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Author:	Kublay KOCAK

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THE PURSUIT OF SECURITY AND GEOPOLITICAL RISKS AFTER THE RUSSO-UKRAINIAN WAR

Kublay KOCAK¹

ABSTRACT:

THE RUSSIAN INVASION OF UKRAINE IN FEBRUARY 2022 TRIGGERED AN UNPRECEDENTED ENERGY CRISIS IN EUROPE, FUNDAMENTALLY CHALLENGING ITS LONG-STANDING ENERGY SECURITY PARADIGM BASED ON SIGNIFICANT DEPENDENCE ON RUSSIAN FOSSIL FUELS. THIS PAPER ANALYZES THE PROFOUND SHIFTS IN EUROPEAN ENERGY POLICY AND THE GEOPOLITICAL LANDSCAPE IN THE WAKE OF THE WAR. IT EXAMINES THE IMMEDIATE IMPACTS OF THE CRISIS, INCLUDING SOARING ENERGY PRICES AND SUPPLY DISRUPTIONS, AND EVALUATES THE EU'S RESPONSE STRATEGIES CENTERED ON DIVERSIFYING ENERGY SOURCES AND ROUTES. THE PAPER INVESTIGATES THE INCREASED ROLE OF EXISTING SUPPLIERS LIKE NORWAY, THE STRATEGIC TRANSIT POTENTIAL OF COUNTRIES SUCH AS TURKEY, AND THE PROSPECTS AND CHALLENGES OF DEVELOPING NEW SOURCES LIKE THOSE IN THE EASTERN MEDITERRANEAN. IT ALSO ASSESSES THE CRITICAL VULNERABILITY OF ENERGY INFRASTRUCTURE, EXEMPLIFIED BY THE NORD STREAM PIPELINE SABOTAGES. FURTHERMORE, THE ANALYSIS DELVES INTO THE ACCELERATED PUSH FOR RENEWABLE ENERGY DEPLOYMENT (SOLAR, WIND) UNDER THE REPOWEREU PLAN, EVALUATING ITS FEASIBILITY, SUFFICIENCY, AND ASSOCIATED CHALLENGES (INTERMITTENCY, GRID INTEGRATION, SUPPLY CHAINS). SIMULTANEOUSLY, IT DISCUSSES THE PRAGMATIC, ALBEIT CONTROVERSIAL, ADJUSTMENTS IN POLICIES TOWARDS CONVENTIONAL SOURCES LIKE NUCLEAR POWER AND COAL, DRIVEN BY SHORT-TERM SECURITY NEEDS, AND THEIR IMPLICATIONS FOR CLIMATE TARGETS. THE PAPER ARGUES THAT WHILE EUROPE HAS MADE SIGNIFICANT STRIDES IN REDUCING RELIANCE ON RUSSIAN ENERGY, ACHIEVING A TRULY RESILIENT, AFFORDABLE, AND SUSTAINABLE ENERGY FUTURE REQUIRES NAVIGATING COMPLEX GEOPOLITICAL RISKS, MANAGING THE ENERGY TRILEMMA, ACCELERATING THE CLEAN ENERGY TRANSITION WHILE ADDRESSING NEW DEPENDENCIES, AND STRENGTHENING ENERGY DEMAND MANAGEMENT. THE TRANSITION IS ONGOING, FRAUGHT WITH CHALLENGES, BUT CRUCIAL FOR EUROPE'S LONG-TERM STRATEGIC AUTONOMY AND CLIMATE GOALS.

KEY WORDS: EUROPEAN ENERGY SECURITY, RUSSIA-UKRAINE WAR, ENERGY CRISIS, GEOPOLITICAL RISKS, ENERGY DIVERSIFICATION, RENEWABLE ENERGY TRANSITION

¹ PhD Candidate, Babeş-Bolyai University, Faculty of History and Philosophy, Doctoral School of International Relations and Security Studies, kubilay.kocak@gmail.com

INTRODUCTION

The economic stability, industrial production, and social welfare of the European continent have been deeply dependent, for many years, on a reliable and predictable energy supply. In this context, energy security—meaning the provision of energy in a physically uninterrupted, economically affordable, and environmentally sustainable manner—has been accepted as an indispensable strategic priority for European countries and the European Union (EU) [1]. However, this pursuit of security harbored significant vulnerabilities, particularly due to a structural and growing dependence on external fossil fuel sources, especially natural gas, and specifically on the Russian Federation [2,3]. Although short-term energy supply interruptions or price fluctuations in the past occasionally highlighted these risks, they did not trigger a radical transformation in Europe's overall energy supply architecture.

This established order was shaken to its foundations by the war that began with Russia's invasion of Ukraine on February 24, 2022. This war not only disrupted Europe's security balances but also caused an unprecedented crisis in the continent's energy supply systems, which had been its main pillar for decades. Russia's tendency and potential to use energy flow as a political weapon, alongside the extensive economic and energy-focused sanctions imposed by the EU and its allies on Moscow, created shockwaves in global energy markets. As a result, Europe faced a deep energy crisis characterized by record increases in energy prices, serious concerns about supply shortages, and disruptions in supply chains [4]. This crisis, beyond emergency interventions, made a fundamental reassessment and structural change in Europe's energy policies—a paradigm shift—inevitable. This shift is shaped around fundamental axes such as the rapid reduction of dependence on Russian energy, the radical diversification of supply sources and routes, and the acceleration of energy transition processes.

This paper aims to analyze this critical transformation process that Europe is undergoing in the energy field and the associated geopolitical dynamics. The main objective is to examine the shift in the European energy security paradigm triggered by the Russo-Ukrainian War, to evaluate the geopolitical risks that have emerged or intensified in this process, and to thoroughly address the continent's strategies for securing and diversifying its energy supply. In this context, the paper will focus on the following fundamental questions: To what extent and in which directions has the Russo-Ukrainian War changed Europe's energy policies and security perception? What vulnerabilities and risks do events like the Nord Stream pipeline sabotages reveal regarding the security of critical energy infrastructures? How is the role of traditional suppliers like Norway changing, and what is the place and importance of transit countries like Turkey and new potential resource regions like the Eastern Mediterranean in Europe's supply diversification strategies? To what extent are investments in renewable energy sources sufficient and economically feasible to meet Europe's energy needs? How do crisis conditions affect policies regarding traditional sources like nuclear energy and coal, and what is the relationship between this situation and long-term sustainability goals?

To answer these questions, the paper is structured in a logical sequence. Following this introductory section, the second section will detail the direct impacts of the Russo-Ukrainian War on European energy markets and the dimensions of the crisis. The third section will analyze the physical and geopolitical risks to energy infrastructures, focusing on the Nord Stream sabotages. The fourth section will examine, in the context of European supply diversification efforts, the growing importance of Norwegian gas, Turkey's strategic transit role, and the potential and challenges of energy resources in the Eastern Mediterranean. The fifth section will evaluate the sufficiency and feasibility of renewable energy sources, as well as the changing policies towards traditional sources like nuclear energy and coal. The sixth section will discuss, in light of the findings, the future of European energy security, the

fundamental risks that need to be managed, and the dynamics of the energy transition process. Finally, the concluding section will summarize the main arguments and key findings of the paper. This analysis is important for understanding the current situation and evaluating possible trajectories in a period when critical decisions are being made that will shape Europe's energy future.

1. THE RUSSO-UKRAINIAN WAR AND THE TRIGGERING OF THE EUROPEAN ENERGY CRISIS

As mentioned in the introductory section, Europe's energy security already faced certain risks before the Russo-Ukrainian war due to its high dependence on Russian fossil fuels. However, the war that began on February 24, 2022, dramatically brought these existing vulnerabilities to the surface, leaving the continent facing an energy crisis on a scale unseen for decades. With the start of the war, global energy markets, especially the European natural gas market (through benchmark prices like the Dutch TTF), experienced sudden and excessive price increases [5]. This initial shock wave was caused by the potential threats of the physical conflict environment to energy infrastructure and supply chains, as well as growing concerns that Russia might use energy exports as a weapon.

A bidirectional dynamic was effective in deepening the crisis. On the one hand, the European Union and Western allies rapidly implemented comprehensive sanctions packages against Moscow, aiming to weaken Russia's war economy and respond to its aggression. These sanctions included banning the import of Russian coal, a decision for a phased embargo on Russian oil, and measures restricting financial transactions with Russian energy companies (European Council 2022). Particularly with the UK and America at the forefront and with the participation of EU member states to support Ukraine, these steps, while clearly demonstrating Europe's intention to strategically distance itself from Russian energy, also disrupted existing supply balances, increasing uncertainty in the markets. This situation led to the prices of natural gas and energy rising several times in almost all European countries, causing serious difficulties for the European population and industry.

On the other hand, Russia, in retaliation for Western sanctions and support for Ukraine, increasingly began to use energy supply as a geopolitical instrument. Notably, it gradually and significantly reduced the flow of natural gas sent to Europe via the Nord Stream 1 pipeline, citing "technical problems" [6]. It also demanded that some European countries make payments for natural gas in rubles and completely cut off the gas flow to countries that refused this demand. These moves made it difficult to fill Europe's natural gas storage facilities, pushed supply security concerns for the winter months to their peak, and drove prices in the spot markets to historic record levels [7].

The combined effect of these developments had serious consequences for European economies and societies. It caused price increases and inflation at rates unseen in European countries. The exorbitant increases in energy costs, also fueling general price rises, reduced the purchasing power of households and exposed millions of people to the risk of energy poverty. Many industrial enterprises in energy-intensive sectors (chemicals, metallurgy, fertilizers, etc.) were forced to reduce or halt their production due to increased costs, which exerted downward pressure on economic growth [8]. European governments were compelled to announce multi-billion euro support packages for households and businesses, implement energy-saving measures, and activate emergency plans to mitigate the effects of the crisis. This situation clearly demonstrates that the Russo-Ukrainian war, beyond being a mere military conflict, has

functioned as a catalyst that has fundamentally shaken Europe's energy security paradigm and mandated a structural transformation.

2. THREATS TO SUPPLY SECURITY AND INFRASTRUCTURE RISKS: THE EXAMPLE OF THE NORD STREAM SABOTAGES

The European energy crisis triggered by the Russo-Ukrainian war, beyond supply interruptions and price fluctuations, has also brought to light new and serious threats to the physical security of the continent's energy supply chains. The most concrete and worrying example of these threats is the sabotage carried out in September 2022 on the Nord Stream 1 and Nord Stream 2 natural gas pipelines located in the Baltic Sea. These multi-billion euro infrastructure projects, designed to transport gas directly from Russia to Germany, had become a symbol of Europe's dependence on Russian gas and, at the same time, of the geopolitical tensions generated by this dependence [9]. Nord Stream 1 had supplied Europe with significant quantities of gas for years, while the Nord Stream 2 project never entered commercial operation due to geopolitical controversies and decisions made after Russia's invasion of Ukraine.

At the end of September 2022, in international waters near Denmark and Sweden, massive gas leaks were detected on three of the four lines of both pipelines, caused by powerful underwater explosions [10]. The investigations carried out strongly demonstrated that these leaks were not the result of an accident, but of intentional actions, i.e., sabotage. This event was recorded as one of the largest and most audacious attacks on critical international energy infrastructure in modern history.

Although the perpetrator or perpetrators of the Nord Stream sabotages have not yet been officially and definitively identified, the event caused a major diplomatic crisis at the international level and mutual accusations. Russia accused Western countries or Ukraine, while Western countries and analysts focused their suspicions on Russia's own actions or on other potential non-state actors [11]. Regardless of the perpetrator's identity, these sabotages had several important consequences:

Revealing Infrastructure Vulnerability: The event painfully demonstrated how vulnerable critical infrastructures such as submarine pipelines and communication cables are and that they can be targeted. This situation prompted European countries to reassess the security of their own energy infrastructures and increase protection measures [12].

Physical Elimination of Supply Options: At the time of the sabotage, Nord Stream 1 was already operating at a very reduced capacity, and Nord Stream 2 was not operating at all. However, the physical damage to the pipelines effectively eliminated the possibility of large-scale Russian gas delivery to Europe via this route in the short and medium term. This situation represented a symbolic and practical turning point that accelerated Europe's complete detachment from Russian gas.

Increased Geopolitical Uncertainty: The sabotages demonstrated that the conflict in the energy domain could evolve towards unconventional methods and direct attacks on infrastructure, further escalating the existing geopolitical tension. The risk of such events recurring created additional uncertainty and a risk premium in the energy markets.

In conclusion, the Nord Stream sabotages demonstrated that the equation of Europe's energy security cannot be solved merely by diversifying suppliers and routes, but also that ensuring the physical security of existing and future energy infrastructures is of vital importance. This event opened a new front in Europe's quest for energy independence and security, forcing the continent to cope with more complex and unpredictable risks. In this context, the efforts to turn towards alternative suppliers and routes, which will be addressed in

the next section, aim not only to reduce dependence on Russian gas but also to disperse such physical risks.

3. EUROPE'S ENERGY SUPPLY DIVERSIFICATION STRATEGIES AND ALTERNATIVE ROUTES

The energy crisis triggered by the Russo-Ukrainian war and supply security concerns, heightened by events such as the Nord Stream sabotages, have made the diversification of energy supply sources and routes an urgent and central strategic objective for the European Union and its member states. The rapid reduction of the decades-long dependence on Russian energy has necessitated both strengthening relationships with existing reliable partners and accelerating the search for new suppliers and transport routes. This multi-faceted effort has the potential to reshape Europe's energy map, highlighting different actors and regions in the process. This section will examine the growing role of existing suppliers like Norway, the importance of strategic transit countries such as Turkey, and potential new resource regions like the Eastern Mediterranean.

3.1. The Increased Role of Existing Suppliers: The Example of Norway

Faced with the dramatic decrease in Russian gas supply, one of the first and most reliable alternatives Europe turned to was Norway, a long-standing major gas supplier. Norway is a country integrated into European energy markets through pipelines (e.g., Europipe II, Langeled), known for its political stability and predictable production policies [13]. With the start of the war and the reduction of Russian gas flow, Norway took steps to increase its production and exports to the maximum possible level to meet Europe's growing demand. Adjustments were made to production licenses, and maintenance work at some fields was postponed to maximize short-term supply [14]. In 2022, Norway became the largest natural gas supplier for many European countries, especially Germany, taking Russia's place [15].

However, the potential of Norwegian gas to cover Europe's entire need is limited. Norway's production capacity has a specific ceiling due to the maturation of existing fields and limited major new discoveries [16]. As the potential to increase production further is restricted, Norwegian gas, although compensating for a significant part of the lost supply from Russia, cannot offer a permanent solution on its own. Nevertheless, Norway's stable and reliable contribution to European energy security has played and continues to play a vital role during the crisis period. Furthermore, new infrastructure projects, such as the Baltic Pipe pipeline extending to Poland which became operational at the end of 2022, facilitate the transport of Norwegian gas to Central and Eastern Europe, further enhancing its strategic importance.

3.2. New Supply Routes and the Importance of Transit Countries: The Role of Turkey

In Europe's supply diversification strategy, not only the source countries but also the transit countries and routes that will transport these resources to European markets are of critical importance. In this context, Turkey, owing to its geographical position, serves as a natural bridge between potential energy resources in the Caspian Basin, Central Asia, and the Middle East, and European consumption centers. This strategic role of Turkey has materialized particularly through the Southern Gas Corridor (SGC) project. The main artery of this corridor, the Trans-Anatolian Natural Gas Pipeline (TANAP), connects Azerbaijani gas transported through Turkey to the Trans-Adriatic Pipeline (TAP). Furthermore, it might also be possible to transport gas from Turkmenistan to Europe via Turkey [17].

In the post-Russo-Ukrainian War period, increasing the capacity of the SGC has become an important alternative for Europe. Declarations of intent were signed between Azerbaijan and the EU regarding the doubling of gas supply, making the capacity expansion projects for TANAP and TAP more attractive [18]. Turkey, in light of these developments, frequently expresses its goal of positioning itself not just as a transit country, but also as a regional energy trading center (hub). However, Turkey's ability to fully play this role depends both on the mobilization of additional gas sources from the Caspian and Middle Eastern regions and on the evolution of the sometimes fluctuating political relations between Turkey and the EU. Regional geopolitical instabilities and investment costs are also factors that must be considered in realizing this potential [19].

3.3. Potential New Resource Regions: Eastern Mediterranean Energy Resources

Another important region to which Europe has turned its attention in the search for alternatives to Russian gas is the Eastern Mediterranean. Significant natural gas reserves discovered, especially in the last decade, off the coasts of Israel (Leviathan, Tamar), Cyprus (Aphrodite, Glaukos), and Egypt (Zohr) have positioned the region as a potential energy exporter [20]. Transporting these resources to European markets holds the potential to increase the continent's supply diversity.

However, there are serious obstacles to transforming Eastern Mediterranean gas into a concrete alternative for Europe. Firstly, most of these resources are located in deep waters, and their extraction and processing are technically challenging and economically very costly. The second and more significant obstacle is the complex geopolitical structure of the region. Ongoing disputes regarding the delimitation of maritime jurisdiction zones among Turkey, Greece, the Greek Cypriot Administration, the Turkish Republic of Northern Cyprus, Israel, Egypt, and Lebanon hinder the development and financing of energy projects (Cyprus Problem, Turkey-Greece relations, etc.) [21]. For example, the EastMed pipeline project, planned to transport Israeli and South Cypriot gas to Europe via Greece, is a project whose feasibility is questioned due to its high cost and the geopolitical risks along the route. Alternative options considered, such as liquefying gas through existing LNG (Liquefied Natural Gas) facilities in Egypt and transporting it to Europe, or a pipeline passing through Turkey, seem more reasonable from a cost and line security perspective. Although this situation has the potential to play an important role in the European energy equation, it is far from offering a rapid solution to replace Russian gas in the short term.

In conclusion, Europe's efforts to diversify its energy supply cover a broad spectrum, from greater reliance on existing partners like Norway, to developing cooperation with transit countries like Turkey, and evaluating the potential (along with its difficulties) of new source regions like the Eastern Mediterranean. However, none of these strategies is sufficient on its own, and each presents its own unique opportunities and risks. This situation directs Europe not only towards fossil fuel alternatives but also towards managing energy demand and fundamentally transforming the energy system.

4. ANALYSIS OF ALTERNATIVE ENERGY SOURCES: SUFFICIENCY, FEASIBILITY, AND FUTURE PERSPECTIVE

The efforts to diversify fossil fuel supply and routes, detailed in the previous section, although constituting an important part of Europe's response to the energy crisis, are not sufficient on their own. The Russo-Ukrainian war has also reinforced the need for the European Union to accelerate the energy transition and manage energy demand in line with already

existing climate objectives [22]. The crisis provided a strong impetus, particularly for accelerating the transition to renewable energy sources and increasing energy efficiency. However, the pressure to meet urgent energy needs has led, in some countries, to pragmatic adjustments in policies regarding more traditional and controversial sources, such as nuclear energy and coal. This section will analyze these two main trends, critical for Europe's energy future – the accelerated transition to renewable energy and the changing attitudes towards traditional sources.

4.1. Renewable Energy Sources (Solar, Wind etc.): Accelerated Transition and Challenges

Renewable energy sources (primarily solar and wind), considered the most sustainable path to reducing dependence on Russian fossil fuels and ensuring long-term energy security, have become more strongly positioned at the center of Europe's energy strategy in the post-war period. The EU, through the REPowerEU plan developed in response to the crisis, has set ambitious targets for accelerating the installation of renewable energy capacity, simplifying permitting processes, and increasing investment in new technologies such as green hydrogen [3]. The expansion of renewable energy offers the potential to reduce dependence on imported fossil fuels, thereby increasing energy sovereignty, and to achieve climate change mitigation goals.

However, efforts to accelerate the transition to renewable energy also face significant challenges:

- **Sufficiency and Integration:** The intermittent nature of solar and wind energy (dependence on weather conditions) makes it difficult to constantly match supply with demand. This situation requires major investments in energy storage technologies (large-scale batteries, pumped-storage hydropower plants, green hydrogen production, etc.) and in grid infrastructure (strengthening transmission lines, smart grids) (International Renewable Energy Agency) [23]. Rapidly reaching a scale where renewable sources can meet total energy demand depends on overcoming these technological and infrastructural barriers.
- **Feasibility and Supply Chains:** Although the costs of renewable energy technologies have decreased significantly in recent years, financing the massive investments required can present difficulties, especially during a period with concerns about economic recession. Furthermore, dependence on certain countries, such as China, for critical raw materials needed for the production of solar panels, wind turbines, and batteries (lithium, cobalt, rare earth elements, etc.) creates the risk of a new strategic dependency [24]. The length of permitting processes and local-level objections (land use, etc.) can also slow down project implementation.
- **Economic Profitability:** Although renewable energy projects are economically attractive in the long run, costs related particularly to energy storage and grid integration can affect the total system cost and, consequently, the prices reflected to the final consumer. Market mechanisms and support policies must adapt to this new reality.
- Despite these challenges, the transition to renewable energy is considered an indispensable path for Europe's energy future. The crisis has heightened the urgency of this transition and strengthened political will, but achieving the objectives will require continuous effort, innovation, and investment.

4.2. A Strategic Return to Traditional Sources? The Role of Nuclear Energy and Coal

The urgent supply deficit and high prices generated by the energy crisis have reignited long-standing debates in Europe regarding nuclear energy and coal. Despite the contradiction with climate objectives, the pressure to ensure short-term energy security has led some countries to review their policies concerning these sources.

- **Nuclear Energy:** Particularly in countries like France, where nuclear energy holds a significant share in the energy mix, the trend towards extending the lifespan of existing plants and investing in new-generation reactors has strengthened. Even in countries like Germany, which had decided on a complete nuclear phase-out, the closure of the last plants was postponed due to the crisis, and they were kept as an emergency reserve [25]. Nuclear energy offers the potential to contribute to energy security by providing low-carbon and baseload (continuous) electricity. However, disadvantages such as nuclear waste disposal, safety concerns, high construction costs, and long project timelines persist, as does its controversial position in public opinion. Furthermore, dependence on countries like Russia and Kazakhstan for nuclear fuel supply raises the issue of the need for diversification.
- **Coal Use:** One of the most evident short-term effects of the crisis was the temporary increase in the use of coal-fired power plants or the extension of the lifespan of those previously planned for closure in many European countries, aiming to ensure the switch from natural gas to electricity and cover the supply deficit [26]. This situation created a clear contradiction with the EU's ambitious climate objectives and increased environmental concerns. Although authorities emphasize that this situation is a temporary and emergency measure, the duration of the return to coal and how it will affect long-term decarbonization pathways remain a significant question mark.

In conclusion, European energy policy finds itself in a complex search for balance. On the one hand, it seeks to accelerate the transition towards renewable energy for long-term climate objectives and energy independence, while on the other hand, it is forced to take pragmatic (and sometimes reluctant) steps towards traditional sources like nuclear energy and coal to ensure short-term energy security. This situation clearly highlights the potential tensions and trade-offs between the objectives of energy security, economic competitiveness, and environmental sustainability.

5. DISCUSSION: THE FUTURE OF EUROPE'S ENERGY SECURITY AND THE GEOPOLITICAL RISKS THAT MUST BE MANAGED

As examined in detail in the previous sections, the Russo-Ukrainian war has fundamentally shaken the status quo that persisted for decades in Europe's energy policies, triggering a mandatory paradigm shift. The strategic vulnerability created by excessive dependence on Russian fossil fuels, particularly natural gas, was painfully experienced with the war, pushing Europe to redefine its energy security and develop multidimensional strategies to guarantee it. This discussion section aims to synthesize Europe's efforts to cope with this new energy reality, the fundamental challenges it faces, the new geopolitical risks that have emerged, and the effects on the future of the energy transition.

Europe's efforts to distance itself from Russian energy and diversify supply sources have progressed with remarkable speed and determination since the beginning of the crisis. Steps such as increasing supply from reliable partners like Norway, a stronger orientation

towards global LNG markets, strengthening cooperation through the Southern Gas Corridor with countries like Azerbaijan and Turkey, and accelerating the installation of renewable energy capacity under the REPowerEU plan have allowed significant ground to be covered in a short time [27]. Notably, filling natural gas storage facilities above target levels and navigating the winter of 2022-2023 more easily than expected demonstrated the success of the measures taken and the demand reduction policies applied. However, this success does not reflect the whole picture. Increased LNG imports to replace Russian gas have exposed Europe more to price fluctuations in global LNG markets and to competition with other major consumers like Asia [28]. Furthermore, the failure to resolve geopolitical knots in potential new resource regions like the Eastern Mediterranean and the need for healthier and more transparent relations with transit countries like Turkey could facilitate reaching the potential of these alternatives. Therefore, although diversification efforts have made important strides, Europe's energy security is not yet fully ensured, and new dependency risks are emerging.

In this process, Europe faces difficulties in restoring the delicate balance of the classic "energy trilemma"—namely supply security, economic affordability, and environmental sustainability. During the peak of the crisis, the priority of ensuring supply security and controlling exorbitant prices led to the adoption of pragmatic short-term measures, such as increasing coal use or extending the lifespan of nuclear power plants, which contradict climate objectives (Section 5.2). Although it is emphasized that these measures are temporary, they pose the risk of a potential deviation from the path towards achieving long-term decarbonization goals. At the same time, high energy prices have placed a serious burden on households and industry, fueled inflation, and threatened Europe's global competitiveness. While energy efficiency and demand management measures play an important role in alleviating this pressure, it is clear that we are facing a deep problem requiring structural solutions.

From a geopolitical perspective, distancing from Russia is also causing significant changes in Europe's external relations. While cooperation with the US in the energy field (especially in LNG supply) is increasing, the strategic importance for Europe of countries like Norway, Azerbaijan, Turkey, Qatar, and Algeria has risen. However, these new or strengthened relationships also carry their own risks. Internal political instabilities in supplier countries, regional conflicts, or the geopolitical agendas of these countries can pose new threats to Europe's energy security. As seen in the example of the Nord Stream sabotages, threats to the physical security of energy infrastructure are now a more concrete risk factor and can originate not only from state actors but potentially also from non-state actors. Additionally, with the acceleration of the transition to renewable energy, the concentration of supply chains for critical raw materials necessary for these technologies (especially China's dominance) creates a new strategic dependency and an area of geopolitical competition [24,29].

From the perspective of the future of the energy transition, the crisis has created a contradictory effect. On the one hand, it clearly demonstrated the risks of dependence on fossil fuels, emphasizing the urgency of the transition to renewable energy and energy efficiency and strengthening political will (REPowerEU). On the other hand, short-term supply security concerns and economic pressures have led, in some countries, to new investments in fossil fuel infrastructure (e.g., LNG terminals) or the continuation of the use of existing coal/nuclear capacity, creating a "lock-in" risk. Europe's ability to ensure both energy security and achieve ambitious climate goals will depend on successfully managing these contradictory dynamics, massively increasing investments in clean technologies and related infrastructure, and structurally reducing energy demand.

In conclusion, European energy security is undergoing a profound transformation in the post-Russo-Ukrainian War period. Although significant steps have been taken towards liberation from dependence on Russia, the process is far from complete, and new challenges and risks have emerged. Europe is making difficult choices among the elements of the energy trilemma, trying to cope with changing geopolitical balances, and seeking a path between the goal of accelerating the energy transition and short-term realities. Future energy security will depend not only on diversifying supply sources but also on strengthening demand management, increasing energy efficiency, massively accelerating investments in renewable energy and related infrastructure, and proactively managing emerging geopolitical and technological dependency risks. This is a long-term process requiring continuous adaptation, strong political will, and coordination among member states.

CONCLUSIONS

This paper has examined the post-Russo-Ukrainian War period, which represents a turning point in the field of European energy security. The energy crisis triggered by the war clearly demonstrated the unsustainability of the European energy paradigm, which persisted for decades and was based particularly on dependence on fossil fuels from Russia, as well as the profound geopolitical risks involved. As analyzed throughout the paper, this crisis forced Europe into a radical change in energy policies, namely the search for a new energy security paradigm.

Our fundamental findings show that this paradigm shift is a multidimensional and complex process. Firstly, as a direct effect of the war, Europe had to face record energy prices, threats of supply disruption, and serious economic difficulties. Secondly, the sabotage of the Nord Stream pipelines revealed new and concrete threats to the physical security of critical energy infrastructures, deepening concerns about supply security. Thirdly, although Europe strengthened relations with existing partners like Norway, reassessed the role of potential transit countries like Turkey, and turned towards new source regions like the Eastern Mediterranean in order to distance itself from Russian energy, each of these diversification efforts has its own limits, costs, and geopolitical difficulties. Fourthly, the crisis reinforced the need to accelerate the transition to renewable energy and energy efficiency, but also led to pragmatic adjustments (sometimes contradicting climate objectives) in policies regarding traditional sources like nuclear energy and coal, under the pressure of short-term supply security.

In light of these findings, the fundamental argument of the paper is as follows: The Russo-Ukrainian War has pushed Europe to adopt a more proactive, diversified, and resilient approach regarding energy security; however, this transition process is far from complete and brings with it new dependencies, geopolitical risks, and the necessity of managing the delicate balances within the "energy trilemma" (security, affordability, sustainability). Europe's energy future will be shaped not only by changing supply sources but also by effectively managing energy demand, accelerating the energy transition with determination (especially investments in renewable energy and related infrastructure), and carefully managing the emerging new strategic and technological dependencies.

In conclusion, Europe's journey in terms of energy security continues. The crisis has provided painful lessons and triggered important policy changes. However, building a safer, more sustainable, and economically affordable energy future will require a long-term vision, continuous adaptation, strong coordination among member states, and firm political will. How Europe manages this difficult process will significantly influence not only its own welfare but also the future of global energy markets and geopolitical balances.

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