Climate Policy and Plans for Recovery in Bulgaria and Lithuania

Maria Kotseva-Tikova, Jaroslav Dvorak[1]

Abstract: *The article analyses the climate policy and activities envisaged by the national recovery and resilience plans of Bulgaria and Lithuania, which aim to contribute to the green transformation and stabilisation of both economies after the economic slowdown as a result of COVID-19. The methodology of the current research is based on literature review and data analysis of the two countries with different economic structures and sizes. The National Recovery and Resilience Plans (NRRP) of both countries are compared through the methodology of Bruegel think tank, as that approach is applied to study the Bulgarian plan, which was finalised on 6 April 2022. The main instrument for recovery is the investment in the green economy, which also allows for reaching the climate neutrality target. Both countries demonstrate a decrease in emissions since 1990, as the GHG emissions per GDP in Bulgaria are more than two times higher than the EU27 average and the Lithuanian emissions, as a result of the energy sector. The countries need further actions for GHG reduction and have therefore allocated significant financial resources to achieve the green recovery measures in their plans.*

Keywords: *climate policy, climate change, recovery and resilience plans, Bulgaria, Lithuania.*

Introduction

It is recognised that climate changes are real and increasingly as a result of anthropogenic activities. Scientists show that climate conditions are changing and threatening different elements of the environment. Recent studies have proven a correlation between human activities and greenhouse gas emissions (GHG) increase (Tang et al., 2021). The 2021 assessment report of the Intergovernmental Panel on Climate Change (IPCC) strongly emphasises that the increases in greenhouse gas emissions from 1850 to present are unequivocally caused by human activity.

The efforts of the governments and international organisations are oriented towards finding suitable solutions for decreasing the anthropogenic influence and to keep the temperature increase below 1.5°C. The realisation of such a global task requires comprehensive efforts and international partnerships (DeWit, Shaw, Djalante, 2020; de las Heras, 2021). In this regard, it is required to update the national targets, as well as to increase the aid to the poorest and most vulnerable countries to tackle the climate change effects. Societies are in a period when they need to change the way they are used to doing

[1] **Maria Kotseva-Tikova** is chief assistant at Sofia University "St. Kliment Ohridski", Department of Public Administration and at the Economic Research Institute at the Bulgarian Academy of Sciences, Regional and Sectoral Economy Department.
E-mail: maria_kotseva@yahoo.com
Jaroslav Dvorak is professor of public administration at the Klaipėda University, Lithuania, Department of Public Administration and Political Sciences and visiting assoc. professor at University of Johannesburg, South Africa, School of Public Management, Governance and Public Policy.
E-mail: jaroslav.dvorak@ku.lt

business and consuming goods. Global responses are necessary but not sufficient. The Climate Governance Commission (2021) considers that doubt stems from the velocity and competence needed to match the intensifying climate urgency. A fundamental transformation of technologies, industrial processes, and production models, as well as of transportation and consumption patterns, is urgently required.

The key measure to prevent global warming and its negative impacts is the reduction of GHG emissions, as the annual meetings of the Conference of the Parties (COP) are expected to contribute to it and motivate actions towards the carbon neutrality goal until 2050. During the COP26 in 2021, the international community discussed the aim of reducing global CO_2 emissions by 45% by 2030 and to zero by mid-century. A growing number of nations, regions, cities, and businesses have recently pledged to achieve net-zero carbon emissions by 2050 or earlier. This can be considered an important step forward, even though most of these commitments are not sufficiently robust (The Climate Governance Commission, 2021).

The EU member states can support the green transition through the use of recovery and resilience mechanisms, which contribute to the achievement of the EU target of climate neutrality. Tightening the targets is perceived as an efficient measure to bring the European industry close to its global ambitions (Pietzcker et al., 2021). The member states have allocated almost 40% to climate measures in their national recovery and resilience plans (NRRP). Moreover, Kaklauskaitė and Navickė's (2021) research confirmed that the EU member states allocated large amounts of funding to address common social topics (unemployment, poverty, social exclusion) and achieve better results in adapting to climate change and reducing and mitigating its negative effects.

Previous research (Allam et al., 2021) has already raised the question of theoretical conception and knowledge structures in the context of global climate policy trends such as the Green Deal. As the world situation changes very rapidly today, war and modern military activities are becoming critical factors for the growth of environmental pollution, the loss of biodiversity and others (Reis et al., 2022). There is a general consensus that new climate policy measures can radically change political and economic governance frameworks. It is emphasised that new trends such as resilience and climate change adaptation are emerging very quickly in strategies and plans, in contrast to national legislation (Mehryar and Surminski, 2021). However, the analysis of a Swedish case concerning the implementation of the EU Floods Directive confirmed that various environmental measures in some cases can also encumber collaborative and voluntary initiatives (Goytia, 2021).

The article examines the framework of climate policy in two EU countries, which may contribute to improving the knowledge on climate policy. The aim of the research is to compare the climate policy and activities envisaged by the NRRP of Bulgaria and Lithuania, seeking to contribute to the green transformation and stabilisation of both economies after the economic slowdown as a result of the COVID-19.

The applied methodology is composed of case studies for two countries with different economic structures and sizes. The choice of Bulgaria and Lithuania is relevant for the trends in new EU member states and appropriate for several reasons. First, Lithuania and Bulgaria joined the EU in different periods – in 2004 and 2007 respectively, but the gap between them was only three years. Researchers Čiburienė and Zaharieva

(2006) analyse the national competitiveness of the state and highlight the impact of EU membership on economic development and environmental protection. Secondly, Lithuania has been in the Eurozone since 2015 and a member of the Organisation for Economic Cooperation and Development (OECD) since 2018, which may contribute to a higher attractivity to investors (Hofbauer and Limanskis, 2022). This factor was identified by the above-mentioned authors in their study about Latvia, therefore, considering the particularities Latvia and Lithuania share, it can be implied that these conclusions can be valid for this case as well. Higher environmental standards were subsequently applied in the Baltic Sea region. Green investments require, on the other hand, greater amount of funds and longer payback periods, and access to such creditors is much easier for the OECD countries. Thirdly, it is recognised that the temperature is rising throughout the EU, especially faster in Southern Europe, where Bulgaria is located, therefore it will be affected more often by heat waves, which will have a negative effect on people's health (Lenaerts et al., 2022). The raise of average temperature also heavily impacts Bulgarian agriculture, which is an important economic sector.

The NRRPs of both countries are compared through the methodology of Bruegel think tank. Initially, the Bruegel approach was developed and applied to the first EU states that had presented NRRPs, including Bulgaria's initial version of October 2021. Due to domestic political changes, Bulgaria delayed its plan and finalised it on 6 April 2022. The authors used the Bruegel methodology to evaluate the final Bulgarian document, studying its structure and comparing it with the Lithuanian one, considering the Bruegel evaluation of the initial version. The two versions of the Bulgarian plan were evaluated through this methodology, which allowed to identify the new and stronger commitments towards more green energy projects in the state.

The main stimulus for such plans is the necessity to boost economic activity together with its transformation towards climate-neutral solutions. Greening the energy base and digitalising most sectors can positively impact the development of the member states, as Bulgaria envisages investing € 6.3 billion in grants and Lithuania – € 2.2 billion until 2026. Climate neutrality stimulates research and development (R&D) and new technology application in most industries, which improves their efficiency and energy independence. The latter is important under the new international situation with high energy prices and other risks, which modern societies face. This is not seen as a brand-new policy, but as an already existing governance model facilitating its implementation (Misik and Oravkova, 2022). The use of common resources could support cohesion, resilience, and transformation in the EU (Crescenzi et al., 2021) to provide prosperity through timely and effective measures.

Climate concerns

International negotiations for GHG reduction are complex due to distrust of the causes of climate change. There are two types of factors that have an impact: natural and anthropogenic. The lack of consensus on a universal hypothesis, which explains past and present changes, hampers global efforts to address them.

Anthropogenic factors are related to human activity and its impact on elements of the climate system – land surface, vegetation, atmospheric composition, water, etc. In recent years, there have been dramatic changes in the components of the climate system

for short periods, which contrasts with the changes that have taken place in the past tens or even hundreds of thousands of years. At the beginning of the 21st century, the debate between supporters and opponents of environmental initiatives is intensifying. In contrast with the reports of the IPCC, there are others who do not accept the data and try to find errors in the calculation of the anthropogenic effects and even forge data (Masson-Delmotte et al, 2021).

McElroy (2016) believes that some of the statements about the lack of human influence are ideological, based on distrust of science or suspicion of government manipulation of the issue for other purposes. He proves that the concentration of crucial greenhouse gases is increasing, that the planet is now warmer than it has been in the last 140 years, and that changes resulting from human activity are fundamental. A lot of researchers try to explain climate scepticism, as Johansson, Berggren and Nilsson (2022). Among the main factors for refusal to accept climate change as a problem are: income; education; psychological, sociological, cultural, and political factors. The difference in the attitudes could be explained by the fact that climate protection is seen as a global public good. As Böhringer et al. point (2021), each country benefits from the emission abatement of other countries.

Despite the differences in the attitudes toward global warming, the international community tries to find an appropriate way to make all countries in the world engage with GHG decrease (Impinna, 2021). The US has had a leading role in climate change governance from the '60s to the late '80s (of the 20th century), and brought this topic to the attention of the international community. At that time, in 1988, the IPCC was established and since then it has been seen as an attempt to institutionalise the developing debate on climate change. After the withdrawal of the US from the Kyoto protocol, the EU has become the leading international organisation attempting to stimulate the world's efforts to combat climate change.

The most recent international agreement – the Paris Agreement – establishes a system for every state to prepare its own way of contributing to the decarbonisation process. It is considered weaker than the Kyoto Protocol, but necessary to "get key actors on board" (Andresen et al., 2016). There has been an increase in the number of countries setting targets for reducing greenhouse gases to zero. By April 2021, there were 44 countries and the European Union, which accounted for about 70% of global CO2 emissions (Bouckaert et al., 2021). Ten countries make it legally binding, eight are proposing to do so through legal obligation and the rest through other political commitments. If all commitments are met, this will somehow reduce the gap between the target pursued by these countries, and the level that needs to be reached to achieve zero emissions by 2050 worldwide. According to Bouckaert et al., (2021), the achievement of all targets will be accompanied by 22 gigatonnes (Gt) of CO_2 emissions worldwide in 2050, which corresponds to an increase in temperature in 2100 by about 2.1°C (with a 50% probability). Kreutzer, Loris, Tubb and Dayaratna (2016) reach a similar conclusion, emphasising the need for a historical assessment of global warming data, which will clarify the possibilities of impact policies.

Human activity is considered to be the main reason for increased greenhouse gas emissions since 1850. The estimated range of the total human-induced increase in global surface temperature from 1850–1900 to 2010–2019 is from 0.8°C to 1.3°C, with a most

likely estimate of 1.07°C (Masson-Delmotte et al., 2021). These changes are considered to determine other planetary impacts, such as precipitation increase, melting glaciers, changes in ocean levels and temperatures, and changes in the Earth's biosphere. The energy sector and the extraction of conventional fuels have made a significant contribution to the increase in CO2 concentrations during the last decades.

The EU27 member states backed the goal of climate neutrality by 2050 by reducing emissions by at least 55% until 2030 compared to 1990 levels. Achieving this target requires initiatives in a number of sectors considered key emitters of greenhouse gases. It is ambitious and requires accelerating the rate of decarbonisation. Decarbonisation is a process covering different industries, and, while electricity is seen as the easiest sector to tackle, it is far more complex for transport, heating, industry and agriculture (Tol, 2021). According to Tol (2021), reaching the targets of the Paris Agreement would cost between 0.5% and 10.5% of GDP in 2050, with an average of around 3%. The benefits are only 0,3% of GDP. He anticipates that weather disasters will not materialise in the long term, which might result in a decrease of the support for the EU's climate policy. However, it is recognised that GDP represents neither a good nor a reliant indicator of progress. This indicator does not cover all variables, and, by extension, does not show what might have been produced in one region and consumed in another (Wróblewski, 2020).

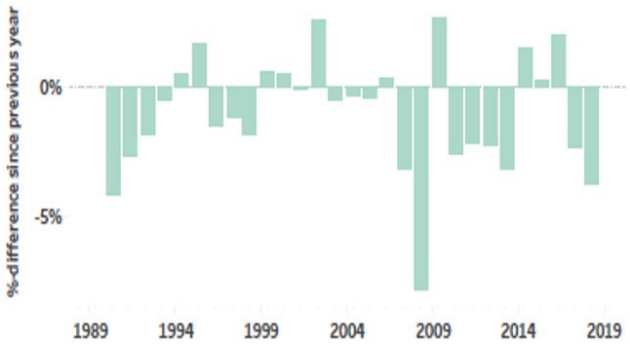
Climate change generates not only physical but also potential systemic risks, as it threatens social and financial stability. It could disrupt societies and negatively impact vulnerable groups (Ringsmuth et al., 2022). The massive storms, floods etc. can have substantial economic costs, financial losses, and lead to the devaluation of carbon-intensive assets (Orazio, 2021). Several climate-related risks could threaten financial systems and require the implementation of prudentially motivated policies (Balcerzak and MacGregor Pelikánová, 2020; Baer et al., 2021; Bracking and Leffel, 2021). Climate-related fiscal policies can stimulate physical and financial investments in sustainable activities. It is important to have a state intervention at all levels (municipal, federal, etc.) through financial incentives, adopting regulation and training to successfully implement green projects and share their positive effects among all groups (Godin et al., 2021). The crisis periods stimulate investing in green activities. Such investments will positively influence employment and will stimulate R&D in green industries (Dong et al, 2022). Green recovery policies should be designed by combining basic economic recovery policies with a carbon tax.

Investing in carbon-free solutions, renewable energy, electrical vehicles, circular economy, sustainable food systems and forestry, and replacing fossil fuel technologies represent the way towards reaching climate neutrality and preventing a temperature increase. In some sectors and industries, there are no viable low-carbon solutions, which require more investments in developing affordable alternatives. At the same time, the transition must be done in such a way that supports sustainable development.

Analysis of GHG emissions in Bulgaria and Lithuania

In the context of the EU efforts to become climate neutral, the European Environment Agency (EEA) statistics point to an average decrease of GHG emissions of 25.89% compared to the levels in 1990, and a 4% annual decrease in 2019 *(Figure 1)*.

Figure 1. Annual percentage change emissions in the EU

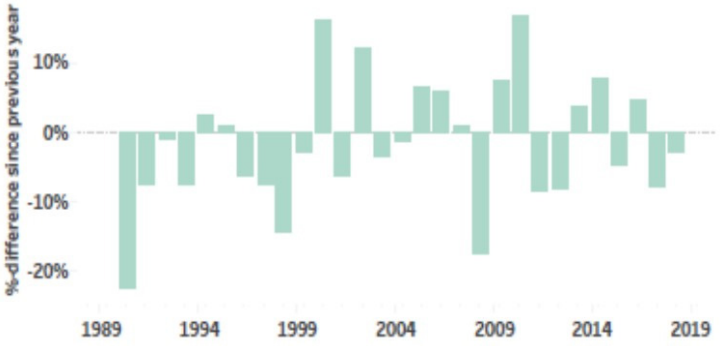


Source: EEA greenhouse gases – data viewer, 2021.

The strongest decreases are observed after crises – in 1989 during the post-socialist transformation, in 2009 after the global financial crisis, and in 2019 during the COVID-19 pandemic. The global financial-economic crisis resulted in the highest reduction. During that period, new investment alternatives were structured and financed. Green economy was recognised as the appropriate answer to support the economy and combat climate changes.

In Bulgaria, there have been three years with an increase and three years with a decrease in GHG. Since 1990, there has been a 42.22% change and a 3% annual decrease in 2019 *(Figure 2)*.

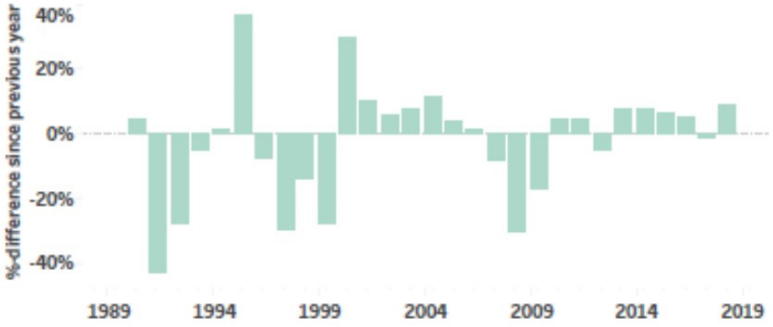
Figure 2. Annual percentage change emissions in Bulgaria



Source: EEA greenhouse gases – data viewer, 2021.

The highest decrease is observed in 1989 and 2009 with 22% and 17% annual change, respectively. The data for Lithuania show a greater GHG decrease – of 64.19% in1989 and an annual increase of 9% in 2009 *(Figure 3)*. Despite this, the country has achieved a significant result with the biggest decreases recorded in 1992 (43%) and 2009 (30%).

Figure 3. Annual percentage change emissions in Lithuania



Source: EEA greenhouse gases – data viewer, 2021.

The economic and financial crisis has resulted in a GHG decrease in both countries analysed, yet of different magnitude. After the initial lowering as a result of economic and political transformation, in 2009 the global financial crisis impacted them strongly again. As Miciuła et al. (2021) point, the Central and Eastern European (CEE) countries experienced the highest GHG reduction in the EU, the main reason for that being the economic crisis. Belonging to the same region, Bulgaria shows a similar tendency.

Bulgaria has had results close to the EU average during the past four years, with a better-accumulated decrease since 1990. Nevertheless, fossil fuels will continue to play a dominant role till 2050 (Miciuła et al., 2021). In 2019 Bulgaria had emissions of 8,1 t CO2 per capita, and Lithuania of 7.4 t CO_2, which is below the EU27 average of 8,4 t CO_2.

In 2019, the total emissions per GDP are higher in Bulgaria in comparison to Lithuania and EU27 *(Figure 4)*. The amount of GHG emissions of Lithuania for 2019 amounted to 20.4 million tons of CO2 and was by 57.4% lower than the amount of GHG emissions in 1990 – 47.8 million tons of CO2.

Figure 4. GHG emissions in EU27 in comparison with Bulgaria and Lithuania

Sector Name	Gas	Country	Year of Date	Emissions t CO2 equivalent	Emissions per capita t CO2 equivalent	Emissions per GDP t CO2 equivalent
1 - Energy	All greenhouse gases - (CO2 equivalent)	Bulgaria	1990	71,288,991	8.18	
			2019	40,228,061	5.77	766.45
		EU-27	1990	3,741,639,249	8.90	455.14
			2019	2,767,335,106	6.19	208.36
		Lithuania	1990	33,122,490	8.96	1,189.69
			2019	11,888,780	4.25	274.58
2 - Industrial Processes and Product Use	All greenhouse gases - (CO2 equivalent)	Bulgaria	1990	10,084,042	1.16	
			2019	6,359,874	0.91	121.17
		EU-27	1990	462,139,052	1.10	56.22
			2019	339,781,384	0.76	25.58
		Lithuania	1990	4,460,237	1.21	160.20
			2019	3,410,128	1.22	78.76
3 - Agriculture	All greenhouse gases - (CO2 equivalent)	Bulgaria	1990	12,307,646	1.41	
			2019	6,249,247	0.90	119.06
		EU-27	1990	487,972,116	1.16	59.36
			2019	385,786,960	0.86	29.05
		Lithuania	1990	8,687,433	2.35	312.04
			2019	4,245,498	1.52	98.05
4 - Land Use, Land-Use Change and Forestry	All greenhouse gases - (CO2 equivalent)	Bulgaria	1990	-19,128,425	-2.19	
			2019	-9,562,007	-1.37	-182.18
		EU-27	1990	-211,235,333	-0.50	-25.70
			2019	-249,067,074	-0.56	-18.75
		Lithuania	1990	-5,450,674	-1.47	-195.78
			2019	-5,435,953	-1.95	-125.55
5 - Waste management	All greenhouse gases - (CO2 equivalent)	Bulgaria	1990	6,297,400	0.72	
			2019	3,118,095	0.45	59.41
		EU-27	1990	174,885,735	0.42	21.27
			2019	115,514,532	0.26	8.70
		Lithuania	1990	1,522,132	0.41	54.67
			2019	823,442	0.29	19.02
6 - Other Sector	All greenhouse gases - (CO2 equivalent)	Bulgaria	1990			
		EU-27	1990			
			2019			
		Lithuania	1990			
			2019			
Total emissions (UNFCCC)	All greenhouse gases - (CO2 equivalent)	Bulgaria	1990	99,978,080	11.47	
			2019	55,955,277	8.02	1,066.09
		EU-27	1990	4,870,956,024	11.59	592.52
			2019	3,610,051,758	8.08	271.81
		Lithuania	1990	47,792,292	12.92	1,716.61
			2019	20,367,848	7.29	470.41

Source: EEA greenhouse gases – data viewer, 2021.

The structure of the amount of GHG emissions of Lithuania changed due to the transformation of the national economy (shrinkage of the industrial sector and expansion of the service sector, changes in the energy resources used etc.) and the GHG reduction measures implemented. These measures have already contributed to the GHG aim for 2030, but more appropriate ways must be found to reach further decreases. Since 2014, the level of GHG emissions shows annual increases except for 2018.

Both countries need to change the emissions levels to move closer to the average of the Union. The high GHG emissions per GDP in Bulgaria are due to the energy sector – more than two times higher than EU27 and Lithuanian emissions per GDP. The sectoral structure shows low performance in that ratio across all sectors. In Bulgaria, the emissions per capita show better results in other energy non-related sectors. The energy intensity of the Bulgarian economy continues to be the main problem, as well as its high dependence on local coals. The coal share in electricity production is 40%, as most of the

coals are mined in the country, which means the coal sector also contributes to national employment and GDP more than in countries that rely exclusively on imported coal. The Bulgarian coal industry is under economic pressure from increased CO2 prices (Zachmann et al., 2022). Obviously, it requires technological transformation, which is the reason for the envisaged investments in renewable energy sources (RES) in the coal regions through the projects from the NRRP.

The GHG impacts climate change and are expected to negatively influence all sectors of the economy of both countries (National Strategy for Climate Change Adaptation and Action Plan, 2019; National Climate Change Agenda, 2021). The strongest influence in Bulgaria will be on agriculture and ecosystems (Mochurova et al., 2014; Branzova and Ruscheva, 2019), but also on energy and transport, as well as negative impact on income. In Lithuania, the transport and agricultural sectors will also be the most affected (National Climate Change Agenda, 2021). During the COVID-19 pandemic in 2020, the agriculture and the food industry were less affected and showed resilience to this shock (Kotseva-Tikova and Dvorak, 2021), but the abrupt climate change could potentially transform agri-structures and yields. The National Strategy for Climate Change Adaptation and Action Plan (2019) estimates, that the benefits from the adaptation are high especially in case of more intense climate changes. The government can use national financial sources, as well as EU financing to develop green and carbon-neutral solutions for the most vulnerable industries. In that respect, the NRRP of Bulgaria envisages the highest share of grants and private financing to be oriented to green projects and renewable energy generation.

Lithuania has several large companies operating in the chemical, cement, and energy sectors, which generate particularly large amounts of emissions. It is no coincidence that the economic impact of climate change varies from county to county. For example, in Telšiai county, where the largest oil refinery in the Baltic States operates, there is no positive impact or very limited. However, in contrast to Klaipėda county, a port associated with high air pollution, it is observed that the economic impact of climate change is positive (Sørensen et al., 2021). Although Lithuania has met its commitment for 2020 not to increase pollution with greenhouse gases of more than 15%, it is doubtful that a 9% reduction will be reached by 2030 compared to the 2005 level, as Lithuania has the highest emissions per unit of value-added produced in the EU and the economy is twice as energy-intensive (Škiudas et al., 2020).

Since the Lithuanian National Climate Change Agenda (2021) foresees that in 2050 the country's economy will be circular and climate neutral, the relevant measures are included in the current governmental program. In this sense, six main initiatives are foreseen in the implementation of climate policy: (i) a green tax reform; (ii) a circular economy for Lithuania; (iii) a climate-neutral economy by 2050; (iv) a climate-neutral government from 2024, the entire public sector from 2027; (v) a reduction of greenhouse gas emissions in major industrial enterprises; (vi) a 40% decrease in the energy intensity of the Lithuanian economy by 2030 (Seimas, 2020). However, according to the results of the 2021-2022 climate survey conducted by the European Investment Bank (EIB), the majority of the country's population has a dissenting opinion regarding the Government's planned climate policy measures. The results of the survey showed that 56% of the Lithuanian respondents believe that the transition to a green economy will not bring economic growth, while the Bulgarians are more optimistic – 52% think that

the climate policies will boost economic growth (European Investment Bank, 2022). Such findings may indicate that the majority of the Lithuanian respondents have conservative political views, which are often associated with inactivity (Chadwick, 2017). Meanwhile, Bulgarians seem to have egalitarian and communitarian worldviews and support urgent actions (Chadwick, 2017). On the other hand, there is still a lack of active climate change communication both from the side of the governments and environmental NGOs (Burkšienė and Dvorak, 2022). Also, 52% of the Lithuanians and 59% of Bulgarians do not support climate policy measures due to the fear that they will be negatively affected by the national employment lowering levels. On the contrary, a previous study found that environmental identity is important for the Lithuanian population and is essential for national and individual identity (Balžekienė and Budžytė, 2021).

Climate change is the most serious problem facing the world according to a Eurobarometer survey published in 2021, which showed that more than nine in ten Europeans (93%) believe that climate change is a serious problem. The report indicates that nearly one in five Europeans (18%) ranked it ahead of poverty, hunger, lack of drinking water (17%) and the spread of infectious diseases (17%) (Eurobarometer, 2021). Combating climate changes requires combined efforts from both companies and households. Not all citizens take action to fight climate change. Close to half of respondents in Czechia (50%), Italy (48%), Lithuania (48%), and Estonia (47%) say that they have acted, with smaller shares in Romania (31%), Bulgaria (38%) and Latvia (42%). Less than a quarter of respondents consider themselves personally responsible for tackling climate change in five countries, including Latvia (20%), Bulgaria (21%) and Czechia (22%) (Eurobarometer, 2021). Most people think the green transition will improve the quality of their life, and such expectations can support the planned steps towards climate neutrality.

National Recovery and Resilience Plans

In the context of the EU efforts for climate neutrality and decarbonisation, the resilience and recovery instruments are developed to help member states recover after the COVID-19 pandemic and to streamline the implementation of green activities toward climate neutrality.

Each member state developed a National Recovery and Resilience Plan (NRRP) aiming at overcoming problematic areas, including the targets for the European Semester. They are built as country-specific, as they have to address particular economic and social challenges (Misik and Oravkova, 2022). However, Guillamón et al. (2021) found that the choice of classical criteria for allocating money (higher population, higher GDP per capita, higher unemployment) was more beneficial for countries with higher incomes than for economically weak ones.

The European Commission paid special attention to the pillars of green transition and digital transformation. It evaluated national plans expecting minimum 37% of the costs to be assigned to climate investment and minimum 20% to stimulate the digital transition. However, researchers (Maranzano et al., 2021) acknowledge, that it will be difficult to measure the economic impact of the use of NRRP resources as it will depend on significant structural development. Bratu (2021) argued that in the case of NRRP it will be very important to ensure transparency in the use of funds, monitoring,

control, and fraud prevention. Developed economies are deploying unprecedented fiscal and monetary resources to tackle the pandemic and its associated socio-economic consequences, but assessing the environmental impact of such efforts is difficult (Mealy et al., 2021). Some evaluations show that plans would have some positive effects on CO_2 emissions as in some cases (Romani et al., 2022) they will be a result of energy transition investments, thus making climate benefits more likely to be more substantial in the long-term.

The Bulgarian National Recovery and Resilience Plan

The Bulgarian National Recovery and Resilience Plan was initially presented in October 2021 with an investment of € 6.6 billion from the Recovery and Resilience Facility (RRF), being amongst the latest submitted for evaluation. After several changes in priorities and remarks from the European Commission (EC), it was finalised in April 2022 with increased investments of € 6.9 billion. The Bulgarian plan included an increased green investment share from the initial 45.8% to 53.66%. Renewable energy sources (RES) are expected to reach a 26% share in the gross final energy consumption in 2024, relying on hydrogen as an environmental energy option. It is planned for 2021-2024 that the cumulative reduction of the energy and carbon intensity of the national economy to be 10%. The NRRP covers four areas of investments, as follows:

1. *Innovative Bulgaria* covers educational, scientific, and industrial activities with 26.9% of the financial resources. The funds are aimed at modernising education and improving skills, stimulating science and research, and transforming the industry through increased efficiency and RES usage.
2. *Green Bulgaria* received the highest share of funding with 38.1%. The key activities cover low carbon economy with an emphasis on energy efficiency measures in buildings, RES for decentralised production by households and 1.4 GW RES capacity and batteries, digital transformation of the energy system operator, hydrogen and biogas production, and geothermal energy utilisation, electricity storage system application. With respect to biodiversity and agriculture, the management and improvement of these sectors are envisaged.
3. *Connected Bulgaria* has a share of 17.4%. It secures digital connectivity, transport connectivity and investments in the rehabilitation of railway transport, construction of the intermodal terminal, support for the construction of a metro line, development of ecological, safe, functional, and energy-efficient transport systems, and electrification of vehicles. In the field of local development, along with the digitalisation in the water sector, investments in the water supply and sewerage networks for agglomerations between 2000 and 10000 inhabitants are envisaged.
4. *Fair Bulgaria* has a share of 17.7%. This area comprises 25 investments in the business, social and healthcare sectors. Measures for e-justice, information systems in construction and a number of other digital activities are envisaged. A greater level of social inclusion is expected to be achieved through measures for long-term care, social economy, adult education,

digitalisation of museums, libraries, and others. For the healthcare sector, the planned activities are the modernisation of the technical base and the emergency call system, and the implementation of digital medical diagnostic. A combination of important country activities for technical modernisation and introduction/improvement of software solutions has been proposed.

The Bulgarian NRRP lacks assessment and projections for waste management approaches from energy efficiency and RES. The green economy is mainly understood in terms of energy efficiency and renewable energy sources and is intertwined with activities on digitalisation and improvement of information systems, including in the agricultural sector. There is a lack of specifics for circular economy development and, above all, planning the life cycle of the products, which will reduce the carbon footprint and increase efficiency. Green capacity projects are projected to overcome the absence of an updated overall strategy for the development of the country's energy sector.

A green economy entails more than renewable sources. It "leads to improved well-being and social equality" (UNEP, 2011). Its aim is to provide a variety of opportunities for economic development and poverty reduction, without depleting or destroying a country's natural resources, while supporting the sustainable development of cities and regions and solving narrow infrastructure problems. Initiatives for more alternative energy sources and electric cars are closely linked to solving critical problems in the existing energy infrastructure. Encouraging the use of environmentally friendly energy sources and means of transport requires the provision of charging stations and an extensive energy network. It is also necessary to predict the way the batteries and photovoltaics are handled after the end of their life cycle. The full potential of the green economy can be achieved in connection with waste management activities, as well as the transition to a new understanding of production cycles – to find opportunities for non-waste processes and possibilities for operating with different types of products, which can no longer be used. This presents a field for research and the creation of innovative technological solutions, leading eventually to higher efficiency of resources.

The Lithuanian National Recovery and Resilience Plan

On 16 April 2021, the Lithuanian Ministry of Finance presented the NRRP to the general public. At that moment, a very short period (4-5 days) was foreseen for stakeholders' consultation, thus complex and essential insights lacked the necessary time to be presented. It remained unclear what was the outcome and the level of stakeholders' involvement. The member states should have provided a summary of the consultation and how the views received were incorporated into the final document (Vanhercke and Verdun, 2021). However, evidence gathered by other researchers (Verdun and Vanhrecke, 2022) shows that social dialogue has been weak in most EU countries. According to George (2021), those who are involved in the planning are the ones who operate the real process. For its part, the European Commission notes that a close dialogue took place with the Lithuanian government until the plan was submitted on 14 May 2021 and approved in July 2021 (European Commission, 2021). In Lithuania, the NRRP is divided into three key measures, which are presented below:

1. The first measure is green transformation, which focuses on sustainable power generation, sustainable mobility, and accelerating the renovation of buildings. It allocates 37.8% of the total sum for the fight against climate change and the implementation of the green targets. This measure envisions funding for the development of renewable energy sources, the reduction of pollution by increasing the use of renewable energy sources in the transport sector and support to the population for the renovation wave.
2. 32% of the total allocations are earmarked for digital transformation. A solid package of funds is planned to create innovative digital tools, as well as the development of a technological Lithuanian language based on artificial intelligence. It is planned to digitise public administration services for businesses and residents and to develop a 5G network.
3. A key measure to reinforce Lithuania's economic and social resilience is going to fund the improvement of the infrastructure, and of the quality and affordability of the healthcare system with a focus on modernisation of the healthcare infrastructure. Lifelong learning and higher education innovation should receive the largest amount of funding under this instrument. Pre-school education is expected to improve through the consolidation of teaching and learning resources. This measure aims to strengthen social protection by implementing a guaranteed minimum income protection scheme. The smallest amount of funds is allocated for optimising public sector tax compliance, business environment and human resource management.

Comparing the Bulgarian and Lithuanian National Recovery and Resilience Plans

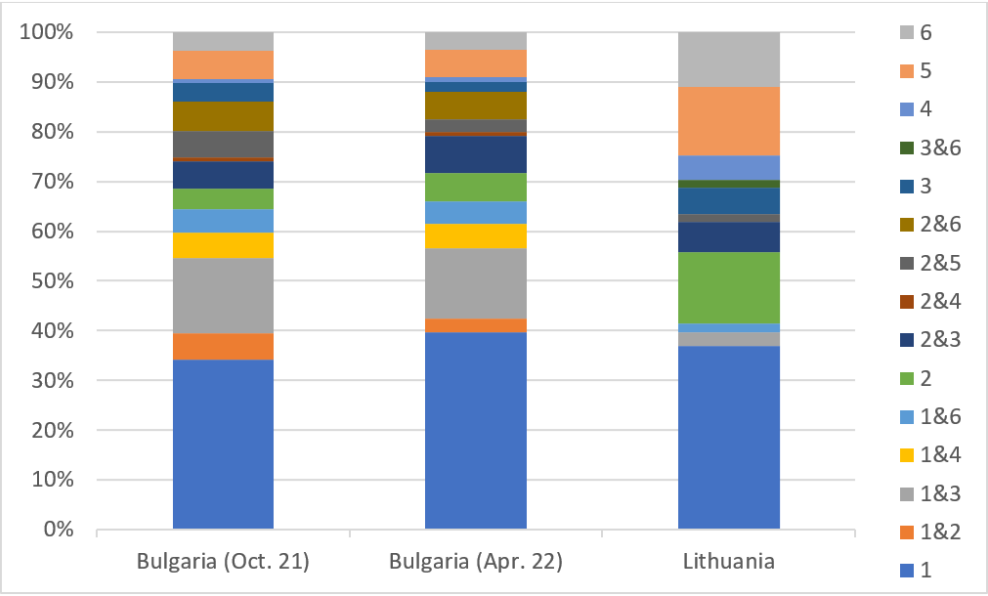
All member states have presented their plans in different periods, which allows their comparison through different methodologies. Darvas and other researchers from Bruegel compared some of the NRRPs; Bulgaria is not included though. They consider the six pillars (missions) defined in Article 3 of the Recovery and Resilience Facility (RRF) Regulation:

- Green transition.
- Digital transformation.
- Smart, sustainable, and inclusive growth including economic cohesion, jobs, productivity, competitiveness, research, development and innovation and a well-functioning internal market with strong SMEs.
- Social and territorial cohesion.
- Health and economic, social, and institutional resilience, with the aim of, inter alia, increasing crisis preparedness and crisis response capacity; and
- Policies for the next generation, children, and youth such as education and skills.

Using this categorisation, they assign either one or two pillars to each spending category based on their judgement. When two pillars are assigned, a multiplicity of categories

emerge. Using that approach, we evaluated Bulgaria's NRRP and compared it with Lithuania's plan assessment, which was released by Bruegel *(Figure 5)*.

Figure 5. The NRRP of Lithuania and Bulgaria from April 2022 and from October 2021



Sources: Darvas, Z., Domínguez-Jiménez, M., Idé Devins, A., Grzegorczyk, M., Guetta-Jeanrenaud, L., Hendry, S., Hoffmann, M., Lenaerts, K., Schraepen, T., Tzaras, A., Vorsatz, V., Weil, P., 2022. European Union countries' recovery and resilience plans, and own calculations (N.B. The pillars used in the evaluation by Bruegel reflect the ones in the Regulation.)

The Bulgarian plan was approved by the European Commission in April 2022. The final version envisages investments of €6.3 billion, provided for 58 investment projects. The Lithuanian's plan relies on €2.2 billion for 28 investment projects[2]. Lithuania's plan envisages the realisation of small projects – the average amount is €78 million/project, while the Bulgarian consists of projects with an average amount of €108 million. The grant investment will be €815 per capita in Lithuania and €926 per capita in Bulgaria.

NRRP of Bulgaria includes more projects that have mixed contributions to the six pillars of the RRF Regulation. Both countries have dedicated the highest share of funds to the green transition objective. The Bulgarian plan envisages more combinations of green projects with other types such as digital transformation, social cohesion, smart growth, and policies for the next generation. The same is valid for the second pillar – the

[2] The EC has updated the maximum financial contribution for non-repayable financial support of the member states on the 30 June 2022, as the decrease for Bulgaria is around € 0,5 billion (-8% change) and for Lithuania € 0,1 billion (-5% change). https://ec.europa.eu/info/sites/default/files/2022_06_30_update_maximum_financial_contribution_rrf_grants.pdf (Accessed: 9 October 2022).

digital transformation initiatives are combined with all other activities. Smaller amounts are dedicated to the rest of the four pillars.

The Bulgarian NRRP includes projects that will be financed mainly by EU grants. Additionally, the government will invest around € 1 billion and the private sector around €2.4 billion. The plan includes 58 investment initiatives, and 12 of them are envisaged to be supported by private financing. The highest share of the private financing is planned for the economic transformation of the private companies with respect to energy generation for self-consumption, as well as the installation of significant (1.4 GW) RES capacities. Their aim is to support independent electricity generation with a positive impact on the prices. Two key investments from the *Innovative Bulgaria* area will be realised mainly through private co-financing, but how exactly the EU grant will induce significant amounts of private capital aimed at innovative decarbonisation is not clear. It is expected that the grants for industrial area development and investments in economic transformation will leverage 1.3 times higher additional private capital funding.

The fourth area *Fair Bulgaria* consists of a vast number of projects (25 projects) envisaging €1 billion in grants, €0.3 billion in additional national financing, and a small amount of private financing – €0.17 billion. The projects included in this area are reduced in size in comparison with the ones in the other three investment priorities, concerning digitalisation and modernisation of state agencies and services, and rely on the competence of the beneficiaries to execute them. The delay in the finalisation of the Bulgarian plan requires faster steps and the creation of favourable conditions for the accomplishment of the full package of projects.

The plans are part of the EU packages to stimulate economic activity. Some researchers advise EU policymakers not to remove fiscal support too quickly. The orientation towards green and digital spending, as well as the medium-term focus of the plans, can reduce carbon and pollutant emissions (Liu et al, 2021), but does not prevent short-term scarring risks, especially in labour markets (Claeys et al., 2021). The citizens who think that the green transition will improve the quality of their life can support the planned steps towards climate neutrality accompanied by state political and financial measures.

Conclusions

Climate change is real and is due to anthropogenic impacts, which have intensified during the last decades. It motivates global efforts and pledges for climate neutrality until 2050 to keep the average temperature rise below 2°C, preferably under 1.5°C. Climate change generates not only physical, but also systemic risks as they threaten social and financial stability and requires appropriate policies. The climate-related policies can stimulate physical and financial investments in sustainable activities. State intervention is important and seen as an instrument to foster effective green projects as it provides financial instruments from local and European sources.

Bulgaria and Lithuania support the global and European efforts to decrease GHG emissions and invest in green energy and energy efficiency. They have significantly decreased their CO_2 emissions since 1990 and need further actions to contribute to climate neutrality. Both countries intend to use funds from the RRF instrument and through their NRRPs to have 37.8% of the envisaged investments for green initiatives

in Lithuania, while Bulgaria has planned a share of 53.66% of the investment for green energy and energy efficiency. The medium-term horizon of NRRP limits the projects and puts a requirement for quick steps to carry out the investments by all stakeholders. The political and economic situation can stimulate the movement towards greater capacities of RES and more energy-efficient buildings but at the same time requires providing the necessary legislative, financial and human resources to realise the plans. Part of the successful fulfilment is the establishment of circular business models in the renewable and energy efficiency industries, that could foster local economic development together with energy efficiency increase and GHG decrease.

The EU membership provides financial resources for green projects and both Lithuania and Bulgaria have access to them but the effect on economic development and environmental protection depends strongly on the capacity to invest smartly and efficiently not just to acquire. The huge amount of financing is envisaged as a co-financing from the private sector and the state in the case of Bulgarian NRRP, which depends on the available financing and the interest rates. The rise of interest rate may lessen the investments and hinder project realisation. The delay in the preparation of the Bulgarian plan and the political instability makes green development difficult, in addition to the lack of engagement of the households with the measures to adapt to climate changes and decrease GHG emissions. There are too many projects in the Bulgarian NRRP, which make their implementation difficult until 2026. The realisation of the planned projects requires information dissemination and mechanisms for the support of households and small companies to participate and prepare the necessary documentation.

References

- Andresen, Steinar, Jon Birger Skjærseth, Torbjørg Jevnaker, and Jørgen Wettestad, "The Paris Agreement: Consequences for the EU and Carbon Markets?", *Politics and Governance*, vol. 4, no. 3, 2016.
- Allam, Zaheer, Ayyoob Sharifi, Damien Giurco, and Samantha A. Sharpe, "On the theoretical conceptualisations, knowledge structures and trends of green new deals", *Sustainability*, vol. 13, no. 22, 2021.
- Balžekienė, Aistė, and Agnė Budžytė, "The Role of Environmental Attitudes in Explaining Public Perceptions of Climate Change and Renewable Energy Technologies in Lithuania", *Sustainability*, vol. 13, no. 8, 2021.
- Baer, Moritz, Emanuele Campiglio, and Jérôme Deyris, "It takes two to dance: Institutional dynamics and climate-related financial policies", *Ecological Economics*, vol. 190, 2021.
- Balcerzak, Adam P., and Radka MacGregor Pelikánová, "Projection of SDGs in codes of ethics – Case study about lost in translation", *Administrative Sciences*, vol. 10, no. 4, 2020.
- Böhringer, Christoph, Sonja Peterson, Thomas F. Rutherford, Jan Schneider, and Malte Winkler, "Climate policies after Paris: Pledge, trade and recycle: Insights from the 36th energy modelling forum study (EMF36)", *Energy Economics*, vol. 103, 2021.
- Bouckaert, Stéphanie, Araceli Fernandez Pales, Christophe McGlade, Uwe

Remme, Brent Wanner, Laszlo Varro, Davide D'Ambrosio, and Thomas Spencer, "Net Zero by 2050: A Roadmap for the Global Energy Sector", International Energy Agency, Paris, 2021.

- Branzova, Petia, and Darina Ruscheva, "The impact of climate change and investment on fruit crop development", *Economic Thought Journal*, no. 6, 2019.
- Bratu, Mihai, "EU Recovery and Resilience Facility: Characteristics and Medium-Term Objectives", *Euroinfo*, vol. 5, no. 4, 2021.
- Bracking, Sarah, and Benjamin Leffel, "Climate finance governance: Fit for purpose?", *Wiley Interdisciplinary Reviews: Climate Change*, vol. 12, no. 4, 2021.
- Burksiene, Valentina, and Jaroslav Dvorak, "E-Communication of ENGO's for Measurable Improvements for Sustainability", *Administrative Sciences*, vol. 12, no. 2, 2022.
- Chadwick, Amy E., "Climate Change Communication", *Oxford Research Encyclopedia of Climatic Science*, 2017, Available at: https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-22 (Accessed: 5 July 2022).
- Claeys, Grégory, Zsolt Darvas, Maria Demertzis, and Guntram B. Wolff, "The Great COVID-19 Divergence: Managing a Sustainable and Equitable Recovery in the EU", *Intereconomics*, vol. 56, no. 4, 2021.
- Crescenzi, Riccardo, Mara Giua, and Giulia Valeria Sonzogno, "Mind the COVID-19 crisis: An evidence-based implementation of Next Generation EU", *Journal of Policy Modeling*, vol. 43, no. 2, 2021.
- Čiburienė, Jadvyga, and Galina Zaharieva, "International Trade as a factor of competitiveness: comparison of Lithuanian and Bulgarian cases", *Inžinerinė ekonomika*, no. 4, 2006.
- de las Heras, Beatriz Pérez, "European Climate Law (s): Assessing the Legal Path to Climate Neutrality", *Romanian Journal of European Affairs*, vol. 21, no. 2, 2021.
- DeWit, Andrew, Rajib Shaw, and Riyanti Djalante, "An integrated approach to sustainable development, National Resilience, and COVID-19 responses: The case of Japan", *International Journal of Disaster Risk Reduction*, vol. 51, 2020.
- Dong, Hanmin, Xiujie Tan, Si Cheng, and Yishuang Liu, "COVID-19, recovery policies and the resilience of EU ETS", *Economic Change and Restructuring*, 2022.
- D'Orazio, Paola, "Mapping the emergence and diffusion of climate-related financial policies: Evidence from a cluster analysis on G20 countries", *International Economics*, vol. 169, 2022.
- Darvas, Zsolt, Marta Domínguez-Jiménez, Ashling Idé Devins, Monika Grzegorczyk, Lionel Guetta-Jeanrenaud, Surya Hendry, Mia Hoffmann, Klaas Lenaerts, Tom Schraepen, Alkiviadis Tzaras, Victor Vorsatz, Pauline

Weil, European Union countries' recovery and resilience plans, Bruegel Datasets, 2022, Available at: https://www.bruegel.org/publications/datasets/european-union-countries-recovery-and-resilience-plans (Accessed: 5 July 2022).

- George, Bert, "Successful strategic plan implementation in public organisations: Connecting people, process, and plan (3Ps)", *Public Administration Review*, vol. 81, no. 4, 2021.
- Guillamón, María-Dolores, Ana-María Ríos, and Bernardino Benito, "An assessment of post-COVID-19 EU recovery funds and the distribution of them among member states", *Journal of Risk and Financial Management*, vol. 14, no. 11, 2021.
- Goytia, Susana, "Issues of natural resources law for adopting catchment-based measures for flood risk management in Sweden", *Sustainability*, vol. 13, no. 4, 2021.
- EEA greenhouse gases - data viewer, 2021 Available at: https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer (Accessed: 5 July 2022).
- European Commission, Climate Change Report Summary, *Special Eurobarometer 513*, March-April 2021. Available at: https://ec.europa.eu/clima/system/files/2021-07/report_summary_2021_en.pdf (Accessed: 5.7.2022).
- European Commission, Next Generation EU: Commission endorses Bulgaria's €6.3 billion RRF plan, Brussels, 7 April 2022. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2282 (Accessed: 5 July 2022).
- European Commission, RRF: Update of the Maximum Financial Contribution. Commission Note to the Council and European Parliament, Brussels, 30 June 2022. Available at: https://ec.europa.eu/info/sites/default/files/2022_06_30_update_maximum_financial_contribution_rrf_grants.pdf (Accessed: 5 July 2022).
- European Investment Bank, The Economic and Social Impact of the Green Transition, *2021-2022 EIB Climate Survey*, part 3-3, 2022. Available at: https://www.eib.org/en/surveys/climate-survey/4th-climate-survey/green-transition-jobs-lifestyle-adaptation.htm (Accessed: 5 July 2022).
- Eurostat, Greenhouse gas emissions per capita https://ec.europa.eu/eurostat/databrowser/view/T2020_RD300__custom_2038816/default/table?lang=en (Accessed: 5 July 2022).
- Godin, Karine, Jean Philippe Sapinski, and Serge Dupuis, "The transition to net zero energy (NZE) housing: An integrated approach to market, state, and other barriers", *Cleaner and Responsible Consumption*, vol. 3, 2021.
- Impinna, Maria Antonia, "History of climate change law and policy in the EU and the USA", *European Energy & Climate Journal*, vol. 9, no. 4, 2021.
- Johansson, Alva, Niclas Berggren, and Therese Nilsson, "Intolerance predicts climate skepticism", *Energy Economics*, vol. 105, 2022.

- Hofbauer, Günter, and Andrejs Limanskis, "An assessment of the level of sustainability of Foreign Direct Investments (FDI) of German companies in Latvia", *Forum Scientiae Oeconomia*, vol. 10, no. 1, 2022.
- Kaklauskaitė, Ulijona, and Jekaterina Navickė, "Ekosocialinė valstybė Europos Sąjungoje: šalių narių socialinės ir klimato politikos santykio analizė" [Eco-social State in the European Union: the Relationship Between the Social and Climate Policy of the Member States], *Socialinė teorija, empirija, politika ir praktika* [Social Theory, Empiricism, Policy and Practice], vol. 22, 2021.
- Kotseva-Tikova, Maria, and Dvorak, Jaroslav, "The bioeconomy during COVID-19 pandemic: the case of Bulgaria and Lithuania", *Economic Thought Journal*, vol. 4, pp. 49-70, 2021.
- Lenaerts, Klaas, Simone Tagliapietra, and Guntram Wolff, "How can the European Union adapt to climate change?", *Policy Contribution*, Issue 11/22, 2022.
- Liu, Li-Jing, Yun-Fei Yao, Qiao-Mei Liang, Xiang-Yan Qian, Chun-Lei Xu, Si-Yi Wei, Felix Creutzig, and Yi-Ming Wei, "Combining economic recovery with climate change mitigation: A global evaluation of financial instruments", *Economic Analysis and Policy*, vol. 72, 2021.
- LR Seimas, Nutarimas dėl aštunioliktosios LR Vyriausybės programos [Resolution on the 18th Government of the Republic of Lithuania program], no. XIV-72, Vilnius, 11 December 2020.
- LR Seimas, Nutarimas dėl nacionalinės klimato kaitos valdymo darbotvarkės patvirtinimo [National Climate Change Agenda], no. XIV-490, Vilnius, 30 June 2021.
- Maranzano, Paolo, Mario Noera, and Roberto Romano, "The European industrial challenge and the Italian NRRP", *PSL Quarterly Review*, vol. 74, no. 298, 2021.
- Masson-Delmotte, Valérie, Panmao Zhai, Anna Pirani, Sarah L. Connors, Clotilde Péan, S. Berger, N. Caud et al., "Climate change 2021: the physical science basis", *Contribution of working group I to the sixth assessment report of the intergovernmental panel on climate change*, 2021.
- McElroy, Michael B. "Energy and climate: vision for the future" Oxford University Press, 2016.
- Mealy, Sam, Melanie Brusseler, and Sima Kammourieh, "Greening the Recovery in Developed Economies", *Mapping the Political economy of the Global Financial Ecosystem: Interim Report*, E3G, 2021.
- Mehryar, Sara, and Swenja Surminski, "National laws for enhancing flood resilience in the context of climate change: potential and shortcomings", *Climate Policy*, vol. 21, no. 2, 2021.
- Miciuła, Ireneusz, Henryk Wojtaszek, Bogdan Włodarczyk, Marek Szturo, Miłosz Gac, Jerzy Będźmirowski, Katarzyna Kazojć, and Judyta Kabus, "The Current Picture of the Transition to a Green Economy in the EU –Trends in Climate and Energy Policy versus State Security", *Energies*, vol. 14, no. 23, 2021.

- Mišík, Matúš, and Veronika Oravcová, "Ex Ante Governance in the European Union: Energy and climate policy as a 'test run' for the post-pandemic recovery", *Energy Policy*, vol. 167, 2022.
- Mochurova, Milkana, Nedka Ivanova, Plamen Mishev, Maria Peneva. "Climate change and Bulgarian agriculture: economic impact and vulnerability", UNWE Publishing House, 2014.
- National Strategy for Climate Change Adaptation and Action Plan, 2019, Available at: https://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=1294 (Accessed: 5 July 2022).
- Pietzcker, Robert C., Sebastian Osorio, and Renato Rodrigues, "Tightening EU ETS targets in line with the European Green Deal: Impacts on the decarbonisation of the EU power sector", *Applied Energy*, vol. 293, 2021.
- Reis, João, Nuno Melão, Joana Costa, and Bohuslav Pernica, "Defence industries and open innovation: ways to increase military capabilities of the Portuguese ground forces", *Defence Studies*, 2022.
- Ringsmuth, Andrew K., Ilona M. Otto, Bart van den Hurk, Glada Lahn, Christopher PO Reyer, Timothy R. Carter, Piotr Magnuszewski et al., "Lessons from COVID-19 for managing transboundary climate risks and building resilience", *Climate Risk Management*, 2022.
- Romani, Ilenia, Marzio Galeotti, and Alessandro Lanza, "Besides promising economic growth, will the Italian NRRP also produce fewer emissions", *Politica Economica*, no. 1, 2022.
- Sørensen, Michael Tophøj, Carsten Jahn Hansen, and Tom Goosse, "Territorial patterns and relations in Lithuania", ESPON, 2021, Available at: https://www.espon.eu/lithuania (Accessed: 5 July 2022).
- Škiudas, Kęstutis, Andrius Kubilius, and Jonas Urbanavičius, "Žmonijos veiklos sukelta klimato kaita: priežastys, pasekmės, galimybės" [Climate change caused by human activity: causes, consequences, possibilities], *Europos Politika: Lietuvoje Ir Europoje*, Europos viešosios politikos institutas [*European Politics: In Lithuania and Europe*, European Public Policy Institute], Vilnius, 2020.
- Tang, YH., et al. "Impact assessment of climate change and human activities on GHG emissions and agricultural water use", *Agricultural and Forest Meteorology*, vol. 296, 2021.
- The Climate Governance Commission, "Governing Our Climate Future", Interim Report, Stockholm, 2021. Available at: https://globalchallenges.org/governing-our-climate-future/ (Accessed: 5 July 2022).
- Tol, Richard SJ., "Europe's Climate Target for 2050: An Assessment", *Intereconomics*, vol. 56, no. 6, 2021.
- Vanhercke, Bart, and Amy Verdun, The recovery and resilience facility: have social actors been sidelined?, Vienna, 2021, Available at: https://hdl.handle.net/1887/3249877 (Accessed: 5 July 2022).
- Verdun, Amy, Bart Vanhercke, "Are (some) social players entering European

recovery through the Semester back door?", *Social policy in the European Union: state of play 2021*.

- Wróblewski, Łukasz. "Cross-border ties in the light of the EU common market", *Border and Regional Studies*, vol. 8, no. 4, 2020.
- Zachmann Georg, Franziska Holz, Claudia Kemfert, Ben McWilliams, Frank Meissner, Alexander Roth, Robin Sogalla, "Decarbonisation of the energy system" *Policy Contribution*, Issue no. 1, Bruegel, 2022. Available at: https://www.bruegel.org/2022/01/decarbonisation-of-the-energy-system/ (Accessed: 5 July 2022).