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ENERGY TRANSITION AND INTERNATIONAL SECURITY: THE ROLE OF THE EUROPEAN UNION AND NATO IN BUILDING RESILIENCE TO GEOPOLITICAL THREATS

Abstract

This article analyses the impact of the energy transition on international security, with a focus on the actions of the European Union and NATO. It discusses mechanisms for supply diversification, the development of renewable energy sources, the protection of critical infrastructure and the threats posed by raw material dependence. The strategic importance of synergies between energy policy and security is highlighted, pointing to the growing role of transatlantic cooperation in building resilience to geopolitical threats.

Keywords

Energy security, critical infrastructure, strategic resilience, geopolitical threats, energy supply diversification

Introduction

In the context of deepening competition for strategic resources and a redefinition of the international order, the energy transition is becoming not only political and economic, but also geostrategic. Changing paradigms of energy production and consumption are determining new lines of division, alliances and tensions, redefining the classical notion of state security. In this dimension, energy policy is no longer the domain of technocratic strategies – it is becoming a field where the interests of states, international organisations and supranational actors clash.

The growing importance of renewable energy sources and the raw materials necessary for their development, such as lithium, cobalt or rare earths, highlights a new form of dependency, this time oriented around so-called ‘green supply chains’. Their control is becoming the subject of an intense geopolitical game, in which the advantage is not necessarily gained by the largest CO₂ emitters, but by those who can effectively manage access to the technology, know-how and raw materials necessary for the transformation.

In the face of these challenges, the EU and NATO are increasingly integrating energy issues into their strategic priorities, treating it as a foundation for systemic resilience and community political cohesion. The answer to the question of how energy policy translates into the ability to respond to hybrid threats, destabilisation of border regions or commodity pressures from authoritarian actors is becoming crucial for the future of the European and transatlantic security architecture.

This article attempts to identify and interpret these relationships in the context of current geopolitical processes, with a particular focus on the mechanisms implemented by the European Union and NATO. The analysis is based on the conviction that the energy transition is not an isolated phenomenon, but deeply embedded in the structure of contemporary international relations – becoming one of the key tools for redefining the global balance of power in the 21st century.

Methodological and methodical assumptions

The aim of this article is to analyse in detail the mechanisms and strategies adopted by the EU and NATO to strengthen resilience to the geopolitical threats accompanying the energy transition and to assess the impact of these actions on international security. The research question posed is how the mechanisms developed and strategies implemented enhance international stability and the effectiveness of these organisations’ responses to contemporary energy challenges. The study is based on an analysis of the literature on the subject, normative documents and statistical data, as well as historical and contemporary determinants of energy security policy. The methodology of the study includes a critical analysis of sources, a comparison of mechanisms and an assessment of their effectiveness in the context of current geopolitical developments. The analysis conducted allows for the identification of key

challenges and the definition of the role of these organisations in the global energy transition process. The structure of the article is designed to provide a holistic view of the issue – from an introduction to basic concepts and the embedding of the energy transition in the context of international security, to an analysis of specific strategies and mechanisms implemented by the EU and NATO. The different parts of the text cover both the strategic and operational perspectives of the measures taken.

Energy transition as an element of international security

Energy transition is one of the key elements of contemporary international security, as it reduces dependence on imported energy resources while diversifying supply. The European Union imported 90% of its natural gas by 2022, with as much as 45% coming from Russia.

This situation highlighted the strategic risks associated with such significant dependence on a single supplier. In response to these challenges, the implementation of the energy union was launched, including the construction of the LNG terminal in Swinoujście, which plays a key role in reducing the EU's energy dependence. This terminal is capable of receiving units of up to 150,000 m³ and regasification allows the volume of liquefied gas to be increased to around 600 m³ of mains gas. The importance of this infrastructure goes beyond the borders of Poland, also strengthening the energy security of the entire EU¹. One of the priorities within the energy transition strategy is the diversification of supply and the construction of energy rings, which include cooperation with Germany, Sweden and Lithuania. Such measures counteract the geopolitical risks arising from the dominance of a single supplier. The development of renewable energy is another important aspect that fits into the strategy of strengthening international security. In 2021, renewable energy accounted for 21.8 per cent of EU energy consumption, showing a growing trend towards decarbonisation. These actions highlight the EU's role as a leader in the fight against the climate crisis and strengthen the geopolitical stability of the region². The international impact of the energy transition can also be seen in the reduction of greenhouse gas emissions. In the EU, these emissions have decreased by 31% between 1990 and 2020, demonstrating the effectiveness of climate strategies.

Reducing emissions not only contributes to environmental protection, but also minimises conflicts over resources of traditional energy resources³. Investment in renewable energy sources positively impacts the global perception of the region as a leader in environmental action and promotes international stability⁴. However, the

1 T. Jerzyniak, *The EU De-Risking of Energy Dependencies: Towards a New Clean Energy Geopolitical Order? Politics and Governance*, 2024, p. 4.

2 P. Mickiewicz, *Determinants of the maritime security strategy of the Republic of Poland*, *Yearbook of Maritime Security*, 2013, VII, p. 302.

3 A. Pinkas, *Climate protection as a determinant of energy system integration*, *Folia Iuridica Universitatis Wratislaviensis*, 2022 11(2), p. 19.

4 A. Widuto, *Energy transition in the EU*, European Parliamentary Research Service, PE 754.623, Brussels 2023, p. 3.

challenges of the energy transition cannot be overlooked. The EU is highly dependent on imports of critical minerals such as lithium, cobalt and rare earths, 90% of which come from China. Forecasts indicate that demand for these minerals will triple by 2030 under a net zero emissions scenario. Such a situation poses not only a technical challenge, but also a strategic one, forcing the EU to develop a strategy to diversify its supply and establish international cooperation in order to reduce the risks arising from China's dominance⁵. The construction of critical infrastructure, including the LNG terminal in Swinoujście, is one of the EU's key actions to ensure energy security. Such investments strengthen the reliability of gas supply and increase the region's energy resilience. The EU additionally plans to step up investment in energy infrastructure to €530 billion per year by 2030. This reflects a commitment to long-term energy plans, which also require extensive international cooperation⁶. The development of modern technologies, such as hydrogen, is an important part of the region's independence from fossil fuels. The EU's hydrogen strategy aims to produce and import 20 million tonnes of hydrogen by 2030, strengthening its position in the global energy market⁷. The energy transition is also changing the global balance of power, reducing the importance of traditional energy commodities such as coal. For example, the share of coal in China's energy mix has fallen from 72.2% in 2000 to 60.4% in 2017, illustrating the global transformation of the energy sector⁸. Poland's energy policy also recognises the importance of natural gas as a key component of the energy transition. Burning natural gas produces almost twice as much carbon dioxide compared to oil or coal, making it a greener transition fuel. In 2005, Poland's natural gas production amounted to 4.3 bcm and allowed it to cover about 31% of the domestic demand for this fuel, which underlines the importance of domestic resources in ensuring energy security. It is also worth noting the projected global growth in natural gas consumption of 2.3% per annum, from 2442 bcm per annum in 2000 to a projected 4831 bcm per annum in 2030, illustrating the growing role of this resource in the global energy mix⁹. NATO also recognises the importance of the energy transition in the context of international security. As part of the NATO 2030 programme, the organisation is focusing on diversifying supply chains, protecting critical infrastructure and countering hybrid threats such as cyber attacks and disinformation. Intensive international cooperation, including joint monitoring and harmonisation of operations, is key to effectively countering such threats. NATO initiatives raise awareness of energy threats and strengthen the Alliance's position as

5 T. Jerzyski, *The EU De-Risking of Energy Dependencies: Towards a New Clean Energy Geopolitical Order? Politics and Governance*, 2024, p. 4.

6 J. Trubalska, *Energy Union – a key concept in EU energy policy*, Pulaski Policy Papers, 2015, p. 1.

7 A. Widuto, *Energy transition in the EU*, European Parliamentary Research Service, PE 754.623, Brussels, 2023, p. 5.

8 A. Wilgos, *The importance of the renewable energy sector in building China's energy security*, Doctoral dissertation, Poznań University of Economics, 2018, p. 3.

9 S. Rychlicki, J. Siemek, *Natural gas in the energy policy of Poland and the European Union*. *Energy Policy*, 2008 11(1), pp. 2-3, 9.

a key actor in the security area¹⁰. In summary, energy transition is a multidimensional process that not only contributes to strengthening international security, but also changes geopolitical dynamics on a global scale. Actions at EU and NATO level reflect the strategic importance of this transition in both regional and global contexts.

Mechanisms for building resilience to geopolitical threats

Diversification of energy sources is a key element of a strategy to increase resilience to geopolitical threats¹¹. An example of such efforts is the development of LNG infrastructure, including the Swinoujscie terminal, which allows for the regasification of liquefied natural gas up to 600 m³ per LNG unit. This type of investment reduces dependence on a single supplier, such as Russia, which supplied the European Union with 45% of its natural gas needs before 2022. As a result, the development of such projects not only strengthens energy security, but also enables a more flexible response to crises¹². As part of the NATO 2030 programme, extensive activities have been undertaken to protect and diversify energy supply chains.

Key activities include the identification of gaps in critical infrastructure and the intensification of joint initiatives between Alliance member states. In the face of geopolitical threats, such as potential energy supply disruptions, NATO is also increasing its commitment to promoting cooperation and monitoring potential threats in real time, an important step in building resilience¹³. Diversification of energy sources is also a key element of the European Union's climate policy. Investments in the renewable energy sector and the development of new technologies, such as green hydrogen production, are aimed at reducing greenhouse gas emissions and reducing dependence on fossil fuels. These activities not only support a sustainable energy transition, but also contribute to reducing geopolitical risks arising from the dominance of traditional raw material suppliers¹⁴. Monitoring private sector activities plays an important role in minimising losses from energy risks. The example of Indonesia, where the private sector is engaging in infrastructure investment, demonstrates the importance of publicprivate sector partnerships in ensuring energy stability. Such cooperation can also inspire other regions that face similar energy security challenges¹⁵. Investment in the development of critical infrastructure, including renewable energy sources and hydrogen technologies, is the foundation for building stability of energy supply. The European Union's strategy is to produce 10 million tonnes of

10 T. Nowak, *Building resilience to current and future hybrid threats*, *Roczniki Nauk Społecznych*, 2022 14(50)(4), p. 31, 37.

11 P. Mickiewicz, *Determinants of the maritime security strategy of the Republic of Poland*, *Yearbook of Maritime Security*, 2013, VII, p. 302.

12 T. Jerzyniak, *The EU De-Risking of Energy Dependencies: Towards a New Clean Energy Geopolitical Order? Politics and Governance*, 2024, p. 4.

13 T. Nowak, *Building resilience to current and future hybrid threats*, *Annals of Social Science*, 2022 14(50)(4), p. 31.

14 A. Widuto, *Energy transition in the EU*, European Parliamentary Research Service, PE 754.623, Brussels, 2023, p. 5.

15 M. Telus, *Quality of education in higher education with particular reference to non-public schools in Poland*, *Economy and Finance*, 2018 Zeszyt 9, p. 91.

hydrogen and import the same amount by 2030. This is a significant step towards the decarbonisation of the economy, which at the same time reduces the geopolitical risks arising from dependence on fossil raw materials¹⁶. Having an adequately developed infrastructure, such as the LNG terminal in Swinoujscie, is key to responding quickly and effectively to energy crises. An infrastructure base of this type is fundamental to national and regional strategies for building resilience to threats. The example of Poland shows that investments in energy infrastructure can significantly strengthen security at both national and international levels¹⁷. Modernising and securing key energy infrastructure requires significant financial investment. The European Union is planning investments of €530 billion per year until 2030 to meet the challenges of the energy transition. Securing adequate financial resources and using them efficiently is key to achieving security and energy stability objectives¹⁸. The experience of infrastructure management in the education and science sector can be a valuable resource for the energy sector. Diagnosing problems such as outdated structures or financial shortfalls allows better management of transformation processes in other sectors. Cooperation between different fields of knowledge can bring innovative solutions to global energy challenges¹⁹. Transatlantic cooperation within NATO plays an important role in countering cyber attacks and disinformation that affect the security of critical infrastructure. Monitoring threats and developing strategies to respond to adversaries' hybrid activities are crucial for NATO member states. Such projects strengthen the alliance's cohesion and highlight its role in building international security²⁰. The integration of energy policy with security policy within the EU and NATO contributes to strengthening resilience to energy disruptions. Examples of joint initiatives, such as conflict monitoring and taking stabilisation measures in sensitive regions, demonstrate the importance of a synergistic approach between the two domains. Effective international cooperation minimises risks and generates new opportunities in the face of global challenges²¹. Harmonisation of technological and regulatory standards through transatlantic cooperation supports the development of common defence mechanisms. These initiatives enable countries to create a unified framework for dealing with energy threats, which is crucial for the coherence of security strategies²². Considering the impact of migration on the strain on energy resources is important in the context of humanitarian crises. During the 2022 refugee crisis, it was noted how important it is to coordinate actions in the area

16 T. Jerzyniak, *The EU De-Risking of Energy Dependencies: Towards a New Clean Energy Geopolitical Order? Politics and Governance*, 2024, p. 4.

17 P. Mickiewicz, *Determinants of the maritime security strategy of the Republic of Poland*. *Maritime Security Yearbook*, 2013, VII, p. 302.

18 A. Widuto, *Energy transition in the EU*, European Parliamentary Research Service, PE 754.623, Brussels, 2023, p. 6.

19 M. Telus, *Quality of education in higher education with particular reference to non-public schools in Poland*, *Economy and Finance*, 2018 Zeszyt 9, p. 189.

20 T. Nowak, *Building resilience to current and future hybrid threats*, *Roczniki Nauk Społecznych*, 2022 14(50)(4), p. 37.

21 E. Bendyk, P. Buras, *Poland in the face of war, Poland in the post-war world*, Stefan Batory Foundation, 2022, pp. 1-3.

22 T. Nowak, *Building resilience to current and future hybrid threats*, *Roczniki Nauk Społecznych*, 2022 14(50)(4), p. 37.

of both social and energy infrastructure. The examples of countries such as Hungary and Romania point to the contribution of international cooperation to maintaining socio-economic stability²³. European Union regulations, such as directives on energy security, support the energy transition and the development of renewable energy sources. The increase of the RES share in the EU energy mix to 38% in 2020 confirms the effectiveness of these regulations. Further development of legislation in this area is necessary to meet future challenges²⁴. The EU's critical minerals policy requires strategic changes to diversify supply and reduce dependence on China. Projections indicating a threefold increase in demand for these minerals by 2030 highlight the importance of precise legal provisions that could secure mineral supplies and minimise geopolitical risks²⁵. Securing financing and developing mechanisms to support investment in renewables is one of the cornerstones of increasing resilience to energy supply disruptions.

Stable financing of energy projects enables the EU to meet its climate and economic targets²⁶. Think tanks, such as the Pulaski Foundation, provide invaluable analysis and recommendations to support precise energy policy planning. The influence of experts in defining strategic priorities contributes to more effective implementation of transformational programmes, as noted in research on international security²⁷. The integration of electricity systems between non-EU countries, as in the case of Ukraine in 2022, strengthens regional energy stability. Such initiatives reduce the effects of armed conflicts on regional energy security, while promoting further international cooperation²⁸. Regional projects such as the Baltic Pipe or cooperation within the Tri-Community are an important element in strengthening the geopolitical position of Central and Eastern Europe. They reduce the region's dependence on global suppliers of energy resources, while contributing to increased stability and security²⁹. The development of defence capabilities in Central and Eastern Europe is essential in the face of growing hybrid threats, including destabilising actions by Russia. Investment in regional defence mechanisms strengthens energy resilience and overall national security³⁰. Countries such as Hungary and Romania, which are supporting Ukrainian refugees, point to the benefits of international crisis cooperation. Integrating action during humanitarian crises affects the socio-economic

23 A. L. Dumitrescu, V. ConstanTIN, *The Socio-Economic Impact of Migration in the EU: In the Case of Ukraine Refugees*. Centre for European Studies Department, Institute for World Economy, Ministry of Internal Affairs, 2022, p. 10.

24 J. Pepe, *Geopolitics and Energy Security in Europe*, Friedrich-Ebert-Stiftung, 2022, p. 7.

25 T. Jerzysiak, *The EU De-Risking of Energy Dependencies: Towards a New Clean Energy Geopolitical Order? Politics and Governance*, 2024, p. 4.

26 A. Widuto, *Energy transition in the EU*, European Parliamentary Research Service, PE 754.623, Brussels, 2023, p. 5.

27 T. Pawluszko, *International security in the research of Polish think tanks. Yearbook of International Security*, 2014 8(2), p. 2.

28 E. Bendyk, P. Buras, *Poland in the face of war, Poland in the world after the war*, Stefan Batory Foundation, 2022, p. 4.

29 T. Nowak, *Building resilience to current and future hybrid threats*, *Roczniki Nauk Społecznych*, 2022 14(50)(4), p. 30.

30 I. Jankowska, *Energy security in the state security policy*, PWSZ IPIA Lubuskie Studies, 2015 Volume XI, p. 5.

stability of the region and can inspire future policies³¹. Promoting sustainable development through climate targets is another important step towards strengthening energy security. Reducing greenhouse gas emissions and reducing dependence on fossil fuels brings the European Union closer to achieving its strategic goals for the energy transition³². Raising the target for the share of renewables in the EU's energy mix to 40% by 2030 sets an ambitious direction for future action in energy policy. Such decisions accelerate the energy transition while minimising the economic risks arising from dependence on energy imports³³. Flexibility in energy policy is essential in the face of global energy market shocks. Investment in low-carbon technologies, such as green hydrogen, enables the European Union to adapt quickly to changing geopolitical conditions and also increases its resilience to such challenges³⁴. The support of regional cooperation and think tanks, such as the Pulaski Foundation, demonstrates the value of experts in harmonising energy policy. Their analyses and recommendations contribute to building more coherent and effective strategies at the international level³⁵. In summary, comprehensive efforts to build energy resilience, including investment in RES, protection of critical infrastructure, international cooperation and diversification of energy supply sources, underpin effective energy security policies and strengthen the ability of states and international organisations to respond to contemporary geopolitical threats.

Summary

The aim of this article was to analyse the mechanisms and strategies implemented by the European Union and NATO in the context of the energy transition and its impact on international security. The considerations presented focused on showing the multidimensionality of the energy transition process and its strategic importance in the dynamically changing geopolitical realities. Issues of energy dependence, the growing importance of renewable energy sources, the challenges of critical minerals and the role of international organisations in building resilience to geopolitical threats were addressed. The analysis has shown that energy transition not only strengthens energy security, but also contributes to international stability by reducing the risk of conflict and limiting the influence of dominant states in traditional energy sectors. The results presented indicate that the aim of the thesis has been achieved and that the research questions posed have been addressed in detail. Energy transition is a key

31 A. Dumitrescu, V. ConstanTIN, *The Socio-Economic Impact of Migration in the EU: In the Case of Ukraine Refugees*, Centre for European Studies Department, Institute for World, Economy, Ministry of Internal Affairs, 2022, p. 11.

32 B. Fortunski, *Global justice and the energy policy of the European Union*. In O. Janikowska & J. Słodczyk (eds.), *Global justice*, University of Opole Publishing House, 2016, p. 9.

33 J. Pepe, *Geopolitics and Energy Security in Europe*, Friedrich-Ebert-Stiftung, 2022, p. 7.

34 A. Cherp, J. Jewell, *Energy security assessment framework and three case-studies*, In H. Dryer, & M. J. Trombetta (eds.), *International Energy Security Handbook*, Edward Elgar Publishing, 2013, p. 12.

35 T. Pawłuszko, *International security in the research of Polish think tanks*, *International Security Yearbook*, 2014 8(2), p. 13.

element of the European Union's security policy, as evidenced by measures such as the development of energy infrastructure, investment in renewable energy sources and the promotion of low-carbon technologies. The implementation of projects such as the LNG terminal in Świnoujście has significantly reduced regional dependence on a single supplier, which is a fundamental step in building resilience to geopolitical threats. At the same time, the dynamic development of renewable energy contributes to the decarbonisation of the economy, highlighting the role of the EU as a leader in green action on the international stage. In this context, the energy transition not only improves the region's energy stability, but also shapes the image of the EU as a key actor in the fight against the climate crisis. One important conclusion of the analysis is the noticeable reduction in dependence on traditional raw material suppliers such as Russia, which has significantly influenced the geopolitical balance of power. Diversification of energy sources and investments in critical infrastructure, such as the Baltic Pipe, further reduce the dominance of countries such as Russia and strengthen the position of Central and Eastern Europe on the global energy map. At the same time, the North Atlantic Alliance, as part of the NATO 2030 initiative, is focusing on protecting critical infrastructure, countering hybrid threats and fostering transatlantic cooperation, all of which contribute to an increased level of international security in the energy context. While NATO has so far been seen mainly as a military alliance, it is now playing an increasingly important role in countering energy-related threats, thus making a significant contribution to the issue at hand. The challenges identified in the article, related to the growing demand for critical minerals such as lithium or cobalt and their monopolistic control by China, highlight the need to develop European raw material strategies. The projected threefold increase in demand for these raw materials forces the EU to develop diversification policies and intensify cooperation with other regions of the world. These issues point to the need to further strengthen efforts to secure access to critical minerals, which are becoming the cornerstone of the energy transition towards green energy. Similarly, the importance of hydrogen technologies was highlighted as a promising solution for decarbonisation and decoupling from fossil fuels, further enhancing the region's energy sustainability. The analysis of the results in the context of existing research shows consistency with previous studies on the importance of reducing greenhouse gas emissions and increasing the share of RES in the energy mix. However, unlike many previous publications, this paper considers the role of NATO in building energy resilience, which brings a new perspective to the existing literature. The threads taken up in the paper on the integration of energy policy with security policy at the regional and transatlantic level provide a better understanding of the interdependencies between these domains. The findings show that the energy transition, despite its challenges, has been effective in stabilising the international situation, demonstrating the effectiveness of actions taken by both the European Union and NATO. Some limitations were highlighted during the development of the article, such as the limited availability of up-to-date figures on the impact of recent NATO and EU

actions on global energy security. Some conclusions were based on forecasts, which makes them susceptible to future volatility due to dynamically changing geopolitical circumstances.

In addition, the article focuses mainly on the actions of the EU and NATO, which may overlook the potential contributions of other international actors. All these aspects suggest the need for further research that could deepen the analysis of the role of other international organisations and countries outside the discussed structures in the energy transition process. In the long term, it would also be advisable to study the effects of the energy transition on the balance of power in the international system and the role of cross-sectoral cooperation in overcoming energy security challenges. It would be particularly important to develop an analysis of the growing demand for critical minerals and its impact on global power balances, as well as to explore the effectiveness of EU and NATO cooperation in countering hybrid threats. Further exploration of these issues will help to develop a more comprehensive vision of the energy transition as a tool not only to reduce emissions and combat the climate crisis, but also to strengthen international security.

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