

Article

The European Dilemma—Energy Security or Green Transition

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Abstract: The energy transition is a subject of significant interest in the countries of the European Union, and the involvement of public authorities is remarkable. Unlike previous energy transitions, this process is politically driven, the efforts of public authorities being secondary to the actions of companies whose guidelines are based on stability at the European level through strategies and directives. This paper aims to provide an overview of the current evolution of energy security status in the European Union and in Romania, with reference to global efforts to achieve climate neutrality through the energy transition. The historical method was used in the elaboration of the material, in order to outline the current energy security policies in terms of sustainability, both environmental and social. The logical method was used in order to emphasize the cause–effect relationship between economic processes in the energy sector. The use of bibliometric analysis demonstrated the importance of the topic of energy transition in scientific literature, but it also demonstrated the increasing interest of researchers in subjects related to energy security and energy poverty in the context of this new transition. By using the graphical method, statistic data and their evolution were highlighted in detail for the present study. The results of the articles are embodied in an approach that aims to focus on economic and social factors that determine the capacity of states to support the EU’s independence from a single supplier in the current context of conflict. The authors conclude by anticipating massive challenges in achieving the environmental objectives of the European Green Deal, as well as by highlighting the issue of energy poverty as a social factor influencing global strategic decisions.

Keywords: energy security; energy transition; sustainable development; just transition; energy dependence; energy poverty



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1. Introduction

Mankind is experimenting with a new energy transition due to challenges caused by climate change and the limitations of natural resources. The need to promote the low-carbon economy has determined paradigm shifts at the macro- and micro-economic levels, international institutions and public authorities in all countries being increasingly concerned with the promotion of complex policies to reduce the harmful effect of human activity on the natural habitat [1–6].

This transition process generates numerous economic, social, technical, and even political challenges, with renewable energy being the newest asset in the energy mix [7–14] and drawing investment into energy [15], as well as having important social and environmental implications for energy policy modelling [16].

Unlike other energy transitions, this transition, which emphasizes the use of renewable energy, is a politically driven process, with considerable efforts being made at the international level to adopt agreements that promote carbon neutrality [17–22]. The European Union stands out in this complex effort to support the energy transition, important steps being taken by creating the Energy Union in 2015, by promoting an energy independence strategy and stimulating the twin transition, considering the growing importance of digitization, including in the energy sector [17,23–28]. In addition to the efforts by public authorities to create the legal framework, paradigm changes are also being registered at the level of companies increasingly involved in energy transition, aiming at reducing consumption, increasing energy efficiency, orientation towards renewable energy sources (RES), and to promote concrete actions of social responsibility that focus on consumers and local communities [29–33].

An overview of some factors that build the energy security of the European space is necessary for understanding the decisions that are contemporaneous within the current context generated by the military conflict in Ukraine [10,34,35]. The big challenge is to maintain and even accelerate the pace on the path of the energy transition. Anyway, it is difficult to develop scenarios for green growth [36]. The energy crisis which erupted as a result of the conflict in Ukraine emphasized the problems related to energy security and the need for diversification of alternative resources [37].

In 2022, in the context of the hybrid warfare in Ukraine, the EU expanded sanctions against Russia [38]. Compared to previous conflicts, Russia has disrupted the global economic framework. In February 2022, the sanctions were in the financial, energy, and transport domains. In March, prohibitions were placed on investments in Russia's energy sector. In April 2022, bans on imports of coal and other solid fossil fuels from Russia were adopted. In June 2022, prohibitions on imports of oil and refined petroleum products from Russia were instituted, with some exceptions for pipeline oil. In July 2022, the period for energy and financial sanctions was extended until January 2023. In December 2022, an agreement was reached between the member states regarding Russian oil price ceiling.

Since December 2022, the list of products that cannot be imported from Russia to the EU includes, among others, oil and refined-petroleum products (from February 2023), with some exceptions, and coal and other solid fossil fuels. At the same time, goods that cannot be exported to Russia from the EU include specific products and technologies for oil refining, as well as the equipment, technology, and services of the energy industry. The EU has closed its ports to Russia's entire merchant fleet, but the measure does not affect ships carrying energy, pharmaceuticals, medical, agricultural and food products, humanitarian aid, coal, nuclear fuel, and other goods necessary for the operation of civilian nuclear capabilities.

The target of the REPowerEU plan is to achieve the recovery from the economic crisis generated by COVID-19 pandemic, as well as to reduce the European Union's dependence on Russian fossil fuels. The new plan considers the use of nuclear energy and fossil fuels (oil, coal) by the EU countries as temporary solutions, which would not endanger the achievement of the European Green Pact.

Starting from the dependence of the European countries on energy imports from Russia and determinations related to energy poverty, this study aims to research the policies necessary to ensure energy security within the energy transition, including proposals of the EU and international decision-makers to reduce energy dependence.

The information was objectified by referring to the official statistical data of Eurostat, the available data being selected. The research methods used (historical, logical, graphic, analysis, and synthesis of information) led to the achieved results, respectively, the contributions of the authors in comparative exposition of some series of statistical data for data extracts considered relevant in the present study, as well as in the graphic representation of statistical elements, where no graphs specific to the needs of the present study were identified. The results of the articles are embodied in an approach that aims to emphasize some economic and social aspects that determine the countries capacity to support the EU's

independence from a single supplier in the current context of conflict. The authors conclude by anticipating massive challenges in achieving the environmental objectives of the Green Deal, as well as by highlighting energy poverty issues as a social factor influencing global strategic decisions. Romania's energy security could be ensured in a sustainable way, within the targets set at the European Union level, if interconnected infrastructure was developed and the judicious use of funding was ensured.

Taking into account these considerations, the research hypothesis is "The current energy transition is in a process of metamorphosis under the impact of the geopolitical situation in Europe, energy security being the main objective pursued by the public authorities."

2. Literature Review

Energy is a fundamental requirement for the functioning of human society, and its availability and affordability are critical to economic and social development. However, the energy sector is undergoing significant changes, as countries seek to move towards a more sustainable energy system that reduces carbon emissions while meeting growing energy demand. The transition to a sustainable energy system presents challenges and opportunities for energy security, energy poverty, and sustainable development. The objective of this literature review is to analyze the existing literature on energy security, energy transition, sustainable development, just transition, energy dependence, and energy poverty using bibliometric analysis to provide insights and identify research gaps.

The literature review is based on bibliometric analysis of published articles in Web of Science and Scopus databases. The search terms used were "energy security", "energy transition", "sustainable development", "just transition", "energy dependence", and "energy poverty." The search was restricted to articles published in English from 2010 to 2022. A total of most cited 500 articles were identified and analyzed using VOSviewer software (version 1.6.18). The analysis focused on co-authorship, citation analysis, and keyword analysis.

Co-authorship analysis revealed that the majority of the articles were authored by researchers from the United States, China, and Europe. The United States had the highest number of publications, with 2022 articles, followed by China and Europe. The analysis of the citation network revealed that the most influential articles in this field were focused on energy security, energy transition, and sustainable development. The analysis of keywords showed that the most frequently used keywords in this field were "energy", "sustainability", "climate change", "renewable energy", and "policy".

In terms of energy security, the concept of energy security is evolving. There is a shift towards a more comprehensive approach that takes into account not only security of supply, but also the environmental, social, and economic aspects of energy. The need for greater international cooperation to address energy security issues, particularly in the areas of energy trade, investment, and infrastructure development, has also been identified in the literature.

With regard to energy system transformation, the transition to a sustainable energy system is a complex process that requires a comprehensive approach, taking into account technological, economic, social, and environmental factors. The importance of renewable energy technologies in the transition to a sustainable energy system has been highlighted, as well as the need for policies and regulations to support the development and deployment of these technologies.

The concept of sustainable development has shown that the energy sector has a key role to play in the achievement of the goals of sustainable development. The need to transition to a sustainable energy system that reduces carbon emissions and promotes economic and social development has been identified in the literature. The literature has also highlighted the importance of accessing energy for sustainable development, particularly in developing countries.

For a just transition, the literature review showed that the transition to a sustainable energy system can have a significant social and economic impact, particularly on workers

in the fossil fuel industry. It highlights the need for policies and programs to support a just transition, ensuring that fossil fuel workers are not left behind and have opportunities for retraining and employment in the renewable energy sector.

The literature review on energy dependence has shown that the reduction in dependence on imported energy sources can be an improvement in energy security and an aid to economic development. In order to reduce dependence on imported energy, the literature has highlighted the importance of developing domestic energy sources and increasing energy efficiency.

Energy poverty is a critical issue that has gained attention in recent years, both in academia and in policy-making. It refers to the lack of access to modern energy services, which affects people's quality of life, health, education, and income. Bibliometric analysis has been used extensively to understand trends, research gaps, and emerging issues in the field of energy poverty.

Some research gaps in the area of energy poverty are also highlighted by the bibliometric analysis. For example, most studies have focused on the environmental and economic impacts of energy poverty. Less attention has been paid to the social and health impacts. Research on the effectiveness of policies and technologies to address energy poverty is also lacking.

The transition to renewable energy from fossil fuels is a complex process supported by public authorities in all countries, as well as by international organizations, due to the globalization generated by the liberalization of the movement of goods, people, and capital, as well as the need to ensure energy security [39–42]. In Romania, the most important percentage of the energy mix belongs to hydroelectricity [33,43]. The winter of 2022–2023 will be the challenge that Europe will have to face, with gas storage still insufficiently full, holding a share of renewable energy far from the level that would be needed, as well as an incipient transport infrastructure and use of liquefied natural gas [44]. Thus, for the EU, the data show that coal-based electricity represented 19% of the total in the last three months of 2021 amid growing tensions between Ukraine and Russia, culminating with the conflict that broke out in February 2022 [45] signaled two years ago that diminishing fossil fuel supplies could radically reorient international financial flows and recreate the geo-economics of energy production and use. In addition to the particularly complex technical challenges, the energy transition also causes social concerns on the part of the authorities considering that the increase in prices and fluctuations in the energy supply affect the population, especially vulnerable consumers who face growing energy poverty [46–51]. In addition, the renunciation of the exploitation of certain energy resources has various consequences for local communities where the closure of farms and the cessation or reduction in the activity of some companies demonstrates a chain reaction, not only in the business ecosystem but also for the local workforce which faces the specter of unemployment. However, there is a chance for communities heavily affected by energy transition to benefit through the implementation of the Just Transition Mechanism [52].

In order to analyze the most relevant concepts in the field, a bibliometric analysis was carried out, using the academic platform Web of Science as the source of scientific articles, analyzing the topicality of the article given by energy security, energy transition, sustainable development, just transition, energy dependence, and energy poverty. Thus, the content of the 500 most cited articles related to renewable energy transition on Web of Science was explored to highlight the structure of the scientific domain using content analysis, inspecting the most frequent words and the relationship between words. The empirical analysis showed that the most frequent words in the full content of the selected articles, apart from the keywords used, are shown in Figure 1, including “energy”.

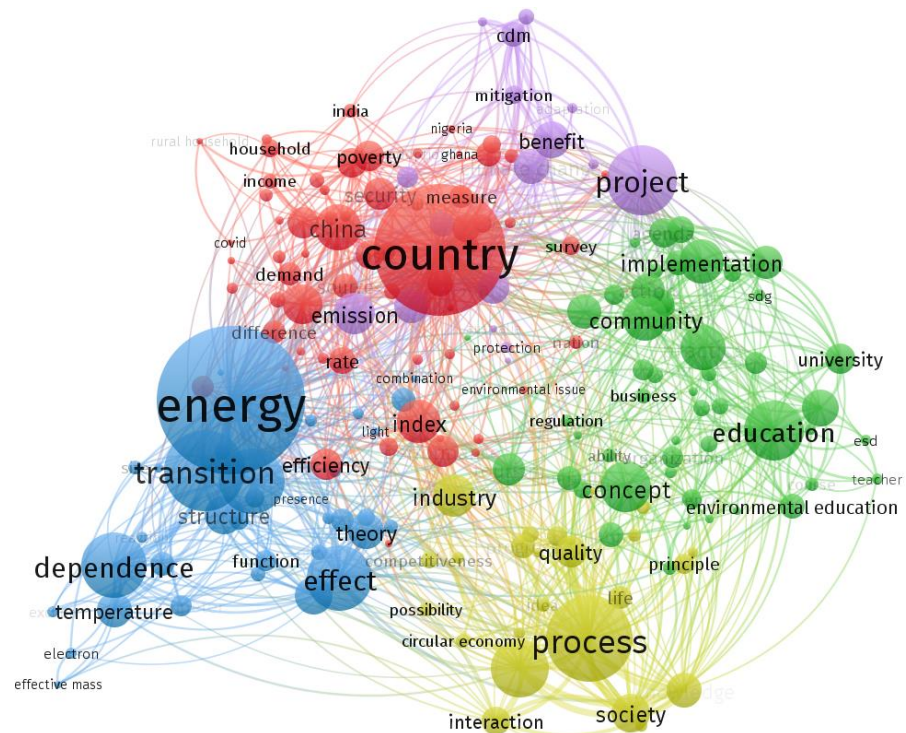


Figure 1. Network visualization in the bibliometric analysis related to chosen keywords related to ideas of this paper (driven by the authors).

The transition to renewable energy is the path to sustainability. Energy sustainability is related to “energy”, “dependency”, “sustainability”, “projects”, “processes”, “efficiency”, and “education” (Figure 2).

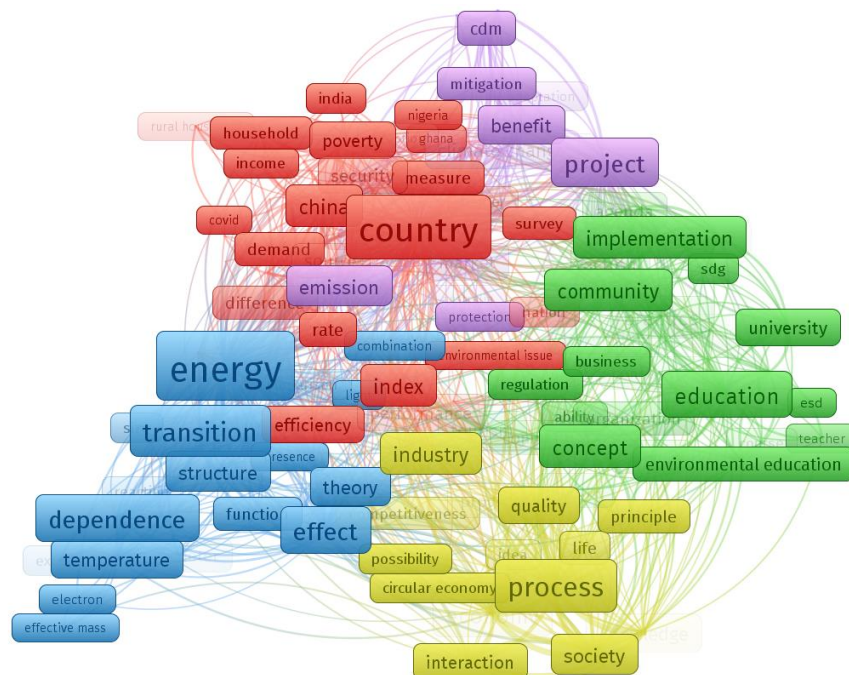


Figure 2. The bibliographic interconnections among chosen keywords related to the ideas of this paper (driven by the authors).

The literature on energy security, energy transition, sustainable development, just transition, and energy poverty revealed some interesting insights from the bibliometric analysis. The analysis showed that the most productive authors were from the US, China, and the UK, and that the most common research collaborations were between authors from the US and China. This suggests that there is a high level of interest in these topics on the part of researchers from these countries.

The keyword co-occurrence analysis showed that the most common themes were energy security, renewables, climate change, energy efficiency, energy poverty, and energy policy. These suggest that these are the most important topics in the field of energy research. The analysis also showed that energy supply, energy demand, energy independence, and energy diversification were the most common keywords related to energy security. This suggests that a key concern for researchers working on energy security is to ensure a reliable and diversified energy supply.

The citation analysis showed that the most-cited articles focused on renewable energy, energy efficiency, energy poverty, and energy policy. This suggests that these are the most influential areas of energy research. The most highly cited article in the dataset focused on renewable energy and climate change, highlighting the importance of renewable energy in mitigating climate change.

The bibliometric analysis of this topic shows an increasing research output and a multidisciplinary approach to the issue. However, there are still research gaps that need to be addressed, in particular regarding the social and health impacts of energy security and the effectiveness of policies and technologies to address this issue.

In this highly volatile context, climate and nature must be fully protected; however, this can only be achieved through sustainable living. The future is reflected in the sustainability of the transition to renewable energy sources.

3. Methods

The historical method was used in the elaboration of the material, in order to understand the outlining of current energy security policies in terms of sustainability, both environmental and social. The logical method was used in order to emphasize the cause-effect relationship between economic processes in the energy sector. By using the graphical method, statistical data and their evolution were highlighted in detail for this study. The analytical and synthetic approach provided us with a systematic and integrated view of the complex of factors considered in the study. The study focused on the EU economies, considering the progress made by these countries in the energy transition process, but also the challenges they have to face for increasing their independence from Russia, considering the conflict in Ukraine. The statistical data analyzed were those available at Eurostat.

4. Results and Discussion

According to the definition provided by the International Energy Agency [53] (energy security means ensuring the uninterrupted operation of energy sources at reasonable costs. If we refer to energy security on a short time horizon, we focus on energy system resilience to unexpected changes in the supply–demand balance. Additionally, energy security on long-term is mainly based on investments for energy supply in step with economic development and environmental imperatives.

At the EU level, energy diplomacy focused on energy security and the necessity of energy diversification [54], the energy union being structured on five pillars, energy security, decarbonization, energy efficiency, competitiveness and innovation, and the European energy market [55]. The European Green Deal [56] has as a target the development of the economy decoupled from the consumption of natural resources, for which, in 2020, an important investment instrument was launched—the Just Transition Mechanism [57]. It will focus on financial allocations for specific regions and sectors in transition, with high vulnerabilities, facilitating employment in new and transition sectors as reskilling opportunities. Through the “Green Deal”, the EU assume the role of a leader in combating

climate change issues. European leaders have as their objective, for the year 2050, the transformation of the region into the first continent with zero GHG.

In the statement of October 2022, the EU Council announced the official position for the 27th UN Climate Change Conference (COP27), which took place between 6 and 18 November 2022 in Sharm El-Sheikh, Egypt [58]. Thus, the Council was to reconfirm its position, expressed in June 2022, through the “Fit for 55” legislative package, which supports the reduction in greenhouse gas emissions by a minimum of 55% until 2030 by reference to 1990, as well as the achievement of climate neutrality by 2050. However, the final report of COP 27 instituted the aim of a gradual decrease in using all fossil fuels, with a target of 45% reduction in GHG emissions.

The 2030 Agenda for Sustainable Development [59], through Objective 7—Accessible and clean energy, also proposed, by 2030, a significantly increased proportion of green energy in the international energy mix, along with investments in R&D and infrastructure for energy. Overall progress for these indicators is, for now, below 50% [60]. The Conclusions of the European Council, 2019 [61] admitted the right of member states to decide their energy mix at a national level, including the choice of technologies considered appropriate by each country.

An overall scenario for the share of green energy globally in the coming years is accompanied by a drastic reduction in the oil and natural gas consumption. However, estimates show that the energy mix will still involve, in 2030, a considerable part of energy supplied from traditional fossil fuels (33%), as well as from nuclear sources, approximately 17% (European Council of Foreign Relations, 2021). In November 2022, in Romania, coal and hydrocarbons represented more than 32% of the national energy mix for electricity production, 35.6% was provided by hydroelectric energy, and 7.6% came from nuclear energy [62].

The data we compared, respectively, before the economic context created by the military conflict in Ukraine and a year after its beginning, show that percentages for Romania are slightly changed in these 12 months. Thus, the most significant difference was in relation to the share of coal, which experienced an increase of 1.5% in the national mix between February 2022 and the same month of 2023, but also of hydrocarbons, whose percentage is decreasing by 0.8% (Figure 3).

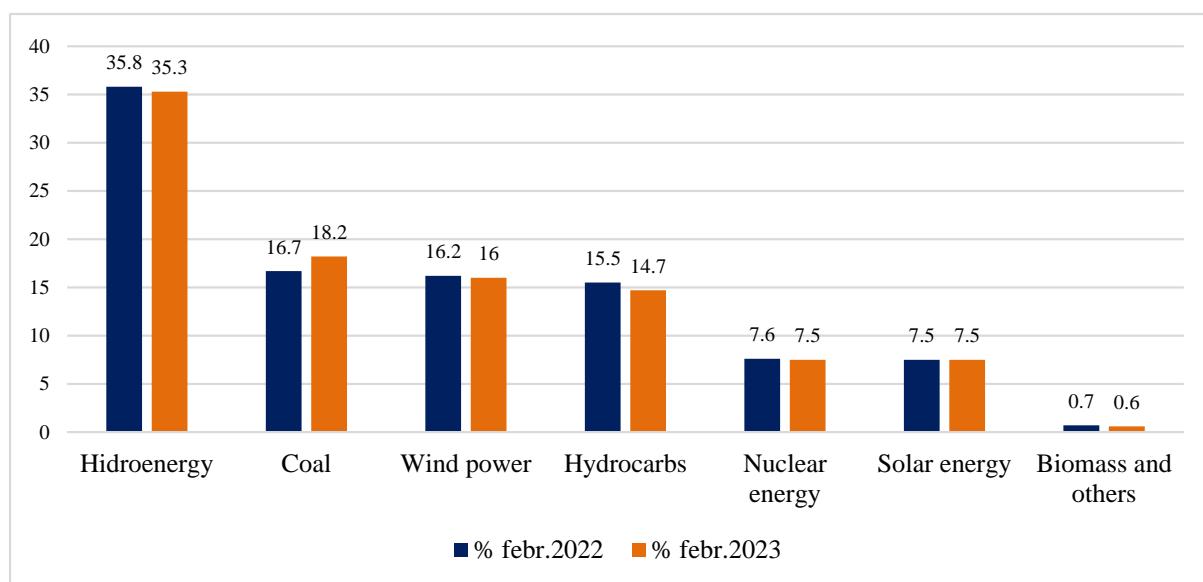


Figure 3. Romania’s energy mix in electricity production—comparative data on February 2022 and on February 2023. Source: ANRE (graph developed by authors, based on compared statistics).

In the new context of February 2022, states across the European continent resorted to the solution of restarting coal plants and mines so that they could realize another ambition of Europe, that of replacing gas imported from Russia.

According to the data made public by the IEA report, the entire process for ensuring coal needs increased in 2021 by 10% compared to the previous year, i.e., investments that exceeded USD 105 billion. Estimates are following the pattern of an upward curve in 2022, with India and China leading the way as major coal investors.

Moreover, according to the IEA estimates [63] in the perspective of 2023, the data indicate the further growth of coal consumption. As in previous years, China's consumption equals the combined values of India, USA, EU, and the rest of the world, and India will exceed the consumption of the US and EU combined.

The EU coal consumption increased by 10% in the first half of 2022, driven by demand for coal for electricity generation (IEA, Demand–Coal market update July 2022). The immediate future for the EU needs for coal use is considered “highly uncertain” by the IEA, taking into account the volatility of gas supplies from Russia. In the agency's forecasts, the production and use development of RES and energy saving plans during 2023 could compensate for the closure of some nuclear plants. Hence, the decrease in the demand for coal in 2023 in Europe is related to the supposed greater availability in France of nuclear power plants compared to 2022.

From an energy security perspective, the EU resilience implies the diversification of energy suppliers and the reduction in dependence on a singular supplier [64]. The current geopolitical context demonstrates how important it is to control and reduce energy import dependence. In 2020, the EU imported 57.5% of the energy that it consumed [65]. Essential fuel sources in the EU's energy mix in 2020, such as natural gas (23.7% of total fuels) and oil and petroleum products (34.5% of total fuels), are imported in a significant percentage.

Thus, regarding natural gas, the dependence percentage was 83.6% and 97% regarding oil. It should be noted that 18 member states (of the EU27) record a dependence rate of over 80% for imports for natural gas, of which 12 countries reach or tend toward the 100% threshold. The percentage of 80% is exceeded by 24 countries regarding dependence on oil imports. The lowest total energy dependence in 2020 was recorded by Sweden (33.5%), Romania (28.2%), and Estonia (10.5%). Regarding coal, the import dependency share was 35.8% (7.4% less than in 2019). Although the origins of the EU energy imports have changed in the last decade, the statistics showed a strong dependence of the EU's energy imports from Russia [66,67].

Since 2018, the USA has been a new entrant into the oil and gas import market in the European space, the percentage of imports increasing from 0% in 2010 to 8.1% in the case of oil and 4% in the case of liquefied gases [66–68]. If we refer to the dependence on Russia of energy imports for each of the member states, we note that, at the level of statistical data collected for 2020 [68] (9 countries register a rate of over 30% (among which include Germany, Poland, the Netherlands, and Hungary). By expanding the percentage range to 20%, we find Belgium, Italy, and Denmark. Below 10% are countries such as Sweden, France, and Spain. Romania's dependence on Russia is 17%.

In 2020, the share of the EU imports from Russia in total energy imports was 41.1% for natural gas, 36.5% for oil, and 19.3% for coal, as can be seen in Figure 4; 13 member states imported more than 50% of natural gas from Russia, with Hungary, Latvia and Finland exceeding or approaching 100%.

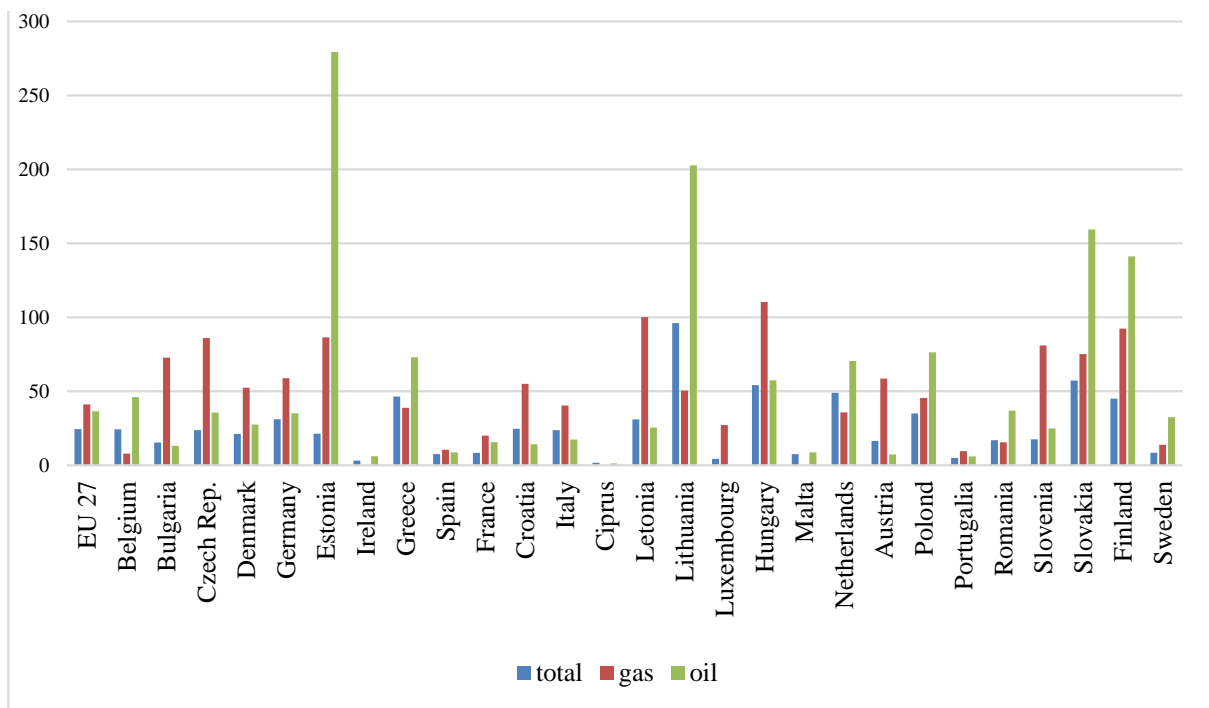


Figure 4. EU imports from Russia in 2020, in percents of the total imports for the mentioned source of energy. Source: Eurostat, 10 March 2022 (graph developed by authors, on Eurostat statistics).

Regarding the evolution of the value of the EU energy imports from Russia and the USA, in the period 2011–2021, there can be observed important changes; statistics in Figure 5 show a decrease in the value of these imports from Russia and a doubling of the values of those from the USA.

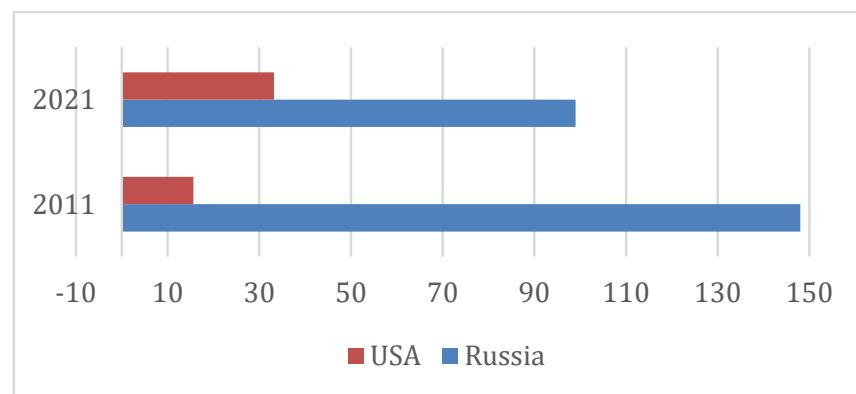


Figure 5. Evolution of EU energy imports from Russia and USA—values for 2011–2021 (EUR billion). Source: graph developed by authors, on Eurostat statistical data, USA-EU—international trade in goods statistics (February 2022).

An important indicator used to evaluate the energy security in the EU state is dependence on coal from Russia. This indicator represents the ratio of coal imports from Russia to the domestic fuel consumption associated with this type of fuel. From statistics provided by IEA [69], the situation is shown in Figure 6, the data available at country level being from 2021.

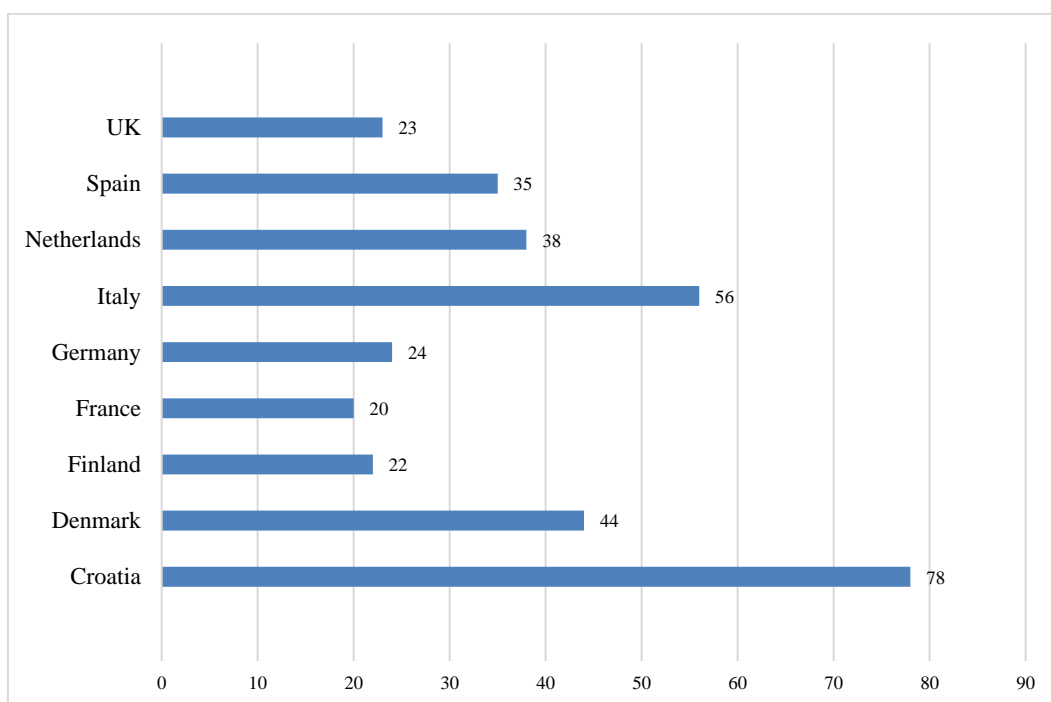


Figure 6. Countries that use coal in their energy mix and are reliant on coal imports from Russia in a percentage higher than 20%, at the level of 2022. Source: graph developed by authors based on International Energy Agency statistics, *Reliance on Russian Fossil Fuels in OECD and EU Countries*, <https://www.iea.org/data-and-statistics/data-product/coal-information-2>, accessed on 10 February 2023.

Further, we wanted to find out the estimated schedule for coal phase-out for these above-mentioned European countries. We did comparative research on publicly available data, between the targets set before the emerging of the conflict in Ukraine and the most recently announced targets, collected in July 2022, as can be seen in Table 1.

We observe that, among the European countries that are still including coal in their energy mix and are reliant on Russian coal imports for more than 20% of it, in the context of the ongoing conflict in Ukraine, some of the targets to phase-out remain unchanged. On one hand, France has recently delayed its deadline by 1 year and Germany by 3 years. On the other hand, Denmark and Romania have advanced by 2 years.

The European Attitudes towards EU Energy Policy—2019 survey [70] (reveals that 89% of European citizens consider the secure access to energy as a priority for the EU, so that the part of people who cannot pay energy bills would be reduced. Figure 7 shows that the responsibilities of the EU would include, in the view of the Europeans, combating energy poverty and ensuring competition in the markets for competitive prices. Additionally, in the projection for the next 10 years, ensuring energy costs as low as possible is seen as among the EU's priorities by 37% of Europeans.

Within the geopolitical context, but also considering the expectations and concerns of citizens, the EU decision-makers have identified a series of instruments that could support energy transition processes. The concept of a “just transition” calls for the solution of interconnecting the efforts to achieve climate neutrality, paying special attention to aspects related to equity for people from the segment affected by energy poverty and the precariousness of the means of subsistence, categories that are dependent on an economy based on fossil fuels. During the energy transition, some fields of activity will reduce their economic output and employment. The targeted economic sectors are coal production and utilization, as well as sectors for which alternative technological solutions could be implemented for the purpose of decarbonization. In this sense, the Just Transition

Mechanism is an instrument meant to support the fair transition to a zero-emission economy, respecting the “no one is left behind” principle [71].

Table 1. Estimated years assumed by countries dependent on more than 20% of their energy supply on Russian coal for phasing out Russian coal from their energy mix. Data were analyzed comparatively by authors in three stages, January 2021, January 2022, and July 2022. Data source: <https://beyond-coal.eu/europes-coal-exit/> (accessed on 20 July 2022), <https://beyond-coal.eu/wp-content/uploads/2021/01/Overview-of-national-coal-phase-out-announcements-Europe-Beyond-Coal-January-2021.pdf> and <https://beyond-coal.eu/wp-content/uploads/2022/01/overview-of-national-coal-phase-out-commitments-13-January-2022.pdf> (accessed on 13 January 2022).

State	Appraisal January 2021	Appraisal January 2022	Appraisal July 2022
France	2022	2022	2023
UK	2024	2024	2024
Italy	2025	2025	2025
Denmark	2030	2028	2028
Finland	2029	2029	2029
Netherlands	2029	2029	2029
Germany	2035	2038	2038
Romania	-	2032	2030
Spain	Under discussion	2030	2030
Croatia	2033	2033	2033

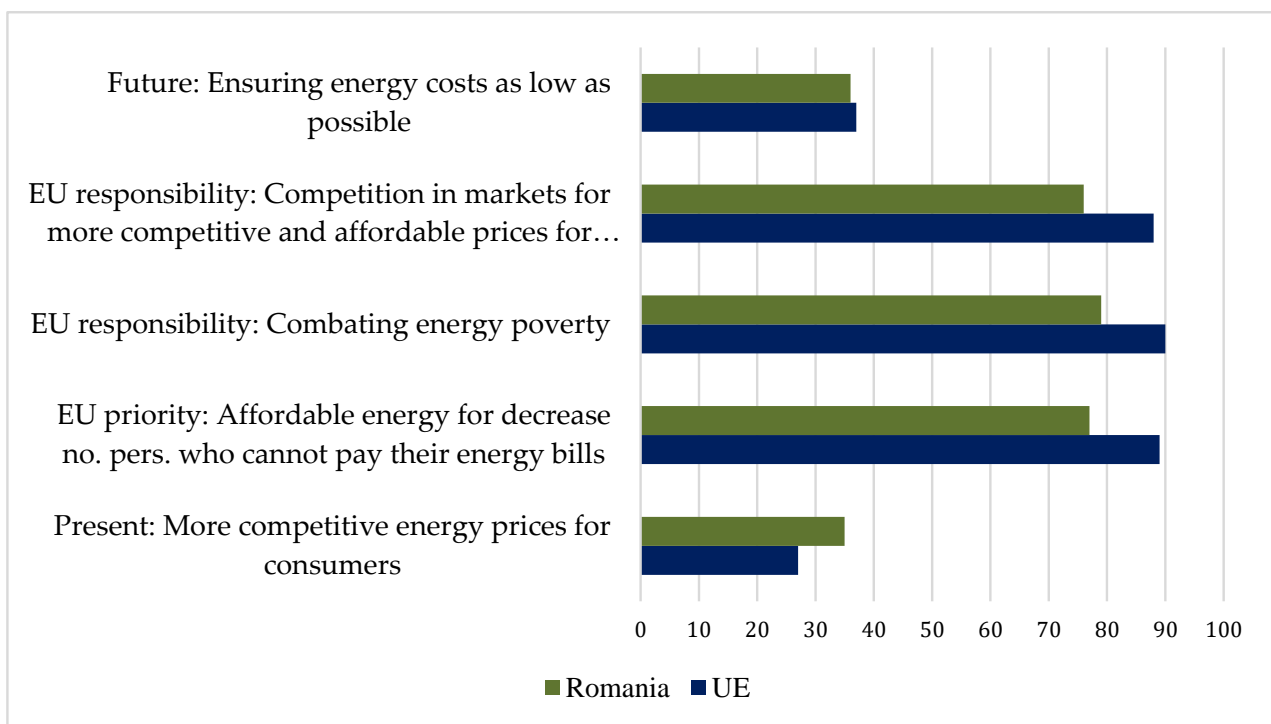


Figure 7. Extract from the Attitude of Europeans regarding the EU energy policy Report (2019). Source: graph developed by authors, on Eurobarometer statistical data, 2019.

The plan launched by the European Commission on 8 March 2022 [72,73] proposes developing the energy system resilience in the EU based on two dimensions, gas supply diversification, calling on greater imports of liquefied natural gas (LNG), biomethane and renewable hydrogen, as well as the faster decrease in the use of coal by increasing energy efficiency, renewable energies, removing blockages in the energy infrastructure development. To achieve the targets, the Commission relies on the implementation of the measures included by countries in their national recovery and resilience plans.

The main concerns are related to the existence of LNG unloading terminals and the ability of other gas suppliers to increase their current production in the coming period, to which is added the prospect of high costs that threaten the supply of liquefied gas from the US. The European Energy Agency launched a set of recommendations that would entail changes in energy consumption habits [74]. Thus, “Playing my Part” could mean reducing the level of heating and the use of air conditioning, adjusting the settings of boilers/indoor boilers, working from home, using cars more economically, reducing speed on highways, not using personal cars on Sundays in cities, cycling distances that could replace the car, using public transport, and using trains instead of planes.

5. Conclusions

The energy transition is a subject of significant interest in the countries of the European Union, and the involvement of public authorities is remarkable [75–86]. Unlike previous energy transitions, this process is politically driven, the efforts of public authorities being secondary to the actions of companies whose guidelines are based on stability at the European level through strategies and directives. The new geopolitical context and the significant dependence of the European Union on a single energy source supplier have emphasized the urgency for energy transition, especially through alternative energy sources and supplier diversification, but also through the responsibility of citizens in relation to energy-consumption behaviors. Expectations are also related to the responsibility with which member states will view the implementation of national recovery and resilience plans and just transition allocations. However, nuclear energy, natural phases, and coal, although not considered green energy sources, are, in the short and medium term, components of European energy security, and replacing them in the European energy mix is a serious challenge.

This study shows, with official statistical data, that an immediate decoupling of the EU from energy imports from Russia is complicated to achieve, given that the latest official statistics show that some of the member states are very dependent on these imports. Temporarily, the EU accepted a compromise on the Green Deal implementation, regarding the resumption of coal production, a solution for which alternatives are being sought through the Just Transition Mechanism. The current energy crisis that European countries are facing generates challenges for public authorities and companies, as well as opportunities in the business environment. The reconfiguration of the energy mix is necessary to reduce the dependence on Russia’s energy resources, which determines the reconsideration of coal and nuclear energy. The social pressures exerted by deepening energy poverty have a major impact on the reconsideration of the energy transition process. Maintaining the health of the population and the level of comfort are essential and the notion of a just transition is more consistently included as a key element in the reconfiguration of the energy transition in the countries of the European Union.

This study was limited to official statistics, especially those published by the European Commission and International Energy Agency. Additionally, the limits of the research are given by the time frame for which these official data are available. Financial aspects were not detailed for the Just Transition Mechanism and RePowerEU, as the allocation of funding and the stage of project contracting are still in their early stages.

As for future research directions, the authors would consider an analysis of the impact of the conflict in Ukraine on the Central and Eastern EU countries that are members of the European Union and that align with the directions of actions established in Brussels but that

have a lower level of development, as they face greater challenges regarding their resilience and ability to face such events. The risk of energy poverty intensification will be the subject of future studies that will take into account the evolution of the geopolitical situation, the economic growth rate, and the weather evolution, which, in the climate change context, seems to have a moderate impact on energy consumption in cold periods.

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