



Mapping of EU Member States' / regions' Research and Innovation plans & Strategies for Smart Specialisation (RIS3) on Bioeconomy

Task 3

Case Study Report Lithuania

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1. Short Regional Bioeconomy Profile

Name of the case region/country	Lithuania
Member State	Lithuania
GDP – Euro per capita (2014)*	12 400
Total ESIF Research & Innovation per capita per year*	48.61
Total H2020 per capita per year*	2.58
Value Chain Approach to the Bioeconomy**	Crop-based primary production; Foods and beverages; Animal-based primary production; Forest-based primary production; Bio-energy and fuel from biomass
Thematic Focus of the Bioeconomy Approach**	Crop Production; Food Processing; Wood-based biomass; Animal Husbandry; Forestry and Wood;
Research and Innovation Fields highlighted for the Bioeconomy**	Quality, Health, Security in Processing; Water Management; Natural Resources and Ecosystem Management; Environmental sciences; Agronomy and crop sciences oenology, etc.; Forestry sciences
Bioeconomy Activity Level**	Middle
CASE STUDY SUMMARY	
Bioeconomy Approach	Priority is to establish the economy in higher added value production and to be more independent of foreign energy sources.
Bioeconomy Ecosystem	Strong cluster in biotechnology, large agriculture sector.
Bioeconomy Policy Support	Weak synergies between FP7 and structural funds, weak national support. Smart specialisation strategy is pivotal for development of the bioeconomy
Successful initiatives and Good Practices	Voucher enables an SME to buy R&I expertise or knowledge from a research institution. Activities to facilitate participation in Horizon 2020
Main Needs, Gaps and Bottlenecks	Weak link between public research and private business, lack of coherent bioeconomy strategy

* Source of the data: S3 – Regional Viewer: <http://s3platform.jrc.ec.europa.eu/synergies-tool>

** Data collected by this Study project in Task 1.

2. Bioeconomy Ecosystem

2.1 Origin of Interest in the Bioeconomy

Lithuania has no specific national bioeconomy strategy but the bioeconomy is currently being pursued within the government's sector policies for agriculture, fishery, forestry, regional development, environment and innovation.

Traditionally, the Lithuania government has supported the bioeconomy mainly within the area of biotechnology, which is one of Lithuania's strongest science sectors. Annual growth rate of the biotech industry during the last decade was about 20 %. In 2013 sales of biotech industry were equal to 1.38 % of GDP (EU average 0.12 %). Furthermore Lithuania has large resources of biomass, both agro-biomass (grain, straw) and forest biomass.

In 2007–2010 the “National Industrial Biotechnology Development Programme” was implemented – and continued/re-launched for the period 2011–2013. The government Agency for Science, Innovation and Technology (MITA) has led the implementation of this programme. Since 2014 biotechnology policies are mainly being addressed as part of Lithuania's Smart Specialization Programme which is linked to the country's “Innovation Development Programme” (2014–2020). The biotechnology programme have emphasized on high-tech industry development within the life-science area but they have also aimed to reduce the country's dependence on imported fossil fuels, and to increase added value in agricultural and forestry products, through e.g. technology development in order to process local biomass resources into bioplastics, second generation biofuels, biopharmaceuticals and animal drugs and other bio-based materials. Activities have also included environmental biotechnology efforts such as pilot and demonstration projects and promotion of infrastructures for commercial use of side and waste products.

2.2 Bioeconomy Stakeholders

Key player in the Lithuanian bioeconomy are Ministry of Agriculture, Ministry of Energy, Ministry of Environment, Ministry of Economy, Ministry of Health, Lithuanian Biotechnology association, Lithuanian Research Council and the Agency for Science, Innovation and Technology. Lithuanian Open R&D Network is also an important stakeholder. This organisation offers open access R&D facilities, equipment, services, and high-level R&D intellectual potential for the creation and development of R&D activities in engineering and information technology, biomedicine and biotechnology, materials science and physical and chemical technologies.

The smart specialization programme was developed by the Ministry of Education and Science and the Ministry of Economy. The Research and the Higher Education Monitoring and Analysis Center (MOSTA) is responsible for the implementation efforts.

The following initiatives and organisations is also worth mentioning:

- Joint Life Science Center of Vilnius University, Kaunas University of Technology.
- Lithuanian Biotechnology Association (LBTA) and Lithuanian Biomass Energy Association (LITBIOMA)
- Private companies: Amilina, Kurana, Mestila.

2.3 Bioeconomy – strategies, plans and projects

In general terms Lithuania has a historical separation of science and industry and the prevailing differences in culture, a lack of productive collaboration between the industry and public research sectors is one of the most challenging issues in the Lithuania's innovation system.

In the 2014–2020 smart specialisation strategy, attention on bioeconomy is realised through the following two priorities;

- Energy and sustainable environment. This priority incorporates; smart systems for energy efficiency, diagnostic, monitoring, metering and management of generators, grids and customers; **energy and fuel production using biomass/waste** and waste treatment, storage and disposal; technology for the development and use of smart low-energy buildings – digital construction; solar energy equipment and technologies for its use for the production of electricity, heat and cooling
- Agricultural innovations and food technologies. This priority incorporates; **sustainable agri-biological resources and safer food; functional food; innovative development, improvement and processing of biological raw materials (bio-refinery)**

The strategic goal of the smart specialisation strategy is to increase the impact of high value added, knowledge-intensive and highly-qualified-labour-intensive economic activities on the GDP and structural changes of the economy by means of the R&I decisions.

The selection of *Energy and sustainable environment* area has been determined by the need to respond to such future challenges and trends as insufficient diversification of energy sources, high energy prices, uneconomical and inefficient use of energy, and lack of ecosystem sustainability. The issues of the country's

energy independence and energy security have been exacerbated by the increased dependence on imported energy upon the closure of the Ignalina Nuclear Power Plant, rapidly rising energy prices.

The *Agricultural innovation and food technologies* area has been selected due to the need to respond to such future challenges and trends as insufficient sustainability of the food chain, insufficient sustainability of the use of biological resources in agriculture and food industry, insufficient safety and quality of food, and lack of efficiency in the development and use of raw food.

The smart specialisation programme includes an action plan for sustainable use of agro-biological resources and safe food. In terms of actions, the smart specialisation programme gives priority to nurturing knowledge-intensive businesses and clusters, and promoting cooperation between research and business to accelerate commercialization of R&D results. Also, the action plan encourages the development of biorefinery plants in Lithuania.

The focus on agriculture innovation is also motivated by the Lithuanian government arguing that Lithuania has an good knowledge base on sustainable food production including; knowledge on agricultural plant and animal genetics and biotechnologies, their growing/farming technologies, crop protection against harmful organisms, rational use of water, balance and migration of nutrients, sustainable use of energy and waste management, the sustainable development of the food and beverage industry, and raw food and foodstuffs safety¹. Furthermore Lithuania has potential for the development of food raw materials and foodstuffs for the country's own needs as well as for export to the European markets. In order to successfully utilise this knowledge, Lithuania needs more innovative SMEs that promote growth and job creation; more investments, innovation in both established and emerging sectors, and collaboration between researchers and experts in various fields in the process of the search for best solutions.

3. Bioeconomy Policy Support

3.1 General support framework

Due to the lack of a specific bioeconomy strategy the main supporting document is the smart specialisation strategy.

¹ Resolution on the approval of the programme in the implementation of the priority areas of research and development and innovation and their priorities, Government of the republic of Lithuania, 2014

In general terms a large part of Lithuania's industries operate in the less profitable parts of the value added chain, i.e. they sell raw materials, assembly services or production capacities, or manufacture low value-added products. The share of high-tech industry remains small – largely due to weak inter-sectoral integration, even though opportunities for this are provided by the introduction of advanced high technologies in traditional industries. The national scientific potential is also considered to be underused by Lithuania's businesses.

Lithuania has set a target to achieve 1.9 % of total GDP to R&I by 2020. In 2012 the value of this indicator was 0.9%. Considerable increase in business investments in R&I is necessary in order to achieve this target as their share is disproportionately small compared with other financing sources (26.6% of total expenditure for R&I) and almost no increase is seen. Expenditure is primarily concentrated in the academic sector. According to Eurostat, in 2011 the business sector expenditure for R&I per capita was EUR 24.1, whereas the EU average is EUR 318.4.

In addition, efficiency of investments in R&I and the value added have to increase. The smart specialisation strategy is proposing that this can be achieved by the active use of the opportunities provided by the synergies with Horizon 2020 and of the advantages provided by integration into the international research structures and collaboration with international partners, along with the optimisation of the R&I system (by creating a legal framework conducive to innovation and by reforming the institutional structure accordingly).

Nevertheless under the conditions of limited human, financial, material and other resources it is unlikely that the growth in the country's innovation potential and sustainable economic growth can be achieved easily since most actors lack a strong scientific potential and capacity of adapting new scientific knowledge for the creation of new technologies. There are indications that there are no sufficiently strong economic entities that understand the benefits of employing new technologies and are able to apply them in such a way that increases competitiveness. Furthermore collaboration between science and business is weak and fragmented in the quest for development of new technologies and formation of new knowledge-intensive enterprises.

More specific, a low innovation capacity of the majority of businesses is hampering the absorption of public support measures². Lithuania does not have a strong track record of innovation, and the private sector does not perceive innovation as critical factor to long-term competitiveness. Export and competitiveness in Lithuania are highly dependent on relatively large traditional sectors. For the time being, the majority of enterprises in these sectors are consumers rather than creators of innovation.

² Stairway to Excellence Country report: Lithuania, EU Commission 2015

In recent years these sectors have also lost their competitive advantages of low labour cost due to aggressive competition in the global business environment, in particular; China, India, Korea and Brazil. Rapid changes in technologies are also putting under pressure both industries which compete through low costs and manufacturers employing new technologies in developed countries. Taking these structural changes into account a transformative innovation strategy becomes even more relevant.

3.2 Bioeconomy Policy Support

ESIF funds are important to implement the smart specialisation strategy. 10.1 % of the total allocations in the Lithuania national ESIF programme (approximately 800 million EUR) are envisaged to stimulate research, technological development and innovation in Lithuania. In particular, the OP contribution is expected to foster commercialisation and knowledge transfer to private business. Furthermore the priorities; supporting the shift towards a low-carbon economy in all sectors (14.5%); environment, sustainable use of natural resources and adaptation to climate change (12.5%); and SMEs' competitiveness and innovation (7.9%) may also fund projects related to development of the bioeconomy sector in Lithuania.

Furthermore the national EAFRD programme mention several actions linked to the bioeconomy:

- Investments in processing of agricultural products, in marketing and/or development
- Investments in development and adaptation of agricultural and forestry infrastructure

The European Commission “Action plan for the European Union Strategy for the Baltic Sea Region” mentions Bioeconomy as one of the main priorities, where marine energy, blue biotechnology and sustainable use of biomass are pivotal topics.

It shall also be noted that the strategy mentioned above is financially neutral and relies on a coordinated approach, synergetic effects and, on a more effective use of existing EU instruments and funds, as well as other existing resources and financial instruments, where the ESI funds are pivotal. However, the actions and projects under the strategy can also be funded by many other financial sources (Horizon 2020, BONUS Joint Baltic Sea Research and Development Programme, the LIFE programme, Education and Culture programmes etc.), as well as national, regional, private sources.

Among the funding sources the Interreg programme for the Baltic Sea is important. This programmes has two priority axis related to Bioeconomy:

- Efficient management of natural resources, targeting at the reduction of pollution of the waters in the Baltic sea region and the strengthening of resource-efficient growth, in particular sustainable production and use of renewable energy, energy efficiency and resource-efficient blue growth. Total ERDF support under this priority is 84 million EUR.
- Capacity for innovation, targeting actions to strengthening the ability of the Baltic Sea region to create and commercialise innovation. It aims at supporting a framework for the generation of innovations building on complementarity in a diverse region in such a way that new, smart combinations of competences and strengths can develop and reach its full potential. Total ERDF support under this priority is 84 million EUR.

3.3 ESIF and H2020 resources for the Bioeconomy

Under the FP7 Lithuania received in total 54.7 million euro. In relation to other countries these funds were allocated to a relatively high degree to coordination and support actions (34.9 %) and SME measures (14.2 %). Collaborative research project was the overall largest instrument (38.7%). By far the largest proportion of FP7 beneficiaries (41.2%) in Lithuania are in the higher education sector. In terms of thematic orientation the sectors received most funds were ICT (27.2%) and Health (17 %), whereas the sectors more related to Bioeconomy were smaller; Energy (14.8 %) Food, agriculture and biotechnology (4.4%). The success rate in the field of energy were higher than the EU average whereas in food, agriculture and biotechnology the success rate was lower.

In general the FP7 and structural fund activities, both under national and ETC programmes, have been all rather separate streams of planning and actions in Lithuania. There is has been a lack of strategy or tactics of creating synergies between the SF/ESIF or FP7 measures. Before 2015 there were no targeted national instruments facilitating synergies between Horizon 2020 and EU structural funds in Lithuania, however recently a number of actions contributing to synergies between the national and international sources have been implemented. Targeted incentives aimed at facilitation of national participation in FP7/Horizon 2020 are now available, for example; the compensation of application preparation and VAT costs and compensation of international partner search and information campaigns in firms and technology centres to stimulate and facilitate participation in Horizon 2020. The Ministry of Education and Science are planning more activities in order to facilitate synergies between ESIF and Horizon 2020 funding, including:

- Co-financing from the national funds to Lithuanian applications selected by the Horizon 2020;

- Funding for projects that were positively evaluated, shortlisted, but not funded under Horizon 2020;
- Funding for parallel labs located in Lithuania and partnering countries.

A number of factors limit Lithuania's participation in the FP7/Horizon 2020 projects and reduces the synergies between the ESIF and national policy instruments and Horizon 2020. Among the key factors are weak links to the European networks and limited international visibility, limited number of strong private R&I performers and the overall low level of absorptive capacities. Furthermore Horizon 2020 projects are considered less attractive for private enterprises because they are perceived as very risky due to low success rate, having high administrative load and being very far away from the market.

4. Successful Initiatives and Good Practices

4.1 Ino-vouchers LT

One of the most successful instrument fostering cooperation between public research institutions and enterprises is Ino-vouchers LT. The pilot innovation vouchers scheme was launched in 2010 and after the confirmed success was upgraded to the Ino-vouchers LT scheme in 2012 (the annual budget is €1.65m). The voucher enables an SME to buy R&I expertise or knowledge from a research institution such as; industrial or applied research; technological development (experimental or development, design and technological works); technical feasibility studies. 1026 ino-vouchers (€4m) were funded over 2010–2014 from both ERDF and national sources. Beneficiary surveys (Visionary Analytics, 2014) highlight high satisfaction and perceived usefulness of this instrument even despite its small value. Apparently, the innovation vouchers instrument has been very successful due to the following conditions:

- Simple administration – no restrictions, no administrative load, fast evaluation according to “first come – first serve” principle, which is very different from the SMEs’ experience with any other ESIF funded instrument. The mode of delivery based on a fixed sum principle, standardized activities and outputs, also creates less administrative cost for the implementing agency, and thus could be mainstreamed for other easy-to-standardize incentives in the next period.
- Meets the high demand for quick experimentation / rapid prototyping / incremental innovations which is not otherwise supported.

4.2 Lowering barriers for participation in Horizon 2020

The Lithuanian Research Council and the Agency for Science, Innovation and Technology have launched a number of initiatives in order to facilitate national participation in Horizon 2020:

- Partial (up to 25 %) compensation of participants contribution to Horizon 2020 projects
- Compensation of application preparation costs (up to 4300 EUR)
- Compensations of VAT expenses
- Compensation if international events costs (researchers travel costs etc.)
- Technical assistance and dissemination of information about Horizon 2020. For instance assistance to researcher to find international partners and proofreading applications.

4.3 Research project co-funded by Horizon 2020 USAGREENCHEM

The Lithuanian company JSC BIOCENTRAS is participating in a research project co-funded by Horizon 2020. The project "US4GREENCHEM" – Combined Ultrasonic and Enzyme treatment of Lignocellulosic Feedstock as Substrate for Sugar Based Biotechnological Applications – aims to design a bio-refinery concept for the complete valorisation of lignocellulosic biomass that is energy- and cost- efficient and based solely on green technologies. The concept combines mechanical pre-treatment of the substrate with the aid of ultrasound to overcome its recalcitrance and disrupt inhibitors with mild CO₂ hemicelluloses degradation and with the enzymatic recovery of sugars and technologies for the valorisation of the by-products released in the process.

<http://www.us4greenchem.eu/>

5. Needs, Gaps and Bottlenecks to Deploy the Bioeconomy

The Ministry of Economy is going to prepare a feasibility study on “Bioeconomy Development in Lithuania” and also investigate opportunities for bilateral Lithuanian–Norwegian cooperation in this area (to be prepared in close collaboration with Norwegian experts). While learning from Norwegian experience, Lithuania intends to evaluate the potential of the bioeconomy in Lithuania, to identify potential areas for bilateral Lithuanian–Norwegian cooperation in bioeconomy and to make recommendation for the development of bioeconomy and the necessity of drafting the bioeconomy strategy in Lithuania.

The weakness of Lithuanian Bioeconomy innovation system tainted with the general weaknesses of the Lithuania innovation system. The main issues are;

- i) general lack of coordination, which results on fragmentation and duplication of funding. Part of the solution is to strengthen the clusters and create incentives for merging them or “killing” the unproductive ones.
- ii) low level of R&I transfer between public research and private business. This weakness origins both form lack of commercially–valuable results in the academy, on the one hand, and low ability to look outside the short term company’s horizon, to identify and exploit external knowledge, on the business side.

Better cooperation between public research and private enterprises is seen as a key focus to promote knowledge transfer. Big investment have been made to build up Technology Transfer Offices, but the involvement of the private enterprises in these projects have been limited. One explanation of the lack of interest from private business were due to large focus in these programmes was allocated towards public research institutions to modernise infrastructure rather than foster collaboration between public research and private enterprises.

Lack of coordination leads to huge fragmentation of instruments, programmes, institutions and infrastructures. A key challenge is thus to reduce fragmentation and improve policy capacities. For example, in the previous programming period, a cluster, a science park and an open access centre all operating in the same R&I sector would compete for funding for delivering similar innovation, promotion and technology transfer services. To ensure synergies, the state should review the currently existing structures, for example, some clusters can become part of the existing science and technology parks. In some cases, science parks could lead the activities of clusters. The strongest organization can become a project leader of “joint project” or “joint initiative”.

The existing target group in Lithuania for the excellence-based competitive R&I measures is rather limited – consisting mainly of the limited number of top-tier research groups and few knowledge-based spin-off companies. Raising the allocations for direct R&I measures without simultaneously dealing with the pipeline creation through capacity building might result in problems with absorption of available funding. The policy mix have previously lacked focus on the proactive incentives to encourage companies, entrepreneurs to become involved in the discovery of opportunities for diversification and innovation. In the 2014–2020 period the policy spotlight has to move from “hard” infrastructure development to absorptive capacity strengthening and acceleration of new ideas pipeline through the innovation support services, such as:

- Mechanisms (e.g. vouchers) to boost experiments and discoveries while encouraging connections among economic agents.
- Industry, technology and market foresights, studies on long term future trends and likely development of technologies that could improve the forward looking capabilities and agility.
- Innovation scouting / brokerage and other “soft” innovation support services aimed at emphasizing the value of innovation and linking the activities of different actors in the innovation system.
- Lack of skilled specialists is an emerging challenge for innovation development in SMEs which needs to be addressed.
- Policy mix has to acknowledge the different maturity of existing and potential innovators: need for diversified and tailor-made instruments.
- Furthermore, within the low value added manufacturing sector there is a large group of potential consumers of innovations that are in need of new technological solutions and can thus contribute to the creation of market for innovations.

6. Information Sources

Literature and Documents:

Action plan for the European Union Strategy for the Baltic Sea Region, European Commission 2015

Bioeconomy Policy, Synopsis of national strategies around the world, German Bioeconomy council, 2015

Operational programme for the European Union fund investment in 2014–2020 (National ERDF programme)

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Rural Development Programme for Lithuania 2014–2020

Smart Specialisation Assessment in Latvia, Pelse, Lescevic 2016

Stairway to Excellence Country report: Lithuania, EU Commission 2015

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State of Play; Bioeconomy strategies and policies in the Baltic Sea Region countries, Nordic council of Ministries February 2016

Relevant websites:

<https://zum.lrv.lt/en/>

<http://www.am.lt/VI/en/VI/index.php>

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<http://www.mosta.lt/en/>

<http://www.us4greenchem.eu/>

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