

## THE ROLE OF ENVIRONMENTAL TAXES IN BIOECONOMY DEVELOPMENT: CASES OF LITHUANIA AND GEORGIA

*Astrida Miceikienė*<sup>1</sup>, *Vazha Verulidze*<sup>2</sup>, *Mindaugas Kuklierius*<sup>3</sup>

<sup>1</sup>*Prof. dr. Vytautas Magnus University, Lithuania, E-mail address: astrida.miceikiene@vdu.lt*

<sup>2</sup>*Prof. Batumi Shota Rustaveli State University, Georgia, E-mail address: vazha.verulidze@bsu.edu.ge*

<sup>3</sup>*Vytautas Magnus University, Lithuania, E-mail address: mindaugas.kuklierius@vdu.lt*

*Received 25 03 2022; Accepted 30 03 2022*

### Abstract

The bioeconomy development is an important strategy for increasing sustainability and to achieve European Green deal. Environmental taxes are one of the most important tools for the development of the bioeconomy. The research aim is to compare the role of environmental taxes in countries with different levels of economic development: Lithuania and Georgia. The authors explore the following question: whether the policy of environmental taxes can contribute to the development of bioeconomy. Research results show that aims of bioeconomy and environmental taxes are the same and contribute to solving several societal challenges. Environmental taxes in Lithuania are more important and help to development bioeconomy. Lithuania does not yet levy a carbon tax, although it participates in the EU emissions trading system. Having started to implement the Green Deal, Lithuania will have to apply carbon taxes and other environmental taxes. Environmental tax burden in Georgia is very low, but this country has the potential to develop the bioeconomy.

**Keywords:** *bioeconomy, environmental taxes, sustainability, European Green Deal.*

**JEL Codes:** *Q51, Q56.*

### Introduction

As part of the European Green Deal, the EU has set out ambitious targets to tackle climate change and foster a cleaner environment, aiming for a 55% reduction in greenhouse gas emissions by 2030, and to become a climate-neutral continent by 2050. The European Commission has emphasized that green taxes can play an active and positive role in support of other EU climate and energy policies such as the EU Emission Trading System. Environmental taxes are the most important tool to develop principles of the European Green Deal. Environmental taxes have been designed to impose taxes on the behaviour that is harmful to the planet's health (Green Taxation, 2020). To reduce the emission of greenhouse gas globally, the international bodies such as the International Monetary Fund, environmental organisations, and a number of economists agree that the key

tool for fighting climate change is environmental taxation and bioeconomy development. The first bioeconomy strategy was named “Innovating for Sustainable Growth: a Bioeconomy for Europe”. This strategy was presented in 2012 (EU, 2012). In 2018, the bioeconomy strategy was renewed. Particular emphasis was placed on the sustainable development aspect, which maximised the contribution towards achieving the 2030 Agenda and Sustainable Development Goals in this strategy (EU, 2018).

The bioeconomy serves the goals of resource saving and reduction of environmental pollution and is, therefore, in accordance with the principles of sustainable development. Since private markets alone have been failing to serve these goals successfully, the government is called for to promote the

bioeconomy in order to ensure sustainable economic development. They are based on a simple principle — polluter pays — and are essential to halting the climate change (Johnson et al., 2021; D'amato, & Korhonen, 2021; Miceikiene et al., 2021; Norregaard, Reppelin-Hill, 2000). Environmental taxation has been a permanent feature of the policy agenda over the last few decades. Researchers are debating whether environmental taxes are driving the development of the Green Deal and bioeconomy (Mehdiyeva, 2021; Verulidze, Miceikiene, 2021; Freire-González, 2018).

The research aim is to compare the role of environmental taxes in countries with different levels of economic development: Lithuania and Georgia. The authors also explore the following question: whether the policy of environmental taxes can contribute to the development of bioeconomy. The authors assume that the impact of environmental taxes on the bioeconomy development is very different in these countries.

### **Literature review**

The bioeconomy is set to play a significant role in the green transition as it facilitates a shift from a fossil fuel-based economy to the one based on renewable and biological resources. The renewed bioeconomy strategy of the European Union (EU), the European Green Deal, and the Common Agricultural Policy 2021-2027 place particular emphasis on the sustainability aspect. New challenges are emerging in relation to climate change and sustainability as the Paris Agreement and the UN's commitments to sustainable development have entered into effect. Meanwhile, technological innovations and, in particular, the digital revolution are making a considerable impact on the production, processing and distribution of foodstuffs (Liobikiene et al., 2020; Böcher et al., 2020).

The Organization for Economic Cooperation and Development (OECD) defines green development as a solution to promote economic development while preventing the environmental degradation, loss

of biodiversity, and wasting of natural resources (Fan, X., Li, X., & Yin, J. 2019).

Bioeconomy serves the goals of resource saving and of reducing environmental pollution and is, therefore, in accordance with principles of sustainable development (Ahlheim, 2018). Since private markets alone have been failing to serve these goals successfully, the governments are called to promote bioeconomy in order to ensure sustainable economic development. Environmental taxation is an important economic policy tool of central authorities, which supports the long-term sustainable development of the society and economy (Kotlán et al., 2021).

Environmental taxes provide incentives for further efficiency gains, green investment and innovation, and shifts in consumption patterns (Albiac et al., 2017; Miceikiene et al., 2018; Garnier et al., 2019). Increased or more effective use of environmentally related taxes can drive a growth-oriented reform by transferring the tax burden from more distortive taxes, e.g., on corporate or personal income, and contributing to fiscal consolidation as well as helping to develop environmentally friendly forms of business (such as bioeconomy, etc.).

Bioeconomy aims to contribute to solving several societal challenges:

- ensuring food security,
- management of natural resources in a sustainable manner,
- reduction of dependence on non-renewable resources,
- mitigation of and adaptation to climate change,
- creation of jobs and maintenance competitiveness (Venkatramanan et al., 2021; Asada et al., 2020; Böcher et al., 2020; Liobikiene et al., 2021).

The environmental taxes have similar objectives. As the European Union have taken innovative steps toward bioeconomy development, this organization has become one of the key focal points for discussion and information exchange on these issues among the developed economies. Certain European countries have also implemented environmental taxes reforms. The aim behind

these reforms is shifting the tax burden in favour of environmentally related taxation. There is almost absolute unanimity when it comes to acknowledging environmental taxation as the key tool for moving towards a decarbonized economy that favours sustainable development. Among the main benefits that justify the existence of these taxes, the following are the most evident:

- internalization of the negative externalities;
- promotion of energy saving and the use of renewable sources;
- discouragement of anti-ecological behaviour;
- motivation of the companies to innovate in sustainability;
- generation of revenue for governments, allowing other taxes to be lowered or environmental projects to be carried out;
- environmental protection (Khan et al., 2021; Miceikiene et al., 2021; Miceikiene, Butvilaite, 2018).

Environmental taxes, which are environmentally effective, could ensure fiscal sustainability by achieving revenues and can have distributional implication. These taxes can ensure sustainable development, which is an ideal introduction to the complex relationships between the economy, society, and the environment (Mascu et al., 2013).

Compared goals of bioeconomy and environmental taxes to see, that they are similar: protect environment, adapt to climate change, generation of revenue, and creation of new jobs.

### **Research methodology**

The following theoretical methods were used in order to substantiate the problem relevance: scientific literature analysis, comparative analysis, systemic analysis, document analysis, generalization analysis, and other common research methods. Bibliometric method was used in the analysis of the relations between the environmental

taxes and bioeconomy from the theoretical perspective. Research conducted by the Lithuanian and foreign researchers, published in the peer-reviewed and international databases with an impact factor, such as Web of Science, Scopus, EBSCO, Springer, were analysed. Statistical methods were used for the purpose of the empirical study.

The research presented in the article analysed and compared the possibilities (indicators) of two countries with different levels of economic development (Lithuania and Georgia) to develop bioeconomy. Environmental taxes were used as the factor. The results were compared with the mean indicators of the OECD countries.

In Lithuania, 4 types of environmental taxes are used: energy, transport, pollution, and resources taxes, in Georgia – transport taxes only.

The research consisted of several stages. In the first stage, the analysis of bioeconomy development and environmental tax situation in Lithuania and Georgia was performed in order to identify the role of bioeconomy in the economies of both countries.

As part of the assessment of the effect of environmental taxes on the bioeconomy development, the indicators identifying the environmental taxes in Lithuania and the mean indicators of the OECD countries were calculated. The following groups of indicators were selected for the analysis:

1. Share of environmental taxes revenue in GDP;
2. Air pollution-related taxes revenue;
3. Revenue from taxes targeting biodiversity;
4. Climate change-related taxes revenue;
5. Revenue from energy taxes;
6. Revenue from transport taxes;
7. Revenue from pollution taxes;
8. Revenue from resource taxes.

Due to the scarce information of low volume of the environmental taxes, the environmental tax indicators of Georgia were not calculated.

In the second stage of the research, the key indicators characterizing the bioeconomy were calculated and analysed:

1. Agriculture, forestry and fishery, value added (% of GDP);
2. Total production of renewables (PJ);
3. Share of renewables in total energy production (%);
4. Share of renewables in TES (%);
5. Share of solid biofuels in renewables production (%);

Mean indicators of Lithuania, Georgia, and OECD were calculated. The conclusions were developed on the basis of the empirical study.

This research starts with data collection, gathering and systematisation. The study used statistics from 2000 to 2019. The data for the research was gathered from OECD database.

### **Bioeconomy development and environmental taxes in Georgia**

The opportunities for bioeconomy development under the conditions regulated entrepreneurial activities by the means of green taxes have not been not explored in Georgia sufficiently. The expected outcome has not been estimated in contrast to the outcome of environmental pollution and depletion of natural resources in parallel with economic growth, endangering the prospects of further economic development. Thus, the tax system is not being reformed gradually, taking into consideration the environmental interests of the country. Therefore, the green taxes cannot perform their environmental function yet. The future of sustainable development of the country directly depends on the promotion of environmentally healthy production methods and restriction of environmentally undesirable activities.

Industrial production is less developed in Georgia, except for the plants dating back to the Soviet period. Nonetheless, majority of them are inactive or have already been destroyed, and do not have a negative environmental impact. In the context of current economic system, the use of natural resources is at its peak, and an environmental impact is often not taken into consideration. Meanwhile,

the Law of Georgia establishing the Environmental Assessment Code aims to promote the environmental protection, human life and/or health, cultural heritage and material assets, in the implementation of strategic documents or activities which may have significant effects on the environment, human life and/or health (Environmental Assessment Code, 2021).

Environmental taxes are basically excise taxes levied on production of goods which are damaging to the environment as it generates GHG emissions. The purpose of the taxes is to discourage the economic activities with minimal cost in order to reduce and control the environmentally damaging discharges. In the context of green taxes, pollution is considered as a cost of production (Singh, S., Haldar, N. & Bhattacharya, A., 2018).

At present, the excise tax plays the role of an environmental tax in Georgia. Since 1 January 2017, it was increased significantly for petroleum products, oil distillates, and natural gas (Excise Tax, 2021). The reason behind the tax increase was to avoid the expected reduction of budget revenues as a result of the profit tax reform, rather than an environmental policy. It eventually led to an increase in prices on essential goods. Thus, assigning a function of green tax to the excise tax may have a negative impact on people's well-being. Furthermore, when the role of green tax is played by the excise tax on cars, in particular, old cars, this also has an environmental dimension.

The Georgian legislation recognizes the necessity of measures for environmental protection, including the use of taxes. The purpose of economic incentives for environmental protection is to support the development and implementation of the best non-waste, environmentally sound, non-polluting and low-waste technology and technique, and the use of secondary raw materials as well as implementation of efficient environmental projects, which may be carried out through:

- a) awareness raising in environmental protection issues;
- b) tax benefits;

c) preferential public loans (Law of Georgia...,2021).

In reality, the environmental policy of the country is incapable of addressing the existing challenges, as confirmed by the environmental efficiency index. According to the index, the environmental conditions in Georgia have been deteriorating during the recent 10 years, and the country is the 102<sup>nd</sup> with the score of 41.3 (Environmental Performance Index, 2020).

In certain regions of Georgia, such as Tkibuli, Terjola, Chiatura, Zestafoni, where industrial facilities still function, the environmental and human health situation is dire. Therefore, the association agreement with the EU is particularly important for Georgia, because it envisages implementation of the European political, trade, economic, social, and legal standards in the country. This agreement presents the possibility to define the role of green taxes in the country and strengthen their environmental function while promoting production of environmentally safe products. This would contribute to sustainable economic development and increased competitiveness. It is also important that, as of 2023, the carbon tax will be implemented in the EU. This tax will introduce an additional levy on products from various countries in accordance with the new rules adopted by the European Parliament. This also needs to be taken into account in Georgia.

Environmental taxes can enable regulation of the agricultural sector in Georgia, as it is a historically agrarian country, and this sector has a huge potential for development. Achievement of the environmental goals in the agricultural sector is possible through fiscal incentives. These benefits will perform a function of environmental taxes, in particular, in terms of VAT exemption of the agricultural production process applicable to environmentally safe products.

### **Bioeconomy development and environmental taxes in Lithuania**

Bioeconomy has an important role in the overall economy of Lithuania. The total turnover of the Lithuanian bioeconomy sectors is about EUR 15 bln (Y2020) and accounts for about 14% of the total turnover of non-financial companies. Over the third of the turnover is generated by the food processing industry and other bio-based manufacturing sectors. A smaller share is generated by the agriculture, forestry and logging, fishery, and aquaculture. More than the sixth of the employed population in Lithuania are occupied in bioeconomy and almost half of them are occupied in agriculture, forestry, and fishery. Food industry accumulates almost the fifth of the occupied population. Bioeconomy accounts for about 15% of the national GDP, with more than half of this share generated by the food system, i.e., food industry and agriculture. The export value of the Lithuanian bioeconomy sector was almost EUR 12 bln, i.e., 45% of the total Lithuanian product export. The Lithuanian bioeconomy sectors employ about 18% of the total employed population.

It should also be noted that, Lithuania stands out among other EU countries for the strong specialization in the bioeconomy sectors. According to the conducted analysis of location coefficients, Lithuania is the 6<sup>th</sup> in the EU-28 by the GDP concentration in biomass production sectors and the 1<sup>st</sup> in the EU-28 by the GDP concentration in the fully biomass-based manufacturing sectors. The mean annual export growth rate of the sectors attributable to bioeconomy in 2001–2018 exceeded the global export growth considerably. Namely, the mean annual growth in the Lithuanian export of food and agricultural products was 12.8%, global – 5.9%, the mean annual growth in the Lithuanian export of furniture industry was 14.8%, global – 5.6%, and the growth in the Lithuanian export of the chemicals and plastic industry was about 15% each, global – about 6%.

Nevertheless, negative trends have been noticed recently in Lithuania: reduction in the volumes of livestock products associated with the tightening requirements related to the environmental pollution and increase in the environmental taxes; reduction of tax exemptions for agriculture, in particular, those related to environmental protection (reduction of diesel fuel excise exemptions, heavier taxation imposed on the natural resources, etc.). The European Green Deal requirements empower the countries to reconsider the environmental taxes in order to strengthen their role in abatement of the environmental pollution. This will have a significant impact on the development of bioeconomy.

In Lithuania, the environmental taxes are applied in all the sectors, including bioeconomy. Environmental taxes are an efficient policy to help reduce environmental degradation and address climate change. Environmental taxes accounted for about 2% of GDP in 2018, which was lower than the level of the year 2000 and the 2.2% OECD average. Almost all the environmental taxes (90%) are excise duties on oil and oil products, with pollution and natural resource use taxes accounting for the remaining share. Recently, the government has taken action to increase pollution taxes. In January 2020, a number of modifications were made to the Law on the Pollution Tax, actually representing a set of taxes on polluting products, and entered into effect in January 2021. They included increases in tax rates for most pollutants discharged in the air and for some pollutants discharged into water bodies and into the soil from stationary sources. The average tax rate increase was three-fold and even greater for certain pollutants (for instance, VOC and PM), but have remained low compared to the costs of pollution.

Lithuania has one of the lowest excise duties on motor fuel, petrol and diesel in the OECD, and one of the largest “diesel differentials”, i.e., the gap in the price of diesel versus gasoline. The Law on Motor Vehicle Registration Tax entered into effect on 1 July 2020 (Parliament of Lithuania, 2020), thereby introducing a tax on private cars for the first time. The tax rates are based on CO<sub>2</sub> emissions

and the type of fuel used. They apply to all cars with emissions exceeding the threshold of 130 g/km of CO<sub>2</sub>. An environmental bonus was also introduced for cars purchased with emissions below this threshold (EUR 1,000 per car, with a requirement to send the old car for scrappage). Fossil fuels used in agriculture and fisheries are subject to a reduced excise duty. In particular, the fuel excise duty applied to diesel in this sector is less than 16% of the amount applied to road and residential use. Certain fiscal measures related to the environment have been introduced recently. For instance, newly purchased widely used products, such as tyres and batteries, which account for a large portion of waste, have been added to the list of products subject to increased pollution tax rates.

Lithuania does not yet levy a carbon tax, although it participates in the EU emissions trading system. The CO<sub>2</sub> tax enables efficient taxation of different forms of energy in line with their contribution to climate change. Political economy considerations might call for direct reimbursement for all or a part of carbon tax proceeds to households. The impact of the carbon tax might differ across income groups or regions (Flues, Thomas, 2015); hence, these effects should be taken into account when designing the reimbursement systems.

### **Statistical analysis**

In the present paper, the greenhouse gas emissions were compared in OECD countries, Lithuania and Georgia by the authors. CO<sub>2</sub> generated by combustion of fossil fuels and biomass accounts for about 90% of total CO<sub>2</sub> emissions and determines the overall GHG emissions trend. After three years of stability, global energy-related CO<sub>2</sub> emissions picked up again and reached a record high of 32.8 billion tonnes in 2017. Emissions are still growing in many countries mainly due to increases in the transport and the energy sectors (OECD, 2019).

Since 1990, the growth in energy-related CO<sub>2</sub> emissions has been slowing down in OECD countries as a group. Today, OECD countries emit about 35% of global CO<sub>2</sub>



emissions from energy use, compared to more than 50% in 1990. Lithuania's data are better than the OECD average. On a per-capita basis, the OECD countries still emit far more CO<sub>2</sub> than most other world regions: 8.9 tonnes of CO<sub>2</sub> per capita were emitted on average in the OECD countries in 2018 compared to 4.3 tonnes in the rest of the world. In Lithuania, this indicator was about 6,5 tonnes of CO<sub>2</sub>, Georgia – 4.54 tonnes of CO<sub>2</sub>. In Lithuania, the indicator was increasing, while in Georgia, decreasing. This shows that the industrial economy needs to be transformed to target development based on the principles of the bioeconomy in order to reduce the GHG

emissions. The environmental taxes are one of the most effective ways to reduce CO<sub>2</sub>.

The main indicators of the role of environmental taxes in the development of bioeconomy is the revenue from environmental taxes. The authors have compared this indicator in Lithuania and the OECD countries. Georgia does not provide official information on this indicator. The situation in Lithuania is better on average than in the OECD countries in terms of the share (percentage) of the revenues from environmental taxes in GDP, revenue from the air pollution-related taxes. Nonetheless, the revenues from transport taxes in Lithuania are low (Table 1).

**Table 1. Main indicators of environmental taxes in Lithuania and OECD**

Indicators	Unit of measure	Lithuania		OECD	
		2000	2019	2000	2019
Environmental taxes	% of GDP	2.76	1.94	1.83	1.52
Revenue from air pollution-related taxes	% of environmental tax revenue	65.1	92.34	85.1	80.02
Revenue from taxes directed at biodiversity	% of environmental tax revenue	7.1	2.77	1.18	0.92
Revenue from climate change-related taxes	% of environmental tax revenue	66.24	91.1	90.32	90.61
Revenue from energy taxes	% of GDP	1.74	1.72	1.31	1.08
Revenue from transport taxes	% of GDP	0.67	0.08	0.46	0.4
Revenue from pollution taxes	% of GDP	0.05	0.04	0.05	0.04
Revenue from resource taxes	% of GDP	0.3	0.11	0.01	0.01

Having analysed the revenue from climate change-related taxes, the authors found that Lithuania only had energy tax bases.

Having started implementation of the Green Deal, Lithuania will have to apply carbon taxes and other environmental taxes (Table 2).

**Table 2. Revenue from climate change-related taxes in Lithuania and OECD**

Indicators	Unit of measure	Lithuania		OECD	
		2000	2019	2000	2019
Climate change-related tax revenue: energy tax bases	% of environmental tax revenue	63.1	88.31	70.96	70.52
Climate change-related tax revenue: transport tax bases	% of environmental tax revenue	0	0	18.95	19.75
Climate change-related tax revenue: resource tax bases	% of environmental tax revenue	0	0	0.38	0.4
Climate change-related tax revenue: pollution tax bases	% of environmental tax revenue	0	0	0.38	0.4

In Lithuania, the same situation could be noticed in the relation to the revenue from air pollution-related taxes. The best situation is

that of the energy tax, but while the worst situation has been noticed in relation to the resource tax (Table 3).

**Table 3. Revenue from air pollution-related taxes in Lithuania and OECD**

Indicators	Unit of measure	Lithuania		OECD	
		2000	2019	2000	2019
Air pollution-related tax revenue: energy tax bases	% of environmental tax revenue	63.1	88.31	68.45	63.82
Air pollution-related tax revenue: transport tax bases	% of environmental tax revenue	0.24	1.91	15.96	16.2
Air pollution-related tax revenue: resource tax bases	% of environmental tax revenue	0	0	0.62	0.48
Air pollution-related tax revenue: pollution tax bases	% of environmental tax revenue	1.73	2.12	0.01	0.01

Lithuania does not have any biodiversity related taxes, but it has resource taxes only. For example, these are taxes and charges on

pesticides, fertilisers and other sources of GHG emissions, natural resource extraction, and entrance fees to natural parks.

**Table 4. Revenue from biodiversity-related taxes in Lithuania and OECD**

Indicators	Unit of measure	Lithuania		OECD	
		2000	2019	2000	2019
Biodiversity-related tax revenue: energy tax bases	% of environmental tax revenue	0	0	0.003	0.009
Biodiversity-related tax revenue: transport tax bases	% of environmental tax revenue	0	0	0.194	0.225
Biodiversity-related tax revenue: resource tax bases	% of environmental tax revenue	0	0	0.663	0.574
Biodiversity-related tax revenue: pollution tax bases	% of environmental tax revenue	7.1	2.77	0.322	0.423

The authors have compared the mean indicators of bioeconomy in Lithuania, Georgia and OECD countries. The main

indicator is agriculture, forestry and fishery, value added, % of GDP (Table 5).

**Table 5. The main factors of bioeconomy**

Indicators	Lithuania		Georgia		OECD	
	1990	2019	1990	2019	1990	2019
Agriculture, forestry and fishery, value added (% of GDP)	9.88	3.24	30	7.3	2.33	1.39
Food and beverage industry, value added (% of GDP)	6.5	3.7	35	9.1	x	x

The research has shown that both in Lithuania and in Georgia, agriculture, forestry and fishery, as the producers of biological resources and key bioeconomy sectors, account for a considerably greater share compared to the mean share among the OECD

countries. This suggests that there is the potential for bioeconomy development in Lithuania and Georgia, in particular, in the current context of climate change and implementation of the EU's Green Deal. The indicators were better in Georgia. Georgia has



the potential to develop bioeconomy; however, it should use environmental taxes and protect the environment, develop organic farming to

be considered as a member of the OECD or the EU.

**Table 6. Bioeconomy indicators in Lithuania and Georgia**

Indicators	Lithuania		Georgia	
	1990	2019	1990	2019
Total production of renewables (PJ)	13.42	70.06	46.84	40.94
Share of renewables in total energy production (%)	6	85	55	93
Share of renewables in TES (%)	2	22	9	20
Share of solid biofuels in renewables production (%)	89	76	42	24

Other indicators of the bioeconomy development in the both countries analysed demonstrate the pace of development potential of the bioeconomy businesses (Table 6). An environmental tax system in line with bioeconomy development and investment into

environmental protection and bioeconomy development could help maintain and improve this pace. A balanced environmental tax system and harmonized bioeconomy targets would help achieve sustainability goals (Figure 1).



**Figure 1. The link between environmental taxation, the bioeconomy and sustainability**

Investment in environment-related research and development has grown in the recent years, as has the market for environmental technology, goods and services in Lithuania and Georgia. This is main condition for developing the bioeconomy in context of sustainability.

**Conclusions**

The aims of bioeconomy and environmental taxes are the same and contribute to solving several societal challenges: ensuring food security, management of natural resources in a sustainable manner, reduction of dependence on non-renewable resources, mitigation of and adaptation to climate change, creation of jobs, and maintenance of competitiveness. Bioeconomy serves the goals of resource

saving and reduction of environmental pollution and is, therefore, in accordance with principles of sustainable development.

Certain European countries have implemented environmental tax reforms. No reforms have been implemented in Lithuania and Georgia. The aim of this kind of a reform is shifting the tax burden in favour of environmentally targeted taxation.

The situation in Lithuania is better on average than in the OECD countries in terms of the share of the revenues from environmental taxes in GDP, revenue from the air pollution-related taxes. The revenues from transport, taxes in Lithuania are low. Almost all environmental taxes (90%) are excise duties on oil and oil products, with the taxes on pollution and natural resource use accounting for the remaining share.

Lithuania does not yet levy a carbon tax, although it participates in the EU emissions trading system. Having started to implement the Green Deal, Lithuania will have to apply carbon taxes and other environmental taxes.

Environmental tax burden in Georgia is very low, but this country has the potential to develop the bioeconomy. At present, the excise

tax plays the role of an environmental tax in Georgia. Since 1 January 2017, it was increased significantly for petroleum products, oil distillates, and natural gas. The reason behind the tax increase was to avoid the expected reduction of budget revenues as a result of the profit tax reform, rather than an environmental policy.

## References

- AHLHEIM, M., 2018, Environmental economics, the bioeconomy and the role of government. In *Bioeconomy* (pp. 317-329). Springer, Cham.
- ASADA, R., CARDELLINI, G., MAIR-BAUERNFEIND, C., WENGER, J., HAAS, V., HOLZER, D., & STERN, T., 2020, Effective bioeconomy? A MRIO-based socioeconomic and environmental impact assessment of generic sectoral innovations. *Technological Forecasting and Social Change*, 153, 119946
- BÖCHER, M., TÖLLER, A. E., PERBANDT, D., BEER, K., & VOGELPOHL, T., 2020, Research trends: Bioeconomy politics and governance. *Forest Policy and Economics*, 118, 102219.
- D'AMATO, D., & KORHONEN, J., 2021, Integrating the green economy, circular economy and bioeconomy in a strategic sustainability framework. *Ecological Economics*, 188, 107143.
- Environmental Assessment Code: Law of Georgia Environmental Assessment Code*, 2021, article 2. Retrieved: <https://www.matsne.gov.ge/en/document/view/3691981?publication=2> Access:12.03.2021.
- Environmental Performance Index, 2020*. Retrieved: <https://epi.yale.edu/epi-results/2020/component/epi> Access:12.04.2021.
- Excise Tax: Tax Code of Georgia*, 2021, article 188. Retrieved: <https://www.matsne.gov.ge/en/document/view/1043717?publication=152> Access:13.04.2021
- FAN, X., LI, X., & YIN, J., 2019. Impact of environmental tax on green development: A nonlinear dynamical system analysis. *PLoS ONE*, 14(9), 1–23. <https://doi.org/10.1371/journal.pone.0221264>
- FLUES, F., THOMAS A., 2015, The distributional effects of energy taxes, *OECD Taxation Working Papers, No. 23*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5js1qwkqqr-bv-en>.
- FREIRE-GONZÁLEZ, J., 2018. Environmental taxation and the double dividend hypothesis in CGE modelling literature: A critical review. *Journal of Policy Modeling*, 40(1), 194-223.
- Green Taxation – in support of a more sustainable future*. European Commission. [https://ec.europa.eu/taxation\\_customs/green-taxation-0\\_en](https://ec.europa.eu/taxation_customs/green-taxation-0_en) <https://doi.org/10.1080/00207543.2016.1144940>
- JOHNSON, C., SIERRA, A. R., DETTMER, J., SIDIROPOULOU, K., ZICMANE, E., CANALIS, A., & PUZZOLO, V., 2021, The Bio-Based Industries Joint Undertaking as a catalyst for a green transition in Europe under the European Green Deal. *EFB Bioeconomy Journal*, 1, 100014.
- KHAN, S. A. R., PONCE, P., & YU, Z., 2021. Technological innovation and environmental taxes toward a carbon-free economy: An empirical study in the context of COP-21. *Journal of Environmental Management*, 298, 113418.
- KOTLÁN, I., NĚMEC, D., KOTLÁNOVÁ, E., SKALKA, P., MACEK, R., & MACHOVÁ, Z., 2021. European Green Deal: Environmental Taxation and Its Sustainability in Conditions of High Levels of Corruption. *Sustainability*, 13(4), 1981.
- Law of Georgia on Environmental Protection*, 2021, article 18 Retrieved: <https://www.matsne.gov.ge/en/document/view/33340?publication=21> Access:18.03.2021.
- LIOSIKIENE, G., CHEN, X., STREIMIKIENE, D., & BALEZENTIS, T., 2020. The trends in bioeconomy development in the European Union: Exploiting capacity and productivity measures based on the land footprint approach. *Land Use Policy*, 91, 104375.
- LIOSIKIENĖ, G., MICEIKIENĖ, A., & BRIZGA, J., 2021, Decomposition analysis of bioresources: Implementing a competitive and sustainable bioeconomy strategy in the Baltic Sea Region. *Land Use Policy*, 108, 105565.
- MASCU, S., CIOTE, C. S., LIPARA, D., & PARASCHIV, G. M., 2013, Environmental fiscal policy of central and eastern european countries in the bioeconomy era. *International Multidisciplinary Scientific GeoConference: SGEM*, 2, 127.
- MEHDIYEVA, L., 2021., Problems of formation and development of ecological taxation. *Economic and Social Development: Book of Proceedings*, 186-190.
- MICEIKIENĖ, A., & BUTVILAITĖ, A., 2018, Model for Assessment of the Effect of Environmental Taxes on Environmental Protection in Selected Countries.

MICEIKIENĖ, A., GESEVIČIENĖ, K., & RIMKUVIENĖ, D., 2021, Assessment of the Dependence of GHG Emissions on the Support and Taxes in the EU Countries. *Sustainability*, 13(14), 7650.

NORREGAARD, J., & REPELIN-HILL, V., 2000, Taxes and Tradable Permits as Instruments for Controlling Pollution Theory and Practice.

NORREGAARD, J., REPELIN-HILL V., 2000, Controlling Pollution Using Taxes and Tradable Permits. International Monetary Fund.

*Environment at the Glance: Climate change*, 2020, OECD, [www.oecd.org/environment/env-at-a-glance](http://www.oecd.org/environment/env-at-a-glance).

*Lithuania - Changes in Taxation of Employment-Related Income for 2020*, 2020, Parliament of Lithuania, [https://www.lrs.lt/sip/portal.show?p\\_r=35403&p\\_k=1&p\\_t=269641](https://www.lrs.lt/sip/portal.show?p_r=35403&p_k=1&p_t=269641).

SINGH, S., HALDAR, N., & BHATTACHARYA, A., 2018, Offshore manufacturing contract design based on transfer price considering green tax: a bilevel programming approach. *International Journal of Production Research*, 56(5), 1825–1849.

*Ten trends for the sustainable bioeconomy*, 2020, Nordic Council of Ministers.

VENKATRAMANAN, V., SHAH, S., & PRASAD, R. (EDS.), 2021, *Sustainable bioeconomy: pathways to sustainable development goals*. Springer Nature.

VERULIDZE, V., MICEIKIENĖ, A., 2021, Green economy as a new opportunity to stimulate export and attract investments, the case of Georgia. *Management Theory and Studies for Rural Business and Infrastructure Development*, 43(4), 468-474.