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Karolina Klecha-Tylec
http://orcid.org/0000-0002-2786-6192
Uniwersytet Ekonomiczny w Krakowie
klechak@uek.krakow.pl

Agnieszka Pach-Gurgul
http://orcid.org/https://orcid.org/0000-0003-1917-4679
Uniwersytet Ekonomiczny w Krakowie
apach@uek.krakow.pl

Marta Ulbrych
http://orcid.org/0000-0003-3886-371X
Uniwersytet Ekonomiczny w Krakowie
ulbrychm@uek.krakow.pl

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The European Union energy transition in the context of the Fit for 55 and REPowerEU strategies

Abstract

RESEARCH OBJECTIVE: The aim is to present the conditions, assumptions and concept of the Fit for 55 and REPower EU strategies, and subsequently evaluate their progress.

THE PROBLEM AND RESEARCH METHODS: The fundamental justification for the EU's energy transformation, as the leader in this area so far, was climate protection. After Russia's invasion of Ukraine, the urgent need for increased energy security turned out to be. In seeking answers to the possibilities of implementing both tasks, the study used a number of research methods, including primarily critical literature analysis and descriptive statistics methods.

THE PROCESS OF ARGUMENTATION: Firstly, the essence of the modern energy transition and a review of the literature in this field are presented. Then, an attempt is made to address the dilemma: the EU energy transformation – progress or regression? The next part presents the importance of Fit for 55 and REPowerEU. Finally, the key energy figures and analyzed strategies progress were presented.

THE RESEARCH RESULTS: In response to the events in Ukraine, the EU launched the REPowerEU plan to reduce dependence on Russian fuels by cutting energy consumption, diversifying supplies, and boosting clean energy

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production. It accelerates the Fit for 55 plan, which aims to cut CO2 emissions by 55% by 2030 and reach net zero by 2050. While the plan originally included a gradual shift from Russian hydrocarbons, the invasion has prompted the EU to fast-track decarbonization, though short-term energy security concerns may slow the energy transition.

CONCLUSION, INNOVATIONS, AND RECOMMENDATIONS: The analysis carried out made it possible to conclude that the war in Ukraine has not caused a retreat from the green energy transition, on the contrary, it has further motivated the EU to take several actions including decarbonization as defined in the Fit for 55 and REPowerEU strategies.

Keywords:
energy transition, EU, Fit for 55, REPowerEU, Russia-Ukraine war

INTRODUCTION

The energy transition is a change in the way we produce, deliver and consume energy. One of the key aspects of energy transition is the replacement of conventional, carbon-intensive fuels with renewable fuels. The European Union has for years been a leader in promoting and supporting energy transition globally as well as regionally (within member states). At the heart of the European Union's energy transition are, among other things, the decisions taken under the Paris Agreement, which aims to halt increases in the average global temperature at 1.5–2°C relative to the 1990 level. Complementing the previous path of argumentation, based on climate protection, the need to increase energy security after Russia's invasion of Ukraine and the ongoing war became clear. REPowerEU improved energy efficiency targets, increased plans to import LNG from non-Russian suppliers, presented concepts for the development of the green hydrogen market as well as the development of the heat pump market and outlined several initiatives that are intended to both accelerate the energy transition while also guaranteeing the EU's energy security. The research will enable us to find answers to a number of questions about the contemporary energy transition of the European Union. This article will be an attempt to answer the following research questions:

- what are the assumptions and concept of the Fit55 and REPower EU strategies;
- what is the EU's energy import dependency rate and how is Russia's importance changing in this context;
- what is the progress in implementing the strategies;

Implementation of the above research goals and objectives will enable verification of the formulated research hypothesis: the war in Ukraine has not caused a retreat from the green energy transition, on the contrary, it has further motivated the European Union to undertake a number of measures including energy saving and energy efficiency improvement as defined in the Fit 55 and REPower EU strategies. Diverse research methods will be used to achieve the outlined research objectives and verify the research hypothesis, including critical analysis of literature on the subject, analysis of source materials, international reports and statistical materials.

1. THE ESSENCE OF THE MODERN ENERGY TRANSITION – A REVIEW OF THE LITERATURE

Nowadays, the essence, determinants and course of the energy transition are being studied by many researchers (Hafner & Tagliapietra, 2020; Goldthau, Westphal, & Keim, 2018). One of the key aspects of the energy transition is the replacement of fossil, carbon-intensive fuels with renewable resources (IRENA 2019, WEF 2019). The turn to the "green economy," has become a global phenomenon and is understood as a transition from the current energy system using non-renewable energy sources (fossil fuels) to an energy system based primarily on renewable (RES) and low-carbon sources, as highlighted by Overland (2019) or Santos et.at (2019).

Concerns about the impact of fossil fuel consumption on climate change are a primary motivation for the energy transition, as highlighted by Hallegatte et al. (2016) in their research. Others include air quality and energy security, as highlighted by Eyl-Mazzega, Mathieu (2019). The energy transition is transforming many aspects of the economy, such as the electricity system, the automotive industry, public and private transportation, heating, construction, agriculture and many industrial sectors. It is a process of modifying economies

and energy grids to be more sustainable, that is, less dependent on fossil fuels and more energy efficient, and consequently less damaging from a climate, public health and environmental perspective. The energy transition goes beyond the area of energy security and brings with it new economic models containing hitherto overlooked conditions and variables, effects and consequences for society and industry and the economy as a whole. Therefore, the energy transition should be understood more broadly, and one can talk about its main dimensions, including (Asif, 2022):

1. Economic, which means new investment opportunities and jobs, or export/import of low-carbon technologies. In this aspect, energy transformation is a tool for increasing the competitiveness of economies, covering various fields and sectors of human activity.
2. Industrial, which means the modernization and innovation of the economy and the transition to digitization and advanced, less polluting and less energy-intensive technologies. Green modernization of the economy through technological innovation combines the achievement of environmental goals with simultaneous industrial progress.
3. Social, which includes action to protect the climate and provide public health benefits. The energy transition significantly diminishes air pollution, lowering public health expenditures, addressing social needs to reduce the negative impact of the energy sector on the natural environment. The transformation generates positive social impacts, such as new jobs, improved air quality, increased purchasing power and better housing. At the same time, it also has a social cost, as in some sectors it will create new jobs, while in others it will lead to their reduction.

Today's energy transition is strongly primarily viewed through the lens of reducing CO_2 emissions from fossil fuel combustion that contributes to climate change and the associated threats to humans and ecosystems (Overland, 2019).

2. THE EU ENERGY TRANSITION – EVOLUTION OR DEVOLUTION?

Over the years, it has become apparent that the world's most ardent advocate of the energy transition is the EU. It is among the world leaders in the energy transition, ambitiously pursuing goals to reduce Greenhouse Gases (GHG) emissions and increase the share of RES in power generation. For EU member states, the transition of the energy system has become a strategic goal in the fight against climate change, leading to the improved energy security, competitiveness and economic attractiveness of Europe in the transition to a GHG-neutral economy by 2050. Energy plays a key role in the EU's energy transition, responsible for more than 75% of GHG emissions in the EU and producing 10% of global CO_2 emissions.

The first significant step, part of the EU's energy transition path and a step towards the goal of being the world's first zero-carbon continent by 2050, was the adoption of the energy and climate package in 2008, commonly referred to as 3 × 20% by 2020. The package's goals included:

1. To increase the share of energy obtained from RES to 20% of the total energy balance of the EU by 2020.
2. To reduce primary energy consumption in the EU by 20% compared to the forecast made for 2020 and presented in 2005.
3. A 20% reduction in CO_2 emissions compared to 1990 emission levels.

The goals of the energy and climate package have become so important that they have been confirmed in the Europe 2020 Strategy (European Commission, 2010). In March 2011, in the Energy Roadmap 2050 document, the EC adopted a roadmap leading to a transition to a competitive low-carbon economy by 2050 with a goal of reducing CO_2 emissions by 96–99% compared to 1990 (European Commission Staff Working Paper, 2011).

In October 2014, at the European Council, EU leaders set new climate and energy targets for 2030, including more ambitious reduction thresholds, including tightening the reduction of 40% of greenhouse gas emissions compared to 1990, sourcing at least 27% of energy from renewable sources and improving energy efficiency by the same amount (European Council 2014). Ahead of the Paris

UN Climate Change Conference COP21/CMP11 (2015), the EU submitted a planned nationally determined contribution (INDC) to the secretariat of the UN Framework Convention on Climate Change confirming – in line with the European Council's October 2014 conclusions – a commitment to reduce its own GHG emissions by at least 40% by 2030 compared to 1990 (United Nations, 2015). Thus, the EU became a party to the new global climate agreement and committed to the provisions arising from the extension of the Kyoto Protocol for the period 2013–2020. On October 4, 2016, the Council decided that the EU would ratify the Paris Agreement.

Another step in support of international energy transition efforts was the adoption by the Environment Council in September 2015 of conclusions setting out the EU's position for the COP21 climate conference in Paris. The ministers, "agreed that the EU will work towards an ambitious, legally binding and dynamic agreement envisioning a halt to global warming below 2°C".

In November 2016 the EC also announced, "Accelerating Innovation in Clean Energy" (European Commission, 2016) identifying four technological areas of the energy transition such as:

1. decarbonization of natural resources by 2050;
2. strengthening EU leadership in renewables;
3. developing integrated energy storage solutions;
4. developing electromobility and a more integrated urban transportation system.

In its conclusions on EU Climate and Energy Diplomacy, adopted in March 2017, the Council set out a list of actions and priorities for implementing the Paris Agreement, including energy and climate diplomacy based on energy security and diversification of energy sources. In June 2017, the European Council reaffirmed the commitment of the EU and its member states to swift and full implementation of the Paris Agreement, stressing that the agreement is an essential element in the modernization of industry and the economy in Europe (Council conclusion on European climate diplomacy after COP21, 2016).

The EC in November 2018 presented a long-term strategic vision for a modern, competitive and climate-neutral economy in the 2050 horizon. The strategy illustrates how EU can lead the way in achieving climate neutrality by introducing innovative technological solutions and aligning policy actions. With regard to improving

energy efficiency, the EC has planned to increase it by at least 32.5% by 2030, through among other things, improving low-emissions in the transport sector (European Commission, 2018).

The European Green Deal focuses on three main assumptions for the transition to clean energy to help reduce GHG emissions and improve the quality of life of European citizens. These assumptions are:

1. Ensuring an affordable and secure energy supply in the EU.
2. Creating a fully integrated, interconnected and digital EU energy market.
3. Prioritize energy efficiency, improve the energy performance of buildings and develop an energy sector based mainly on renewable sources.

In December 2020, the European Council approved a new binding EU target to reduce GHG by at least 55% by 2030 compared to 1990. To bring selected areas into line with the new reduction target, the European Commission published a package of legislative proposals (the so-called "Fit for 55" package) on July 14, 2021.

As part of the Fit for 55, the Communication "Ready for 55": achieving the EU's 2030 climate target on the road to climate neutrality was announced (COM(2021)550). Fit for 55 is a set of interrelated proposals that, taken together, are intended to ensure the implementation of the European Union's ambitious climate policy to achieve its energy transition goals. However, events that followed shortly after the presentation of this package, namely Russia's invasion of Ukraine, caused the package to be modified, as discussed in more detail below.

3. THE IMPORTANCE OF THE FIT 55 AND REPOWER EU STRATEGIES FOR THE EU'S ENERGY TRANSITION AFTER THE ATTACK BY THE RUSSIAN FEDERATION ON UKRAINE

The attack by the Russian Federation on Ukraine launched in February 2022 – eight years after the annexation of Crimea and the continued destabilization of the country through Moscow-inspired

separatist fighting in the Donetsk and Luhansk regions – has called into question the global security system and balance of power, motivating all its participants to review their policies and strategies from the perspective of military defence. The issue of energy security was the second most important element of consideration, due to Russia's position in the global energy resource market. These issues are particularly relevant for the EU, some members of which remain heavily dependent on Russian supplies, especially oil, natural gas and coal. The year 2022 has therefore proved to be a kind of turning point in European energy policy, by shifting the focus from energy transition and climate challenges to ensuring energy security, diversification and stability of supply.

In the first months after Russian raw material supplies were cut off, as well as the imposition of EU sanctions on Russia in this regard, there were growing concerns about availability and prices for raw materials from directions other than Russia. Concern and worry among EU policymakers, as well as ordinary citizens, about what the winter of 2022/2023 would look like in terms of energy supplies, what costs it would create, seemed to accompany the invasion from the beginning. As the months passed, the situation seemed more and more serious. A very strong realisation came into focus for EU politicians that perhaps in recent years had been neglected: issues directly related to energy security, among others, the development of energy infrastructure, new agreements to guarantee the diversification of supply, the development of technologies other than traditional ones: liquefied natural gas (LNG), fracking, etc. Further questions arose: What would the energy transition process look like in these new geopolitical circumstances? How would the vested interests of EU member states in energy raw materials, which up to that point had had very good relations with the Russian Federation, be arranged? One might get the impression that, in a sense, the topic of transition has quieted down with the outbreak of war in Ukraine, as fear about the continuity of supplies have emerged. This concern results from the fact that the EU's energy import dependency rate in 2021 was 56%, making the EU the largest net importer of energy in the world. Over the course of 2022, the situation changed dramatically, with several rounds of sanctions on Russian energy products, EU policy initiatives to wean ourselves off Russian energy and Russia-imposed gas transmission and pricing

restrictions, the attitude of the EU's main decision-makers towards the energy transition changed. A few months after the beginning of the aggression, when the situation had calmed somewhat and politicians and the EU public had become accustomed to the new geopolitical conditions, it was agreed that the earlier strategy needed to be refined so that the energy transition continued to have a very prominent role i.e., be more strongly linked to and multi-directionally strengthening the energy security of EU countries.

The EU has therefore decided to implement an ambitious plan to reduce its dependence on Russian fossil fuels and accelerate its energy transition. The Russian invasion of Ukraine has greatly affected the economy and society in the EU. In March 2022, EU leaders agreed that the EU's dependence on imports of Russian gas, oil and coal should be gradually reduced. In May 2022, the EC presented the REPowerEU plan. The plan builds on the implementation of legislative proposals from the Fit for 55 package, which support the ambitious goal of the EU to reduce, in line with the European Green Deal, net greenhouse gas emissions by at least 55% by 2030 and achieving climate neutrality by 2050. It includes the following recommendations and proposals: reduce overall dependence on fossil fuels, more quickly diversify supplies and supply routes, further develop the EU hydrogen market, increase the pace of development of renewable energy sources, improve the interconnection of European gas and electricity networks, strengthen EU planning for security of supply, improve energy efficiency and promote closed-loop systems.

At the same time, the main leaders of the EU member states, asked the EC to develop a plan to quickly reduce the EU's over-dependence on imports of Russian gas, oil and coal. May 18, 2022, the Commission presented the REPowerEU plan. It focuses not only on strengthening the EU's strategic autonomy in the energy sector, but also on supporting the transition to clean energy and joining forces for a more resilient energy system, i.e. combining the energy transition with energy security. The effect of such a combination could be to accelerate the energy transition to strengthen energy security. The EU intends to achieve this through energy savings, investments in renewable energy and diversification of supply.

The REPowerEU plan builds on the implementation of the legislative proposals in the Fit for 55 package, which support the ambitious

goal of the EU to reduce, in line with the European Green Deal, net GHG emissions by at least 55% by 2030 and achieving climate neutrality by 2050. REPowerEU is designed to help make the EU less dependent on Russian fossil fuels by saving energy, diversifying supplies and accelerating the transition to REPowerEU clean energy. It focuses not only on strengthening the EU's strategic autonomy in the energy sector, but also on supporting the transition to clean energy and joining forces for a more resilient energy system. Reforms and investments should focus on:

- improving energy infrastructure and facilities to meet the most urgent needs for security of natural gas supply, including LNG, especially to enable diversification of supply in the interest of the EU as a whole,
- boosting energy efficiency in buildings,
- decarbonizing industry,
- increasing the production and use of sustainable biomethane and clean or renewable hydrogen,
- increasing the share and accelerating the uptake of renewable energy,
- encouraging the reduction of energy demand,
- eliminating internal and cross-border bottlenecks in energy transmission and distribution, and promoting zero-emission transportation and its infrastructure,
- promoting energy storage.

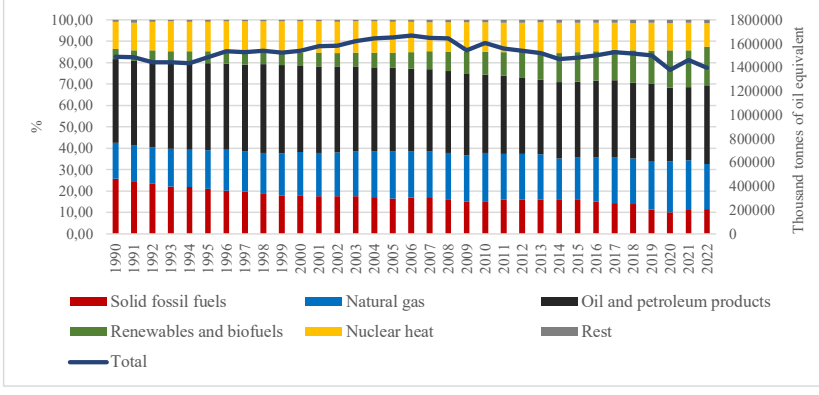
Such measures may paradoxically accelerate the EU's transition rather than the other way around and strengthen its level of energy security at the same time.

4. PROGRESS IN THE IMPLEMENTATION OF THE FIT 55 AND REPOWEREU PLANS

A clearly defined direction of EU energy transition strategy requires an overview of the EU energy landscape. In 2022 gross available energy (gross available energy = primary production + recovered & recycled products + imports – export + stock changes) reached 1 396 million tonnes of oil equivalent (Mtoe) in the EU which was 6.3% lower than the result from 1990 (figure 1). The largest share in the

gross available energy structure (almost 40.0%) is accounted for by oil and petroleum products. In other words, 69.5% of all energy in the EU was produced in 2022 from coal, oil and gas. Between 1990 and 2022 the share of solid fossil fuels in final energy consumption dropped significantly (from 25.8% in 1990 to 11.6% in 2022). Natural gas consumption in absolute terms remained quite stable over this period, ranging the share from 16.8% in 1990 to 20.0% in 2022. On the other hand, renewable and biofuels increased their share overall, moving from 4.7% in 1990 to 17.8% in 2022.

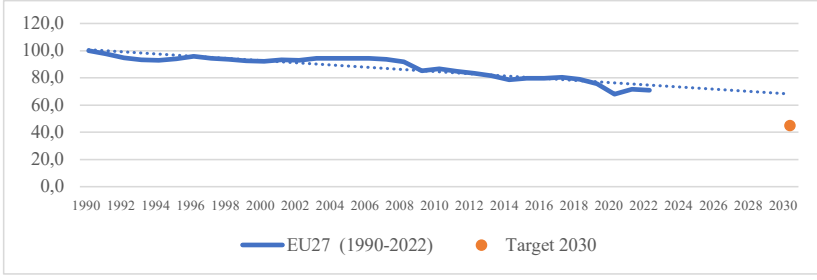
Figure 1. Gross available energy by fuel in the European Union, 1990–2022



Source: own elaboration based on: Eurostat, 2024a.

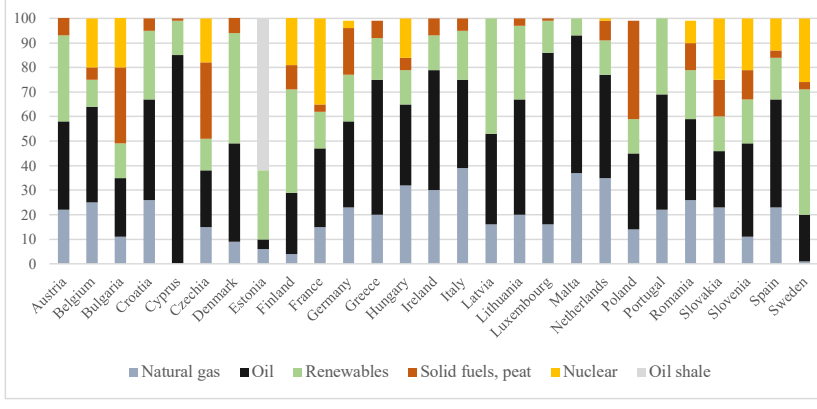
Increasing the share of RES used in the EU is essential in providing an alternative to fossil fuel imports but also to reduce greenhouse gas emissions. Figure 2 shows that overall, the EU's GHG emissions have been following a downward trend over the last three decades. Net gas emissions, including international aviation in the EU, decreased by 30% between 1990 and 2022. The EU has taken significant steps to fulfil climate neutrality 2030 targets, however the current 30-year trend does not allow for achieving the declared reduction. Compared with the pace of emission reductions noted during the past decade, the average annual rate of must more than triple to reach the 2030 climate target.

Figure 2. Net greenhouse gas emissions in the European Union (Total excluding land use, land use change and forestry sector (LULUCF) and memo items, including international aviation), 1990–2022, 1990=100



Source: own elaboration based on: Eurostat, 2024b.

Figure 3. Energy mix by EU members (% of gross available energy), 2022



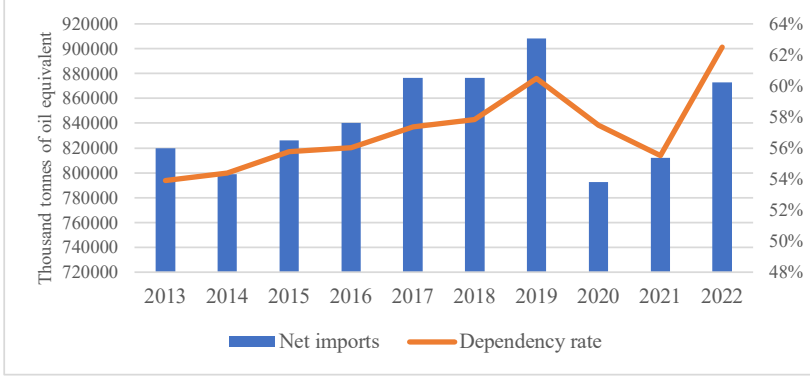
Source: own elaboration based on: European Commission, 2024; Eurostat, 2024c.

According to the data collected in Figure 3, the share of solid fossil fuels in gross available energy was the highest in Poland (40%), Czechia and Bulgaria (31%). The EU average stood at a much lower figure of 10.6%. The share of natural gas ranged from 39% in Italy to under 1% in Sweden. In Sweden, RES accounted for half of their gross available energy in 2022 (51%), while in Latvia, Denmark and Finland this figure stood at 47%, 45% and 42%, respectively. The lowest results in this respect were registered in Malta (7%) and Belgium (11%). There were 13 EU member states with nuclear power plants. France had the highest nuclear share (35%), followed by Sweden (26%), Slovakia (25%)

and Slovenia (21%). It is worth noting that Estonia is the only country that uses oil shale as its primary energy source (62%).

In 2022, 63% of the energy available in the EU was produced outside EU member states. Figure 4 shows the energy dependency rate of the EU average and the value of net imports in the last decade. (The energy dependency rate shows the proportion of energy that an economy must import. It is defined as net energy imports divided by gross available energy, expressed as a percentage.)

Figure 4 EU energy imports dependency rate (%) and value of net imports (toe), 2013–2022



Source: own elaboration based on: Eurostat, 2024a.

Energy dependence has tended to increase since 2013 and is particularly pronounced in the natural gas sector (the dependency rate on natural gas in 2021 was 83.5%), owing mainly to the gradual dwindling of volumes in the North Sea gas fields. The situation varied greatly among member states: the overall dependency rate ranged from 99% in Malta to 6% in Estonia (Eurostat, 2024b). (The energy dependency rate shows the proportion of energy that an economy must import. It is defined as net energy imports divided by gross available energy, expressed as a percentage.)

Table 1. Russia's share in primary energy imports, 2019–2022 (million tonnes)

EU imports of	2019	2020	2021	2022
Petroleum oils	26.9%	26.6%	25.8%	20.2%
Natural gas	41.5%	44.3%	44.8%	21.9%

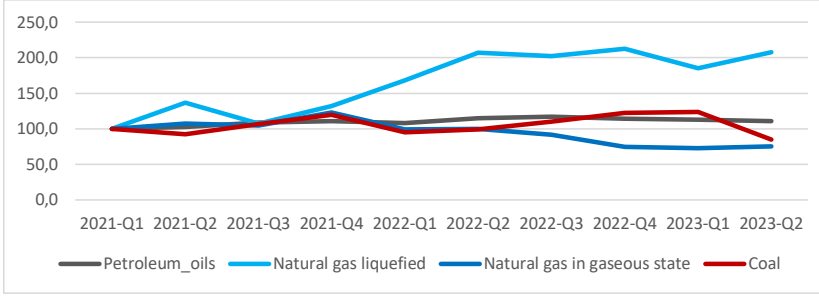
Source: own elaboration based on: Eurostat, 2024d.

Among the countries that have supplied energy to the EU, Russia has played a crucial role for a long time in primary energy imports: in 2019 it provided 26.9% of petroleum oils and 41.5% of natural gas (table 1). The decline in fossil energy reserves in the EU, as well as the fight against climate change, have transformed Russia into a major energy supplier, which puts the EU in the trap of relying considerably on the natural gas and oil supply of one supplier (Ilie et al., 2023). (The countries' different energy mix and import dependencies create different energy dependencies on Russia. In 2020, the country with the largest share of energy needs satisfied by Russian imports in the EU was Lithuania (96.1%), followed by Slovakia (57.3%) and Hungary (54.2%). The least dependent was Cyprus (1.7%), Ireland (3.2%) and Luxembourg (4.3%) (Eurostat, 2022).) Russia's invasion of Ukraine has all but stopped Russian gas imports via pipelines and a sharp decline in Russian gas imports has triggered a price crisis. Consequently, the share of Russia's natural gas in EU imports dropped to 21.9% in 2022 (in volume terms). This reduction was possible mainly thanks to actions undertaken which aligned with the assumptions of the REPower EU plan. However, at the time of writing this article, the assessment of the implementation of the strategy is not an easy task due to the lack of relevant statistical data. Basically, there have been three main ways to move away from dependence on Russian hydrocarbons:

1. Diversifying sources of energy supply.

In the second quarter of 2022 Russia was the first supplier of coal and petroleum oil to the EU (with a share of 32.8% and 6.9%, respectively) and the second supplier of gas in gaseous state and LNG (with a share of 28.3% and 15.2%, respectively). The EU has diversified gas imports away from Russia, with LNG playing a key role in this shift, which can be seen by analysing the data presented in figure 5. In 2023, EU member states imported 134 bcm of LNG, making up 42% of total EU gas imports. In 2023, the United States was the largest LNG supplier to the EU, representing almost 50% of total LNG imports. Nevertheless, Europe's success in slashing Russian piped gas imports contrasts with its rising shipments of LNG from the country. Between 2021 and 2023, Russian LNG supply to Europe increased 11% in terms of value (The Institute for Energy Economics and Financial Analysis, 2024).

Figure 5. Index of the volume of EU imports of energy products, 2021–2023 (first quarter 2021 = 100)



Source: own elaboration based on: Eurostat, 2024d.

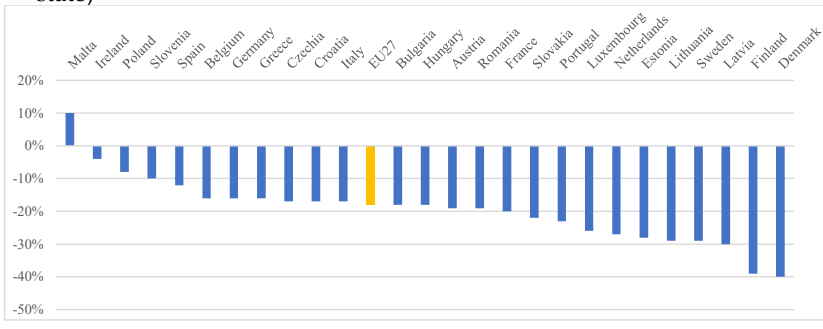
Because of several sanctions directly and indirectly affecting the Russian imports of energy products, the share of the main partners has undergone significant changes. As a consequence of the fifth package of EU sanctions which imposed a prohibition to purchase, import or transfer coal and other solid fossil fuels into the EU, Russia's share in EU imports of coal dropped to zero in the fourth quarter of 2022. The largest supplier is currently Australia with a 35.5% share in total extra-EU coal imports. In petroleum oils trade, the United States (17.1%), Norway (13.6%) and Kazakhstan (10.9%) were the largest partners in the first quarter of 2024. Norway was the largest supplier of natural gas in gaseous state to the EU with a share of 46.6%. In the first quarter of 2024, compared to the first quarter of 2023, Russia's share in EU imports of LNG increased by 4.4 pp despite falling in absolute terms. In the aftermath, Russia with a share of 17.7%, was the EU's second largest supplier of LNG behind the United States: 47.4% (Eurostat, 2024e).

2. Reducing natural gas consumption in EU member countries.

Reducing natural gas consumption has been pivotal efforts to contain the energy crisis. Between August 2022 and January 2024, EU member states reduced overall gas consumption by 18% (ca. 101 bcm). Figure 6 presents the change in natural gas consumption since the implementation of the Council Regulation (EU) 2022/1369 on coordinated demand-reduction measures. The greatest progress in this respect

was recorded in Denmark and Finland (around 40% compared to the same period of the 5-year average), while the smallest was in Ireland and Poland (4% and 8% respectively).

Figure 6. Natural gas demand reduction by EU member states, (August 2022–January 2024, compared to the same period of the 5-year average by member state)



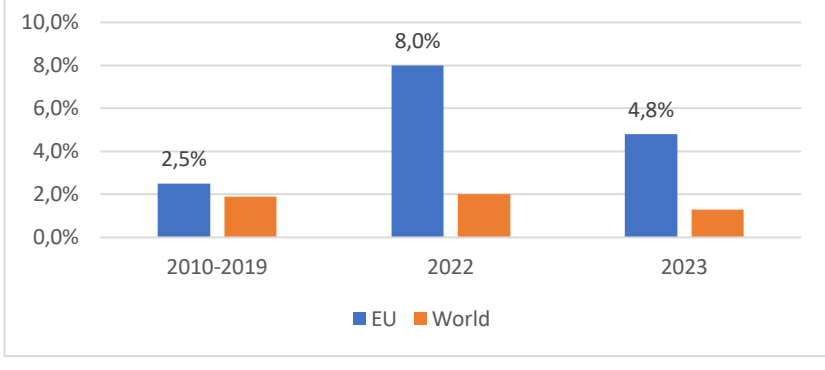
*Cyprus does not use natural gas.

Source: own elaboration based on: European Commission, 2024.

- Energy efficiency improvement

The rate of improvement in energy intensity, which is a measure of an economy's energy efficiency, is presented in figure 7.

Figure 7. Energy intensity improvement, 2010–2023



Source: own elaboration based on: IEA (2023).

Over the entire period under review, the EU results exceed the average level of energy intensity reduction globally. EU member states

energy intensity progress registered 8% in 2022 followed by almost 5% in 2023.

CONCLUSIONS

Energy policy, as an element of public policy implemented by the authorities of a given country, determines the issues of the volume and sources of energy production, the methods of its distribution and predicts the levels of its consumption. Within EU structures, the EU tries to take over these tasks, or even takes them over, as a body superior to national governments. Undoubtedly, EU policy is often on a collision course with the goals of the energy policies of individual countries, mainly in the field of energy security.

In the context of the above considerations, it is worth noting that the most important factors determining the energy security of each country are a diversified balance of trade in fuels and energy, diversification of sources and directions of supply, and an appropriately developed infrastructure for the transmission, storage and distribution of energy carriers. The same applies to the EU, created by separate economic organisms created by individual countries.

The EU imports more than half of the energy it consumes, mainly in the form of oil and petroleum products (36.8% of the gross available energy in the EU in 2022, compared to 39% in 1990). Another 21.1% of the EU energy balance is natural gas (16.8% in 1990), followed by renewables and biofuels (17.9% in 2022, compared to 4.8% in 1990). Solid fossil fuels and nuclear energy have a similar proportion with over an 11% share in the EU energy balance but have experienced a decline in their share since 1990 from 26% and 12.7%, respectively. The largest increase in the share in the energy balance of the entire EU in the analysed period was therefore from renewable energy sources and biofuels, which was in line with the created EU policy. However, fossil fuels, nuclear energy and gas still constitute the basis of the EU energy sector.

In the context of the above conditions and EU objectives resulting from the Fit 55 and REPowerEU strategies, it is also worth noting the high dependency ratio of 63% for the entire EU, which has systematically increased over the last decade (in 2013 it was 54%).

At the same time, as a result of actions taken from 2022 to reduce energy dependence on the Russian Federation, the EU has reduced the share of imports of Russian petroleum oils from 26.9% in 2019 to 20.2% in 2022, while natural gas has decreased from 41.5% to 21.9%, respectively. EU countries have reduced their natural gas consumption under REPowerEU strategies, including 11 by more than 20%. The leaders in this dimension are Denmark and Finland (reduction by approx. 40%). Only Malta increased consumption of the analysed raw material during this time (by 10%).

Without further actions aimed at developing energy that can be produced independently within the EU, and implementing energy-saving solutions in industry, infrastructure, transport and the everyday lives of EU citizens, it will be impossible to maintain this trend without an economic slowdown and the possibility of potential social unrest, also on an inter-state scale. The diversity of existing conditions in the energy sector in individual EU countries may result in difficulties in implementing coherent solutions that serve the consistent development of all EU economies. This in turn may result in uneven implementation of the Fit 55 and REPowerEU strategies and delays in their implementation. Additionally, it should be borne in mind that in general the EU is characterized by a high level of energy intensity improvement. Compared to the global average, this indicator has been approximately three times higher for the EU over the last dozen or so years, which indicates the positive effects of the energy transformation of the European Union.

For the full implementation of the Fit 55 and REPowerEU strategies, an appropriately adjusted and continuously adjusted response to further geopolitical changes in the region and the world (including the Middle East), the adaptation of modern technological solutions in the energy sector and industry, the raising of consumers' ecological awareness. In addition, it is important to ensure the continuity of supplies of energy raw materials and components to produce modern energy solutions, while ensuring the competitiveness of the European economy.

This is an extremely difficult challenge for the EU, especially for the European Commission of the future term, as well as for politicians of individual EU countries at national and local levels. Only joint actions and considering various arguments and conditions, while

ensuring consensus, can effectively lead to the goal set for 2050. During its implementation, it is important to implement similar actions by other developed and developing economies that dominate the world economy.

One of the central contributions of this text is the analysis of how the EU's energy transition strategies, notably the *Fit for 55* package and the *REPowerEU* plan, are now being seen as interwoven with energy security concerns. The added value of the paper is the use of empirical data, showing the progress of the EU's energy transition in terms of energy consumption patterns, the changing energy mix, and the diversification of supply sources. It highlights the shifting patterns of energy imports and the growing role of liquefied natural gas and renewable energy sources in the EU's energy mix. This statistical analysis provides a clear picture of the EU's current energy landscape and the challenges ahead in terms of meeting climate targets and reducing dependence on fossil fuels.

References

Asif, M. (Ed.) (2022). *Introduction to the Four-Dimensional Energy Transition*. Weinheim: WILEY-VCH GmbH. DOI: 10.1002/9783527831425.ch1.

Conference of the Parties to the United Nations Framework Convention on Climate Change (2016). 1. Information provided in accordance with paragraph 104 of decision 1/CP.21 related to entry into force of the Paris Agreement (Article 21). In *Report of the Conference of the Parties on its 21st session, held in Paris from 30 November to 13 December 2015* (FCCC/CP/2015/10). https://digitallibrary.un.org/record/831049/files/FCCC_CP_2015_10-EN.pdf?ln=en (accessed on 21.06.2024).

European Commission. (2010). *Communication from the Commission. Europe 2020, A strategy for smart, sustainable and inclusive growth* (COM(2010) 2020 final). https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A52010DC2020.

European Commission. (2011). Commission Staff Working Paper. Impact Assessment. Accompanying the document Communication from the Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee Of The Regions. *Energy Roadmap 2050* (SEC(2011) 1565 final. Part 2/2). https://eur-lex.europa.eu/resource.

html?uri=cellar:87b5da64-6b38-49d2-b77a-e9524b44abeb.0001.02/DOC_2&format=PDF.

European Commission. (2019). Communication From The Commission To The European Parliament, The European Council, The Council, The European Economic And Social Committee, The Committee Of The Regions And The European Investment Bank. *A Clean Planet for all. A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy* (COM(2018) 773 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0773.

European Commission. (2021). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. *"Ready for 55": achieving the EU's 2030 climate target on the road to climate neutrality* (COM(2021)550). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0550.

European Commission. (2022). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. REPowerEU Plan* (COM(2022) 230 final). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0230.

European Council. (2014). *Conclusions on 2030 Climate and Energy Policy Framework*. European Council 23–24 October 2014, Brussels, 23 October 2014, SN 79/14. https://www.eea.europa.eu/policy-documents/european-council-23-24-10 (accessed on 30.07.2024).

European Commission. (2024). *REPowerEU. – 2 years on*. https://energy.ec.europa.eu/publications/repowereu-2-years_en#details (accessed on 25.07.2024).

Eurostat. (2022). *EU energy mix and import dependency*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:EU_energy_mix_and_import_dependency (accessed on 30.07.2024).

Eurostat. (2024a). *Complete energy balances* [*nrg_bal_c__custom_12459929*]. https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_c__custom_12491728/default/table?lang=en (accessed on 02.08.2024).

Eurostat. (2024b). *Net greenhouse gas emissions*. https://ec.europa.eu/eurostat/databrowser/view/sdg_13_10__custom_12659470/default/table?lang=en (accessed on 22.08.2024).

Eurostat. (2024c). *Shedding light on energy in Europe – 2024 edition*. https://ec.europa.eu/eurostat/web/interactive-publications/energy-2024 (accessed on 02.08.2024).

Eurostat. (2024d). *EU imports of energy products continued to drop in Q2 2023*. https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20230925-1 (accessed on 02.08.2024).

Eurostat. (2024e). *EU imports of energy products – latest developments*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_-latest_developments#Main_suppliers_of_petroleum_oils.2C_natural_gas_and_coal_to_the_EU (accessed on 06.08.2024).

Eurostat. (2024f). *Energy statistics – an overview*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview (accessed on 02.08.2024).

Eyl-Mazzega, M.-A., & Mathieu, C. (2019). *Strategic dimensions of the energy transition. Challenges and responses for France, Germany and the European Union*. Paris: Institut Français des Relations Internationales.

Goldthau, A., Keim, M., & Westphal, K. (2018). The geopolitics of energy transformation: governing the shift – transformation dividends, systemic risks and new uncertainties. *SWP Comment*, *42*, 1–4.

Goldthau, A., Westphal, K., Bazilian, M., & Bradshaw, M. (2019). How the energy transition will reshape geopolitics. *Nature*, *669*, 29–31.

Hafner, M., & Tagliapietra, S. (2020). The Global Energy Transition: A Review of the Existing Literature. In M. Hafner, S. Tagliapietra (Eds.), *The Geopolitics of the Global Energy Transition. Lecture Notes in Energy*, *73*. Cham: Springer. https://doi.org/10.1007/978-3-030-39066-2_1.

Hallegatte, S., Bangalore, M., Bonzanigo, L., Fay, M., Kane, T., Narloch, U., Rozenberg, J., Treguer, D., & Vogt-Schilb, A. (2016). *Shock waves: managing the impacts of climate change on poverty*. Washington DC: World Bank, Climate Change and Development.

IEA. (2023). *Energy Efficiency 2023*. IEA, Paris. https://www.iea.org/reports/energy-efficiency-2023 (accessed on 05.08.2024).

Ilie, A.G., Zlatea, M.L.E., Negreanu, C., Dumitriu, D., & Pentescu, A. (2023). Reliance on Russian Federation Energy Imports and Renewable Energy in the European Union. *Amfiteatru Economic, The Bucharest*, *25*(64), 780–797. DOI: 10.24818/EA/2023/64/780.

IRENA. (2019). *A New World. The Geopolitics of the Energy Transformation*. https://www.irena.org/publications/2019/Jan/A-New-World-The-Geopolitics-of-the-Energy-Transformation (accessed on 22.08.2024).

Overland, I. (2019). The geopolitics of renewable energy: debunking four emerging myths. *Energy Research & Social Science*, *49*(2019), 37–40.

Santos Pereira, D., Cardosomarques, A., & Fuinhas, J.A. (2019). Are renewables affecting income distribution and increasing the risk of household poverty? *Energy*, *170*, 791–803.

The Council of the European Union. (2022). *Council Regulation (EU) 2022/1369 of 5 August 2022 on coordinated gas demand reduction, amended by Regulation* (EU) (L 206/1). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R1369.

The Institute for Energy Economics and Financial Analysis. (2024). *Europe's gas consumption falls to 10-year low as peak LNG demand nears*. https://ieefa.org/articles/europes-gas-consumption-falls-10-year-low-peak-lng-demand-nears (accessed on 05.08.2024).

United Nations. (2015). *Paris Agreement*. http://unfccc.int/files/essential_background/con-vention/application/pdf/english_paris_agreement.pdf.

WEF. (2018). *Fostering Effective Energy Transition. A Fact-Based Framework to Support Decision-Making*. The World Economic Forum. https://www.weforum.org/publications/fostering-effective-energy-transition/ (accessed on 05.08.2024).

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