pressing need for your product?	30 out of 100 = 30%
b)	Of these, how many will you be able to get the attention of?	6 out of 30 = 20%
c)	Of these, how many will be convinced that your offering is the best option?	3 out of 6 = 50%
d)	Of these, how many sales deals will you realistically be able to close?	2 out of 3 = 66%
<b>Overall penetration rate</b>		<b>2 out of 100 = 2%</b>

Multiplying the numbers from step one and two will give you the total number of clients you can obtain in the target market.

### 3. Determine the price that you will charge your clients (P)

The price you will charge your clients can be determined in a number of ways. Two simple options are:

- i) Cost plus pricing: If you are entering a new market, one way of setting a price is working out your costs then adding a set amount or margin.
- ii) Competitive pricing: Copy the pricing strategies of your competitors

### Bringing it all together

Once you have set the price for your innovation, you are ready to estimate the economic value of your target market by simply multiplying the output of the three steps described previously:

$$\text{Market Value} = C \times R \times P$$

### Additional note

The main purpose of this exercise is to gain a better understanding of the factors that could influence the potential size of the target market, and apply that knowledge to inform your business strategy. Since the outcome of this exercise relies strongly on assumptions made along each of the three steps, it is strongly recommended to conduct an adequate level of research on your target market, run a sensitivity analysis by varying the assumptions made in each of the steps and estimate for best- and worst-case scenarios.



**Table 4: User Input Form for Market Size Estimation**

(with examples in red font)

<b>MAIN TARGET GROUP: Manufacturers of packaging solutions for fruits and vegetables</b>							
Location	Year	Number of Customers (C)	Market Penetration Rate (R)	Market Size (C x R )	Price (P)	Market Value (C x R x P)	Comments/ Assumptions
Berlin	2020	4	50%	2	€ 1,000.00	€ 2,000.0	We have strong and long-standing relationships with two of the companies in the city.  We are aware of their need for a bio-based packaging solution like ours and we think their willingness to adopt it would be medium to high.
...			%			€	

<b>KEY GROWTH OPPORTUNITY: Manufacturers of packaging solutions for fruits and vegetables</b>							
Location	Year	Number of Customers (C)	Market Penetration Rate (R)	Market Size (C x R )	Price (P)	Market Value (C x R x P)	Comments/ Assumptions
Germany	2020	15	20%	3	€ 1,000.00	€ 3,000.0	We have identified 15 other potential clients across the country. Even though our network is not as strong outside Berlin, having closed deals with the first two clients in the city should provide good references for us to convince a number of players to take up our innovation.
...			%			€	

## 5.2.4 Exercise 4: Market Growth Rate

### Introduction and instructions

After having estimated the size of your target market in the previous exercise, the next step is to determine whether the market can be expected to grow, remain stable, or shrink in the future.

This task provides a good chance to think about future opportunities and challenges in your market. Hence, the outcomes of this exercise will also be useful to elaborate time series, make observations, and identify trends. The figures can also be used to conduct a comparative analysis against other market segments of interest, other industries, or growth rates of economy-wide indicators like GDP.

You can calculate the market growth rate in three steps:

1. Calculate the market value in the reference year ( $MV_0$ ) – for instance, this can be what you calculated in the previous exercise (market size estimation)
2. Calculate the market value in the year of interest ( $MV_1$ ) – i.e. a snapshot of the market one year later, five years later, etc.<sup>5</sup>
3. Calculate the market growth rate (%G) using the following formula:

$$\%G = (MV_1 / MV_0)^{(1/\# \text{ of years})} - 1$$

Calculating these projections can be done in the same way as you calculated the original market value in the previous exercise. Hence, resources such as Eurostat and company accounts, will again be of use. Remember, the aim of this task is not to calculate a perfectly accurate growth rate, but rather to consider the future of your market and the opportunities and challenges that may arise.

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<sup>5</sup> The decision of what the year of interest should be is commonly made based on data availability or strategic interests of the organisation. Calculating the market size in past years is commonly easier as data is more readily available. Such historic data can be used to identify trends and associate them with changes in past political or economic conditions, among others. Making projections into the future might be more difficult due to the need of assumptions, but of high strategic value.

**Table 5: User Input Form for Market Growth Rate****(with examples in red font)**

Market Value in Reference Year (MV <sub>0</sub> )	Market Value in the Year of Interest (MV <sub>1</sub> )	Market Growth Rate (%G) = $(MV_1 / MV_0)^{(1/\# \text{ of years})} - 1$	Comments/ Assumptions
€ 2,000.00	€ 5,000.00	$(5000/2000)^{(1/1)} - 1 = 1.5 = 150\%$	MV <sub>0</sub> = 2015 , MV <sub>1</sub> = 2016
€ 950.00	€ 2,000.00	$(2,000/950)^{(1/4)} - 1 = 0.2045 = 20.45\%$	MV <sub>0</sub> = 2011 , MV <sub>1</sub> = 2015
€ ...	€	%	

### 5.2.5 Exercise 5: SWOT Analysis

#### Introduction and instructions

The idea behind this exercise is to use the results of the PESTEL Analysis (see Chapter 2) to define a list of priority actions to increase the competitiveness of bio-based businesses in your region. For instance, the six conditions studied in the PESTEL Analysis are all potential drivers of opportunities and threats (e.g. changes in regulation, demographics, lifestyle, technology).

The figure below shows a SWOT matrix template. In each quadrant of the SWOT, a list of questions is shown to help you identify the strengths, weaknesses, opportunities, and threats relevant for bio-based businesses in your region. Use them as a guide to fill out the template. Make sure all entries are formulated in a concise, action-orientated way and, to the extent possible, based on facts rather than opinions. Stick to one entry per line, and aim for three to five entries per quadrant.

A well-structured group brainstorming exercise should result in a thorough list. Be realistic and objective in your analysis.

**Table 6: User Input Form for SWOT Analysis** (with examples)

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>▶ What does your organization do better than others?</li> <li>▶ What are your unique selling points?</li> <li>▶ What is your organization's competitive edge?</li> <li>▶ What do competitors and customers in your market perceive as your added value?</li> <li>▶ ...</li> </ul>	<ul style="list-style-type: none"> <li>▶ What do other organizations do better than you?</li> <li>▶ What elements of your business add little or no value?</li> <li>▶ What do competitors and customers in your market perceive as your shortcomings?</li> <li>▶ What could you improve?</li> <li>▶ ...</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>▶ What political, economic, social, technological, environmental, or legal changes are happening that could be favorable to bio-based businesses in your region?</li> <li>▶ Where are there currently gaps in the market or unfulfilled demand?</li> <li>▶ What new innovation could be brought to the market?</li> <li>▶ What social and environmental impacts could bio-based products and services or their enabling technologies have?</li> <li>▶ ...</li> </ul>	<ul style="list-style-type: none"> <li>▶ What political, economic, social, technological, environmental, or legal changes are happening that could be unfavorable to bio-based businesses in your region?</li> <li>▶ What restraints do bio-based businesses in your region face?</li> <li>▶ What is your competition doing that could negatively impact you?</li> <li>▶ ...</li> </ul>

## 5.2.6 Exercise 6: SWOT Priority Score

### Introduction and instructions

Note: This exercise is to be completed on the accompanying Excel file *SWOT and Priority Score* (see sheet "2 Priority Score").

After identifying the Strengths, Weaknesses, Opportunities, and Threats for bio-based businesses in the region, the next step is to decide which factors the Task Force should focus on. This exercise will identify which factors are most strategically important. To help clarify the analysis, consider the internal factors (Strengths and Weaknesses) and external factors (Opportunities and Threats) separately.

The Strengths, Weaknesses, Opportunities, and Threats that you entered in the previous SWOT exercise should be copied across to the excel file sheet. Once you complete the steps below, the sheet will automatically calculate a priority score for internal factors (Strengths and Weaknesses) and for external factors (Opportunities and Threats).

#### *Internal factors: Strengths and weaknesses*

You have the ability to address strengths and weaknesses of your offer relative to your competitors. The key to prioritizing which factors to focus on is to consider two aspects: (1) How crucial is this strength to the product's or service's success (or how likely is it that this weakness will lead to its failure)?; and (2) for each factor, how do you compare to your competition? You need to ensure that you protect and promote your key strengths, and quickly address any important weaknesses. This exercise will help prioritize what factors to focus on first.

1. Step one: Importance – the first step is, for each strength and weakness, to consider how crucial each factor is to your success (ask yourself, how important is this factor for me to deliver value to my customer?). Select a number between 1 and 5, where 1: unimportant; 2: low importance; 3: moderately important; 4: important; 5: absolutely crucial. Do this for every strength and weakness.
2. Step two: Relative strength/weakness – the next step is to compare yourself with your competition. For each strength (and weakness), grade yourself compared to your competition on a 1 -3 scale: 1: I am marginally stronger (weaker) than my competition; 2: I am moderately stronger (weaker) than my competition; 3: I am considerably stronger (weaker) than my competition.

At this point, a priority score for each strength and weakness will be calculated automatically. Those factors with the highest scores should be your focus: you should continue to protect and develop your most important strengths and you should work quickly to address the high priority weaknesses.

#### *External factors: Opportunities and threats*

You also should look beyond you and your competitors today to scan the horizon for potential threats or opportunities – and to prepare for them. To prioritize which opportunities and threats you should focus on, you should consider two aspects: (1) What is the probability that this opportunity/threat will occur? And (2) how big an impact would this factor have on your success, if it did occur? This exercise will help focus your attention on the external factors that are most likely to have a large impact on your success.

3. Step three: Probability of impact – for each entry, consider the likelihood that this opportunity or threat will arise. Select a number between 1 and 5, where higher numbers imply a greater likelihood that the factor will occur (1: very unlikely to occur; 2: unlikely; 3: 50:50 chance; 4: likely to occur; 5: very likely to occur). Enter a value between 1 and 5 for each opportunity and threat you have identified.
4. Step four: Impact level – Next, use the drop-down list in the "impact level" column to indicate how large an impact on your success the threat or opportunity would have, if it occurred. Select either 1: minor impact, 2: moderate impact, or 3: large impact. Enter a value between 1 and 3 for each opportunity and threat entry.



## 5.2.7 Exercise 7: Business Model Canvas

### Introduction and instructions

The Business Model Canvas is used to visually represent a firm's current or future business model. It offers a succinct summary of the business model, making it an essential tool for developing the business into the future. It captures the key elements of a business plan whilst highlighting the links between components. It encourages a focus on customer value but is thorough; its nine elements cover the essential aspects of a business, including customers, the firm's offer to them, the infrastructure to deliver, and finances. Completing the Business Model Canvas will help identify gaps in a business plan and bring additional clarity to the developer's thinking.

The results yielded by the Business Model Canvas exercise will benefit from a variety of perspectives, so it is especially important to get every member of the Task Force engaged in this final exercise. The Canvas should be completed iteratively; a potential order is suggested below but make sure to jump backwards and forwards as the team thinks of new elements and want to edit or add to previous entries.

Some tips: (1) the Business Model Canvas should be a live document – the Task Force and the rest of the OIP are encouraged to revisit the Canvas later on during the regional strategy and road map development phase, add to it and edit as assumptions are tested, the understanding of potential customers and the value proposition is fine-tuned; (2) avoid generalities and be as explicit and quantitative as possible – if there are elements where you cannot be specific, come back and edit these after thinking and researching more later.

The building blocks of the Business Model Canvas:

1) Customer segments: Who are our most important customers?

- Prioritize and be specific

2) Value propositions: What problem do we solve for our customer, what value do we bring them, and how do we differentiate ourselves from the competition?

- Think: how does your product/service improve the customer's life; why do they choose your offer?<sup>6</sup> Be specific

3) Channels: What is the best way to reach customers – to raise awareness, enable them to purchase, and deliver our good/service?

- Think about it from the customer's perspective – how will they find out about your offer? Describe marketing and sales channels

4) Customer relationships: How does the customer interact with you throughout the sales process (and after)?

- Do you offer personalized support and co-create solutions with clients or use automated service - which is best for your business?

5) Key resources: What strategic assets do you need to deliver value (by carrying out your key activities)?

6) Key activities: What activities must you complete to deliver your value proposition to your customers?

<sup>6</sup> The value proposition canvas can be useful here: <https://www.peterjthomson.com/2013/11/value-proposition-canvas/>

- Prioritize activities here: try to identify which processes and actions are truly crucial to delivering your value proposition and earning revenue.
- Key resources can be categorized as human, financial, physical, or intellectual

7) Key partners: Who are you reliant on to carry out your key activities and deliver value to your customers?

- Identify current (and potential) partners and suppliers whom you need to help your customers

8) Cost structure: What are the costs of running your business, and are they fixed or variable?

- Identify all the costs associated with your business and think about how you could minimize them; remember to link them to key activities to ensure they are relevant costs.

9) Revenue streams: How do all of the above building blocks come together to provide you with revenue?

- Be specific and quantitative; also, link the revenue streams to customer segments, value propositions, and channels.



Table 8: User Input Form for Business Model Canvas

7) Key Partners	6) Key Activities	2) Value Propositions	4) Customer Relationships	1) Customer Segments
	5) Key Resources		3) Channels	
8) Cost Structure		9) Revenue Streams		

## **6 Looking forward**

### **6.1 Outlook towards the formulation of bio-based strategy and roadmap documents**

In order to make the best out of the planned process and efforts described in this document, it is essential to identify the linkages (e.g. feed-in points) between the work carried out in the market assessment and business model design tasks and the formulation of the regional strategies in Task 5.4 early on. OIP facilitators are therefore encouraged to think ahead and outline their expectations in transposing this work into the strategy formulation activities. This should include foreseeable barriers and opportunities, the listing and description of some concrete next steps, and a rough common timeline highlighting the feed-in points between the two tasks. Running such an exercise before or at the start of the Task 5.3 activities will help ensure the relevance and usability of their outcomes.

### **6.2 Reflecting and documenting the lessons learned**

Running the market assessment and business model design process described in the previous chapters will certainly demand significant effort and commitment from the OIPs and their facilitators. At the same time, it will yield important material for the subsequent preparation of the regional bioeconomy strategies and roadmaps. It is also expected that several distinct lessons on setting up and running such multi-stakeholder processes, in this case thematically focused on business development, arise from each region. It is therefore important to periodically reflect upon and document these outputs as they emerge.

The best way to do this and the frequency with which the reflections should be made is left for the OIP facilitators and the Task Force to decide. In principle, an option would be to set up short internal feedback sessions for Task Force members to evaluate the process at several stages, discuss their experiences as participants and submit suggestions for improvement. Other options may be found more suitable by the teams. In any case, at least two feedback sessions should be organised as described in Chapter 4.3. As regards documenting the process at the meta-level (i.e. beyond the results of the assessment exercises), while future deliverables (e.g. D6.1) and periodic reports will be good channels to register this generated knowledge, OIPs could consider producing briefing documents to compile and communicate the lessons learned.

Lastly, mutual learning among OIPs is a core element of the BE-Rural concept. Thus, the exchange of key lessons on barriers and enabling factors to the identification of business opportunities and design of locally adapted business models will be pursued by the consortium. A concrete and already established forum for this are the periodic coordination meetings of the consortium. Dedicated sessions as online or face-to-face formats will be explored ad-hoc as the five processes kick off.

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## Annex I – Sample Questionnaire for first consultation checkpoint

### Opinion/validation survey

**Name of your organisation:** Klicken oder tippen Sie hier, um Text einzugeben.

**OIP:** Wählen Sie ein Element aus.

**Type of organisation:** Wählen Sie ein Element aus.

**Which biomass type is the most relevant for your Region?** (please select maximum three options)

- ☐ Forest biomass (wood and by-products from wood processing, e.g. saw dust)
- ☐ By-products of forest management (e.g. short rotation coppice and young forest stand)
- ☐ Wood pulp and paper industry waste
- ☐ Perennial grasses from agroforestry
- ☐ Agricultural/agri-food waste (different streams)
- ☐ Root vegetables
- ☐ Low-value fish stocks (by-catch)
- ☐ Fish waste
- ☐ Other

Please specify: Klicken oder tippen Sie hier, um Text einzugeben.

**What do you consider to be potential needs for consumption of bio-based products and services in the region?**

- ☐ Energy autarchy (i.e. reduced dependency from imported fossil fuels)
- ☐ Reduction of plastic littering
- ☐ Supply of nutritious, regional foods and beverages
- ☐ Conservation of traditions
- ☐ Taking advantage of locally available resources that are currently not used
- ☐ Diversification of the regional/local economy
- ☐ Specialization of the regional/local economy
- ☐ Other

Please specify: Klicken oder tippen Sie hier, um Text einzugeben.

**In which products or services do you see the biggest opportunity for biomass use?**

- ☐ Pellets (bioenergy)
- ☐ Briquettes (bioenergy)
- ☐ Woodchips (bioenergy)
- ☐ Anaerobic biodigestion for biogas production (bio-energy)
- ☐ Gasification/pyrolysis of biomass (bio-energy)
- ☐ Solid wood panels and prefab wood products
- ☐ Handicrafts
- ☐ Furniture
- ☐ Processing technologies for the utilization of fish waste in the cosmetics and pharmaceutical
- ☐ Bio-based additives from nanocellulose fibres extracted from root vegetables for production
- ☐ Sale of small-scale fishery products/low-value fish stocks as environmentally friendly alternatives
- ☐ Sale of small-scale fishery products/low-value fish stocks as ingredient of traditional recipes
- ☐ Application of innovative technologies such as freeze-drying to increase value and popularity of underused fishery resources
- ☐ Whey-based energy drink
- ☐ Fibre-rich, gluten free drink
- ☐ Production of bio-chemicals from bio-waste (e.g. from wood pulp and paper industry waste)
- ☐ Manufacture of auto-parts from biomass
- ☐ Manufacture of textiles from still unused biomass feedstocks
- ☐ Production of essential oils and herbal plants in the cosmetics and pharmaceutical industry
- ☐ Packaging and disposable tableware solutions made of agricultural residues
- ☐ Renewable biocomposite (e.g. for manufacturing plant pots, construction boards and ornamental vases) made of mycelium (fungus) growing in agroforestry residues
- ☐ Transportable plant for protein production from fish waste
- ☐ Other

Please specify: [Klicken oder tippen Sie hier, um Text einzugeben.](#)

## Annex II – Online resources to inform Exercise 3: Market Size Estimation

The following resources could be useful to complete the assessment exercises. Along with these resources below, keyword rich searches should lead you to what you want to know.

### **Population projections**

EUROSTAT provides projections of population growth by country and region, and also breaks this down by age and sex. The data can be viewed online or downloaded at <http://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-projections/database>

### **Economic growth**

#### **Inflation**

Inflation measures the change in prices in an economy. Stable and low inflation is considered an important indicator of an economy's health.

The headline EU inflation indicator is the Harmonised Index of Consumer Prices. This is shown visually for all of Europe here: <http://ec.europa.eu/eurostat/inflation-dashboard/> This tool also allows you to see price changes by item group (e.g. housing, food and beverages, technology etc.)

Detailed data by country can be found here: <http://ec.europa.eu/eurostat/web/hicp/data/database>

#### **Exchange rates**

The exchange rate, i.e. how much of a foreign currency one Euro can buy, can have a large impact on business viability, especially for heavily traded goods and services. It is also a key indicator of an economy's health.

Overall trends can be seen by checking the European Central Bank's daily nominal effective exchange rate, which is a weighted average exchange rate with 19 of Europe's major trading partners: <https://www.ecb.europa.eu/stats/exchange/effective/html/index.en.html>

The ECB also provides long term data on specific exchange rates: <https://www.ecb.europa.eu/stats/exchange/eurofxref/html/index.en.html>

#### **European economic growth (and projections)**

Data on past and projected medium term economic growth for European countries can be found here: [http://ec.europa.eu/economy\\_finance/eu/countries/index\\_en.htm](http://ec.europa.eu/economy_finance/eu/countries/index_en.htm)

#### **International economic data**

The World Bank has an excellent data platform that covers a wide range of economic and social variables, by country. For example, GDP levels, GDP per capita, GDP growth (<http://data.worldbank.org/indicator/NY.GDP.MKTP.CD>); unemployment (<http://data.worldbank.org/indicator/SL.UEM.TOTL.ZS>); inflation (<http://data.worldbank.org/indicator/FP.CPI.TOTL.ZG>); exports (<http://data.worldbank.org/indicator/TX.VAL.TECH.CD>), and many more.

### **Public perceptions**

Public perception data on a massive variety of topics is collected by the EU in the form of the Eurobarometer every year. Approximately 1000 people in each EU country are interviewed and the data is collected and made available at the following interactive website: <http://ec.europa.eu/COMMFrontOffice/publicopinion/index.cfm/General/index>

## **Environmental issues**

### **General European and country overviews**

The EEA's annual State of the Environment reports present detailed information by topic and country on all sorts of environmental issues and industries affected and dependent on the environment. It can be found here: <http://www.eea.europa.eu/soer>

### **Climate change impacts**

The most recent Intergovernmental Panel on Climate Change (IPCC) report is the key reference for climate change impacts and vulnerabilities. The Europe chapter is likely to be of particular reference: [http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap23\\_FINAL.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap23_FINAL.pdf) as is the higher-level Summary for Policymakers: [http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap23\\_FINAL.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap23_FINAL.pdf)

### **Climate change commitments**

The Climate Tracker website independently tracks and evaluates climate commitments. It has up to date policy information, by country. <http://climateactiontracker.org/countries.html>