THE OXUS SOCIETY FOR CENTRAL ASIAN AFFAIRS

DECARBONIZING KAZAKHSTAN: WHAT FUTURE AWAITS MINING REGIONS AND TOWNS?

MADINA JUNUSSOVA, ZARINA ADAMBUSSINOVA AND ALEXANDER DIENER

DECARBONIZING KAZAKHSTAN: WHAT FUTURE WAITS MINING REGIONS AND TOWNS?

This report is published as part of the “Kazakhstan Futures Program” (January-September 2023) with financial support from the U.S. Embassy in Kazakhstan.

About the authors:

Madina Junussova: University of Central Asia, CERGE-EI Foundation Fellow-Teacher

Zarina Adambussinova: American University of Central Asia, Kazakhstan

Alexander Diener: University of Kansas, USA

THE OXUS SOCIETY
FOR CENTRAL ASIAN AFFAIRS

ABSTRACT

This policy brief assesses how Kazakhstan's efforts to achieve carbon neutrality could impact the country's mining regions and towns. To make this assessment, authors review Kazakhstani decarbonisation and regional development policy, official statistics, expert interviews, and international cases attempting similar transitions. The resulting analysis points to three potential scenarios for the future of mining regions and towns. By comparing the potential positive and negative economic, social, and environmental consequences of these scenarios, authors recommend policies to prepare mining regions and towns in Kazakhstan for decarbonization with a goal of achieving just, equitable, and sustainable development. This research was carried out as part of the Oxus Society for Central Asian Affairs - The Kazakhstan Futures Programme (January-September 2023) with financial support from the U.S. Embassy in Kazakhstan.

To mitigate the negative impact of climate change and achieve sustainable development (i.e., improving ecology and health as well as expanding business competitiveness in foreign markets), Kazakhstan is joining the global decarbonization movement. Varied iterations of policy highlight this effort. In 2013, the country's then-President Nursultan Nazarbayev approved the *"Concept of Transition to a Green Economy,"* [1] and by 2016, Kazakhstan ratified the Paris Agreement on climate change. [2] In 2023, current-President Kassym-Jomart Tokayev approved the "Strategy for Achieving Carbon Neutrality by 2060" [3] (hereafter referred to as the decarbonization strategy), which states that "the extraction of fossil fuels will need to be significantly reduced." [4] The strategy aims to decrease coal mining, broadly considered among the more ecologically damaging extractive energy resources, and is a primary target of Kazakhstan's decarbonization policy. However, the implementation of the strategy includes replacing coal with natural gas, which requires continued or even increased mining.

At present, Kazakhstan's economy relies heavily on profits generated from the extraction and sale of hydrocarbons and other mineral resources. Oil and gas accounted for 20% of the country's GDP in 2022. [5] According to data from 2020, fuel and energy resources significantly exceed domestic consumption, with crude oil production outpacing Kazakhstan's usage by 5 times ***(See Figure 1 on Page 3).*** Consequently, the country faces the complex task of achieving carbon neutrality without derailing economic and social development predicated on export of surplus hydrocarbon resources. This is critical when considering that the country's recent social tensions originated in mining regions and towns. For instance, two mining towns, Zhanaozen and Ekibastuz were epicentres of public protest and civil unrest extending from policy changes relating to hydrocarbon resource extraction and pricing ***(see Figure 2 on Page 3).***

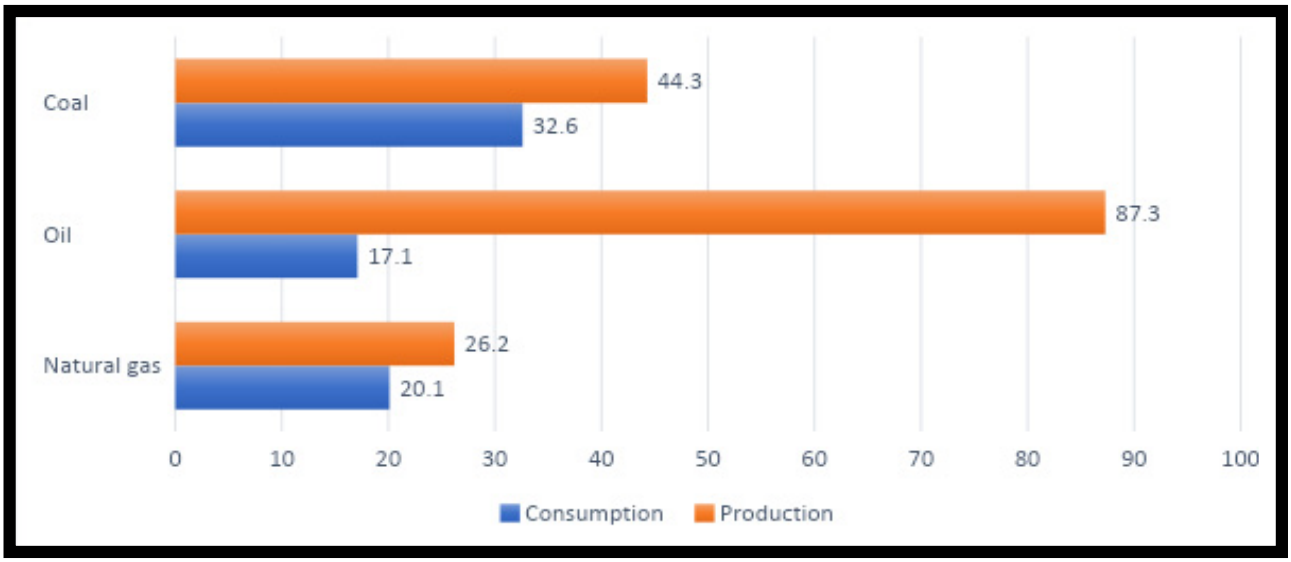

Figure 1: Gross Consumption and Production of Fuel and Energy Resources [6]

Figure 2: Location of Zhanaozen and Ekibastuz [7]

Expert interviews [8] suggest that Kazakhstan's decarbonization pursues benefits from long-term geo-environmental alignment with the international community rather than immediate remuneration to the Kazakhstani population. Global trends relating to the international climate change agenda and sustainable development strategies, such as the Paris Agreement in 2015, and the Summit on Ambitious Climate Actions in 2020, create a cadre of "green" states with which Kazakhstan's executive leadership wishes to be associated [9]. However, there is no consensus within Kazakhstan's government (writ large), business community, or citizenry as to the necessity for carbon neutrality. This lack of accord within the government and amongst decision-makers concerning national and regional policies bodes ill for the aforenoted policy initiatives and prospects of civil solidarity. [10]

Additionally, these reforms are being implemented amidst a geopolitical crisis involving economic sanctions against Russia, with which Kazakhstan is closely tied through energy infrastructure (the heat and energy systems of southern regions of Russia depend on coal from Ekibastuz), as well as politically and economically (Kazakhstan is part of the Eurasian Economic Union and other integrative regional associations). Increased use of gas for Kazakhstan's domestic purposes (i.e., transitioning from coal and oil to natural gas) has the potential to alienate China, which has made significant investments in pipelines and other infrastructure to facilitate Central Asian gas and oil exports to PRC industrial centres. [11] The energy sector is the largest source of greenhouse gas emissions in Kazakhstan, accounting for 77.6% or 272.5 million tons in 2020. [12] The country's "green development" strategy seeks to curtail the use of coal in favour of gasifiying the power sector and progress toward carbon neutrality. This is ambitious and costly given the state's 50% reliance on coal and 18% reliance on oil, as compared to 31% use of natural gas for thermal and electric power ***(See Figure 3 on Page 5).***

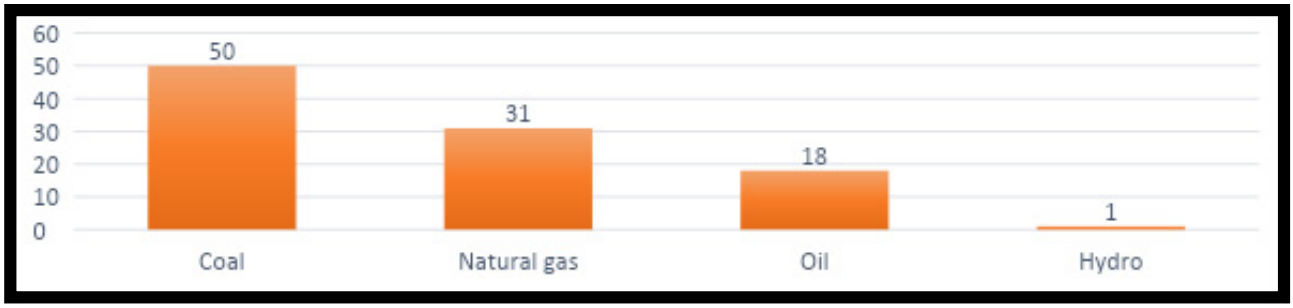

Figure 3: Structure of Gross Consumption of Fuel Resources in 2020, (%) [13]

Moreover, natural gas is expensive both for the extracting companies and for ordinary users of communal services. [14] Natural gas pricing has been regulated by the Kazakhstani government to ensure relative affordability to domestic markets. This makes its usage within the country less profitable than sale on the international market. Any decarbonization strategy needs to take this into consideration as reducing the volume of carbon resource extraction, while good for the environment, may have deleterious effects on economic vitality and social equity through reduced supply. At present, Kazakhstani policy documents pertaining to decarbonization lack coherent data-driven analyses and assessments of the potential consequences for mining regions and towns, and both skilled and unskilled workers in these hydrocarbon related industries. With considerable inequality in the country, both between individual regions and large and small cities, implementation of the decarbonization strategy has the potential to stir civil unrest. [15]

In its current form, Kazakhstan's decarbonization strategy signals an intent to "transform the economy to ensure prosperity, sustainable economic growth, and equitable social progress" by 2060. [16] However, it is currently unclear how this goal will translate into regional policies. How will the government manage regional peculiarities and existing economic, energy, and environmental issues,

especially in mining towns? It is worth noting that Kazakhstan's mining towns are a product of Soviet industrialization and urbanization in the 1950s and 1960s. The design of such towns and worker settlements embraced resource dependence, which is why they are referred to as *"monotowns."* This locational focus on servicing mineral resources has made these cities vulnerable to external and internal crises.

Many cities in Kazakhstan, where mineral resources have been depleted and extraction ceased, suffer from serious economic, social, and even environmental problems due to improper reclamation and remediation of former extractive infrastructure. [17] Research over the last two decades suggests that mining towns experience significant environmental issues, deteriorating public health, outflow of economically-active population, social inequality, and low economic diversification. [18] The deterioration of infrastructure leads to accidents and inefficiencies in Kazakhstan's monotowns, such as the incidents at the Ridder power plants in Ekibastuz in 2022. Damage to steam pipes that deliver steam throughout the city left over 100,000 people without central heating as night-time temperatures hit -30 degrees Celsius (-22 Fahrenheit). Kazakhstan's president asked his government to consider nationalizing *"problematic"* power plants to avoid future breakdowns that threatened lives.

Civil unrest and protest-related violence in Zhanaozen in 2011 [19] prompted government efforts to improve conditions in mining towns through the "Monotowns Development Program 2020" [20] which was later integrated into the structure of the "Regional Development Program 2020-2025." [21] Despite significant investments allocated for infrastructure modernization in these cities and providing some opportunities for their participation in the planning process, the main problem of resource dependency remained. For example, in Ekibastuz,

youth unemployment between the ages of 15 and 28 increased from 3% in 2014 to 4% in 2017, and the number of active small and medium-sized businesses decreased from 8,000 in 2015 to 7,700 thousand in 2017. [22] The regional policy, which focused on the development of large urban agglomerations, neglected issues of ecology, urban infrastructure development, and the health and safety of the local population in mining regions and towns. [23] The authors therefore suggest future research and systematic exploration of likely development scenarios as well as alternative ways to manage the decarbonization of Kazakhstan's mining regions and towns.

METHODOLOGY

This research includes a review of existing policies and analysis of official statistics. Additionally, qualitative research methods were applied for a deeper understanding of the issue. Specifically, expert (semi-structured) interviews were conducted with six representatives from the national government and independent experts from Kazakhstan and Canada in the fields of economic diversification, regional development, and carbon neutrality ***(See Appendix 1, Table 1 on Page 20)***. All experts were provided with project information in advance and provided informed consent for anonymous use of the data obtained during the interviews for research purposes. The expert interviews were conducted online using Zoom from March to May 2023.

POLICY OPTIONS AND IMPLICATIONS

Zero Scenario: Decarbonization strategy is not implemented.

The first scenario being considered is Scenario 0, where the decarbonization strategy is not effectively implemented. Expert interviews revealed that decision-makers at the national and local levels of government in Kazakhstan are disparate in their opinions on the necessity of decarbonization. [24] Moreover, there is significant skepticism about the feasibility of implementing such a broad ranging socio-economic strategy. [25] The transition from coal to gas in Kazakhstan will be extremely challenging due to the lack of necessary infrastructure. [26]

In light of the complex geopolitical situation and energy demands of Russia and China portending long-term interests Kazakhstan's hydrocarbon resources, government officials are unlikely to support serious measures aimed at reducing carbon emissions in the fossil fuel sector. Additionally, experts interviewed emphasized that the social tensions in the country are directly linked to the lack of decisive actions regarding the development of the energy sector. [27] According to them, the country lacks sufficient gas reserves to replace coal and oil as the primary fuel.

In response to rising social tensions, the Kazakhstani government will likely continue its policy of subsidizing the development of the energy sector to support employment in the extractive industries. This will likely maintain an inefficient tariff policy and artificially regulated pricing for end consumers. [28]

Due to the national government's lack of trust in local authorities, mining cities

are less likely to gain autonomy and access to financial resources, as well as the authority to make decisions regarding taxation and energy tariffs. [29] Consequently, these cities will struggle to replenish their budgets and utilize local financing for timely modernization and maintenance of urban infrastructure. There is also a risk that the development of housing and communal infrastructure in mining cities will be deprioritized for government investment, leading to further deterioration and potential civil unrest. [30]

However, according to experts, carbon-producing cities and employment in the extractive industries will remain attractive to certain segments of the population, leading people to relocate to them from other regions and countries in search of higher incomes. [31] At the same time, the ongoing digitization and optimization of mining enterprises are expected to reduce the demand for human labor, leading to a slight increase in unemployment among low-skilled workers. [32]

Additionally, some mining cities that have exhausted their mineral reserves for extraction will likely manage to diversify and be thereby excluded from the new regional policy. Representatives of the national government continue to believe in the "top-down" partnership with private businesses and expect mining companies to help cities with diversification. [33] They cite individual cases, such as the appearance of bus and tire manufacturing in Saran, to support their stance. [34] Officials presume that if some carbon-producing cities, such as Arkalyk, a former mono-city where bauxite was depleted, succeeded in providing employment opportunities for workers, others will also be able to do so. [34] The mining company ERG provided employment for workers in alternative company facilities that remain functional in Aktobe, Kostanay, and Pavlodar regions. Some also underwent retraining, while others received substantial severance packages.

Nevertheless, most non-governmental experts agreed that further isolation

and marginalization of mining cities and regions can be expected. This will likely lead to increased regional inequality and poverty, growth in the informal economy and social tension, protests, and population outflow due to a low standard of living and worsening environmental conditions. By contrast, representatives of the national government contend that these issues, including environmental challenges faced by mining cities, can be rapidly addressed through development regulation, increased control, and the introduction of more stringent standards. [35]

Rapid Transition Scenario: Active top-down implementation of decarbonization without regional policy adaptation.

The second scenario involves the active implementation of the decarbonization strategy as planned "from the top-down," but without supporting reforms in the country's regional policy. The national company Samruk Kazyna assesses several development scenarios and proposes to focus on a wide ranging decarbonization scenario. [36] The potential for such an effort to advance without adequate measures at the regional policy level derives from the country's tendency for top down formation and implementation of national agendas. [37]

Experts studying the impact of a coal phase-out on the country's economy agree that the environmental effect of decarbonization would be positive. [38] However, they also note that evaluating the effect is challenging due to the lack of detailed statistics on the ecology of mining cities and the impact of the industry on the health of the population living in those cities and surrounding regions.

Some aspects of decarbonization have already been initiated through the concept of transitioning to a green economy. For example, the approval of the new environmental code [39] introduces carbon trading in the country *(Article 289)*. Carbon trading refers to a calculated volume of greenhouse gases emissions,

which is set by authorities for a specific period. This has already caused confusion among representatives of mining and energy companies. Kazakhstan is also actively developing alternative energy sources. However, all the so-called "clean energy" is centralized and distributed through the general grid, reducing its efficacy and offsetting benefits for users residing near the fuel generation sources. [40]

Experts note that there is a possibility of increasing inequality between the western and northern regions, which extract hydrocarbon resources, and the southern regions that have potential for developing alternative energy. Their concern relates to "energy poverty" among certain populations where costs of thermal and electrical power may exceed people's purchasing power. [41] Additionally, there may be a shortage of qualified labor, and even if those previously involved in coal mining are retrained to work in the alternative energy sector, there will still be insufficient human resources. [42]

Mining cities will likely remain sites of social tension, where widening development gaps between regions become conspicuous and protests or work stoppages effect energy costs on a national level. For example, one expert shared the results of a recent study on Zhanaozen, noting that the population rates the quality of mobile communication, trade networks, catering, financial services, and ready-to-use services relatively high. However, the ratings for public services such as housing and utilities, medical and educational services, public transport, and city improvement are significantly lower. [43]

Reduction in carbon fuel volumes could readily catalyse economic crises in regions and cities, resulting in job losses, decreased revenue to local budgets, increased poverty, and migration to more economically vibrant major cities. [44] Additionally, experts highlight the increasing strain on housing, education,

transportation, and other forms of infrastructure in major cities, like Almaty, tasked with accommodating internal migrants and providing jobs. [45]

Regional policies tend to focus on maintaining slower paced urbanization of large cities. Representatives of the national government however indicated support for the rapid outflow of population from mining cities [46] should relocation present a better economic prospect than remaining in place. [47] Interviews also show that representatives of the national government do not see a significant need to get involved in the decarbonization process at this stage. They are focused on improving connectivity between regions and achieving uniformity in providing access to basic services according to established standards. [48] Current regional policy aims to regulate and standardize what the population of large, medium, and small cities should receive in terms of civil beneficence. Only after creating uniformity of equal living conditions in urban centers across the country, will governmental attention be turned to individual mining cities and regions.

Slow Transition Scenario: Decarbonization strategy is gradually implemented through strengthened regional policy and mining town support systems.

The third scenario involves decarbonization through a regional policy that attends to the needs of specific locales (e.g., mining towns) and incorporates insights from local governments to augment and humanize national policy goals. Such an approach also increases the role of local populations and businesses in the process of economic diversification and efforts to improve the quality of life in mining (and other) cities and regions of the country. Expert interviews emphasize the need for regional policy that is informed by all stakeholders. [49] According to them, it is crucial to adapt the decarbonization strategy and its implementation for the unique settings and circumstances of specific mining cities and regions. [50] Strategic preparation of mining cities and regions for the above referenced transition requires diversification of their economic activities. [51]

In the words of developers of the decarbonization strategy through enhanced regional policy:

"The next step should be the development of a roadmap for its implementation, including the development of regional sectoral or urban strategies for decarbonization." [52]

Successful implementation of the national government's vision for decarbonization requires the support of regional and local authorities. Local authorities are better acquainted with peculiarities, conditions, and infrastructural possibilities of specific locales, making it easier for them to build trust and dialogue with the resident populations. [53] It should be noted that decentralization of power is not new in Kazakhstan's politics. As experts point out, conditions are improving for the formation of independent governance bodies at the local level:

"(...) they are going to strengthen local budgets, strengthen local governance, resolve many issues at the local level, including self-governance." [54]

Strengthening local governance should also involve the nurturing of capable leaders who can direct mining cities toward alternative development. One expert made an example of the leadership role of former Akim (mayor) of the Lisakovsk mining town back in 2002 when local governments of Kazakhstan had more decision-making freedom and a better tax system:

"(...) Firstly, he created a free economic zone, secondly, a large business center, and started attracting various projects, including a brewery, a plant for processing agricultural products, and the production of dry milk. Milk was brought to him from farms from all surrounding regions, not just from his own region for processing... He offered virtually free rent in this business center for

one tenge, conditionally." [56]

Local authorities can also play a crucial role in establishing a mutually beneficial dialogue with representatives of mining companies and involve them in the process of local decarbonization through technology improvement. Mining companies, concerned about their position in the global climate ranking, actively work on implementing the best available technologies. [57] Whether an act of "greenwashing" or not, companies are encouraged to form partnerships that can result in improved environmental conditions at the local level. Examples include Chevron and KazMunayGas reaching an agreement on joint actions aimed at improving carbon utilization and storage, emissions and leakage management, and increasing energy efficiency. [58]

Coal mining companies also seek decarbonization through eco-friendly methods of coal extraction and usage. For example, Bogatyr Komir [59] is exploring possibilities for coal production without combustion, conducting research on coal processing into fuel powder, and further blending it with petroleum products to obtain environmentally friendly fuel. In this context, experts emphasize the importance of government support and funding allocation to improve hydrocarbon resource extraction technologies:

"I always say there may be enough coal, but there are no technologies. Technologies cost money, technologies are not buried in the ground to be dug out and installed." [60]

For successful implementation of the decarbonization strategy at the regional level, it is essential to ensure that the transition is socially just for the resident population. Most experts interviewed agree that the transition to decarbonization should be gradual, and people should be given choices. Some may want to

continue working in mining companies in other regions, some may opt for monetary compensation, and some may choose to stay in the city and start their own businesses:

"(...) in Arkalyk after the closure of bauxite mining... the backbone of workers left with equipment, buildings (...) they established individual entrepreneurs or limited liability companies, started taking orders for repair work." [61]

ACTIONABLE RECOMMENDATIONS

After comparative analysis of the expected positive and possible negative economic, social, and environmental consequences ***(See Appendix 1, Table 2 on Page 21)*** of decarbonization, this section outlines and optimal path forward. Achieving carbon neutrality is possible and attainable if the extracting regions and cities actively and directly participate in this process. It all starts with a dialogue among the government, businesses, and society. The following nine initiatives are recommended for Kazakhstan's pursuit of carbon neutrality. They presume the national government's desire to create favourable conditions for the populations of mining regions and towns to remain in place rather than embracing neo-liberal approach that allows declining conditions and lack of opportunity to redistribute population without active governmental intervention.

1. *If the state wants to secure the support of society in achieving carbon neutrality, it is necessary to conduct a nationwide informational campaign to improve awareness and engage government authorities (at varied scales), businesses, and population in cross-sectoral and*

developing regional policies aimed at socially just strategy implementation.

Initiative 1:

Initiate education for government officials and decision-makers involved in formulating and approving policies regarding the consequences of climate change, measures for adaptation and mitigation, the establishment of sustainable regional infrastructure, [62] and the transition to green energy. [63] Government officials and political leaders must understand and acknowledge the importance of achieving "social justice" [64] and involve the population in phased decarbonization plans, which may directly impact their lives. The development of cross-sector collaboration is crucial for achieving synergy between strategic plans for regional development, energy, and other sectors. [65]

Initiative 2:

Initiate dialogue with representatives of extractive companies and other industries. For example, establish collaborative forum in which mining companies, mine-workers, and agricultural representatives work with local, regional, and national authorities to implement a negotiated vision of decarbonization using innovative technologies. Reach a shared understanding regarding the eco-friendly transformation of extractive industries and a gradual transition to green technologies. Experts emphasize the potential of utilizing new technologies to create effective carbon sequestration sites through advancements in science and specialized agriculture. [66]

Initiative 3:

Engage universities and research organizations by providing them with financial support for active international collaboration and involvement in the process of eco-friendly transformation of the extractive industry and the enhancement of

qualifications for local communities. This is especially pertinent for the younger generation and women. The government should commence re-training and requalification of both skilled and unskilled workers in mining towns involved in low-paying and informal sectors of the economy. Training should be directed toward favourable transition to green practices [67] and incorporate the interests and labour requirements of strong entrepreneurs, engineers, programmers, scientists, ecologists, and experts in green economy and finance in mining regions and towns.

2. *If the state wants to develop strong regions and cities, a well-designed strategy for administrative, fiscal, and political decentralization is needed. This process involves both strengthening the role of local authorities and their direct accountability to their populations, as well as improving legislation to address conflicts and inefficiencies that hinder effective interactions between national, regional, and local levels of governance. This must be undertaken with care to mediate corruption and cronyism which have the potential to derail or undermine trust in the transition process.*

Initiative 4:

Create institutional conditions that incentivize regional and municipal authorities to effectively utilize local resources and create favourable conditions for local business development. Provide the necessary level of administrative and fiscal freedom for making decisions regarding local resources and obtaining financial benefits from utilizing the unique local potential to supplement local budgets and stimulate business growth. [68] Such efforts will require legal reform as a foundational change that will ensure long term effects of initial transitional efforts.

Initiative 5:

Stimulate active involvement of local authorities, extractive enterprises, and the population in seeking and shaping a shared future. Decentralize finances from national funds and establish local long-term development funds in mining towns. Support local initiatives for strategic planning and the implementation of local innovative projects, enabling the initiation of alternative development scenarios to gradually move away from dependency on mineral resources. [69]

Initiative 6:

Analyse and improve legislation and control over the implementation of state and private financing, including budgeting, public procurement, investment, credit allocation, and grants. Create favourable and conducive legislative conditions for the development of new investment mechanisms and green financing. For instance, competitive funding competitions can be organized for cities, as done in the United States. Individual locales develop a Comprehensive Economic Development Strategy to diversify their respective economies and upon successful approval of the mining town's/region's strategy, can receive up to a million dollars for development. [70] During the strategy formulation, local communities, businesses, and other population groups must be involved.

> *3. If the state aims to improve the well-being of the population and reduce social tension, prioritizing "social justice" and "community involvement" in the transition to low-carbon development is essential.*

Initiative 7:

Gradually shift away from direct subsidization of the hydrocarbon energy sector towards developing local opportunities. Decentralizing alternative energy and improving public access to clean and affordable energy is an important step in this process. Moreover, establishing a sustainable and transparent system for

local tariffing, collecting payments for municipal services, and reinvesting them into the development and support of local energy infrastructure is a key garnering popular support and avoiding civil unrest. “Social justice” is a broad concept that, while deriving from universal ideals, must attend in application to the specific circumstances (social, political, and cultural) of varied sites. Offering opportunities and choices to the population is empowering and catalyzes buy-in from those the policy is seeking to serve. [71]

Initiative 8:

Initiate a process of upgrading the qualifications of government officials involved in regional and urban development planning and management. Teach them to engage in horizontal dialogue with local businesses and effectively involve different segments of the population in the planning and management of urban development.

Initiative 9:

Create local infrastructure and begin to educate and actively engage the local population and communities in planning the future development of their hometowns. Here, the establishment of multifunctional community centers can play a key role, where people can gather, collectively discuss, and hold significant events for them and their city.

APPENDICES

Table 1. List of Interviewed Experts:

№	Expert and Area of Interests	Organization	Gender	Interview Date	City and Country of Residence
1	Decarbonization Strategy Analyst and Developer	Ministry of National Economy	Male	March 2023 (Zoom)	Astana, Kazakhstan
2	Urban Development Researcher	Ministry of Science and Education	Female	March 2023 (Zoom)	Almaty, Kazakhstan
3	Regional Policy Analyst and Developer	Ministry of National Economy	Male	April 2023 (Zoom)	Astana, Kazakhstan
4	Regional Development Analyst and Researcher	Ministry of National Economy	Male	April 2023 (Zoom)	Astana, Kazakhstan
5	Urban and Regional Development Analyst	Non-governmental organization	Male	April 2023 (Zoom)	Astana, Kazakhstan
6	Energy Modelling Analyst	International consulting agency	Female	May 2023 (Zoom)	Montreal, Canada

Table 2.

Comparisons of Development Scenarios and Impact on Regional Development

Development Scenarios	Expected Positive and Negative Impact on		
	Economy	Social Development	Environment
Zero Scenario: Decarbonization Strategy Not Implemented	• Economic growth rates in extractive regions are maintained. • Development remains concentrated in narrow industries with a dependency on extractive enterprises. • Regional inequality continues to grow. • The informal sector in the economy continues to expand. • Private business experiences limited growth. • Economic diversification remains at a low level.	• There is a slight reduction in employment in the extractive industry due to optimization and digitalization. • Poverty continues to rise in both mining and small towns. • Rapid deterioration of communal and housing infrastructure with the potential for recurring technological accidents and disasters. • Population outflow from small towns.	• Deterioration of the environment in mining regions and towns. • Depletion of mineral resources and irreversible geological processes. • Worsening of public health. • Increased negative impact from climate change, water scarcity, prolonged droughts, dust storms, and soil salinization.
Extreme Scenario: Active Implementation of Decarbonization Strategy	• Economic crisis in mining cities and regions due to bankruptcy and closure of enterprises. • Sharp increase in development disparities between regions of the country. • Preservation of natural resource reserves for future generations.	• Sharp increase in unemployment and poverty. • Active migration from former mining regions to major cities. • Energy poverty due to financial inability to access gas. • Extreme growth in social tension, protests by the population.	• Partial improvement in the environment due to reduced mining and emissions. • Slow but gradual restoration of the natural environment. • Partial mitigation of the negative impact of climate change.
Rational Scenario: The decarbonization strategy is implemented through strengthening regional policies	• Transitioning mining enterprises into the green economy sector. • Diversification of the economy by stimulating the development of knowledge-intensive and innovative projects. • Improving the business climate and providing financial support to local businesses and startups. • Preserving natural resource reserves for future generations. • Gradual alignment of regional development.	• Enhancing the qualifications of the population to increase earning levels or foster entrepreneurship. • Improving the well-being of the population and reducing poverty. • Reducing youth outmigration. • Alleviating social tension through dialogue and engaging the population in development planning.	• Significantly improving the environment. • Enhancing public health. • Mitigating the negative impact of climate change through the application of an ecosystem approach, reclamation, agrarian purification, and greening of areas affected by extractive industries.

REFERENCE LIST

1. Presidential Decree No. 577 of the Republic of Kazakhstan dated May 30, 2013, on the "Concept of Transition to a Green Economy." Retrieved from the source: https://adilet.zan.kz/rus/docs/U1300000577."
2. Law of the Republic of Kazakhstan No. 20-VI ZRK dated November 4, 2016, on the ratification of the Paris Agreement. Retrieved from the source: https://adilet.zan.kz/rus/docs/Z1600000020.
3. Presidential Decree No. 121 of the Republic of Kazakhstan dated February 2, 2023, on the approval of the "Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan by 2060." Retrieved from the source: https://adilet.zan.kz/rus/docs/U2300000121.
4. Please refer to the introduction of the "Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan by 2060."
5. Official website of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Energy and Commodity Markets Statistics. Energy Balance. Retrieved on April 12, 2023, from the source: https://old.stat.gov.kz/official/industry/30/statistic/8
6. Source: Official website of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Energy and Commodity Markets Statistics. Energy Balance. Retrieved on April 12, 2023, from the source: https://old.stat.gov.kz/official/industry/30/statistic/8
7. Nations Online Project: https://www.nationsonline.org/oneworld/map/kazakhstan-political-map.htm
8. Expert interviews with representatives of the national government, March 2023.
9. Please refer to the introduction of the "Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan by 2060." The source is mentioned in footnote 3 on the previous page.
10. Expert interviews with representatives of the national government, March 2023.
11. Bradshaw, M. and Waterworth,A. (2020) China's dash for gas: local challenges and global consequences, Eurasian Geography and Economics, 61:3, 266-304, DOI: 10.1080/15387216.2020.1716819
12. Please refer to the introduction and the energy section of the "Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan by 2060."
13. Official website of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Energy and Commodity Markets Statistics. Energy Balance. Retrieved on April 12, 2023, from the source: https://old.stat.gov.kz/official/industry/30/statistic/8
14. Interview with an analyst from an international consulting agency, May 2023
15. Asian Development Bank. (2021). Study on Regional Inequality in Kazakhstan. Retrieved from: https://www.adb.org/sites/default/files/project-documents/54093/54093-001-tacr-ru.pdf. See Yerken Turganbayev and Alexander Diener "Kazakhstan's Evolving Regional Economic Policy: Assessing Strategies of Post-Socialist Economic Development" (Eurasian Geography and Economics v. 59 no. 5-6, 2019) pp. 657-684 for a textured perspective on regional inequality in Kazakhstan.
16. Please see the introduction of the "Strategy for Achieving Carbon Neutrality in the Republic of Kazakhstan by 2060."
17. Atakhanova, Z., Azhibay, S. Assessing economic sustainability of mining in Kazakhstan. Mineral Economics (2023). https://doi.org/10.1007/s13563-023-00387-x
18. Interview with an analyst from an international consulting agency, May 2023.
19. On the 16th of December 2011, workers of mining companies who continued to request an increase in salary since May 2011 refused to leave their tents set up at the Zhanaozen's central square. Police tried to clear the central square to celebrate Independence Day, but protesters started throwing rocks and smashing sound equipment. As a result of the tension between mining workers and local police, people were killed and more than 100 injured.

20. Resolution of the Government of the Republic of Kazakhstan dated May 25, 2012, No. 683, on the approval of the Program for the Development of Monotowns for 2012-2020. Retrieved from: https://adilet.zan.kz/rus/docs/P1200000683.
21. Resolution of the Government of the Republic of Kazakhstan dated December 27, 2019, No. 990, on the approval of the State Program for the Development of Regions for 2020 - 2025. Retrieved from: https://adilet.zan.kz/rus/docs/P1900000990.
22. Official website of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Regional statistics (2012-2017). Retrieved on October 16, 2023, from the source: https://stat.gov.kz/ru/region/
23. Junussova M., and Bemisheva A. (2020). Monotowns of Kazakhstan: Development Challenges and Opportunities. In A. Koulouri & N.Mouraviev (Ed.), Kazakhstan's development journey: Entrenched paradigms, achievements, and the challenge of global competitiveness. London: Palgrave Macmillan.
24. Interview with a representative of the national-level management responsible for decarbonization, March 2023.
25. Interview with an analyst from a non-governmental organization, April 2023
26. Interview with a representative of the national-level management responsible for regional development, March 2023.
27. Interview with an analyst from a non-governmental organization, April 2023.
28. Interview with an analyst from an international consulting agency, May 2023.
29. Junussova M., Maulsharif M., & Soltybaeva S. (2022). Sustainable infrastructure development in Central Asian cities. NARXOZ University: Central Asian Economic Review, 5(146), pp. 53–67. DOI: https://doi.org/10.52821/2789-4401-2022-5-53-67 (in Russian), p. 58.
30. Interview with a representative of the national-level management responsible for urban development, March 2023.
31. Interview with a representative of the national-level management responsible for regional policy, March 2023.
32. Ibid.
33. Interview with a representative of the national-level management responsible for regional policy, April 2023
34. Ibid.
35. Ibid.
36. Samruk Kazyna. (2022) Low Carbon Development Concept of JSC "Samruk Kazyna." Retrieved from: https://sk.kz/investors/financial-performance/reports/low-carbon_development_concept_en.pdf
37. Interview with an analyst from a non-governmental organization, April 2023.
38. Interview with an analyst from an international consulting agency, May 2023.
39. Environmental Code of the Republic of Kazakhstan (version as of May 1, 2023). Retrieved from: https://online.zakon.kz/Document/?doc_id=39768520.
40. Temirgaliyeva, N., and Junussova, M. (2020). Renewable Electricity Production and Sustainability of the National and Regional Power Systems of Kazakhstan. Silk Road: A Journal of Eurasian Development 2(1), pp. 35–53. DOI: https://doi.org/10.16997/srjed.15.
41. Interview with an analyst from an international consulting agency, May 2023.
42. Ibid.
43. Interview with an analyst from a non-governmental organization, April 2023.
44. Interview with a representative of the national-level management responsible for urban development, March 2023.
45. Ibid.
46. Interview with a representative of the national-level management responsible for regional policy, April 2023.
47. Ibid.
48. Ibid.
49. Interview with a representative of the national-level management responsible for urban development, March 2023.
50. Interview with an analyst from an international consulting agency, May 2023.
51. Interview with an analyst from a non-governmental organization, April 2023.
52. Interview with a representative of the national-level management responsible for decarbonization, March 2023.
53. Interview with a representative of the national-level management responsible for urban development, March 2023.

54. Ibid
55. Interview with an analyst from a non-governmental organization, April 2023.
56. Interview with a representative of the national-level management responsible for urban development, March 2023.
57. KazMunayGas. (2021) Low Carbon Development Program 2022-2031. Retrieved from: https://www.kmg.kz/en/sustainable-development/low-carbon-development-program/.
58. Greenstein E. (June 8, 2022) Chevron and KazMunayGas announce collaboration to explore potential carbon emissions reduction opportunities. https://inbusiness.kz/en/news/chevron-and-kazmunaygas-announce-collaboration-to-explore-potential-carbon-emissions-reduction-opportunities.
59. Bogatyr Komir is one of the world's largest open pit coal mining enterprises, operated in Ekibastuz and accounting for 70 % of all coal mined in the Ekibastuz coal basin and 40 % of the total coal production in Kazakhstan.
60. Interview with a representative of the national-level management engaged in decarbonization, March 2023.
61. Interview with an analyst from a non-governmental organization, April 2023.
62. The University of Central Asia, in collaboration with international partners under the guidance of the Organization for Economic Cooperation and Development (OECD), is already engaged in enhancing the qualifications of civil servants from Kazakhstan, Kyrgyzstan, Mongolia, Uzbekistan, Tajikistan, and Turkmenistan. Learn more at www.sipa-centralasia.org.
63. For example, it is possible to adapt materials from the course "Transition to Clean Energy," developed by the Kazakh-German University (DKU) in partnership with other Kazakhstani universities and available in open access. You can find the project at the following link: https://crs.dku.kz/en/main-directions/program-on-green-energy-and-climate/clean-energy-transition-course/
64. Here, we reference the term introduced by U.S. researchers and its interpretation proposed by colleagues from Canada: "Social justice encompasses political actions aimed at minimizing the harmful impact of industrial and other economic activities on workers, local communities, and society as a whole, while maximizing their potential benefits": Krawchenko, T., Gordon, M. (2022). Just transitions for oil and gas regions and the role of regional development policies, Energies, Special Issue: Challenges and Research Trends of Energy Transition in Fuel-Dependent Regions, 15(13), 4834, (p. 1).
65. Our proposals are supported by expert opinions - interviews with representatives of the national government and an international consulting agency, May 2023.
66. Our proposals are supported by expert opinions - interviews with representatives of the national government, March-April 2023.
67. Our proposals are supported by expert opinions - interviews with representatives of the national government and non-governmental organization, March-April 2023.
68. Our proposals are supported by expert opinions - interviews with representatives of the national government, March-April 2023.
69. Our proposals are supported by expert opinions - interviews with representatives of the national government and non-governmental organization, March-April 2023.
70. Interview with a regional development analyst and researcher, Ministry of National Economy, March 2023.
71. Our proposals are supported by expert opinions - interviews with representatives of the national government and non-governmental organization, March-April 2023.

NOTES

Cover Photo Source

The image on the cover of this report was generated using AI software, though the prompt A scene at a Kazakh mine site during its closure. The image focuses on the mine's entrance, with obvious mining equipment such as conveyours. The images was generated by Michael Hilliard, on the 14th February, 2024.

Decarbonizing Kazakhstan:
What Future Awaits Mining Regions and Towns?

Written by

Madina Junussova, Zarina Adambussinova and Alexander Diener

Edited by

Edward Lemon, Bradley Jardine and Michael Hilliard

Copyright, 2024

For more information please visit

www.oxussociety.org