Evaluation of the socioeconomic impact of the peat industry in Latvia, Lithuania and Estonia

Latvian Peat Association, Estonian Peat Association, and The Association of Growing Media Producers

FINAL REPORT

KPMG Baltics SIA

2025

This report contains 76 pages

Glossary

CIT	Corporate Income Tax
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GVA	Gross Value Added
IPCC	Intergovernmental Panel on Climate Change
KPMG	KPMG Baltics SIA
LIAA	Latvijas Investīciju un attīstības aģentūra
LULUCF	Land Use, Land-Use Change and Forestry
NECP	National Energy and Climate Plan
NGO	Non-Governmental Organization
NRT	Natural Resource Tax
NUTS	Nomenclature of Territorial Units for Statistics
PIT	Personal Income Tax
R&D	Research and Development
RHP	Regeling Handels Potgronden
RPP	Responsibly Produced Peat
TC	Total Contribution
TVA	Total Value Added
US	United States of America
VAT	Value Added Tax

Contents

1 Introduction

KPMG Baltics SIA, on the basis of the contract signed on 30.07.2024, with the Latvian Peat Association (Biedrība Latvijas Kūdras asociācija), Estonian Peat Association (MTÜ Eesti Turbaliit), and The Association of Growing Media Producers (Durpių įmonių asociacija „Lietuviškos durpės") (hereinafter referred to as the "Clients") has completed an **evaluation of the socioeconomic impact of the peat industry in Latvia, Lithuania and Estonia** (hereinafter referred to as the "Contract")**.**

The purpose of the evaluation is to build understanding about how the peat industry influences socioeconomic landscape of Latvia, Estonia and Lithuania. It is achieved by identifying what qualitative and quantitative socioeconomic indicators characterize the peat industry, which socioeconomic indicators are possible to estimate based on data availability, and what evidence shows the estimated socioeconomic impact of peat industry in Latvia, Estonia and Lithuania.

The expected result of the evaluation is to comprehensively understand how the peat industry influences the socioeconomic landscapes of Latvia, Estonia and Lithuania by identifying and analysing both quantitative and qualitative socioeconomic indicators, determining which indicators can be estimated based on data availability, and estimating the overall socioeconomic impact of the peat industry.

The report is based on information provided by the Clients, information from surveys of companies and publicly available information. The work has been carried out in accordance with the proposal prepared by KPMG and the instructions of the responsible representatives of the Clients.

The Clients shall have the right to handle the report as provided for in the Contract with the Contractor. If third parties choose to rely on this report, the Contractor shall have no obligation or liability to them.

The procedures performed in preparing this report do not constitute an audit or attestation as required by the International Federation of Accountants' International Standards on Auditing or other auditing guidelines in Latvia.

KPMG thanks the Clients and peat industry companies in Latvia, Estonia and Lithuania for the constructive cooperation during the evaluation.

Executive summary – Latvia

€126.2m
The peat industry's gross value added (GVA) in Latvia for 2023

€221.3m
The peat industry's total contribution in Latvia for 2023

5 171
Estimated number of jobs created by the peat industry directly in Latvia for 2023

19.1%
Latvia's share of global peat export quantity, 2019-2023 average

Latvia's peat reserves contain an estimated 1.7 billion tons of peat and peat is being extracted from an area of approximately 25.5 thousand hectares.

As of 2023, 62 companies had active licences for peat extraction in Latvia and the industry saw a total turnover of €277 million. Latvia is the world's leading exporter of peat by quantity, contributing to 19.1% of global export quantity on average from 2019 to 2023.

The peat industry's gross value added (GVA) in Latvia for 2023 was estimated at €126 215 649 – approximately 0.37% of Latvia's 2023 total GVA. Value added per employee in the peat industry was €54.2 thousand and the value added per company was €2.7 million, both significantly higher than the national averages of €38.7 thousand and €0.2 million, respectively.

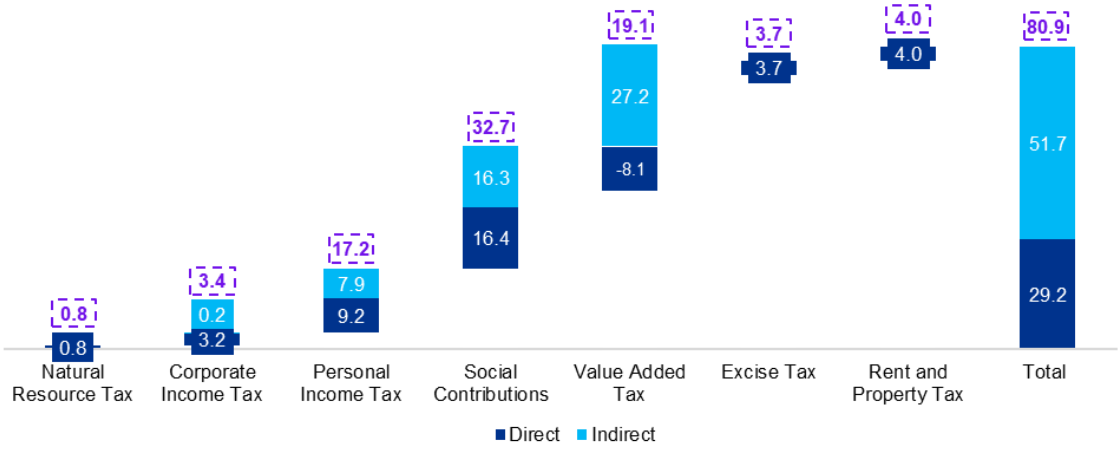
The peat industry's total contribution (includes industry GVA and related company GVA, the related sector taxes, and related consumption) in Latvia for 2023 was estimated as €221 317 643 – approximately 0.65% of Latvia's 2023 total GVA.

The peat industry creates an estimated 2 327 jobs directly in Latvia, as well as additional 2 844 jobs indirectly in Latvia and internationally, totalling 5 171 jobs created as of 2023.

The peat industry significantly contributes to related industry development, with an estimated amount spent on related industries in 2023 of at least €111.3 million in Latvia and €46.1 million internationally.

Key economic activity leads to an estimated total contribution of tax indicators associated with the peat industry of €80.9 million in 2023.

Estimated direct and indirect tax contributions associated with the peat industry in Latvia, M EUR (2023)



Executive summary – Estonia

€53.3m
The peat industry's gross value added (GVA) in Estonia for 2023

€81.2m
The peat industry's total contribution in Estonia for 2023

2 284
Estimated number of jobs created by the peat industry directly in Estonia for 2023

12.4%
Estonia's share of global peat export quantity, 2019-2023 average

Estonia's peat reserves are estimated at 2.37 billion tonnes, where 0.65 million tonnes are classified as passive deposits and 1.8 billion tonnes as active deposits. The licensed area for peat extraction is about 21.3 thousand hectares.

As of 2024, 34 companies had active licences for peat extraction in Estonia and the industry saw a total turnover of €149 million in 2023. Estonia is among the world's leading exporters of peat by quantity, contributing to 12.4% of global export quantity on average from 2019 to 2023.

The peat industry's GVA in Estonia for 2023 was estimated at €53 338 263 – approximately 0.16% of Estonia's 2023 total GVA. Value added per employee in the peat industry was €61.8 thousand and the value added per company was €2.0 million, both significantly higher than the national averages of €48.1 thousand and €0.2 million, respectively.

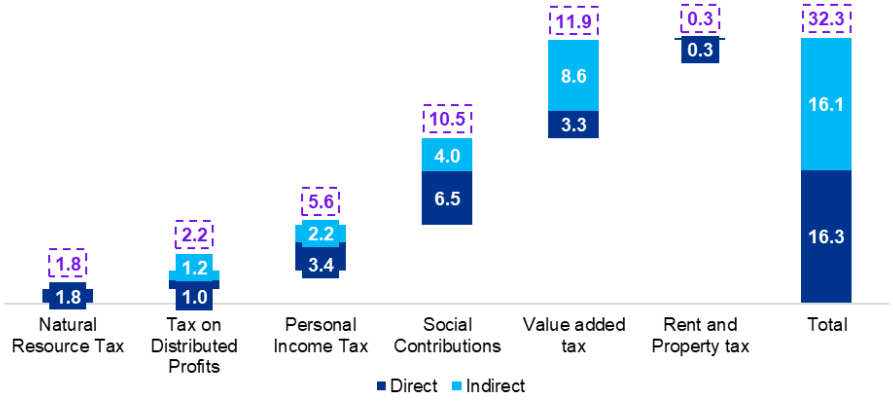
The peat industry's total contribution (includes industry GVA and related company GVA, the related sector taxes, and related consumption) in Estonia for 2023 was estimated as €86 352 612 – approximately 0.27% of Estonia's 2023 total GVA.

The peat industry creates an estimated 1 325 jobs directly in Estonia, as well as additional 960 jobs indirectly in Estonia and internationally, totalling 2 284 jobs created as of 2023.

The peat industry significantly contributes to related industry development, with an estimated amount spent on related industries in 2023 of at least €43.1 million in Estonia and €15.2 million internationally.

Key economic activity leads to an estimated total contribution of tax indicators associated with the peat industry of €32.3 million in 2023.

Estimated direct and indirect tax contributions associated with the peat industry in Estonia, M EUR (2023)



Executive summary – Lithuania

€22.2m
The peat industry's gross value added (GVA) in Lithuania for 2023

€53.2m
The peat industry's total contribution in Lithuania for 2023

2 025
Estimated number of jobs created by the peat industry directly in Lithuania for 2023

8.7%
Lithuania's share of global peat export quantity, 2019-2023 average

In Lithuania, remaining geological reserves of detailed surveyed peat deposits in 2023 were 1.184 billion m³, however, official data are not converted into tons. The area, which is allocated to peat industry use is about 13 thousand hectares.

As of 2024, 35 companies had active licences for peat extraction in Lithuania and the industry saw a total turnover of €108 million. Lithuania is among the world's leading exporters of peat by quantity, contributing to 8.7% of global export quantity on average from 2019 to 2023.

The peat industry's GVA in Lithuania for 2023 was estimated at €22 228 809 – approximately 0.03% of Lithuania's 2023 total GVA. Value added per company was €1.1 million, significantly higher than the national average of €0.2 million.

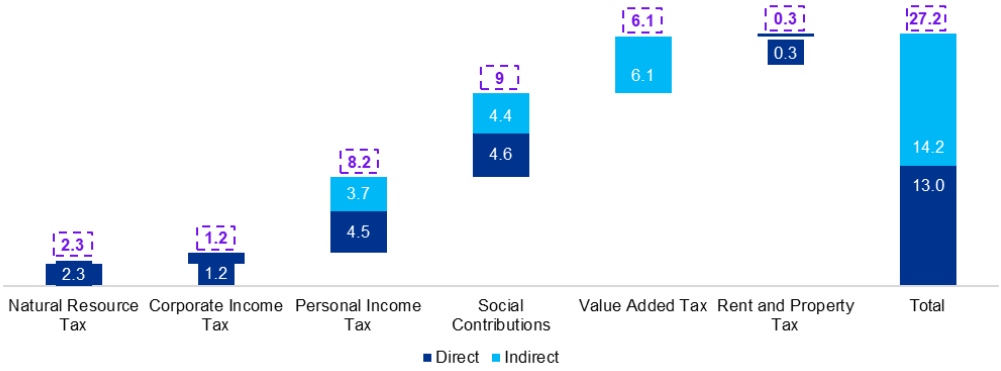
The peat industry's total contribution (includes industry GVA and related company GVA, the related sector taxes, and related consumption) in Lithuania for 2023 was estimated as €53 248 471 – approximately 0.08% of Lithuania's 2023 total GVA.

The peat industry creates an estimated 1 051 jobs directly in Lithuania, as well as additional 970 jobs indirectly in Lithuania and internationally, totalling 2 021 jobs created as of 2023.

The peat industry significantly contributes to related industry development, with an estimated amount spent on related industries in 2023 of at least €29.3 million in Lithuania and €3.5 million internationally.

Key economic activity leads to an estimated total contribution of tax indicators associated with the peat industry of €27.2 million in 2023.

Estimated direct and indirect tax contributions associated with the peat industry in Lithuania, M EUR (2023)

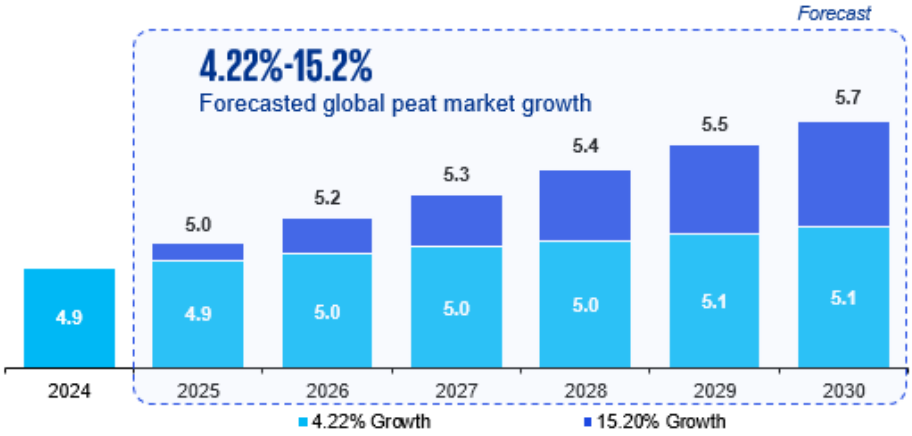


1.1 Global peat market forecasts

The global market of peat products is estimated at EUR 5 billion in 2024[1] (Figure 1). In recent years, growth rates have not been as rapid as in the past, influenced by both the Covid-19 pandemic and the Russian-led war in Ukraine. These events had a significant impact on the global peat market, disrupting traditional supply chains and the availability of raw materials, leading to price increases. The Covid-19 pandemic also affected the global end-product market, leading to a global decrease in demand in several sectors, including several agricultural sectors.

Despite the negative geopolitical trends, the global market of peat products is projected to grow at an average annual rate of 4.22% to 15.2%[2] until 2030 (Figure 1). Market forecasts vary due to the assumptions made and the quality of the data available, but all forecasts unanimously point to expected market growth.

Figure 1. Global peat market (raw peat and peat products) size (BN EUR)[3]



Despite the geopolitical uncertainty, some studies have predicted the global horticultural peat market growth beyond 2030. An expected market increase for peat until 2050 is twofold, to a total of 80 Mm^3y^{-1}. [4]

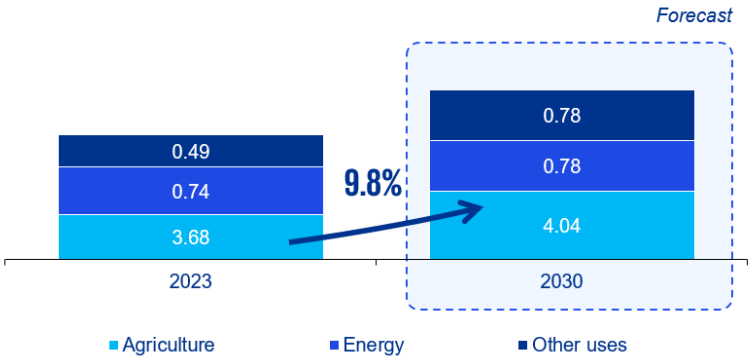
1.1.1 Global peat market growth by type of use

Agriculture currently accounts for around 75% of all peat extracted globally, with its primary use in growing media for crops and horticultural applications (Figure 2). This percentage is expected to remain stable as the global demand for peat-based growing media rises, driven by the expansion of agricultural and horticultural activities. Peat is favoured for its excellent water retention, nutrient-holding capacity, and soil-structure

[1] KPMG analysis, using data from Maximize Market Research – Peat Market Size, Market Research Future – Peat Market Size, Market Reports World – Peat Market Size,. Medium – Peat Market Size, Global Market Estimates – Peat Market Size
[2] Ibid.
[3] Ibid.
[4] block.rotterdam.2018.pdf

improvements, which make it indispensable in modern farming practices, especially in seedling production and greenhouse cultivation. In regions like China and Europe, peat remains a critical resource in agriculture, and its demand continues to grow with the increasing need for sustainable crop production systems [5,6].

Figure 2. Global peat market growth, by type of use (2023-2030), BN EUR[7]



Globally, the usage of peat for energy purposes is predicted to decrease in market share, given the high GHG emissions associated with peat combustion (Figure 2)[8]. Recently, peat has gained importance as a strategic resource to have reserve stocks for energy security, such as in Finland.[9] In the Baltic States, almost no peat is being used for energy supply, and the national policies[10,11,12,13] that are currently in force does not describe that there would be any use for energy purposes.

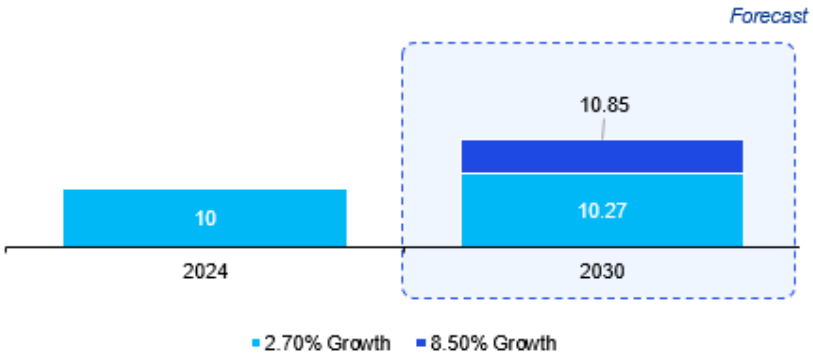
Around a tenth of the global peat market is driven by various other peat products, where the potential for research and innovation is high, however significant R&D investment is needed (Figure 2). This market share is forecast to grow more slowly than agriculture, reaching EUR 0.78 billion in 2030[14]. The global market is made up of very diverse and specific sub-sectors, such as medical, industrial, etc.

[5] Peat Market: Global Industry Analysis and Forecast (maximizemarketresearch.com)
[6] Peat Market Analysis by Relevant Business Segment & Application (htfmarketintelligence.com)
[7] KPMG analysis, using data from Maximize Market Research – Peat Market Size, Market Research Future – Peat Market Size, Market Reports World – Peat Market Size,. Medium – Peat Market Size, Global Market Estimates – Peat Market Size
[8] Ibid.
[9] Security of energy supply - Ministry of Economic Affairs and Employment
[10] Par Taisnīgas pārkārtošanās teritoriālo plānu (likumi.lv)
[11] National Energy and Climate Plan | Ministry of Climate (kliimaministeerium.ee)
[12] Nacionalinė energetikos strategija (lrs.lt)
[13] National Energy And Climate Action Plan Of The Republic Of Lithuania For 2021-2030
[14] KPMG analysis, using data from Maximize Market Research – Peat Market Size, Market Research Future – Peat Market Size, Market Reports World – Peat Market Size,. Medium – Peat Market Size, Global Market Estimates – Peat Market Size

1.1.2 Key drivers for global peat product demand in agriculture and food production

The agriculture sector accounts for a significant share of the global market of peat products, where peat is used for soil improvement and as an essential raw material for growing media. According to the Food and Agriculture Organisation of the United Nations, the global market for organic agriculture grew by 12.8% between 2020 and 2022[15]. This growth has been fuelled by the increasing demand for organic food products, which in turn is driving demand for peat as a substrate. Market reports indicate that the global market for growing media will grow from EUR 10 billion in 2024 to EUR 10.27 billion or even EUR 10.85 billion in 2030, growing at an average annual rate of 2.7% to 8.5% (Figure 3)[16].

Figure 3. Global Growing Media market growth, BN EUR[17]



The global growing media market growth is driven by following causes:

— Growing demand for food products due to growing world population. Peat-based growing media is widely used in agriculture and horticulture to improve crop yield and quality, making them crucial for meeting the rising demand for fresh produce [18,19].
— Increase in the availability of information on the benefits of using growing media, such as yield and quality of seedlings [20,21].
— Technological growth, which is driving the development of new growing media products and technologies [22,23].

The global food market is expected to grow significantly in the next years (Figure 4), driven by rising population demands and the need for sustainable food production methods. This growth creates a critical role for substrates, particularly in soilless

[15] The World of Organic Agriculture - Statistics and Emerging Trends 2024 (fibl.org)
[16] KPMG analysis, using data from Maximize Market Research – Peat Market Size, Market Research Future – Peat Market Size, Market Reports World – Peat Market Size,. Medium – Peat Market Size, Global Market Estimates – Peat Market Size
[17] Ibid.
[18] Growing media for food and quality of life in the period 2020-2050
[19] Peat Market 2024-2032 | Size, Share, Growth (markwideresearch.com)
[20] Current and Future State of the Growing Media Industry - Greenhouse Grower
[21] Infographic: Peat, growing media and sustainability (jiffygroup.com)
[22] Current and Future State of the Growing Media Industry - Greenhouse Grower
[23] The use of peat in growing media - BVB Substrates (bvb-substrates.com)

agriculture and controlled environments, which will be essential to meeting future food demands. As global food production systems seek to increase efficiency, substrates like peat, coir, and other growing media will continue to support advancements in crop yields, particularly in vertical farming and aquaculture [24,25,26].

Figure 4. Forecasted growth of various global food markets [27,28,29,30]

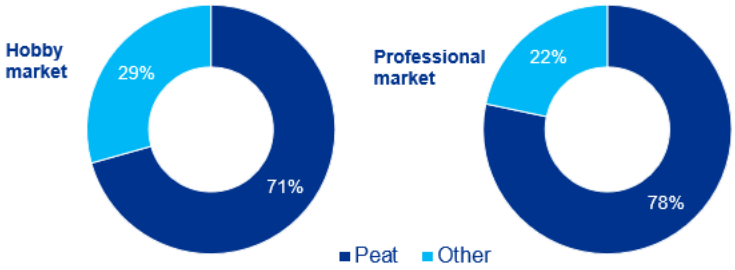
Vertical farming, a rapidly growing sector heavily reliant on peat substrates and hydroponic systems, is also experiencing robust expansion. This innovative farming method, which enables year-round crop production with reduced land and water use, is expected to grow at an annual rate of 24.6%, potentially reaching a market value of EUR 12.2 billion by 2026. The use of advanced technologies like artificial intelligence in vertical farms further contributes to its efficiency and scalability [31,32,33].

1.1.3 Proportion of peat in growing media

Peat-based growing media is the largest market segment, accounting for more than 71% of the total European hobby market and 78% of the total European professional market (Figure 5). This dominance is expected to remain stable through 2030 due to peat's unmatched properties in water retention and nutrient support, making it highly effective for plant growth. Despite efforts to find sustainable alternatives, such as coir or wood-based materials, peat continues to be widely used in both professional horticulture and retail sectors due to its superior performance and availability [34,35].

[24] Agricultural and food markets: Trends and prospects | OECD-FAO Agricultural Outlook 2021-2030 | OECD iLibrary (oecd-ilibrary.org)
[25] The Future of Food at a Pivotal Moment | Morgan Stanley
[26] Economic analysis of supply and demand for food up to 2030 – Special focus on fish and fishery (fao.org)
[27] Mordor Market Research – Global Berry Market
[28] Mordor Intelligence – Global Tomato Seed Market
[29] Research and Markets – Global Cucumber Market
[30] Grand View research– Global Paprika Market
[31] Vertical Farming: The Only Way Is Up? (mdpi.com)
[32] Vertical Farming: The Future of Agriculture? - CENGN
[33] Vertical Farming Takes Food Production to Greater Heights (global-imi.com)
[34] Peat Market - Sales Analysis & Share | Forecast Upto 2030 | IMR (introspectivemarketresearch.com)
[35] Peat Market Analysis by Relevant Business Segment & Application (htfmarketintelligence.com)

Figure 5. Average proportion of peat in substrates, Europe [36]



The most popular peat alternatives are[37,38,39,40,41,42, 43,44, 45, 46]:

- Coconut Coir: Known as coconut fibre, it has properties similar to peat, making it widely used. It is biodegradable and non-toxic, but high sodium and chlorine levels can harm plants. It can be mitigated by washing, which is water intensive (5 kg of dried coconut coir requires 20 litres of water and 5 cycles of fresh water). Sourced mainly from Southeast Asia, it involves high transport costs and emissions, and poses biological contamination risks due to differing climates. Additionally, production of coir products for growing media is connected to a range of social issues (notably, child labour) in Asia.
- Wood Fiber and Bark: A byproduct of the wood industry, often locally sourced. It retains air and nutrients well, suitable for plants preferring acidic environments due to its low pH. However, it has poor drainage and can retain too much water, so it should be mixed with other substrates. As for a byproduct, its physical, biological, and chemical properties tend to vary. Although researched, further development is pending.
- Compost: Made from decomposed organic waste, rich in nutrients but with high pH. Quality can vary due to diverse compostable materials. It has good drainage and can be home-produced, but should not exceed 40% of the substrate mix. Yet, composts are relatively unreliable, as they often either contain pathogens, are not stable, or have high water or nutrients content, which is not suitable for professional use.
- Perlite: A volcanic glass that becomes porous when heated, sterile and suitable for seed germination. It can develop algae in hydroponic systems and should be mixed with other products. Perlite production is energy-intensive from mining to its expansion.
- Rock Wool: Made from basalt and limestone, it absorbs water well and is used for seed germination and rooting, yet its production is energy-intensive. It has a high pH

[36] Peat replacement in horticultural growing media: Availability of bio-based alternative materials (econstor.eu)
[37] Thakulla et. al. (2021) Soilless Growing Mediums
[38] Hirschler & Thrän (2023)
[39] Coir.com. (n.d.). Peat Moss Substitutes.
[40] PRYCE, S. (1991). Alternatives to peat. Professional Horticulture, 5(3), 101–106.
[41] Waste & Resources Action Programme (WRAP). (n.d.). Replacements for peat in horticulture
[42] Gruda, N. S. (2019). Increasing Sustainability of Growing Media Constituents and Stand-Alone Substrates in Soilless Culture Systems.
[43] 091102 Mineral wool
[44] How Perlite is Made: From Mining to Distribution - Supreme Perlite Company
[45] Intercontinental movement of soil with plants for planting
[46] Cleaning cocopeat for production of potato rooted apical cutting

that needs adjusting before use. While not biodegradable, it can be reused for 3-4 years and recycled with construction rock wool. Overall, mineral wool has the highest negative impacts on human health, and freight costs are relatively high.

- Soil: Can replace peat depending on its composition and properties, providing a natural growth environment with varying water absorption, aeration, and nutrient availability. Mixing different soil types can achieve desired physical properties for specific plant needs. Yet, the use of soil poses phytosanitary risks, which, combined with the relatively high weight of soils have notable implications on export.

It is important to note that the introduction of peat substitute products into the market must occur gradually, accompanied by extensive testing to ensure that the growing substrates can provide the necessary properties for plants and seedlings. A too-rapid phase-out of peat usage could create conditions where it is impossible to fully replicate the growing conditions provided by peat, potentially reducing plant productivity or survival rates.[47]

1.1.4 Political considerations

Overall, there is a continuing debate in Europe regarding the sustainability of peat. Peat forms over thousands of years from partially decomposed organic material in waterlogged environments, leading to its slow regeneration. Yet still, the classification of peat is under discussion[48,49,50]. This debate has implications for EU policies, particularly in the context of reducing carbon emissions and achieving energy transitions under the Green Deal[51]. Currently, in all 3 Baltic States – Latvia[52], Lithuania[53], and Estonia[54] -, peat is classified alongside other non-renewable or mineral assets in subterranean depths.

On the other hand, the peat industry can play a significant role in achieving the European Union's strategic goals as outlined in the European Green Deal, particularly the Farm to Fork and EU Forest strategies. Farm to Fork Strategy[55] aims to ensure the production of healthy, affordable, and sustainable food while reducing the use of pesticides. Peat-based products, used extensively in agriculture as growing media, are essential in sustainable food production systems, especially in controlled environments like greenhouses. By enhancing crop yields and reducing the need for chemical fertilizers and pesticides, peat substrates support sustainable agriculture and contribute to overall food security[56,57].

[47] HTA | New evidence shows Defra proposals for an early peat ban will have negative environmental and economic impacts
[48] Harvesting peat moss contributes to climate change, Oregon State scientist says | Newsroom | Oregon State University
[49] WER_2013_6_Peat.pdf
[50] Characteristics of Peat Biomass as an Alternative Energy and Its Impact on the Environment | Request PDF
[51] The European Green Deal - European Commission (europa.eu)
[52] Likums "Par zemes dzīlēm". https://likumi.lv/ta/id/40249
[53] https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.19879?jfwid=-rl2j69408
[54] Earth's Crust Act–Riigi Teataja
[55] Farm to Fork Strategy - European Commission (europa.eu)
[56] Reduction and replacement of peat in substrates (hortidaily.com)
[57] Peat Substitution in Horticulture: Interviews with German Growing Media Producers on the Transformation of the Resource Base (mdpi.com)

Halting further drainage of peatlands will protect biodiversity and maintain carbon absorption. Restoring these areas by rewetting them and reintroducing peat-forming plants will rebuild carbon reserves, lower emissions, and support long-term biodiversity recovery[58], while afforestation of peatlands directly supports reaching the goals of the EU Forest Strategy[59], as peatlands that have been restored or repurposed for afforestation contribute to carbon capture and forest protection. Moreover, peat-based growing media are crucial in the early stages of forest development, particularly in seedling nurseries, where the qualities of peat enhance seed germination and tree growth [60,61].

[58] Guiding peatland restoration for climate and biodiversity action | The Convention on Wetlands, The Convention on Wetlands
[59] Forest strategy - European Commission (europa.eu)
[60] Peat alternatives: 11 peat substitutes - Plantura
[61] Peat substitutes from renewable resources and landscape conservation materials | International Society for Horticultural Science (ishs.org)

2 Interactions between the peat industry and socioeconomic landscapes

2.1 Peat value chain and use in different industries

The peat value chain (Figure 6) illustrates main activities of peat industry companies which further impact the socioeconomic landscape trough both upstream and downstream activities, which generate employment, supports related industries, and enhances regional and national economies. By involving technology acquisition, peatland management, and production processes, peat industry stimulates sectors like manufacturing, logistics, and agriculture. The value chain's integration with global markets boosts trade balance and economic growth, while fostering sustainable practices and community well-being through public and private sector collaboration.

Figure 6. Peat value chain

Notes: This is a generalized value chain where each step is listed once, thus it is not linear (the sequence of steps can vary), and steps may repeat multiple times or not exist at all.
Source: KPMG analysis, based on Paoli, I., Feofilovs, M., Kamenders, A., & Romagnoli, F. (2022). Peat production for horticultural use in the Latvian context: sustainability assessment through LCA modeling

Peat value chain has impact on both upstream and downstream activities.

Upstream activities

The upstream activities are more than just peat extraction, as the first activities of peat extraction begin with preparing the necessary documentation, acquiring the technologies necessary, and procuring the suppliers. Equally as important is peatland management throughout all stages of peat value chain, as it must be prepared for extraction, properly managed through extraction and reclamation. During extraction, the peat is extracted from the field and dried, if applicable. Transport to further production could also be considered an upstream activity.[62]

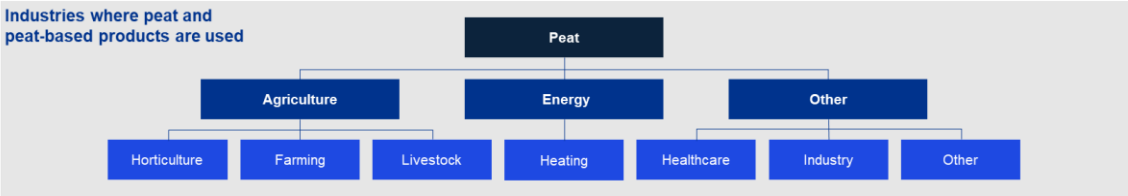
[62] Paoli, I., Feofilovs, M., Kamenders, A., & Romagnoli, F. (2022). Peat production for horticultural use in the Latvian context: sustainability assessment through LCA modeling

Downstream activities

Beyond selling the peat directly from the field, there are different parts of the value chain that comprise the downstream activities in the peat value chain. At the production stage, different substrates are produced and then packaged, marked and distributed to the users.[63]

At all parts of the value chain, there are different involved parties and service providers, and they represent both public and private sector.

Figure 7. Industries which use peat and peat-based products



Sources: KPMG analysis, HV.pdf, PowerPoint Presentation, Other uses - International Peatland Society

In horticulture, peat is valued for its ability to enhance soil structure, retain up to 20 times its weight in water, and reduce nutrient leaching, which are crucial for successful crop production. It improves drainage in heavy soils, aerates roots, and stabilizes pH levels, furthermore, its cation exchange capacity allows to retain and gradually release minerals.[64] Due to its traits, peat is suitable for adapting to needs of different kinds of plants, enabling a controlled growing environment.[65] Peat is still the main component in the professional substrate market. In farming, peat is mostly used for improving the soil – as fertilizer, soil improver or for enhancing the organic matter.[66]

In some countries, for example, Finland[67], peat is relied upon as a backup heating source due to the high cost and limited availability of alternatives like gas, electricity, coal, or wood in off-grid areas. Poorly insulated homes and harsh winters exacerbate the need for reliable heating, while the cost of upgrading to modern systems is prohibitive for many. Additionally, the Finnish government has recognized peat as a part of its energy supply diversification, maintaining strategic reserves for energy supply.[68]

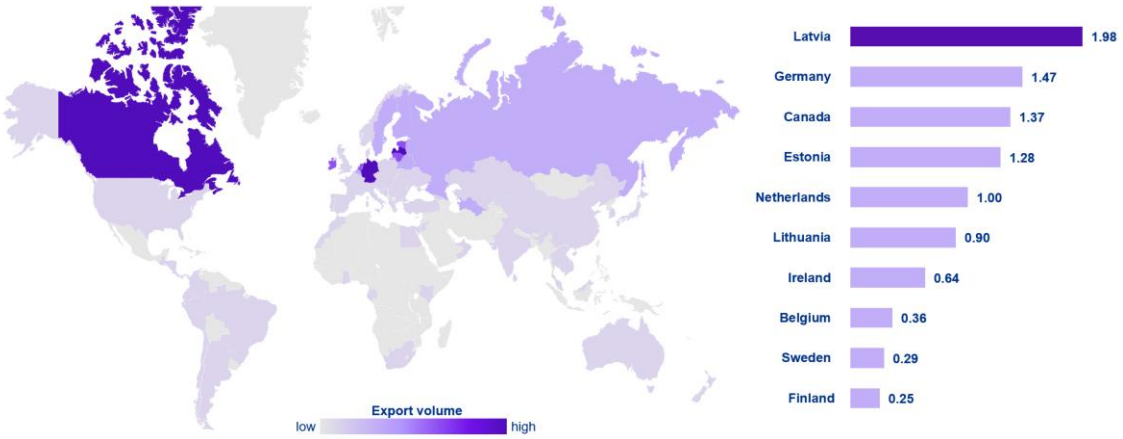
Peat is also used in textiles (e.g., cotton grass fibres, paper), as a building and insulation material for canals, homes, and stables, and in balneology, therapy, and medicine (e.g., baths, cosmetics)[69] or as an important flavour enhancer for whisky production.[70]

[63] Paoli, I., Feofilovs, M., Kamenders, A., & Romagnoli, F. (2022). Peat production for horticultural use in the Latvian context: sustainability assessment through LCA modeling
[64] Peat for horticulture - International Peatland Society
[65] PowerPoint Presentation
[66] Why are we worried about Peat?, Interreg VB North Sea Region Programme
[67] District_heating_in_Finland_2023.pdf
[68] Security of energy supply - Ministry of Economic Affairs and Employment
[69] Other uses - International Peatland Society
[70] 7. Impact on people using peat for fuel and on island communities - Ending the sale of peat: consultation analysis - gov.scot

2.2 Overview of peat industry's role in international supply chain

Based on data about peat export volumes from 2019 to 2023, we conclude that Latvia has been the world's largest exporter by volume (millions of tonnes), with Estonia being fourth largest exporter, and Lithuania being the sixth largest exporter worldwide. The ten largest peat-exporting countries account for over 90% of total world peat exports (Figure 8).

Figure 8. Average amount of peat exported, Millions of tonnes (2019-2023) [71]

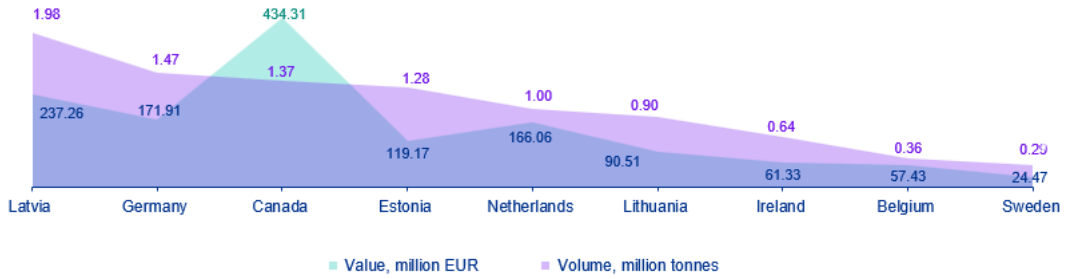


Notes: 1. Export data may exceed the amount of peat extracted in the respective countries, as extraction figures are based on raw peat with a 40% moisture content. In contrast, exported peat products often have higher moisture levels and include additives, which can increase their total weight; 2. Only years where a country was an exporter (only non-zero export amounts) are included in the calculation.

Despite Latvia being the largest peat exporter by volume, exporting an average of 1.98 million tonnes of peat per year, similarly to Estonia and Lithuania it lags behind Canada in the value of exported peat products (Figure 9). This is due to both the different peat products exported (raw peat or peat substrates) and the main export markets (e.g. Canada mainly exports to the US market, which is characterised by higher prices), both of which have a direct impact on export prices [72]. The average value per tonne of peat exported (listed under HS code 270300 for export: Peat, incl. peat litter, whether or not agglomerated", which includes raw peat, processed peat, and substrates) for Latvia is EUR 119.59, for Lithuania EUR 100.45 and for Estonia EUR 92.88. The prices indicate that out of the Baltic countries Latvia is exporting peat products with the most added-value, while Estonia is exporting peat products with slightly lower added-value[73]. It can be explained by 58% of all peat extracted in Estonia being attributable to the Northern and Western NUTS regions, both of which include the majority of Estonia's sea ports, therefore improving the accessibility for raw peat export via maritime transport.

[71] Trade statistics | ITC (intracen.org) and KPMG analysis
[72] KPMG analysis
[73] Trade statistics | ITC (intracen.org) and KPMG analysis

Figure 9. Comparison of average export volumes and values (2019-2023)[74]



An analysis of peat imports from 2019 to 2023 shows that the US and several European countries are the largest importers of peat products. Together, the top 11 largest importing countries account for 73% of global imports of peat products (Figure 10) [75]. The biggest importers of peat are primarily located in Western Europe. Peat is imported by both non-peat producing countries (e.g. the Netherlands, France) and peat producing countries (Germany, Poland, Canada, Lithuania) (Figure 10).

Figure 10. Average amount of peat imported, millions of tonnes (2019-2023) and share of imports from Latvia, Lithuania and Estonia[76]

	Average import volume 2019-2023, million tonnes	Share of imports from Latvia	Share of imports from Lithuania	Share of imports from Estonia
Top 11	Netherlands 1.69	11% (Top 4)	8% (Top 5)	14% (Top 3)
	United States of America 1.36	2% (Top 2)	>1% (Top 5)	>1% (Top 4)
	Germany 0.95	31% (Top 1)	19% (Top 3)	13% (Top 4)
	France 0.60	5% (Top 5)	2%	10% (Top 4)
	Italy 0.56	36% (Top 2)	5% (Top 4)	3% (Top 5)
	Belgium 0.54	19% (Top 3)	>1%	20% (Top 2)
	United Kingdom 0.51	10% (Top 3)	1%	1%
	Poland 0.39	27% (Top 1)	26% (Top 2)	3%
	China 0.37	50% (Top 1)	9% (Top 3)	29% (Top 2)
	Canada 0.33	1% (Top 5)	0%	0%
	Lithuania 0.19	48% (Top 1)	-	5% (Top 4)

Makes up ~73% of the total volume of world peat imports

Peat and peat products are in demand worldwide and market trends show that demand will continue to increase, driven by a growing demand for horticultural products, in particular fruit and vegetables. Europe and North America are expected to continue to account for the largest market share (more than 50%) [77], in line with historical trends (Figure 10), but China and other Asian countries are also expected to play an increasing role. The Asian region is likely to experience significant growth due to increasing

[74] Trade statistics | ITC (intracen.org) and KPMG analysis
[75] Ibid.
[76] Ibid.
[77] Peat Market Size, Share and Forecast to 2026 (straitsresearch.com)

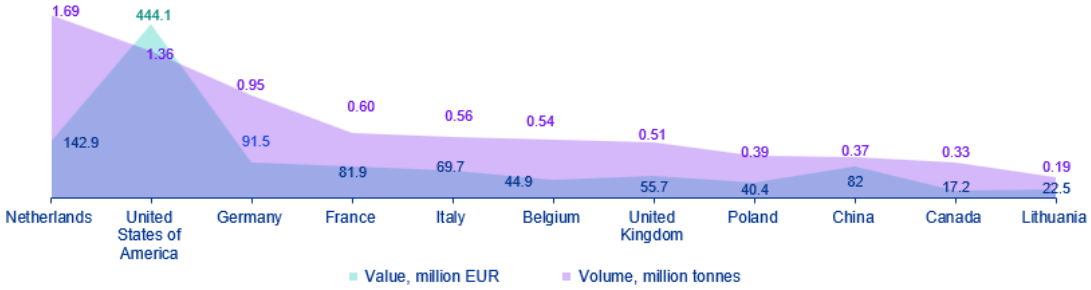
population and demand for food products. Chinese demand is also expected to grow, thanks to the spread of modern agricultural practices [78,79], with Latvia currently supplying on average 50% of China's peat imports and, combined with Estonia's 29% share and Lithuania's 9% share, the Baltic states supplying 88% of China's peat imports.

The Netherlands is the largest peat importer globally, with an average volume of 1.69 million tons, and there is a consensus on the importance of peat in the professional market[80]. The country relies heavily on imports from Latvia (supplying 11% on average) and Estonia (supplying 14% on average). Germany imports a significant share from Latvia (supplying 31% on average), which is its top supplier, as well as Lithuania at 19%, and a ban on new peat mining licenses could further boost imports [81]. Italy also has a strong import relationship with Latvia, receiving 36% on average of their peat supplies. Poland is heavily reliant on imports from Latvia and Lithuania at 27% and 26%, respectively (top 2 largest import suppliers). Belgium supplies a combined 39% from Latvian and Estonian imports. United States rely on peat imports from Canada, with demand expected to remain stable or increase [82] with additional imports from other countries such as Latvia (supplying 2% on average). Notably, many of the Baltic peat producing companies are parts of larger groups which are based in the biggest export destinations, e.g. Klasmann-Deilmann (Germany), Jiffy Group (Netherlands), Van der Knaap (only in Estonia, Netherlands).

When analysing both import volumes and values (Figure 11), significant differences are evident in the import data for the Netherlands and the US, with the Netherlands importing a significantly higher volume of peat products with a lower value, while the trend is reversed in the US. This can be explained by the difference in import products, as the Netherlands mainly imports raw peat, which is further processed and turned into peat substrates, while the USA imports finished products [83].

[78] Peat Market Forecast to Reach $27 Billion by 2033 (evolvebi.com)
[79] Global Peat Market Analysis | Size & Forecasts (globalmarketestimates.com)
[80] 'Reducing substrates' environmental footprint goes step by step'
[81] Climate Action Plan 2050: Principles and Goals of the German Government's Climate Policy
[82] U.S. Geological Survey, Mineral Commodity Summaries, January 2023
[83] KPMG analysis

Figure 11. Comparison of average import volumes and values (2019-2023)[84]



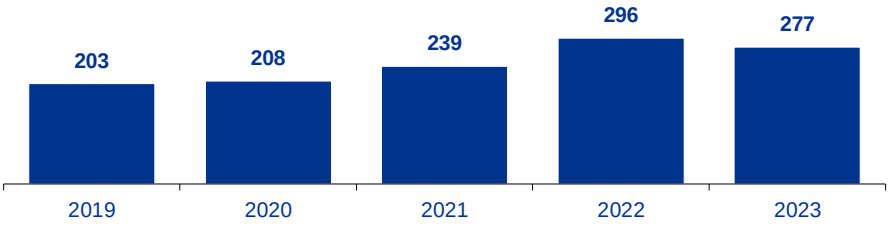
2.3 Overview of peat industry's role in national and regional level

2.3.1 Latvia

Latvia's peat industry plays a significant role in the national economy and natural resource management. The country has vast peat reserves, with approximately 0.65 million hectares, covering almost 10% of the country[85]. The peat reserves contain an estimated 1.7 billion tons of peat[86]. Peat is being extracted from an area of approximately 25.5 thousand hectares[87].

As of 2023, 62 companies had active licences for peat extraction in Latvia[88]. On average around 1 800 people are employed in the peat industry annually, however during extraction season that rises to 2 500[89]. In 2023, the peat industry in Latvia saw a total turnover of 277 million EUR (Figure 12).

Figure 12. Turnover of peat extraction industry companies in Latvia 2019-2023, Million EUR [90]



The industry is also an important export contributor, with Latvia's peat exports valued at 256.3 million EUR in 2023, accounting for 16% of the global peat export value, and

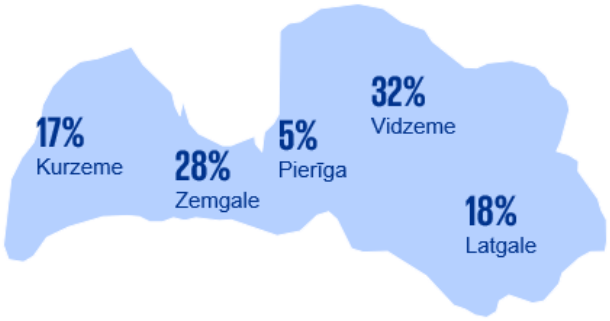
[84] Trade statistics | ITC (intracen.org) and KPMG analysis
[85] Reserves and production (latvijaskudra.lv)
[86] www.latvijaskudra.lv
[87] Latvian Peat Association, based on State Environmental Service. Calculated 25.5 thousand hectares as average extraction area from 2020 to 2024.
[88] Kūdras ieguve un vietas rekultivācija :: Peat (latvijaskudra.lv)
[89] Ibid.
[90] Nodokļu maksātāju deklarētie uzņēmumu gada pārskata pamatrādītāji (vid.gov.lv)

constituting 1.4% of Latvia's total exports in 2023[91]. In terms of quantity, in 2023 Latvia exported 1.89 million tons of peat and peat products (under HS code 270300)[92]. Latvia exports approximately 95% of the peat extracted to other countries, with approximately 70% being exported to other European countries[93].

Peat extraction is spread across the territory of Latvia: in 2023, Kurzeme planning region accounted for 23% of licensed peat extraction areas, Riga planning region for 8%, Vidzeme for 29%, Zemgale for 23% and Latgale for 17%.[94] Although Latgale is the richest region in peat resources in the country (it has 31% of all peat resources in Latvia), Latgale has the one of the lowest percentages of licensed extraction areas[95].

In 2023, 1.47 million tons of peat were extracted in Latvia[96]. More than 90% of peat extraction was located outside of the capital city Riga and its nearby region Pierīga (Figure 13).

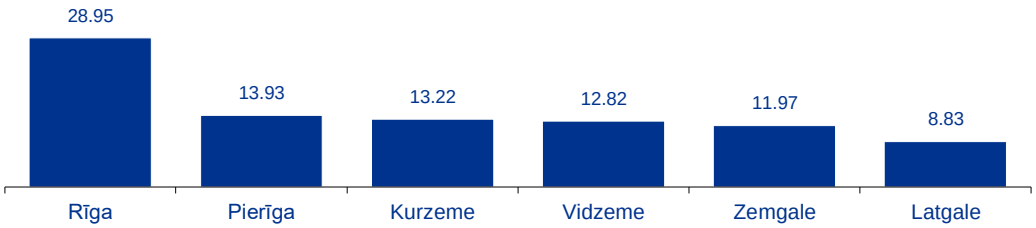
Figure 13. Breakdown of extracted peat by Latvian NUTS 3 statistical regions (2023)[97]



Instead, peat extraction is located in regions, where unemployment, low wages, and poverty risks are more prevalent, as they are less economically developed, taking into account the GDP per capita (Figure 14). The population, particularly young people and highly skilled professionals, tend to migrate from the regions to larger cities where there are better opportunities for personal and professional development. Major urban centres serve as key national and international hubs, connecting to other regional economies and acting as focal points for knowledge, growth, and innovation [98]. Thus, the peat industry is crucial for the development of Latvia's regions, as it provides competitive job opportunities and economic income – preconditions for better self-realization – closer to people who prefer to live in the regions [99]. This is especially important in Eastern border regions, where in light of the current geopolitical situation, it is essential to focus more on ensuring that residents feel safe and are motivated to live and work in Latvia.[100]

[91] International Trade Centre
[92] Ibid.
[93] Statistics | Eurostat (europa.eu)
[94] Latvian Peat Association, based on State Environmental Service
[95] Par Kūdras ilgtspējīgas izmantošanas pamatnostādnēm 2020.–2030. gadam (likumi.lv)
[96] Krājumu bilance (lvgmc.lv)
[97] Krājumu bilance (lvgmc.lv)
[98] Labour income and the unemployment rate in the regions of Lithuania, Latvia and Estonia: differences and change in the period 2004–2013
[99] Ibid.
[100] Valdība apstiprina rīcības plānu Austrumu pierobežas drošībai un izaugsmei | Ministru kabinets

Figure 14. GDP contribution per capita, per NUTS 3 statistical region in Latvia in 2021, thousand EUR[101]



Latvian national planning documents emphasize a sustainable approach to peat extraction, with no expected annual increase in extraction volumes until 2030. This approach aligns with environmental objectives to manage GHG emissions and ensure responsible resource use[102]. In line with the overall objective, the Latvian NECP[103] calls for the creation of a detailed map showing the distribution of peat soils on agricultural land, as well as the promotion of appropriate reclamation methods for historically exploited peat extraction sites [104].

In Latvia, regulations mandate that peat extractors must perform land reclamation[105]. However, many peatlands were mined during the Soviet era, and those responsible for their reclamation are no longer identifiable. Some reclamation efforts may have started but were left unfinished due to political regime changes. These areas are classified as historical extraction sites in peatland policy. Restoration of these sites, mainly to revive bog habitats, is funded by the EU LIFE program through various projects.[106] Additionally, the Territorial Just Transition Plan[107] envisages the restoration of over 4 thousand hectares of habitats or bog ecosystems of EU importance, as well as the exploration and inventory of historical peat sites in to decide on the most appropriate recultivation approach of 9 thousand hectares[108].

Reclaiming historic and degraded peat extraction areas is vital to bringing these lands back into economic use, whether through afforestation or cultivating crops like large cranberries or blueberries. The faster peat extraction is completed and the site is reclaimed, the shorter the timeframe for GHG emissions linked to the extraction process. However, in some cases, peat extraction cannot be fully completed due to low demand for well-decomposed peat, found in the deeper layers of deposits, despite its increasing use in horticulture [109]. Reclamation can be carried out simultaneously with peat extraction, as the license area for use of subterranean depths may include both areas

[101] Iekšzemes kopprodukts, tūkst. eiro – Teritoriālā vienība un Laika periods. PxWeb (stat.gov.lv)
[102] Latvijas Vēstnesis (vestnesis.lv)
[103] Aktualizētais Nacionālais enerģētikas un... - Latvijas Vēstnesis
[104] Par Kūdras ilgtspējīgas izmantošanas pamatnostādnēm 2020.–2030. gadam (likumi.lv)
[105] Derīgo izrakteņu ieguves kārtība
[106] Par Kūdras ilgtspējīgas izmantošanas pamatnostādnēm 2020.–2030. gadam
[107] Par Taisnīgas pārkārtošanās teritoriālo plānu
[108] Eiropas Savienības kohēzijas politikas programmas 2021.–2027. gadam 6.1.1. specifiskā atbalsta mērķa "Pārejas uz klimatneitralitāti radīto ekonomisko, sociālo un vides seku mazināšana visvairāk skartajos reģionos" 6.1.1.1. pasākuma "Atteikšanās no kūdras izmantošanas enerģētikā" pirmās projektu iesniegumu atlases kārtas īstenošanas noteikumi
[109] Par Kūdras ilgtspējīgas izmantošanas pamatnostādnēm 2020.–2030. gadam

where peat extraction continues and areas where reclamation works are carried out. Reclamation must be initiated within a year after completing the peat extraction in the whole license area. The different types of reclamation which can be carried out in peat extraction sites in Latvia are [110]:

- Establishment of cropland;
- Establishment of sown perennial grasslands;
- Establishment of large cranberry plantations;
- Establishment of highbush blueberry and lowbush blueberry plantations;
- Establishment of paludiculture fields;
- Afforestation;
- Creation of water bodies;
- Rewetting (re-creating mire conditions).

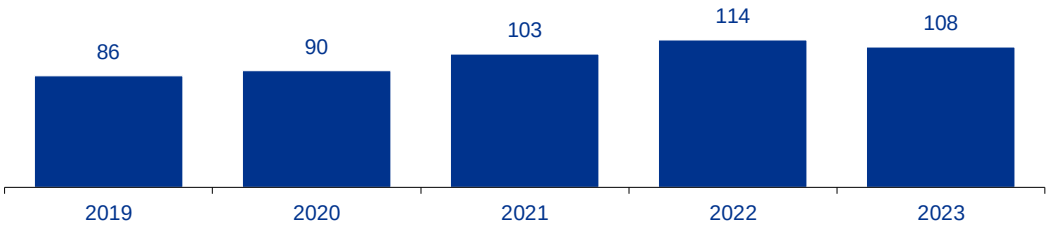
2.3.2 Lithuania

Lithuania's peat industry plays a significant role in the national economy and natural resource management. In Lithuania, bogs and other peatlands cover about 9% of country's territory, i.e. approximately 0.65 million ha, of which about 13 thousand ha (~2% of the total peatland area) are allocated for peat industry use[111]. As of 31 December 2023, number of detailed surveyed peat deposits in Lithuania was 117, with a total area of 60 143 ha. Remaining geological reserves of detailed surveyed peat deposits on 31 December 2023 were 1.184 billion m³. By adding preliminarily surveyed deposits (727 in total), overall peat resources in Lithuania would exceed 3 billion m³. At present, official data are reported in cubic meters (m³). Conversion into tons depends on applied conversion coefficient, which may vary depending on peat characteristics.

As of 2024, 35 companies had licenses for peat extraction in Lithuania [112]. On average around 1053 people are employed in the peat industry annually [113]. In 2023, the peat industry in Lithuania saw a total turnover of 108 million EUR (Figure 15).

[110] LIFE REstore - Rokasgrāmata "Kūdras ieguves ietekmētu teritoriju atbildīga apsaimniekošana un ilgtspējīga izmantošana" (daba.gov.lv)
[111] Lithuanian Geological Survey
[112] ALIS - Viešoji informacija (alisas.lt)
[113] Companies. Rekvizitai.lt Lithuania (vz.lt)

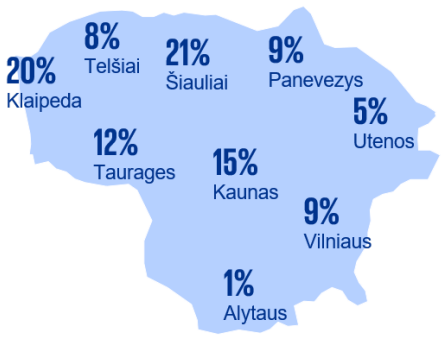
Figure 15. Turnover of peat extraction industry in Lithuania 2019-2023, Million EUR[114]



The industry is also an important export contributor, with Lithuania's peat exports valued at 104.2 million EUR in 2023, accounting for 7% of the global peat export value, and constituting 0.26% of Lithuania's total exports in 2023[115]. In terms of quantity, in 2023 Lithuania exported 0.86 million tons of peat and peat products (under HS code 270300)[116], with approximately 70% being exported to other European countries [117].

Peat extraction is mostly spread evenly across the territory of Lithuania: Šiaulių county accounted for 21% of peat extracted in 2023, Klaipėdos county for 20%, Kauno county for 15%, Tauragės county for 12%, Panevėžio county for 9%, Vilniaus county for 9%, Telšių county for 8%, Utenos county for 5%, and Alytaus county for 1% [118]. In 2023, 700.7 thousand tons of peat were extracted in Lithuania[119]. More than 90% of peat extraction was located outside of the capital region (Vilniaus county) (Figure 16).

Figure 16. Breakdown of extracted peat by Lithuanian NUTS 3 statistical regions (2023)[120]

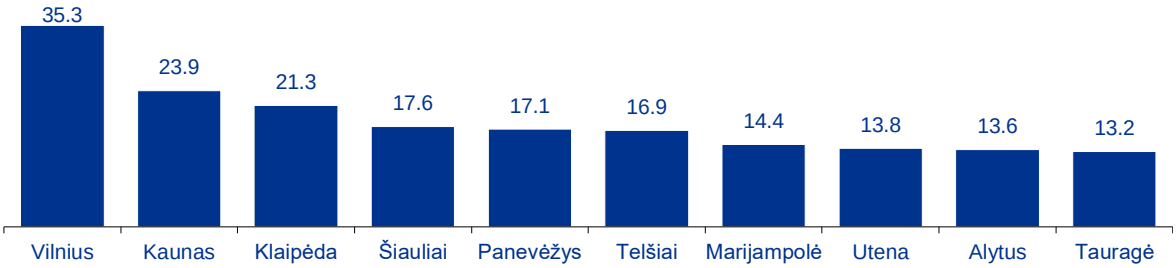


Instead, peat extraction is located in central and western Lithuania regions, where unemployment, low wages, and poverty risks are more prevalent, as they are less

[114] Ibid.
[115] International Trade Center
[116] Ibid.
[117] Statistics | Eurostat (europa.eu)
[118] 'Naudingųjų iškasenų gavyba 2019–2023 metais - Lietuvos geologijos tarnyba prie Aplinkos ministerijos (lrv.lt)
[119] Ibid. Calculated from 2.93 million cubic meters at a 0.239 tonnes to m^3 conversion rate
[120] 'Naudingųjų iškasenų gavyba 2019–2023 metais - Lietuvos geologijos tarnyba prie Aplinkos ministerijos (lrv.lt), Calculated from 2.93 million cubic meters at a 0.239 tonnes to m^3 conversion rate

economically developed, taking into account the GDP per capita (Figure 17). The importance of regional development is outlined in 2.3.1 Latvia.

Figure 17. GDP contribution per capita, per NUTS 3 statistical region in Lithuania in 2021, thousand EUR[121]



The National Energy and Climate Plan of Lithuania prioritizes the restoration and conservation of wetlands, particularly on arable peatlands, by safeguarding permanent grassland cover and promoting wetland protection. Meanwhile, the National Strategy for Sustainable Development highlights opportunities for afforestation on fertile soils within the LULUCF sector and stresses the importance of economic and administrative actions to reclaim depleted quarries and peat bogs, as well as maintain abandoned old farm buildings. It also envisions creating conditions for landscape protection, management, and planning through a national landscape management plan[122].

There is also a strong focus on restoring drained wetlands by halting arable farming, reestablishing appropriate water levels, and supporting ecosystem maintenance through sustainable economic practices. The plan aims to restore an additional 8,000 hectares of wetlands with organic soils by 2030[123]. Reclaiming historic and degraded peat extraction areas is vital to bringing these lands back into economic use, whether through afforestation or cultivating crops like large cranberries. The faster peat extraction is completed and the site is reclaimed, the shorter the timeframe for greenhouse gas emissions linked to the extraction process[124]. The different types of reclamation which can be carried out in peat extraction sites are[125]:

— Conversion into agricultural land;
— Conversion into water bodies;
— Conversion into forest land;
— Restoration into peatland ecosystems;
— Conversion into other types of land use.

Additionally, the National Energy and Climate Plan of Lithuania includes the development of an action plan to safeguard organic soils on agricultural land against erosion and convert them into GHG sinks. The Ministries of Environment and Agriculture will lead

[121] Rodiklių duomenų bazė - Oficialiosios statistikos portalas
[122] National Energy And Climate Action Plan Of The Republic Of Lithuania For 2021-2030
[123] Ibid.
[124] Par Kūdras ilgtspējīgas izmantošanas pamatnostādnēm 2020.–2030. gadam (likumi.lv)
[125] 166 Dėl Pažeistų žemių, iškasus naudingąsias iškasenas, rekultivavimo metodikos patvirtinimo (lrs.lt)

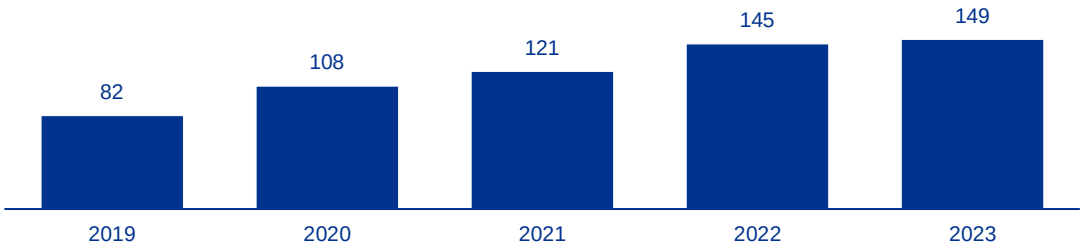
efforts to determine the most effective peatland restoration methods. A GHG charge per tonne of peat extracted will be introduced, accompanied by strategies to transform drained and unused peatlands into GHG sinks. Lastly, the plan outlines that the use of peat in energy and district heating will gradually decrease [126].

2.3.3 Estonia

Estonia's peat industry holds significant importance in the national economy and in managing natural resources. The country's peat reserves are estimated at 2.37 billion tonnes, with 0.6 million tonnes classified as passive deposits and 1.8 billion tonnes as active, or usable, deposits[127]. Of the active deposits, 573 million tonnes have been designated for industrial extraction [128]. There are currently 128 operating peat extraction sites in Estonia, with licensed area of about 21 300 hectares [129].

As of 2024, 34 companies had active licences for peat extraction in Estonia [130]. On average around 850 people are employed in the peat industry annually [131]. In 2023, Estonia's peat industry generated a total revenue of 149 million EUR (Figure 18).

Figure 18. Turnover of peat extraction industry in Estonia 2019-2023, Million EUR[132]



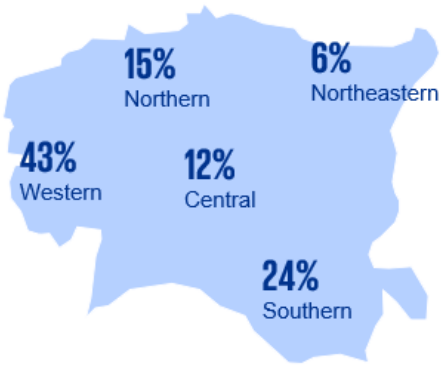
The industry is also an important export contributor, with Estonia’s peat exports valued at 148.4 million EUR in 2023, accounting for 9% of the global peat export value, and constituting 0.8% of Estonia’s total exports in 2023[133]. In terms of quantity, in 2023 Estonia exported 1.28 million tons of peat and peat products (under HS code 270300)[134] approximately 70% being exported to other European Union countries[135].

Peat extraction is not spread evenly across the territory of Estonia, and is mostly based in Western Estonia statistical region. Western Estonia accounted for 43% of peat

[126] National Energy And Climate Action Plan Of The Republic Of Lithuania For 2021-2030
[127] After amendments of national legal acts, the area of peatlands suitable for extraction has decreased by approximately 70%
[128] Peat - Turbaliit
[129] Peatland-related Policies in Six Central and Eastern European Countries
[130] Information provided by Clients
[131] e-Äriregister (rik.ee)
[132] e-Äriregister (rik.ee).
[133] International Trade Center
[134] Ibid.
[135] Statistics | Eurostat (europa.eu)

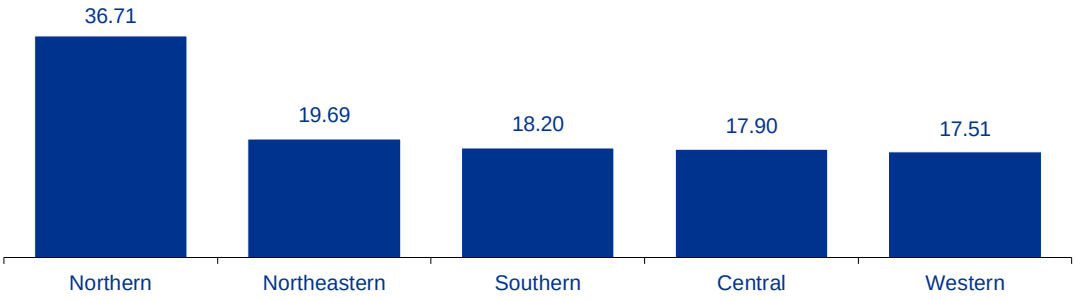
extracted in 2023, Southern Estonia for 24%, Northern Estonia for 15%, Central Estonia for 12% and Northeastern Estonia for 6% [136]. In 2023 0.89 million tons of peat were extracted in Estonia [137].

Figure 19. Breakdown of extracted peat by Estonian NUTS 3 statistical regions (2023)[138]



Instead, peat extraction is located in regions, where unemployment, low wages, and poverty risks are more prevalent, as they are less economically developed, taking into account the GDP per capita (Figure 20). The importance of regional development is outlined in 2.3.1 Latvia.

Figure 20. GDP contribution per capita, per region in Estonia in 2023, thousand EUR[139]



An Action Plan for Protected Mires (2016-2023) sets out monitoring the condition of mires, establishes protection procedures, protects existing mires, and works on restoring them. The action plan sets the goal that by 2030, all wet forest habitats will be mapped, their deterioration will be halted, and various forest habitats will be restored on an area of 13,000 hectares. A goal has been set that by 2050 a total of 126,000 hectares of wet forest habitats are to be preserved in favourable condition, the vulnerability of species

[136] koondbilanss_2023.pdf (maaamet.ee)
[137] Ibid.
[138] koondbilanss_2023.pdf (maaamet.ee)
[139] RAA0050: GROSS DOMESTIC PRODUCT (ESA 2010) by Year, County and Indicator. Statistical database

living in them, such as the black stork, white-backed woodpecker, and other woodpeckers be decreased, and the area of peat-accumulating forests be increased [140].

Reclaiming historic and degraded peat extraction areas is vital to bringing these lands back into economic use, whether through afforestation or cultivating crops like large cranberries or blueberries. The faster peat extraction is completed and the site is reclaimed, the shorter the timeframe for greenhouse gas emissions linked to the extraction process. The initial findings from the first year of greenhouse gas (GHG) measurements indicate that establishing berry plantations leads to a reduction in GHG emissions compared to unreclaimed peat extraction sites. Nevertheless, projections suggest that over the long term (25 to 100 years), GHG emissions from berry plantations may exceed those associated with abandoned, unreclaimed peat extraction areas. Additionally, GHG emissions are elevated due to fertilization activities conducted prior to planting berry seedlings[141].

Restoration efforts are primarily overseen by the State Forest Management Centre, focusing on the restoration of degraded peatlands that are part of Ramsar and Natura 2000 areas. The Centre has restored around 17,000 hectares of peatland habitats, including over 1,000 hectares of abandoned extraction sites. Restoration activities have been funded primarily through the European Union's Cohesion Fund and other EU structural funds. In addition, large-scale restoration projects, such as LIFE Peat Restore, LIFE Mires Estonia, and Waterlands, have been carried out under the leadership of the Fund for Estonian Nature and Tallinn University, covering thousands of hectares[142].

The Estonian Peat Association, which represents peat extraction companies, has committed to rewetting 5,000 hectares of depleted peatlands by 2030, emphasizing responsible production practices. Strict regulations ensure that extraction permits are granted only after a thorough impact assessment, and that reclamation is mandatory for all depleted sites. However, concerns remain regarding the long-term monitoring of restored peatland habitats, particularly concerning greenhouse gases, vegetation, water levels, and water quality[143].

Currently in Estonia, a large part of the climate-related policy planning documents are under revision, which will also have some impact on peatland management and peat use. As the policies are changing, the political aspects are not as clear as in the other Baltic States. As of now, approximately 96% of peat production is used for horticulture, with even higher share in years other than 2022.[144]

[140] Peatland-related Policies in Six Central and Eastern European Countries
[141] LIFE REstore - Rokasgrāmata "Kūdras ieguves ietekmētu teritoriju atbildīga apsaimniekošana un ilgtspējīga izmantošana" (daba.gov.lv)
[142] Peatland-related Policies in Six Central and Eastern European Countrieshttps://www.euki.de/wp-content/uploads/2024/09/euki_peatlands_ceeweb.pdf
[143] Peatland-related Policies in Six Central and Eastern European Countries
[144] kull-kuttim-2024-hortipeat-study-003.pdf

3 Evidence of socioeconomic impact of the peat industry in Latvia, Lithuania and Estonia

3.1 Latvia

This section aims to showcase the estimated socioeconomic impact of the peat industry in Latvia. First, the cumulative socioeconomic impact will be presented trough estimated gross value added (GVA) and total contribution (TC) of peat industry companies to the national economy. Afterwards, a more detailed and comprehensive evidence of how the TC impacts the national and international economy and society will be provided through 4 main indicator categories: Economic, Social, Environmental, and Governance. The analysis is based on sourced secondary data and industry company survey results.

The direct peat industry impact is calculated using data from 46 active companies that conducted their main operations in the NACE 08.92 classification during 2023, from which 31 contributed to the survey-based indicators of the impact evaluation.

The peat industry's gross value added (calculated according to the methodology outlined in Appendix C) in Latvia for 2023, attributable as the industry's direct GDP, was estimated as 126 215 649 EUR – equal to 0.37% of Latvia's 2023 total GVA[145].

In 2023, the peat industry in Latvia employed 2.3 thousand people and contributed an estimated €126.2 million in value added. Despite its relatively small size compared to other sectors, the peat industry excels in several key economic metrics:

- Value added per employee in the peat industry was €54.2 thousand, significantly higher than the national average of €38.7 thousand and surpassing the accommodation and food service activities sector (€22.4 thousand).
- Value added per company in the peat sector was €2.7 million, considerably higher than the national average of €0.2 million (Figure 21).

Figure 21. Estimated value added in peat industry compared to related industries

Measure (2023)	Latvia, Total[146]	Agriculture, forestry and fishing	Accommodation and food service activities	Peat industry[147]
Value added (M EUR)	34 283.3	1 502.6	700.1	**126.2**
Number of people employed (th.)	886.5	22.1	31.3	**2.3**
Number of enterprises	177 726	23 418	4 118	**46**

[145] IKP 2023. gadā samazinājies par 0,3 %, bet 4. ceturksnī pieaudzis par 0,1 % | Oficiālās statistikas portāls
[146] Statistikas portāls
[147] Firmas.lv data for 46 companies with main operations in peat extraction per the NACE classification and which have submitted annual reports for 2023

Measure (2023)	Latvia, Total[146]	Agriculture, forestry and fishing	Accommodation and food service activities	Peat industry[147]
Value added per employee (th. EUR)	38.7	68	22.4	**54.2**
Value added per company (M EUR)	0.2	0.1	0.2	**2.7**

The peat industry's total contribution (calculated according to the methodology outlined in Appendix C) in Latvia for 2023 was estimated as 221 317 643 EUR – equal to around 0.65% of Latvia's 2023 total GVA.

The aforementioned indicators describe the industry's overall contribution to Latvia's economy and society, while the following sections provide a detailed breakdown of the contribution's components and show evidence of their impact on the economy and society.

3.1.1 Economic indicators – impact assessment

The economic impact assessment of the peat industry in Latvia offers a more detailed insight of the sector's contribution to the national economy as well as internationally. This chapter examines various economic indicators, such as the industry's influence on job creation, tax contributions, and its effects on related industries both domestically and internationally. By assessing the industry's operational spending and its integration within the broader economic landscape, the assessment underscores the peat industry's vital role in fostering regional economic development, improving infrastructure, and promoting sustainable growth throughout Latvia and internationally.

Figure 22. Estimated contribution from 8 tax indicators in 2023, M EUR

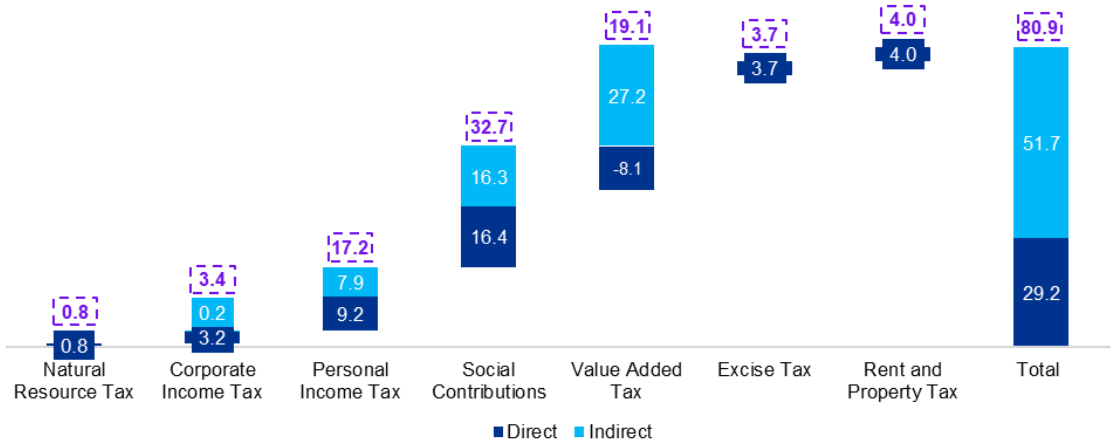
Indicator	Direct (M EUR)*	Indirect (M EUR)	Total (M EUR)
Natural Resource Tax	0.8	-	0.8
Corporate Income Tax	3.2	0.2**	3.4
Personal Income Tax	9.2	7.9***	17.2
Social Contributions	16.4	16.3***	32.7
VAT	-8.1	27.2****	19.1
Excise Tax	3.7	-	3.7
Rent and Property Tax	4.0	-	4.0
Total (2023)	**29.2**	**51.7**	**80.9**

Notes:
*Data for 46 peat industry companies
** Data for 2 peat sales companies
***The indirect PIT and social contributions are calculated according to estimated number of indirect jobs as presented in section 3.1.2. Social indicators as well as adding taxes paid by 3 peat trading companies
**** The indirect VAT is calculated as 21% of transactions with related local industries as reported in peat industry company survey (extrapolated to 100% of companies, as other tax indicators represent 100% of market (except rent and property tax, which cannot be determined))
Sources:
1. KPMG analysis, Krājumu bilance (data of peat extraction volumes in 2023 for natural resource tax estimation);
2. KPMG analysis, Firmas.lv (financial statements of 46 peat industry companies and 3 peat trading companies);
3. KPMG analysis, Latvian peat industry survey results (31 companies representing more than 82% of extracted peat)

Estimated contribution of tax indicators associated with the peat industry in 2023, totals to 80.9 million euros. It includes direct and indirect contributions across various categories: Natural Resource Tax (0.8M EUR), Corporate Income Tax (3.4M EUR), Personal Income Tax (17.2M EUR), Social Contributions (32.7M EUR), Excise Tax (3.7M

EUR), and Rent and Property Tax (4.0M EUR). Notably, VAT shows a negative direct contribution of -8.1M EUR (due to the high export levels and VAT refunds), offset by a significant indirect contribution of 27.2M EUR related with extensive upstream activities and payments to providers of relevant services and goods within the Latvian territory.

Figure 23. Estimated direct and indirect tax contributions associated with the peat industry in Latvia, M EUR (2023)



Note: VAT extrapolated to 100% of companies, as other tax indicators represent 100% of market (except rent and property tax. which cannot be determined)
Sources:
1. KPMG analysis, Krājumu bilance (lvgmc.lv) (data of peat extraction volumes in 2023 for natural resource tax estimation);
2. KPMG analysis, Firmas.lv (financial statements of 46 peat industry companies and 3 peat trading companies);
3. KPMG analysis, Latvian peat industry survey results (31 companies representing more than 82% of extracted peat)

In 2023, the Latvian peat industry engaged in substantial financial transactions with various sectors, contributing to economic activity through its upstream operations. Locally, logistics companies were the primary recipients, with expenditures amounting to at least 17.9 million euros, indicating the logistical demands of peat operations. Fuel trading and domestic transport companies followed, with expenditures of at least 11.6 million euros and 11.2 million euros, respectively, reflecting the industry's operational requirements. Additional local sectors, including pallet manufacturing, machinery repair, peat suppliers, machinery suppliers, construction, packaging manufacturing, and substrate manufacturers, also received notable contributions (Figure 24). **Total estimated amount spent on related industries in 2023 is at least €111.3 million** (See Appendix D for full list).

Figure 24: Estimated spending on top 10 related industries in Latvia, M EUR, 2023

Rank	Industry	Total Spent
1	Logistics Companies	17.9
2	Fuel Trading Companies	11.6
3	Domestic Transport Companies	11.2
4	Pallet Manufacturing Companies	10.6
5	Machinery Repair Companies	9.4
6	Peat Suppliers	8.5

Rank	Industry	Total Spent
7	Machinery Suppliers	8.2
8	Construction Companies	6.1
9	Packaging Manufacturing Companies	4.4
10	Substrate Manufacturers	3.1

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus ensure VAT comparability with other taxes and estimate full industry contribution

Internationally, the industry's expenditures were led by logistics companies at 20.1 million euros, followed by packaging manufacturing and additive manufacturing companies, with 10.0 million euros and 7.5 million euros, respectively. Other sectors such as substrate manufacturers, peat suppliers, machinery suppliers, and pallet manufacturing were also involved in these financial interactions (Figure 25). **Total estimated amount spent on related industries internationally in 2023 is at least €46.1 million** (See Appendix D for full list).

Figure 25: Estimated spending on top 10 related industries internationally, M EUR, 2023

Rank	Industry	Total Spent
1	Logistics Companies	20.1
2	Packaging Manufacturing Companies	10.0
3	Additive Manufacturing Companies	7.5
4	Substrate Manufacturers	2.5
5	Peat Suppliers	1.7
6	Machinery Suppliers	1.6
7	Machinery Repair Companies	0.5
8	Pallet Manufacturing Companies	0.4
9	Port Services	0.4
10	Substrate materials	0.4

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus estimate full industry contribution

The export volumes noted in Figure 8 rely on the HS 270300 code, which combines raw peat, processed peat and substrates. To evaluate export volume by product type, we conducted a survey of Latvian peat industry companies. In total, 24 out of 31 Latvian companies who participated in the survey indicated that they have exported their production outside Latvia over the last 5 years (Figure 26).

Figure 26. Estimated share of average annual export volume by type, 2019-2023, tonnes

Product Type	Share of average export volume per year
Raw Peat	13.6%
Substrate	33.0%
Fractionated Peat	53.4%

Note: Any peat exported for energy purposes has been reported as raw peat.
Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as share of other companies cannot be determined))

Considering the types of peat exported, it can be assumed that Latvian peat producers mostly provide materials for further use and production for horticulture purposes, which have significantly lower impact on the environment than peat use for energy[148,149]. The use of peat in Latvian energy balance is minimal, as it was 0.09% in 2023 and an average of 0.04% from 2014 to 2023[150, 151]. Transition away from peat production for energy use is also supported by Latvian Territorial Just Transition Plan[152].

3.1.2 Social indicators – impact assessment

The peat industry supports social development by creating jobs, providing competitive wages, and generating VAT contributions through the spending of its employees. To evaluate the social dimension indicators, the analysis was started by estimating the VAT contributions resulting from the expenditures of employees within the peat industry.

The peat industry promotes regional development by creating jobs and offering competitive wages (Figure 27) compared to other significant industries outside major cities (agriculture, forestry, mining, and quarrying). Higher income levels provide employees with more disposable income, which is spent on consumer goods, thereby allowing for the evaluation of potential expenditures on consumer goods and the amount of VAT paid into the state budget.[153]

Figure 27. Average wage in peat, agriculture, forestry, and mining industries in Latvia, 2023

Industry	Average Wage in 2023 (Gross, EUR)
Peat Industry	1 586
Agriculture (Crop and Animal Production)	1 297
Forestry (Forestry and Logging)	1 748
Mining and Quarrying	1 703
Total Average (All Industries)	**1 537**

Sources:
1. KPMG analysis, Firmas.lv (financial statements of 46 peat industry companies);
2. KPMG analysis, Statistikas portāls

In Latvia, the peat industry plays an important role in creating indirect jobs through its wide-ranging supply chain and related activities. Each job directly involved in peat production helps generate additional employment in areas like transportation, machinery manufacturing, maintenance, and service provision.[154] Based on available studies, estimates have been made to determine the number of people indirectly connected to the Latvian peat industry, both locally and internationally. This network of interconnected jobs highlights the broader economic impact of the peat industry beyond its direct operations (Figure 28).

[148] Peat for horticulture - International Peatland Society
[149] Power from peat—more polluting than coal—is on its way out in Ireland | Science | AAAS
[150] KPMG analysis, based on Energobilance, TJ, tūkst.toe (NACE 2. red.) – Rādītāji, Energoresursu veids un Laika periods. PxWeb
[151] Energobilance, naturālās mērvienībās (NACE 2. red.) – Rādītāji, Energoresursu veids un Laika periods. PxWeb
[152] Par Taisnīgas pārkārtošanās teritoriālo plānu
[153] Kūdras ieguves un izmantošanas sociāli-ekonomiskais izvērtējums un ilgtspēja (2017, LLU, LKA)
[154] Indirect jobs in activities related to coal, peat and oil shale

The comprehensive estimation, considering the number of employees in the peat industry and VAT rates, resulted in an estimated VAT contribution from employee spending amounting to 14.6 million EUR. Of this total, 7.1 million EUR is attributed to direct contributions from the peat industry, while 7.5 million EUR is attributed to indirect contributions from related industries at the national level.

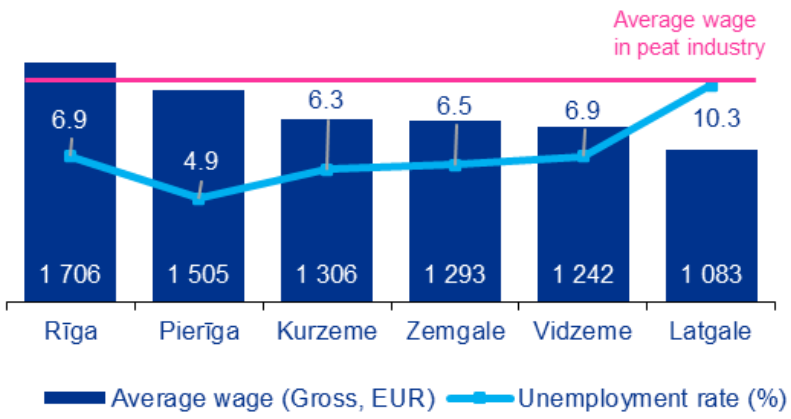
Figure 28. Estimated number of employees and VAT contribution from their spending

	Direct (Peat Industry)	Indirect (Peat-Related Industries, National Level)	Indirect (Peat-Related Industries, International)	Total
Estimated Contribution (%)	45%	50%	5%	100%
Estimated Number of Employees	2 327	2 586	259	5 171
Annual VAT Contribution per Employee (EUR)	3 053	2 908	N/A	N/A
Estimated VAT Contribution from Employee Spending in 2023 (million EUR)	**7.1 M EUR**	**7.5 M EUR**	**N/A**	**14.6 M EUR**

Source: Indirect jobs in activities related to coal, peat and oil shale, KPMG analysis (Firmas.lv (average number of employees and financial statements of 46 peat industry companies);

Peat extraction primarily occurs in regions characterized by relatively higher unemployment, lower incomes, and poverty risks. Based on secondary data analysis, it is evident that wages in the peat industry are higher than the regional average and comparable to wages in Latvia's most economically developed regions – Rīga and Pierīga. Consequently, given the high added value of the peat industry, its role in mitigating socioeconomic challenges is apparent (Figure 29).

Figure 29. Average wage and unemployment rate in Latvian NUTS 3 statistical regions, 2023



Source: KPMG analysis. Statistikas portāls

A noticeable trend indicates that peat extraction in Latvia takes place in regions where salaries are comparatively lower and unemployment rates are higher. For instance, the Vidzeme region, responsible for 32%[155] of the nation's peat extraction, reports the second lowest average gross wage and second highest unemployment rate.

The survey results indicate a strong presence of benefits to local communities ensured by peat industry companies, such as investments in public infrastructure and employment opportunities for students (Figure 30).

Figure 30. Projects in collaboration with local authorities

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

In addition to collaboration with local municipalities, from 2019 to 2023, the Latvian peat industry allocated a total of at least €575.2 thousand to sponsorship and donation initiatives, reflecting its commitment to community engagement. The largest share of funding was dedicated to sports, totalling to at least €268.4 thousand, followed by local municipalities and NGOs with estimated €110.4 thousand (Figure 31). This support assists with promoting sports, supporting local governance, and contributing to education, charity, and cultural initiatives.

[155] Krājumu bilance (lvgmc.lv)

Figure 31. Estimated spending on sponsorship and donation initiatives, thousand EUR

Category	2019	2020	2021	2022	2023	Total
Sports	27.3	37.4	19.7	77.9	106.2	**268.4**
Local Municipalities and NGOs	8.3	2.7	0.7	51.3	47.5	**110.4**
Education	14.2	10.9	15.9	15.9	21.0	**77.9**
Charity	3.1	3.3	8.5	28.9	23.2	**66.9**
Culture	14.2	8.1	7.7	10.9	10.7	**51.5**
Total (thousand EUR)	**67.1**	**62.3**	**52.5**	**184.8**	**208.5**	**575.2**

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

3.1.3 Environmental indicators – impact assessment

The sustainability initiatives undertaken by the Latvian peat industry focus on land restoration and environmental protection. It examines various approaches to sustainability, including reclamation projects that aim to restore peatlands and enhance ecological health. Additionally, the section assesses the industry's adherence to environmental certification standards. Managing environmental impact is crucial for building trust and aligning with professional standards in major European markets like the Netherlands, Germany, France, Italy, and Belgium. Certifications demonstrate the industry's commitment to responsible practices and sustainable resource management, enhancing its reputation as a reliable supplier of environmentally friendly products.

The survey conducted among Latvian peat industry companies highlights compliance with key certifications, such as Responsibly Produced Peat (RPP) and RHP. According to the data, there is a notable trend in acquiring these certifications. Specifically, 9 companies have obtained RPP certification, with an additional 3 in the process, which sets criteria for peat extraction related to harvesting, restoration, and environmental protection. This certification improves market access in sustainability-focused markets, specifically in the EU. Additionally, 5 companies have achieved RHP certification, with 2 more in progress. The RHP certification serves as an international quality mark, ensuring product quality and safety for horticulture, thereby enhancing product competitiveness and reputation (Figure 32).

Figure 32. Reported RPP and RHP certification holders in Latvia

Certificate	Description	Impact	Count
RPP	Sets criteria for peat extraction regarding harvesting, restoration, and environmental protection.	Improves market access in sustainability-focused markets.	9 (3 in process)
RHP	International quality mark ensuring product quality and safety for horticulture.	Enhances product competitiveness and reputation.	5 (2 in process)

Sources:
1. Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))
2. Responsibly Produced Peat
3. Home – RHP

The RPP[156] certification acts as a sustainability benchmark, ensuring that peat extraction is carried out responsibly with minimal environmental harm. This certification attracts consumers who value sustainability and supports the peat industry's long-term viability by encouraging responsible resource management.

The RHP[157] certification is an international quality standard that ensures peat-based growing media meet the high standards required for professional horticulture. It assures product quality, safety, and performance, enhancing competitiveness by meeting the needs of professional growers and fostering customer trust. Additionally, RHP certification bolsters the reputation of companies within the industry.

An important part of the peat resource management cycle is reclamation, which can be suitable for economic activities or for restoring the natural functions of extraction sites. Yet, it must be noted that when choosing a type of reclamation, the primary consideration should be restoring extraction sites in the most environmentally suitable way. Companies surveyed reported that the most popular reclamation methods are afforestation and rewetting (Figure 33), both of which are considered to be methods for restoring the natural functions.

Figure 33. Reclamation methods reported in Latvia

Berry Plantations	Paludiculture Fields	Afforestation	Installation of Water Reservoirs	Rewetting
3	1	18	3	12

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

The various reclamation methods offer distinct benefits for peatland restoration and environmental sustainability. Afforestation is effective in reducing greenhouse gas emissions as forests grow, though economic returns are realized only after a decade. Berry cultivation, while requiring significant investment, provides substantial economic benefits alongside emission reductions. Paludiculture, still experimental, offers economic advantages and greenhouse gas sequestration with relatively low investment. Rewetting prioritizes ecosystem services and long-term emission reductions without immediate revenue. Water reservoirs enhance biodiversity and hold potential for future economic use (see more detailed descriptions about each method of reclamation in the Appendix B).[158]

3.1.4 Governance indicators – impact assessment

This section examines how the Latvian peat industry leverages advanced technologies and expertise to foster research and innovation. By integrating these resources, the industry enhances operational efficiency and sustainability, contributing to improved governance.

[156] Responsibly Produced Peat
[157] Home – RHP
[158] LIFE REstore - OPTIMISATION MODEL

Foreign investments provide additional capital from other countries, promoting local economic development. Foreign investments are crucial as they provide access to more advanced technologies and expertise, which improve business productivity and sustainability.[159] Survey participants indicated that over the past 5 years, foreign investments have been received from countries such as Germany, Denmark, and Belgium.

From 2019 to 2023, the peat industry received at least 24.4 million euros in foreign investments, with amounts increasing each year. These funds have been important for buying and updating equipment and machinery to make operations more efficient. Money has also been spent on improving infrastructure, like transportation and facilities, to help with peat extraction and distribution. Additionally, investments have gone into expanding production, especially in making substrates and buying land, to support future growth and resource needs (Figure 34).

Figure 34. Foreign investments in Latvian peat industry, M EUR

	2019	2020	2021	2022	2023	Total (million EUR)	Purpose
Estimate of Foreign Investments (at least)	3.3	3.2	3.9	6.2	7.8	24.4	• Acquisition of Fixed Assets (purchase and modernization of equipment and machinery) • Infrastructure Development • Production Expansion (substrate production, land acquisition)

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

Between 2019 and 2023, the peat industry in Latvia saw at least 72.0 million euros in local investments. These funds were used for various purposes, such as renovating and repairing buildings, buying real estate, and upgrading equipment and machinery to improve production. Investments also went into managing and fixing production areas, as well as intangible assets like technology. There were long-term financial investments to keep the industry sustainable, and money was spent on acquiring fixed assets. Additionally, support from the state, LIAA, and the EU helped boost these efforts, providing extra financial aid and incentives (Figure 35).

Figure 35. Local investments by Latvian peat producers, M EUR

	2019	2020	2021	2022	2023	Total	Purpose
Estimate of Local Investments (at least)	15.0	14.1	15.3	14.9	12.7	**72.0**	• Building Renovation and Repair • Real Estate Acquisition • Investments in Equipment and Production Machinery • Management and Repair of Production Areas • Intangible Investments

[159] Foreign direct investment, regional market conditions and regional development - Wen - 2007 - Economics of Transition - Wiley Online Library

	2019	2020	2021	2022	2023	Total	Purpose
							• Long-Term Financial Investments • Acquisition of Fixed Assets • Support from the Government, LIAA, and EU

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

Finally, Latvian peat industry companies also take advantage of opportunities to obtain loans from banks to improve their operations and productivity. The most common purposes for these loans are the acquisition of fixed assets, modernization of equipment, infrastructure development, and production expansion (Figure 36).

Figure 36. Local loans taken by Latvian peat industry companies, M EUR

Category	2019	2020	2021	2022	2023	Total	Goals
Estimate of Locally Taken Loans (at least)	0.2	0.7	0.8	1.4	0.5	3.6	• Acquisition of Fixed Assets (purchase and modernization of equipment and machinery) • Infrastructure Development • Production Expansion

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

The contribution to research and development (R&D) activities is a key element of good governance. The peat industry companies can engage in scientific collaboration to drive innovation, enhance environmental sustainability, and ensure adherence to regulatory standards. By collaborating with scientific organizations, the industry can develop more efficient extraction methods, adopt sustainable practices to minimize environmental impacts, and innovate new products. These efforts build public confidence and assist the industry in adapting to climate change, securing its long-term viability and competitiveness. Between 2019 and 2023, investments of Latvian peat industry companies in R&D totalled to at least 339.3 thousand euros, showing growth every year (Figure 37).

Figure 37. Estimated spending on R&D, thousand EUR

	2019	2020	2021	2022	2023	Total
Investments in R&D (at least)	35.7	40.5	51.9	70.0	141.2	**339.3**

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

In addition to collaboration with others, Latvian peat companies have been rather active in undertaking different initiatives aimed at raising awareness and educating the society about different aspects about peat industry. Prioritisation of communication with the society is another evidence of good governance practices (Figure 38).

Figure 38. A summary of the educational and awareness-raising initiatives undertaken by Latvian peat companies 2019-2023

Activity	Year(s)	Comments
Communication of Laflora Wind Park Initiative	2020, 2021, 2022, 2023	Informative campaign about the Laflora Wind Park initiative and renewable energy as a reclamation measure, communication of the Environmental Impact Assessment process
TPF - Threat to the Peat Industry	2021	Information campaign about the threat posed by TPF regulation to the peat industry in Latvia
Cessation of Energy Peat Extraction and Use	2022	Information campaign about maintaining the possibility of using energy peat in Latvia
Tours/Educational Events "Responsible Peatland Management" - Introduction to Sustainable Peat Extraction and Horticultural Substrate Production at Laflora	Throughout the period, ongoing	Tours, educational events, excursions in the company's peat extraction areas for various stakeholders - ministry officials, policymakers, municipal representatives, institutions, students, and others.
Involvement in the LU Faculty of Geography and Earth Sciences Telmatology Course	Throughout the period, ongoing	Annually, students from the LU Faculty of Geography and Earth Sciences Telmatology (Peat Science) course visit the company's production facilities and peatlands to learn about peat formation and its use in horticultural substrate production.
Regular Media Relations	Throughout the period, ongoing	Press releases, initiated articles, comments, interviews about the importance of the peat industry to the Latvian economy and various industry developments.
Support for the Local Community in Jelgava Municipality	Throughout the period, ongoing	Sponsorship activities and donations, mainly for sports, arts, culture, and education initiatives in Jelgava Municipality - supporting and developing the local community.
Visits to Peat Extraction Sites for Students, Local Communities, NGOs, and Other Interested Parties regarding the Peat Extraction Process in Both Production and Environmental Contexts	Since 2017	
Latvian Peat Association of peat industry companies seminar about Fire Safety at Peatlands	2019	An extraction site was visited, and a discussion took place. Representatives from ministries and subordinate institutions participated (Ministry of Agriculture, Ministry of Environmental Protection and Regional Development, Ministry of the Interior, State Fire and Rescue Service, and State Forest Service).

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat

The peat industry can collaborate with the scientific field to promote innovations, enhance environmental sustainability, and maintain compliance with regulatory requirements. Establishing scientific collaborations allows for the development of more efficient peat extraction methods that reduce the industry's environmental impact and create new products. These collaborations also foster public trust and help the industry

adapt to the challenges posed by climate change.[160,161] Additionally, partnerships between industry and academia create value by tackling real-world problems and improving education through hands-on experiences like internships and joint research projects, making students more employable. These collaborations help schools update their courses to match industry trends, while companies gain new ideas, fresh talent, and insights from academic research to boost innovation and improvement.[162]

Figure 39. Reported publications in collaboration with academic institutions

Publication	Year
*Sustainable Peatland Management (*lat. *Ilgtspējīga kūdras purvu apsaimniekošana)* - Presentation at the University of Latvia Conference"	2024
Scientific publication: *Peat production for horticulture use in the Latvian context: Sustainability through LCA modelling*	2022

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat)

[160] . Cooperation in R & D and eco-innovations: The role in companies' socioeconomic performance – ScienceDirect
[161] (PDF) Improving Firms' Performance and Sustainability: The Case of Eco-Innovation in the Agri-Food Industry (researchgate.net
[162] How Industry-Academia Collaborations Create Impact | AACSB

3.2 Estonia

This section aims to showcase the estimated socioeconomic impact of the peat industry in Estonia. First, the cumulative socioeconomic impact will be presented trough estimated gross value added (GVA) and total contribution (TC) of peat industry companies to the national economy. Afterwards, a more detailed and comprehensive evidence of how the TC impacts the national and international economy and society will be provided through 4 main indicator categories: Economic, Social, Environmental, and Governance. The analysis is based on sourced secondary data and industry company survey results.

The direct peat industry impact is calculated using data from 27 active companies that conduct their main operations in the NACE 08.92 classification during 2023, from which 15 contributed to the survey-based indicators of the impact evaluation.

The peat industry's gross value added (calculated according to the methodology outlined in Appendix C) in Estonia for 2023, attributable as the industry's direct GDP, was estimated as 53 338 263 EUR – equal to 0.16% of Estonia's 2023 total GVA[163].

In 2023, the peat industry in Estonia employed 0.9 thousand people and contributed an estimated €53.3 million in value added. Despite its relatively small size compared to other sectors, the peat industry excels in several key economic metrics:

- Value added per employee in the peat industry was €61.8 thousand, significantly higher than the national average of €48.1 thousand and surpassing both the agriculture, forestry and fishing and the accommodation and food service activities sector (€40.4 thousand and €27.2 thousand, respectively).
- Value added per company in the peat sector was €1.98 million, considerably higher than the national average of €0.20 million (Figure 40).

Figure 40. Estimated value added in peat industry compared to related industries

Measure (2023)	Estonia*, Total[163]	Agriculture, forestry and fishing[150]	Accommodation and food service activities[150]	Peat industry direct[164]
Value added (M EUR) (2023)	31 659.7	735.7	627.7	**53.3**
Number of people employed (2023) (th.)	682	18.2	23.1	**0.9**
Number of enterprises (2023)	156 183	6 508	4 825	**27**
Turnover (2023) (M EUR)	94 666.2	2 404.7	1 436.1	**149.4**

[163] National Statistics Data bases of Estonia
[164] e-Äriregister data for 27 companies with main operations in peat extraction per the NACE classification and which have submitted annual reports for 2023

Measure (2023)	Estonia*, Total[163]	Agriculture, forestry and fishing[150]	Accommodation and food service activities[150]	Peat industry direct[164]
Value added per employee (M EUR) (2023)	0.048	0.040	0.027	**0.062**
Turnover per employee (M EUR) (2023)	0.139	0.132	0.062	**0.173**
Value added per company (M EUR) (2023)	0.20	0.11	0.13	**1.98**
Turnover per company (M EUR) (2023)	0.61	0.37	0.30	**5.53**

The year of data for each row is shown in brackets after the respective measure, except for the following measures: Value added per employee, Turnover per employee, Value added per company, and Turnover per company, which are calculated values based on the previous rows.
* Excluding financial and insurance activities.

The peat industry's total contribution (calculated according to the methodology outlined in Appendix C) in Estonia for 2023 was estimated as 86 352 612 EUR – 0.27% of Estonia's 2023 total GVA.

The aforementioned indicators describe the industry's overall contribution to Estonia's economy and society, while the following sections provide a detailed breakdown of the contribution's components and show evidence of their impact on the economy and society.

3.2.1 Economic indicators – impact assessment

The economic impact assessment of the peat industry in Estonia provides a more detailed examination of the sector's contribution to the national economy as well as internationally.

The economic impact of the peat industry in Estonia has been estimated according to the methodology described in 3.1.1 Economic indicators – impact assessment.

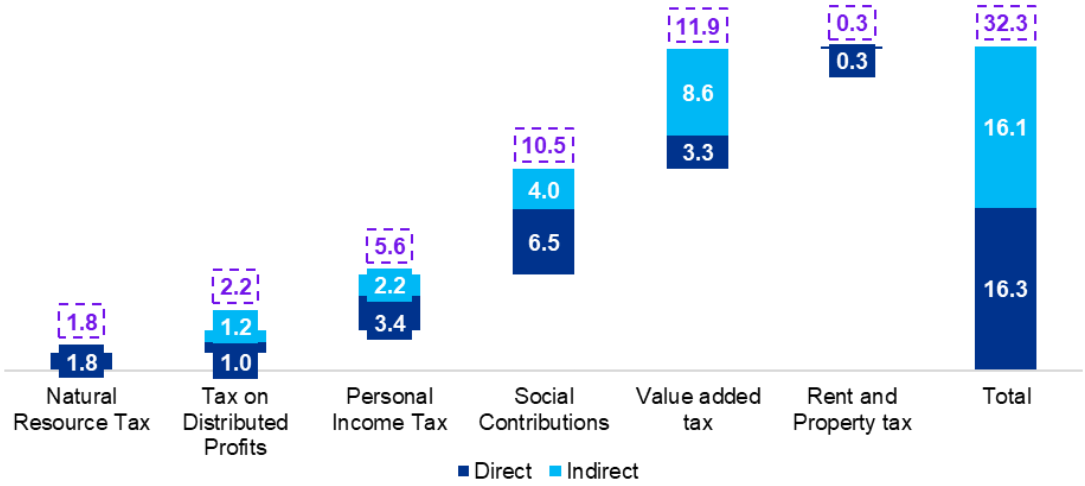
Figure 41. Estimated contribution from 6 tax indicators in 2023, M EUR

	Direct (M EUR)*	Indirect (M EUR)	Total (M EUR)
Natural Resource Tax	1.8	-	1.8
Tax on Distributed Profits	1.0	1.2**	2.2
Personal Income Tax	3.4	2.2***	5.6
Social Contributions	6.5***	4.0****	10.5
Value Added Tax	3.3*****	8.6******	11.9
Rent and Property Tax	0.3	-	0.3
Total (M EUR) (2023)	**16.3**	**16.1**	**32.3**

Notes:
*Data for 27 peat industry companies
** Data for 6 peat related subcontractor companies
*** Social contributions is based on *Sotsiaalmaksud*, which includes *Sotsiaalmaks* (Social tax), *Kohustuslik kogumispension* (Compulsory funded pension), and *Töötuskindlustusmaksed* (Unemployment insurance contributions)
****The indirect PIT and social contributions is calculated according to estimated number of indirect jobs as presented in section 3.2.2. Social indicators as well as adding taxes paid by 6 peat related subcontractor companies
***** Direct VAT has been calculated using revenue from peat industry company financial statements for 2023, dividing the revenue into Estonian and non-Estonian revenue to calculate the VAT from revenue. The VAT from expenditure on related industries in Estonia for 2023 is then subtracted from the revenue VAT to achieve the Direct VAT.
****** The indirect VAT is calculated as 20% of transactions with related local industries as reported in peat industry company survey (extrapolated to 100% of companies, as other tax indicators represent 100% of market (except rent and property tax, which cannot be determined))
Sources:
1. KPMG analysis, koondbilanss_2023.pdf (maaamet.ee)l (data of peat extraction volumes in 2023 for natural resource tax estimation);
2. KPMG analysis, e-Äriregister, (financial statements of 27 peat industry companies and 6 peat related subcontractor companies);
3. KPMG analysis, Estonian peat industry survey results (15 companies representing more than 83% of extracted peat)

An analysis of the tax indicators associated with Estonian peat industry reveals an estimated total contribution of €32.3 million to the national economy in 2023, split between €16.3 million in direct taxes and €16.1 million in indirect taxes. Key contributions include €5.6 million from personal income taxes and €10.5 million from social contributions, reflecting the industry's role in employment and social welfare. Additionally, the industry contributed €11.9 million in VAT, highlighting its influence on upstream related sectors and payments to providers of relevant services and goods within the Estonian territory.

Figure 42. Direct and indirect tax contributions of the peat industry in Estonia, M EUR (2023)



Note: VAT extrapolated to 100% of companies, as other tax indicators represent 100% of market (except rent and property tax. which cannot be determined)
Sources:
1. KPMG analysis, koondbilanss_2023.pdf (maaamet.ee) (data of peat extraction volumes in 2023 for natural resource tax estimation);
2. KPMG analysis, e-Äriregister, (financial statements of 27 peat industry companies and 6 peat related subcontractor companies);
3. KPMG analysis, Estonian peat industry survey results (15 companies representing more than 83% of extracted peat)

The Estonian peat industry plays a significant role in supporting other industries through its upstream operations, both locally and internationally. The industry's practice of outsourcing and contracting various services facilitates the assessment of its secondary economic impacts. This interaction contributes to economic activity in related sectors and supports job creation.

Previous studies on the socio-economic impact of the peat industry have highlighted that its operational requirements lead to the outsourcing and contracting of numerous services. This allows for systematic observations and assessments of the industry's secondary economic impacts on these sectors, thereby contributing to economic activity and employment opportunities (Figure 43). **Total estimated amount spent to related industries in 2023 is at least €43.1 million** (See Appendix D for full list).

Figure 43. Spending on top 10 related industries in Estonia, M EUR, 2023

No.	Industry	Total Amount Spent (M EUR)
1	National transport companies	7.8
2	Machinery suppliers	6.7
3	Fuel trading companies	4.4
4	Logistics companies	4.1
5	Port services	3.5
6	Pallet manufacturing companies	3.3
7	Machinery repair companies	2.9
8	Construction companies	2.1
9	Packaging companies	1.8
10	Substrate manufacturers suppliers	1.6

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus ensure VAT comparability with other taxes and estimate full industry contribution

The data on international spending by the Estonian peat industry participants in 2023 highlights its financial interactions with various sectors (Figure 44). **Total estimated**

amount spent to related industries internationally in 2023 is at least €15.2 million (See Appendix D for full list).

Figure 44. Spending on top 10 related industries internationally, M EUR, 2023

No.	Industry	Total Amount Spent (M EUR)
1	Logistics companies	3.8
2	Packaging manufacturing companies	3.3
3	Port services	2.3
4	Machinery suppliers	1.7
5	Inland transport companies	1.4
6	Substrate manufacturers	1.4
7	Banks	0.5
8	Pallet manufacturing companies	0.4
9	Construction companies	0.1
10	Engineering, monitoring, and consultancy services	0.1

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus estimate full industry contribution

The export volumes noted in Figure 8 rely on the HS 270300 code, which combines raw peat, processed peat and substrates. To evaluate export volume by product type, we conducted a survey of Estonian peat industry companies. Over the last 5 years, Estonian peat producers have exported mostly upgraded peat (substrates and fractionated peat) (Figure 45).

Figure 45. Estimated share of average export volume per year by product type, 2019-2023, tonnes

Product	Share of average export volume per year
Raw peat	27.9%
Fuel peat	1.4%
Upgraded peat*	70.7%

* Upgraded peat is the sum of substrates and fractioned peat.
Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as share of other companies cannot be determined))

Considering the types of peat exported, it can be noted that Estonian peat producers mostly provide materials for further use and production for horticulture purposes, which have significantly lower impact on the environment than fuel peat[165,166], which is the smallest exported volume.

3.2.2 Social indicators – impact assessment

Peat, commonly produced in the EU, is considered a socially favourable growing medium because of its positive contributions to community infrastructure, human rights, and the promotion of labour rights and decent work conditions.[167] The peat industry contributes to social development by facilitating job creation, offering competitive wages, and generating VAT contributions through employee spending.

[165] Peat for horticulture - International Peatland Society
[166] Power from peat—more polluting than coal—is on its way out in Ireland | Science | AAAS
[167] Environmental and social life cycle assessment of growing media for urban rooftop farming | The International Journal of Life Cycle Assessment

The social impact of the peat industry in Estonia is estimated according to the methodology described in 3.1.2 Social indicators – impact assessment.

Figure 46. Average wage in peat, agriculture, forestry, and mining, 2023

Industry	Average wage in 2023 (Gross, EUR)
Peat industry	1 798
Agriculture, forestry, and fishing	1 584
Mining and quarrying	2 097
Total average (All industries)	**1 884**

Sources:
1. KPMG analysis, e-Äriregister,
2. KPMG analysis, National Statistics Data base of Estonia

Drawing from available studies, estimates have been formulated regarding the number of employees indirectly associated with the Estonian peat industry, both locally and internationally. This interconnected employment network underscores the broader economic impact of the peat industry beyond its immediate operational scope.

The full estimation, taking into account the number of employees in the peat industry and VAT rates, resulted in an estimated VAT contribution from employee spending at the amount of 6.8 million EUR in Estonia, of which 4.3 million EUR is direct and 2.6 million EUR is indirect.

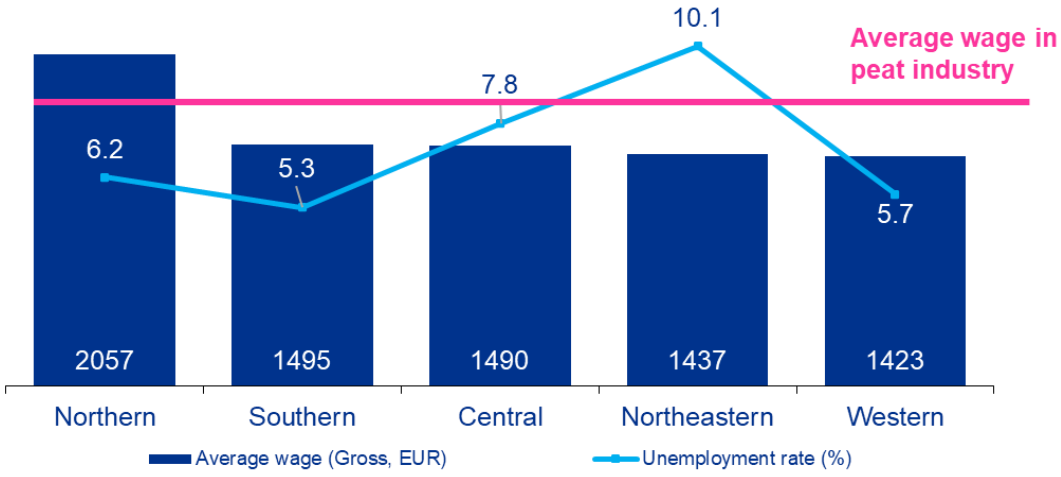
Figure 47. Estimated number of employees and their contribution

	Direct (peat industry)	Indirect (peat-related industries, national level)	Indirect (peat-related industries, internationally)	Total
Estimated contribution (%)	58%	35%	7%	**100%**
Estimated number of employees (2023)	1 325	800	160	**2 284**
VAT contribution per employee, annually (EUR) (2023)	3 232	3 125	N/A	**N/A**
Estimated VAT contribution from employee spending (M EUR) (2023)	**4.3**	**2.6**	**N/A**	**6.8**

Source: Indirect jobs in activities related to coal, peat and oil shale, KPMG analysis

Data analysis indicates that wages within the peat extraction industry surpass regional averages, positioning the industry as a significant contributor to addressing these socio-economic challenges in areas outside the capital. Notably, the Western statistical region, which accounts for 43% of Estonia's peat extraction, exhibits one of the lowest average wages at €1,423. The peat industry plays a crucial role in alleviating income disparities by providing above-average wages and helping to reduce unemployment in these regions.

Figure 48. Average wage and unemployment rate in Estonia by NUTS 3 statistical regions, 2023



Source: KPMG analysis, National Statistics Data bases of Estonia

The survey results indicate a strong presence of benefits to local communities ensured by peat industry companies, such as investments in public infrastructure and educational projects (Figure 49).

Figure 49. Projects in collaboration with local authorities

Project examples	Total (th. EUR)
Construction of public infrastructure	655.1
Education	10.7

Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

In terms of sponsorship and donation initiatives, survey respondents indicated active support for sports, charitable activities, cultural events, and educational programs. Over the past five years, participants in the Estonian peat industry have invested at least €204,000 in these areas (Figure 50).

Figure 50. Estimated spending on sponsorship and donation initiatives, thousand EUR

Category	2019	2020	2021	2022	2023	Total
Local communities and NGOs	2.7	3.6	19.5	30.8	19.3	88.1
Sports	9.5	14.0	13.2	31.2	10.4	78.3
Culture	7.2	7.0	7.0	7.0	8.0	36.1
Education	-	-	-	-	1	1

Category	2019	2020	2021	2022	2023	Total
Total (th. EUR)	**19.6**	**24.6**	**39.7**	**69.0**	**38.7**	**204.3**

Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

3.2.3 Environmental indicators – impact assessment

This section investigates the sustainability practices of the Estonian peat industry, focusing on adherence to environmental certification standards and reclamation projects, which is aligned with the focus areas described in 3.1.3 Environmental indicators – impact assessment.

Figure 51. RPP and RHP certification holders in Estonia

Certificate	Description	Impact	Count
RPP	Sets criteria for peat extraction regarding harvesting, restoration, and environmental protection.	Improves market access in sustainability-focused markets.	18
RHP	International quality mark ensuring product quality and safety for horticulture.	Enhances product competitiveness and reputation.	9

Sources:
1. Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))
2. Responsibly Produced Peat
3. Home – RHP

The survey conducted has provided evidence of compliance among peat industry companies with several key certifications, including Responsibly Produced Peat (RPP) and RHP. The data indicates a growing trend in certification acquisition, with 18 respondents reporting RPP certification and 9 respondents reporting RHP certification for the years 2022 and 2023. The role of the RPP and RHP certifications is outlined in 3.1.3 Environmental indicators – impact assessment.

Figure 52. Reclamation methods reported in Estonia

Afforestation	Peatland Restoration
15	22

Note: Peatland Restoration includes rewetting and installation of water reservoirs
Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

The data indicates the use of three reclamation methods: afforestation, installation of water reservoirs, and rewetting, each offering unique environmental benefits. Afforestation, applied in 15 cases, reduces peat layer mineralization and greenhouse gas emissions, though economic returns are realized only after a decade. Water reservoirs, used in 2 instances, primarily restore biodiversity and offer potential economic uses. Rewetting, implemented in 20 cases, focuses on restoring peatlands to their

natural state, providing high ecosystem service value and long-term emission reductions (see more detailed descriptions about each method of reclamation in the Appendix).[168]

3.2.4 Governance indicators – impact assessment

This section highlights how the Estonian peat industry utilizes advanced technologies and expertise to advance research and innovation. Through these efforts, the industry enhances its operational efficiency and sustainability, reinforcing effective governance.

The Estonian peat industry has invested significantly in its development through local and foreign loans totalling €14 million over the past five years. Local loans (€4.6 million) supported working capital, equipment modernization, and facility expansion, while foreign loans (€10 million) focused on fixed assets and working capital.

Figure 53. Local and foreign loans taken by Estonian peat industry companies, M EUR

Category	2019	2020	2021	2022	2023	Total	Purpose
Local loans	2.2	0.5	-0.6*	1.9	0.6	**4.6**	• Working capital increase • Modernisation of equipment, expansion of production • Construction of a packaging plant • Construction of warehouse • Production equipment • Peat machinery • Investments in technology
Foreign loans	1.0	1.0	3.0	5.0	0.0	**10.0**	• Investments in fixed assets • Working capital increase

Note: * Due to overdraft fees and repayment
Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

Over the past five years, the Estonian peat industry has invested at least €21 million in local initiatives aimed at enhancing infrastructure and production efficiency. These investments, distributed as €2.2 million in 2019, €1.6 million in 2020, €2.4 million in 2021, €4.4 million in 2022, and €10.4 million in 2023, focus on a variety of projects. Key areas include the partial restoration and renovation of peat production areas, namely the partial restoration of the Lavassaare peat production area, construction and renovation of roads for improved transport access, and building construction or renovation. Additional funds

[168] LIFE REstore - OPTIMISATION MODEL

have been allocated to overground electrical cables, acquisition and refurbishment of production machinery, and the acquisition of fixed assets.

Figure 54. Local investments by Estonian peat producers, M EUR

Category	2019	2020	2021	2022	2023	Total	Purpose
Local investments	2.2	1.6	2.4	4.4	10.4	**21.0**	• Partial restoration/renovation of peat production area • Construction/renovation of roads for transport to production areas • Construction/renovation of buildings • Overground cables (electricity) • Acquisition/renovation of production machinery • Acquisition of fixed assets

Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

Peat industry companies were invited to provide examples of their investments in R&D and research partnerships. Survey results reveal that companies within the Estonian peat industry have collectively invested approximately 298 thousand EUR in R&D activities over the last 5 years.

Figure 55. Spending on R&D, thousand EUR

Purpose	2019	2020	2021	2022	2023	Total
R&D	72	22	56	125	23.7	**298.7**

Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat (not extrapolated to 100%, as involvement of other companies cannot be determined))

Regarding the collaboration with field of science, the surveyed companies did not present extensive list of publications in collaboration with academic institutions, however, one notable example is the book **"The Sphagnum mosses of Estonia"** in cooperation with Tartu University.

3.3 Lithuania

This section aims to showcase the estimated socioeconomic impact of the peat industry in Lithuania. First, the cumulative socioeconomic impact will be presented trough estimated gross value added (GVA) and total contribution (TC) of peat industry companies to the national economy. Afterwards, a more detailed and comprehensive evidence of how the TC impacts the national and international economy and society will be provided through 4 main indicator categories: Economic, Social, Environmental, and Governance. The analysis is based on sourced secondary data and industry company survey results.

The direct peat industry impact is calculated using data from 20 active companies that conduct their main operations in the NACE 08.92 classification during 2023, from which 11 contributed to the survey-based indicators of the impact evaluation.

The peat industry's gross value added (calculated according to the methodology outlined in Appendix C) in Lithuania for 2023, attributable as the industry's direct GDP, was estimated as 22 228 809 EUR – 0.03% of Lithuania's 2023 total GVA[169].

In 2023, the peat industry in Lithuania employed 1.1 thousand people and contributed an estimated €22.2 million in value added. Despite its relatively small size compared to other sectors, the peat industry excels in several key economic metrics:

- Turnover per employee in the peat industry was €103.0 thousand, surpassing both the agriculture, forestry and fishing and the accommodation and food service activities sector (€42.3 thousand and €56.7 thousand, respectively).
- Value added per company in the peat sector was €1.1 million, considerably higher than the national average of €0.2 million (Figure 56).

Figure 56. Estimated value added in peat industry compared to related industries

Measure (2023)	Lithuania, Total[170]	Agriculture, forestry and fishing[167]	Accommodation and food service activities[167]	Peat industry direct[171]
Value added (M EUR)	66 444.8	2 003.8	1 230.5	**22.2**
Number of people employed (th.)	1 441.1	72.9	37.9	**1.1**
Number of enterprises	329 853**	ND	10 421	**20**
Turnover (M EUR)	157 266.9	3 082.52	2 150.3	**108.3***
Value added per employee (th. EUR)	46.1	27.5	32.5	**21.2**
Turnover per employee (th. EUR)	109.1	42.3	56.7	**103.0**
Value added per company (M EUR)	0.2	ND	0.1	**1.1**
Turnover per company (M EUR)	0.5	ND	0.2	**5.4**

The year of data for each row is shown in brackets after the respective measure, except for the following measures: Value added per employee, Turnover per employee, Value added per company, and Turnover per company, which are calculated values based on the previous rows.
* Data for 2023
** Does not include agriculture enterprises;

[169] Key indicators of Lithuania 2023 presented at the press conference - Valstybės duomenų agentūra
[170] Official Statistics Portal of Lithuania
[171] Lursoft IT - databases of enterprises. data for 20 companies with main operations in peat extraction per the NACE classification and which have submitted annual reports for 2023

The peat industry's total contribution (calculated according to the methodology outlined in Appendix C) in Lithuania for 2023 was estimated as 53 248 471 EUR – 0.08% of Lithuania's 2023 total GVA.

The aforementioned indicators describe the industry's overall contribution to Lithuania's economy and society, while the following sections provide a detailed breakdown of the contribution's components and show evidence of their impact on the economy and society.

3.3.1 Economic indicators – impact assessment

The economic impact assessment of the peat industry in Lithuania looks at how the sector contributes to the country's economy. It considers factors like job creation, tax payments, and the industry's effect on related businesses both locally and internationally.

The economic impact of the peat industry in Lithuania has been estimated according to the methodology described in 3.1.1 Economic indicators – impact assessment.

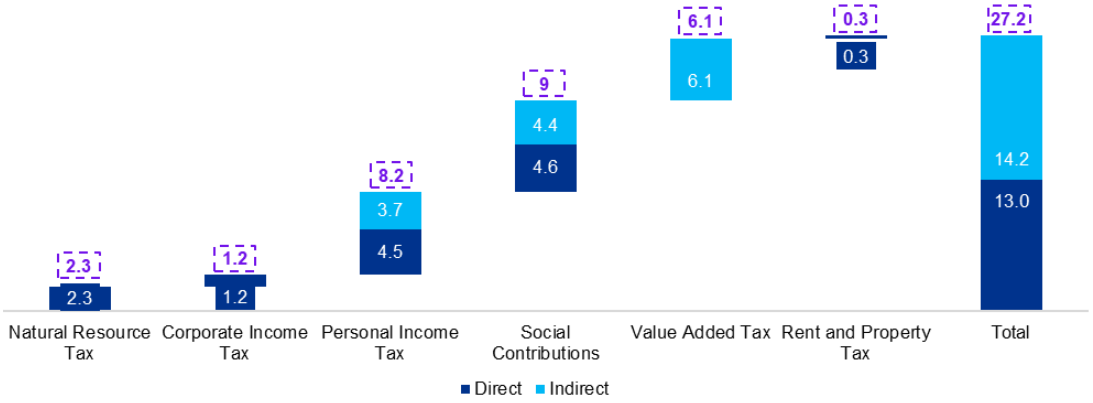
Figure 57. Contribution from 7 tax indicators in 2023, M EUR

	Direct (M EUR)*	Indirect (M EUR)**	Total (M EUR)
Natural Resource Tax	2.3	0.0	2.3
Corporate Income Tax	1.2	0.0	1.2
Personal Income Tax	4.5	3.7**	8.2
Social Contributions	4.6	4.4**	9.0
Value Added Tax	0	6.1***	6.1
Rent and Property Tax	0.3	0.0	0.3
Total	**13**	**14.2**	**27.2**

Notes:
*Data for 20 peat industry companies
**The indirect PIT and social contributions is calculated according to estimated number of indirect jobs as presented in section 3.3.2. Social indicators
*** The indirect VAT is calculated as 21% of transactions with related local industries as reported in peat industry company survey (not extrapolated to 100% due to unknown survey respondent market share)
Sources:
1. KPMG analysis, 'Naudingųjų iškasenų gavyba 2019–2023 metais - Lietuvos geologijos tarnyba prie Aplinkos ministerijos (lrv.lt) (data of peat extraction volumes in 2023 for natural resource tax estimation);
2. KPMG analysis, Rekvizitai.lt (financial statements of 20 peat industry companies);
3. KPMG analysis, Lithuanian peat industry survey results (11 companies)

An analysis of the Lithuanian peat industry shows a total contribution of €27.2 million to the national economy, divided into €13 million in direct taxes and €14.2 million in indirect taxes. Significant contributions include €8.2 million from personal income taxes and €9.0 million from social contributions, highlighting the industry's role in employment and social welfare. Additionally, the industry contributed €6.1 million in VAT, underscoring its impact on related sectors.

Figure 58. Direct and indirect tax contributions of the peat industry in Lithuania, M EUR (2023)



Note: VAT not extrapolated to 100% due to unknown survey respondent market share
Source: KPMG analysis, Rekvizitai.lt. Directory of Lithuanian companies, maps., Lithuanian peat industry survey results (11 companies);

The Lithuanian peat industry supports other industries by spending on services and resources both locally and internationally. The biggest spending was on logistics companies (€8.0 million), followed by fuel trading companies (€5.8 million), and pallet manufacturing companies (€3.9 million) (Figure 58). By outsourcing and contracting services, the industry boosts economic activity and creates jobs in areas like electricity production, packaging, and forestry (Figure 58). Studies show that these needs lead to more service contracts, helping to measure the industry's wider economic impact and support job growth in various sectors. **Total estimated amount spent to related industries in 2023 is at least €29.3 million** (See Appendix D for full list).

Figure 59. Spending on top 10 related industries in Lithuania, M EUR, 2023

No.	Top 10 industries locally	Total amount spent (M EUR)
1	Logistics Companies	8.0
2	Fuel Trading Companies	5.8
3	Pallet Manufacturing Companies	3.9
4	Substrate producers	3.5
5	Machinery repairers	2.5
6	Equipment and machinery rental	1.3
7	Electricity producers	1.1
8	Packaging companies	1.0
9	Security services	0.4
10	Forestry sector	0.3

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Lithuanian peat industry survey results (not extrapolated to 100% due to unknown market share of survey participants)

The largest expenditure internationally was in the substrate producers (€1,304,654), followed by packaging companies (€993,537) and machinery suppliers (€486,505). Other sectors receiving payments included machinery repairers (€458,103), logistics companies (€125,794), and pallet manufacturing companies (€66,688), with smaller amounts going to port services, peat producers, and domestic transport companies (Figure 60). **Total estimated amount spent to related industries internationally in 2023 is at least €3.5 million** (See Appendix D for full list).

Figure 60. Spending on top 9 related industries internationally, EUR, 2023

No	Top 9 industries internationally	Total Amount Spent (EUR)
1	Substrate Producers	1.3
2	Packaging Companies	1.0
3	Machinery Suppliers	0.5
4	Machinery Repairers	0.5
5	Logistics Companies	0.1
6	Pallet Manufacturing Companies	0.07
7	Port Services	0.03
8	Peat Producers	0.005
9	Domestic Transport Companies	0.005

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Lithuanian peat industry survey results (not extrapolated to 100% due to unknown market share of survey participants)

The export volumes noted in Figure 8 rely on the HS 270300 code, which combines raw peat, processed peat and substrates. To evaluate export volume by product type, we conducted a survey of Lithuanian peat industry companies. Over the last 5 years, Lithuanian peat producers have exported mostly raw peat and substrates, exporting significantly lower volume of fractionated peat (Figure 61).

Figure 61. Estimated share of average export volume by product type, 2019-2023, tonnes

Product	Share of average export volume per year
Raw peat	27.6%
Substrate	67.8%
Fractionated peat	4.6%

Source: Lithuanian peat industry survey results

Lithuanian peat producers primarily export peat types intended for further processing and use in horticulture, which has a considerably lower environmental impact compared to peat used for energy production[172,173].

3.3.2 Social indicators – impact assessment

The peat industry in Lithuania significantly contributes to social development by creating jobs, offering competitive wages, and generating VAT contributions through employee spending.

The social impact of the peat industry in Lithuania is estimated according to the methodology described in 3.1.2 Social indicators – impact assessment.

Figure 62. Average wage in peat, agriculture, forestry, and mining, 2023

Industry	Average wage in 2023 (Gross, EUR)
Peat industry	€ 1 763.6
Agriculture, forestry and fishing	€ 1 716.4
Mining and quarrying	€ 2 083.8

[172] Peat for horticulture - International Peatland Society
[173] Power from peat—more polluting than coal—is on its way out in Ireland | Science | AAAS

Industry	Average wage in 2023 (Gross, EUR)
Manufacturing	€ 1 931.9
Total average	**€ 2 013.8**

Source: Home - Oficialiosios statistikos portalas, KPMG analysis

Based on available studies, estimates have been made about the number of workers indirectly linked to the Lithuanian peat industry, both locally and globally. This network of interconnected jobs highlights the wider economic influence of the peat industry beyond its direct operations.

The full estimation, taking into account the number of employees in the peat industry and VAT rates, resulted in an estimated VAT contribution from employee spending at the amount of 6.7 million EUR in Lithuania, of which 3.5 million EUR is direct and 3.2 million EUR is indirect.

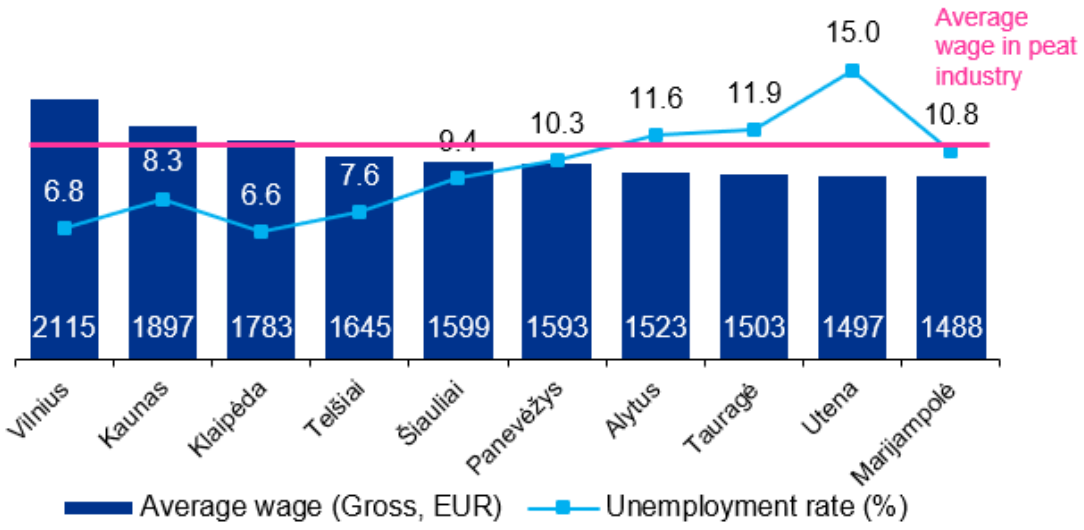
Figure 63. Estimated number of employees and their contribution

	Direct (peat industry)	Indirect (peat-related industries, national level)	Indirect (peat-related industries, internationally)	Total
Estimated contribution (%)	52%	42%	6%	**100%**
Estimated number of employees	1 053	849	121	**2 025**
VAT contribution per employee, annually (EUR)	3 306	3 739	N/A	**N/A**
Estimated VAT contribution from employee spending in 2023 (M EUR)	**3.47**	**3.17**	**N/A**	**6.65**

Source: Indirect jobs in activities related to coal, peat and oil shale, KPMG analysis

Data analysis indicates that wages within the peat extraction industry surpass regional averages, positioning the industry as a significant contributor to addressing these socio-economic challenges in areas outside the capital. The peat industry offers competitive wages compared to these regions. Additionally, the regions with lower average wages below the peat industry wage tend to have higher unemployment rates, with Utena having the highest unemployment rate at 15.0% (Figure 64). This indicates that the peat industry could be an attractive employment option in areas with lower average wages and higher unemployment, potentially providing more stable and better-paying job opportunities in those regions. Overall, the peat industry's wage level appears to be favourable compared to certain local labour markets in Lithuania.

Figure 64. Average wage and unemployment rate in Lithuania, 2023



Source: Lithuanian peat industry survey results, Rekvizitai.lt. Directory of Lithuanian companies, maps.

The survey findings reveal that peat industry companies significantly benefit local communities through investments in public infrastructure and green areas (Figure 65).

Figure 65. Projects in collaboration with local authorities

Joint projects/initiatives carried out in collaboration with local municipalities
A total of at least EUR 518,800 over the last 5 years

Project Examples	Total (th. EUR)
Public infrastructure (road) improvement	518.8
Rehabilitation of green areas	

Source: Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))

Survey results indicate that a total of 308.9 thousand euros was spent on different sponsorship and donation areas from 2019 to 2023. Most of the money went to charity, especially in 2022, with 154.3 thousand euros. Sports got 63.3 thousand euros, while culture and local governments/NGOs received 46.7 thousand euros and 39.1 thousand euros, respectively. Education received smaller support with only 1.6 thousand euros. Overall, there's a strong focus on charity and community support, especially in 2022 (Figure 66).

Figure 66. Estimated spending on sponsorship and donation initiatives, thousand EUR

Category	2019	2020	2021	2022	2023	Total
Charity	0.0	1.0	0.0	154.3	2.9	158.2
Sports	6.1	6.5	18.4	20.7	11.6	63.3
Culture	18.4	10.7	10.0	3.0	4.6	46.7
Local Governments and NGOs	8.8	5.1	10.9	7.2	7.2	39.1
Education	0.2	0.0	0.2	0.5	0.7	1.6
Grand Total	**33.4**	**23.3**	**39.4**	**185.7**	**27.0**	**308.9**

Source: Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))

3.3.3 Environmental indicators – impact assessment

This section investigates the sustainability practices of the Lithuanian peat industry, focusing on adherence to environmental certification standards and reclamation projects, which is aligned with the focus areas described in 3.1.3 Environmental indicators – impact assessment.

Figure 67. Reported RPP and RHP certification holders in Lithuania

Certificate	Description	Impact	Count
RPP	Sets criteria for peat extraction regarding harvesting, restoration, and environmental protection.	Improves market access in sustainability-focused markets.	3
RHP	International quality mark ensuring product quality and safety for horticulture.	Enhances product competitiveness and reputation.	3

Sources:
1. Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))
2. Responsibly Produced Peat
3. Home – RHP

The survey shows that peat industry companies are adhering to important certifications like Responsibly Produced Peat (RPP) and RHP. There is a rising trend in obtaining these certifications, with 3 companies having RPP and 3 having RHP. The role of the RPP and RHP certifications is outlined in 3.1.3 Environmental indicators – impact assessment.

Survey results show that there is one instance each of converting peatlands to water bodies and forest land, while 18 instances focus on restoring peatland ecosystems (Figure 68).

Figure 68. Reclamation methods reported in Lithuania

Conversion to Water Bodies	Conversion to Forest Land	Restoration to Peatland Ecosystems
1	1	18

Source: Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))

Converting peatlands to water bodies primarily benefits biodiversity restoration and may offer opportunities for economic activities. Afforestation, or conversion to forest land, helps reduce greenhouse gas emissions as forests grow, although economic returns are not expected for at least a decade. On the other hand, restoring peatland ecosystems, or rewetting, is highly valued for its ecosystem services, with long-term benefits in emission reductions and peat layer restoration (see more detailed descriptions about each method of reclamation in the Appendix B)[174].

[174] LIFE REstore - OPTIMISATION MODEL

3.3.4 Governance indicators – impact assessment

This section explores the role of advanced technologies and expertise in driving research and innovation within the Lithuanian peat industry. By adopting these resources, the industry boosts its operational efficiency and sustainability, supporting robust governance.

From 2019 to 2023, the Lithuanian peat industry received at least €18.2 million in foreign investments. The investments peaked in 2020 at €5.3 million and again in 2022 at €7.1 million, focusing on machinery and infrastructure upgrades, production expansion, and workplace improvements (Figure 69).

Figure 69: Foreign investments in Lithuanian peat industry, M EUR

	2019	2020	2021	2022	2023	Total (million EUR)	Purpose
Estimate of Foreign Investments (at least)	2.5	5.3	2.4	7.1	0.9	18.2	• Machinery and Infrastructure Upgrades • Production Expansion • Workplace Improvements

Source: Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))

From 2019 to 2023, the peat industry in Lithuania secured €7.5 million in local investments. In 2022, investments significantly increased to €2.7 million, and the upward trend continued in 2023, reaching €3.6 million, highlighting ongoing efforts to enhance operational efficiency and market reach (Figure 70).

Figure 70. Local investments by Lithuanian peat producers, M EUR

	2019	2020	2021	2022	2023	Total	Purpose
Estimate of Local Investments (at least)	0.4	0.4	0.4	2. 7	3.6	**7.5**	• Investments in Equipment and Production Machinery • Increasing extraction capacity • Investments in ecommerce

Source: Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))

Over the last 5 years, there has been only one loan taken by Lithuanian peat companies, amounting to 5.1 million EUR (Figure 71).

Figure 71. Local loans taken by Lithuanian peat industry companies, M EUR

Category	Total	Goals
Estimate of Locally Taken Loans (at least)	5.1	Working capital

Source: Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))

Peat industry's contribution to research and development (R&D) is vital for good governance. Over the last 5 years, Lithuanian peat producers have spent at least 364 thousand euros on R&D activities (Figure 72).

Figure 72. Investments in R&D activities, EUR

Purpose of investment	
Investigation of product characteristics	
Study of product characteristics	
Development of new cultivation media, cultivation testing	**364 010**

Source: Lithuanian peat industry survey results (11 companies (not extrapolated to 100%, as involvement of other companies cannot be determined))

The peat industry companies have been actively collaborating with academic and research organizations to advance innovation and sustainability in the peat sector. Partnerships with Vytauto Didžiojo University, Wetland Restoration and Protection Foundation, the Lithuanian Nature Foundation, and the Public Research Centre for Economic Studies show commitment to environmental sustainability, innovation, and climate action in the peat sector (Figure 73).

Figure 73. Reported educational and science projects

Project/Activity	Year(s)
Company presentations, group visits to extraction and production sites, company presentations in schools	Regularly
Investigation of product characteristics	2021
Study of product characteristics	2022
Restoration of degraded peatlands by combining peat farming and restoration of peatland ecosystems	2020-2021
Assessment of the biodiversity of a part of the Laukesa raised bog	2022
Development of new growing media using alternative materials	2022-2023
Restoration of depleted peatlands combining peat farming and restoration of peatland ecosystems	2019-2023
Economic analysis of the use of alternative materials in substrates	2019-2022

Source: Lithuanian peat industry survey results (11 companies)

Additionally, companies are organizing educational activities, to educate the public about their practical activities, for example, by regularly, several times a year, presenting its activities to communities and educational/training institutions (schools, colleges, universities) through various initiatives, including company presentations, group visits to extraction and production sites, and interactive sessions in schools.[175]

[175] Lithuanian peat industry survey results (11 companies)

Appendix A: Indicator methodologies and sources

No.	Indicator	Description	Methodology and data sources
1	**Economic – Natural Resource Taxes (NRT)**	Reflects direct financial contributions to state and municipal budgets through industry-related taxation[176].	Measure the total amount of NRT paid by the peat industry (quantity of extracted peat x NRT rate): • Latvia: Quantity of extracted peat (Atradņu reģistrs un krājumu bilance (lvgmc.lv)) x NRT rate (Dabas resursu nodokļa likmes | Valsts ieņēmumu dienests (vid.gov.lv)) (Tax payments for the extraction or use of natural resources or environmental pollution, within the amounts specified by the limits, shall be included as follows: 1) in 2024, 60 per cent into the State budget, 40 per cent into the budget of such local government within the territory of which the relevant activity is performed; 2) in 2025, 50 per cent into the State budget, 50 per cent into the budget of such local government within the territory of which the relevant activity is performed; 3) in 2026, 40 per cent into the basic budget, 60 per cent into the basic budget of such local government within the territory of which the relevant activity is performed.) • Lithuania: Quantity of extracted peat ('Naudingųjų iškasenų gavyba 2019–2023 metais - Lietuvos geologijos tarnyba prie Aplinkos ministerijos (lrv.lt)) x NRT rate (Lietuvos Respublikos mokesčio už valstybinius gamtos išteklius įstatymas) • Estonia: Quantity of extracted peat (koondbilanss_2023.pdf (maaamet.ee)) x NRT rate (https://www.riigiteataja.ee/akt/130062017034?leiaKehtiv)
2	**Economic – Corporate Income Taxes (CIT)**	Represents financial contributions to the state budget through corporate income taxes[177].	Calculate the total CIT paid by the peat industry to the state budget: • Latvia: Distributed profit (Firmas.lv) x CIT rate (Uzņēmumu ienākuma nodokļa likmes) • Lithuania: Distributed profit (Rekvizitai.lt. Directory of Lithuanian companies, maps.) x CIT rate (Corporate Income Tax) • Estonia: Profit (e-Äriregister (rik.ee) x CIT rate (Tax rates)
3	**Economic – Personal Income Taxes (PIT)**	Reflects the industry's financial impact on municipal and national revenue	Assess the total PIT paid by the peat industry companies, contributing to both municipal and national budgets: (Taxable income – Basic exemption) x number of workers x income tax rate • Latvia: Firmas.lv, Finanšu ministrija; • Lithuania: Rekvizitai.lt. Directory of Lithuanian companies, maps., Personal Income Tax - VMI

[176] Based on Kūdras ieguves un izmantošanas sociāli-ekonomiskais izvērtējums un ilgtspēja (2017, LLU, LKA)
[177] Ibid.

No.	Indicator	Description	Methodology and data sources
		through PIT contributions[178].	• Estonia: e-Äriregister, Estonian Tax and Customs Board
4	**Economic – Social Contributions**	Reflects the industry's financial impact on national social security revenues[179].	Assess the total social contributions (employer and employee taxes for social insurance) by the peat industry: Gross salary x number of workers x social contribution tax rates: • Latvia: Firmas.lv, Finanšu ministrija; • Lithuania: Rekvizitai.lt. Directory of Lithuanian companies, maps., Personal Income Tax - VMI • Estonia: e-Äriregister, Estonian Tax and Customs Board
5	**Economic – Value Added tax from economic activities**	Reflects the government revenues from VAT payments for goods and services[180].	Assess the total VAT revenues to state budget by the peat industry: • Latvia: VID administrētie kopbudžeta ieņēmumi 2023 | Valsts ieņēmumu dienests, company survey (31 respondent) • Lithuania: Rekvizitai.lt. Directory of Lithuanian companies, maps.,, company survey (11 respondents) • Estonia: e-Äriregister, company survey (15 respondents)
6	**Economic – Rent paid**	Peat industry pays rent for use of peatlands, which is a contribution to state/municipal budgets[181].	Rent rate for area x peatland area rented: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)
7	**Economic – Immovable Property Taxes (IPT)**	Direct financial contributions to municipal budgets through IPT payments[182].	Evaluate the total IPT paid by the peat industry to municipalities: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents)

[178] Based on Kūdras ieguves un izmantošanas sociāli-ekonomiskais izvērtējums un ilgtspēja (2017, LLU, LKA).
[179] Kūdras ieguves un izmantošanas sociāli-ekonomiskais izvērtējums un ilgtspēja (2017, LLU, LKA)
[180] Industry expert suggestions
[181] Ibid,
[182] Kūdras ieguves un izmantošanas sociāli-ekonomiskais izvērtējums un ilgtspēja (2017, LLU, LKA)

No.	Indicator	Description	Methodology and data sources
			• Estonia: company survey (15 respondents)
8	**Economic – Impact on Related Industries Locally**	Assesses secondary economic effects on sectors like transport and logistics due to the peat industry's operational needs at the local level[183].	Analyse the outsourcing and contracting activities of the peat industry and their economic impact on local sectors: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)
9	**Economic – Impact on Related Industries Internationally**	Assesses secondary economic effects on sectors like transport and logistics due to the peat industry's operational needs at the international level[184].	Analyse the outsourcing and contracting activities of the peat industry and their economic impact on international sectors: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)
10	**Economic – Export volume by product**	Evaluates the peat industry's role as a raw material supplier on a global scale, affecting various sectors internationally	Exported product end use (indicative list; per company): Raw peat, Finished product (substrate), Fractionated peat, Fuel peat: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)

[183] Kūdras ieguves un izmantošanas sociāli-ekonomiskais izvērtējums un ilgtspēja (2017, LLU, LKA)
[184] Ibid.

No.	Indicator	Description	Methodology and data sources
11	**Social – Jobs Created/Competitive Pay**	Contribution to regional development by creating jobs and offering competitive pay, especially in areas with lower economic development[185].	Track the number of jobs created and compare average wages in the peat industry to regional averages, assessing the economic impact on consumer spending and VAT contributions (disposable income per employee x no. of workers x % of wage spent on consumer goods x VAT rate): • Latvia: Firmas.lv, Indirect jobs in activities related to coal, peat and oil shale, % of wage spent on consumer goods (where VAT applicable) (KPMG analysis) • Lithuania: Rekvizitai.lt. Directory of Lithuanian companies, maps., Indirect jobs in activities related to coal, peat and oil shale, % of wage spent on consumer goods (where VAT applicable) (KPMG analysis) • Estonia: e-Äriregister, Indirect jobs in activities related to coal, peat and oil shale, % of wage spent on consumer goods (where VAT applicable) (KPMG analysis)
12	**Social – Cooperation Projects with Municipalities**	Collaboration with local municipalities to boost economic development, improve infrastructure, and promote sustainable growth[186].	Summarise the investments made by peat industry companies in cooperation projects initiated with municipalities to support job creation, local services, and community benefits: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)
13	**Social – Spending on sponsorship and donation initiatives**	Amount of funding spent on sponsorship and donation activities	Summarise the amount of money which peat industry companies have donated for various causes important to society (charity, sports, culture, education, NGOs etc.): • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)

[185] Kūdras ieguves un izmantošanas sociāli-ekonomiskais izvērtējums un ilgtspēja (2017, LLU, LKA)
[186] Par Reģionālās politikas pamatnostādnēm 2021.–2027. gadam, The role of industrial parks in ensuring sustainable development of the region | E3S Web of Conferences, Innovation, regional development and relations between high- and low-tech industries

No.	Indicator	Description	Methodology and data sources
14	**Environmental – Certifications Obtained**	Assesses the number of RPP and RHP certifications[187].	Count the number of RPP and RHP certifications obtained: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)
15	**Environmental – Reclamation Methods**	Methods chosen for reclamation and their benefits[188]	Based on the survey, assess the trends of reclamation methods chosen and their benefits: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)
16	**Governance – Attraction of Foreign Investments**	Measures the capital influx, economic boost, and employment generation through foreign direct investment (FDI) in the peat industry[189].	Quantify the amount of FDI received and its impact on local economies, technology access, and productivity: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)
17	**Governance – Local investments and loans**	Measures the capital flow, and employment generation through local	Quantify the amount of local investments and loans received and its impact on local economies, technology access, and productivity: • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)

[187] Responsibly Produced Peat Home – RHP
[188] LIFE REstore - OPTIMISATION MODEL
[189] Foreign direct investment, regional market conditions and regional development - Wen - 2007 - Economics of Transition - Wiley Online Library, Foreign Direct Investment and Regional Economic Performance - Mullen - 2005 - Kyklos - Wiley Online Library

No.	Indicator	Description	Methodology and data sources
		investments in the peat industry[190].	
18	**Governance – Cooperation with the Field of Science**	Utilizes scientific collaboration to stimulate innovation, improve sustainability, and maintain regulatory compliance[191].	Identify partnerships with scientific organizations and assess their contributions to developing efficient extraction methods, sustainable practices, and innovative products (investments in R&D activities, educational and awareness-raising initiatives, publications in collaboration with academic institutions): • Latvia: company survey (31 respondent) • Lithuania: company survey (11 respondents) • Estonia: company survey (15 respondents)

[190] Foreign direct investment, regional market conditions and regional development - Wen - 2007 - Economics of Transition - Wiley Online Library, Foreign Direct Investment and Regional Economic Performance - Mullen - 2005 - Kyklos - Wiley Online Library
[191] Cooperation in R & D and eco-innovations: The role in companies' socioeconomic performance - ScienceDirect, (PDF) Improving Firms' Performance and Sustainability: The Case of Eco-Innovation in the Agri-Food Industry

Appendix B: Environmental impact of reclamation

Peat extraction and its use in horticulture are important to the Baltic economies, contributing significantly to agricultural productivity and sustainability. Peat, a widely used growing medium in horticulture, is valued for its role in controlled-environment agriculture, where it reduces fertilizer requirements and improves soil quality. Unlike alternative substrates, such as rock wool, used peat is not waste; it reintegrates into ecosystems, enhancing soil organic content in fields and forests. However, peat extraction and drainage are also linked to significant greenhouse gas (GHG) emissions, accounting for 71% from agricultural use, 16% from degraded areas, 9% from extraction fields, and 5% from renaturalized areas.[192] The Baltic region's emissions factors differ from the IPCC standards due to warmer climatic conditions, emphasizing the need for localized, long-term studies to understand emissions patterns.[193] Moreover, the undervaluation of peatland ecosystems' economic and environmental contributions, coupled with underinvestment in their restoration, exacerbates their degradation.[194] Sustainable management, including post-use reclamation, positions peat as a model for circular economy principles in horticulture, demonstrating its ability to store carbon and support biodiversity. This approach ensures that economic benefits align with environmental preservation and social responsibility.

Figure 74. Reclamation methods suitable for Baltic region

Method	Description
Afforestation	Recommended to reduce peat layer mineralization. GHG emissions decrease directly proportional to forest growth, but economic returns are not expected after 10 years.
Arable Land	One of the least effective reclamation methods for mitigating climate change, as it does not ensure a reduction in GHG emissions and even produces the highest emissions when used in agriculture.
Berry Cultivation	Offers the highest economic benefits and significant emission reductions but requires much larger investments compared to other reclamation methods.
Paludiculture	A new and still experimental reclamation method with relatively low required investments, but it provides economic benefits and GHG sequestration.
Rewetting	Does not generate revenue, but has a high value for ecosystem services. Emission reductions and peat layer restoration are expected in the long term.
Water Reservoirs	The greatest benefit is the restoration of biodiversity. There is the potential to use the areas for economic activities as well.

[192] latvijas_kudras_asociacija_14022020_fin.pdf
[193] https://restore.daba.gov.lv/public/download.php?id=309
[194] https://www.uncclearn.org/wp-content/uploads/library/PeatCRSM.pdf

Method	Description
Grasslands	Low reclamation and maintenance costs, with expected revenues within the first 10 years, but they produce large GHG emissions. Grass root systems improve soil quality.

Source: LIFE REstore - OPTIMISATION MODEL

Figure 75. Reclamation method costs per hectare

Reclamation Method	Lowest Cost (EUR)	Highest Cost (EUR)
Afforestation	10,960	14,170
Arable Land	8,270	10,870
Berry Cultivation	42,885	139,454
Paludiculture	2,656	3,536
Rewetting	4,706	6,106
Water Reservoirs	6,200	8,100
Grasslands	8,770	10,95

Source: LIFE REstore - OPTIMISATION MODEL

Figure 76. Emissions Summary in different scenarios (tonnes CO_2 eq/ha in 100 years)

Scenario	Details
Scenario A	Initial water table depth: 0.5 m; Peat available: 5000.0 m³/ha; Carbon content: 0.05 tonne C/m³; Total carbon: 250 tonne C/ha
Scenario B	Peat layer depth: 3 m; Annual peat harvesting: 953 m³/ha/y; Peatland life: 31 years; Ditch area: 5% of total area; Diesel use: 610 l/ha/y
Scenario C	Conversion from pristine peatland to harvest: 5 years; Peat layer depth: 3 m; Annual peat harvesting: 953 m³/ha/y; Carbon content: 0.05 tonne C/m³
Scenario D	Assumed similar to rewetting a peatland after harvesting, as no emissions factors were available for the natural state

Category	A (IPCC)	A (LV-spec)	B (IPCC)	B (LV-spec)	C (IPCC)	C (LV-spec)	D (IPCC)	D (LV-spec)
C oxidation of abandoned peat	987.0	523.9						
Water level reached	9.7	677.7						
Soil emissions peat harvesting			371.3	191.0	371.3	191.0		
Fuel use during peat harvesting			57.3	57.3	57.3	57.3		
Peat off-site used in growing media			5079.9	5273.4	5079.9	5273.4		
Rewetted peatland			62.5	62.5	62.5	62.5		
LUC biomass loss conversion					14.7	14.7		
LUC stock soil conversion					3.7	3.7		

Category	A (IPCC)	A (LV-spec)	B (IPCC)	B (LV-spec)	C (IPCC)	C (LV-spec)	D (IPCC)	D (LV-spec)
Natural emissions							90.5	90.5
TOTAL 100Y	**996.7**	**1201.5**	**5570.9**	**5584.0**	**5589.2**	**5602.4**	**90.5**	**90.5**

Note: LV-spec: factors based on country-specific emission factors developed for Latvian managed peatlands in the context of the LIFE Restore project (Agnese Priede et al. 2019)
Source: Growing-Media-Europe-Sector-Guideline-v1-0-31-5-2021.pdf

Appendix C: Gross value added and total contribution methodology

Gross value added (GVA) is a key component in a country's GDP calculation, as the sum of all industries' GVA is the Total value added (TVA), from which the GDP is estimated by adding all taxes less subsidies on products[195]. Additionally, the expenditure approach to calculating GDP features the following formula:

$$GDP = C + I + G + (X - M)$$

, where consumption (C), investment (I), government spending (G), exports (X), and imports (M) all contribute to the GVA calculation[196].

The total contribution (TC) of the peat industry is its GVA combined with the indirect GDP generated by the industry, which is comprised of related company GVA, the related sector taxes and related consumption. It is given by the following formula:

$$TC = GVA + indirect\ GVA + indirect\ taxes\ (CIT, PIT, VAT, Social\ contributions) + (indirect\ employees \times indirect\ disposable\ earnings)$$

[195] What is the difference between total value added and gross domestic product? – World Bank Data Help Desk
[196] GDP Formula - How to Calculate GDP, Guide and Examples

Appendix D: Estimated spending on related industries

Latvia

Figure 77: Estimated spending on related industries in Latvia (2023, EUR)

Rank	Industry	Total Spent
1	Logistics Companies	€17 946 908
2	Fuel Trading Companies	€11 556 762
3	Domestic Transport Companies	€11 228 388
4	Pallet Manufacturing Companies	€10 631 367
5	Machinery Repair Companies	€9 361 988
6	Peat Suppliers	€8 507 718
7	Machinery Suppliers	€8 163 695
8	Construction Companies	€6 078 069
9	Packaging Manufacturing Companies	€4 389 885
10	Substrate Manufacturers	€3 055 701
11	Electricity Producers	€2 743 282
12	Port Services	€2 729 773
13	Subcontracted Services in Peat Extraction (in the production process)	€2 688 338
14	Equipment and Machinery Rental (tractors, excavators, bulldozers, sifters, shredders, etc.)	€2 106 375
15	Insurance Companies	€1 937 026
16	Cleaning and Territory Maintenance Services	€1 390 242
17	Lubricant Manufacturers	€1 351 870
18	Heating Providers	€1 007 590
19	Substrate Materials	€734 494
20	Forestry Sector	€604 743
21	Geological Research and Inventory Companies	€593 863
22	Banks	€592 346
23	Security Services	€382 330
24	Waste Management Services	€344 551
25	Suppliers of Other Fixed Assets (trailers, buckets, milling machines, etc.)	€299 984
26	Accounting Firms	€291 434
27	Repair Material Manufacturers	€194 885
28	Manufacturers of Consumables (including pipes, etc.)	€142 976
29	Professional Services (auditing, computer software, lawyers, translators, etc.)	€95 805
30	Trading Brokerage Fee	€52 482
31	Timber Producers	€18 517
32	Films for Covering Piles, Metal Stakes, Rubber, etc.	€16 898
33	Concrete Slab Manufacturers	€16 829
34	Communication Services	€1 634

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus ensure VAT comparability with other taxes and estimate full industry contribution

Figure 78: Spending on related industries internationally (2023, EUR)

Rank	Industry	Total Spent
1	Logistics Companies	€20 103 972.68
2	Packaging Companies	€10 040 170.06
3	Additive (Mineral Fertilizer, etc.) Production Companies	€7 541 534.15
4	Substrate Producers	€2 529 919.41
5	Peat Extraction Companies	€1 669 335.37
6	Machinery Suppliers	€1 583 814.15
7	Machinery Repairers	€497 965.70
8	Pallet Manufacturing Companies	€426 776.59
9	Port Services	€365 853.66
10	Peat Delivery Companies	€365 853.66
11	Substrate Materials	€365 853.66
12	Insurance Companies	€146 706.10
13	Domestic Transport Companies	€137 473.17
14	Banks	€69 189.38
15	Films for Covering Piles, Metal Stakes, Rubber, etc.	€49 476.61
16	Peat Analysis	€33 201.32
17	Geological Research and Inventory Companies	€31 875.61
18	Fuel Trading Companies	€30 487.80
19	Lubricant Manufacturers	€30 487.80
20	Certification Costs	€30 487.80
21	Advertising, Participation Fee, Marketing and Other Sales Costs	€8 231.71
22	Metal	€5 209.33
23	Accounting Firms	€4 380.49
24	Trading Brokerage Fee	€3 808.35

Source: Latvian peat industry survey results (31 companies representing more than 82% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus estimate full industry contribution

Estonia

Figure 79: Spending on related industries in Estonia (2023, EUR)

Rank	Industry	Total Spent
1	Domestic Transport Companies	€7 829 264
2	Machinery Suppliers	€6 675 713
3	Fuel Trading Companies	€4 371 060
4	Logistics Companies	€4 101 699
5	Port Services	€3 455 287
6	Pallet Manufacturing Companies	€3 298 630
7	Machinery Repairers	€2 855 567
8	Construction Companies	€2 116 416
9	Packaging Companies	€1 832 102
10	Substrate Producers	€1 600 494

Rank	Industry	Total Spent
11	Electricity Producers	€995 123
12	Equipment and Machinery Rental (tractors, excavators, bulldozers, sifters, shredders, etc.)	€683 007
13	Insurance Companies	€412 256
14	Banks	€365 324
15	Recruitment	€362 928
16	Land Reclamation	€361 446
17	Security Services	€251 725
18	Lubricant Manufacturers	€220 342
19	Environmental Impact Assessment	€184 547
20	Waste Management Services	€181 540
21	Engineering, Monitoring and Consultancy Services	€173 897
22	Road Construction	€143 413
23	Heating Providers	€131 312
24	Accounting Firms	€125 954
25	Cleaning and Territory Maintenance Services	€91 830
26	Materials for Machine Repair and Construction	€78 937
27	Other Services, Goods	€78 313
28	IT	€49 918
29	Postal and Communication Services	€30 120
30	Forestry Sector	€3 867

Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus ensure VAT comparability with other taxes and estimate full industry contribution

Figure 80: Spending on related industries internationally (2023, EUR)

Rank	Industry	Total Spent
1	Logistics Companies	€3 820 811
2	Packaging Companies	€3 265 734
3	Port Services	€2 288 248
4	Machinery Suppliers	€1 695 245
5	Domestic Transport Companies	€1 387 375
6	Substrate Producers	€1 375 241
7	Banks	€517 465
8	Pallet Manufacturing Companies	€359 036
9	Construction Companies	€113 855
10	Engineering, Monitoring and Consultancy Services	€94 882
11	Machinery Repairers	€93 677
12	Equipment and Machinery Rental (tractors, excavators, bulldozers, sifters, shredders, etc.)	€54 964
13	Insurance Companies	€51 000
14	IT	€30 133
15	Accounting Firms	€2 394
16	Forestry Sector	€361

Rank	Industry	Total Spent
17	Postal and Communication Services	€12

Source: Estonian peat industry survey results (15 companies representing more than 83% of extracted peat); KPMG analysis, recalculated to cover 100% of the industry and thus estimate full industry contribution

Lithuania

Figure 81: Spending on related industries in Lithuania (2023, EUR)

Rank	Industry	Total Spent
1	Logistics Companies	€8 048 423
2	Fuel Trading Companies	€5 822 401
3	Pallet Manufacturing Companies	€3 868 937
4	Substrate Producers	€3 543 247
5	Machinery Repairers	€2 464 615
6	Equipment and Machinery Rental (tractors, excavators, bulldozers, sifters, shredders, etc.)	€1 280 866
7	Electricity Producers	€1 084 639
8	Packaging Companies	€982 267
9	Security Services	€371 890
10	Forestry Sector	€297 477
11	Insurance Companies	€227 180
12	Banks	€208 246
13	Domestic Transport Companies	€202 394
14	Cleaning and Territory Maintenance Services	€175 080
15	Waste Management Services	€144 314
16	Machinery Suppliers	€121 011
17	Heating Providers	€101 040
18	Construction Companies	€95 405
19	Lubricant Manufacturers	€94 512
20	Port Services	€61 942
21	Land Reclamation, Water Level Control Services	€25 200
22	Geological Research and Inventory Companies	€22 684
23	Accounting Firms	€9 500

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Lithuanian peat industry survey results (not extrapolated to 100% due to unknown market share of survey participants)

Figure 82: Spending on related industries internationally (2023, EUR)

Rank	Industry	Total Spent
1	Substrate Producers	€1 304 654
2	Packaging Companies	€993 537
3	Machinery Suppliers	€486 505
4	Machinery Repairers	€458 103
5	Logistics Companies	€125 794
6	Pallet Manufacturing Companies	€66 688

Rank	Industry	Total Spent
7	Port Services	€25 000
8	Peat Producers	€4 804
9	Domestic Transport Companies	€4 613

Note: Packaging manufacturing companies include all peat packaging, excl. pallets
Source: Lithuanian peat industry survey results (not extrapolated to 100% due to unknown market share of survey participants)

Contact us

Artūrs Petrovs
Partner, Advisory
T +371 29947696
E esturca@kpmg.com

Kristaps Kovaļevskis
Senior Manager, Advisory
T +371 28447273
E kkovalevskis@kpmg.com

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