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Assessment of New Climate And Energy Targets for the Baltic States

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ABSTRACT

The European Union is the global forerunner in climate change mitigation policies. The new climate change mitigation targets were set for the European Union (EU) countries following the Energy and climate package targets established for renewable energy sources, energy efficiency improvements, and greenhouse gas (GHG) emission reductions. The European Commission (EC) has revised targets for 2030 several times, following the increased stringency of climate change mitigation commitments. The EU adopted the Climate Law, setting a legally binding goal to achieve a climate-neutral EU society by 2050. The EC agreed on an interim goal of a net 55% GHG emission decrease by 2030 and developed a Fit for 55 package, bringing EU regulations in line with the 2030 goal. The paper aims to analyze new EU climate change mitigation targets and to assess and compare the situation and advancements achieved by the Baltic States. The new targets for renewable energy sources, energy efficiency, and GHG emission decrease for the Baltic States were analyzed, and progress achieved was evaluated on the basis of data provided in the National Energy and Climate Plans (NECPs) submitted to the EC.

KEY WORDS:

climate change mitigation, NECPs, targets, achievement, Baltic States.

JEL Classification: Q2, Q28, Q48.

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1. Introduction

Combating climate change, mitigation and decreasing greenhouse gas (GHG) emissions is the priority policy in the EU. Therefore, energy and climate policy are cornerstones of the EU's foreign policy agenda (Wang et al., 2024). Continuing the previously approved climate policies and measures is necessary for the European Commission, bearing in mind the significant changes in both domestic and international acceptance of climate policies and the evolving geopolitical landscape (Constantini et al., 2022a; Enescu, Szeles, 2023; Ali et al., 2023; Gu, 2023). Although the energy crisis provoked by the Russian attack on Ukraine has been resolved, it has

had an intense effect on the strategic orientations of the EU (Dupont, Torney, 2021; Constantini et al., 2022b). Geopolitical instability has intensified in the Middle East, and competition with China persists in industries critical to the energy transition, such as electric vehicles and renewables, especially solar panels (Kuzemko et al., 2022; Ostrowski, 2022; Misik, Nosko, 2023). It is crucial that this new geopolitical context does not upset the delicate balance between decarbonization, competitiveness, and energy security in the EU (Dupont et al., 2023). Nevertheless, the European Commission will need to vigorously advocate for decarbonization within the EU and in its global engagements (Hafner, Raimondi, 2020; Wolf et al., 2021).

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The EU issued new energy and climate policy documents by setting more stringent targets for GHG emission decrease, the share of renewable energy sources in final energy consumption and energy efficiency advancement (Oei et al., 2019; Oberthur, von Homeyer, 2023). Consequently, the EU countries were requested to amend their National Energy and Climate Plans (NECPs) to address new energy and climate targets (Paoli, Geoffron, 2019; Grafakos et al., 2020; Scorza, Santopietro, 2021).

Though there are several studies dealing with EU climate change mitigation policies in new geopolitical situation (Tutak et al., 2021; Rivas et al., 2021; Firoiu et al., 2022; Wang et al., 2023; Bashir et al., 2023; Manate et al., 2023; Halaskova et al., 2023), there is gap in research analysing the situation of EU countries or regions in implementing new energy and climate commitments set by European Commission.

The paper aims to bridge this gap and analyzes the new climate change mitigation targets for 2030 set by the EU for the Baltic States, and evaluates the Baltic states' efforts in fulfilling these targets based on their updated National Energy and Climate Plans (NECPs), and provides comparative policy analysis to understand the main reasons of hurdles during implementation of these new targets.

The paper follows this structure: Section 2 provides an examination of climate policies on the basis of scientific literature and policy analysis; Section 3 presents an analysis of new EU climate change mitigation targets for the Baltic States; Section 4 discusses policies and measures implemented in the Baltic states; Section 5 offers conclusions and policy recommendations

2. EU Climate Change Mitigation Policies

The European Union has made significant strides in advancing the European Green Deal by swiftly implementing key initiatives like the 'Fit for 55' package, supplemented by the REPowerEU Plan. Announced in the summer of 2021, the "Fit for 55" package was developed for implementing the EU Climate Law's mandate to achieve by 2030 a net GHG emission decrease by at least 55% compared to the year 1990 level. The REPowerEU Plan, introduced in

2022, aims to rapidly reduce the EU energy import dependency on fossil energy resources from Russia. In addition to improving the energy self-sufficiency of the EU, REPowerEU is also focused on quickening the clean energy transition and fostering collaboration in establishing a more resilient energy system. These critical EU climate change mitigation initiatives are linked to more ambitious targets for 2030, pushing the EU toward a more sustainable and carbon-free energy future (Sclacke et al., 2021).

The EU has established the following goals to decrease GHG emissions and achieve decarbonization of the energy sector by 2030:

1. The ETS Directive targets GHG emissions decrease from electricity and manufacturing by 62% in comparison to GHG emission levels in the ETS sectors.
2. The Emission Sharing Regulation (ESR) mandates a 40% reduction in GHG emissions from transport, agriculture, buildings, and waste compared to 2005 levels.
3. The LULUCF Regulation sets strict limits to ensure an increase in land-based carbon removals to 310 MtCO₂-equivalent.
4. The Renewable Energy Directive (RED) establishes a target to achieve 45% renewables in final energy consumption, up from the initial goal of 40%, which was at 42.5% as of recent data.
5. The Energy Efficiency Directive (EED) aims for an 11.7% decrease in final energy demand compared to 2020 levels, updating the initial target of a 9% reduction based on 2020 projections.

Since 2018, EU countries have been required to prepare plans for implementing climate and energy goals established for 2030. The National Energy and Climate Plans (NECPs) are key tools used by Member States to outline their strategies for meeting the climate change mitigation goals of the EU. NECPs are crucial for guiding each Member State's efforts towards transformation into a climate resilient society by 2050. These plans provide a framework for making short-, medium-, and long-term investments and play a vital role in mobilizing the substantial resources needed to collectively achieve climate neutrality. Moreover, they are instrumental in ensuring a fair transition within the EU, while safeguarding energy affordability, equality, and security (Rayner et al., 2023).

EU MS submitted their draft NECPs in 2019, and EC then requested that these plans be reviewed and updated to meet the enhanced targets established in the European Green Deal, the European Climate Law, the 'Fit for 55' package, and the 2022 REPowerEU Plan. The revised NECPs also address the new challenges posed by the Russian invasion of Ukraine and align with the Paris Agreement's commitments.

Facing many global challenges, the European Commission has taken decisive action by establishing the Recovery and Resilience Facility (RRF) to assist a carbon-neutral and resilient European Union. This includes integrating REPowerEU into the Recovery and Resilience Plans (RRP) of Member States. The RRF has allocated 275 billion EUR to support the low-carbon transition and the actions for the implementation of the REPowerEU plan. These reforms have a direct impact on the objectives of the NECPs in the EU countries, making it imperative that the updated NECPs thoroughly reconnoiter collaborations with RRFs.

The revised NECPs provide MS with the appropriate structure to meet their obligations and achieve the EU targets for 2030. These targets incorporate GHG emission decrease by at least 55%, achieving at least 42.5% of renewable energy sources in final energy consumption (to reach the goal- 45%), and reducing EU final energy demand by almost 12% compared to projections

3. Analysis of Baltic States' Progress in Implementing New Climate and Energy Targets

3.1. GHG Emission Reduction

The new EU climate change mitigation goal for 2030 is to reduce GHG emissions by at least 55% in comparison to the GHG emission level in 1990 under the 'Fit for 55' package and under the recent REPowerEU Plan which is built on the implementation of the Fit for 55 package. The analysis of NECPs indicates that by 2030, GHG emissions are expected to be 51% lower than 1990 levels, falling 4% short of the 55% GHG reduction goal established by the EU Climate Law. To bridge this gap, Member States need to implement additional measures in transport, buildings, agriculture, and waste to meet the goals established by the Effort Sharing Regulation

(ESR) and Land Use, Land Use Change and Forestry (LULUCF) Regulations.

The Effort Sharing legislation targets greenhouse gas emissions from various sectors not enclosed in the Emission Trading Scheme (ETS), which makes up approximately 60% of the domestic GHG emissions in the EU. It establishes a binding national target to decrease GHG emissions by 40% in comparison to 2005 levels based on the Effort Sharing Decision (ESD) for 2013-2020 and the ESR for 2021-2030 (Quemin, 2022).

The NECPs represent a positive step toward meeting the more ambitious targets set out in the ESR. However, a substantial shortage remains to be covered. Current projections indicate that emissions will decrease by only 33.8% by 2030, which is 6.2% short of the EU GHG reduction goal. Only a few Member States, but not the Baltic States, have integrated the new emissions trading scheme into their NECPs and GHG emission projections. This system covers energy consumed in buildings and by road transport and provides additional incentives to meet the ESR targets (Ortega et al., 2021).

Most of the updated NECPs lack sufficient ambition and concrete actions related to land use. A limited number of EU countries have outlined clear strategies to achieve their national net GHG emission reduction targets, raising concerns, particularly in Estonia and a few other countries.

The transport sector requires more targeted measures to reduce emissions. Although some countries, including Estonia, have set overall greenhouse gas reduction targets, most have focused on measures like electrifying transport and developing infrastructure for zero-emission vehicles. While certain countries have set specific targets for electric vehicles by 2030, others continue to support fossil-fuel vehicles. Additionally, overall NECPs lack specific measures to support sustainable aviation fuels. Therefore, the NECPs should be better aligned with the investments and reforms outlined in national Recovery and Resilience Plans to promote the development of carbon-free mobility.

Regarding non-CO₂ emissions, which accounted for 30% of ESR emissions in 2021, the efforts described in the draft NECPs are varied. Just a minority of countries, including Lithuania, have addressed a relatively wide range of non-CO₂ sources, and other Baltic States like Estonia showed very low ambition to reduce non-CO₂ emissions according to ESR. (Table 1).

Table 1
Assessment of New GHG Emission Reduction Targets in the Baltic States

Countries	Total GHG emissions including LU-LUCF		ESR emissions		Ambition
	2030	2050	2005	2030	
Estonia	10.6	4.6	6.2	5.5	Low ambition
Latvia	12.2	11.1	8.6	7.9	Moderate ambition
Lithuania	8.7	7.4	13.1	10.3	High ambition
EU-27	2284	1589	2517.1	1656.9	

Source: created by authors based on European Commission (2023a,b)

Table 2
Assessment of New Renewable Energy Consumption Targets in the Baltic States

EU countries	RES shares, %				
	2020 national binding target	2021 national shares	2030 national contribution	2030 national shares according to the formula	Ambition gap
Estonia	25%	38.0%	65%	50%	Significantly above
Latvia	40%	42.1%	57%	61%	Significantly below
Lithuania	23%	28.2%	55%	49%	Significantly above

Source: created by authors based on European Commission (2023a,b)

As one can notice from Table 1, Lithuania, for example, has a high ambition to reduce GHG emissions according to ESR. Lithuania has set clear intentions for reducing non-CO2 emissions in the waste and agricultural sectors. Nevertheless, additional actions are needed from other countries, including Estonia, to effectively curb non-CO2 emissions.

It is necessary to stress that in finalizing NECPs, Baltic States should better describe how their plans align with their national NECPs and explain their integrated national approach.

3.2. Renewable Energy Sources

The EU is obligated to increase the target set for the share of renewables to at minimum- of 42.5%, with a goal of reaching 45% by 2030.

The renewable energy ambition levels proposed by Member States suggest a Union-wide share of 38.6% to 39.3% by 2030, surpassing the 32% target set in the original Renewable Energy Directive (RED II) but falling

short of the revised 42.5% binding target. To meet the EU’s 2030 renewable energy goal, the Baltic States must increase their contributions.

Significant differences exist in the contributions from various Baltic States toward the EU’s renewable energy target (Table 2).

Only seven Member States have submitted contributions that meet or exceed their expected national levels. Lithuania and Estonia aim for 100% renewables in their power sectors by 2030, while Denmark targets 117%. Overall, EU MS recognize the significance of solar energy and establish plans to support solar energy adoption, particularly in the household sector, through various economic encouragements and streamlined authorising processes, which align with the EU Solar Energy Strategy.

In their draft updated NECPs, Member States have outlined their policies and measures with varying levels of detail. Removing barriers to power purchasing agreements (PPAs) is crucial for facilitating market uptake of

Table 3*Assessment of New Energy Efficiency Targets in the Baltic States*

Coun-tries	Final energy consumption			Primary energy consumption		
	Contribution reported by MS	Results based on formula EED recast	Deviation of the contribution based on the results formula	Contribution reported by MS	Results based on formula EED recast	Deviation of the contribution based on the results formula
Estonia	2.6	2.6	1.35%	5.1	3.9	30.63%
Latvia	3.4	3.3	4.16%	4.1	3.7	10.04%
Lithuania	4.2	4.2	-1.14%	5.2	5.2	0.83%
Total	814.3	763		1067.5	992.5	

Source: created by authors based on European Commission (2023a,b)

renewables. Estonia, for instance, is taking steps to encourage private investments through such agreements.

Several Member States have implemented measures to streamline the permitting process for renewable energy projects. For example, Estonia developed plans to promote the designation of special areas for the acceleration of renewable energy projects.

The analysis shows that by 2030, the portion of renewables in final energy consumption is projected to be between 38.6% and 39.3% at the EU level. While this surpasses the 32% target set by RED II, it falls short of the newly established binding target of 42.5%. It is necessary to stress that just a few Member States, including Estonia and Lithuania, have submitted NECPs demonstrating that their contributions align with the revised RED II national targets.

3.3. Energy Efficiency

The European Union has set an overall goal to decrease energy demand by 11.7% until 2030 under the goal established in the package 'Fit for 55' and the REPowerEU Plan. This target is based on projections of the 2020 EU Reference Scenario outlined in the new, recast Energy Efficiency Directive (EU) 2023/1791, adopted in 2023.

The European Union places significant emphasis on energy efficiency within its policy framework, adhering to the "energy-efficiency-first principle." This principle underscores the importance of prioritizing energy efficiency in all policy decisions.

It is crucial that the final updated NECPs provide specific details on how Member States plan to implement this principle. In a few countries, including Lithuania the energy-efficiency first principle is addressed across numerous policy domains. However, some draft plans do not mention the energy-efficiency principle at all.

In 2021, the EU's energy consumption exceeded the 2030 suggested goal for primary energy demand by 31.9% and the binding target for final energy demand by 26.9%. Although most EU MS in their draft updated NECPs have submitted their national contributions to the EU's 2030 energy efficiency goal, only a few, including Estonia, have proposed notably ambitious plans concerning final energy demand reductions. Additionally, some countries, including Lithuania, have shown ambition in both primary and final energy demand reduction, aligning with EED recast (Table 3).

The assessment highlights a significant shortfall in meeting the EU's 2030 energy efficiency goals for primary and final energy demand. Specifically, there is a gap of 75 Mtoe for primary energy demand and 53.1 Mtoe for final energy demand compared to the Union's 2030 targets (EC, 2023a).

The overall final energy consumption in the EU will reach 814.3 Mtoe, representing a 5.8% reduction from 2020 projections for 2030. While this figure is below the 2018 Energy Efficiency Directive (EED) target of 956 Mtoe, it is still higher than the 2023 EED recast

Table 3*Assessment of New Energy Efficiency Targets in the Baltic States*

Countries	Type of policies and measures and sector	Energy savings due to implemented policies in 2030, PJ
Estonia		
Trainings and events to promote a more sustainable use of energy and resources	General programme/overall	0.11
Modernization of heating systems, oil boiler replacement	General programme/overall	0.11
Fuel and energy taxes	General programme/overall	0.57
Eco driving	Information/training/transport	0.18
Time-based road toll for heavy duty vehicles	Other/transport	0.11
Mobile speed cameras old	Mandatory standards/transport	0.04
Electro-intensive enterprises excise duty reduction	Fiscal/industry	0.08
Resource efficiency measures to support investments in the manufacturing and mining industry	General programme/industry	0.08
Atmospheric air protection program, including heating equipment for apartment associations	Financial/households	0.04
Renovation of apartment buildings	Financial/households	0.20
Renovation of rental apartments	Financial/households	0.20
Renovation of social care homes	Financial/services	0.02
New childcare and pre-primary education infrastructure	Financial/services	0.02
Support for improving the energy efficiency of coastal fishing vessels	Financial/services	0.02
Latvia		
Energy Efficiency Obligation Scheme	Market-based Instruments/overall	1.0
Voluntary Agreements on Improving Energy Efficiency	Other/overall	0.08
Energy Audits/Energy Management Systems and Energy Efficiency Improvement in Large Enterprises	General programme/overall	0.48
Latvia		
Energy Efficiency Obligation Scheme	Market-based Instruments/overall	1.0
Voluntary Agreements on Improving Energy Efficiency	Other/overall	0.08
Energy Audits/Energy Management Systems and Energy Efficiency Improvement in Large Enterprises	General programme/overall	0.48
Development of electric vehicles charging infrastructure in public areas: Recovery and Resilience Facility Funding	General programme/transport	2.00
New electric passenger trains (railway)	Financial, others/transport	0.02
Development of electric vehicles charging infrastructure on the TEN-T road network: funding by Latvia's EU Cohesion Policy Programme for the 2021-2027 planning period	General programme/transport	0.14
Energy Audits/Energy Management Systems (EMS) and Energy Efficiency Improvements in Large Enterprises and Large Electricity Consumers	Mandatory information/industry	0.11
Grants for Energy Audits and Technical documentation: ELENA (European Local Energy Assistance) programme	Financial/industry	0.11
Voluntary Agreements on Improving Energy Efficiency in Industry sector	Others/industry	0.04

Table 3*Assessment of New Energy Efficiency Targets in the Baltic States (Continued)*

Countries	Type of policies and measures and sector	Energy savings due to implemented policies in 2030, PJ
Latvia		
Minimal Requirements for Energy Efficiency of Residential Buildings	Mandatory standards and information/households	0.15
RES technologies in Residential Buildings to reduce GHG emissions: national EAAI instrument.	Financial/households	0.25
Minimum thermal insulation standards (2020)	Mandatory standards/households	0.25
Energy audits/Energy Management Systems (EMS) and Energy Efficiency Improvements in Large Enterprises and Large Electricity Consumers	Mandatory information/services	0.07
Energy efficiency measures in general education institutions: Latvia's Plan of EU Recovery and Resilience Facility	Financial others/services	0.02
Energy efficient lighting in public outdoor areas: 2021-2027 EU funding planning period.	General programme/services	0.07
Lithuania		
Energy Efficiency Directive (2012/27/EC) - Law on the Energy Efficiency (EU related)	General programme/overall	0.23
Recast Ecodesign Directive for Energy-related Products (Directive 2009/125/EC) - Requirements for ecodesign for energy related products (EU related)	Others/overall	0.23
National Energy Independency Strategy	General programme/overall	0.23
EU Structural Funds 2021-2027 (Installation of private electric car charging points for individuals in individual homes/gardens)	General programme/transport	0.09
EU Structural Funds 2021-2027 (Installation of private charging points for electric cars)	General programme/transport	0.09
Installation of private electric vehicle charging access points for legal entities at workplaces (EU Structural Funds 2021-2027)	General programme/transport	0.09
EU Structural Funds 2021-2027 (Building data bank)	General programme/industry	0.05
EU Structural Funds 2021-2027 (Promote the introduction of RES in industrial enterprises (Central and Western Lithuania region, private sector))	General programme/industry	0.05
EU Structural Funds 2021-2027 (Investment support to solar PV power plants on land)	General programme/industry	0.05
Promotion of the Use of ENergy from Renewable Sources Directive (RED) - Law on Renewable Sources (EU related)	Financial, others/households	0.34
EU Structural Funds 2021-2027 (Prosumers' investment into development of RES-E production capacities in Lithuania)	Financial/others	0.07
EU Structural Funds for 2014-2020 (RES for Households)	Financial/others	0.07
EU Structural Funds 2021-2027 (Digitalization of buildings renovation)	Financial, General programme/Services	0.03
RED Directive on Promotion of the Use of Energy from Renewable Sources	Financial, information and training/Services	0.08
Directive 2009/125/EC on Ecodesign of energy related products	Others/Services	0.03

Source: created by authors based on Odysee-Mure (2024)

target of 763 Mtoe, which requires an 11.7% reduction. Only a few Member States, including Lithuania, have proposed ambitious enough plans to meet these energy consumption reduction levels.

4. Climate Policies in the Baltic States

A review of climate change mitigation policies and measures in the Baltic States was performed based on an analysis of NECPs of countries and EUROSTAT, Odysee-Mure data.

The Odysee-Mure project (2024) scores EU Member States based on achievement in energy efficiency improvements using various energy efficiency assessment indicators, policy scoring, etc, in four major sectors: Transport, industry, services, and households. The three scores for ranking countries based on energy efficiency improvements are applied: Achieved energy efficiency level, energy efficiency progress/trends, and energy efficiency improvement policies and measures. Transport, Services, Households, and Industries sectors are included and combined. The maximal total score is 1.

The overall ranking provided by the Odysee-Mure project (2024) showed that Latvia was amongst the best-performing EU MS according to energy efficiency in 2023, with a score of 0.61 (see Table 5). Estonia received a score of 0.54, and Lithuania received a score of -0.42. Latvia has showed the best results in policies. Estonia showed the best results in trends. Lithuania received the highest score according to level criteria.

Comparing the achievements of Baltic States according to policies in specific sectors, Estonia got the highest evaluation in industry. In all other sectors (transport, households, services) the best-performing state according to energy efficiency level, trends, and policies was Latvia.

5. Conclusion

The conducted study showed that new climate change mitigation targets set by Fit to 55 packages raised additional requirements for the Baltic States in terms of more strict requirements for energy efficiency improvement, penetration of renewables and consequently for higher GHG emission reduction.

The updated NECPs of the Baltic States integrated new climate change mitigation targets. However, an

assessment performed by the EC showed that Latvia is significantly below the target set for 2030. Lithuania and Estonia are both above the RES target set for 2030, according to the Fit to 55 package.

Estonia in updated NECPs showed quite a high (30.63%) deviation from national primary inputs to the EU energy efficiency target for 2030 (11.7%). Latvia and Lithuania showed smaller deviations, especially Lithuania showed very small deviations according to primary energy and no deviation for final energy demand goals.

Analysis of climate policies in the Baltic states that in all other sectors (transport, households, services), Latvia was the best results, showing country in terms of energy efficiency level, trends, and policies. Estonia received the highest evaluation among the Baltic States according to performance on energy efficiency in the industry sector.

The updated NECPs in the Baltic States should incorporate more ambitious energy efficiency inputs for reaching the EU 2030 energy efficiency goals, with clear paths for cutting energy demands. Baltic States must better define their national policy frameworks and establish credible plans to achieve the EU's proposed levels of ambition, especially concerning energy efficiency improvement contributions, cumulative end-use energy savings, and stressing the key role of the public sector. Detailed evidence on scheduled energy consumption reductions by public entities and the energy refurbishment of public buildings should also be included in NECPs.

The 'Fit for 55' package aims for 100% zero-emission buildings by 2050. The current cycle of NECP updates offers the Baltic States the opportunity to revise their building renovation strategies set by 2020. The new ambitions should incorporate establishing intermediate milestones for 2030 and 2040, along with targets set for energy use in the building sector, GHG emission reduction, and building renovation targets. These targets, presented in the form of indicators, must be supported by appropriate policies, actions, and securing funds, considering the sector's capabilities and primary obstacles.

References

- Ali, M., Seraj, M., Alper, E., Tursoy, T., & Uktamov, K. F. (2023). Russia-Ukraine war impacts on climate initiatives and sustainable development objectives in top European gas importers. *Environmental Science and Pollution Research*, 30(43), 96701-96714. <https://doi.org/10.1007/s11356-023-29308-9>.
- Bashi, M. H., De Tommasi, L., Le Cam, A., Relaño, L. S., Lyons, P., Mundó, J., ... & Stancioff, C. E. (2023). A review and mapping exercise of energy community regulatory challenges in European member states based on a survey of collective energy actors. *Renewable and Sustainable Energy Reviews*, 172, 113055. <https://doi.org/10.1016/j.rser.2022.113055>.
- Costantini, V., Morando, V., Olk, C., & Tausch, L. (2022). Fuelling the fire: Rethinking European policy in times of energy and climate crises. *Energies*, 15(20), 7781. <https://doi.org/10.3390/en15207781>
- Costantini, V., Morando, V., Olk, C., & Tausch, L. (2022). Fuelling the fire: Rethinking European policy in times of energy and climate crises. *Energies*, 15(20), 7781. <https://doi.org/10.3390/en15207781>.
- Dupont, C., & Torney, D. (2021). European Union climate governance and the European Green Deal in Turbulent times. *Polit. Govern.* <https://doi.org/10.17645/pag.v9i3.4896>.
- Dupont, C., Moore, B., Boasson, E.L., Gravey, V., Jordan, A., Kivimaa, P., & von Homeyer, I., (2023). Three decades of EU climate policy: Racing toward climate neutrality?. *Wiley Interdisciplinary Reviews: Climate Change*, 15(1), e863 <https://doi.org/10.1002/wcc.863>
- Enescu, A. G., & Szeles, M. R. (2023). Discussing energy volatility and policy in the aftermath of the Russia-Ukraine conflict. *Frontiers in Environmental Science*, 11, 1225753. <https://doi.org/10.3389/fenvs.2023.1225753>.
- European Commission (2023a). *Report from the Commission to the European Parliament and the Council*. EU Climate Action Progress 2023. COM (2023) 653 final. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52023DC0653>
- European Commission (2023b). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of Regions*. EU-wide assessment of the draft updated National Energy and Climate Plans as an important step towards the more ambitious 2030 energy and climate objectives under the European Green Deal and RePowerEU. COM (2023) 796 final. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2023%3A796%3AFIN>
- Evans, S., Mehling, M. A., Ritz, R. A., & Sammon, P. (2021). Border carbon adjustments and industrial competitiveness in a European Green Deal. *Climate Policy*, 21(3), 307-317. <https://doi.org/10.1080/14693062.2020.1856637>.
- Firoiu, D., Pîrvu, R., Jianu, E., Cismaş, L.M., Tudor, S., & Lăteş, G. (2022). Digital performance in EU member states in the context of the transition to a climate neutral economy. *Sustainability*, 14(6), 3343. <https://doi.org/10.3390/su14063343>.
- Grafakos, S., Viero, G., Reckien, D., Trigg, K., Viguie, V., Sudmant, A., ... & Dawson, R. (2020). Integration of mitigation and adaptation in urban climate change action plans in Europe: A systematic assessment. *Renewable and Sustainable Energy Reviews*, 121, 109623. <https://doi.org/10.1016/j.rser.2019.109623>
- Gu, Y. (2023). The adverse effects of the outbreak of Russia-Ukraine conflict on the energy supply system of Europe. *Journal of Education, Humanities and Social Sciences*, 8, 1231-1238. <https://doi.org/10.54097/ehss.v8i.4456>.
- Hafner, M., & Raimondi, P. P.(2020). Priorities and challenges of the EU energy transition: from the European green package to the new green deal. *Russian Journal of Economics*, 6(4), 374-389. <https://doi.org/10.32609/j.ruje.6.55375>.
- Halaskova, M., Linhartova, V., Gavurova, B., & Niroda, P. (2023). Indicators of government effectiveness in European Countries: Empirical Analysis with the use of panel data. *Transformations in Business & Economics*, 22(58), 280-298.
- Kuzemko, C., Blondeel, M., Dupont, C., & Brisbois, M. C. (2022). Russia's war on Ukraine, European energy policy responses & implications for sustainable transformations. *Energy Research & Social Science*, 93, 102842. <https://doi.org/10.1016/j.erss.2022.102842>.
- Manate, D., Lile, R., Rad, D., Szentesi, S.-G., & Cuc, L. D. (2023). An analysis of the concept of green buildings in Romania in the context of the energy paradigm change in the EU. *Transformations in Business & Economics*, 22(58), 115-129.
- Mišík, M., & Nosko, A. (2023). Post-pandemic lessons for EU energy and climate policy after the Russian invasion of Ukraine: Introduction to a special issue on EU green recovery in the post-Covid-19 period. *Energy Policy*, 177, 113546. <https://doi.org/10.1016/j.enpol.2023.113546>

- Oberthür, S., & Von Homeyer, I. (2023). From emissions trading to the European Green Deal: the evolution of the climate policy mix and climate policy integration in the EU. *Journal of European Public Policy*, 30(3), 445-468. <https://doi.org/10.1080/13501763.2022.2120528>.
- Odyssee-Mure. (2024). *A decision-support tool for energy efficiency policy evaluation*. <https://www.odyssee-mure.eu/>
- Oei, P. Y., Hainsch, K., Löffler, K., von Hirschhausen, C. R., Holz, F., & Kemfert, C. (2019). A new climate for Europe: 2030 climate targets must be more ambitious. *DIW Weekly Report*, 9(40/41), 365-372. https://doi.org/10.18723/diw_dwr:2019-40-1.
- Ortega, A., Gkoumas, K., Tsakalidis, A., & Pekar, F. (2021). Low-emission alternative energy for transport in the EU: state of play of research and innovation. *Energies*, 14(22), 7764. <https://doi.org/10.3390/en14227764>.
- Ostrowski, W. (2022). The twenty years' crisis of European energy security: Central and Eastern Europe and the US. *Geopolitics*, 27(3), 875-897. <https://doi.org/10.1080/14650045.2020.1835863>
- Paoli, L. D., & Geoffron, P. (2019). Introduction: A critical overview of the European national energy and climate plans. *Economics and Policy of Energy and Environment*, 1, 31-41.
- Quemin, S. (2022). Raising climate ambition in emissions trading systems: The case of the EU ETS and the 2021 review. *Resource and Energy Economics*, 68, 101300. <https://doi.org/10.1016/j.reseneeco.2022.101300>.
- Rayner, T., Szulecki, K., Jordan, A. J., & Oberthür, S. (2023). The global importance of EU climate policy: an introduction. In *Handbook on European Union climate change policy and politics* (pp. 1-21). Edward Elgar Publishing. <https://doi.org/10.4337/9781789906981.0001>
- Rivas, S., Urraca, R., Bertoldi, P., & Thiel, C. (2021). Towards the EU Green Deal: Local key factors to achieve ambitious 2030 climate targets. *Journal of cleaner production*, 320, 128878. <https://doi.org/10.1016/j.jclepro.2021.128878>
- Scorza, F., & Santopietro, L. (2024). A systemic perspective for the Sustainable Energy and Climate Action Plan (SECAP). *European Planning Studies*, 32(2), 281-301. <https://doi.org/10.1080/09654313.2021.1954603>
- Schlacke, S., Wentzien, H., Thierjung, E. M., & Köster, M. (2022). Implementing the EU climate law via the 'Fit for 55' package. *Oxford Open Energy*, 1, oiab002. <https://doi.org/10.1093/ooenergy/oiab002>
- Tutak, M., Brodny, J., & Bindzar, P. (2021). Assessing the level of energy and climate sustainability in the European Union countries in the context of the European Green Deal strategy and Agenda 2030. *Energies*, 14(6), 1767. <https://doi.org/10.3390/en14061767>
- Wang, D., Dong, L., & Mei, J. (2023). An advanced review of climate change mitigation policies in Germany, France, and the Netherlands. *Environmental Research Letters*, 18(10), 103001. <https://doi.org/10.1088/1748-9326/acf58f>.
- Wang, D. Chen, L., & Dong, L. (2024). A critical review of climate change mitigation policies in the EU - based on vertical, horizontal and policy instrument perspectives, *Journal of Cleaner Production*, 467, 142972. <https://doi.org/10.1016/j.jclepro.2024.142972>.
- Wolf, S., Teitge, J., Mielke, J., Schütze, & F. Jaeger, C. (2021). The European Green Deal — more than climate neutrality. *Intereconomics*, 56, 99-107. <https://doi.org/10.1007/s10272-021-0963-z>.