# ENERGY DIPLOMACY IN THE CONTEXT OF THE GLOBAL ENERGY TRANSITION

**Assem SADYKOVA*** *Doctoral student at the Institute of Diplomacy of the Academy of Public Administration under the President of the Republic of Kazakhstan, Astana, Kazakhstan, assem.sadykova@apa.kz, ORCID ID: https://orcid.org/0009-0008-0266-2610*

**Kamilla SHERYAZDAN** *PhD, Associate Professor at the Institute of Diplomacy of the Academy of Public Administration under the President of the Republic of Kazakhstan, Astana, Kazakhstan, kamilla.sheryazdanova@apa.kz, ORCID ID: https://orcid.org/0000-0001-5419-1138*

**Oleg BARNASHOV** *PhD, Head of the Office for Cooperation with International Organizations, Department of International Cooperation in Science and Education, Peoples' Friendship University of Russia, Moscow, Russian Federation, barn.oleg@gmail.com, ORCID ID: https://orcid.org/0000-0001-5576-732X*

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**Annotation.** Contemporary transformations of the global energy system, accompanied by intensifying geopolitical tensions and climate-related challenges, determine the relevance of studying energy diplomacy as a key instrument of security and sustainable development. The purpose of this article is to trace the evolution of energy diplomacy from its traditional focus on resource security to the integration of ecological, technological, and social dimensions into international strategies. The central hypothesis assumes that the neorealist perspective provides the strongest explanatory framework for analyzing current dynamics, since competition for resources and control over transit routes remain primary determinants of world politics, while liberal and constructivist interpretations demonstrate limited explanatory capacity. Methodologically, the study relies on an interdisciplinary synthesis of political economy, international relations theory, comparative analysis, and a critical review of academic literature, including the Kazakhstani research segment, which emphasizes hydrogen energy, risk management, and regional imbalances. The findings indicate a gradual shift of energy diplomacy from fragmented practices toward more comprehensive and coordinated international approaches aimed at promoting renewable energy and energy efficiency. The conclusion highlights the necessity of multi-level and multi-actor governance that combines geopolitical security with climate resilience and energy justice, thereby reinforcing the applied significance of the study for both national policy-making and global energy strategies.
**Keywords:** energy diplomacy, energy security, neorealism, renewable energy, Kazakhstan, climate resilience, international relations

**Аңдатпа.** Қазіргі әлемдік энергетикалық жүйенің трансформациясы, геосаяси шиеленістердің күшеюімен климаттықсын-қатерлер энергетикалық дипломатияны қауіпсіздікпен тұрақты дамуды қамтамасыз етудің негізгі құралы ретінде зерттеудің өзектілігін айқындайды. Бұл зерттеудің мақсаты – энергетикалық дипломатияның тарихи эволюциясын талдау және оның ресурстық қауіпсіздіктен экологиялық, технологиялық және әлеуметтік факторларды қамтитын кеңауқымды стратегияларға қарай бағытталғанын көрсету. Негізгі гипотеза – энергетикалық қауіпсіздікпен энергетикалық дипломатияны түсіндіруде неореализм мектебінің түсіндірмелік әлеуеті жоғары, өйткені ресурстар үшін бәсекелестікпен транзиттік бағыттарды бақылау қазіргі халықаралық қатынастардың басты детерминанттары болып қалабереді. Әдіс намалық тұрғыдан зерттеу саясиэкономияға, халықаралық қатынастар теориясына, салыстырмалы талдауға және ғылыми әдебиеттерге сынишолу жасауға сүйенеді. Қазақстандық зерттеулер сегментіндесу текті энергетика, тәуекелдерді басқару және аймақтық теңсіздіктер мәселелері қарастырылған. Нәтижелер энергетикалық дипломатияның фрагменттелген тәжірибеден жаңартылған және үйлестірілген халықаралық тәсілдерге көшуін көрсетеді. Қорытындысында көп деңгейлі және көп актілі басқару қажеттігі айқындалып, геосаяси қауіпсіздікпен климаттық тұрақтылықты үйлестірудің маңызы атап өтіледі.
**Түйін сөздер:** энергетикалық дипломатия, энергетикалыққ ауіпсіздік, неореализм, жаңартылатын энергия, Қазақстан, климаттық тұрақтылық, халықаралық қатынастар.
**Аннотация.** Современные трансформации мировой энергетической системы, сопровождаемые обострением геополитической напряжённости и климатическими вызовами, предопределяют актуальность исследования энергетической дипломатии как инструмента обеспечения безопасности и устойчивого развития. Цель работы заключается в выявлении эволюции энергетической дипломатии от традиционного акцента на ресурсной безопасности к интеграции экологических, технологических и социальных факторов в международные стратегии. В качестве гипотезы выдвигается положение о том, что неореалистический подход обладает наибольшей

*Corresponding author: A.Sadykova, assem.sadykova@apa.kz*

объяснительной силой в анализе современных процессов, поскольку борьба за ресурсы и контроль над транзитными маршрутами остаются ключевыми детерминантами мировой политики, тогда как либеральные и конструктивистские интерпретации демонстрируют ограниченность. Методология исследования основывается на междисциплинарном синтезе политической экономии, теорий международных отношений, сравнительного анализа и критического обзора научной литературы, включая казахстанский сегмент, где акцент сделан на водородной энергетике, рисках и региональных дисбалансах. Результаты показывают, что энергетическая дипломатия постепенно переходит от фрагментарных практик к более комплексным и согласованным международным подходам, направленным на продвижение возобновляемых источников энергии и энергоэффективности. Сделан вывод о необходимости многоуровневого и многоакторного управления, которое сочетает геополитическую безопасность с климатической устойчивостью и энергетической справедливостью, что усиливает прикладное значение исследования для разработки национальных и международных стратегий.
**Ключевые слова:** энергетическая дипломатия, энергетическая безопасность, неореализм, возобновляемая энергия, Казахстан, климатическая устойчивость, международные отношения.

## Introduction

Energy diplomacy, as an important dimension of international relations, reflects the evolving interaction between resources and states' foreign policy strategies. While the emphasis was previously on resource control and protecting national interests, modern challenges - primarily climate change - more cooperative and globally integrated approaches (Kaya&Kaya, 2025). This means moving from simple transactions to multi-level diplomatic formats that take into account social and environmental factors.

The internationalization of energy security, reinforced by globalization, has necessitated the emergence of new diplomatic tools capable of managing risks and ensuring supply stability. The concept of «energy security», which emerged following the passage of the US National Security Act of 1947, has evolved into a context-specific category, dependent on the level of development, import dependence, and the quality of national strategies (Knox-Hayesetal., 2013).

The global energy transition, characterized by a growing share of renewable energy sources, simultaneously creates risks and opportunities. It requires adaptive strategies, including green financing, the development of environmentally friendly technologies, and the diversification of energy portfolios. Moreover, «energy security» today encompasses not only security of supply but also the sustainability of critical mineral supply chains and the equitable distribution of innovative technologies (Chengetal., 2025).

The changing structure of the global energy sector is creating new vulnerabilities and dependencies, reinforcing the importance of proactive energy diplomacy. Preventing energy inequality and mitigating climate risks requires a rethinking of multilateral cooperation mechanisms (Radtke & Renn, 2024).

IPCC reports (2023) emphasize that accelerating the energy transition is a prerequisite for fulfilling international climate commitments. However, the transition to renewable energy sources is changing alliances and the geopolitical architecture, creating new zones of competition and cooperation. This requires a rethinking of national political and economic strategies and the development of innovative diplomatic approaches capable of minimizing conflicts and ensuring equal access to sustainable energy pathways.

### *Purpose and hypothesis of the study*

This study analyzes the historical evolution of energy diplomacy, emphasizing its adaptive nature in response to geopolitical shifts and technological change. Particular attention is paid to the transformation of the concept of «energy security», which has expanded beyond supply security to include environmental sustainability and sociotechnical transformations, thereby altering the nature of energy-related foreign policy strategies. This evolution demonstrates the growing role of energy diplomacy in shaping global energy governance, as states actively develop renewable energy projects not only for economic but also for geopolitical reasons.

One of these countries is China, which aspires to become a world leader in the production and export of renewable energy technologies. Thus, by raising not only its economic status, but also strengthening its political role on the world stage, the Celestial Empire is trying to reduce its dependence on external energy supplies and strengthen its influence in countries interested in environmentally friendly technologies. This is confirmed by the «Made in China 2025» strategy, which is aimed at leadership in high technology (Zhang & Andrews-Speed, 2019). According to a study by the HKUST Li & Fung Supply Chain Institute (2025), China has become the world leader in

the production of solar panels and batteries. In 2023, the global production of solar modules was approximately 612 GW, of which China's production is estimated at 518 GW. This is approximately 85% of the global volume. Germany also seeks to strengthen its own geopolitical position in the European Union through the development of «green energy». The main goal is to reduce Europe's dependence on Russian gas and oil, especially after the Ukrainian events. At the same time, Germany aims to strengthen its role as a leader in environmental transformation in Europe (Beck, 2025). These cases show a huge relationship between energy, ecology, security and geopolitics in general.

The relevance of this study stems from the need for a thorough understanding of the relationship between energy policy stringency and environmental outcomes, particularly in developed economies, to effectively advance climate initiatives and achieve sustainable development goals. A sustainable energy transition entails complex political and economic dynamics, with states consciously determining the pace and direction of renewable energy deployment based on strategic priorities and perceived competitiveness of a green economy. In this context, balancing the interests of the traditional hydrocarbon sector and rapidly growing renewable energy, while also taking into account the infrastructure and technological limitations of developing countries, becomes an important challenge.

The energy transition requires an analysis of the political feedback mechanisms that shape global renewable energy governance and influence market opportunities and international alliances. The study argues that energy diplomacy has historically served as a tool for projecting power and securing access to resources, gradually transforming from resource-focused negotiations to strategic approaches that incorporate environmental and technological dimensions (Legrand & Stone, 2018). This transformation reflects a shift from transactional logic to holistic strategies that integrate climate imperatives, technological innovation, and sustainable development goals.

The study's hypothesis is based on the assertion that the greater a country's dependence on hydrocarbon imports, the more active its diplomatic efforts to promote renewable energy sources. A clear example of this is the European Union and China's efforts to ensure their energy security and avoid dependence on «unreliable suppliers» or trade/sanctions wars by diversifying supply routes and promoting green energy development.

Thus, energy diplomacy is becoming a key mechanism for regulating the interaction of geopolitical interests, economic development, and environmental responsibility in the current global energy landscape.

## Methodology

The theoretical foundations of the research are based on the basic principles of the school of political realism / neorealism. Events of the modern world, especially in the context of escalating international tensions against the background of the confrontation between Russia and Western countries, demonstrate that, despite the possibility of analyzing energy security and energy diplomacy from the standpoint of various theoretical schools of international relations, it is the approaches of political neorealism that make it possible to fully reveal their essence. Current events can be interpreted as a manifestation of the struggle for resources: sanctions and tariff measures applied by Western countries against Russia, India and China, as well as the escalation of the situation in the Middle East and the Al-Aqsa Triangle region, reflect competition for control over energy transit routes. From our point of view, the positions of the school of liberalism, which focus on institutional mechanisms and confidence-building measures, as well as constructivist approaches to energy security, turn out to be limited and insufficiently explanatory for analyzing modern realities.

The research methodology combines interdisciplinary approaches, allowing us to identify the interaction of political, economic and technological factors that determine the development of energy diplomacy. The analytical framework uses political economy to assess the role of international regimes, national governments, and energy corporations in facilitating or slowing the global transition to clean energy.

Special attention is paid to the impact of geopolitical risks on the pace and directions of energy transformations. At the same time, it is taken into account that global interdependence can both accelerate and limit these processes. It also analyzes the effectiveness of political instruments and mechanisms of international cooperation that determine the sustainability and dynamics of the energy transition.

The methodological framework is based on the recognition that energy transformation is not only a technical, but also a socio-political process. The study takes into account the principles of justice and equality, as well as new trends- the digitalization of energy systems and the influence of social media, shaping public participation and new forms of energy citizenship, which in turn rebuilds the mechanisms of energy diplomacy.

**Table 1. Approaches of school of international relations theory to energy diplomacy**

| Theoretical school | Key provisions | Interpretation of energy security and diplomacy | Strong sides | Limitations |
|---|---|---|---|---|
| Political realism/ neorealism | The international system is anarchic; states operate in the logic of a "struggle for survival"; the main goal is security and power | Energy diplomacy is seen as an instrument of struggle for resources and control over transit routes. Sanctions, tariff wars, and conflicts in the Middle East are interpreted as a struggle for resources. | This explains the competition or energy resources, militarization of transit routes, and geopolitical rivalry. | Underestimates the role of institutions, norms, environmental and climate imperatives. |
| Liberalism | Independence, institutions, and international regimes reduce the likelihood of conflict; cooperation is possible through rules and treaties. | Energy security is ensured through international organizations (IEA,EU),energy dialogues, trust mechanisms, and joint projects. | Emphasizes the importance of institutions and norms; explains successes in integration and climate agreements. | Poorly explains situations of intense competition and the application of sanctions; it is of limited use in crisis analysis. |
| Constructivism | International relations are shaped by ideas, norms, identities, and discourses. | Energy diplomacy is understood through the formation of a «discourse of sustainable development», norms of climate responsibility and «energy justice». | Explains the role of ideas(for example, the Paris Agreement, the concept of «fair transition»), the importance of discourses and public pressure. | Limited explanatory power in the context of fierce resource competition and geopolitical confrontation |

**compiled by the authors based on the analysis of scientific literature*

## Review of scientific literature

A review of the of the scientific literature on energy diplomacy, tracing its evolution from geopolitical approaches to modern interpretations involving environmental, social and technological dimensions (Levendaetal.,2020). The historical trajectory goes from resource-based practices that ensure security of supply to multidimensional strategies related to climate change, sustainable development and energy equity. Special attention is paid to the «fair transition» paradigm and the involvement of non-state actors and international organizations, reflecting the increasing complexity of global energy systems.

The literature notes that the concept of energy security, established in 1947, has long dominated government policy and international relations. However, modern challenges such as climate risks and global interdependence have expanded its content to include environmental sustainability and social equality (Jiang&Martek, 2021). Diversifications of sources and energy efficiency have become important components, which simultaneously strengthen sustainability and stimulate economic growth («Capturing the Multiple Benefits of Energy Efficiency», 2014).

Historical analysis highlights the role of energy policy in shaping geopolitical configurations and reproducing global asymmetries (Hornborg, 2019). This makes fair energy transition not only an

environmental, but also a political and economic challenge. The review highlights gaps in the study of strategies of various actors-from local communities to international organizations-in the context of the transition to renewable sources. Modern discourse links energy diplomacy with the achievement of the Sustainable Development Goals and the Paris Agreement. Sustainable transition is seen as a global political choice involving international cooperation and the development of green technologies (Huetal., 2022). The growth of renewable energy sources and technological innovations, including digitalization and artificial intelligence, are becoming drivers of the new energy architecture (Settinoetal., 2023; Castillo-Reyesetal., 2023).

Thus, energy diplomacy has evolved from a resource-based tool to a comprehensive mechanism for regulating global energy transitions, combining issues of security, ecology and justice. Several dominant trends can be identified in Kazakhstan's recent research on energy security issues. One of the most notable is the emphasis on hydrogen energy as a factor of future sustainability. Thus, Sarsembayev (2022) considers hydrogen as a tool to strengthen the country's energy in dependence and export diversification, while pointing to technological and investment barriers. This line is continued by a team of authors led by Ibrayeva (2024), emphasizing the role of hydrogen in ensuring the sustainability of Kazakhstan's energy balance and emphasizing the importance of international cooperation in the development of «green» technologies.

The second area is related to the management of risks and vulnerabilities in the field of energy security. Omirtay and Elemesov (2020) analyze the institutional model of regulation, emphasizing the need for a balance between state control and market mechanisms. In the applied aspect, the work of Ongdash, Omirtay and Nurgabylov (2023) demonstrates Kazakhstan's high sensitivity to global price fluctuations and geopolitical factors. In recent years, research has become even more applied: Popp and Kudaibergenov (2025) are developing a risk management model in the fuel and energy complex, taking in to account cyber threats and critical infrastructure protection, while Nurgaliuly and Smagulova (2025) are using quantitative methods (entropy-TOPSIS) to identify regional energy security imbalances. This shift from normative and conceptual research to practical models is indicative of the growing applied focus of national science.

A separate block of research is devoted to the impact of global trends on the national energy sector. Aubakirova, Isatayeva and Biryukov (2023) draw attention to the social dimension of the energy transition, emphasizing the need for a fair distribution of costs and benefits, especially for coal-mining regions. These works demonstrate the understanding that energy security goes beyond technical solutions and is closely linked to social and political processes.

Finally, meta-level research is emerging in scientific discourse. Thus, Nurgaliyly (2024) performs a bibliometric analysis of publications, recording a relatively low citation rate of Kazakhstani authors, but at the same time noting the growing interest in renewable energy sources and hydrogen technologies. This approach allows us to understand not only the subject area, but also the trajectory of the development of the national research school.

In general, the literature of recent years reflects a movement away from descriptive and institutional research towards more comprehensive and applied research. Kazakh authors increasingly consider energy security not only as a problem of resource provision, but also as a multi-level phenomenon, including global trends, diplomatic aspects, social challenges and regional imbalances.

**Results**

A comprehensive analysis shows a paradigm shift in the goals and tools of energy diplomacy: from ensuring resource security to the challenges of sustainable development and the climate agenda. Renewable technologies and new international mechanisms are coming to the fore, which requires a review of diplomatic practices, taking into account environmental factors and innovations. The results highlight the importance of equitable access to sustainable energy, especially for developing countries where financial and infrastructural barriers need to be overcome. The concept of Energy Democracy (Judsonetal., 2022) enhances the participation of communities and citizens, creating more equitable outcomes. The success of transitions largely depends on diplomacy bridging the gaps between developed and developing countries in technology transfer and institutional strengthening (Pereiraetal., 2025). The study captures the transition from fragmented policies to more coherent international approaches aimed at promoting renewable energy. However, barriers remain-conflicting interests, inconsistent regulation, and weak institutional implementation-leading

to discrepancies between declarations and practice. At the same time, adaptive «political mixes» are emerging that take into account national and regional contexts, which requires flexible diplomatic strategies. It is noted that the obvious manifestations of the transition (consumption structure, transportation of resources) are accompanied by less studied ones - a change in security paradigms and a redistribution of geopolitical influence. This indicates the need for an integrated analytical framework combining quantitative and qualitative measurements of energy transitions.

The political economy of energy demonstrates that the coevolution of flows, markets, and policy frameworks determines the pace of decarbonization. However, the continued high levels of emissions amid economic growth indicate the complexity of the transition. Targeted coordinated measures and enhanced international cooperation are needed to accelerate decarbonization (Yuetal., 2024).

In this way, energy diplomacy goes beyond the traditional supply chain, shapes new energy landscapes, and redefines the foundations of national security through participation in the global energy transition.

## Discussion

The discussion focuses on how energy diplomacy can proactively respond to the challenges of the energy transition by facilitating technology transfer, promoting policy coherence, and supporting international cooperation. The central task is balancing the interests of the hydrocarbon industries and the «green» sector, which determines the institutional and investment landscapes of the energy sector.

Key challenges are related to transition management: the need to align long-term strategies with short-term actions, the integration of various actors, and the provision of learning mechanisms (Laesetal.,2014). Different political systems have different effects on the scale of adoption of sustainable technologies, and geopolitical risks can both accelerate and slow down decarbonization processes.

Energy diplomacy plays a special role in overcoming political polarization, which prevents the formation of complex political «mixes» necessary for deep decarbonization (Bang,2021).This requires taking into account how national interests and international commitments converge or diverge in shaping energy policies, especially in the context of climate goals.

An important focus is to address the institutional and financial gaps hindering the achievement of the SDGsin the field of clean energy. The various trajectories of industrialized countries, from the development of nuclear energy to the accelerated introduction of renewable energy, show the lack of a universal model and emphasize the need for differentiated diplomacy. Additional difficulties are caused by price fluctuations and internal coalitions of interests that determine the trajectory of the transition (Murdocketal., 2018).

**Table 2. Tools of energy diplomacy and their effects**

| Energy Diplomacy Tools | Content/mechanisms | Impact on energy security | Impact on stability | Influence on climate policy |
|---|---|---|---|---|
| Energy catalogs and forums | Multilateral and bilateral negotiations (G20, IRENA, EU Energy Dialogue) | Reduce the risks of supply disruptions, create coordination mechanisms | Promote the exchange of best practices | Increase the consistency of climate targets |
| Joint ventures and alliances | International projects on extraction, renewable energy, infrastructure (gas pipelines, wind farms) | Diversify sources and routes | Accelerate the introduction of new technologies | Reduce dependence on carbon-intensive solutions |
| Financing and green investments | IFI loans, «green bonds», development funds | Improve the reliability of energy supply through modernization | Create a stable infrastructure | They stimulate emission reduction and decarbonization |

| Energy Diplomacy Tools | Content/mechanisms | Impact on energy security | Impact on stability | Influence on climate policy |
|---|---|---|---|---|
| Sanctions and export restrictions | Pressure policy (for example, sanctions on oil/gas or technology exports) | They can undermine the security of thetargetcountries,strengthentheinitiatorsthroughdiversification | They are pushing us to find alternative solutions. | Climate initiatives are temporarily slowing down, but they are speeding up the search for renewable energy sources |
| Transfer technologies | Transfer of knowledge, licenses, and equipment (solar panels, hydrogen technologies) | Strengthens energy independence of importing countries | Reduces the technological gap | Accelerates the implementation of the Paris Agreement and the SDGs |
| Regulatory and legal initiatives | Internationalagreements,standards,climatepackages(ParisAgreement,Fitfor55) | Create a predictable investment environment | Harmonize rules and reduce risks | They set long-term trajectories for reducing emissions |

**Compiled by the authors based on the analysis of scientific literature*

Practical tools of energy diplomacy include dialogues, joint ventures, and technical assistance programs supporting the global energy transition. Special attention is paid to mitigating the social consequences: ensuring equal access to clean energy, retraining workers and diversifying economies. International agencies and partnerships play an important role here.

Of particular importance is the formation of a stable legal and regulatory framework capable of reducing investment risks and stimulating private capital inflows. The discussion also highlights the importance of decentralizing energy systems, which requires new approaches to network management, financing, and standards (Johannsenetal., 2021).

Thus, energy diplomacy should combine technical, social and legal aspects, actively participate in shaping global norms and standards, and ensure conditions for a fair and comprehensive energy transition.

## Conclusion

The results of the study show that energy diplomacy has undergone a clear shift: from focusing on the security of fossil fuel supplies to supporting the global energy transition. This evolution is driven by the imperatives of combating climate change and promoting sustainable development, which requires a focus on renewable sources and energy efficiency.

The reorientation of diplomatic efforts involves the development of political «mixes» and the use of energy transition intermediaries to accelerate the implementation of sustainable systems. The analysis highlights the need for a multi-layered approach, from local communities to the international level, as well as the abandonment of carbon-intensive structures in favor of decentralized and flexible configurations.

The energy transition has not only a technological, but also a socio-political dimension, which requires adaptive management mechanisms and an international framework for cooperation. The accelerating need to reduce emissions is generating demand for innovative solutions, including mature low-carbon sources, the use of local resources and skilled labor.

At the same time, the key challenge remains the balance between energy security and environmental sustainability in the context of geopolitical instability and price volatility. Therefore, modern energy diplomacy must be able to integrate energy equity, technological innovation, and climate resilience into its strategies, thereby providing the conditions for a successful global transition.

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**ӘЛЕМДІК ЭНЕРГЕТИКАЛЫҚ КӨШУ ЖАҒДАЙЫНДАҒЫ ЭНЕРГЕТИКАЛЫҚ ДИПЛОМАТИЯ**

***Әсем САДЫҚОВА*,*** *Қазақстан Республикасының Президентінің жанындағы Мемлекеттік басқару академиясы Дипломатиялық институтының докторанты, Астана, Қазақстан, assem.sadykova@apa.kz, ORCID ID: https://orcid.org/0009-0008-0266-2610*

***Камилла ШЕРЬЯЗДАНОВА****, PhD докторы, Қазақстан Республикасының Президентінің жанындағы Мемлекеттік басқару академиясы Дипломатиялық институтының доценті, Астана, Қазақстан, kamilla.sheryazdanova@apa.kz, ORCID ID: https://orcid.org/0000-0001-5419-1138*

***Олег БАРНАШОВ****, PhD докторы, Халықаралық ұйымдармен ынтымақтастық офисінің жетекшісі, Ресей Халықтар Достығы Университетінің ғылым және білім саласындағы халықаралық ынтымақтастық департаменті, Мәскеу, Ресей Федерациясы, barn.oleg@gmail.com, ORCID ID: https://orcid.org/0000-0001-5576-732X*

**ЭНЕРГЕТИЧЕСКАЯ ДИПЛОМАТИЯ В УСЛОВИЯХ ГЛОБАЛЬНОГО ЭНЕРГОПЕРЕХОДА**

***Асем САДЫКОВА****, *докторант Института дипломатии Академии государственного управления при Президенте Республики Казахстан, Астана, assem.sadykova@apa.kz, ORCID ID: https://orcid.org/0009-0008-0266-2610*

***Камилла ШЕРЬЯЗДАНОВА****,доктор PhD, Ассоциированный профессор Института дипломатии Академии государственного управления при Президенте РК, Астана, Казахстан, kamilla.sheryazdanova@apa.kz, ORCID ID: https://orcid.org/0000-0001-5419-1138*

***Олег БАРНАШОВ****, доктор PhD, руководитель Офиса по сотрудничеству с международными организациями, Департамент международного сотрудничества в науке и образовании Российского Университета Дружбы народов, Москва, Российская Федерация, barn.oleg@gmail.com, ORCID ID: https://orcid.org/0000-0001-5576-732X*