D.3.1 Country report: Bulgaria

This project has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement ***No 838087***

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November 2020

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Key issues for the development of bioeconomy in Bulgaria

Bioeconomy in Bulgaria is in the initial stage and industry lacks consistent communication and collaborations with research and policy actors.

Bulgaria, however, has an excellent resource base and can use bioeconomy as an opportunity to optimise productivity and potential from existing natural resource assets. This will offer significant prospects for improved circularity, optimal use of resources and meeting the needs of modern society in terms of health and well-being, the environment, food, energy, materials, and chemicals. Sectors within the bioeconomy will strengthen the Bulgarian economy and move Bulgaria towards a low carbon future.

Rural areas will be revitalised and transformed through the circular bioeconomy. Innovations in rural areas have the potential to contribute to the creation of a sustainable bio- based economy in Bulgaria. Success in this area depends on numerous factors, such as common agricultural policies, energy and climate policies, tax regulations and market and price developments. The competitive disadvantages of sustainable bio- economic methods and products that exist under current market conditions can be mitigated by intelligent regulatory and funding instruments.

Bioscience and biotechnology have the potential to create new solutions that are economically and environmentally sustainable as well as resource efficient. These solutions will create opportunities in agri-food, chemicals, materials, energy and fuel production, health, and the environment. Feasibility studies, pilot projects should involve different stakeholders in the development of new opportunities and new technologies for valorisation of residues and wastes for new biochemical, products and energy options.

Establishment of R&D& and innovation infrastructure will provide businesses and researchers with regional focal points for innovation and the commercialisation of new products and processes should be the focus together with capacity building of young researchers and start-up companies.

Tailored financing and investment will allow start-ups to thrive. This will range from healthier, more sustainable, and affordable foods due to smarter, more productive agricultural systems; to better medicines; sustainable fuels and cheaper materials, all whilst providing a cleaner environment for all.

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1. Introduction

The aim of the report is to present a set of specific, attainable, relevant biobased value chains and time-based Action Plan for the development of bioeconomy in Bulgaria. The work has capitalised on the findings of the work in CELEBIO[1] and is structured in four sections.

The first presents the current state of bioeconomy, discusses the country's comparative strengths, opportunities, and barriers, and provides an overview of the existing policy regime per value chain stage (i.e., biomass production, conversion, distribution, end use).

The second introduces the Bioeconomy Vision, the value chains selected by national stakeholders and outlines how they fit to the three main priorities[2] from the 2018 Update of the European Bioeconomy Strategy[3]:

- Strengthen and scale-up the bio-based sectors, unlock investments and markets
- Deploy local bioeconomies rapidly across Slovenia
- Understand the ecological boundaries of the bioeconomy

The third provides facts tailored to each value chain in terms of current exploitation of biomass raw materials, future actions that could steer innovative and resource efficient market uptake for biobased products, potential interventions and expected added value. This information has resulted from the consultation with national stakeholders within the duration of the project. This section also includes information on the relevance to the UN Strategic Development Goals (SDGs), selected relevant projects and markets for the biobased products that will derive from each value chain.

Finally, the fourth part provides an implementation plan, jointly developed with stakeholders, which includes time specific goals for reaching the Vision.

[1] https://celebio.eu/wp-content/uploads/2020/07/Bulgaria-Country-Report.pdf
[2] https://ec.europa.eu/research/bioeconomy/pdf/bioeconomy_line_actions.pdf#view=fit&pagemode=none
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0673&from=EN

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2. Bioeconomy in Bulgaria

Current state

The development of bio-based industry in Bulgaria is in its initial stage. Bioeconomy had an annual turnover of fourteen billion Euros in 2017 which translates to 16,000 Euros per person employed in the sector with the EU27 average figure being 127,000 Euros.

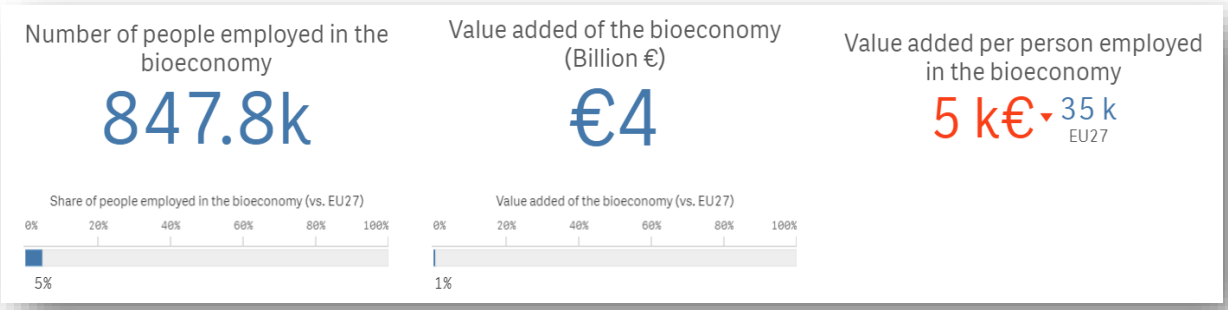


Figure 1 Value added in terms of jobs and wealth in the Bulgarian bioeconomy (source: datam.jrc.ec.europa.eu)

The value added from the bioeconomy sector in the country was 4 billion Euros and in the same year there were 847,800 people employed.

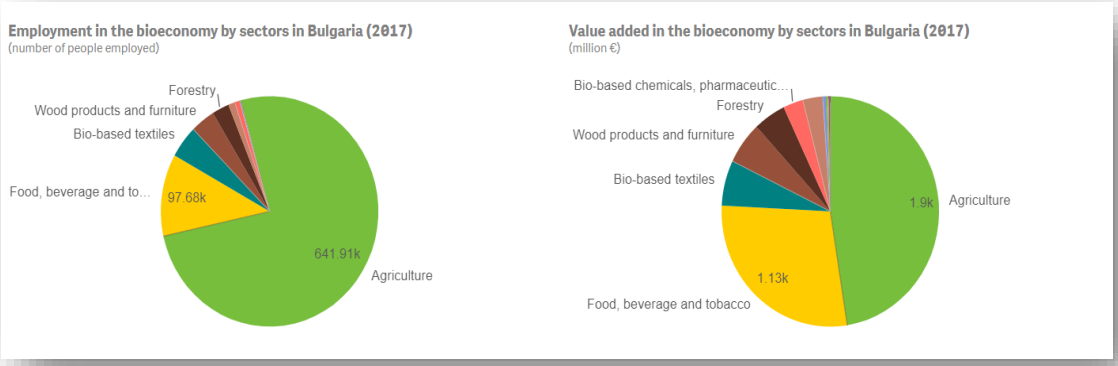


Figure 2 Employment and value added in the bioeconomy by sectors in Bulgaria in 2017 (source: datam.jrc.ec.europa.eu)

Agriculture remains the biggest sector in terms of employment (76% of the total number of people employed) with food, beverage, and tobacco following with much smaller share (11.5%). In terms of value-added agriculture leads with 1.9 million Euros and food, beverage and tobacco follow with 1.13 million Euros.

Most of the Bulgarian companies are still lagging in the bio-based R&D; the connection between them and the research institutes and universities is not well established. They are part of different industries and sectors (energy, pulp and paper, agriculture, plastics, textile, pharma, etc.), focused on the traditional manufacturing and processing. There is a little or no focus on bioeconomy or the opportunities for creating new value chains.

Strengths, opportunities and barriers

	• Bulgaria has enough land to provide raw materials for food and biofuels production • Long tradition in agriculture and food processing • Regions with preserved biodiversity • Unused potential available from primary residues, secondary residues and unused lands. • Cost of biomass resources are relatively low in comparison to many regions in the EU • Still many underutilised biomass resources • A long agricultural tradition in planned economy • Non-utilised arable land	• Still many biomass resources that can be mobilised • Turning bio-waste, residues and discards into valuable resources and creation the innovations and incentives • Opportunities to produce low-ILUC biomass on abandoned lands • Production of healthy and functional food and drinks for a healthy Europe is a trend the Bulgarian market can connect to. • Production of medical aromatic plans for medicines, food additives and cosmetic products	• Depopulation of rural areas • Lack of labour in agriculture because of non-attractive remuneration in agriculture sector • Lack of rural population to produce and collect the biomass in the long term • No market for high added value biomass, uses only low-quality chains for heat/electricity • Pollution through inefficient use of biomass, firewood burned in low-efficient hearing devices in local heat production • Import of value-added products
	• Dominating publicly owned pattern - large share of state ownership of the forest is a good prerequisite for sustainable management • A long tradition in forest management, uniform forest management system • Availability of 10-years local/regional forest plans, good planning of biomass flow balance, • Possibilities for additional mobilisation of primary forest resources • Forest processing industry is growing and leads to more secondary forestry residues • Well developed industry for glued boards and chipboard, pulp, paper... • High percentage of firewood in energy balance	• Mobilisation of unused biomass for future bio-based materials production • Development of new bio-based products on lignocellulosic base • Biomass production for low ILUC biofuels	• Climate changes - erosion of forest terrains, probability for fire occurrences, risk agents as insects) • Concerns for overharvesting • Short and vertical value chain • Presence of illegal logging and harvesting • Inefficient utilisation of firewood for heating • Attitudes towards the use of wood for electricity production
	• Development of waste management infrastructure that can be used for energy and/or material recovery • High existing potential for utilization which is currently still going to landfill • Development of separate waste collection on household level • Utilisation of manure in agriculture • Utilisation of sewage sludge	• Opportunities for improvement of performance of waste management under the guidance of the EU directives. • Turning bio-waste, residues and discards into valuable resources and creation the innovations and incentives • Knowledge-based production and utilisation of biological resources, biological processes and principles • Knowledge transfer from more advanced countries in EU • Introduction of innovative technologies for biodegradable waste utilization • EU support/funding for improvement of waste management infrastructure and waste management system • Utilization of currently landfilled biodegradable waste • Implementation of "Waste Market"	• Negative public opinion on waste separation, utilization for energy/recovery purposes • Lack of recognition for the opportunities in waste utilization within bioeconomy principles • Backwardness and lack of change within legislation and strategic framework • Indifference of sector stakeholders

Policy mechanisms relevant to bioeconomy in Bulgaria

There is no dedicated bioeconomy policy in Bulgaria. There are however related national strategies and programs that define strategic goals, objectives, and priorities. The Smart Specialization Strategy and Action Plan (S3), Energy Development Strategy by 2030, Rural Development Programme, Operational program "Competitiveness and Innovations", direct the use of funds for the accomplishment of the European cohesion policy for the 2014-2020 period.

Figure 3 Policy mechanisms relevant to bioeconomy in Bulgaria (green: regulations; blue: financing; beige: information provision) the policy mechanisms that are currently operational in Bulgaria.

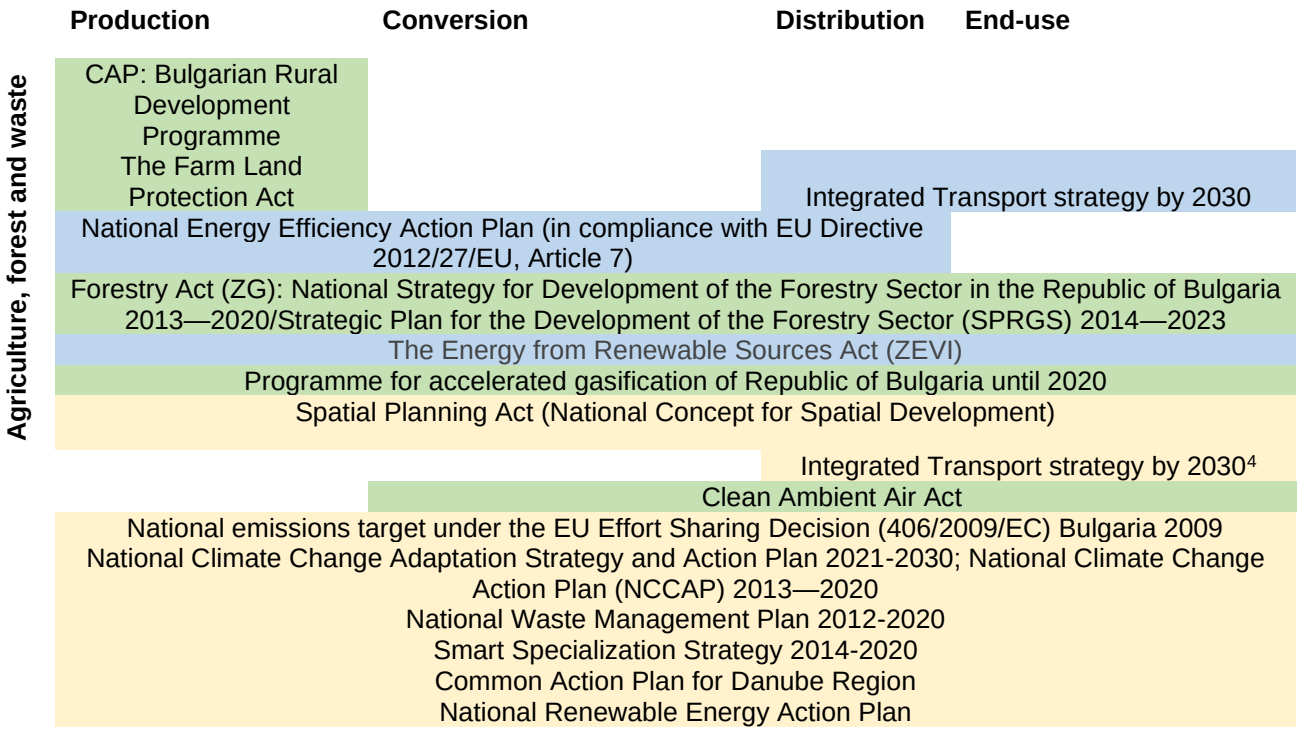


Figure 3 Policy mechanisms relevant to bioeconomy in Bulgaria (green: regulations; blue: financing; beige: information provision)

[4] https://www.mtitc.government.bg/en/category/42/integrated-transport-strategy-period-until-2030

3. Vision and implementation plan

Vision for sustainable and circular bioeconomy in Bulgaria

The development of the Bulgarian Bioeconomy will focus on:

Boosting modern technologies for transformation of medical and aromatic plants as rich source of biologically active substances for development of traditional and modern medicines, nutraceuticals, food supplements/additives, functional foods

Smart utilization of biomass resources for new products, fuels, and bioenergy.

Valorisation of all biodegradable wastes for new products, fuels, and bioenergy.

New flagship projects for existing and new bioeconomy-related industries

Generation of high added value and job creation

Contribution to health ecology system and mitigation of climatic change.

Strengthen and scale-up the bio-based sectors, unlock investments and markets

This section focuses the Bulgarian Action Plan on value chains selected by national stakeholders as promising ones that have significant potential for market uptake of domestic raw materials and are suitable to foster innovation for the existing industrial infrastructure.

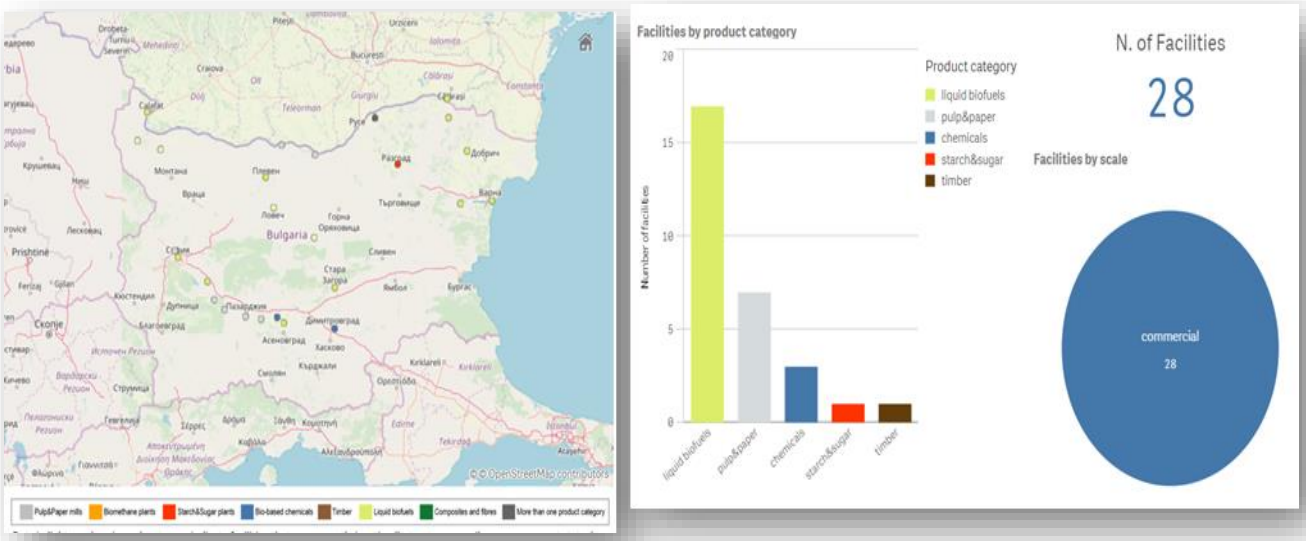


Figure 4 Biorefineries in Bulgaria (source: https://datam.jrc.ec.europa.eu/datam/mashup/BIOBASED_INDUSTRY/index.html)

Figure 4 Biorefineries in BulgariaProvides and overview of the biorefineries in Bulgaria.

There are currently twenty-eight commercial facilities operating in the country within the liquid biofuels, pulp and paper, chemicals, starch and sugar, and timber.

Bulgaria belongs to the group of "modest innovators" in the Innovation Scoreboard, meaning that is well below that of the EU average. The companies are still lagging in the bio-based R&D; the connection between them and the research institutes and universities is not well established.

CELEBIO has also engaged with national stakeholders to understand their perspectives of the Bulgarian bioeconomy and select value chains with strong potential to uptake indigenous raw materials, foster the development of innovative products and contribute to the development of Bulgarian bioeconomy.

To establish robust bioeconomy in Bulgaria will have to implement the following actions:

Mobilise public and private stakeholders, in research, demonstration and deployment of sustainable, inclusive, and circular bio-based solutions

Promote and in the 100 million EUR Circular Bioeconomy Thematic Investment Platform that will be launched by the European Commission

Disseminate and promote the European's Commission study and analysis of enablers and bottlenecks and the voluntary guidance that they will provide for the deployment of bio-based innovations

Promote and/or develop standards and emerging market-based incentives, and improve labels applicable to bio-based products on the basis of reliable and comparable data on environmental and climate performance

Facilitate the development of new sustainable biorefineries and confirm the type and estimated potential

Support the research and innovation investments for the development of substitutes to fossil based materials that are bio-based, recyclable and marine-biodegradable, and of bio-remediation methods by mobilising the key actors in the relevant value chains including the plastics value chain and to contribute to plastic-free, healthy and productive European seas and oceans

Deploy local bioeconomies rapidly across Bulgaria

The value chains mentioned above and selected by national stakeholders fit well the regional distribution of biomass raw materials across Bulgarian regions.

To deploy local bioeconomies rapidly across Bulgaria the following actions must be planned:

To adapt national definition of bioeconomy

Develop a Strategic Deployment Agenda for sustainable food and farming systems, forestry, and bio-based production in a circular bioeconomy

Development of National, regional, and local bioeconomy strategies

To promote applied R&D on the efficient generation and supply of regional biomass, considering sustainability, the preservation of biodiversity and climate change mitigation as well as new requirements, demands and markets.

Establish Regional Innovation Centres for circular bioeconomy (biorefineries)

Implement pilot actions to support local bioeconomy development (rural, coastal, urban) via European Commission instruments and programmes

Set up an EU Bioeconomy policy support facility and participate in a European Bioeconomy Forum for Member States

Promote education, training, and skills across the bioeconomy

Value chains from agriculture

The most important crops in Bulgaria are cereals and oil crops, e.g. sunflower and rape. Permanent crops cover a relatively small percentage of the cropping area, particularly in comparison to many EU countries.

To deploy bioeconomy in Bulgarian agriculture the following actions must take place:

Introduce regulatory and funding interventions for bioeconomy in rural areas

Facilitate the market uptake of agricultural residues

Explore the potential of bioeconomy to create added value in agriculture and rural areas

Develop suitable concepts for harvesting, decentralised processing, logistics and warehousing, minimizing post-harvest losses and ensuring that the quality of the biomass is maintained during storage and processing.

Engage with stakeholders, set quality requirements, check cost efficiency, and agree on standardised quality parameters

Launch pilot projects, flagship initiatives, vouchers for start-ups and innovative companies to promote bioeconomic innovations in rural areas with a focus on innovative biobased products and materials

Develop innovative business models for agricultural and forestry value chains and their implementation in rural areas.

The value chains selected by the national stakeholders are:

- **Medicinal and aromatic plants for food additives and cosmetic products**
- **Straw for animal bedding, heating and as a fuel for harvesting machines and in paper industry**
- **Residues from meat industry and manure could be used for as fuel for heat generation**
- **Residues from agro-industries: Wine distilleries; Food and beverage industries; Milk processing industries**

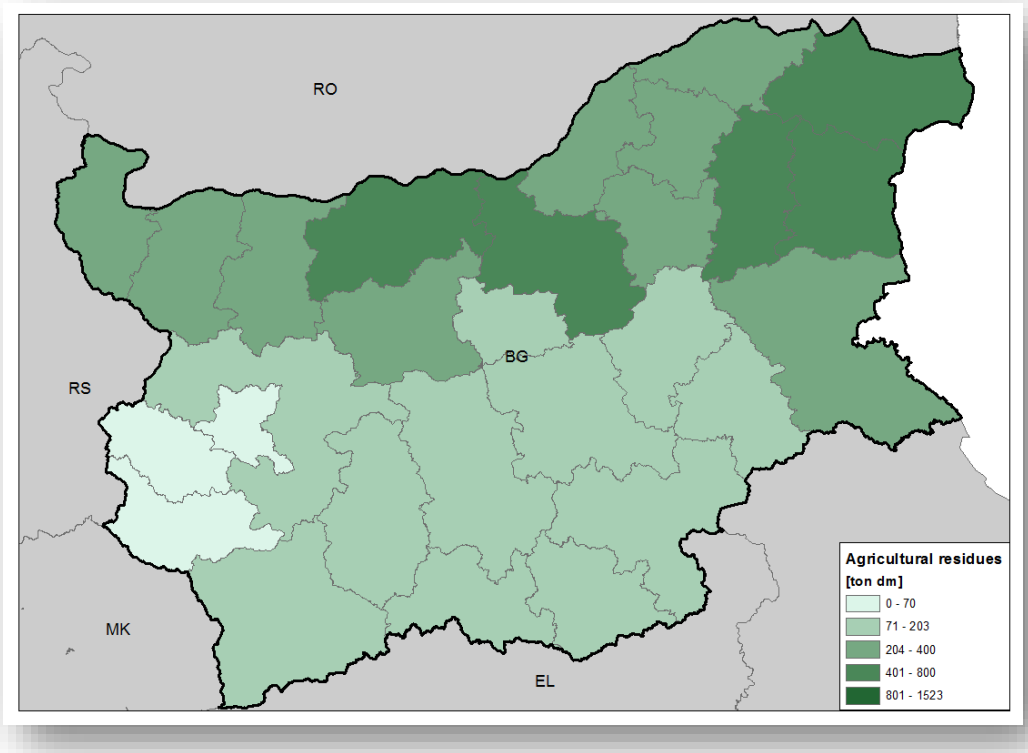


Figure 5 Total primary residual biomass potential from agriculture in ton dry motter/year (S2Biom Base 2020 potential)

Figure 5 Total primary residual biomass potential from agriculture in ton dry motter/year (S2Biom Base 2020 potential) illustrates the concentration of agricultural biomass in Bulgarian regions

Value chains from forestry

Bulgaria has considerable forest resources - forest territories occupy more than one third of the country's territory. According to the Executive Forest Agency, the area of the forest territories in 2018 amounts to 4,257,200 hectares. The state forest territories cover an area of 3,090,010 ha (72.58%). Non-state forest territories cover an area of 1,050,424 ha (24.67%), of which 558,116 ha (13.11%) - municipal forest territories, 425,246 ha (9.99%) - forest territories owned by individuals amount to 47,167 ha.

To deploy bioeconomy in Bulgarian forestry the following actions must take place:

Stimulate the usage of forest residues

Explore the potential of bioeconomy to create added value in forestry and rural areas

Creation of pilot and demonstration facilities

to preserve and create suitable local, natural, healthy, productive and stable forests

The value chains selected by the national stakeholders are:

- **Forest based biomass for bioenergy**
- **Wood for eco-innovation/ construction, residues from paper industry**

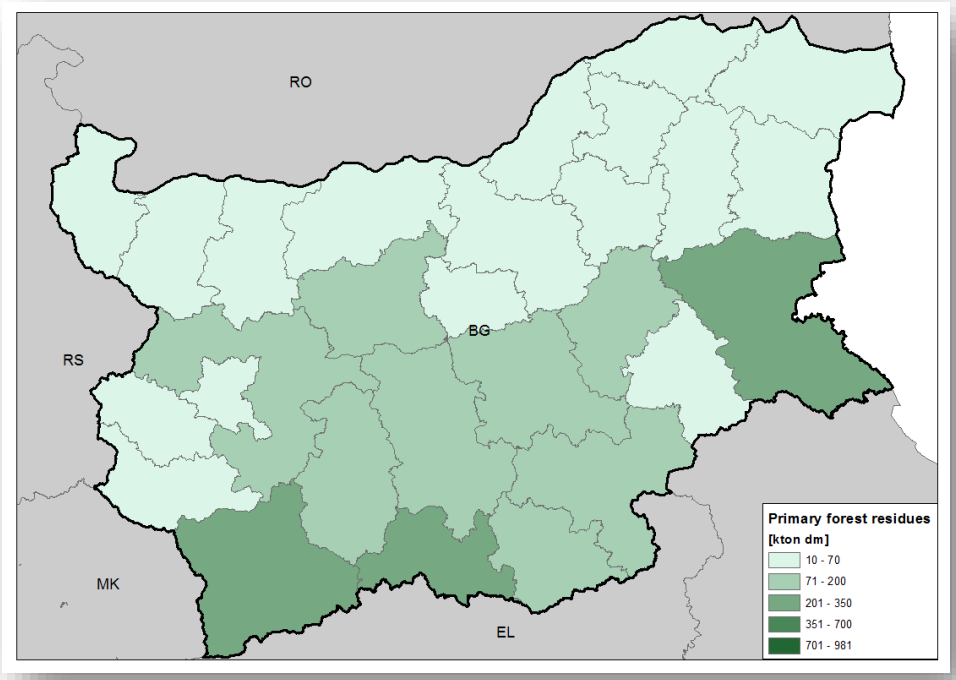


Figure 6: Distribution of primary residues potential from forests Kton dry matter (S2Biom Base 2020 potential)

Figure 6: Distribution of primary residues potential from forests Kton dry matter (S2Biom Base 2020 potential)illustrates the concentration of forest biomass in Bulgarian regions

Value chains from biowastes

To deploy bioeconomy in Bulgarian biowaste sectors the following actions must take place:

Stimulate the usage of industrial residues and waste

Creation of pilot and demonstration facilities

The exploitation of side streams and residues from biomass production and processing for coupled and cascade usage.

The value chains selected by the national stakeholders are:

Utilisation of biowastes (residues from wood industry, sunflower husks, etc) for solid biofuels and energy
Utilisation of bio-wastes from different flows (households, industrial wastes, waste waters of food industry, etc) in anaerobic digestions installations
Recovery of nutrients from wastewater treatment plants - sewage sludge

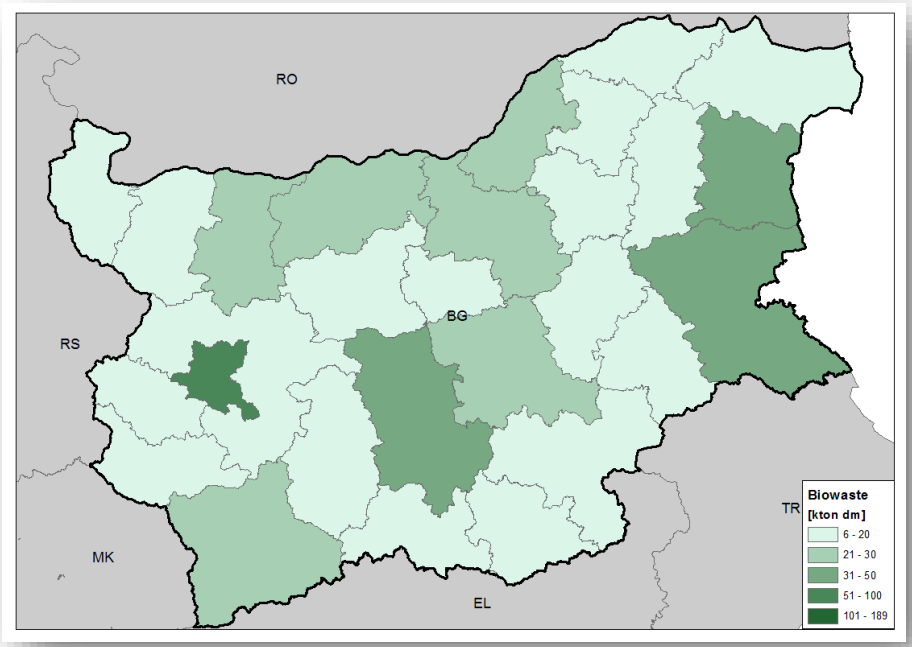


Figure 7 Distribution of biowastes in Bulgaria

Figure 7 Distribution of biowastes in Bulgariaillustrates the concentration of biowastes in Bulgarian regions

Understand the ecological boundaries of the bioeconomy

Land use change

Land use is related to raw material production. Emissions from land use change can be significant in some circumstances, however, the simple notion of land use change emissions is not sufficient reason to exclude biomass from the list of worthwhile technologies for climate change mitigation, bioeconomy and circular economy.
The value chains selected for the Bulgarian bioeconomy comprise of residual and waste fractions so there is no risk expected from their mobilisation and future exploitation.

Biodiversity

Forest biomass: Low risks can be anticipated. Loss of dead wood and stumps may negatively influence species diversity and soil fauna. Contrary to this, leaving them all on the ground may result in increased fertilisation (N and wood ash) and negative impacts on vegetation

Agricultural biomass: medium risks can be anticipated without sustainable practices.
Biodiversity loss when harvesting too many crop residues
Absence of fertilisation with animal manure would reduce microbiological activity

Biowastes: Positive in regions where it avoids landfill

Soil & Carbon stock

Forest biomass: Moderate risk of soil erosion; risk to lose soil organic carbon; risk to lose nutrients and risk of reduced soil fertility and soil structure when overharvesting forest residues
There are debates that using the wood in panel boards, creates a carbon stock in comparison to combustion of the wood

Agricultural biomass: Moderate risk to lose soil organic carbon when overharvesting crop residues; risk to lose nutrients when overharvesting
Absence of fertilisation with animal manure would reduce soil organic matter and soil nutrients,
Reduction of soil organic matter and soil nutrients

Biowastes: Positive in regions where it avoids landfill.
Digested organic waste is a source of soil improving material.

Water

Forest biomass: No effect on the quantity; If no removal leads to increased fertilisation the leaching on N to water may increase

Agricultural biomass: Reduction of soil water retention capacity, increasing risk of water erosion
Reduction of soil water retention capacity due to lower microbiological activity

Biowastes: Lower risk of water pollution in regions where it avoids landfill

Sustainability risks from the exploitation of biomass raw materials for bioeconomy in Slovenia (red: high risk; yellow: moderate risk; green: no/ positive impact)

Feedstock		Sustainability risks (high- red; moderate- yellow; low- green)			
		Land use (iLUC risk)	Biodiversity	Soil & Carbon stock	Water
Primary forestry production	Stemwood from thinnings & final fellings	None			
Primary forestry production	Stem and crown biomass from early thinnings				
Primary forestry residues	Logging residues from final fellings				
Secondary residues from wood industries	Saw mill residues	None	None		None
Secondary residues from wood industries	Other wood processing industry residues				
Agricultural residues	Straw/stubbles	None			None
Secondary residues of industry utilising agricultural products	By-products and residues from food and fruit processing industry	None	None	None	None
Biodegradable municipal waste	Biodegradable waste	None			

4. Value chains for the Bulgarian bioeconomy

The third section provides facts tailored to each value chain in terms of current exploitation of raw materials, future actions that could steer innovative and resource efficient market uptake for biobased products, potential interventions and expected added value. This information has resulted from the consultation with national stakeholders within the duration of the project. This section also includes information on the relevance to the UN Strategic Development Goals (SDGs), selected relevant projects and markets for the biobased products that will derive from each value chain.

Agriculture
Main aim of the selected value chains is to:

- Support livestock and crop production; Involvement of rural citizens in rural development
- Exploit high residue potential; Local food processing industries offer opportunities as the negative balance of food export and import is growing

Forestry
Main aim of the selected value chains is to:
- Development of rural business activities by mobilising new value chains in the context of circular economy
-New legislation divide State and non-state forests and makes access to funds from state easier (?)
-Research and Innovation activities towards higher added value products from forest biomass and to increase the share of RES

Wastes
Main aim of he selected value chains is to:
-IncreasE efficiency of metal processing and of electricity generation from waste could increase overall resource efficiency

Straw for animal bedding, heating and as a fuel

Value chain	SDGs	Examples of relevant projects
Straw for animal bedding, heating and as a fuel for harvesting machines and in paper industry		Optisochem Web site http://optisochem.eu/

Current exploitation of biomass raw materials

- There is a well-developed practice to utilise a considerable portion of the straw from harvested crops and use it in horticulture and livestock breeding.
- Low-level of utilisation of agro-residues for biogas and electricity production.

Future actions

- Promotion the efficient, sustainable use of available natural resources respecting ecological burdens
- Optimise the efficient use of straw
- Displace fossil-based resources in the agri-food supply chain
- Developing and accessing scenarios that supply bioenergy for various end uses (heating, mobility, electricity)
- Stimulate the usage of agricultural residues

Potential interventions

- Extension of regulatory and funding instruments of the Ministry of agriculture and food for rural areas for the bioeconomy.
- Further development of technologies for the conversion of straw to higher value products

Expected added value

- Securing the supply of raw materials for a sustainable circular bioeconomy and exploiting future-oriented opportunities for creating added value and employment in rural areas.
- Contribution to the reduction of greenhouse gasses and other pollution environmental, social, economic benefits

Product Group	Market size
Agro-chemicals Fertilisers	M 1,000 – 10,000 kt
Sustainable Energy	L >10,000 kt

Medicinal and aromatic plants

Value chain	SDGs	Examples of relevant projects
Medicinal and aromatic plants		EXANDAS Exploitation of aromatic plants' by-products https://www.exandas-project.eu/

Current exploitation of biomass raw materials
There are small producers but not well organised and linked to industrial actors
There is abundance of wild species that can provide raw materials for essential oils production, food additives and cosmetic products.

Future actions
Increase the cultivation of medicinal and aromatic plants, particularly in marginal rural areas.
Establish local cooperatives

Potential interventions
- Tax incentives
- Start-up financing for farmers

Expected added value
- Land will be brought back to use; new industries created; lower carbon-footprint by growing locally; replacement of non-biodegradable products (auto plastic interiors).

Product Group	Market size
Cosmetics	S <1,000 kt
Paints & coatings	
Plant based-chemicals	M 1,000 – 10,000 kt
Fertilisers	

Residues from agro- food industries

Value chain	SDGs	Examples of relevant projects
Residues form meat industry and manure could be used for as fuel for heat generation		AgriChemWhey Web site https://www.agrichemwhey.com/ agrimax Web site http://www.agrimax-project.eu DEMETER Web site http://www.demeter-eu-project.eu EXCornsEED Web site https://www.excornseed.eu/ PRO-ENRICH Web site https://www.pro-enrich.eu/
Utilisation of residues from distilleries		
Utilisation of waste from food and beverage industries		
Utilisation of waste from milk processing industries		

Current exploitation of biomass raw materials
Currently most of the meat industry end up as waste, putting strong pressure on the water treatment facilities

Future actions
- To stimulate investments for small farmer's installations for anaerobic digestion of agricultural residues and animal manure.
- To establish community installations for anaerobic digestion of agricultural wastes and animal manure
- Pilot projects for exploitation of side streams and residues from processing for coupled and cascade usage.

Potential interventions
- Establishment of research and technological infrastructure and education and training facilities for bioeconomy and technology, including animal wastes
- Launch competitions for start-ups, pioneering projects, flagship initiatives to promote bioeconomic innovations in rural areas.

Expected added value
- Less wastes from food-processing, use of side streams and reduction of negative impact on the environment.
- Untapped potentials in obtaining functional components and materials (bioactive components, fibrous materials) before energy use

Product Group	Market size E
Cosmetics Paints & coatings	S <1,000 kt
Plant based-chemicals Fertilisers	M 1,000 – 10,000 kt
Sustainable Energy	L >10,000 kt

Forest based value chains

Value chain	SDGs	Examples of relevant projects
Forest based biomass for bioenergy		Web site https://www.bioforever.org EFFORTE Web site https://www.luke.fi/efforte/
Wood for eco-innovation/ construction, residues from paper industry		

Current exploitation of biomass raw materials

- Dominating publicly owned pattern - large share of state ownership of the forest is a good prerequisite for sustainable management
- A long tradition in forest management, uniform forest management system
- Availability of 10-years local/regional forest plans, good planning of biomass flow balance,

Future actions

- Development of Regional action plans for utilisation of forest biomass
- Establishment of regional/local biomass logistic centres
- Promotion of efficient and effective biomass generation and bioeconomic value creation chain trough digital options in the areas of forestry
- Wide campaign for replacement of old inefficient stoves with alternative efficient heating devices based on modern wooden biofuels and bio-heat
- Developing suitable concepts for harvest, decentralised processing, logistics and warehousing, minimizing post-harvest losses, and ensuring biomass quality during storage and processing.

Potential interventions

- Forest Certification
- Introduce innovation financing for food SMEs and industries
- Regulation on forest raw materials for bioeconomy

Expected added value

- Increase sustainable utilisation of biomass & decrease of energy poverty
- Reduction of air pollution, including PM10 and PM2,5

Product Group	Market size
Cosmetics Paints & coatings	S <1,000 kt
Plant based-chemicals	M 1,000 – 10,000 kt
Sustainable Energy	L >10,000 kt

Value chains based on biowastes

Value chain	SDGs	Examples of relevant projects
Utilisation of biowastes (residues from wood industry, sunflower husks, etc) for solid biofuels and energy	6 CLEAN WATER AND SANITATION; 7 AFFORDABLE AND CLEAN ENERGY; 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION; 15 LIFE ON LAND	B-Ferst Web site https://bferst.eu/; DEEP PURPLE Web site http://deep-purple.eu/; PERCAL Web site http://www.percal-project.eu
Utilisation of bio-wastes from different flows (households, industrial wastes, waste waters of food industry, etc) in anaerobic digestions installations		
Recovery of nutrients from wastewater treatment plants - sewage sludge		

Current exploitation of biomass raw materials
Low exploitation of biowastes

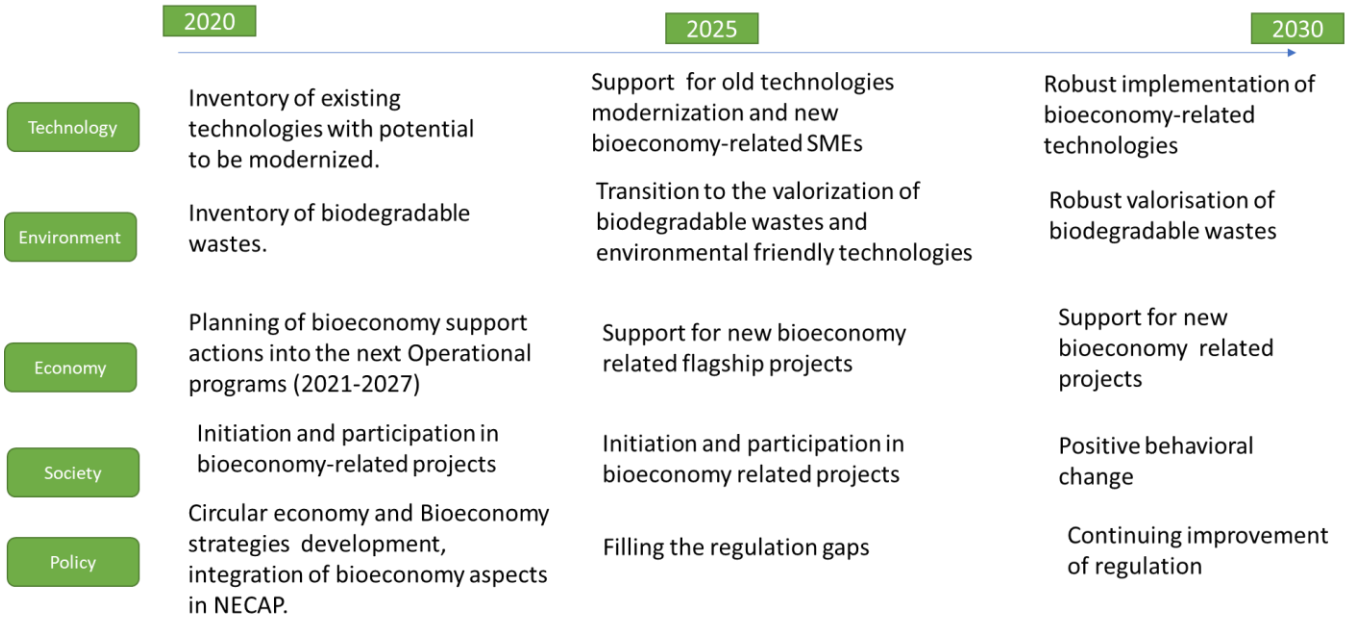
Future actions
- Acceleration of introduction of end of waste legislation to facilitate utilisation of some of biowastes
- Stimulate the turning of bio-waste, residues, and discards into valuable resources

Potential interventions
- Incentives for the use of waste for biogas production (subsidies) and fostering the development of clean and renewable energy production. This could include penalties and rewards for energy production, depending on their environmental impact.
- National wide recycling and waste separation campaign and implementation of this type of education in the schools.

Expected added value
- Increased use of urban/municipal waste, cleaner energy, reduced environmental impact, potential to improve revenue of all stakeholders
- Efficient system of urban waste collection, improvements possible in higher share of energy utilisation (biogas)
- New opportunities for eco-construction options in integration of renewable energy

Product Group	Market size
Cosmetics Paints & coatings	S <1,000 kt
Plant based-chemicals Fertilisers	M 1,000 – 10,000 kt
Sustainable Energy	L >10,000 kt

5. Implementation plan



The country will substantially increase the sustainable usage of bio-waste, residues and discards from agriculture and forestry.

The food waste will also be reduced by 50% by 2030.

The waste management and usage of waste as a resource will be dramatically improved with having 65% of the waste recycled while lowering the percentage of waste that goes to landfills to 25% by 2030.

Bulgaria will also explore more opportunities to use biomass sustainably in order to reach at least 32% share of renewables in the energy mix by 2030.

By 2030 Bulgaria will reach land degradation neutrality and restore at least 20% of the degraded ecosystems.

Actors and funding opportunities

Action[5]	Actors involved	Indicative cost	Funding instruments
Pilot, demonstration and commercialisation of bioeconomy-related technologies (T)		2020-2025: 10 milion € 2025- 2030: 20 milion €	Eco-Fund: Loan, subsidy and tender for RES-E RES-H new building obligation
Medicinal and aromatic plants that are based for phyto-pharma value chain that covers essential oils production, food additives and cosmetic products		2020-2030: 20 milion €	CAP
Valorisation of biodegradable wastes. waste management and usage of waste as a resource will be dramatically improved with having 65% of the waste recycled while lowering the percentage of waste that goes to landfills to 25% by 2030. (T)		2025- 2030: 50 milion €	Next Generation EU Action Plan on financing sustainable growth
Reduce food wastes by 50% by 2030		2020-2030: 30 milion € joint public and private funds	
By 2030 Bulgaria will reach land degradation neutrality and restore at least 20% of the degraded ecosystems. (Env)		2020-2030: 10 milion €	Action Plan on financing sustainable growth CAP
Increasing private financial lever for supporting investments in biobased technologies, in particular seed investments and venture capital (Econ)		2020-2030: 50 milion € private funds	Multiannual Financial Framework (MFF)
Informed citizens and improve behavioural change to reduce dependence on fossil fuels and favors bio-based alternatives (S)		2020-2030: 5 milion €	Action Plan on financing sustainable growth
Dedicated bioeconomy strategy; Circular economy and Bioeconomy strategies development, integration of bioeconomy aspects in NECAP (P)		2020-2030: 1 milion €	Action Plan on financing sustainable growth
Encouraging development of bioeconomy clusters (P)		2020-2030: 10 milion €	Action Plan on financing sustainable growth

[5] T: Technology; Env: Environment; Econ: Economy; S: Society; P: Policy

6. Potential socio- economic impact of Bulgarian Bioeconomy Action Plan

JOBS	Create 5,000 new jobs in agriculture, forestry, and food processing industry
LEVERAGE INVESTMENTS	Leverage 100 million € private investments within ten years
FOSTER COLLABORATIONS	Cluster creation At least twenty new collaborations between raw material providers and industrial actors
BOOST INNOVATION	Ten new biobased value chains embedded in agriculture, food, and forest industries. Produce ten new patents and IP rights, Support the creation of ten spin-offs and start-ups.

7. Potential environmental impacts of Bulgarian Bioeconomy Action Plan

	Reduce emissions in food industry by 25% Reduce emissions in agriculture by 30%
	Contribute to the sustainable management of natural resources and foster efficient water use. Support a circular and sustainable bioeconomy in Europe.
	Biodiversity
	Local resources for products, energy and fuels