СУЧАСНА СИСТЕМА МІЖНАРОДНОГО ПРАВА

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CLIMATE NEUTRALITY IN THE EUROPEAN UNION: LEGAL CHALLENGES AND NATIONAL STRATEGIES

КЛІМАТИЧНА НЕЙТРАЛЬНІСТЬ У ЄВРОПЕЙСЬКОМУ СОЮЗІ: ПРАВОВІ ВИКЛИКИ ТА НАЦІОНАЛЬНІ СТРАТЕГІЇ

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Abstract. The article analyzes the climate policy of the European Union and its members, in particular in the context of the goal of achieving climate neutrality by 2050, enshrined in the European Climate Law. Based on a comparative analysis of the legal strategies of the EU states, national approaches to the implementation of obligations to achieve climate neutrality, the level of their legal certainty, as well as the ambition of the established time horizons are outlined, the nature of the goal of climate neutrality as a normative category, as well as the issues of the effectiveness of the implementation of international obligations. An interdisciplinary assessment of the potential of legal instruments in the context of a just energy transition is proposed.

Keywords: International Environmental Law, Climate change, Paris Agreement, European Climate Law, climate neutrality.

Анотація. У статті проаналізовано кліматичну політику Європейського Союзу та його членів, зокрема у контексті цілі досягнення кліматичної нейтральності до 2050 року, закріпленої в Європейському законі про клімат. На основі порівняльного аналізу правових стратегій держав ЄС окреслено національні підходи до імплементації зобов'язань щодо досягнення кліматичної нейтральності, рівень їх юридичної визначеності, а також амбітність встановлених часових горизонтів. У дослідженні приділено увагу правовій природі цілі кліматичної нейтральності як нормативній категорії, а також питанням ефективності виконання міжнародних зобов'язань. Запропоновано міждисципліновану оцінку потенціалу правових інструментів у контексті справедливого енергетичного переходу.

Ключові слова: міжнародне екологічне право, зміна клімату, Паризька угода, Європейський закон про клімат, кліматична нейтральність.

Relevance of topic. Achieving climate neutrality is a central goal of the European Union's modern climate policy and the global agenda for sustainable development. Legal support for this

goal is of particular importance in the context of the intensifying climate crisis, energy transformation and the need for coordination between states with different levels of economic development. Taking into account the obligations enshrined in the European Climate Law, as well as significant differences in national approaches to the implementation of net zero goals, there is a need for a systematic analysis of the legal mechanisms applied by the EU Member States. The relevance of the topic is also enhanced by the need to strengthen regulatory coherence, transparency of implementation and interstate climate solidarity, which is a prerequisite for achieving a single EU climate vector by 2050.

Recent Literature Review. Recent studies highlight the EU's strategic positioning as a global climate leader. Olesia Tkachuk (2024) emphasizes the legal and institutional foundations of the EU's climate neutrality agenda, while Delbeke J. (Ed.) (2024) presents an interdisciplinary analysis of regulatory tools in Delivering a Climate Neutral Europe. Bruneckienė J., Zykienė I., and Mičiulienė I. explore how national competitiveness intersects with climate goals, revealing diverse approaches among EU countries. Legal perspectives are advanced by Aryanpour M. (2024), who examines the integration of climate ambition into resource governance, and Henckens T. (2021), who underscores sustainability constraints linked to mineral use. Anderson-Samways B. and Hobby J. (2022) critique the weakness of voluntary frameworks like the Paris Agreement, highlighting the need for enforceable commitments. Further comparative insights are drawn from Medvedieva M., Yedeliev R., Reznikova N., Nanavov A., and Grydasova G. (2024), who analyze national legal discrepancies in EU member states. These findings are contextualized using legislative sources and reports such as the European Climate Law, Climate Action Tracker (2023), and the EEA Trends and Projections Report (2023).

The purpose of the paper. The purpose of this paper is to analyze the legal obligations to achieve climate neutrality by the European Union and its members, considering international obligations, internal strategic documents of the Member States and the degree of legal specification of climate goals.

Main research results. The international role of the European Union as a leader in the field of climate policy has been formed gradually, starting from the 1990s, in the context of the formation of the global regime to combat climate change. From the very beginning, the EU played a leading role within the framework of the United Nations Framework Convention on Climate Change (UNFCCC), through its active participation in the development and implementation of the Kyoto Protocol (1997), and later in the formation and promotion of the Paris Agreement (2015) (Tkachuk, 2024). By announcing the ambitious goal of achieving climate neutrality by 2050, the EU enshrined it in the European Green Deal and the European Climate Law, which made this goal legally binding, however, despite the unified framework, national approaches to the implementation of climate commitments differ significantly, which creates challenges for the coordinated achievement of a common goal in the context of political fragmentation, asymmetry of resources and varying degrees of readiness for energy transformation.

The declared goal of achieving climate neutrality has been legally enshrined in the European Climate Law (Regulation (EU) 2021/1119), which establishes that the EU must achieve a balance between anthropogenic greenhouse gas emissions and their absorption within the Union by 2050 (European Union, 2021). The legislator defines climate neutrality as net zero emissions, i.e. a state where residual emissions that cannot be eliminated are offset by natural sinks, through forests, soils, oceans, or carbon capture and storage technologies.

According to the Climate Action Tracker methodology, climate neutrality or net zero is not just a balance between emission sources and sinks, but a systemic obligation to reduce all emissions as much as possible, followed by science-based compensation for residual emissions, which should be enshrined in the national legal framework (Climate Action Tracker, 2023).

The modern European understanding of climate neutrality is not only an environmental but also a legal construct that requires the mandatory integration of environmental, economic and technological instruments into the regulatory and political system of the Union. In the national

legislation of the EU countries, climate neutrality is usually enshrined as "net zero greenhouse gas emissions", which provides for minimizing emissions to a possible level with their subsequent absorption or elimination. For example, Greek Law No. 4936/2022, according to the Article 2, para. 3, defines climate neutrality as "the balance between anthropogenic greenhouse gas emissions from sources and their absorption by sinks" (Government of Greece).

The European Union has identified achieving climate neutrality by 2050 as a strategic goal in line with the European Green Deal. To gradually approach this goal, the EU has committed to reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. The rejection of compromise between environment and development is enshrined in both political and scientific strategies. Despite common commitments, there are significant differences in results between EU countries due to income levels, infrastructure and scientific potential (Bruneckienė, Zykienė, & Mičiulienė, 2023).

In response to the growing need for ambitious climate policies, most countries in the European Union have declared their intention to achieve climate neutrality by 2050. In some cases, even more ambitious time horizons have been established. For example, Finland plans to become climate neutral by 2035, and Sweden and Germany by 2045, anticipating the achievement of negative emissions after that. Iceland, although not a member of the EU, intends to achieve carbon neutrality by 2040.

Among the countries that have declared goals until 2050 are France, Ireland, Greece, the Netherlands, Portugal, Spain, Luxembourg, Denmark and others. However, it should be noted that in several states — such as Belgium, Bulgaria, Croatia, Lithuania, Malta, Latvia, Romania, Slovakia, Slovenia — the relevant obligations are not yet fixed in national legislation.

In addition to long-term goals, considerable attention is paid to intermediate commitments. For example, Denmark aims to reduce greenhouse gas emissions by 70% by 2030 (compared to 1990), France by 40%, Portugal by 55%, and Germany by 65%.

It is worth noting that some countries, including Germany, are also setting targets for greenhouse gas removal within the Land Use, Land Use Change and Forestry (LULUCF) sector, with plans to achieve a negative balance in 2045.

Despite the overall vector of climate neutrality, progress and legislative specification vary greatly between countries. This poses challenges to the coherent achievement of the pan-European goal of neutrality by 2050, which is a fundamental goal of the European Green Deal. As Lithuanian researchers Brunetskienė, Zikienė, and Mičiulienė (2024) rightly point out, despite the unity of goals, in particular in achieving climate neutrality, EU countries implement these tasks in different national contexts — taking into account differences in socio-economic systems, institutional models, level of infrastructure development and resource base, which significantly affects the dynamics of the transition and creates structural challenges for policy coherence.

Examples of lawmaking of EU countries on the implementation of requirements for achieving climate neutrality in national legal orders are discussed below.

Finland has one of the highest levels of climate policy ambition among the countries of the European Union. The country has legislatively enshrined the goal of achieving climate neutrality by 2035, as well as the transition to negative emissions after this period. According to the climate law adopted in 2015, the primary goal was to reduce greenhouse gas emissions by 80% by 2050 compared to 1990 levels. climate commitments. The law clearly states that the reduction targets cover both sectors covered by the EU Emissions Trading System and sectors covered by the Joint Commitments Regulation, demonstrating Finland's comprehensive approach to achieving climate neutrality (Ministry of the Environment of Finland, 2022).

Austria has set itself one of the most ambitious climate goals among the countries of the European Union — achieving climate neutrality by 2040 (Climate Change Laws of the World, n.d.). This commitment was first enshrined in the government's coalition agreement for 2020-2024 between the Austrian People's Party and the Green Party, which positioned the country as a

potential EU leader in the field of climate protection, emphasizing the interconnectedness of climate justice, innovative development and economic transformation. Although the current climate legislation in Austria was focused only on the period up to 2020, the process of updating the national climate law is currently underway. The new version is expected to formalize the goal of achieving climate neutrality by 2040, which is already mentioned in the National Long-Term Strategy (LTS) and was proclaimed as a political commitment by the previous government. This goal is ahead of the pan-European commitment to achieve neutrality by 2050 and demonstrates Austria's commitment to play a leading role in climate governance within the EU. The expected legislative consolidation of this goal should ensure that it is binding and contribute to the coherence of national policies with European climate commitments.

Sweden has set an ambitious goal of achieving climate neutrality by 2045, after which it is expected to achieve negative emissions. This is one of the most ambitious climate goals among EU countries. The statutory commitment provides for a reduction in greenhouse gas emissions by 85% by 2045 compared to 1990 levels, while interim targets include emission reductions of 63% by 2030 and 75% by 2040, excluding absorptions in the LULUCF sector (European Climate Neutrality Observatory, 2024). Sweden is an example of a country that combines science-based approaches with political will for long-term climate transformation.

Germany has set a legally binding goal of achieving climate neutrality by 2045, followed by a transition to negative emissions. The law allows the use of international offset to achieve climate goals, but at the same time calls on the federal government to refrain from using the flexible mechanisms provided for by the EU Effort-Sharing Regulation, with a particular focus on the land use, land-use change and forestry sector, which sets a commitment to set carbon sink targets for 2035, 2040 and 2045 in accordance with government executive orders (Climate Action Tracker, 2024).

France consistently pursues a policy of reducing greenhouse gas emissions enshrined in legislation. The 2015 version of the climate law set a commitment to reduce emissions by 40% by 2030 (compared to 1990 levels) and by 75% by 2050. As part of the updated climate strategy, the country aims to achieve climate neutrality by 2050, which corresponds to at least 83.3% emission reductions and a maximum of 16.7% carbon absorptions (relative to the volume of emissions of 1990) (Ministry for the Ecological Transition, 2023). Importantly, France legally excludes the use of international offsetting to achieve these goals, which underscores its emphasis on domestic efforts to reduce emissions.

Greece has committed to achieving climate neutrality by 2050 and has implemented a mechanism for monitoring and revising interim targets, with legally enshrined benchmarks providing for a reduction in greenhouse gas emissions by 55% by 2030 and by 80% by 2040 compared to 1990 levels (Climate Change Laws of the World, n.d.). In addition, the country has pledged to completely phase out coal by 2028, an important milestone in the process of decarbonizing the energy sector.

As of 2024, Cyprus has not yet enshrined a legally binding goal of achieving climate neutrality in national legislation, at the same time, the country has declared its intention to achieve climate neutrality by 2050 in accordance with pan-European commitments, in particular, it is expected that this goal will be officially included in the future long-term strategy to reduce greenhouse gas emissions (Grantham Research Institute on Climate Change and the Environment, 2023). Despite of the lack of legally defined intermediate benchmarks, Cyprus adheres to the goals of the European Climate Law, which provides for 2050 as a key benchmark for achieving carbon neutrality.

Ireland has committed to achieving climate neutrality by 2050 at the latest, which is defined as a long-term strategic goal in the field of climate policy. As an interim benchmark, the country has set a binding target to reduce greenhouse gas emissions by 51% by 2030 compared to 2018 levels (European Climate Neutrality Observatory, 2024). Although this obligation is not enshrined in

national legislation as a separate legal act, it is a key component of the state's political course in response to pan-European obligations and the Paris Agreement.

Luxembourg has declared its intention to achieve climate neutrality by 2050 at the latest, which is in line with the pan-European strategic course. Although this goal has not yet been enshrined at the legislative level, it is reflected in the national climate policy, in the medium term, the country has committed to reducing greenhouse gas emissions by 55% by 2030 compared to 2005 levels (European Climate Neutrality Observatory, 2024). The achievement of these goals involves the implementation of numerous measures in the fields of transport, construction, energy and waste management, which are key sources of emissions in Luxembourg.

The Netherlands has declared the achievement of climate neutrality by 2050 at the latest, with the possibility of achieving negative emissions after this date. Although this goal is not currently enshrined at the legislative level, it is recognized in the state's strategic documents. In the medium term, the Netherlands has committed to reducing greenhouse gas emissions by 55% by 2030 compared to 1990 levels (European Climate Neutrality Observatory, 2024). The implementation of this goal is carried out through a comprehensive approach to the transformation of the energy sector, transport and industry, as well as active support for renewable energy sources.

Denmark has set a clear goal of achieving climate neutrality by 2050, which was enshrined in the 2014 law on the transition to a "low-emission economy". In 2020, quantitative long-term targets were added to this law, including a commitment to reduce greenhouse gas emissions by 70% by 2030 compared to 1990 levels. that these national targets are achieved through "real internal reductions", avoiding carbon leakage, as well as enshrines sectoral targets within the Energy Agreement. An important development was the adoption by the parliament in October 2021 of a mandatory target for reducing emissions in agriculture by 55-65% by 2030, taking into account land use, land use change and forestry (Finance, 2021). Greenland, as an autonomous territory within the Kingdom of Denmark, participates in the international climate process through a joint delegation with Denmark and the Faroe Islands. Although it is not formally part of the EU and is not subject to its climate legislation, Greenland supports climate cooperation and develops its own environmental approaches, in particular in the areas of energy and environmental protection in the Arctic region. sea rise levels are currently limited, with scientific projections suggesting that the complete melting of Greenland's ice sheet – even if it lasts for centuries – could cause sea level rise of up to seven meters, with catastrophic consequences for the world's coastal regions (IPCC, 2021).

Croatia currently does not have a goal to achieve climate neutrality enshrined in its national legislation, but the main long-term guidelines are defined in the National Long-Term Development Strategy with Low Greenhouse Gas Emissions until 2050. The document provides for a reduction in greenhouse gas emissions in the range from -56.8% to -73.1% by 2050 compared to the level of 1990, excluding absorption (European Environment Agency, 2023). While the long-term one itself does not contain clearly expressed quantitative commitments to achieve climate neutrality, it forms the basis for the gradual decarbonization of the country's economy, in particular in the energy sector. Also, according to the National Energy and Climate Plan (NECP), Croatia has identified sectoral targets, primarily in the field of energy, which are key to achieving overall climate goals, although they remain indicative. Despite the availability of strategic documents, the lack of legally binding goals makes it difficult to assess the country's commitments in the context of the pan-European course towards climate neutrality by 2050.

Bulgaria currently does not have climate goals enshrined in legislation to achieve climate neutrality, but the country is gradually moving in this direction: in July 2024, the Climate Neutrality Roadmap was updated, which is based on the scenario report and recommendations prepared by the Energy Transition Commission in September 2023 (Grantham Research Institute on Climate Change and the Environment, 2023). This document outlines a long-term decarbonization strategy, but provides for the preservation of coal generation without restrictions until at least 2038. In addition, Bulgaria has not yet implemented the provisions of the "Fit for 55" package in its legislation (Reznikova, Grydasova, Medvedieva, & Matiushyna, 2024). There is also no mechanism

to guarantee the alignment of policy development with the achievement of national targets for 2030 and 2050, as well as tools for retrospective policy review of compliance with long-term climate targets.

Portugal has set a goal of achieving climate neutrality by 2050, with the possibility of accelerating this deadline by 2045. In the long term, the country plans to reduce greenhouse gas emissions by 90% compared to 2005 levels. To achieve these goals, intermediate targets have also been set: a reduction in emissions by 55% by 2030 and by 65-75% by 2040, excluding changes in land use and forestry (European Climate Neutrality Observatory, 2024). This approach demonstrates the country's strategic vision for sustainable development and the country's efforts to comply with the European Union's common climate commitments.

Spain has declared its intention to achieve climate neutrality by 2050. The current interim target calls for a 23% reduction in greenhouse gas emissions by 2030 compared to 1990 levels, but this commitment is not enshrined in climate law, it is part of the overall national climate strategy (European Climate Neutrality Observatory, 2024). The definition of the goal for 2040 is planned in the Decarbonization Strategy until 2050, which should become a long-term benchmark for ensuring a sustainable transition to a climate-neutral economy.

In today's conditions of climate instability and political fragmentation, an effective resource policy should not only meet the challenges of the energy transition, but also create a basis for strengthening interstate cooperation and solidarity, Dr. Mehrnoush Aryanpour, a researcher in the field of environmental law, rightly emphasizes (Aryanpour, 2024, p. 36). In this context, as Dr. Thomas Henkens and researchers Bill Anderson-Samways and John Hobby emphasize, traditional legal approaches to natural resources have largely focused on their conservation and management, however, in the context of achieving climate neutrality, these approaches must be transformed towards actively contributing to overcoming the climate crisis by introducing targeted legal mechanisms that ensure both sustainable development and rational use natural resources, especially those that are limited in the context of the energy transition (Henckens, 2021; Anderson-Samways & Hobby, 2022).

According to the well-known Ukrainian scientists Maryna Medvedeva, Roman Yedeleev, Natalia Reznikova, Anton Nanavov and Hanna Gridasova, the study of climate neutrality on the European continent by analyzing the key areas of implementation of this goal in the national practices of the EU Member States has revealed the need to update the European climate strategy and legal instruments for its implementation, which is especially relevant in view of the growth of negative environmental trends, caused by anthropogenic impact, as well as due to the complexity of coordination of efforts between EU countries, due to differences in political and economic systems (Medvedieva, Yedeliev, Reznikova, Nanavov, & Grydasova, 2024).

Achieving the goals of climate neutrality requires not only an ambitious and rigorous implementation of the principles of a just energy transition by increasing the level of commitments in natural resources legislation, but also a rethinking of models of compliance with international obligations, since the current approach, based on self-determined goals and an optional control mechanism, as in the Paris Agreement, has proven to be insufficiently effective compared to agreements such as the Montreal Protocol or the Convention on international trade in endangered species of wild fauna and flora, which demonstrates higher efficiency due to the combination of soft support instruments with tough sanctions measures, in particular, the possibility of suspending trade privileges in case of violation of the terms of the treaty (Aryanpour, 2024, p. 37).

Professor Jos Delbeke, Honorary Director of the European Commission's Directorate-General for Climate Action and one of the architects of the European Green Deal, rightly points out: agreeing on goals alone does not guarantee their implementation, since the main challenge remains effective policy development and implementation in all sectors of the economy, including energy, transport and industry (Delbeke, 2024).

Conclusions. The European Union continues to play a leading role in global climate governance, forming a model of a normative and policy approach to achieving climate neutrality.

The enshrinement of the net zero goal by 2050 in the European Climate Law has been a key step in transforming climate goals from political declarations into legally binding commitments. However, despite the unity of the strategic benchmark, national approaches to achieving this goal remain fragmented both in content and in the level of legal specification.

Comparative analysis shows that EU member states show varying degrees of ambition, legislative detail and pace of decarbonization. Some states (including Finland, Sweden, Germany, Austria) have already set stricter time horizons for achieving climate neutrality, while others have not yet enshrined such obligations in national legislation. This creates risks of unevenness in achieving the pan-European goal.

From a systemic perspective, the attainment of climate neutrality in the European Union requires more than political commitment — it calls for ongoing regulatory transformation, enhanced interstate cooperation, equitable distribution of responsibilities, and robust compliance mechanisms, all underpinned by science-based, legally binding, and technologically feasible approaches.

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