

Low-carbon development Strategy of the Republic of Kazakhstan: factors of formation and current state

Belyaeva, Olga; Nuguspanov, Alisher; Nazym, Turganbek

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СТРАТЕГИЯ НИЗКОУГЛЕРОДНОГО РАЗВИТИЯ РЕСПУБЛИКИ КАЗАХСТАН: ФАКТОРЫ ФОРМИРОВАНИЯ И АКТУАЛЬНОЕ СОСТОЯНИЕ

Ольга Игоревна Беляева^а

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Алишер Нугуспанов^а

Назым Ганиевна Турганбек^б

а Российская академия народного хозяйства и государственной службы при Президенте Российской Федерации

б МГУ им. М.В. Ломоносова

Аннотация: В статье рассмотрена политика низкоуглеродного развития Республики Казахстан. Определены основные факторы, влияющие на формирование соответствующей политики, а также проанализированы основные «низкоуглеродные» инструменты, применяющиеся в стране или запланированные к внедрению как на национальном, так и на региональном уровне. Среди основных факторов, определяющих низкоуглеродную трансформацию Казахстана, выделяются: негативные последствия изменения климата, фактор энергетической безопасности, усиление международного климатического регулирования, «ресурсная» зависимость страны, региональные амбиции страны. Проведенный анализ показал, что при реализации политики низкоуглеродного развития на национальном уровне помимо экологической пользы учитывается экономическая ценность тех или иных мер, в том числе принимая во внимание энергетические и репутационные интересы. Одновременно с этим авторы отмечают, что высокая роль традиционных источников энергии в экономике Казахстана, а также в энергетическом обеспечении страны (в частности, угля) не позволяет стране проводить политику по форсированному отказу от «грязных» источников энергии ввиду экономических и энергетических издержек. В связи с этим политику низкоуглеродного развития Казахстана можно охарактеризовать скорее как «прагматичную».

Ключевые слова: Казахстан, ЕАЭС, Центральная Азия, низкоуглеродное развитие, климатическая политика

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LOW-CARBON DEVELOPMENT STRATEGY OF THE REPUBLIC OF KAZAKHSTAN: FACTORS OF FORMATION AND CURRENT STATE

RESEARCH ARTICLE

Olga Igorevna Belyaeva^a

Alisher Nuguspanov^a

Turganbek G. Nazymb

a Russian Presidential Academy of National Economy and Public Administration

b Lomonosov Moscow State University

Abstract: The article considers the Republic of Kazakhstan's low-carbon development policy. The authors identify the main factors influencing policymaking and analyze the main «low-carbon» instruments applied in the country or planned for implementation at the national and regional levels. Kazakhstan is transitioning to low-carbon energy due to its reliance on resources, climate change concerns, energy security, international climate regulations, and regional aspirations. The analysis has shown that implementing low-carbon development policies at the national level considers the economic value of particular measures apart from environmental benefits, including energy and reputational interests. The authors point out that the significant role of traditional energy sources in the Kazakhstan economy, as well as in the energy supply of the country (especially coal), does not allow the Republic of Kazakhstan to pursue a rapid abandonment of «dirty» energy sources due to economic and energy costs. In this context, the authors characterize Kazakhstan's low-carbon development policy as «pragmatic» and aimed at ensuring economic security.

Keywords: Kazakhstan, EAEU, Central Asia, low-carbon development, climate policy

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Introduction

To date, the trend of low-carbon development and decarbonization is globally significant. This is reflected in the accession of most countries to major international climate agreements and the implementation of relevant policies at the national level. Many countries adopt long-term «low-carbon» strategies and develop appropriate technologies and mechanisms. However, national interests and country-specific issues shape the character of low-carbon development policies, which vary significantly among nations. Consequently, we can see such different content of «low-carbon» transformations in Western regions (EU and US) and in the East (China and India).

Kazakhstan is one of the energy-exporting nations that receives particular attention in the context of reaching the primary climate goals. The world's energy sector is the main contributor to greenhouse gas (GHG) emissions, which is a major driving force behind this attention. According to the International Energy Agency (IEA), global energy-related CO₂ emissions reached a record high of 36.8 Gt in 2022 [IEA, 2023a].

In recent years, scholars have become increasingly interested in the low-carbon and «green» economy development of Kazakhstan, which is reflected in a series of works devoted to various aspects of this process [Andronov, Fanmin, 2019; Dabylytayeva, Rakhymzhan, 2019; Saimova, 2020; Kodaneva, 2022, Poberezhskaya, 2022].

Despite the abundance of scientific works devoted to this issue, there are no studies that comprehensively consider the climate policy of Kazakhstan. Given the approved «Strategy for achieving carbon neutrality of the Republic of Kazakhstan until 2060» in February 2023, as well as previously introduced «low-carbon» measures in the country, the relevance and significance of the study seem very high. The study aims to assess the current state of Kazakhstan's low-carbon development policy. At the first stage, we identified the primary drivers of low-carbon policymaking in the Republic of Kazakhstan. At the second stage, we selected and analyzed the main «low-carbon» instruments applied and/or planned to be applied in the energy sector, including according to the adopted Strategy for achieving carbon neutrality until 2060. At the end of our study, we looked at regional climate initiatives and «low-carbon» processes that the Republic of Kazakhstan is a part of.

Primary factors influencing the low-carbon development policy of the Republic of Kazakhstan

The foundation for Kazakhstan's low-carbon development was laid by the country's accession to the United Nations Framework Convention on

Climate Change (UNFCCC) and its ratification in 1995. In 2009, the Kyoto Protocol was also ratified. In 2016, Kazakhstan was among the first countries to ratify the Paris Agreement. Kazakhstan should reduce greenhouse gas emissions by 15 % until 2030 compared to the level of emissions in 1990 and by 25 % in the event of receiving international support [Central Communications Service of Kazakhstan, 2021]. The announcement of carbon neutrality by 2060 was made in 2020 as a long-term objective. Presently, Kazakhstan participates in the generally accepted international climate approach and is a rightful member of the global climate regulation.

Kazakhstan is already facing the unfavorable effects of climate change. In particular, the country's average annual air temperature is growing faster than the global average [NDC RK, 2023]. Among the main unfavorable consequences of climate change are forest and steppe fires, drought, a decrease in the quantity and quality of drinking water, deterioration of air quality, leading to negative health effects, land degradation, depletion of large rivers and reservoirs, etc. [UNDP, 2022]. According to the World Bank Group, climate-related shocks could reduce Kazakhstan's economy by 1.6 % by 2050 [World Bank, 2022a].

However, climate impacts are not the only driver of low-carbon development in the country; the economic and energy practicality of low-carbon measures amidst national challenges is an equally important driver.

The need for Kazakhstan's economy to diversify is becoming more pressing due to its reliance on «raw materials and resources». To some extent, this demand is satisfied by implementing low-carbon measures. The share of oil in the national budget is about from 55 to 65 % [Economic Research Institute, 2023]. According to forecasts, with proven oil reserves and the current production level, the country's oil reserves will run out in about 43 years [Azretbergenova, Syzdykova, 2020], which actually threatens the entire economy of the country. About 80 % of GHG emissions come from the energy sector, with the agricultural industry in second place (11.6 %) [Strategy..., 2023].

The issue facing Kazakhstan's energy sector is the next requirement for implementing a low-carbon development policy. Among the country's most important problems in the energy sector are the deterioration of generating capacities and the shortage of electricity, which pose direct threats to the country's energy security. Today, the average wear and tear of the electrical grids is about 66 % [Kazinform, 2022]. Based on IEA projections for 2023–2025, the annual growth in electricity demand is expected to be 1.7 % [IEA, 2023b]. In 2022, the deficit was observed for

eight months. By 2029, the electric capacity deficit is expected to exceed 3 GW [Ranking.kz, 2023]. Given the projected growth of the population by 2050 to 27 million (19 million at the beginning of 2022), the issue of energy supply becomes critical [Ministry of Labor and Social Protection of the Republic of Kazakhstan, 2022].

Kazakhstan's transition to a low-carbon economy is hindered by the tightening of climate regulations by major economic partners, including the EU, which accounts for about 30 % of its foreign trade [Forbes.kz, 2023a]. According to forecasts, the annual loss of the country's export revenues due to the EU's Carbon Border Adjustment Mechanism may amount to over \$250 million, where iron and steel production are particularly affected. If the mechanism expands to include oil, the losses could increase to \$1.5 trillion [World Bank Group 2022].

The current status of Kazakhstan's low-carbon development policy

Compliance with international climate agreements requires implementing measures that directly contribute to achieving the goals. *However, introducing different «low-carbon» measures and initiatives in Kazakhstan considers not only the climate-related value but also the practical economic, energy, and reputational benefits of implementing these measures, driven by a series of national challenges described above.*

Among these documents is the Strategy for Achieving Carbon Neutrality to 2060 (the Strategy), approved in February 2023. We should mention that only Kazakhstan and Russia developed such strategies in the EAEU region today. This document is crucial for analyzing low-carbon development policy because it lists the primary «low-carbon» instruments that the country will prioritize within the framework of low-carbon development over the medium and long term. Given the country's emission structure, the «energy» industry in the sectoral approaches is of particular interest.

According to the Strategy, the country plans to gradually replace coal with alternative and renewable energy sources (RES). Also, carbon capture and storage technology are envisioned for GHG capture *precisely in the medium to long term*. The country plans to retire coal-fired capacity that has been in operation for over 30 years and implement carbon capture and storage technology for the units that will remain operational beyond 2035 [Strategy..., 2023].

The RES industry has indeed seen growth in recent years. According to the results of 2018, the share of RES in electricity generation was 1.3 % [Official Information Resource of the Prime Minister of

the Republic of Kazakhstan, 2019], while in 2022, it was already 4.5 % [Ministry of Energy of the Republic of Kazakhstan, 2022]. The previously approved Concept of Kazakhstan's shift to a «green» economy states that the country's energy balance should include 15 % alternative and renewable energy by 2030 and 50 % by 2050 [Concept, 2013]. In 2009, the Law on Renewable Energy Sources was adopted, and state support for the industry began. The real progress in this direction began between 2013 and 2020, when this law was being actively finalized. During this period, several measures were implemented to promote the use of renewable energy sources. These measures included the introduction of feed-in tariffs for selected RES technologies [Agora Energiewende, 2023]. Additionally, a centralized financial settlement center was established to purchase RES, and a mechanism for auction bidding on RES facilities was introduced. Furthermore, RES projects were included in the list of priority investment projects [PWC, 2021].

In the case of coal, we should note the *long-term* nature of the plans described in the Strategy. It can be confirmed by the official statements made by the country's authorities. In October 2022, President K. Tokayev made an announcement that suggested that the country should not abandon the use of coal just yet. He noted that there is technology available to minimize coal emissions into the atmosphere that results from the operation of power plants [Forbes.kz, 2022b]. It is assumed that up to 2035, the share of coal in the energy sector will remain the greatest – 40 % [Zakon.kz, 2022]. The country's plans to continue «working with coal» are evident in another formulation from the Strategy, stating that due to sufficient coal reserves, Kazakhstan will develop a long-term vision for the alternative use of coal [Strategy..., 2023]. At the same time, the country's plan to decommission coal-fired capacity seems curious. Given that 28 of Kazakhstan's 68 operating thermal power plants are coal-based and their average age is 55 years, the implementation of this project implies the closure of almost all coal-fired power plants [CA-NEECA, 2023].

Furthermore, according to the updated 2023 Fuel and Energy Complex Development Concept, by 2029, coal production will reach 117 million tons (113.9 million tons of coal in 2022), and oil production will reach 97 million tons by 2029 (84.2 million tons in 2022). It is also noted that the coal industry will increase using technologies of maximum GHG reduction, including deep coal processing technologies (coal chemistry, enrichment), and environmentally friendly technologies in coal-fired generation. The coal industry will receive further advancement in the

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new Strategy for developing coal companies with a gradual transition towards coal chemistry [Concept..., 2023].

Considering that the coal industry currently contributes significantly to the nation's GDP (about 1.5 %) and plays a significant role in the country's energy supply (70 % of electricity generation), it is probably unrealistic to expect Kazakhstan to completely overhaul its energy system soon [Strategy 2050, 2021]. To date, the accelerated abandonment of coal due to «low-carbon» measures supported by some Western countries *does not fully align with the country's national interests, as reflected in official documents*.

The Kazakhstan's Strategy includes some interesting provisions regarding classifying natural gas as an intermediate fuel. This classification will facilitate the nation's efforts to identify new gas fields through exploration. Moreover, it envisages the entry of nuclear power plants into the capacity structure as a stable energy source; thus, a long-term vision for developing nuclear power will be drafted [Strategy..., 2023]. The inclusion of such an approach is probably *dictated not only by the country's climate goals but also by the country's energy interests in the context of projected energy shortages*. Furthermore, in terms of «greenness», the EU itself, which was until recently acknowledged as the «leader» of the green transition, appears to have played an equally significant role in recognizing these kinds of sources as «green and transitional» [TASS, 2022]. We should also point out that the country ranks second in the world in terms of proven reserves of natural uranium, thus creating favorable conditions for developing the nuclear industry in the country.

In recent years, the nuclear power plants (NPP) topic has gained increased discussion among high-ranking officials. In September 2021, Russian President Vladimir Putin proposed to build a nuclear power plant in Kazakhstan [Lenta.ru, 2021]. Later, the country's representatives repeatedly mentioned that the NPP construction project would be realized with the involvement of an international pool of investors and an international consortium [Kapital, 2022]. Reports indicate that Kazakhstan was considering technologies from various countries, including proposals from Korea's KHNP, China's CNNC, Russia's Rosatom, and France's EDF [Interfax, 2022].

The NPP is planned to be built in Ulken village on the shore of Lake Balkhash. However, the public reaction to the NPP construction can hardly be called positive. For example, representatives of the environmental community categorically oppose the NPP, arguing that there are possible environmental threats from the future nuclear power plant [Forbes.

kz, 2023c]. Already on September 1st, K. Tokayev, during his annual address, proposed to put the issue of NPP construction to a national referendum [Interfax, 2023a]. Currently, the whole negotiating process with potential NPP project realizers has been suspended until the referendum.

Bioenergy and hydrogen energy are promising measures for low-carbon development according to the Strategy. Even though these industries *are only emerging*, we can already see a positive trend in these areas. Last year, Kazakhstan entered the international bioenergy market for the first time, exporting the first 5,000 tons of biofuel [Inbusiness.kz, 2022]. Bioethanol is produced at the Bio Operations plant in the North Kazakhstan region.

The hydrogen direction is also actively developing. In 2021, Kazakhstan signed an agreement with the German-Swedish group Svevind on the construction of RES projects and the production of «green» hydrogen in the Mangistau region. The project involves constructing solar and wind power plants with a total capacity of 40 GW, allowing for the production of up to 2 million tons of «green» hydrogen or 11 million tons of «green» ammonia per year [Forbes.kz, 2023d]. The project is estimated to cost between \$40 and \$50 billion. Following the memorandum of strategic partnership on sustainable feedstock, batteries, and green hydrogen value chains concluded at the end of 2022, it is assumed that Germany aims to reduce its dependence on conventional energy sources by importing Kazakhstani hydrogen in the future [Tengrinews, 2022].

Among Kazakhstan's «low-carbon» instruments, we should also mention the Emissions Trading System (ETS). The ETS covers more than 220 industrial plants with annual emissions of more than 20,000 tons of CO₂ equivalent per year (more than 40 % of the country's emissions) [EDB, 2023]. Even though Kazakhstan was the first country to introduce the ETS mechanism in the EAEU and Central Asia, the system itself is viewed as *insufficiently effective*. While many other emissions contribute to the greenhouse effect, this system only controls CO₂ emissions. We should also note the low price for quotas (average cost is about \$1 per ton) compared to other regions and countries (in the EU, in 2023, such quota prices were estimated at just over €100 per ton) [Interfax, 2023b].

Every year, the number of free quotas in the Republic of Kazakhstan will be reduced. According to the 2022 National Carbon Plan, the reduction (without reserve allowances) would be the following: from 166,2 million tons in 2022 to 158,8 million tons in 2025 [On Approval..., 2022]. Such a reduction *would definitely increase the annual costs for the primary*

“polluters”. It is likely that the shortage of quotas in the future may affect the trading price of carbon units, increasing their value.

However, some studies draw attention to the fact that the number of quotas for 2018–2020 (averaging 161,969,000 units per year + 11,757,878 units in reserve) was lower than for 2021 (169,187,227 units + 11,500,000 units in reserve together with the reserve), when a 1.5 % reduction in quotas per year was announced [Zhumabaev et al., 2022]. Thus, planned reductions for future years from the 2022 level have already been observed several years ago. The absence of a detailed regulation of the functioning of the mechanism for allocating reserve quotas [Forbes, 2022e], as well as the lack of specific rules for determining GHG emission reductions in offset projects [Zhumabaev et al., 2022], are additional difficulties.

Recognizing the practice-oriented approach of Kazakhstan as one of the world’s biggest energy exporters, as well as the country’s climate commitments, the Saudi approach of a circular carbon economy (CCE) may be a possible option for low-carbon development consideration. The Kingdom of Saudi Arabia (KSA) presented this idea at the 2020 G20 as part of its participation. CCE is an integrated approach to managing GHG emission levels and consists of four parts: reduction, reuse, recycling, and elimination [UNFCCC, 2022]. KSA has proposed a “low-carbon” approach that prioritizes meeting its national interests and focuses on using all available mechanisms (RES, nuclear power, etc.) and technologies to reduce greenhouse gases, including those that lower the carbon intensity of traditional energy sources. This approach corresponds with the country’s economic structure, which primarily gains budget revenues from the export of traditional energy sources. For example, carbon capture and utilization mechanisms, including Emissions to Value (E2V) and Carbon Recycling projects, are part of the “reuse cycle”; carbon capture and storage technologies are part of the “elimination cycle” [Ministry of Energy of the Russian Federation, 2020]. The foundation for sharing experiences in this field between nations has already been established. For example, in 2023, Kazakhstan and Saudi Arabia signed a memorandum on cooperation in the fuel and energy sector concerning the development of collaboration in areas of oil and gas, electricity, renewable energy, and “clean” hydrogen [National Association of Oil and Gas Services, 2023].

In recent years, in addition to “low-carbon” instruments in the energy sector, Kazakhstan has been actively developing green finance mechanisms that also meet the country’s economic objectives and increase its overall investment attractiveness. \$610 billion (19.6 % of gross fixed capital formation) is the

estimated net investment in low-carbon technologies required to develop them and achieve carbon neutrality [Strategy..., 2023].

At the beginning of 2021, the Republic of Kazakhstan introduced a new Environmental Code. This code defines the terms “green” financing and “green” projects and also outlines a classification system (taxonomy) for “green” projects that will receive funding through “green” bonds and “green” loans.

In 2021, the green projects taxonomy was adopted, including seven categories of green projects: renewable energy, energy efficiency, green buildings, pollution prevention and control, sustainable use of water and waste, sustainable agriculture, land use, forestry, biodiversity conservation, eco-tourism, and green transportation [Classification..., 2023]. To date, Kazakhstan’s “green” taxonomy is the only one in Central Asia. In the EAEU, Russia also has such a taxonomy.

In 2020, the first “green” bonds in Central Asia were listed on the International Financial Center Astana (IFCA) stock exchange by the Entrepreneurship Development Fund “Damu”, providing support to small and medium-sized enterprises in the implementation of “green” projects, primarily in the renewable energy sector [The Ecolomist, 2021]. At the end of 2021, according to the Green Finance Platform, the country had issued \$90 million in “green” and social bonds and \$66 million in “green” loans [Green Finance Platform, 2022].

In addition, we should note that Kazakhstan is the leader in the Central Asian region in terms of attracted international climate finance. Over the past ten years, over \$1.7 billion in co-financing from international climate funds has been secured [ZOI, 2020]. One of the country’s leading investors in “green transformation” is the EBRD. In 2022, of the \$525 million bank’s investments in Kazakhstan, more than 60 % were classified as “green” [KazTAG, 2023].

The country’s low-carbon development is also implemented at the regional level through the activities of the Eurasian Economic Union (EAEU). Strategic Directions for Developing the Eurasian Economic Integration until 2025 envisage sustainable development and the elaboration of the concept for forming and implementing the “green” economy [Strategic..., 2020]. In April 2021, the EEC Council approved the Action Plan for the implementation of Strategic Directions. At the end of 2021, council members adopted a joint statement on economic cooperation under the climate agenda. A high-level working group was formed to bring member states closer to the climate agenda.

In particular, this working group initiated the development and adoption of the EAEU taxonomy mod-

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el in early 2023 [Criteria..., 2023]. The taxonomy was developed jointly with the state corporation VEB.RF and the Green Finance Center of the Astana International Financial Center. The Eurasian Economic Union is creating a Climate Technology and Digital Initiatives Bank, which will act as a registry for low-carbon production and digital technology projects in addition to the taxonomy model. It includes planned and completed projects in various sectors of energy, industry, etc. Kazakhstan has 11 projects in the registry [EEC, 2023].

Moreover, Kazakhstan is actively promoting the climate agenda in Central Asia, which is also meeting the country's reputational interests as the region's leader, including in the "low-carbon" area. Thus, in the summer of 2023, the country's administration proposed to create a project office of Central Asian countries on climate and green energy in Almaty and, in 2026, to hold a regional climate summit in Kazakhstan under the auspices of the UN. President Tokayev also emphasized the importance of Kazakhstan's initiatives and the climate agenda during the 78th UN General Assembly session [CIS Executive Committee, 2023]. Today, the coordination of Central Asian countries on the low-carbon agenda has reached a qualitatively new level. Currently, countries are collaborating to develop a regional strategy for adapting to climate change as part of the Green Central Asia initiative. This initiative is being carried out by the German Society for International Cooperation. Additionally, the countries have gained valuable experience in dealing with climate change by adopting a united stance in the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC). By October 2023, the countries are expected to have completed and adopted the Strategy, which they will present at the next UN Climate Change Conference as a testament to their cooperative regional efforts.

Conclusion

Today, Kazakhstan is actively promoting the low-carbon direction, manifested in the ratification of international climate agreements and the development of climate policy at the national and regional level. In addition to the adverse effects of climate change, the main drivers of low-carbon development policy are energy-related issues, such as rising energy consumption and a projected energy deficit. These issues include accounting for expected population growth, declining generating capacity, the country's reliance on "raw materials", the strengthening of international climate regulation, and the country's regional aspirations.

When introducing particular "low-carbon" instruments and initiatives, Kazakhstan considers their

practical economic and energy value. We should not expect a drastic overhaul of the entire energy system in the near future, along with abandoning all "dirty" energy sources, given the substantial role that traditional energy sources, especially the coal industry, play in Kazakhstan's economy and energy supply. Additionally, Kazakhstan has plans to continue exploiting these resources (coal and oil). Today, such a forced abandonment does not meet the country's national interests. This approach will most likely be accompanied by greenhouse gas emissions until the relevant mechanisms – discussed in the Strategy and the updated Concept for the Development of the Fuel and Energy Complex – are actively implemented to lower the "carbon intensity" of these resources. In this context, we can describe Kazakhstan's low-carbon development policy as "pragmatic". Given this, the Saudi experience of the circular carbon economy, where such instruments are laid in the conceptual framework, may be an attractive case study for Kazakhstan. Another positive fact in this case is that a favorable base for exchanging experience between countries in the field of "energy" has already been created.

However, despite the "pragmatic" approach, the RES sector is actively strengthening its position in the country, as reflected in the increase in its share in electricity generation in recent years. At the initial stage, forming and developing nuclear, hydrogen, and bioenergy are crucial for Kazakhstan. The advancement of these instruments directly meets the country's interests in diversifying its economy and addressing climate and energy issues.

Another relevant factor is the country's "leadership" in introducing numerous other low-carbon measures, such as ETS and green finance instruments. The attractiveness of the latter is justified by the country's economic interests in terms of increasing investment attractiveness. Given that Kazakhstan is among the leaders in Central Asia in attracting international climate finance, improving the investment environment for green projects will strengthen the country's leading regional position, including among Western partners acting as significant investors in the country's green transformation. Apart from the national level, the country's low-carbon development is also being implemented at the regional level within the EAEU and Central Asia. Along with the countries' shared positions on climate issues and the adoption of joint "low-carbon" documents, Kazakhstan also leads relevant regional projects in which it has a notable role to play. These initiatives also serve Kazakhstan's reputational interests as the region's leader, including in the "low-carbon" area.

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ИНФОРМАЦИЯ ОБ АВТОРАХ:

Ольга Игоревна Беляева, доцент кафедры регионального управления Российская академия народного хозяйства и государственной службы при Президенте Российской Федерации (Российская Федерация, 119606, Москва, проспект Вернадского, 82). E-mail: belyaevaoi@ranepa.ru

Алишер Нугуспанов, аспирант 3 курса

Российская академия народного хозяйства и государственной службы при Президенте Российской Федерации (Российская Федерация, 119606, Москва, проспект Вернадского, 82). E-mail: a.nuguspanov@gmail.com

Назым Ганиевна Турганбек, аспирантка 2 курса факультета политологии, кафедры государственной политики Московский государственный университет им. М.В. Ломоносова (119991, Москва, ГСП-1, Ленинские горы, 1).

E-mail: nazymturg@gmail.com

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INFORMATION ABOUT THE AUTHORS:

Olga I. Belyaeva, Candidate of Sci. (Economics), Associate Professor, Department of Regional Management Russian Presidential Academy of National Economy and Public Administration (82, Vernadsky Prospekt, Moscow, 119606, Russian Federation). E-mail: belyaeva-oi@ranepa.ru

Alisher Nuguspanov, Third year postgraduate student

Russian Presidential Academy of National Economy and Public Administration (82, Vernadsky Prospekt, Moscow, 119606, Russian Federation). E-mail: a.nuguspanov@gmail.com

Nazym G. Turganbek, Second year postgraduate student, Faculty of Political Science, Public Policy Department Lomonosov Moscow State University (1, Leninskie gory, GSP-1, Moscow, 119991, Russian Federation).

E-mail: nazymturg@gmail.com

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