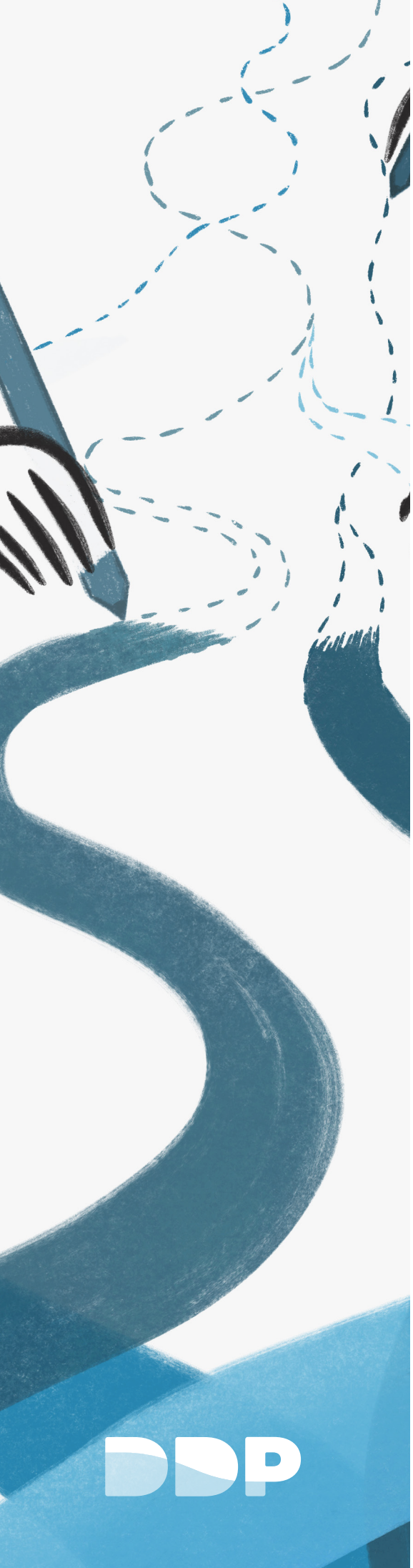

KAZAKHSTAN
POST-PARIS DECARBONIZATION ACTIONS AND STRATEGIC PLANNING FOR CARBON NEUTRALITY

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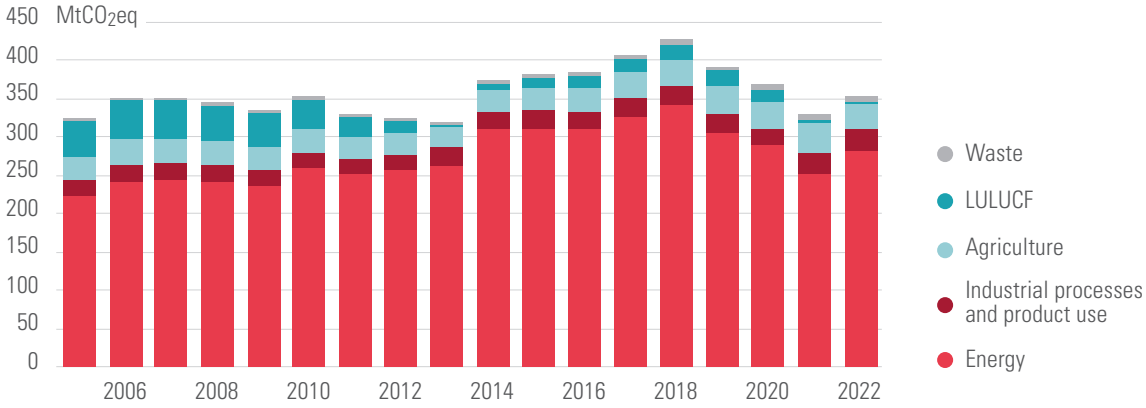
KEY NUMBERS

Kazakhstan, the largest economy in Central Asia, has positioned itself as a prospective regional leader in green and low-carbon development. During the 1990s, the country experienced a dramatic 40% decline in net greenhouse gas (GHG) emissions (including LULUCF), reflecting what can be described as an "unwilled and costly decarbonization." This drop was primarily the result of a deep economic crisis, with GDP contracting by an estimated 35–40%, triggered by the dissolution of Soviet-era economic structures, widespread industrial collapse, and a sharp drop of population wellbeing. Following this turbulent decade, Kazakhstan entered a period of "recarbonization" beginning in 2000. Over the next two decades, net GHG emissions increased by 53%—an average annual growth rate of nearly 2%—driven by the recovery and fossil fuel-intensive development of the national economy.[1] Between 2005 and 2015, prior to Kazakhstan's ratification of the Paris Agreement, net GHG emissions rose from 323 $MtCO_2e$ to 380 $MtCO_2e$, marking a 23% increase despite emerging climate policy efforts (**Figure 1**). In 2013, Kazakhstan launched its national emissions trading scheme (ETS), the first in Central Asia. However, the scheme's initial design failed to drive significant corporate mitigation. It was suspended

1 UNFCCC, Kazakhstan - National Inventory Submissions 2024.

Figure 1. GHG emissions in Kazakhstan



Source: UNFCCC, Kazakhstan - National Inventory Submissions 2024.

in 2016–2017 to resolve operational issues and reform quotas allocation rules. Today, the ETS covers nearly half of national emissions and is regarded as the country's main regulatory tool for emission control. Its planned expansion to additional sectors and offset projects is expected to strengthen Kazakhstan's Paris Agreement implementation.

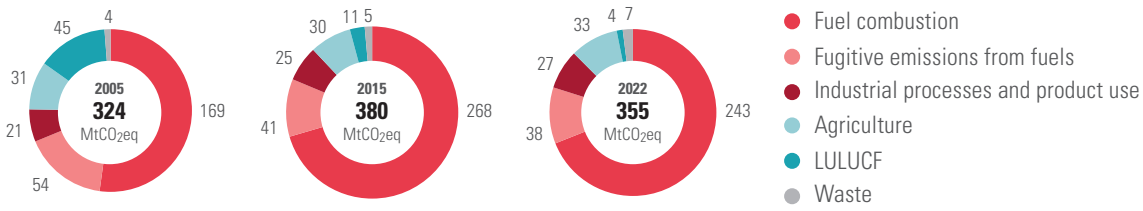
Following Kazakhstan's accession to the Paris Agreement in 2016, emissions continued to rise for three years (up 12%) before falling by 23% in 2019–2021. The initial decline in 2019 was driven mainly by weaker industrial output and lower energy demand, as several energy-intensive sectors—particularly metallurgy and oil refining—reduced production due to global market conditions and maintenance outages. Domestic coal use also dropped slightly, supported by milder weather and modest efficiency gains in the power sector. This temporary dip was amplified in 2020–2021 by the COVID-19 pandemic, which sharply reduced industrial activity, transport, and fossil fuel consumption, while also disrupting oil production and exports. Although energy efficiency improvements and the gradual uptake of renewables contributed marginally, the national ETS played only a secondary role compared to the pandemic-induced contraction. By 2022, emissions had rebounded slightly to around 350 $MtCO_2e$, underscoring that the decline reflected temporary circumstances rather than structural decarbonization. In 2023, GHG emissions (excluding LULUCF) remained almost stable, according to the World Bank Group database.[2]

The fuel and energy sector remains a cornerstone of Kazakhstan's economy. In 2022, the hydrocarbon industry accounted for approximately 18% of GDP, generated over 35% of state budget revenues, and comprised around 60% of total exports (World Bank, 2023). For decades, coal has continued to dominate electricity and heat generation, shaping the country's emissions profile.

Fuel combustion represents the principal source of Kazakhstan's greenhouse gas emissions, with its share increasing from 52% in 2005 to 69% in 2022 (**Figure 2**). Fugitive emissions, primarily methane from oil, gas, and coal operations, constituted 17% of national GHG emissions in 2005 but declined to 11% by 2022, reflecting modest progress in leak detection and infrastructure improvements. The contribution of land use, land-use change and forestry (LULUCF) to net emissions dropped markedly over the same period, from 14% in 2005 to 2% in 2022, largely due to forest conservation efforts and changes in land management practices. Meanwhile, the shares of industrial processes, agriculture, and waste sectors have remained relatively stable, averaging 8%, 9%, and 2% of total emissions, respectively. Kazakhstan's ratification of the Paris Agreement in 2016 did not mark an immedi-

2 https://data.worldbank.org/indicator/EN.GHG.TOT.ZG.AR5?end=2023&locations=KZ&start=2005

Figure 2. Structure of GHG emissions in Kazakhstan in 2005, 2015, 2022.



ate inflection point in these trends: emissions continued to grow until 2018 and only declined thereafter due to temporary economic factors, most notably the COVID-19 crisis, rather than structural mitigation efforts. This suggests that, up to now, the Paris Agreement had limited direct impact on the trajectory and structure of Kazakhstan's emissions.

A critical factor influencing Kazakhstan's GHG emissions trajectory is the aging and deteriorating production infrastructure, particularly within the energy sector mostly inherited from the Soviet era. The majority of the country's power plants operate on outdated technologies that have exceeded their design lifespans. As of recent assessments, approximately 60% of key power plant equipment is depreciated, with certain facilities exhibiting even more advanced stages of deterioration. Compounding this challenge is the poor condition of electricity and heat distribution systems, which suffer from systemic inefficiencies. In some regions, technical losses in distribution networks reach as high as 35% of total electricity transmitted. These infrastructure deficits significantly undermine energy efficiency and contribute to elevated emission intensities, underlining the urgent need for large-scale modernization and targeted investment in resilient, low-carbon energy infrastructure.

Kazakhstan's energy sector also faces other challenges, including methane emissions, which are a significant contributor to its GHG output. Efforts are underway to implement projects aimed at reducing methane leaks and improving overall emission control. The inclusion of methane in the national ETS and participation in the Global Methane Pledge (GMP) initiative further underscore these efforts.

Nuclear energy is emerging as a potential cornerstone of Kazakhstan's strategy to enhance both energy security and decarbonization. Leveraging its status as one of the world's leading uranium producers, Kazakhstan is well-positioned to develop a domestic nuclear power sector. In 2024, a national referendum supported the construction of a nuclear power plant. Prospective reactor suppliers include Russia and China, with operations expected to commence by 2035. However, the proposed development has drawn strong criticism from environmental NGOs and independent experts. Opponents cite concerns over water scarcity, heightened risks from severe climate change, environmental impacts, and the long-term safety of nuclear technologies. Geopolitical risks, particularly the potential dependence on Russian nuclear technology, have also been flagged as a major vulnerability.

Agriculture is the second-largest emitter in the country, producing 33 $MtCO_2e$ per year (as of 2022), primarily methane emissions from livestock. The sector is both impacted by and contributing to climate change, affecting water availability, land degradation, and deforestation. Forest management, afforestation and reforestation, modern agroforestry solutions, and land use practices can contribute significantly to reaching the decarbonization goals of the country. The initiative of expanding carbon farming was announced by Kazakhstan's President Tokayev in 2024, aiming to effectively utilize the vast land resources, especially in the areas affected by degradation and desertification.

ROLE OF LONG-TERM PERSPECTIVE

Kazakhstan's Doctrine (Strategy) for Achieving Carbon Neutrality by 2060 marks the culmination of nearly a decade of progressive efforts to "domesticate" the Paris Agreement and translate its global commitments into a coherent national policy framework. The Strategy estimates $610 billion in required investments for deep decarbonization, of which only 4% is expected from government funds. More than half of the required financing ($386 billion) is anticipated through reallocation of existing investment plans in the energy, transport, and industrial sectors, while $224 billion will need to come from additional new investments. In the short term, about $10 billion by 2030 is required to kick-start priority decarbonization measures.

The Strategy is closely linked to the government's sequential steps in aligning national policy with the Paris Agreement and its long-term development goals. The country has progressively strengthened its climate governance architecture since ratification of Paris Accord in 2016:

2016–2019: With support from international partners, Kazakhstan initiated capacity-building and analytical work to mainstream climate objectives into national and sectoral strategies. Early activities included modeling and analysis of long-term low-emission development scenarios, pilot studies and trainings on carbon markets, and incremental refinements of the domestic regulatory framework, particularly the national ETS. These efforts laid the groundwork for a more structured approach to implementing the Paris Agreement.

2020–2022: Comprehensive analytical materials were developed to assess longer-term decarbonization options. These served as the basis for the Strategy of Carbon Neutrality, which established a national strategic vision for achieving net-zero emissions by 2060. The Doctrine provided an initial assessment of the socio-economic and environmental impacts of the transition, as well as indicative cost estimates. This was the first official articulation of Kazakhstan's carbon neutrality goal.

2023–2025: These earlier building blocks converged in the adoption of the Strategy for Achieving Carbon Neutrality by 2060, formally endorsed at the highest political level. The Strategy set out detailed sectoral decarbonization pathways, including coal phase-out, large-scale renewable and nuclear energy development, hydrogen deployment, electrification of transport, improved energy efficiency, and the introduction of carbon capture technologies. To operationalize these commitments, the government launched in 2024 the development of a comprehensive Roadmap for Strategy implementation, supported by international partners. This unprecedented exercise—expected to be completed in 2025—engages hundreds of experts and think tanks across 18 thematic areas, ranging from sectoral targets (energy, transport, oil and gas, etc.) to financing instruments and regulatory mechanisms, making it one of the most ambitious climate policy design processes in the country.

Kazakhstan has committed to achieving carbon neutrality by 2060 - a goal first announced at the Climate Ambition Summit in December 2020. The Strategy was published for public comments in 2021 and officially adopted via Presidential Decree in February 2023. This Strategy represents a fundamental scaling up of ambition compared to the country's intended nationally determined contribution (iNDC) submitted ahead of COP21 in 2015, which was far from transformational. At that time, Kazakhstan pledged an unconditional reduction of 15% below 1990 emission levels by 2030, with the possibility of a conditional reduction of up to 25%, subject to international support. These targets reflected incremental improvements rather than systemic decarbonization, relying heavily on efficiency gains and modest structural changes. The shift from such limited, conditional pledges to a long-term carbon neutrality goal marks a significant change in Kazakhstan's climate policy narrative, aligning it more closely with global net-zero trajectories, even though implementation challenges remain substantial.

This long-term commitment is underpinned by several strategic frameworks. The Green Economy Concept, originally adopted in 2013 and operationalized in the updated plan in 2024, sets targets for "alternative" electricity - defined as a mix of renewable and nuclear sources - at 30% by 2030 and 50% by 2050. To some extent, this marks a noteworthy change that can be attributed to the momentum created by the Paris Agreement: while the original 2013 concept emphasized incremental diversification of the energy mix, the 2024 plan situates renewable and low-carbon energy expansion more explicitly within Kazakhstan's carbon neutrality narrative. This reflects a shift from policy measures framed largely around energy efficiency and diversification toward an integrated decarbonization agenda, consistent with the broader international pressure and norm-setting effects of the Paris process. At the same time, the context for Kazakhstan's businesses and investors has changed significantly: global growth in green investment flows is reshaping access to finance, while international carbon regulation frameworks such as the EU's Carbon Border Adjustment Mechanism (CBAM) directly affect Kazakhstan's export-oriented industries, especially in steel, cement, and fertilizers. In parallel, the rapid diffusion of ESG reporting standards and carbon footprint disclosure requirements - often demanded by foreign partners and international capital markets - are placing increasing pressure on Kazakhstani companies to improve transparency and align with global low-carbon practices. Together, these external drivers reinforce the domestic policy shift, suggesting that Kazakhstan's 2024 plan reflects not only internal political will but also the international dynamics catalyzed by the Paris Agreement.

A key element of Kazakhstan's forward-looking climate policy is the Roadmap to Carbon Neutrality, drafted by a large group of experts under the supervision of the Ministry of National Economy. As of May 2025, the Roadmap has been released for stakeholder and public consultations. It includes sectoral decarbonization plans for energy, transport, industry, waste, forestry, land use, and agriculture, alongside regulatory mechanisms such as an emissions trading system, green finance mechanisms and carbon offsetting projects. The Roadmap adopts a phased approach, outlining near-term regulatory reforms, medium-term technology deployment, and long-term structural shifts across the national economy. The Strategy estimates a total investment requirement of $500-610 billion by 2060, with financing mapped across a range of public and private instruments designed to intensify the green transition.

Despite these high-level commitments, Kazakhstan faces significant challenges in operationalizing its long-term vision. Institutional fragmentation, overlapping mandates, and policy inconsistencies persist. While strategic goals are well-articulated in national documents, their implementation is hampered by continued coal subsidies, delayed energy pricing reforms, and weak enforcement of environmental and energy efficiency standards. These issues contribute to a disconnect between ambition and execution, undermining investor confidence and slowing progress.

Nevertheless, the long-term perspective has provided a critical anchor for Kazakhstan's climate policy discourse, helping to align national objectives with global climate goals, promote cross-sectoral coordination, and attract international cooperation. The continued refinement of the Long-Term Low Emission Development Strategy (LT-LEDS) and integration of its scenarios into public investment and regulatory processes remain essential to closing the gap between vision and action.

According to the Ministry of National Economy, Kazakhstan's GHG emissions are projected to decline from 353 $MtCO_2e$ in 2022 to 327 $MtCO_2e$ by 2030, 163 $MtCO_2e$ by 2050, and reach net zero by 2060. Sectoral projections indicate substantial reductions in the energy, transport, building, and waste sectors, alongside incremental carbon removals from forestry and large-scale deployment of carbon capture and storage (CCS) technologies, although the latter remain under-defined.

Kazakhstan's analytical and scientific support for decarbonization policy dates back to 2014, when government agencies coordinating the country's

iNDC initiated expert and stakeholder consultations on 2030 targets, ahead of the Paris COP21. Early assessments by teams from EBRD, USAID, and Nazarbayev University proposed moderate targets of 10–15% reductions from 1990 levels by 2030. However, after a critical review and assessment of adopted sectoral goals by a group of independent experts and the Green Academy Centre, the government approved more ambitious targets: a 15% unconditional and 25% conditional reduction by 2030.

Despite resistance from anti-decarbonization lobbies, these targets were retained in Kazakhstan's first NDC (2016) and updated NDC (2023), forming the foundation of the country's long-term carbon neutrality strategy. However, this continuity does not represent a genuine rise of ambition as envisioned under the Paris Agreement's five-year review cycle, but rather the avoidance of backsliding. The NDC targets for 2030 remain modest and essentially incremental when compared to the transformational challenge of achieving net-zero by 2060. The critical issue lies in the internal consistency of Kazakhstan's long-term perspective: the 2030 targets, if left unchanged, risk locking in a pathway that is incompatible with a credible 2060 net-zero trajectory. Without a strengthened interim target that reflects both the Paris ratchet mechanism and the mounting international pressures the credibility of the 2060 neutrality pledge remains questionable, as short-term ambition does not yet align with the long-term vision. However, the ongoing preparation of NDC3.0 reflects a continued lack of ambition, as policymakers tend to debate whether to adhere to the previously determined 15–25% reduction targets rather than advancing more stringent goals.

The policy landscape now increasingly reflects the integration of long-term climate goals into national development planning. The government was supported by extensive analytical work, including cost-benefit analyses, emissions scenarios, and macroeconomic modeling aligned with Paris-compatible trajectories. Notably, the GIZ-supported project (2020–2022), in cooperation with local think tanks, significantly contributed to outlining Kazakhstan's decarbonization opportunities and timelines. The analysis provided sectoral pathways, investment needs, socio-economic and environmental benefits, and policy sequencing options, thereby helping to translate the 2060 carbon neutrality goal into more tangible medium-term actions. Other key contributors include the World Bank, EBRD, and ADB, which emphasized financing strategies and technology deployment, as well as the OECD and IDDRI under the Sustainable Infrastructure Programme in Asia (SIPA), which highlighted governance reforms and cross-sectoral integration. Collectively, these analytical inputs serve to bridge the gap between high-level political commitments and actionable policy measures, offering Kazakhstan a more structured basis for aligning near-term targets with its long-term neutrality trajectory. Future research - such as the application of the IDDRI's Deep Decarbonization Pathways (DDP) Dashboard and the AFD-ESTEEM model - aims to further strengthen knowledge and capacity for the socio-economic and financial analysis of low-carbon transformation across key sectors.

EXAMPLES OF CONCRETE PROGRESS

Progress over the past decade includes meaningful developments in several sectors. In the energy sector, Kazakhstan has adopted renewable energy support programmes, initiated electricity grid modernization, and energy efficiency improvement through advanced standards, smart metering, and electrification of heating.

The renewable energy sector has witnessed significant expansion, particularly following the introduction of an auction mechanism in 2018. This competitive procurement system replaced earlier feed-in tariff schemes with technology-specific tenders, increasing transparency, reducing investor risk, and providing long-term power purchase agreements guaranteed by the state. According to some estimates, the auctions stimulated strong competition and resulted in a 55% reduction in renewable energy tariffs compared to pre-auction

levels.[3] As of 2024, Kazakhstan had 154 operational renewable energy facilities with a combined installed capacity of just over 3 GW, comprising 51% wind, 40% solar, and 9% small hydropower. In that year, these renewables generated about 7.6 billion kWh of electricity, accounting for 6.4% of national output. The national plan aims for 8.4 GW of renewables by 2035, with investment inflows already exceeding USD 5 billion, largely supported by international financial institutions such as the EBRD, ADB, and Chinese development banks. The auction mechanism's strengths lie in its ability to attract foreign capital, lower generation costs, and create a predictable framework for investors. It also helped diversify Kazakhstan's energy mix while reducing fiscal burdens associated with fixed feed-in tariffs. However, its limitations include relatively small auction volumes compared to the scale of needed decarbonization, concentration of projects in resource-rich regions (southern and western Kazakhstan), and persistent challenges with grid integration and balancing capacity. In addition, limited local manufacturing capacity and policy uncertainty around future auction schedules have constrained the development of domestic supply chains. Thus, while the auction system proved effective in catalyzing initial growth in renewables, scaling up toward the 2035 and 2060 targets will require addressing these structural barriers, alongside complementary investments in transmission infrastructure, storage, and regulatory reform.

Electricity market reforms initiated in 2019 sought to increase competition and transparency in Kazakhstan's wholesale power market. Key elements included the gradual move from administratively set tariffs toward market-based pricing for generation, the strengthening of the Financial Settlement Center to ensure reliable payments to independent producers, and the introduction of clearer rules for market access. These changes helped reduce payment risks, improve contract enforcement, enhance investor confidence and facilitate greater participation by private and foreign investors, particularly in renewables.

The strengths of this reform design lie in its improved transparency, reduced counterparty risk, and more predictable investment environment. The reforms also created a framework that could, in principle, better integrate renewable projects through auctions and long-term power purchase agreements. However, several limitations have constrained the decarbonization impact. Persistent fossil fuel price distortions, especially state-regulated, below-cost coal and natural gas prices, undermine the competitiveness of renewables by artificially lowering baseline electricity costs. Cross-subsidization between industrial and household consumers continues to obscure true cost signals, dampening incentives for efficiency and low-carbon investment. The absence of a robust balancing market and limited grid flexibility hampers large-scale integration of variable renewable energy. As a result, the reforms improved market functioning but fell short of creating strong structural incentives for decarbonization, which will require addressing fossil fuel subsidies, strengthening carbon pricing, and modernizing the grid.

Kazakhstan joined the Global Methane Pledge in 2022 and considers concrete actions to reduce methane emissions, primarily in the energy sector at the first stage. Pilot leak detection and repair (LDAR) programs have been introduced in cooperation with the World Bank and UNEP. Satellite monitoring technologies are now utilized for flare verification and leakage detection. Also, Kazakhstan is aligning its methane reporting protocols with international MRV standards through steps toward compliance with Oil & Gas Methane Partnership 2.0 (OGMP 2.0) requirements.

In the transport sector, the government has launched a phased vehicle renewal program, eased regulations for EV imports, and invested in rail and public transport improvements. This integrated approach combines technology adoption, infrastructure upgrades, and fleet modernization, which helps reduce emissions and improve air quality. Its strengths include a clear focus on shifting away from the most polluting vehicles and supporting alternatives to private car use. However, EV adoption is still hampered by high

3 https://www.korem.kz/eng/press-centr/novosti_otrasli/?cid=0&rid=7283&utm_source=chatgpt.com

costs and limited charging infrastructure, while rail and public transport expansion requires long-term financing and better institutional coordination. Overall, these steps move the sector in the right direction but remain insufficient to fully align with long-term decarbonization roadmaps, which foresee near-total electrification of transport and major reductions in car dependency.

In the buildings sector, stricter thermal insulation norms and programs for the deployment of heat pumps are being introduced to cut emissions and reduce energy demand. This approach leverages both regulation and technology deployment, with strong potential for energy savings and cost reductions for households. Its strengths lie in creating structural efficiency gains and promoting cleaner heating systems. Yet, progress is limited by the slow turnover of building stock, high upfront costs of retrofits, and insufficient household access to finance and subsidies. Without stronger support schemes and wider private investment mobilization, the pace of efficiency improvements will fall short of long-term strategies and the 2060 carbon neutrality roadmap, which require widespread deep renovations and near-zero-emission buildings.

EXAMPLES OF CONCRETE BLOCKAGES

Despite notable policy reforms and strategic commitments, Kazakhstan's decarbonization efforts continue to face significant structural and systemic barriers. Coal remains deeply entrenched in the country's energy system, both politically and economically. It accounts for approximately 67% of electricity generation and 80% of thermal energy production.[4] About 32,000 direct jobs in coal-dependent regions[5] create strong socio-political inertia against rapid phase-out.

One major challenge is the slow pace of fossil fuel subsidy reform, which continues to distort energy prices and weaken market signals for low-carbon investments. IEA estimated the total subsidy level at 1.8% of national GDP (as of 2019).[6] These subsidies continue to distort price signals, discourage private investment in low-carbon technologies, and impede energy market liberalization. Efforts to reform subsidies have encountered strong resistance from vested interests in the coal and oil sectors.

Coal production and use receives substantial subsidies, estimated at around USD 2.2 billion annually[7]. These subsidies are delivered in various forms, including direct financial support to energy producers, public investment in coal-related infrastructure, tax incentives for mining operations, and price controls on goods and services that reduce production costs. Such measures distort energy markets, undermine the competitiveness of renewables, and weaken incentives for diversification.[8]

Decarbonization of the industrial hard-to-abate sectors, especially in steel and cement production, is constrained by technological and financial limitations. Kazakhstan's ETS remains underdeveloped, with carbon prices below USD 1 per ton of CO_2[9], minimal compliance flexibility, and continued free allocation of allowances. As a result, the ETS exerts little pressure on industry to adopt low-carbon technologies. There is also a notable absence of commercial-scale CCS initiatives, green hydrogen pilots, or electrification strategies, which are critical for aligning heavy industry with long-term emission reduction pathways.

Urban transport and building energy efficiency remain underdeveloped largely due to a combination of weak enforcement, insufficient supporting policies, and gaps in strategic imple-

4 Beisengazin K. (2025) Coal Sector of Kazakhstan: Challenges and Opportunities for Decarbonizing the Economy, UNCTAD, Integrated Policy Strategies and Regional Policy Coordination for Resilient, Green and Transformative Development: Supporting Selected Asian BRI Partner Countries to Achieve 2030 Sustainable Development Agenda, Project Paper No. 26.

5 Ministry of Industry and Construction of Kazakhstan, AMM: Coal industry of Kazakhstan, 7 June 2024 https://www.gov.kz/memleket/entities/mps/press/news/details/788299?lang=ru

6 IEA (2020) Value of fossil-fuel subsidies by fuel in the top 25 countries, 2019 https://www.iea.org/data-and-statistics/charts/value-of-fossil-fuel-subsidies-by-fuel-in-the-top-25-countries-2019

7 IEA (2020) Value of fossil-fuel subsidies by fuel in the top 25 countries, 2019 https://www.iea.org/data-and-statistics/charts/value-of-fossil-fuel-subsidies-by-fuel-in-the-top-25-countries-2019

8 Agora Energiewende and Qazaq Green (2024): Enabling a just coal transition in Kazakhstan. Opportunities, challenges and strategic pathways.

9 ICAP, Kazakhstan Emissions Trading System 2025. https://icapcarbonaction.com/fr/ets_system/46

mentation. Electric vehicles account for less than 1% of the national vehicle fleet, reflecting both the absence of strong financial incentives and the lack of adequate charging infrastructure. Similarly, while building codes intended to enhance energy efficiency formally exist, enforcement is limited, and compliance remains low, especially outside major cities. Public transport infrastructure is unevenly distributed, with metro systems confined to Almaty and most other urban centers lacking comprehensive electric mobility solutions. Deployment of electric buses and other low-carbon options remains negligible, in part because of inadequate subsidy schemes, limited municipal financing, and insufficient integration of urban transport planning into national climate strategies. Taken together, these gaps suggest that the main barriers are not only technological or financial but institutional — namely, weak enforcement capacity and the absence of a coherent, well-resourced policy framework to accelerate change at scale.

Progress in emissions reduction within the Agriculture, Forestry, and Other Land Use (AFOLU) sectors remains limited. In agriculture, sustainable land-use practices and low-emission production methods have not been sufficiently scaled up. The sector continues to lack dedicated mitigation programs, policy incentives, and investment frameworks to support a transformative shift toward climate-resilient and low-carbon agricultural systems. Sustainable forest management and afforestation are recognized as important pillars of the national carbon neutrality strategy. However, the scale and effectiveness of mitigation actions remain constrained. Despite the launch of the Presidential "Two Billion Trees by 2030" initiative, implementation has been modest, and afforestation outcomes have yet to match the ambition of the target.

Kazakhstan's pathway to a low-carbon economy is obstructed by a complex mix of economic dependencies, institutional inertia, distorted market incentives, and technological gaps. Overcoming these barriers will require coordinated policy action across sectors, acceleration of subsidy reform, enhanced enforcement of regulatory frameworks, and substantial investment in innovation and green infrastructure. Without systemic interventions, the country's long-term climate commitments risk remaining largely aspirational.

LINKS WITH NON-CLIMATE QUESTIONS

Climate policies in Kazakhstan intersect closely with key economic, social, and fiscal priorities. Its economic growth is largely based on gas and oil revenues, accounting for around 35% of GDP and 75% of exports (as of 2023).[10] This dependency creates significant vulnerability to fossil fuel market volatility and introduces tension between climate objectives and fiscal sustainability.

Since 2015, there has been little substantive evolution in addressing the social dimension of the transition. While national strategies increasingly emphasize carbon neutrality and sectoral decarbonization measures, policies to support workers and communities dependent on fossil fuel industries have not advanced. Employment transitions remain a critical blind spot: coal regions such as Karaganda and Pavlodar still host tens of thousands of jobs directly linked to the fossil fuel economy, yet no comprehensive national just transition strategy has been adopted. The absence of retraining programs, labor mobility measures, or targeted social protection mechanisms means that local populations see decarbonization primarily as a threat to livelihoods, rather than an opportunity. This neglect has generated persistent resistance to reform among affected communities and local authorities, reinforcing political inertia. The lack of progress on the social dimension stands out as one of the most significant gaps between the net zero target and the strategies designed to achieve it, undermining both the feasibility and social legitimacy of the transition.

From a macroeconomic perspective, delayed reforms in Kazakhstan's climate policy and energy systems pose growing risks to competitiveness. The introduction of the EU CBAM and tightening global ESG requirements may reduce access to

10 Crédit Agricole Group (2025), Kazakhstan - Economic and political overview https://international.groupecreditagricole.com/en/international-support/kazakhstan/economic-overview

international markets and capital for carbon-intensive industries if proactive adjustments are not implemented. Kazakhstan's key export sectors - aluminium, iron and steel, and fertilizers - are directly affected by the EU's CBAM, with potential export losses of up to $250 million/year by 2035. If CBAM expands to more sectors, petroleum products and chemicals could also face major trade impacts, raising potential losses to over $1.4 billion/year.[11]

There are initial signs that these threats are beginning to trigger policy attention, though not yet at the scale needed for a credible low-carbon transition. CBAM could potentially create a strong indirect incentive for Kazakhstan to decarbonize its industrial base in order to maintain EU market access. Sectoral discussions have emerged around deploying renewable electricity for energy-intensive industries, investing in green hydrogen pilots, and considering carbon footprint certification for exports. However, progress has been negligible yet: industrial modernization projects remain limited, the carbon pricing system is underdeveloped, and no comprehensive industrial decarbonization strategy has been adopted. Without stronger policies, such as targeted support for low-carbon industrial technologies, robust carbon pricing aligned with EU benchmarks, and measures to integrate producers into green value chains, the response risks being too slow and fragmented. As it stands, CBAM pressure is acting more as a warning signal than a transformative driver, but it could evolve into a catalyst if accompanied by a clear strategic pivot by the government.

Key socio-economic issues such as employment in coal-dependent regions, affordability of energy services, and the fiscal implications of climate-related investments are increasingly part of the national discourse. However, there remain significant gaps in the assessment of the socio-economic impacts of decarbonization policies and measures. While climate priorities are often linked rhetorically to economic diversification, energy security, and investment strategy, these connections are not yet well studied or systematically integrated into policy frameworks.

GOVERNANCE

Climate governance in Kazakhstan has evolved significantly in recent years, though it still remains fragmented and inconsistent. Several institutional enablers have supported these changes. The creation of a dedicated Green Finance Committee, proposals for a more effective carbon pricing and reforms in national ETS, and gradual introduction of green procurement mechanisms demonstrate an expanding governance framework. Coordination across ministries has improved, with a central climate policy unit under the Ministry of Ecology, and inter-ministerial groups supporting policy design. Green financing channels are gradually maturing, with increased issuance of green bonds and development of taxonomies aligned with international standards.

The Ministry of Ecology and Natural Resources serves as the lead institution responsible for coordinating national climate policy and representing Kazakhstan in international climate negotiations under the UNFCCC framework. However, MENR's authority is limited by institutional capacity constraints and a lack of enforcement powers, which hinders its ability to ensure implementation across sectors, socio-economic assessments and sectoral regulations.

Core economic ministries, particularly the Ministry of National Economy and the Ministry of Finance, have yet to fully integrate climate objectives into macroeconomic planning, fiscal policy, and public budgeting processes. This disconnect weakens the government's capacity to strategically manage the transition to a low-carbon economy in a socially inclusive and economically sustainable manner. While international partners and donors have played an essential role in supporting Kazakhstan's climate agenda - offering technical expertise and financial assistance - there is an increasing need for more targeted cooperation. Priority areas include innovation

11 World Bank Group (2024) Kazakhstan - Country Climate and Development Report, Background note - EU CBAM: Modelling the Impacts on Kazakhstan's Economy https://openknowledge.worldbank.org/server/api/core/bitstreams/8ff1c67a-12c7-5b19-bcd6-bb89d3f14d87/content

systems, green industrial policy, and financing mechanisms to support a just transition.

Institutional coordination remains a critical gap. Although inter-agency working groups exist, their mandates are often limiting their strategic impact. The National Coordination Council on Sustainable Development, established in 2018 to serve as a cross-sectoral platform, is coordinated by the Ministry of National Economy and plays a role of high-level advisory on SDGs. The Presidential Council on the Transition to a Green Economy provides a forum for discussion of green policy issues. However their mandates are consultative and their influence on policy implementation is limited.

A recent draft law proposes the establishment of a high-level Climate Council under the Prime Minister to centralize coordination and drive climate-related reforms. However, this body remains in the planning phase and currently lacks allocated funding. The absence of such an institution significantly impedes the integration of climate objectives into national development strategies and undermines efforts to implement systemic policy reforms.

Stakeholder participation in climate governance is also limited. Civil society organizations, private sector actors, and subnational authorities remain underrepresented in strategic planning and decision-making processes. Broader public engagement, including that of local communities and vulnerable populations, is minimal, reducing the legitimacy and effectiveness of climate policy.

There have been meaningful steps toward strengthening institutional capacity in decarbonization and sustainability issues. Zhasyl Damu has taken on a central role in supporting the technical implementation and monitoring of Kazakhstan's ETS. Several ministries, including the Ministry of National Economy and the Ministry of Finance, have begun to engage with climate-related fiscal and investment planning, signaling a gradual shift toward mainstreaming climate considerations into economic governance.

In 2024, a new expert advisory group was established to guide the revision of Kazakhstan's NDC and coordinate international engagement. This group includes representatives from government bodies, academic institutions, international partners, and the private sector, reflecting a more inclusive approach to climate policy formulation. While these developments mark important progress, sustained political commitment and institutional reform remain essential. Without a more integrated governance architecture and stronger enforcement mechanisms, Kazakhstan may struggle to achieve its long-term decarbonization targets and fully align with its international climate commitments.

INTERNATIONAL COOPERATION

International cooperation has been instrumental in supporting Kazakhstan's decarbonization. Over the past decade, multilateral development banks, UN agencies, and bilateral donors have provided analytical, financial, and capacity-building support. The EU, OECD, EBRD, ADB, and GIZ have contributed to sectoral strategies, infrastructure investments, and regulatory reform.

The European Bank for Reconstruction and Development (EBRD) has been a major partner, investing approximately USD 4.6 billion in green infrastructure since 2015. The Asian Development Bank (ADB) has played a key role in supporting renewable energy auctions and institutional capacity building, particularly in the solar sector. The World Bank has provided technical assistance on developing measurement, reporting, and verification (MRV) frameworks and methane emissions reduction strategies.

Despite these achievements, critical gaps remain. There is currently no targeted Just Transition Fund to retrain or support workers in coal-dependent regions, leaving a major gap in addressing social equity concerns within the transition. Reform of Kazakhstan's ETS requires international expertise and financial support, particularly to design and implement carbon allowence auction systems and to progressively tighten emissions caps in line with net-zero goals.

The technological cooperation remains underdeveloped. Pilot projects for carbon capture and storage (CCS), green hydrogen, and digital energy systems remain at a nascent stage,

with limited domestic funding and insufficient international co-financing. Bridging these gaps through expanded and targeted international partnerships will be critical to Kazakhstan's ability to deliver on its 2060 carbon neutrality ambition. Enhanced focus on technology transfer, concessional finance, and implementation of Paris Agreement's Article 6 mechanisms can provide the foundation for a resilient and inclusive low-carbon transition.

PATHWAYS FORWARD: STRATEGIC PRIORITIES

Kazakhstan's decarbonization trajectory depends on its ability to overcome structural inertia and fully leverage regional and international opportunities. The path to carbon neutrality by 2060 demands focused strategic action in five key areas:

1. **Coal phase-out strategy**: The government must develop a comprehensive, socially just plan for transitioning away from coal. This includes preparing detailed timelines for mine closures, establishing robust job retraining and relocation programs for displaced workers, and supporting economic diversification initiatives in coal-dependent regions such as Karaganda and Pavlodar.
2. **Institutional reforms**: Establishing a permanent, high-level climate coordination body under the Prime Minister's Office would enable more coherent, cross-sectoral governance. This institution should have a clear mandate, legal authority, adequate funding, and the ability to convene ministries, regional authorities, and key stakeholders.
3. **Carbon pricing reform**: Strengthening Kazakhstan's ETS is essential. Introducing a minimum carbon price floor of at least USD 10 per ton of CO_2, phasing out free allocations, and aligning caps with the 2060 neutrality target will create market incentives for emission reductions and support clean investment.
4. **Green industrialization**: The government should promote domestic value chains for green technologies, including wind and solar components, energy-efficient materials, and battery storage. Specific attention should be given to the decarbonization of steel and cement sectors and to piloting green hydrogen production and application in industry.
5. **Finance mobilization**: Kazakhstan must enhance access to climate finance through the issuance of sovereign green bonds, development of sustainable finance taxonomies, and participation in global climate funds. Blended finance instruments and public-private partnerships can help scale investments in infrastructure, innovation, and resilience.

These strategic priorities will be pivotal in shifting Kazakhstan from incremental changes toward a transformative, resilient, and inclusive net-zero development model.

CONCLUSIONS

Kazakhstan is at a critical crossroads. Its 2060 carbon neutrality pledge signals a clear ambition to lead regional efforts in climate action. Over the past decade, the country has made tangible progress in renewable energy deployment, institutional reform, and international cooperation. However, systemic barriers, including fragmented governance, fossil fuel dependence, and inadequate enforcement, continue to undermine the pace and depth of the transition.

Bridging the implementation gaps will be decisive for Kazakhstan's climate credibility. Advancing policy coherence, scaling up investment, and delivering a just transition for workers and communities are essential next steps. Success will depend on transforming political will into operational capacity, aligning economic structures with climate goals, and sustaining international partnerships. By confronting these challenges, Kazakhstan can affirm its role as a regional climate leader and chart a path toward a sustainable and inclusive low-carbon future.

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