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PURSUING EUROPEAN GREEN DEAL MILESTONES IN TIMES OF WAR IN UKRAINE – A CONTEXT OF ENERGY TRANSITION IN POLAND

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ABSTRACT: Within the sustainable development (SD) paradigm, the European Green Deal (EGD) sets dynamic energy transition goals for the European Union (EU). However, diverse dynamics among member states, exacerbated by events like the COVID-19 pandemic and the war in Ukraine, directly influence this progress. This paper aims to present the energy transition course in EU countries up against the implementation of the objectives of the EGD. This paper conducts a thematic (scoping) literature review and comparative analysis of energy transition progress in all EU countries, concentrating on Poland, which faces unique challenges, including a sluggish pace of energy transition and the effects of the Russian invasion on Ukraine in this regard. Recommendations for Poland include an intensified focus on investments in renewable energy sources (RES) and low-carbon installations. The results demonstrate that collective success in SD necessitates each EU member fulfilling national climate goals, emphasising the need for a unified commitment to navigate complexities and build a sustainable future.

KEYWORDS: European Green Deal, energy transition, sustainable development, renewable energy sources, war in Ukraine

Introduction

Ensuring climate neutrality is one of the leading challenges the world is facing today as we aim to achieve future sustainable development. Thus, caring for the environment and prioritising sustainability finds a key place in a number of international documents and policies, in particular in the "Transforming Our World: Agenda for Sustainable Development – 2030" document, signed by the leaders of the United Nations (UN) member countries in 2015. There are 17 Sustainable Development Goals formulated in it, among which climate action is Goal 13, while clean and accessible energy itself is a separate goal (i.e., Goal 7 "Ensure access to affordable, reliable, sustainable and modern energy for all"). The 2030 Agenda, in conjunction with the Paris Climate Agreement, outlines a path for creating a "better world" and establishes a global platform for collaborating on sustainable development across its economic, social, environmental, and governance aspects (European Commission, n.d.).

While all European Union (EU) countries are members of the UN and thus implement the commitments they have made, additional detailed steps are being adopted within the EU structures to ensure an even smoother transition to a greener economy. Among the most distinguished undertakings in recent years is the uptake of the European Green Deal scheme, which seeks to achieve climate neutrality by 2050 in the EU (Sikora, 2021). One of its main pillars, which at the same time sets measurable goals, is an energy transition involving the abandonment of power generation from fossil fuels such as hard coal. It needs to be noted that achieving grand targets set by the EU is inseparably linked with achieving targets set for every member country. Ultimately, a shift away from hard coal to renewable and nuclear energy should be achieved – the absence or insufficiently low level of reduction of coal's share in the energy mix (with examples from Poland and Bulgaria, among others) has produced unsatisfactory results in emission reductions (Jonek-Kowalska, 2022). Due to this fact, it is crucial to focus on member countries that do not carry out energy transformation effectively and to find reasons behind that. What requires additional attention is that the initial goals set in Europe were characterised by tranquillity and stability, which have changed in recent years. For the past 5 years, the Old Continent went through both the COVID-19 pandemic and the war in Ukraine, which were not without an influence on energy transformation.

Observing the course of transformation in EU countries, it is the understanding of the Polish phenomenon that seems to be vital for the efficacy of the realisation of the European Green Deal objectives. As Poland joined the EU in 2004, its presence in the EU structures provided new opportunities for financing environmental transformation, including energy transformation, through access to funds, expertise or know-how. As Poland is striving to achieve environmental targets set by the EU, it encounters a plethora of challenges, including the ongoing war. However, the war was not the beginning of Poland's struggles to achieve energy transformation goals and pursue European Green Deal milestones. Other member countries, which were simultaneously in the midst of transformational processes, also operated in analogous conditions. Kubiczek et al. (2023a) showed that in many non-transformational dimensions, Poland is slower than EU countries in its transformation towards a carbon-neutral economy.

In 2022, Poland's electricity production relied on coal as much as 69.21% (Ember Climate, 2023). This means that in less than 30 years, the entire Polish system on which the country's energy industry is based (the so-called energy mix) would have to be changed. Poland's heavy dependence on coal and a large proportion of its imports from Russia caused electricity prices to skyrocket after the outbreak of war in Ukraine due to the rising prices of energy carriers. The government had to react to ensure energy security for its population, making it even more imperative to conduct an energy transition in this context. The present situation is a consequence of Poland's long-standing energy transition policy, the results of which are inconsistent with the needs expressed by those in power. Poland is reluctant to move away from coal, which is further influenced by the ongoing war in Ukraine. The war has caused an energy crisis, leaving Poland to still be dependent on coal.

The purpose of the paper is to compare the course of the energy transition in EU countries with the determination of the degree of implementation of the European Green Deal, with particular emphasis on the phenomenon of Poland. This includes a breakdown of the progress of the energy transition among EU countries, specifying Poland, and a portrayal of the current state of the electricity market in Poland, especially in the face of the ongoing war in Ukraine. This is served by a thematic

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(scoping) literature review (Daudt et al., 2013), the efficacy of which is confirmed in numerous studies in environmental science (Kubiczek et al., 2023, 2023a; Lieb, 2022). In order to achieve the objectives, the following research questions were posed:

1. What is the pace of energy transition in the European Union, and which energy sources dominate each member country?
2. What are the challenges and prospects for fulfilling the European Green Deal, with a particular focus on Central and Eastern European countries?
3. How does Poland represent the situation of this region, where the energy transition is not as effective as in other parts of the EU, especially in the context of the war in Ukraine?

This work is organised as follows: Section 2 is devoted to the context and importance of energy transition, Section 3 outlines the methodology, Section 4 focuses on presenting the results, detailing policies and objectives at the international and national levels, and Section 5 is a discussion, which is topped off with a word of conclusion (in Section 6).

An overview of the literature

Towards a greener world: a look into international arrangements

In 2015, world leaders at the UN Climate Change Conference agreed on new targets to combat global warming. This is codified in the Paris Agreement, which is an action strategy to reduce the negative impacts associated with the phenomenon. The European Council, as a consequence of this agreement, approved four targets in the 2030 perspective for the entire EU. It is worth mentioning that already in 2017, the European Council pledged to quickly and fully implement the Paris Agreement as part of the modernisation of industry and the economy in Europe (European Commission, 2018; European Council, n.d.a). In 2018, the European Commission issued a communication, "A Clean Planet for All" (European Commission, 2018a), which called for immediate and decisive climate action and revised the goals of the Paris Agreement. It set new wording for climate protection targets and reaffirmed the goal of increasing energy efficiency in the European Union by at least 32.5% by 2030. In addition, it is assumed that the share of renewable energy will be raised to at least 32% of the EU's total energy consumption. The blending of climate and energy strategies aims to reduce greenhouse gas emissions by at least 40% by 2030 compared to 1990. Adopted EU legislation envisages a total reduction in greenhouse gas emissions of about 45% by 2030. It also foresees a 60% reduction in harmful gas emissions by 2050.

Parties to the Paris Agreement, including all EU members, have also been asked to prepare long-term strategies by 2020, and these include actions until 2050. This requirement stems from the Regulation on Governance of the Energy Union and Climate Action (Regulation, 1999), which sets out the process for member states to prepare these strategies. New strategies are to be prepared every 10 years and cover the next 30 years. However, several countries, including Poland, have not prepared such documents by February 1, 2023 (European Commission, 2023).

In late 2019, the European Parliament declared a climate crisis, calling on the European Commission to ensure that all its legislative proposals are in line with the goal of limiting global warming to below 1.5°C[1] and with the goal of significantly reducing greenhouse gas emissions (European Parliament, 2022). Detailed action plans are laid out in the European Green Deal, which aims to transform the EU economy into a modern, competitive and resource-efficient one (European Commission, 2019). As a key strategy of the European Union, the European Green Deal seeks to transform Europe into a climate-neutral economy by 2050. As part of this strategy, the "Fit for 55" package is an important part of achieving the goals of the European Green Deal, setting out specific measures and regulations to reduce greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. These measures require collective responsibility but are an opportunity for many communities, including consumers, households and individuals. Failure to act in line with the "Fit for 55" package not only leads to negative consequences of climate change, such as floods, droughts and fires but also creates divisions between societies that have access to clean technologies and those that do not (European

[1] Namely: the 2018 Intergovernmental Panel on Climate Change (IPCC) report on the effects of global warming of 1.5°C.

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Commission, 2021). Additionally, it can exacerbate the problem of energy poverty (European Commission, 2021). The main goals of the "Fit for 55" package are contained in the updated (European Commission, 2021):

- Effort Sharing legislation,
- The Energy Efficiency Directive,
- The Land Use, Land Use Change and Forestry Regulation (LULUCF),
- The Renewable Energy Directive (REDII).

Contemporary challenges in deploying energy transition schemes

The energy transition process is proceeding at a different pace depending on the European region and the historical circumstances involved. The energy transition of Poland, being a lens into the region of Central and Eastern Europe, remains a challenge despite numerous European Union initiatives and regulations. According to the European Commission's working document (European Commission, 2020), carrying out the energy transition in Poland requires far more investment than in other EU countries. As Europe's largest coal producer, Poland is facing the need to transition to greener energy sources, but high upfront costs and low public environmental awareness pose significant challenges. However, obstacles such as limited financial resources and formal barriers are impeding the progress of green energy in Poland (Bernaciak et al., 2017). Investments in renewable energy sources are vital for Poland to boost its energy independence and fulfil its environmental commitments (Bąk et al., 2023). In addition, unexpected global events have also hampered the transitional processes. The need to balance economic and environmental aspects in the transition is a key task for Poland to accelerate the transition to a more sustainable energy system.

The next global event significantly hindered the goals and plans set by the EU. The unexpected situation related to the outbreak of the COVID-19 pandemic in 2020 has significantly affected environmental issues. For example, the situation associated with it resulted in a substantial rise in plastic waste, posing a strategic challenge in effective recycling (Choudhury et al., 2022). The pandemic situation has also triggered an increase in municipal waste, causing increased pollution of water, air and soil (Rume & Islam, 2020). On the other hand, however, a reduction in the intensity of transportation and consumption has resulted in a positive environmental impact (Rume & Islam, 2020). However, such significant changes forced in population habits (along with two-fold effects) create uncertainty and, thus, the need to readjust policies related to the energy transition. The important role of the energy sector was also highlighted by the pandemic, including the area of energy security, for the functioning of the economy of Poland and other European countries. In the coming years, the energy sector will face a number of post-COVID challenges related to, among other things, rebuilding or substituting supply chains to drive investment, mobilising funds in budgets strained by the effects of the outbreak and, at times, revising investment plans and accumulating funds for key projects. It is valid that investment decisions are made with a green and low-carbon economic recovery aspect in mind. The adoption of renewable energy by consumers and local governments is essential for the successful integration of green energy into the energy mix (Bąk et al., 2023; Khalid et al., 2021). Post-pandemic recovery activities are aimed at giving a quick and effective boost to growth and creating new opportunities for the national economy. In addition to shielding tools and measures to mobilise domestic public resources, EU support will be used (e.g., under the Polish national strategy "EPP 2040" – "Energy Policy of Poland until 2040"). The strategy, adopted in February 2021 by the Council of Ministers as part of a resolution submitted by the Minister of Climate and Environment, illustrates plans for the development of the fuel and energy sector and sets the framework for Poland's energy transition. The document takes into account the challenges of the adaptation of the Polish economy to EU regulations, the European Green Deal, as well as the economic recovery plan after the COVID pandemic and the pursuit of climate neutrality in the second half of the 21st century (Ministry of Climate and Environment, 2021).

On February 24, 2022, Russia's invasion of Ukraine began, significantly changing the perception of security (including energy security) in Central and Eastern Europe (Żuk & Żuk, 2022). Despite the efforts of Central European countries to limit the impact of the war situation on energy markets, this influence has undoubtedly been and continues to be significant today. This is because, before the outbreak of Russia's aggression against Ukraine, these countries were dependent on supplies of

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energy resources and fuels from Russia. Central European governments were forced to accelerate their transition processes, adapt their energy infrastructure and undertake efforts to store raw materials. However, the resource itself, along with its price, remains a key challenge. The answer to this challenge is to accelerate the energy transition so that States can increase their level of energy self-sufficiency. An increase in the use of renewable energy sources (RES) and a renaissance in nuclear power generation are expected. However, it is vital to be aware of the currently inadequate sustainability criteria and efforts to enhance the pro-environmental aspect of nuclear power (Pieńkowski, 2024).

In the context of the war situation in Ukraine, a discussion has been initiated about the moral imperative of applying an embargo on gas imports from Russia (van Bergeijk, 2022), and although it is a costly decision, it is morally and environmentally desirable (Cecchetti et al., 2022). Embargoes encompass economic and environmental aspects, and Poland, once reliant on energy imports from Russia, was forced to seek alternative sources.

Apart from actions on the supply side (like divesting from fossil fuels and endorsing renewables), there's a need to drive demand for cleaner energy through electric vehicles and energy-saving devices. Without addressing the demand side, sanctions may lead to increased global oil production rather than reduced consumption (Arezki & Nysveen, 2022). The situation jeopardises Poland's fulfilment of European Green Deal goals, presenting significant obstacles – there is a high likelihood that Poland will not meet the imposed EU requirements for the share of energy produced from RES by 2030 (Stanuch & Firlej, 2023). The ongoing conflict in Ukraine underscores the importance of "sovereignty" and "energy security" in relation to climate protection. While transformative processes should prioritise social justice, Żuk and Żuk (2022) suggest that this approach may lean towards nationalist concepts, prioritising energy security over climate concerns. This is evident in conflicts like Ukraine and opposition to international climate agreements. Countries such as Poland might employ the concept of "energy security" to resist EU climate policies. This is evident in actions like postponing the closure of coal mines, redirecting funds from renewable energy to defence, and centralising energy policy. The outcome is a significant surge in energy prices for both private consumers and businesses (Żuk & Żuk, 2022).

Amidst the current gas crisis and soaring fossil fuel prices due to the conflict in Ukraine, many citizens face energy poverty in Poland. In response, the government implemented the Solidarity Shield (Gov.pl, n.d.a), providing support to households, priority utilities, local government units, and small businesses. Poland leads the EU in applying tariffs for SMEs and offers a comprehensive support package to combat the energy crisis. Another initiative, the Energy Shield (Gov.pl, n.d.b), focuses on reducing energy costs for consumers, sensitive entities, and energy companies. It includes measures to limit price increases for system heat and frozen gas prices since January 1, 2023. Additionally, vulnerable consumers receive specific allowances under this form of support.

In early April 2022, due to the growing energy crisis caused by the escalation of the war in Ukraine, changes in EU energy policy and the faster-than-expected development of green technologies, the Council of Ministers adopted the assumptions for the update of the EPP 2040 strategy. Work on the draft update was completed in the first quarter of 2023 (Instrat, 2023), but the process of implementing the EPP 2040 update was delayed and was not implemented until the third quarter of 2023.

Research methods

The European Union defined very ambitious targets for the European Green Deal. However, their implementation has faced a multitude of challenges. While comparing the progress made, it becomes evident that for these targets to be achieved, every member country must contribute to their realisation.

The scope of the comparisons included all 27 countries of the European Union, with a special focus on Poland, and covered the period 1990-2022[2], aiming to encompass the full comparison of the

[2] In 1990 not all current member states were in the EU structures, but the official reports and European data analyzed in Section 3 related to performance often start precisely from 1990, compiling even incomplete data on countries whose accession to the EU took place after that year, hence this time frame of the study was chosen.

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scope of changes in the face of political transformation in Central and Eastern Europe. However, particular temporal emphasis is placed on the unexpected and dynamic events of the past few years, namely the outbreak of the COVID-19 pandemic and Russia's invasion of Ukraine, which also contributed to the need to adjust strategies in the energy transition in the region. Recent years also include the prospect of achieving the intended objectives of the European Green Deal scheme. The analysis was based on secondary data sources: studies, reports and working papers prepared by official EU and national institutions. The examination of these types of sources is a component of the scoping literature review (Daudt et al., 2013).

To address the study objectives, the paper delved into Poland's international context, focusing on its electricity market as a reflection of the ongoing energy transition. This approach provides insights into the transformative processes in the region, highlighting practical challenges and barriers. The significance lies in Poland's pursuit of climate neutrality under the European Green Deal. The analysis covers the period from 2019 to 2022, driven by data availability and the impact of two unforeseen events: the COVID-19 pandemic (most severe in 2020-2021) and Russia's invasion of Ukraine starting in 2022.

Results of the research

EU objectives towards energy transition

Despite concerns about failing to achieve the EU strategy, in March 2023, the EU Parliament and Council issued a communiqué that the 2030 renewable energy target should be increased to 42.5% by 2030, with member states aiming for a 45% target (Ciucci, 2023). The case for more ambitious targets in the context of RES is presented in Table 1.

Table 1. Revision of RES share targets by 2030 (Renewable Energy Directive)

Document	RES share	Reason for change
Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources	By 2030, the final energy consumed in the Union should be sourced at least 32% from renewable sources. The directive includes a clause allowing this target to be increased by 2023.	The target takes into account the ambition expressed in the Paris Agreement, as well as technological development, including reducing the cost of renewable energy investments.
Directive of the European Parliament and of the Council amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652	Proposal to increase the binding renewable energy target in the EU energy mix to 38-40% by 2030.	The drive to increase the use of renewable energy by 2030 aims to better integrate the energy system and meet climate and environmental goals. A more ambitious climate target contributes to environmental and health protection, reduces energy dependence, strengthens the EU's position in technology and industry, and creates jobs and economic growth.
REPowerEU Communication (European Commission, 2022)	Proposal to increase renewable energy target to 45% by 2030.	Increasing the share of RES will accelerate the gradual shift away from Russian fossil fuels. Over time, it will also lower electricity prices and reduce fossil fuel imports.

In order to achieve the original target of 32% renewable energy in 2030, each member state contributes to this goal in terms of its share. These goals are presented in the National Energy and Climate Plans (NECPs). They were introduced by the Energy Union Governance and Climate Action (EU) Regulation 2018/1999, agreed upon as part of the "Clean Energy for All Europeans" package adopted in 2019. The NECP Plan sets out how EU countries intend to achieve the EU's energy and climate goals for 2030. Countries have been asked to update their plans by June 30, 2023 (European Commission, 2023a), and these plans had to include trajectories for renewable energy specified for each member country. Despite specific contributions and trajectories, member states can set higher targets for their national goals (Regulation, 2018). Some countries, however, have set lower RES

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share targets for the EU's assumption (shown in Table 2), which was assessed by the European Commission as unambitious. The analysis looked at plans announced in the 2018 and 2019 drafts, as well as documents called "Commission Staff Working Document: Assessment of the final National Energy and Climate Plan" for individual countries. These are official European Commission documents assessing the final national energy and climate plan of each EU member state, as well as the 2023 drafts if published by the EU.

Table 2. Target share of renewable energy in gross final energy consumption in 2030, considering 2020 levels and changes made in subsequent NECPs

Total national targets	As of 2020	Draft NECP, (submitted in 2018)	Approved NECP (submitted in 2019)	European Commission assessment of 2019 target (*)	Draft updated NECP (submitted in 2023)
Austria	34%	45-50%	46-50%	The indicated share of RES is sufficient	not submitted
Belgium	13%	18.3%	17.5%	Unambitious goal	not submitted
Bulgaria	16%	25%	27.09%	The indicated share of RES is sufficient	not submitted
Croatia	20%	36.4%	36.4 %	The indicated share of RES is sufficient	42.5%
Cyprus	13%	19%	22.9%	The indicated share of RES is sufficient	42.5%
Czechia	13%	20.8%	22%	Unambitious goal	not submitted
Denmark	30%	55%	55%	The indicated share of RES is sufficient	71%
Estonia	25%	42%	42%	The indicated share of RES is sufficient	65%
Finland	38%	50%	51%	The indicated share of RES is sufficient	51%
France	23%	32%	33%	The indicated share of RES is sufficient	not submitted
Germany	18%	30%	30%	The indicated share of RES is sufficient	not submitted
Greece	18%	31-32%	35%	The indicated share of RES is sufficient	not submitted
Hungary	13%	20%	21%	Unambitious goal	29%
Ireland	16%	15.8-27.7%	34.1%	The indicated share of RES is sufficient	not submitted
Italy	17%	30%	30%	The indicated share of RES is sufficient	40% (**)
Latvia	40%	45%	50%	The indicated share of RES is sufficient	not submitted
Lithuania	23%	45%	45%	The indicated share of RES is sufficient	55%
Luxembourg	11%	23-25%	25%	The indicated share of RES is sufficient	37%
Malta	10%	10.6-13.3%	11.5%	Unambitious goal	not submitted
Netherlands	14%	27-35%	27-32%	The indicated share of RES is sufficient	27%
Poland	15%	21%	21-23%	Unambitious goal	not submitted
Portugal	31%	47%	47%	The indicated share of RES is sufficient	49%
Romania	24%	27.9%	27.9-30.7%	Unambitious goal	not submitted
Slovenia	25%	27%	27%	Unambitious goal	30-35%
Slovakia	14%	18%	19.2%	Unambitious goal	23%
Sweden	49%	65%	65%	The indicated share of RES is sufficient	> 65% (***)

Note 1 (*). Benchmarks on the trajectory in the European Commission's assessment of national climate plans refer to the milestones that member countries should achieve over a specified period of time to meet their renewable energy targets and are derived from Annex II of Regulation 2018/1999.
Note 2 (**). A policy scenario that takes into account the effects of both actions already planned and those yet to be defined on the way to the 2030 strategic goals.
Note 3 (***). Sweden assumes an increased share of RES but did not publish a specific share in the draft.
Source: European Commission (2023b).

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As stated above, goals that are below assumed trajectory are called unambitious. For example, for Poland it is set at 25%, with the NECP assuming in 2019 that it will be 21%. Also, in the case of Slovenia, set at 27% in the NECP, and resulting from the trajectory – 37%. A sufficient target is one that coincides with the trajectory (in the Netherlands it is 26%), and an ambitious one is one that significantly exceeds it.

Sweden and Denmark are the countries that are planning the largest share of energy from renewable sources (RES). In its NECP for 2023, Sweden assumes an RES share greater than 65%, with the caveat that it intends to release the official figure at a later date. The research shows that countries that have published a revision of the 2023 NECP have increased their RES share compared to what was previously assumed. This approach brings the entire European Union closer to meeting its targets. Poland, on the other hand, is among the five countries with the smallest share of RES in its energy mix (Figure 1).

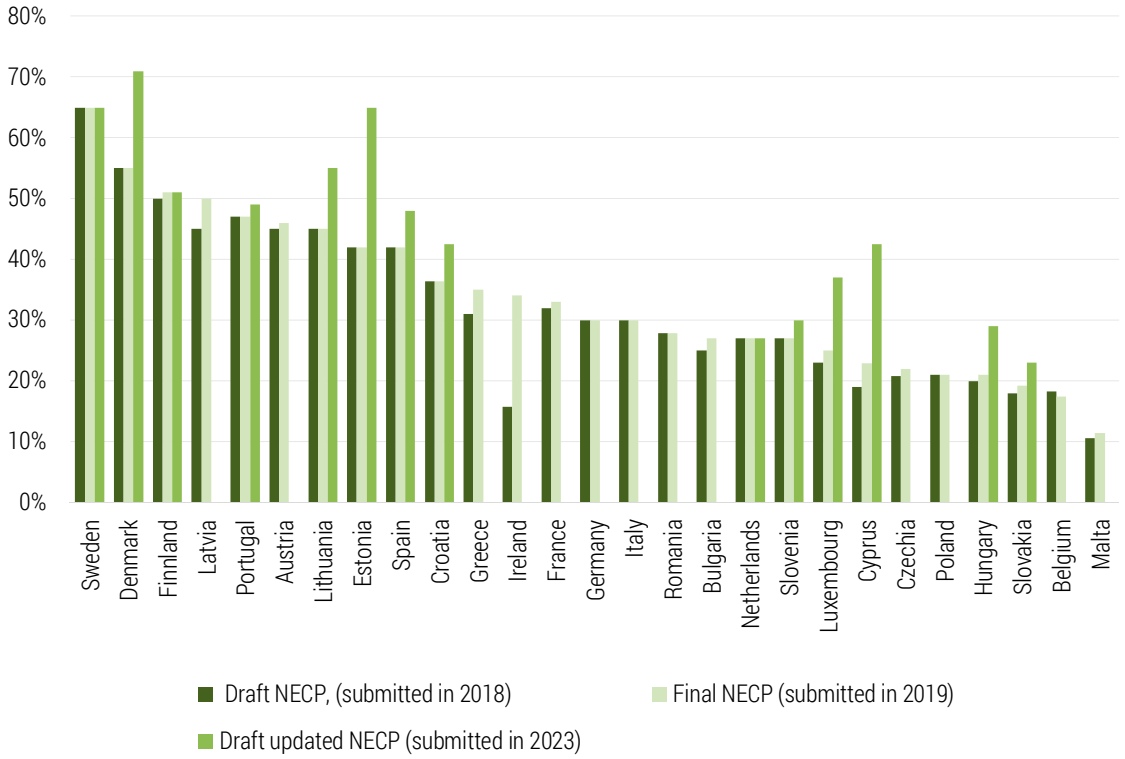

Figure 1. Target share of renewable energy in gross final energy consumption in 2030 in subsequent NECPs
Source: European Commission (2023b).

Implementation of energy transition plans – the EU context

One of the important indicators of the extent to which the energy transition targets are being met is the level of greenhouse gas (GHG) reductions. According to the European Environment Agency report published in 2022, by 2020, the European Union as a whole will have managed to reduce GHG emissions by 34.3% compared to 1990 emissions (EEA, 2022). The leader among EU countries was Estonia, which reduced GHG emissions by as much as 71.2%. Three countries, i.e. Ireland, Belgium and Cyprus, failed to reduce GHG emissivity, and in addition, their emissivity compared to 1990 increased by 6.1%, 26.9% and 69%, respectively. Poland has reduced GHG emissivity by 21% in the last 30 years, which means that in the next 10 years, it needs to be reduced by another 20%. Figure 2 shows a graph of the change in GHG emissions by country and the EU as a whole.

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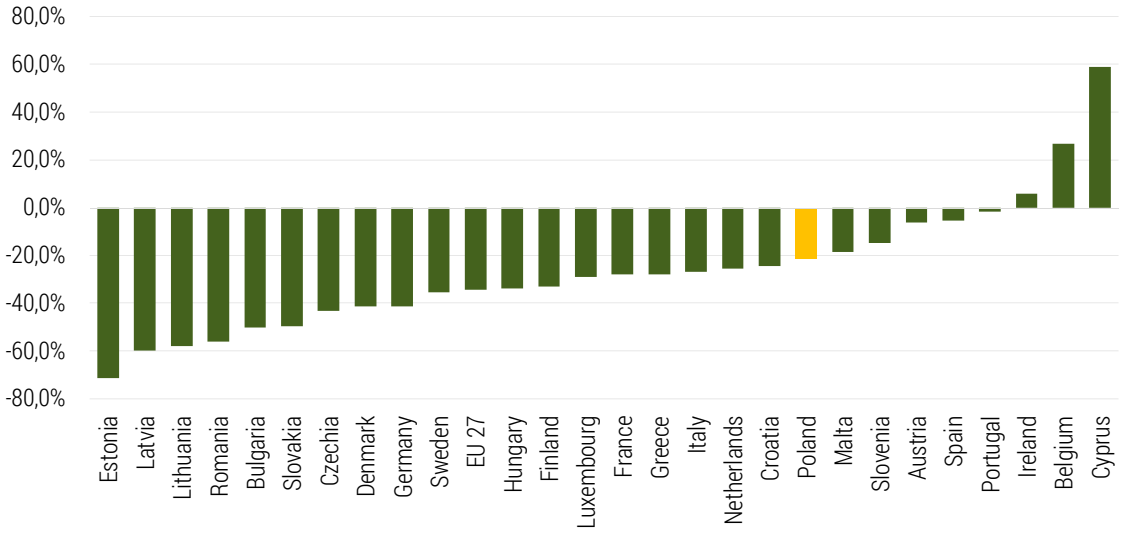

Figure 2. GHG emissions growth by EU countries (1990-2022)

Source: EEA (2022).

Eurostat also recently released actuals showing the change from Q1 2022 to Q1 2023 in GHG emissions growth, which gives context amid the escalating war in Ukraine. Figure 3 presents a chart showing the rate of GHG growth by country. Poland ranked 9th in terms of reducing GHG emissions by just over 5%. The EU leader in reducing the share of pollutants is Bulgaria, with a result of -15.2%. It can be inferred that a great part of the countries constituting the eastern flank of the European Union and NATO (or more broadly, from the Central and Eastern European region, such as Bulgaria, Estonia, and Slovenia) are leading the way in GHG emissions reductions. The exceptions are Latvia and Slovakia, which have seen an increase in these emissions over the period.

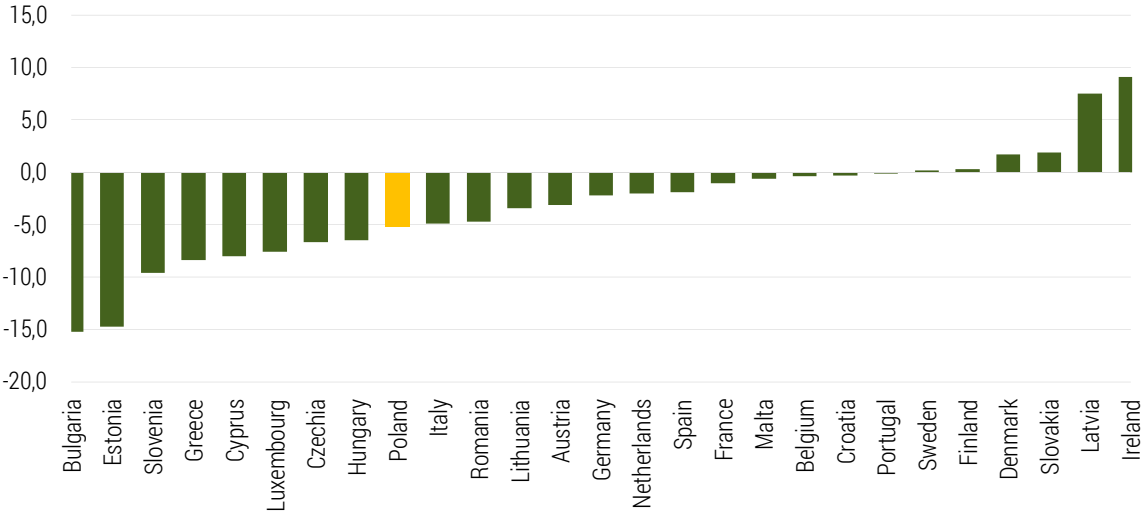

Figure 3. GHG emissions growth by EU countries (Q1 2022 – Q1 2023)

Source: Eurostat (2023).

It can be concluded that the stated goal of a 40 percent reduction in the EU's GHG emissions is realistic and achievable with the constant and multifaceted cooperation of all countries. This is consistent with the position of the EU authorities, who are setting climate targets in this way specifically as they seek to lead the global fight against climate change (European Council, n.d.b).

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It is also vital to highlight the level of contribution of renewable energy sources to the energy mix, which indicates the level of contribution to the transformation processes towards a greener Europe. The share of RES in 2021 in the European Union averaged 21.78%. Only 12 out of 27 countries exceeded the target level of RES share. In Poland, it is only 15.6%, which ranks seventh from the bottom of the list. The leader of the ranking is Ireland, with an RES share of 85.79%, while Luxembourg, at the very end, has an RES share of just 11.74%. Figure 4 illustrates the share of RES between European countries in 2021.

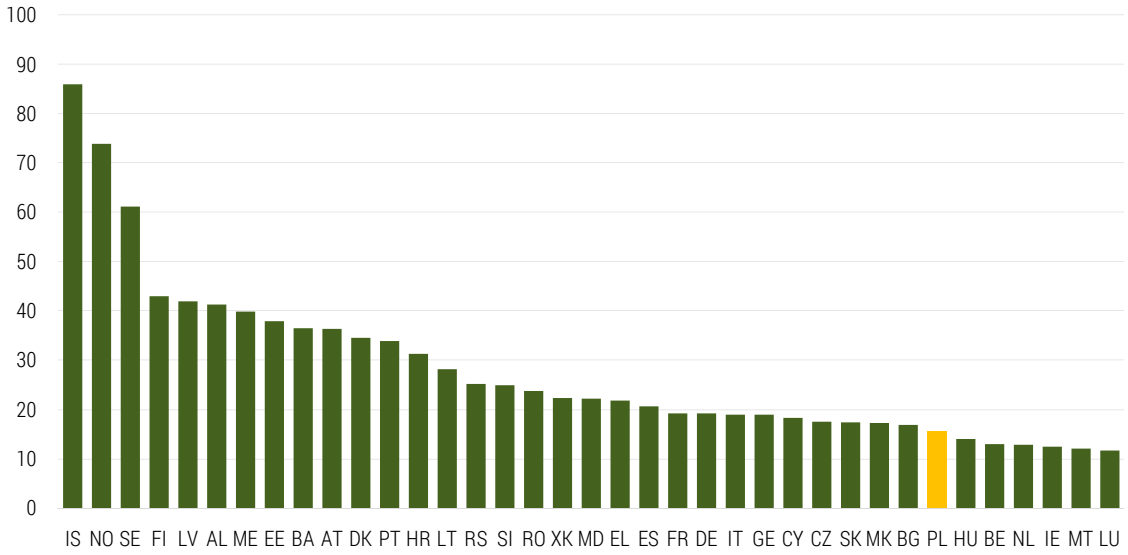

Figure 4. RES share in energy mixes in European Countries in 2021 [%]

Source: Eurostat (2023a).

To unify and liberalise the EU's internal energy market, remedies have been adopted since 1996 to address market access, transparency and regulation, consumer protection, promotion of interconnection and adequate levels of supply (European Parliament, 2023). However, progress in integration hasn't been as dynamic as expected. The original deadline for the market was set by the EU Council in 2014, and none of the binding regulatory guidelines have been fully implemented yet. Recent global events such as the COVID-19 pandemic or Russia's invasion of Ukraine, driven by the need to look for new energy solutions, have once again raised discussions about the EU's internal energy market. In March 2023, a special report (Special Report 03/2023) was published containing recommendations and solutions to accelerate the introduction of the EU internal market.

The EU's Agency for the Cooperation of Energy Regulators (ACER) has no assured authority, making market oversight incomplete and sanctions for market abuses few (European Court of Auditors, 2023). According to the "Special Report 03/2023: Internal electricity market integration," it is recommended that the Commission enhance the legal and enforcement framework and streamline ACER, which should improve efforts to complete the EU internal energy market.

The course of Poland's energy transition: a call to action

Despite the plethora of energy transition initiatives and legislation in the European Union, the process in Poland is far from being efficient. The most popular source of heat in Poland in 2023 remains the solid-fuel boiler, accounting for just over ⅓ of all heat sources, of which as much as 55.6% are coal furnaces and coal-like products (as of April 26, 2023; Główny Urząd Nadzoru Budowlanego, 2023). Poles have historically relied on coal as an energy source that has fueled economic growth and urbanisation processes – especially in industrialised regions like Upper Silesia. Poland's

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industrial sector plays a substantial role in air pollution levels, emitting pollutants (like particulate matter and sulfur dioxide) that affect air quality nationwide (Dmuchowski et al., 2018; Jensen & Mina, 2019), which is linked to increased mortality rates and a higher prevalence of respiratory illnesses (Dąbrowiecki et al., 2022). Poland is also the largest producer of coal in Europe, which naturally influences its prevalence and use in the country by its residents.

As a number of different sectors depend on the use of hard coal, the shift away from its use in favour of renewable energy sources is a dilemma and a game changer for Poland. Restrictions – such as local anti-smog resolutions, adopted in 14 out of 16 voivodeships in Poland in 2016 – are being introduced to achieve the energy transition. They prohibit the use of fossil fuels and heating sources based on solid fuels (Sokołowski & Bouzarovski, 2022; Flaga-Maryańczyk & Baran-Gurgul, 2022). Restrictions on the types of fuels used by households also result from laws adopted at the national level (Act, 2006; Ordinance, 2022). According to the law, products that pose the greatest threat to the environment (such as coal dust, coal flotation concentrate and lignite) are eliminated from the market, and the minimum quality parameters that must be met by coals allowed on the market are specified in a regulation. Unfortunately, current events related to the war in Ukraine have also affected the situation in the hard coal market. The threat of an energy crisis caused by the war has resulted in a deviation from the requirements described in the law. At the same time, there was a need to become independent from fossil fuels imported from Russia, which led to the decision of the Council of Ministers on March 29, 2022, to adopt assumptions for revisiting the EPP 2040. According to the decision, the use of domestic coal resources can be increased occasionally. Poland's energy transition plans had to be put on hold due to the ongoing war on Ukrainian territory and the potential threat of instability. Juxtaposing this with the fact that by 2021, Poland has increased its dependence on energy imports from other countries (Piekut, 2023) further underscores the need to pursue energy independence, notably shutting off supplies from countries considered aggressive.

On the one hand, the EPP 2040 update provides for a periodic increase in the use of hard coal, maintaining the operational readiness of coal units and the development of clean coal technologies. On the other hand, analysts predict that the war in Ukraine will ultimately accelerate decarbonisation. While the EPP 2040 update advocates for a periodic rise in hard coal usage to sustain the operational readiness of coal units and promote the advancement of clean coal technologies, analysts anticipate that the conflict in Ukraine will expedite the process of decarbonisation.

The energy transition is a complex and multidimensional process with a multitude of challenges and ramifications. The exploitation of coal as the main source of energy has a substantial negative impact on the efficiency of the process, but in addition to this, there are other factors that can considerably affect the speed and effectiveness of the transition. A key driver here is society's low environmental awareness. Assessing consumers' adoption of renewable energy and understanding their attitudes and behaviours towards green energy are critical aspects of the energy transition in Poland (Khalid et al., 2021). In this country, despite the introduction of innovative technological and legislative solutions, resistance is often encountered from households that are not always willing to accept changes in their energy use – mainly due to low environmental awareness and habits. Many people remain with traditional sources of heat and energy, often because of relatively low costs and convenience. Poles make environmentally friendly decisions not for pro-environmental reasons but for economic ones. They lack a sufficient level of environmental consciousness to warrant them automatically making ecological decisions without other motivators. This is confirmed by the state report on Poles' ecological behaviours (Ministerstwo Klimatu i Środowiska, 2022), according to which 61% of respondents unplug unused chargers precisely for economic reasons, and the same number of them are motivated solely by price when shopping for groceries – in contrast, only 11% of respondents are motivated by the presence of green certificates. When deciding to convert their energy source to a more environmentally friendly one, consumers often face significant initial expenses, which they are not always ready to face. For Poles, the priority when considering the country's energy transition is the price of energy and its financial burden on citizens, with environmental benefits placed in the background (Herudziński, 2021). However, the war in Ukraine has brought to light the increasing severity of energy concerns. The Polish government has temporarily halted energy price increases for households, but this is not sustainable in the long run due to its high cost for the country. This issue emphasises the significance of the war context.

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Conclusions

The pursuit of sustainable development in the EU was to ensure the setting of transparent environmental goals and the provision of a series of measures to achieve them. The original goals seemed too ambitious, as in many countries, the measures taken did not yield the expected outcomes. Nevertheless, certain countries like Denmark, Lithuania, and Portugal not only align with the EU's set targets, but their updated plans are even more ambitious in their goals for utilising green energy sources. Continuously reassessing goals within the EU, coupled with vigilant progress monitoring, enables them to address emerging challenges posed by the war in Ukraine and the COVID-19 pandemic. These challenges extend to every environmental objective, including the energy transition.

Successful fulfilment of the objectives of the European Green Deal is possible when all EU countries implement its provisions. The Polish case shows that the situation in Ukraine had a significant impact on the course of energy transformation because it showed that RES are also able to guarantee energy security. In doing so, it should be noted that this is a result of the fact that most of the electricity is sourced from coal. The threat of energy security decline became the impetus for taking steps to intensify the energy transition process in Poland and deploy RES-driven solutions.

The results of the analysis also showed that the transition process in Poland is proceeding much more slowly than in the vast majority of EU countries. Hence, this constitutes an urgent argument for continuing to strengthen energy transition activities both in Poland and in Central and Eastern Europe, including the necessity to increase energy independence by investing in RES, as well as other low-carbon energy installations like nuclear power. Intra- and inter-regional cooperation impinge on the achievement of EU-wide energy transition goals and contributes to the common good. A chain is only as strong as its weakest link.

In view of the above, it is recommended that Poland's energy transformation be accelerated by, for example, increasing investments in renewables, promoting energy efficiency throughout Polish society, and supporting the electrification of transportation or green building standards. It is, moreover, advisable to ensure an equitable transition for communities affected by the shift away from fossil fuels and enforce stringent air quality standards to align with the pillars of the EPP 2040.

While the employment of a variety of data sources has helped to give a broad context to the analyses, a limitation of the study remains the lack of in-depth analyses of 'green' ventures, especially those that have been successful. As a result, further research can focus on collecting good practices of those countries where the transition is successful, and through know-how support in those where it is not, adapting practices to the specific domestic characteristics of each country.

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REALIZACJA CELÓW EUROPEJSKIEGO ZIELONEGO ŁADU W CZASIE WOJNY W UKRAINIE – KONTEKST TRANSFORMACJI ENERGETYCZNEJ W POLSCE

STRESZCZENIE: W ramach paradygmatu zrównoważonego rozwoju, Europejski Zielony Ład wyznacza dynamiczne cele transformacji energetycznej dla Unii Europejskiej (UE). Zróżnicowana dynamika między państwami członkowskimi, zaostrzona przez wydarzenia takie jak pandemia COVID-19 i wojna w Ukrainie, wpływa jednak na tempo jego wdrożenia. Celem niniejszego artykułu jest omówienie przebiegu transformacji energetycznej w krajach UE w kontekście realizacji celów Europejskiego Zielonego Ładu. Niniejszy artykuł stanowi tematyczny (zakresowy) przegląd literatury oraz analizę porównawczą postępu transformacji energetycznej we wszystkich krajach członkowskich UE, koncentrując się na Polsce, która stoi przed szczególnymi wyzwaniami, w tym powolnym tempem wdrożenia mechanizmów transformacji energetycznej i skutkami napaści Rosji na Ukrainę w tym zakresie. Rekomendacje dla Polski obejmują kładzenie większego nacisku na inwestycje w odnawialne źródła energii (OZE) i instalacje niskoemisyjne. Wyniki wskazują, że wspólny sukces w zakresie zrównoważonego rozwoju wymaga od każdego członka UE realizacji krajowych celów klimatycznych, podkreślając potrzebę wspólnego zaangażowania w budowanie zrównoważonej przyszłości.

SŁOWA KLUCZOWE: Europejski Zielony Ład, transformacja energetyczna, zrównoważony rozwój, odnawialne źródła energii, wojna w Ukrainie

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