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LEGAL MECHANISMS FOR THE IMPLEMENTATION OF THE "FIT FOR 55" PACKAGE: BETWEEN AMBITION AND EFFECTIVENESS

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Bratko I.V. Legal mechanisms for the implementation on the "Fit for 55" package: between ambition and effectiveness.

The article examines the introduction of legal instruments aimed at achieving the European Union's climate objectives in accordance with its international obligations under the Paris Agreement. Within the framework of the European Green Deal, the author analyzes EU climate policies designed to reach climate neutrality by 2050 and the intermediate goal of reducing greenhouse gas emissions by 55% by 2030, with particular attention to the effectiveness of implementing the "Fit for 55" legislative package adopted to ensure cross-sectoral interaction within the Union, as well as the consistency between declared climate ambitions and actual law-enforcement outcomes. The EU not only maintains the 55% reduction target for 2030 but has also established a separate intermediate objective for 2040, indicating how much additional mitigation is required after 2030 to realistically attain climate neutrality by mid-century.

The article further assesses the key EU mechanisms for achieving climate neutrality pursuant to Regulations 2018/2001 and (EU) 2021/1119, which are essential for shaping national decarbonization plans. The scientific discourse on the effectiveness of EU climate policy is analyzed, emphasizing that progress largely depends on how successfully Member States implement, at the national level, the instruments contained in the "Fit for 55" package–namely industrial and transport decarbonization, the EU Emissions Trading System (EU ETS), the Carbon Border Adjustment Mechanism (CBAM), the expansion of renewable energy, energy taxation reform, enhanced building energy efficiency, and the Methane Regulation aimed at monitoring, reporting and eliminating leaks.

Special attention is given to practical implementation challenges, including social consequences, regional disparities, political sensitivity and the effects of global crises, such as the war in Ukraine and growing energy instability in the EU market. The literature also highlights differentiated effects on aviation pricing and decarbonization rates, because EU ETS, SAF quotas, energy taxation and the CORSIA mechanism influence ticket costs depending on route geography and regulatory regimes.

Key words: International law, international environmental law, EU law, Paris Agreement, climate change, EU climate policy, climate neutrality, "Fit for 55".

Братко Л.В. Правові механізми реалізації пакета "Fit for 55": між амбіціями та ефективністю.

Стаття присвячена аналізу запровадження правових інструментів досягнення кліматичних цілей в ЄС відповідно до міжнародно-правових зобов'язань за Паризькою угодою. В рамках Європейської зеленої угоди автор досліджує кліматичні політики щодо досягнення кліматичної нейтральності до 2050 року та проміжної цілі скорочення викидів на 55% до 2030 року, зокрема ефективність впровадження пакету законодавчих ініціатив "Fit for 55" ухваленого з метою забезпечення галузевою взаємодії в ЄС, а також відповідність задекларованих кліматичних цілей реальній ефективності правозастосування. ЄС має не лише ціль щодо скорочення на 55% до 2030

року, а й окрему проміжну ціль на 2040 рік, яка показує, скільки ще потрібно скоротити викидів після 2030-го, щоб реально вийти на кліматичну нейтральність у 2050 році.

Автор розглядає ключові механізми ЄС досягнення кліматичної нейтральності відповідно до вимог Регламентів 2018/2001 та (ЄС) 2021/1119, врахування яких є важливим для ухвалення національних планів скорочення викидів. Аналізується науковий дискурс щодо ефективності кліматичної політики ЄС, яка значною мірою визначається тим, наскільки результативно держави-члени впроваджують на національному рівні інструменти пакета "Fit for 55", зокрема декарбонізацію промисловості та транспорту, систему торгівлі викидами (EU ETS), прикордонний вуглецевий коригувальний механізм (CBAM), розвиток відновлювальної енергетики, реформу енергетичного оподаткування, підвищення енергоефективності будівель і Регламент про метан, спрямований на моніторинг та усунення витоків. Окрему увагу приділено практичним викликам їх реалізації – соціальним наслідкам, регіональним відмінностям, політичній чутливості та впливу глобальних криз, включно з війною в Україні й енергетичною нестабільністю на ринку ЄС. У дослідженнях також наголошується, що зазначені інструменти по-різному впливають на ціноутворення й темпи декарбонізації авіаційного сектору, оскільки EU ETS, квоти SAF, енергетичне оподаткування та механізм CORSIA змінюють вартість перельотів залежно від географії маршрутів і нормативного режиму.

Ключові слова: Міжнародне право, міжнародне право навколишнього середовища, право ЄС, Паризька угода, зміна клімату, кліматична політика ЄС, кліматична нейтральність, "Fit for 55".

Introduction. The European Union, within the framework of the commitments of the Paris Agreement and the European Green Deal, has identified the achievement of climate neutrality by 2050 as a strategic goal. Adopted in 2021, the "Fit for 55" legislative package aims to achieve a 55% reduction in greenhouse gas emissions by 2030 and to facilitate a gradual transition toward a climate-neutral economy. to a climate-neutral economy in order to combat global warming. In this context, it is relevant to analyze the effectiveness of the legal instruments provided for in the package, taking into account internal and external challenges, including the war in Ukraine and the energy crisis.

The Purpose of the Paper. The article is aimed at a systematic analysis of the legal mechanisms for the implementation of the "Fit for 55" package within the framework of the European Union's climate policy, in particular, their ability to ensure the achievement of climate neutrality goals by 2050. The focus is on assessing the effectiveness of key regulatory instruments, identifying regulatory gaps, and assessing the potential of these measures in a complex socio-economic and geopolitical environment.

Literature Review. The paper draws upon key EU legal instruments, including Regulation (EU) 2021/1119, the revised Regulation (EU) 2018/842, and a series of directives addressing energy efficiency, renewable energy, energy taxation, and the energy performance of buildings. The analytical base is based on official reports from the European Commission (2021a, 2023, 2024), the International Energy Agency (IEA, 2023a–c), as well as current academic publications – including studies by Château and Barlow (2023), Švažas, Bilan and Navickas (2024), De Laurentis (2020), Hoppe and Miedema (2020), Presley (2023), Ehlers, Kölker and Lütjens (2022), Indigo del Guayo and Redondo Torres (2023). Modern publications of Ukrainian researchers were also taken into account, which made it possible to supplement the European discourse with a view from the regional context.

Main research results. In accordance with the provisions of the Paris Agreement and the goals of the European Green Deal, the European Union is implementing large-scale transformational policies to achieve climate neutrality by 2050. The central tool in the European climate policy is the "Fit for 55" legislative package, adopted in 2021, which provides for a reduction in net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels, which is part of the strategy for the long-term transition to a climate-neutral economy within the framework of the European Green Deal.

According to the European Climate Law (Regulation (EU) 2021/1119), member states are obliged to contribute to the achievement of internal climate neutrality by 2050 at the latest, balancing greenhouse gas emissions and removals within the Union, with the further goal of achieving negative emissions. On the way to this goal, the law also sets an intermediate target: a 55% reduction in greenhouse gas emissions by 2030, which has been legally binding since 2021 (Regulation (EU) 2021/1119). These provisions are consistent with the Paris Agreement, in particular Articles 2(1)(a) and 7, on curbing global warming and adapting to climate change.

The "Fit for 55" package proposed a significant number of regulatory changes, including: the transition to renewable energy sources (Directive (EU) 2018/2001); strengthening energy efficiency (Directive 2012/27/EU); reconstruction and modernization of buildings to reduce their carbon footprint (Directive 2010/31/EU); revision of energy and electricity taxation (Directive 2003/96/EC); expanding the use of green hydrogen and other low-carbon gases.

The legislative initiatives of the package are accompanied by social mechanisms, in particular the Just Transition Fund, which aims to support the regions most affected by the "green transition", which is scientifically supported in particular by the analysis of researchers Château and Barlow, who emphasize that the implementation of climate policies must take into account socio-economic differences between EU member states, as this affects the distribution of economic burdens and the fairness of the transition[1]. This ensures social equality, supports employment and prevents negative socio-economic consequences for vulnerable communities.

Particular attention is also paid to the transport sector as part of the "Fit for 55" package. From 2035, the sale of new gasoline and diesel cars with internal combustion engines will be prohibited in the EU (Regulation (EU) 2023/851). Following strong lobbying by Germany, the European Union approved an exemption for synthetic fuels, permitting their use beyond 2035 under specific conditions. In addition, a new regulation on the development of infrastructure for alternative fuels was adopted to ensure a 90% reduction in emissions in transport. In this way, "Fit for 55" not only formalizes the EU's climate commitments, but also creates legal, technical and financial mechanisms to achieve sustainable development, innovative growth and social inclusion.

Within this framework, key measures under the "Fit for 55" package – including the reform of the EU Emissions Trading System (EU ETS) and the planned ban on the sale of new internal combustion engine vehicles from 2035 – play a pivotal role, as well as the introduction of the Carbon Border Adjustment Mechanism (CBAM), are of particular importance. Their implementation is becoming relevant, given that emissions from the transport sector increased by more than 250 million tons in 2022, reaching 8 gigatons of CO_2, mainly due to the recovery of air travel after the pandemic [2]. Given that the largest share of global greenhouse gas emissions is the energy sector (almost 37 Gt), followed by transport (8 Gt), industry (5 Gt) and other sources, effective decarbonization must encompass not only electricity generation, but also industrial processes, transport infrastructure and household energy consumption, which, however, in the case of transport is complicated by a multi-level regulatory structure, since the responsibility for traffic management divided between central, regional and municipal authorities.

In the context of the implementation of the European Climate Plan by 2030, the "Fit for 55" package, in particular through the Carbon Border Adjustment Mechanism (CBAM), updates Member States' national targets for reducing greenhouse gas emissions in sectors not covered by the EU ETS and land use and forestry regulations. According to the updated Effort Sharing Regulation, the EU has raised the overall level of its emissions reduction target from 29% to 40% compared to the 2005 level. The document also establishes mandatory annual national indicators for the relevant sectors. In addition, a joint target has been set at EU level to remove at least 310 million tons of CO_2 equivalent from the atmosphere by 2030, with mandatory distribution among Member States.

An important step in the implementation of the European Climate Law (Regulation (EU) 2021/1119) was the revision of EU energy and climate legislation with the aim of setting a new target for 2040. In accordance with Article 4(3) of the European Climate Law, following the completion of the first Global Stocktake under the Paris Agreement at COP28 in 2023, the European Commission committed to submit a legislative proposal for an interim target by 2040. This commitment was met in February 2024, when the European Commission announced a target to reduce net greenhouse gas emissions by 90% by 2040, relative to 1990 levels. The proposed target, which envisages phasing out fossil fuels and strengthening the role of renewable energies, is based on an impact assessment that takes into account both the economic and social risks of climate inaction. Thus, the EU continues to consistently shape climate policies focused on achieving neutrality by 2050.

At the same time, as noted by well-known scholars Indigo del Guayo and José Antonio Redondo Torres, there are significant legal challenges in achieving these goals. In particular, in the context of volatile energy prices, in particular natural gas, Member States may prefer more carbon-intensive technologies, such as coal-fired power, often accompanied by state subsidies allowed through exceptions to state aid rules approved by the European Commission; thus, social support measures during energy crises can come at the expense of the effectiveness of climate policies [3].

Ukrainian researchers emphasize that the CBAM, which is due to enter into force in 2026, is designed not only to stimulate the decarbonization of high-carbon sectors in the EU partner countries, but also to ensure fair competition between European producers and importers, but its implementation is already causing concern on the part of exporting countries, which are forced to seek a balance between national climate ambitions and foreign trade interests [4].

It is also important to note that a significant share of the total load is methane emissions from the oil and gas sector, which in 2022 reached approximately 2.7 gigatons of CO_2 equivalent, which is due to leaks, incineration and ventilation [5]. Methane is a short-lived but extremely potent greenhouse gas that has about 28 to 30 times higher global warming potential than CO_2 over a 100-year horizon. According to the International Energy Agency (IEA), in 2023 alone, operations in the oil and gas sectors caused approximately 80 million tons of methane emissions, which in CO_2 equivalent represents a significant share of global greenhouse gases [6]. As the well-known researcher Presley emphasizes, the high intensity of methane as a greenhouse gas and its relatively short period of stay in the atmosphere make reducing methane emissions one of the most effective ways to slow down the rate of global warming in the short term [7]. Given this, the "Fit for 55" package includes a separate Methane Regulation, the first comprehensive EU law aimed at directly reducing methane emissions. The regulation mandates the implementation of robust monitoring, reporting, and verification protocols, routine leak detection and repair procedures, and a ban on uncontrolled flaring and venting at oil and gas production sites, transportation and storage facilities. The introduction of these instruments allows for the rapid reduction of methane emissions, which provides a positive effect in the short term and contributes to the achievement of the European climate goals, in particular, the reduction of greenhouse gas emissions by at least 55% by 2030 and the achievement of climate neutrality by 2050. Therefore, methane regulation is a critical component of an effective EU climate policy and an integral part of the implementation of obligations under the Paris Agreement [8]. This fact confirms the need for additional regulatory mechanisms within the framework of European decarbonization policy, which should target not only CO_2, but also other greenhouse gases with high warming potential.

Despite of the European Union's progressive efforts to implement the "Fit for 55" package, the global dynamics of greenhouse gas emissions remain alarming. According to the IEA, in 2022 emissions related to the energy sector reached a record high of 41.3 gigatons of CO_2 equivalent, an increase of 1% compared to the previous year. The main sources of growth were the burning of coal and natural gas, as well as an increase in demand in the transport sector, especially in aviation [9].

Thus, the assessment of the effectiveness of "Fit for 55" should be carried out not only on the basis of internal compliance with the EU targets, but also in a broader global context, taking into account the overall dynamics of emissions growth and the need for accelerated implementation of climate innovations. Despite of the achievements, a number of studies indicate that in order to align EU policies with the goals of the Paris Agreement, it is necessary to reduce emissions by at least 86% by 2030 and achieve neutrality already in the period 2036-2040 years [10]. The EU Parliament, in particular, called for setting a legal target of at least a 60% reduction by 2030, but this proposal was not taken into account in the final text of the law.

The literature provides a comprehensive view of the effectiveness of energy management in the implementation of renewable energy in different regional contexts. As countries move towards a sustainable energy future, investing in inclusive and coherent governance frameworks will be key. Taking into account regional specificities, involving local governments and strengthening cooperation among all actors will significantly contribute to the global energy transition, while ensuring an equal distribution of socio-economic benefits from renewable energy.

A coalition of scientists from the Kaunas University of Technology (Lithuania), the Jan Kochanowski University in Kielce (Poland) and the Technical University in Košice (Slovakia) Mantas Švažas, Yurij Bilan and Valentinas Navickas believe that, despite the active discussion of energy governance issues in Europe in the context of energy transformation, many scientific studies remain at the level of concepts and do not offer practical solutions, which highlights the need to create sustainable a coordination framework that would ensure effective interaction between stakeholders and facilitate the implementation of renewable energy at all levels of government[11].

Researcher C. De Laurentiis emphasizes that "regional governments have significant powers to implement policy measures in the areas of adaptation and mitigation of climate change, which determines the results of territorial governance in the field of renewable energy, at the same time

national governments, seeking to ensure the transition to a low-carbon economy and integrate climate logic at different spatial levels, are increasingly shaping this interaction through energy policies, that competes with other strategic priorities – economic competitiveness, government goals, energy security and infrastructure"[12].

Although significant barriers remain in renewable energy management, Hoppe and Miedema are of the opinion that insufficient attention to regional dynamics hinders effective responses to intermunicipal energy challenges, suggesting the need to develop solutions adapted to specific regional conditions that will respond to national energy policies [13].

Despite of the significant environmental objectives of the "Fit for 55" package, its implementation in the field of maritime transport is accompanied by methodological limitations, scientists Mallouppas, Yfantis, Ktoris and Ioannou draw attention to the fact that the current analysis model is not integrated with macroeconomic indicators, such as the GDP of EU member states [14]. In this regard, the authors propose its extension, which would allow assessing the impact on demand, supply and overall competitiveness of EU economies under the influence of the increase in operating costs in shipping, which can significantly affect not only the structure of logistics, but also foreign trade, especially for vulnerable EU Member States. In addition, the authors emphasize that the regulatory measures of the "Fit for 55" package will affect the economies of the member states in different ways, which requires differentiated approaches, and the proposed methodology can be adapted to any EU country, with the possibility of including intermodal transport, which provides flexibility and scalability for further policy analysis.

A study by Ehlers, Kölker and Lütjens analyzes the impact of the "Fit for 55" package instruments on pricing in the aviation sector, in particular in the context of their application to intra-European and international routes indicating that instruments such as EU ETS, Sustainable Aviation Fuel (SAF) quotas, energy taxation and the CORSIA mechanism have a differentiated impact on ticket prices and, consequently, on the efficiency of decarbonization of air travel [15]. As part of the initiative *ReFuelEU Aviation* SAF quotas will increase gradually until 2050, facilitating the substitution of traditional fuels, but at the same time increasing the cost of transportation. Energy taxation provides for the abolition of benefits for aviation fuel and the introduction of minimum excise rates, leveling the playing field with other modes of transport. On international routes where the EU ETS is not in force, the CORSIA mechanism is applied, which provides for compensation emissions through the purchase of carbon certificates [16]. These tools together create a multi-level incentive system that differentiates the impact depending on the geography of flights, and thus contributes to more precise regulation of emissions in the aviation sector.

In addition, Ukrainian researchers emphasize the lack of an effective mechanism for reimbursement of significant volumes of greenhouse gas emissions caused by armed conflicts, which is a major shortcoming of the current methodological framework for implementing the EU's climate goals lies in its limitations regarding the achievement of climate neutrality by 2050, as outlined in the European Climate Law; this problem is especially relevant in the context of a full-scale war on the eastern borders of the European Union due to the Russian aggression in Ukraine, which historically coincided with the stage of reviewing climate commitments [17].

Conclusions. The "Fit for 55" package represents a key stage in the EU's legal response to its climate ambitions, aiming at a comprehensive transformation of the energy, transport, and economic sectors toward sustainable development. The assessment of its implementation reveals both significant potential and notable challenges, including uneven impacts across member states, the need to integrate macroeconomic forecasting, and to regulate a broader range of greenhouse gases beyond CO_2. Particular attention should be paid to effective methane regulation, support for vulnerable social groups and regions, and the adaptation of climate policy to external geopolitical instability. The success of "Fit for 55" depends on continuous refinement of legal tools, improved multi-level coordination, and robust, evidence-based evaluation of policy effectiveness.

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