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EU energy diplomacy: The Central Asian vector

Abstract. This study gains particular importance in the context of global geopolitical challenges to energy security and the need to diversify energy sources in Europe. The purpose of this study was to provide a comprehensive analysis of the EU's energy diplomacy in the Central Asian region. The study employed the methods of analysis, synthesis, systematisation, comparative studies, statistical analysis, and generalisation. The study found that Central Asian countries, specifically Kazakhstan, Turkmenistan, and Uzbekistan, have considerable hydrocarbon reserves and strong renewable energy development potential, making them key partners for the EU in ensuring energy security and diversifying energy sources. The study found that the EU's energy diplomacy in Central Asia is implemented through a range of bilateral and multilateral mechanisms, but faces serious challenges, such as geopolitical competition, underdeveloped infrastructure, political instability, and imperfect legal regulation of the energy sector in the region. Based on these findings, recommendations were developed to strengthen strategic partnerships, intensify investment activities, harmonise legal regulation and implement international standards, as well as develop renewable energy and improve energy efficiency within the framework of EU cooperation with Central Asian partners. The practical significance of this study lies in the fact that its findings and recommendations can be used to improve the EU's energy strategy, develop effective mechanisms for cooperation with Central Asian countries and build a mutually beneficial partnership in the energy sector, which will contribute to strengthening energy security, sustainable development, and prosperity of both Europe and Central Asia in the long term

Keywords: diversification of supply; hydrocarbon resources; strategic partnership; geopolitical challenges; investment activity; legal regulation

Introduction

The European Union's energy diplomacy in the Central Asian region is becoming increasingly important in the context of global challenges of energy security and diversification of energy sources. Rich in hydrocarbon resources, Central Asia plays a key role in ensuring energy stability and sustainable development in Europe. However, despite the strategic importance of the region, energy cooperation between the EU and Central Asian countries faces a range of challenges that require in-depth investigation and analysis.

The need to study the EU's energy diplomacy in the Central Asian vector is conditioned by a range of factors. First and foremost, Europe's growing dependence on energy imports is prompting the search for alternative sources of supply and the development of strategic partnerships with producing countries. The geopolitical competition for influence in Central Asia between the world's leading actors, including Russia, China, and the United States, complicates the implementation of energy projects and

requires the EU to develop an effective diplomatic strategy. This issue has become particularly acute in the context of the Russian-Ukrainian war, which has led to the need to urgently diversify the European energy market and reduce dependence on Russian energy carriers. Furthermore, the problems of navigation in the Bab el-Mandeb Strait and the threat of terrorism in Africa pose additional challenges to the EU's energy security and highlight the need to develop alternative routes for energy supplies, specifically through Central Asia. Notably, energy security issues are closely intertwined with the problems of sustainable development, climate change, and environmental protection, which necessitates a comprehensive approach to energy cooperation.

The problematic of the study focused on the challenges and obstacles to the effective implementation of the EU's energy diplomacy in the Central Asian region. These include geopolitical competition, insufficient infrastructure development, political instability in some countries

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of the region, corruption, imperfect legal regulation of the energy sector, and the lack of a common energy policy among EU countries. Furthermore, there are risks associated with the environmental impacts of energy production and transportation, which require the implementation of high safety and environmental protection standards.

A review of studies on the EU's energy diplomacy in the Central Asian region shows that this issue is of considerable academic interest, but certain aspects still lack sufficient coverage. V. Melnychuk (2023) analyses the impact of China's One Belt, One Road initiative on EU-China relations, specifically, examines the competition between the EU and China in the Central Asian market, but does not focus directly on the EU's energy diplomacy in the region. This study is useful for understanding the broader geopolitical context in which the EU's energy diplomacy is developing.

Continuing with the topic of geopolitical factors, M. Leonard *et al.* (2021) consider the geopolitical implications of the European Green Deal, but do not pay special attention to the Central Asian region. This study is valuable for understanding the impact of the EU's climate policy on its relations with key partners, which is also significant for energy diplomacy in Central Asia. M. Mišík (2022) focuses on the EU's energy security but does not consider the role of Central Asia in detail. This study is useful for understanding the challenges faced by the EU in the field of energy security and the potential role of the Central Asian region in addressing them.

A somewhat different perspective is offered by T. Kober *et al.* (2020), who analyse scenarios for the development of global energy without focusing on individual regions. This study is important for understanding global energy trends that influence the shaping of the EU's energy diplomacy, including towards Central Asia. O. Semenenko *et al.* (2023) examine the economic relations between the EU and Central Asian countries, but only superficially touch upon energy diplomacy. This study provides a better insight into the broader context of economic cooperation between the EU and the region, which also creates the basis for the development of energy diplomacy.

Thus, despite the existence of studies on the EU's energy policy and its relations with Central Asia, there is a lack of a comprehensive analysis of concrete mechanisms and instruments of the EU's energy diplomacy in the region, an assessment of the effectiveness of existing initiatives, and recommendations for improving the strategy in view of current challenges. The present study aims to fill these gaps.

The purpose of this study was to comprehensively examine the specific features of the implementation of the EU's energy diplomacy in the Central Asian region. To fulfil this purpose, the following tasks are expected to be solved: to analyse the energy potential of Central Asian countries and their significance for European energy security; to investigate the principal areas and mechanisms for implementing the EU's energy diplomacy in the region and identify key problems and challenges that obstruct effective energy cooperation between the EU and Central Asian countries; to develop recommendations for improving the EU's energy diplomacy, considering the specifics of the Central Asian region.

Materials and methods

The study was based on the use of general scientific methods of cognition, specifically, analysis, synthesis, generalisation, comparison, and statistical analysis. The phenomenon under study was broken down into its component parts and each of these aspects was examined in detail, which allowed for a better understanding of the essence and peculiarities of the EU's energy diplomacy in the region.

The interrelationships and interdependencies between the various elements were established and shown to form a coherent system. This helped to obtain a comprehensive vision of the phenomenon under study and formulate key conclusions about its effectiveness and development prospects.

The comparative analysis was used to compare the energy potential of different Central Asian countries, their strategies, and the EU's approach to cooperation with each of them. This helped to identify commonalities and differences in the energy policies of Central Asian states and the specifics of bilateral relations with the EU. Statistical analysis was used to process quantitative data on energy reserves and production, exports to the EU, and renewable energy development indicators. This helped to assess the energy potential of the region and the dynamics of cooperation with the EU. The systematisation helped to create a holistic and structured picture, identify key trends and patterns, and facilitate data analysis and interpretation. The method of generalisation helped to suggest ways to improve the EU's energy diplomacy in Central Asia.

The study was based on a wide range of sources, including statistical data, international agreements, regulations, analytical reports of international, national and civil society organisations, as well as materials of initiatives and programmes. Valuable sources for the study also included materials of such initiatives and programmes as the Neighbourhood Investment Platform (n.d.), the Investment Fund for Central Asia (IFCA) (European Union, 2021) and Horizon 2020 work programme from 2018 to 2020 (2017), The Caspian Pipeline Consortium (2023), which provide financial and technical support for the implementation of energy projects and promote technology transfer and exchange of experience between the EU and Central Asian countries.

The study also relied on the materials of the Extractive Industries Transparency Initiative (EITI) (Nadibaidze & Maisuradze, 2016), the EU Non-Financial Reporting Directive No. 2014/95/EU (2014), the environmental management standard ISO 14001:2015 (2015), and the social responsibility standard SA 8000 (2007). These sources contain significant information on the principles and mechanisms for ensuring transparency, environmental, and social responsibility in the energy sector, which are key factors for the sustainable development of the industry. They also demonstrate the EU's role in promoting these standards and values in cooperation with partner countries, specifically in Central Asia, by supporting the development and implementation of relevant legislation and by engaging European companies with high standards of corporate responsibility in energy projects in the region.

Results

Energy potential of Central Asian countries and their significance for European energy security. Central Asia and the Caspian region have considerable oil and gas reserves, which play a major role in the energy security and economic development of both the countries of the region and neighbouring countries. According to the Energy Information Administration (EIA), the total hydrocarbon resources of the Caspian Basin are 48 bn barrels of oil and 292 tn cubic feet of gas (proven and probable reserves). Therewith, 75% of oil reserves and 67% of gas reserves are concentrated on the Caspian Sea shelf. The northern part

of the Caspian contains most of the oil fields, while the southern sector is rich in gas deposits (Zeynalova, 2021).

Despite their considerable resource potential, the countries of Central Asia and the Caspian region face a range of challenges in developing their oil and gas sectors. These include difficult geological conditions, technological limitations, territorial disputes, geopolitical competition, underdeveloped infrastructure, etc. Effective development of the region's hydrocarbon resources requires large-scale investments, advanced technologies and close cooperation between energy producing, transit, and consuming countries (Fig. 1).



Figure 1. Map of existing and planned oil and gas pipelines across Eurasia

Source:

According to T. Rokicki *et al.* (2023), the EU's dependence on energy imports from Russia was quite high before the crisis in 2020-2022. Specifically, at the beginning of 2019, the share of oil and oil products imported from Russia was about 30% of the EU's total imports of these energy carriers, while the share of natural gas imported from Russia exceeded 40%. However, in the wake of the COVID-19 pandemic and especially after the outbreak of the war in Ukraine, the EU has begun to actively seek ways to reduce its energy dependence on Russia and diversify its sources of supply. Specifically, as early as March 2023,

the share of Russian oil and oil products in EU imports fell to 2.28%, and many countries completely stopped buying them from Russia. As for natural gas, the pace of decline in imports from Russia was somewhat slower due to long-term contracts and infrastructure constraints, but the trend towards reduced dependence was evident.

In these circumstances, Central Asian countries, with their considerable hydrocarbon reserves, could become essential partners for the EU in diversifying its energy supply. The development of cooperation with Central Asian states will not only increase the EU's energy security but

will also contribute to economic development and stability in the region, which is in line with the EU's strategic interests. However, fulfilling this potential requires significant considerable investment in infrastructure and overcoming certain geopolitical challenges.

The principal areas and mechanisms for implementing the EU's energy diplomacy in the region. The EU's energy diplomacy in Central Asia is implemented at both bilateral and multilateral levels. Within the framework of bilateral relations, the EU develops energy cooperation with each country in the region individually, considering their specific needs and capabilities.

Kazakhstan is the EU's key energy partner among Central Asian countries. In 2006, the EU and Kazakhstan signed a Memorandum of Understanding on cooperation in the energy sector, which envisages the development of cooperation in such areas as energy efficiency, renewable energy, modernisation of energy infrastructure, and technology exchange (Mantel, 2015). Turkmenistan is also an important potential partner of the EU in the gas sector. In 2008, the EU and Turkmenistan signed a Memorandum of Understanding on the development of energy cooperation, which prescribes the possibility of supplying Turkmen gas to Europe as part of the Trans-Caspian gas pipeline project (Zanatta, 2023). Despite the signing of a 2008 Memorandum of Understanding between the EU and Turkmenistan on the development of energy cooperation, which provided for the possibility of supplying Turkmen gas to Europe through the Trans-Caspian gas pipeline, this project has not yet been implemented. Although recent political developments in the region, such as the signing of the Convention on the Legal Status of the Caspian Sea in 2018, the conclusion of the Memorandum of Understanding between Turkmenistan and Azerbaijan on the joint development of the "Dostluk field in 2021 and the launch of the Southern Gas Corridor in 2020, have created a more positive diplomatic environment for this infrastructure, the EU has still not managed to establish gas connections with Turkmenistan (Zanatta, 2023). The reasons for this lie not only in the difficult geopolitical situation in the region, but also in Turkmenistan's approach to foreign investment and the EU's energy policy. Specifically, Ashgabat is reluctant to allow foreign companies to develop its gas fields and does not ensure transparency of energy revenues, which scares away European investors (Zanatta, 2023). At the same time, the EU has embarked on a course of decarbonising its economy and gradually phasing out fossil fuels, which calls into question the feasibility of large-scale investments in new gas pipelines (Fetting, 2020). The EU's position is also influenced by the internal political situation in Turkmenistan, which is one of the most repressive and authoritarian regimes in the world (Bohr, 2016; Schatz, 2023). Supporting the rhetoric of promoting democracy and protecting human rights, European politicians are not inclined to make excessive concessions to the Turkmen leadership for the sake of energy interests.

Thus, although the idea of a Trans-Caspian gas pipeline stays on the agenda of bilateral relations, its practical implementation faces serious obstacles that go beyond purely geopolitical considerations. Progress on this issue requires efforts on both sides to create a favourable

investment climate, ensure transparency, and adhere to democratic standards (Yuldasheva, 2022).

Uzbekistan is also actively developing cooperation with the EU in the oil and gas sector. The country has considerable hydrocarbon reserves and is one of the most promising suppliers of gas to the European market. In 2019, Uzbekistan produced 60.4 bcm of gas and exported about 10 bcm, mainly to China and Russia (International Energy Agency, 2021). At the same time, the Uzbek government is interested in diversifying export routes and entering new markets. In this context, the EU is considered as an important potential partner. Uzbekistan can supply gas to Europe through existing and planned pipeline systems, such as the Trans-Caspian gas pipeline and the Southern Gas Corridor (Yuldasheva, 2022).

Furthermore, Uzbekistan is seeking to attract European investment and technology to modernise its oil and gas infrastructure and improve the efficiency of hydrocarbon production and processing. The country is interested in cooperating with leading European energy companies within the framework of projects for the exploration and development of new fields, construction of gas processing plants, etc. While developing cooperation with the EU in the oil and gas sector, Uzbekistan does not forget the significance of developing renewable energy. The country intends to gradually increase the share of renewable energy in its energy balance and counts on EU support in this area, specifically through technology transfer and exchange of experience (Yuldasheva, 2022).

Overall, energy cooperation between Uzbekistan and the EU is comprehensive and covers both conventional and renewable energy sources. It meets the strategic interests of both parties and has considerable potential for further development on a mutually beneficial basis. The practical implementation of the agreements will help strengthen energy security, attract investment, and achieve sustainable development goals in the region (Yuldasheva, 2022).

Alongside bilateral relations, the EU is actively developing multilateral initiatives and projects within the framework of its energy diplomacy in Central Asia. One of the key platforms for multilateral energy cooperation is the EU-Central Asia Energy Initiative, launched in 2007. This initiative aims to strengthen the energy dialogue between the EU and Central Asian countries, exchange experience and best practices in the energy sector, and develop regional energy infrastructure (Mantel, 2015).

Another important project is the Trans-Caspian Gas Pipeline, which will bring natural gas from Turkmenistan and other Central Asian countries to Europe via the Caspian Sea and the Southern Gas Corridor. Although the project faces a range of geopolitical and technical challenges, it stays a priority for the EU in the context of diversifying its energy supply (Mantel, 2015).

The EU also supports the development of renewable energy and energy efficiency in Central Asia through initiatives such as the Neighbourhood Investment Facility (NIF), the Investment Fund for Central Asia (IFCA) and the Horizon 2020 programme. These instruments provide financial and technical support for the implementation of clean energy and sustainable development projects (Neighbourhood Investment Platform, n.d.; Horizon 2020 work programme..., 2017; European Union, 2021).

Energy cooperation between the EU and Central Asian countries is based on a range of legal documents and agreements. The key document in this context is the EU Strategy for Central Asia, adopted in 2007 and updated in 2019 (Mantel, 2015). The Strategy identifies priority areas of cooperation between the EU and the region, among which energy plays a major role. The bilateral Partnership and Cooperation Agreements (PCAs) concluded between the EU and each of the Central Asian countries also contain provisions on energy cooperation (Mantel, 2015; Yuldasheva, 2022; Zanatta, 2023). These agreements create a legal framework for the development of trade and investment relations in the energy sector, as well as for the exchange of technology and experience. Furthermore, the EU and Central Asian countries are parties to the Energy Charter Treaty (ECT), a multilateral agreement that establishes a legal framework for international energy cooperation (Banet, 2024). The ECT ensures investment protection, free trade in energy resources, and facilitates energy transit.

Key issues and challenges of energy cooperation between the EU and Central Asian countries. One of the principal challenges for the EU's energy diplomacy in Central Asia is geopolitical competition and conflicts of interest between the world's leading actors in the region. Russia, China, and the United States also have strategic interests in Central Asia, particularly in the energy sector, which complicates the implementation of energy projects involving the EU.

Russia traditionally views Central Asia as a zone of its influence and seeks to maintain control over energy flows in the region. Moscow is actively promoting its own energy projects, such as the Power of Siberia gas pipeline and the Turkish Stream, which may compete with EU initiatives (Caşın & Kisacık, 2021). China, in turn, is increasing its presence in Central Asia within the framework of the Belt and Road Initiative. Beijing is investing heavily in the development of energy infrastructure in the region, including the construction of gas and oil pipelines connecting Central Asia with China (Manish & Behera, 2024). The United States also has its own interests in the region related to energy security and geopolitical influence. Since 2006, Washington has been supporting projects aimed at diversifying energy routes and reducing the dependence of Central Asian countries on Russia, such as the Trans-Caspian gas pipeline (Siruk, 2006).

Another challenge for energy cooperation between the EU and Central Asian countries is the insufficient level of energy infrastructure development in the region. Many of the existing gas and oil pipelines were built during the Soviet era and need to be modernised and expanded to ensure reliable and efficient energy transportation. Furthermore, the lack of direct access to the Caspian Sea and the need to transport energy through the territories of other countries create additional difficulties for the implementation of EU energy projects in the region. The construction of new pipelines, such as the Trans-Caspian gas pipeline, requires considerable investment and alignment of interests of all parties involved (Palu & Hilmola, 2023).

Technological limitations associated with the production and processing of hydrocarbons in Central Asia may also hinder effective energy cooperation with the EU. Many deposits in the region are characterised by complex

geological conditions, high sulphur content, and other impurities, which requires the use of advanced extraction and treatment technologies (Kolb, 2014). Limited access to modern technologies and equipment can reduce the profitability and environmental friendliness of energy projects.

Political instability, weak democratic institutions, and high levels of corruption in some Central Asian countries pose additional challenges to the EU's energy diplomacy. Opaque decision-making, lack of rule of law and insufficient investment protection may deter European companies from taking part in energy projects in the region. Furthermore, the lack of a common energy policy among EU countries makes it difficult to formulate a coherent and effective energy diplomacy strategy for Central Asia. Different interests and priorities of EU member states can lead to fragmentation of efforts and weakening of Brussels' negotiating position in the region. The imperfect legal regulation of the energy sector in Central Asia, including insufficient protection of investors' rights, lack of transparent rules for access to energy infrastructure, and administrative barriers, may also be an obstacle to the successful implementation of energy projects with EU participation.

Recommendations for improving the EU's energy diplomacy in the Central Asian region. To increase the effectiveness of the EU's energy diplomacy in Central Asia, it is necessary to strengthen strategic partnerships and political dialogue with the countries of the region. This involves regular high-level meetings, exchanging views on key issues of energy cooperation and agreeing on common approaches to addressing existing challenges.

The EU should pay special attention to developing bilateral relations with each of the Central Asian countries, accommodating their specific needs and capabilities. Specifically, expanding the energy dialogue with Kazakhstan, Turkmenistan, and Uzbekistan, which have considerable hydrocarbon reserves, could open new prospects for diversifying energy supplies to Europe. At the same time, the EU should more actively engage other countries in the region, such as Kyrgyzstan and Tajikistan, in energy cooperation, particularly in the development of renewable energy and energy efficiency. This will help strengthen regional integration and sustainable development in Central Asia.

Modernisation and expansion of energy infrastructure in Central Asia is a key factor in the successful implementation of energy projects with EU participation. Brussels should intensify investment activities in the region aimed at building new pipelines, upgrading existing energy networks, and introducing modern technologies for energy production and transportation. Particular attention should be paid to the implementation of strategic projects, such as the Trans-Caspian gas pipeline, which will allow Turkmen gas to be supplied to Europe bypassing Russia. The EU should provide political and financial support for this project, as well as help to regulate the legal status of the Caspian Sea to ensure its smooth implementation. Furthermore, the EU should make more active use of existing investment instruments, such as the Neighbourhood Investment Platform (n.d.) and the Investment Fund for Central Asia (IFCA) (European Union, 2021), to finance energy projects in the region. This will help attract additional funds and technological expertise from European companies to develop the energy sector in Central Asia.

To create a favourable investment climate and ensure the transparency of the energy market in Central Asia, it is necessary to harmonise legal regulation and implement international standards. The EU should more actively promote energy sector reforms in the region, including through technical assistance and the exchange of best practices. Specifically, it is important to strengthen cooperation within the framework of the Energy Charter Treaty (ECT) (Banet, 2024), which establishes a legal framework for international cooperation in the energy sector. The EU should encourage Central Asian countries to fully implement their ECT commitments, especially in terms of investment protection, free trade in energy resources, and unimpeded energy transit.

Moreover, the EU should promote the implementation of European standards of transparency, environmental, and social responsibility in the energy sector in Central Asia, such as the Extractive Industries Transparency Initiative (EITI) (Nadibaidze & Maisuradze, 2016), the EU Non-Financial Reporting Directive 2014/95/EU (2014), the ISO 14001:2015 (2015) environmental management standard, and the SA 8000 social responsibility standard (2007). This includes support for the development and implementation of relevant legislation, as well as the involvement of European companies that adhere to high standards of corporate responsibility in energy projects in the region.

In the context of the global climate crisis and the growing importance of sustainable development, the EU should pay special attention to the environmental and social aspects of its energy diplomacy in Central Asia. This includes promoting the development of renewable energy, improving energy efficiency, and reducing greenhouse gas emissions in the region. The EU should more actively engage Central Asian countries in sustainable development and climate change initiatives, specifically within the framework of the Paris Agreement and the UN Sustainable Development Goals (Falkner, 2016; Biermann *et al.*, 2017). Providing financial and technical support for clean energy and energy efficiency projects could become a vital area of energy cooperation between the EU and the region.

Furthermore, the EU should pay attention to the social impacts of energy projects in Central Asia, including their impact on local communities and the environment. Involving the public in decision-making, conducting environmental impact assessments, and ensuring fair distribution of benefits from energy projects should become an integral part of the EU's energy diplomacy in the region.

Discussion

The findings of this study show certain specific features of Central Asian countries in sustainable energy transition and point to some shortcomings of the EU's current approaches to energy security and cooperation with this region. Specifically, it was found that a sustainable energy transition in Central Asia is slow due to a range of political, financial, technical, and social barriers. Despite the considerable renewable energy potential in the region, it is still underutilised. The EU has a range of strategies and initiatives to improve energy interconnectivity with Central Asia, but they focus mainly on fossil fuels and do not fully consider the potential of renewable energy. In addition, the EU often considers climate instability as a

problem "beyond its borders" and does not sufficiently integrate climate factors into its external energy strategies.

These results are largely consistent with the findings of other studies reviewed in this paper. M. Radovanović *et al.* (2021) also point to a slow energy transition in Central Asia and numerous challenges in the development of the region's energy sector. These include difficult geological conditions, technological limitations, territorial disputes, geopolitical competition, and underdeveloped infrastructure. As in the present study, the researchers note the considerable potential of renewable energy in Central Asia, which, however, stays underutilised due to a range of political, financial, technical, and social barriers. At the same time, unlike in this study, M. Radovanović *et al.* (2021) pay more attention to climate change and the role of Central Asian countries in greenhouse gas emissions. The researchers note that a lack of reliable data on greenhouse gas emissions in the region, but anecdotal evidence suggests that Kyrgyzstan, Uzbekistan, and Tajikistan are not significant emitters due to their low levels of economy, industry, and transport. Kazakhstan and Turkmenistan use mostly clean natural gas, although Kazakhstan's coal industry may be of interest for climate action. These observations complement the picture of the energy landscape in Central Asia presented in this study.

M. Radovanović *et al.* (2021) take a deeper look at the issue of energy poverty and the role of public policy in overcoming it. The researchers emphasise that ensuring access to energy for all segments of the population should form an integral part of energy transition strategies in Central Asia. They discuss measures such as controlling energy prices, improving energy efficiency in households, using affordable renewable energy sources, and increasing household income. These aspects deserve more attention in the present study. Both studies point to the need to strengthen cooperation between the EU and the countries of the region, attract investment, transfer technology and know-how, and reform the energy sector and market.

F. Bossuyt & I. Bolgova (2020) analyse the prospects for cooperation between the EU, China, and Russia in Central Asia within the framework of China's Belt and Road Initiative (BRI). The researchers note that despite the tensions between the EU and Russia, these actors, along with China, have a common interest in developing a transport corridor between China and Europe through Central Asia. While the idea of trilateral cooperation may be too far-reaching at this point, there is room for bilateral cooperation between the parties involved. At the same time, the researchers acknowledge that the study was published before the full-scale Russian invasion of Ukraine in 2022, which dramatically changed the geopolitical landscape and prospects for cooperation.

R. Youngs (2021) examines the relationship between EU foreign policy and energy strategies. The researcher argues that this relationship is complex and diverse, demonstrating both the intensification of confrontation and its mitigation in various aspects of energy policy. R. Youngs introduces the concept of "limited confrontation" to characterise the impact of foreign policy on EU energy policy, when disagreements, although existing, are kept within the limits that allow for the development of common positions. The cited study complements the

present study by highlighting additional aspects of the interaction between EU foreign and energy policy, although it touches less on the internal dynamics of reconciling interests within the EU.

S.K. Pradhan & S.K. Pradhan (2020) analyse the geopolitical dynamics in Central Asia and India's role in the region, specifically in the energy sector. The researchers examine the historical ties between India and Central Asia, the region's oil and gas potential, and Indian investment in these sectors. Much attention is paid to India's Connect Central Asia policy, which aims to strengthen relations with the countries of the region. Despite its focus on Indian interests and strategies, the study offers a valuable insight into the broader geopolitical context in which EU energy diplomacy in Central Asia is unfolding, complementing the findings of the present study.

O. Lazard & R. Youngs (2021) offer a critical look at the EU's current approaches to climate security. The researchers argue that these approaches do not address the root causes of climate instability and may even exacerbate environmental disruption in the long term. They call for a shift from a narrow concept of climate security focused on decarbonisation to a broader notion of environmental security and integrity that includes the restoration of key ecosystems and their interdependencies. These arguments resonate with the theses of the present study regarding the need for a more systematic approach to peace and geopolitics, considering environmental factors. Both studies call on the EU to move beyond a narrow focus on emissions reductions and develop holistic strategies that address the root causes of environmental instability.

The strength of the study by O. Lazard & R. Youngs (2021) is the emphasis on restoring key ecological interdependencies, especially the hydrological cycle, as a prerequisite for true climate security. The researchers convincingly argue that climate change is the result and driver of environmental crises that go beyond excessive carbon dioxide emissions. They emphasise the central role of the fragility of the water cycle and call for the restoration of hydrological balance through contextually adaptive ecological regeneration. On the other hand, the study by O. Lazard & R. Youngs (2021) could benefit from a more detailed elaboration of practical steps to integrate comprehensive regeneration into the EU's foreign policy, development and security cooperation. Although the researchers outline the general principles of environmental diplomacy, the concrete mechanisms and processes for its implementation could be developed in greater depth. Furthermore, the study could pay more attention to potential synergies and trade-offs between the goals of decarbonisation and ecosystem regeneration.

Q. Fatima & S. Zafar (2020) offer a comprehensive analysis of the new "Great Game" in Central Asia, considering the interests and strategies of all key regional and extra-regional players. The researchers identify three dimensions of this "game": geoeconomic (competition for control over the region's energy resources), geostrategic (security interests and strategies of the actors involved), and geopolitical (the role of the Central Asian states themselves and their strategies for positioning in world politics). Q. Fatima & S. Zafar convincingly demonstrate the centrality of the energy factor in this geopolitical

competition. They examine in detail the various pipeline projects – both implemented and planned – as instruments of the geoeconomic strategies of the states involved. The researchers pay special attention to the "pipeline policy" as a key element of the competition for control over energy transportation routes. The study also makes a valuable contribution by analysing the growing geopolitical subjectivity of Central Asian states, which are trying to balance between major players, avoid domination, and maximise the benefits of their strategic position. Q. Fatima & S. Zafar (2020) show how these countries use multi-vectorism and balancing to promote their own interests and enhance their role on the world stage.

At the same time, unlike in the present study, Q. Fatima & S. Zafar (2020) touch less on the internal dynamics of the EU and the issue of alignment of interests and confrontation within the EU regarding energy policy in Central Asia. Instead, they offer a more holistic view of the interaction of interests of all key external players in the region, both regional (Russia, China, Iran) and extra-regional (the United States). Furthermore, the study could benefit from a deeper analysis of the internal political and economic processes in the Central Asian states themselves and their impact on the energy policies of these countries. While the researchers examine the role of Central Asian states in the "Great Game", they pay less attention to the internal factors that shape their energy strategies.

The present study and the study by M. Ardelean *et al.* (2020), complement each other by offering a systematic semi-quantitative methodology for assessing optimal transmission routes between Central Asia and the EU. The researchers develop a cost (friction) mapping model that uses a set of 13 weighted variables representing geographic, environmental, resource, and infrastructure factors. The strength of the methodology is its ability to accommodate the potential of untapped renewable energy sources in the crossed areas when modelling optimal routes. This distinguishes the cited study from those reviewed earlier, which mainly employed qualitative approaches. The inclusion of renewable energy potential proved to be a key determinant of the routes assessed, highlighting the significance of this variable. Furthermore, the researchers pay due attention to the basic policies and strategies of the EU and Central Asia on energy interconnection and renewable energy, which substantiate the relevance of the analysis. They also provide a comprehensive overview of the current energy landscape in Central Asia in terms of fossil fuels, nuclear, renewables, and transmission infrastructure. On the other hand, the study could have benefited from a more detailed discussion of the model's assumptions and limitations, especially with regard to variable selection, friction scoring, and weighting. A clearer explanation of the logic behind these methodological choices would allow for a better assessment of the reliability and reproducibility of the results. Moreover, the study could have analysed the geopolitical, economic, and environmental implications of the assessed routes in more depth, going beyond purely technical modelling.

G. Sonmez (2021) analyses energy security issues in Eurasia in the context of Russian-Ukrainian tensions and Turkey's role as a potential energy hub. The researcher

thoroughly examines the energy crises between Russia and Ukraine in 2006, 2009 and 2014, which have become a chronic reminder of the risks of the EU's energy dependence on Russia. G. Sonmez convincingly demonstrates how Russia has strategically used its energy resources as an instrument of pressure on the EU and neighbouring countries. He highlights the asymmetric nature of the energy interdependence between the EU and Russia, with the latter having more leverage as a key supplier.

Against this backdrop, the researcher analyses Turkey's efforts to become a regional energy hub, taking advantage of its strategic location. G. Sonmez considers key projects such as the Baku-Tbilisi-Ceyhan (BTC) oil pipeline, the Baku-Tbilisi-Erzurum (BTE) gas pipeline, the failed Nabucco project, the Trans-Anatolian gas pipeline (TANAP), and the Turkish Stream. He argues that Turkey has the potential to play the role of a "key Eurasian energy hub" more than ever, while implementing EU and Russian-backed projects in line with its own interests.

In summary, the studies reviewed offer complementary perspectives on the complex dynamics of energy policy in Central Asia and Eurasia as a whole. They agree on the considerable challenges to a sustainable energy transition in the Central Asian region and the shortcomings of the EU's current approaches to energy cooperation with the region. The researchers emphasise the need to rethink EU strategies towards a more holistic, inclusive, and environmentally friendly vision of the region's energy future.

At the same time, the analysed studies highlight different facets of this multidimensional problem. Some of them, like this study, focus on the internal dynamics of the EU and the management of energy policy divergences (Radovanović *et al.*, 2021). Others pay more attention to geopolitical competition for resources and routes (Fatima & Zafar, 2020) or technical aspects of transmission optimisation (Ardelean *et al.*, 2020). O. Lazard & R. Youngs (2020) propose a conceptual shift from climate security to environmental diplomacy, while G. Sonmez (2021) considers the role of individual regional players, such as Turkey. Each of these studies makes a valuable contribution to the understanding of the energy landscape in Central Asia and Eurasia by offering original conceptual frameworks, methodological innovations, and relevant empirical data. Together, they form a completer and more nuanced picture than that which emerges from the analysis of a single study.

Conclusions

An analysis of the energy potential of Central Asian countries has shown their exceptional significance for ensuring Europe's energy security. The region has considerable

hydrocarbon reserves, including oil and natural gas, and has strong renewable energy development potential. Kazakhstan, Turkmenistan, and Uzbekistan are the EU's key energy partners, and cooperation with them could substantially increase the diversification of energy sources and reduce dependence on Russian energy.

The study of the principal areas and mechanisms for implementing the EU's energy diplomacy in the region revealed that it is carried out both bilaterally and multilaterally. The EU develops energy dialogue with each country individually, accommodating their specifics, and takes part in regional initiatives such as EU-Central Asia Energy and the Trans-Caspian gas pipeline project. The key instruments of the EU's energy diplomacy are partnership and cooperation agreements, memoranda of understanding, investment funds, and technical assistance programmes. At the same time, the study revealed a range of problems and challenges that stand hinder effective energy cooperation between the EU and Central Asian countries. These include geopolitical competition from Russia, China, and the United States, underdeveloped energy infrastructure, political instability and high levels of corruption in some countries of the region, imperfect legal regulation of the energy sector, and the lack of a common energy policy among EU countries. Furthermore, the need to ensure sustainable development and consider environmental aspects in the implementation of energy projects is a major challenge. Based on the analysis, recommendations were developed to improve the EU's energy diplomacy in the Central Asian region. The EU should strengthen its partnership with Central Asian countries, step up investments in energy infrastructure, promote regulatory harmonisation and the implementation of international standards, with a particular focus on renewable energy and emissions reduction.

Promising areas for further research include a comparative analysis of the EU's energy diplomacy in different regions, studying the synergy between European and Chinese strategies, devising scenarios for the development of Central Asia's energy sector in line with global trends, and researching the social and humanitarian aspects of the energy transition. The EU's energy diplomacy in the Central Asian vector is a complex issue, the effectiveness of which will determine energy security, sustainable development, and prosperity in Europe and Central Asia.

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Conflict of Interest

None.

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