Research Article

TRANSATLANTIC REGION: WHERE ENERGY SECURITY MEETS GREEN TRANSITION IN A GEOPOLITICALLY TURBULENT WORLD

DOI: 10.58867/LEXK7384

This study provides an analysis of the pathways through which the landscape of Transatlantic energy security has been changing. These pathways are marked by recent geopolitical crises and two outstanding challenges: strengthening energy security and achieving the green transition. The Ukraine war and rising tensions in the Middle East have once more demonstrated how fragile global supply chains are due to their dependence on Russian natural gas and reliance on oil from the Middle East. These crises have brought up the urgent need for energy diversification, with renewable energy being at the center and a strategic means of reducing geopolitical risks in this context. It also analyses how the recent developments have redefined the Transatlantic region's energy-related perspectives, especially how the United States and the European Union cooperate to ensure energy supplies while accelerating the transition toward sustainable

Mehmet Efe Biresselioglu*

Keywords: Energy Security, Green Transition, Transatlantic Cooperation, Geopolitics, Diversification.

TPQ
Summer 2024
Change, Security, and Sustainability in Energy

* Professor Mehmet Efe Biresselioğlu is a Distinguished Professor of Energy Policy at the İzmir University of Economics, where he serves as the founding Dean of the Graduate School, Head of the Sustainable Energy Division and the Principal Investigator of SENLAB.

Energy security and green transition are currently two of the most urgent challenges in many countries of the Transatlantic region. In this regard, climate change and dependence on fossil fuels have prompted the transatlantic drive toward a low-carbon economy in recent years, especially on the European side. Yet all these efforts are being stretched out simultaneously in an increasingly unstable geopolitical environment with increased tensions, wars, conflicts, and trade disruptions that may destabilize the world energy markets.

The Russian invasion of Ukraine, the sanctions against significant exporters of fossil fuels, and the disruption of critical material supply chains have put up the vulnerabilities that are always part of traditional energy systems. These geopolitical crises have also brought the importance of a more resilient and diversified energy portfolio that meets near-term energy security needs and accelerates the transition toward sustainable renewable energy sources.

In the meantime, the Middle East is affected by the current conflicts, such as the Israel-Hamas conflict, that threaten the stability of the regions with rich oil reserves and, thus, the global energy supply. Given the significant role of the Middle East in the global oil market, any disruption in this region has the potential to escalate and impact the global energy market. These crises, resulting in volatility in oil prices, highlight the urgent need for all countries to reduce their dependence on fossil fuels by shifting towards renewable energy sources.

Put together, these crises sharpen the focus toward energy diversification and the development of a resilient and sustainable energy infrastructure in the Transatlantic space. Now more than ever, nations should balance preserving near-term energy security and accelerating the green transition. Indeed, only some issues are pressing the international community more urgently than how to secure energy supplies during crisis periods without turning back to climate-harming policies.

Accordingly, this study responds to twin challenges that puzzle energy security and simultaneously manage the green transition at the Transatlantic level in the face of growing geopolitical instability. The discussion will range from diverse pathways toward supply security and fluctuating geopolitical power dynamics in the age of renewables through international cooperation to emphasize a safe and sustainable energy future. Understanding this unpredictable interplay of forces will make the navigational path to a more resiliency-secure and sustainable global energy system easier.

The Importance of Energy Diversification

The global energy outlook has been considerably altered in the 21st century. Herewith, the concept of energy security has evolved to become multidimensional, as opposed to the traditional perspective that focuses on the security of supply.[1,2] According to the traditional perspective, energy security is limited to the availability and reliable supply of fossil fuels from stable sources. Recent geopolitical tensions have emerged to demonstrate such approaches as fragile and accelerated the need to diversify the energy supply, highlighting the role of renewable energy sources.

Among the essential takeaways from the recent geopolitical situations around the world, like what has been happening with Ukraine and the ongoing war, is that energy supply chains can easily be at the mercy of political instability. Following the invasions of Ukraine in 2022, for instance, the EU was found to be deeply reliant upon Russian natural gas, where more than 40 per cent of its imports emanated from Russia.[3] In turn, setting sanctions against Russia and the action that Russia took against Europe became an extreme energy crisis that exposed the risk caused by over-dependency on one supplier.[4]

However, this crisis also highlighted the necessity to diversify energy sources, both in terms of the type of energy used and the geographical locations of suppliers. It has become more evident in the recent case of Europe with Russia that dependence on a few key suppliers, irrespective of geographical proximity and political orientation, presents a risk to energy security.[5]

Accordingly, immediately after the conflict, Europe tried to find alternative energy sources. The EU then proposed a series of emergency measures, including an ambitious REPowerEU plan, formulated to gradually reduce the EU's dependence on Russian fossil fuels by diversifying supply chains and speeding up the deployment of renewable energy.[6] For instance, LNG imports from the U.S. and Qatar increased,[7] and

1) D. Yergin, Ensuring Energy Security. *Foreign Affairs*, Vol. 85, No. 2 (2006): p. 69. See https://doi.org/10.2307/20031912

2) For more details, see D. Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Free Press, 2008).

3) European Council. (2024a, March 21). "Where does the EU's gas come from?" Retrieved on 14 September 2024. See https://www.consilium.europa.eu/en/infographics/eu-gas-supply/

4) European Council. (2024b, September 30). EU sanctions against Russia explained. Retrieved on 14 October 2024. See https://www.consilium.europa.eu/en/policies/sanctions-against-russia/sanctions-against-russia-explained/

5) J. Jedrych, "The EU Needs Alternatives to Russian Energy. Here's the Plan," Council on Foreign Relations, 13 December 2022. Retrieved on 14 October 2024. See https://www.cfr.org/in-brief/eu-needs-alternatives-russian-energy-heres-plan

6) European Commission, "REPowerEU: Affordable, secure and sustainable energy for Europe," 18 May 2022. See https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

7) A. Loskot-Strachota, U. Keliauskaite and G Zachmann, "Future European Union Gas Imports: Balancing Different Objectives," Bruegel, 3 July 2024. See https://www.bruegel.org/analysis/future-european-union-gas-imports-balancing-different-objectives

in the short term, European countries burned more coal to avoid blackouts.[8] However, this response stressed the importance of the political balance governments will have to walk between energy security and standing true to commitments to climate change.

Renewable energy, such as wind, solar, and traditional hydropower, uniquely enhances energy security by reducing reliance on imported fuels. In contrast to fossil fuels, the supplies of which are often concentrated regionally and primarily under unstable political regimes, renewable energy resources are available globally. This availability enables almost every country, in one way or another, to derive substantial energy supplies from indigenous renewable sources and thereby reduce its vulnerability to external disruption.

The European Green Deal, for example, aims to make the EU climate-neutral by 2050 and strongly emphasizes enhancing energy security by increasing renewable energy production.[9] Investing in wind, solar, and hydrogen technologies would help the EU break its dependence on energy supplies often linked to geopolitical risks. In this respect, renewable energy forms an indispensable building block of a low-carbon supply of diversified energy sources.

Switching to a more diversified energy portfolio based on renewable sources is full of challenges. The main problem is that, unlike fossil fuels, renewable energy, especially wind and solar, is intermittent, depending on weather conditions.[10,11,12] Therefore, countries should be willing to invest in emerging technologies related to renewable energy development, modernize their energy grids and improve interconnection with neighboring states.

Cross-border interconnections stabilise renewable energy supply by transferring surplus electricity from one region to another with higher demand.[13,14,15] Indeed, in

8) Eurostat, "Coal Production and Consumption Up in 2022," 22 June 2023.
See https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20230622-2

9) European Commission, The European Green Deal: Striving to be the First Climate-Neutral Continent, 2019.
See https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

10) K. Van Der Wiel, L. Stoop, B. Van Zuijlen, R. Blackport, M. Van Den Broek and F. Selten, "Meteorological Conditions Leading to Extreme Low Variable Renewable Energy Production and Extreme High Energy Shortfall," *Renewable and Sustainable Energy Reviews*, Vol. 111 (2019): p. 261–275. https://doi.org/10.1016/j.rser.2019.04.065

11) S. Mosquera-López and J. M. Uribe, "Pricing the Risk due to Weather Conditions in Small Variable Renewable Energy Projects," *Applied Energy*, Vol. 322 (2022): p. 119476. https://doi.org/10.1016/j.apenergy.2022.119476

12) R. Meenal, D. Binu, K. C. Ramya, P. A. Michael, K. V. Kumar, E. Rajasekaran and B. Sangeetha, "Weather Forecasting for Renewable Energy System: A Review," *Archives of Computational Methods in Engineering*, Vol. 29, No. 5 (2022): p. 2875–2891. https://doi.org/10.1007/s11831-021-09695-3

13) G. Escribano, C. González-Enríquez, L. Lázaro-Touza and J. Paredes-Gázquez, "An Energy Union without Interconnections? Public Acceptance of Cross-Border Interconnectors in Four European Countries," *Energy*, Vol. 266 (2022): p. 126385. https://doi.org/10.1016/j.energy.2022.126385

14) R. Poudineh and A. Rubino, "Business Model for Cross-Border Interconnections in the Mediterranean Basin," *Energy Policy*, Vol. 107, (2017): p. 96–108. https://doi.org/10.1016/j.enpol.2017.04.027

15) L. M. Abadie and J. M. Chamorro, "Evaluation of a Cross-Border Electricity Interconnection: The Case of Spain-

2022, the EU launched a revised Trans-European Networks for Energy action plan and regulation to increase interconnectivity between states, allowing it to utilise its base of renewable energy resources efficiently.[16] This action plan become especially relevant in the context of enhanced reliance on renewable energy sources by countries requiring flexibility and integration in this grid due to the instability of energy generation.

Although renewable energy is the key to the goal of long-term energy security,[17,18] many countries across the Transatlantic region face the need for a variety of energy mixes during this period. Nuclear energy, for example, has gained attention since it constitutes a low-carbon and stable source that complements renewable energy supply in the energy transition.[19,20] Therefore, France represents an excellent example of how nuclear energy, which currently generates more than 70 percent of the country's electric power, could balance energy security with reducing carbon emissions.[21]

Apart from nuclear, natural gas supplies - particularly in liquefied form, LNG - are seen as a transition fuel.[22,23] Natural gas is a fossil fuel but produces much less CO^2 emissions than coal and oil.[24] The U.S. - now the biggest exporter of LNG globally - has also increased its supplies to Europe to compensate for the shortfall caused by a steep fall in Russian gas supplies.[25] This changeover will demonstrate how LNG can be crucial to stabilizing energy supplies while transitioning to an entirely renewable energy system.

France," *Energy*, Vol. 233, (2021): p. 121177. https://doi.org/10.1016/j.energy.2021.121177

16) European Commission, "Trans-European Networks for Energy: EU Policy for Planning Cross-Border Energy Infrastructure," (June 2022).Retrieved on 14 October 2024. See https://energy.ec.europa.eu/topics/infrastructure/trans-european-networks-energy_en

17) K. Khan, C. W. Su, A. Khurshid and M. Qin, "Does Energy Security Improve Renewable Energy? A Geopolitical Perspective," *Energy*, Vol. 282 (2023): p. 128824. https://doi.org/10.1016/j.energy.2023.128824

18) S. V. Valentine, "Emerging Symbiosis: Renewable Energy and Energy Security," *Renewable and Sustainable Energy Reviews*, Vol. 15, No. 9 (2011): p. 4572–4578. https://doi.org/10.1016/j.rser.2011.07.095

19) Q. Wang, J. Guo, R. Li and X. Jiang, "Exploring the Role of Nuclear Energy in the Energy Transition: A Comparative Perspective of the Effects of Coal, Oil, Natural Gas, Renewable Energy, and Nuclear Power on Economic Growth and Carbon Emissions," *Environmental Research*, Vol. 221, (2023): p.115290. https://doi.org/10.1016/j.envres.2023.115290

20) M. Mathew, "Nuclear Energy: A Pathway Towards Mitigation of Global Warming," *Progress in Nuclear Energy*, Vol. 143 (2021): p. 104080. https://doi.org/10.1016/j.pnucene.2021.104080

21) World Nuclear Association, "Nuclear Power in France," 21 May 2024. Retrieved on 14 October 2024. See https://world-nuclear.org/information-library/country-profiles/countries-a-f/france

22) C. Gürsan and V. De Gooyert, "The Systemic Impact of a Transition Fuel: Does Natural Gas Help or Hinder the Energy Transition?" *Renewable and Sustainable Energy Reviews*, Vol. 138 (2020): p. 110552. https://doi.org/10.1016/j.rser.2020.110552

23) R. F. Aguilera and R. Aguilera, "Revisiting the Role of Natural Gas as a Transition Fuel," *Mineral Economics*, Vol. 33, No. 1–2 (2019): p. 73–80. https://doi.org/10.1007/s13563-019-00192-5

24) R. J. Kuhns and G. H. Shaw, "Coal and Natural Gas," in *Navigating the Energy Maze: The Transition to a Sustainable Future* (Cham: Springer, 2018).

25) International Gas Union. "2024 World LNG Report," (2024). Retrieved on 14 October 2024. See https://www.igu.org/resources/2024-world-lng-report/

While the conflict in Ukraine most directly affected natural gas markets, recent tensions in the Middle East have been putting pressure on international oil supplies. The escalation of conflict between Israel and Hamas- and ongoing turmoil in other nations such as Iran and Syria- has raised concerns that supply disruptions in oil production and transport could occur.[26],[27] The Middle East remains one of the world's most important sources of oil supplies, accounting for about 30 percent of total global production.[28] Any conflict that challenges the stability of the oil-rich countries or the security of crucial transport routes-as a sample, the Strait of Hormuz-would have dramatic impacts on world energy prices.

The geopolitical turmoil of recent years has gone a long way in making clear that energy diversification is a necessity rather than a choice for energy security. As important as renewable energy will be at the heart of such energy diversification, one completed with modernized grids, energy storage, and complementary low-carbon technologies-including nuclear and LNG-will be required to build a resilient energy system. Most of all, the Transatlantic region can lead the way during this transformation and serve as a good example of how energy security might look when combined with green transition in today's world, facing growing volatility.

Geopolitics of Green Transition

The green transition will redefine economies and geopolitics. Conventionally, countries like Saudi Arabia and Russia, which are well endowed with fossil fuel resources, enjoy high geopolitical power since they control global energy supplies.[29,30] That is rapidly changing. The world is turning toward renewable energy. New players in the global energy marketplace are emerging as countries rich in renewable resources, including wind and solar, develop.

During the New Energy era, countries with the most favorable solar and wind climatic conditions would rise to prominence. For instance, Denmark rose to global leadership in wind energy and created new geopolitical alliances based on renewable energy competence. It was made possible through the Danish government's investment in

26) A. Chu, J. Smyth and T. Wilson, "Oil Prices Climb as Iran Missile Attack Prompts Supply Fears," Financial Times, 2 October 2024. Retrieved on 14 October 2024. See https://www.ft.com/content/6ce80cfd-19f9-4798-9980-a57cbfe87c35

27) A. Cornwell, M. Spetalnick and J. Saul, "Countdown to Middle East War? How the Region can step back from the Brink," Reuters, 4 October 2024. Retrieved on 14 October 2024. See https://www.reuters.com/world/middle-east/countdown-middle-east-war-region-can-step-back-brink-2024-10-04/

28) Energy Institute. "72nd Statistical Review of World Energy," (2023). Retrieved on 15 October 2024. See https://www.energyinst.org/__data/assets/pdf_file/0004/1055542/EI_Stat_Review_PDF_single_3.pdf

29) M. Bradshaw, T. Van De Graaf and R. Connolly, "Preparing for the New Oil Order? Saudi Arabia and Russia," *Energy Strategy Reviews*, Vol. 26 (2019): p. 100374. https://doi.org/10.1016/j.esr.2019.100374

30) M. Blondeel, M. J. Bradshaw, G. Bridge and C. Kuzemko, "The Geopolitics of Energy System Transformation: A Review," *Geography Compass*, Vol. 15, No. 7 (2021). https://doi.org/10.1111/gec3.12580

both the technology and infrastructure of wind energy, making it a net exporter of wind power technologies and know-how and, thus, a country to be given the leading role in the green energy revolution.[31]

The same thing could be said regarding how the countries in the Transatlantic region, particularly the United States and parts of Europe, would seek to use their indigenous resources and technology know-how to their advantage in leading the green transition. For example, the U.S. invests heavily in solar power, and states like California and Texas have become pivotal players in producing solar energy.[32] It is about technology and creating a new geopolitical order based on sustainable energy resources.

Countries can now become more energy-independent and not depend too much on oil, coal, and other fossil fuels. In the process, increased energy independence decreases their vulnerability to external economic energy shocks caused by geopolitical conflicts, which may be observed from the current crisis in Ukraine. Germany, for instance, has a policy supporting the green transition called Energiewende, designed to make the country less dependent on imported energy and, at the same time, less vulnerable to geopolitical blackmail.[33] Germany is working on becoming a more self-sufficient energy actor by investing in wind, solar energy, and, recently, hydrogen.

As green energy starts to take center stage in global energy systems, countries already investing and leading green technological development will have the upper hand in the new energy order.

Balancing Green Transition with Immediate Energy Needs

While the green transition will be as vital for sustainability and energy security in the long term, immediate needs have often prevailed to force countries' hands in the face of geopolitical turmoil. Short-term energy security is becoming increasingly opposed to more long-term green goals, especially in regions like Europe, where ongoing energy crises are putting green transition plans to the test.

Most economies, especially emerging ones, still depend on fossil fuels. While renewable energy capacity is increasing, there is still a significant dependency on fossil fuels.[34] This paradox suggests that if countries are to have energy security in

31) Johansen, (2021).

32) American Clean Power. "Clean Power Quarterly Market Report | Q2 2024," (2024). Retrieved on 15 October 2024. See https://cleanpower.org/resources/clean-power-quarterly-market-report-q2-2024-2/

33) Agora Energiewende, "What is the German Energiewende?" (25 March 2024). Retrieved on 15 October 2024. See https://www.agora-energiewende.org/about-us/the-german-energiewende/q1-what-is-the-german-energiewende

34) M. Igini, "Fossil Fuels Accounted for 82% of Global Energy Mix in 2023 Amid Record Consumption: Report," Earth.org (26 June 2024). Retrieved on 15 October 2024. See https://earth.org/fossil-fuel-accounted-for-82-of-global-energy-mix-in-2023-amid-record-consumption-report/#:~:text=Our%20%E2%80%9Cenergy%20hungry%E2%80%9D%20world%20chewed,latest%20report%20on%20world%20energy

the short run, they may need to increase their fossil fuel use while working towards long-term decarbonization.

Following the Ukraine war, countries looking to phase out coal and reduce reliance upon natural gas suddenly found themselves in an energy crisis. The need to secure immediate energy supplies threw them into a no-easy choice.[35] One of the severe tensions that arises from the need to balance green transition with immediate needs is the supply of renewable energy sources. Unlike fossil fuels, renewables cannot provide a base load for energy supply, which has meant significant investments in energy storage technologies and grid infrastructure are required to populate adequate energy sources. The energy crisis in 2022-2023 has been heavily weighing upon the European energy grid because renewables alone could not produce the sudden spike in demand caused by the reduced supplies of Russian gas.[36]

This crisis has made the significance of energy storage systems and the need to modernize the existing grids to address the intermittent nature of renewable energy production even more evident. Such infrastructural issues need to be resolved to achieve a resilient energy system where short-term energy crises can be alleviated without jeopardizing long-term green transition targets.

The Role of Sanctions and Related Trade Disruptions

One of the most common tools that help in geopolitical strategy is sanctions and related trade disruptions.[37,38] However, their interaction with the energy security dimension has reached a new qualitative level in the context of the green transition, as demonstrated by the recent conflicts and sanctions targeting major exporters of fossil fuels that impact the whole energy market. Such sanctions exacerbate the existing vulnerabilities, highlighting the need for diversification and resilience of energy systems.

The most classic example of how trade disruptions may destabilize energy markets is the 2022 Russian invasion of Ukraine and the associated sanctions imposed on Russia. Sanctions against one of the world's largest oil and natural gas suppliers cut off its supplies to Europe and other countries. The consequences were harsh for Europe, which had to change its energy sources quickly and turn to alternative suppliers such

35) M. Ringel, M. Knodt and N. Bruch, "Secure and Sustainable? Unveiling the Impact of the Russian War on EU Energy Governance," in C. Wiesner & M. Knodt (Eds.), *The War Against Ukraine and the EU: Facing New Realities* (Palgrave Macmillan, 2024): p. 133-161.

36) D. Ah-Voun, C. K. Chyong and C. Li, "Europe's Energy Security: From Russian Dependence to Renewable Reliance," *Energy Policy*, Vol. 184, (2023): p. 113856. https://doi.org/10.1016/j.enpol.2023.113856

37) K. Barbieri, "Geopolitics and International Trade", in Z. Cope (eds) *The Palgrave Handbook of Contemporary Geopolitics* (Palgrave Macmillan, Cham, 2024). See https://doi.org/10.1007/978-3-031-25399-7_49-1

38) V. Jakupec, "The Sanctions Wars: Impacts and Consequences," in: *Dynamics of the Ukraine War. Contributions to International Relations* (Springer, Cham, 2024). See https://doi.org/10.1007/978-3-031-52444-8_5

as the United States and Qatar for LNG supplies.[39]

While these sanctions were meant to reduce influence and power geopolitically for Russia, they also created this unintended consequence of inflated energy prices worldwide and shortages in key European markets.[40] A scenario like this now demonstrates how vulnerable the regions relying on particular suppliers are. This would link the importance of energy diversification in mitigating future trade disruptions' impacts.

Sanctions and trade disruptions will affect the supply chains of crucial materials needed for the green transition.[41] Typical examples of renewable energies using these materials include wind turbines and solar panels, with electric vehicles dependent on rare earth elements, among other critical minerals. It often involves production in just a handful of countries, and China already controls the global supply of rare earth elements. The geopolitical tension between China and the Transatlantic region could lead to trade restrictions that create supply disruptions for that material, undermining the pace of green transition.[42,43,44]

Only in the face of such risks have countries begun to diversify supply chains, develop domestic capacity for production, and recycle these critical materials. This will be important in the future, as geopolitical conflicts will not impede the green transition.

Transatlantic Cooperation for Sustainable Energy Security

Transatlantic cooperation is increasingly becoming one of the cornerstones of energy policy in Europe and North America, with challenges going from energy security to the green transition. Accordingly, the two sides of the Atlantic have been working together much more than before, notably on issues such as the development of renewable energy, energy storage technologies, and grid modernization to reduce dependency on fossil fuels while ensuring the security of energy supply.

39) Y. Chen, J. Jiang, L. Wang and R. Wang, R. "Impact Assessment of Energy Sanctions in Geo-Conflict: Russian–Ukrainian War," *Energy Reports*, Vol. 3 (2023): p. 3082–3095. https://doi.org/10.1016/j.egyr.2023.01.124

40) J. Schott, "Economic Sanctions Against Russia: How Effective? How Durable?" Peterson Institute for International Economics Policy Brief, No. 23-3, 13 April 2023. Available at https://ssrn.com/abstract=4431076

41) International Renewable Energy Agency, "Geopolitics of the Energy Transition: Energy Security," (April 2024). Retrieved on 15 October 2024. See https://www.irena.org/Digital-Report/Geopolitics-of-the-Energy-Transition-Critical-Materials#way-forward

42) J. Mardell, "Transatlantic Strategy on Critical Raw Materials," Heinrich Böll Foundation (March 2024). Retrieved on 15 October 2024. See https://us.boell.org/sites/default/files/2024-03/transatlantic-strategy-on-critical-raw-materials.pdf

43) R. Jorge, "Geopolitical Risk: Raw Materials and Technological Dependence," Elcano Royal Institute, 15 March 2023. Retrieved on 15 October 2024. See https://www.realinstitutoelcano.org/en/commentaries/geopolitical-risk-raw-materials-and-technological-dependence/

44) G. A. Casanova, "Rare Earths: Is There Room for a Western Alternative to China?" The Italian Institute for International Political Studies, 5 August 2021. Retrieved on 15 October 2024. See https://www.ispionline.it/en/publication/rare-earths-there-room-western-alternative-china-31344

Traditionally focused on military defense, NATO has increasingly realized energy security as a strategic concern. In the last few years, the alliance has extended the scope to include resilience in energy supply, emphasizing relevant cyber-attacks against energy infrastructures and the vulnerability of the energy supply chain, considering geopolitical conflicts.[45] The interest shown by NATO highlights an increasing awareness that energy security is not exclusively an economic issue but also one of national and regional security.

For instance, critical infrastructure vulnerabilities have been the subject of substantial studies through the contribution of the NATO Energy Security Centre of Excellence based in Lithuania.[46] In light of events in Ukraine, protecting energy systems from physical and cyber disruptions and boosting energy efficiency in member states' green technologies has become the center's number one priority.

Other evidence supporting transatlantic cooperation includes the U.S.-EU Energy Council, another venue for regular cooperation in enhancing energy security and the green transition.[47,48] The Council was established in 2009 and has been one of the leading platforms for advances in renewable energy development, energy efficiency, and innovation in clean energy technologies since then. It also remains exceedingly relevant to coordinating responses through the U.S.-EU Energy Council to the current energy crisis brought on by the Ukraine conflict- to reduce Europe's dependence on Russian energy imports and accelerate the deployment of renewables.

This cooperation has strengthened the Transatlantic Alliance and set an example of how significant economies can cooperate in energy security and sustainability efforts. Given the existing geopolitical difficulties with stable and secure energy supplies, Europe and North America will decide on the further development of the green transition by closely cooperating.

Concluding Remarks

The crises in Europe and the Middle East have shaped the Transatlantic energy security perspective of the 21st century. These crises have revealed the fragility of the current energy system structure and emphasized geopolitical risks such as the

45) A. Bocse, "NATO, Energy Security and Institutional Change," *European Security*, Vol. 29, No. 4 (2020): p. 436–455. https://doi.org/10.1080/09662839.2020.1768072

46) NATO Allied Command Transformation. "NATO Centres of Excellence – Energy Security (ENSEC COE)," 28 August 2023. Retrieved on 15 October 2024. See https://www.act.nato.int/article/nato-centres-of-excellence-energy-security-ensec-coe/

47) Office of International Affairs. (n.d.). "U.S. - EU Energy Council," Energy.gov. Retrieved on 15 October 2024. See https://www.energy.gov/ia/us-eu-energy-council

48) European Commission, "United States of America: EU-U.S. Cooperation on Energy Issues," Retrieved on 15 October 2024. See https://energy.ec.europa.eu/topics/international-cooperation/key-partner-countries-and-regions/united-states-america_en

strong dependence on fossil fuels and the respective need to speed up the integration of renewables in the energy system. Since the Transatlantic cooperation area has been trying to find its way through these challenges, it goes without saying that energy security will continue to be one of the most important decisive factors in policymaking.

A new age of energy politics across the Transatlantic region is, bar none, intermingled: energy security linked with the green transition and geopolitical tensions. Indeed, energy diversification has never been so in evidence as it is now, with countries working toward securing reliable supplies amidst conflict and sanctions. Renewable energy is now increasingly seen as the key ingredient in reducing many risks associated with a classical reliance on fossil fuels, providing greater energy independence and resilience. However, decreasing carbon emissions in a low-carbon economy is a highly complex process requiring nations to balance short-term energy needs against long-term sustainability goals.

Added to this complex transition in energy issues, geopolitical conflicts and disrupted trade might affect the international supply chains, especially critical materials related to renewable technologies. In this context, Europe and North America prioritize strengthening their energy security and accelerating their green transition, making transatlantic cooperation even more critical. Key actors such as NATO and the U.S.-EU Energy Council promote this cooperation and pave the way for a more secure and sustainable energy system.

It will depend on which countries can manage increasingly complex geopolitical tensions and invest in infrastructure, technologies, and policies to advance toward a green transition rapidly. In this regard, the Transatlantic region can lead the world toward a future wherein energy security goes hand in hand with sustainability, even during global uncertainty, foster more international collaboration, and embrace innovative solutions.