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GOVERNMENT SUPPORT AND RENEWABLE-ENERGY INVESTMENT IN KAZAKHSTAN

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Abstract.
Purpose. To evaluate how Kazakhstan's renewable-energy (RE) support policies have influenced private-sector investment and to identify persisting barriers that could prevent the country from reaching its 2030 and 2050 green-transition targets.
Design/methodology/approach. A qualitative content-analysis was performed on thirty-eight Kazakh RE laws, decrees and strategic programmes issued between 2009 and 2024. These primary sources were triangulated with fifteen multilateral assessments (ADB, EBRD, IEA, IRENA, UNDP) and twenty-two peer-reviewed studies. Manual thematic coding (Bowen, 2009; Braun & Clarke, 2006) generated six analytical themes: policy stability, financial incentives, regulatory efficiency, investor trust, grid integration and international cooperation.
Findings. Feed-in tariffs (FITs) and competitive auctions have effectively decreased price volatility, bringing down the average solar and wind strike prices by approximately 40%. However, three structural bottlenecks – intermittent tariff revisions, high domestic borrowing costs and grid congestion in the resource-rich south – continue to depress investor confidence.
Originality. This is the first English-language study to synthesise the full 2009-2024 Kazakh policy corpus and systematically map perceived investment barriers to specific legal instruments in a post-Soviet context.
Keywords: renewable energy, policy support, investment climate, Kazakhstan, qualitative analysis.

Introduction

Kazakhstan – ranked ninth globally by land area – remains Central Asia's economic heavyweight, owing largely to abundant coal, oil and natural-gas reserves. Fossil fuels accounted for 84 % of national primary-energy supply in 2023 (IEA, 2023). The carbon-intensive profile contrasts sharply with the global decarbonisation push and Kazakhstan's own international commitments. In 2016 the Republic ratified the Paris Agreement (UNFCCC, 2015), pledging to reduce economy-wide greenhouse-gas emissions by 15 % below 1990 levels by 2030. Two flagship road maps as concept for Transition to a Green Economy (2013) – set a 10 % renewable-electricity target for 2030 and 50 % for 2050 and Kazakhstan-2050 Strategy (2014) – embedded these energy aims in a broader socio-economic agenda.

Yet progress has been modest. At the end of 2024, renewables generated only 6.4 % of national electricity (IEA, 2024), well below the interim trajectory needed for the 2030 milestone. To stimulate clean-energy investment, the government implemented four main policy instruments such as Feed-in tariffs (FITs) – introduced under the Law on Supporting the Use of Renewable Energy Sources (2009), guaranteeing offtake at technology-specific tariffs and Tax incentives – exemption from VAT and customs duties on imported RE equipment (2012) and a corporate-income-tax holiday for early-stage projects (2018 amendment).

Competitive auctions – launched in 2018 to replace FITs gradually and lower costs via market discovery.

Concessional loans – routed through the Development Bank of Kazakhstan (DBK) at softer terms than commercial finance.

A prima-facie assessment suggests partial success: auction strike prices for utility-scale solar PV fell from USD 0.19 kWh in 2018 to USD 0.11 kWh by mid-2022

(MEGNR, 2019; 2022), while cumulative installed RE capacity grew from 190 MW (2013) to 3.2 GW (2024). Nevertheless, multiple projects were delayed or downsized, and foreign-direct-investment (FDI) inflows into renewables have plateaued since 2021.

Scholarly commentary is divided. Optimistic accounts emphasise Kazakhstan's improving regulatory clarity and regional leadership in auctions (Aitken et al., 2020). Pessimistic analyses highlight three unresolved bottlenecks: (i) tariff volatility during the 2013-2015 currency devaluations; (ii) under-capitalised local banks unable to extend long-tenor project loans; and (iii) a Soviet-era grid concentrated in the coal-rich north, forcing southern solar farms to curtail output (Bissenova, 2022).

Research gap and objective. Existing literature either chronicles policy milestones or examines single case-studies (e.g., a specific 100 MW wind farm). Comprehensive, document-based thematic analysis covering the entire 2009-2024 corpus–and explicitly linking each instrument to an investment barrier–is absent. This paper fills that gap.

How effective are Kazakhstan's government support mechanisms in mobilising renewable-energy investment, and what barriers still prevent the country from achieving its green-transition targets?

By answering, we contribute to (1) practical policy design for emerging-market decarbonisation and (2) theory on institutional impediments to energy transitions in post-Soviet economies.

Literature review

The review is structured in four blocks: (A) global policy instruments, (B) finance and risk, (C) post-Soviet institutional context, and (D) Kazakhstan-specific scholarship. Parts A and B are provided in this segment; Parts C and D appear at the start of Part 2. The review emphasizes how reliable incentives, accessible financing, and strong grid infrastructure all work together to shape the success of renewable energy investments.

Global policy instruments. The past two decades have delivered an extensive empirical record on how policy design shapes renewable-investment flows. Three stylised facts emerge: Long-term revenue certainty lowers risk premiums. Feed-in tariffs (FITs) and contracts-for-difference (CfDs) guarantee developers a predictable cash flow, reducing the cost of capital by 300-600 basis points in emerging markets (Jenner et al., 2013).

Auctions outperform administratively set tariffs when calendars are regular and pre-qualification strict. Meta-analyses of 95 national auction schemes show average cost reductions of 38 % over the first six rounds when governments publish multi-year pipelines (IRENA, 2019).

Retroactive changes destroy confidence quickly. Spain's 2013 FIT claw-back and Czechia's 2011 solar levy caused multi-billion-dollar arbitration cases and a 75 % collapse in new investment within two years (Steffen, 2018).

Finance and risk perception. Beyond headline borrowing costs, the finance literature distinguishes between nominal and effective cost of capital. High real interest rates in emerging markets interact with exchange-rate volatility to create what BloombergNEF (2021) calls a "double premium." Kazakhstan illustrates the pattern vividly: the tenge lost about fifty percent of its value during the 2014-2015 devaluation cycle and a further seventeen percent during the 2020 oil-price collapse. When McCrone et al. (2022) modelled a 100-MW solar project under local-currency versus hard-currency finance, the levelised cost of electricity (LCOE) diverged by nineteen US-dollars per megawatt-hour even though the feed-in tariff was identical in real terms. Currency mismatch on its own can wipe out the benefits of two entire auction rounds.

Developers respond by adopting four main risk-mitigation tactics. First, they negotiate dollar- or euro-indexed PPAs that transfer foreign-exchange risk to the offtaker; this can cut interest-rate spreads by 150-200 basis points, but it is politically sensitive because retail tariffs are capped in tenge. Second, sponsors seek cover from export-credit agencies such as Germany's Euler Hermes or China's Sinosure. An ECA wrap often pushes a project's rating toward investment grade, yet the additional diligence typically adds half a year to the timeline and seldom covers more than seventy percent of the senior debt. Third, project owners co-finance with multilateral senior tranches-EBRD, ADB or IFC-as a signalling device that crowds in commercial mezzanine. While effective, this blended-finance route remains capped by limited concessional envelopes and comes with complex covenant stacks that many local banks find burdensome. Fourth and finally, some sponsors simply front-load equity, raising their share above thirty percent to reduce debt exposure; the obvious trade-off is a lower internal rate of return.

Taken together, these tactics confirm Steffen's (2018) core argument: tariff design alone is not enough. Without credible macro-financial architecture-stable inflation targeting, deeper local bond markets, and affordable hedging instruments-the risk-

adjusted cost of capital will continue to constrain Kazakhstan's renewable build-out.

Institutional context in the post-Soviet space. Most Commonwealth of Independent States (CIS) inherit grid assets and regulatory templates from a single, vertically integrated Soviet power system. Transmission infrastructure remains state-monopolised and dispatch codes are calibrated for baseload coal and gas rather than variable renewables. Scholars talk about three problems in institutions that come from this history.

First, permitting complexity: utility-scale projects must navigate regional akimats, two national ministries and at least one state-owned grid operator; legal competence is fragmented and paperwork heavy. Second, tariff socialisation: politically capped retail prices limit the scope for fully cost-reflective wholesale tariffs, placing upward pressure on subsidies or corporate off-taker balance sheets. Third, fiscal rigidities: because hydrocarbon rents dominate public budgets, reallocating subsidies from fossil fuels toward clean energy faces entrenched political resistance.

Georgia's experience offers a counter-narrative. The country unbundled generation and transmission in 2004, introduced dollar-indexed PPAs for renewables, and cleared a two-gigawatt pipeline by 2020-all while maintaining macro-financial stability. The Georgian case demonstrates that institutional reform can overcome Soviet-era constraints when political commitment aligns with credible macro-economic policy.

Kazakhstan-specific scholarship. Kazakhstan's academic literature can be divided into three main streams, each offering valuable insights but also having their own limitations in scope.

Policy chronologies document every legislative milestone, from the 2009 FIT law to the latest auction decree. Key sources include annual bulletins by the Ministry of Ecology, Geology and Natural Resources (MEGNR, 2019) and legal-database digests issued by the Ministry of Justice (MoJ, 2017). These chronologies are invaluable reference points yet remain largely descriptive, seldom probing causal mechanisms.

Project case-studies drill into individual assets such as the 50-MW Burnoye Solar-2 plant examined by Aitken et al. (2020). While rich in technical and financial detail, they often extrapolate macro-level conclusions from micro-level evidence. Currency volatility, for instance, shaved three percentage points off Burnoye's internal rate of return-important for that project, but not necessarily generalisable.

Barrier diagnostics rely on stakeholder surveys. The UNDP (2021) study of thirty-six investors ranks grid curtailment and loan tenor as the top two constraints. Such diagnostics are persuasive yet static snapshots; they seldom trace how barriers evolve as new policies roll out.

What the literature lacks is an integrated, longitudinal analysis that (a) spans the full 2009-2024 documentary window, (b) triangulates domestic legal texts with external evaluations, and (c) assigns each instrument to the six thematic barriers outlined earlier. Addressing that comprehensive gap is the motivation behind the present research.

Methodology

A qualitative, interpretivist design is chosen because policy meaning and investor perception are socially constructed and cannot be fully captured by quantitative indicators alone. Document analysis enables longitudinal tracing of regulatory change, while triangulation with multilateral and academic sources mitigates single-document bias.

Primary corpus (n = 38) – full texts of laws, decrees, auction regulations, strategy road-maps (2009–2024). Each document downloaded in original Russian/Kazakh, machine-translated to English, then manually checked by a bilingual reviewer.

Secondary corpus (n = 37**)** – fifteen multilateral reports (ADB, EBRD, IEA, IRENA, UNDP) and twenty-two peer-reviewed articles indexed in Scopus or WoS. Inclusion criteria: deals explicitly with Kazakhstan RE policy or investment and published 2013–2024.

Coding strategy

Following Bowen (2009), a three-round coding protocol was adopted:

Open coding – researchers independently labelled text fragments; emergent codes were tabulated (367 raw codes).

Axial coding – raw codes clustered under six parent-themes established from literature: policy stability, financial incentives, regulatory efficiency, investor trust, grid integration, international cooperation.

Selective coding – narrative synthesis linked themes to investment behaviour Inter-coder reliability on a 10 % random subsample achieved $\kappa = 0.86$, meeting "substantial" agreement thresholds. NVivo 14 allowed for organizing and storing codes, but interpreting and making sense of the data required manual effort.

Triangulation – multiple data types (laws, reports, academic studies).

Audit trail – all code decisions logged; corpus publicly archived via Zenodo (DOI provided upon acceptance).

Results and discussion

Thematic results are presented in order of explanatory weight, as assessed by frequency of coded references and corroboration across sources.

Policy stability. Findings. The 2009 FIT regime guaranteed offtake for 15 years but denominated tariffs in tenge. When the national currency depreciated by 50 % in 2014-2015, Cabinet Resolution 271 revised FIT coefficients downward, triggering project delays and two ICSID arbitration notices. Auction regulations (2018) ostensibly rectified this by pegging tariffs to the exchange rate on bid day and indexing to CPI; however, annual auction volumes fluctuated: 300 MW tendered in 2019, only 180 MW in 2021, despite a 300 MW schedule (MEGNR, 2019; 2022).

Interpretation. Investor interviews compiled by EBRD (2022) show risk premia remain 250 bps above those in Uzbekistan, whose PPAs are USD-indexed. Policy credibility thus improves but remains partially discounted.

Financial incentives

Findings. Median solar strike prices fell from USD 0.19 to USD 0.11 kWh (−42 %) between the first and fourth auction rounds; wind dropped from USD 0.056 to USD 0.035 kWh (−37 %). Yet commercial debt costs exceed 13 %. DBK's concessional loan window (USD 400 million) is fully allocated, leaving new projects reliant on foreign lenders at LIBOR + 6–8 %. This wipes out ~30 % of the tariff gain.

Interpretation. Cost-of-capital, not energy-resource quality, forms the binding constraint. Without parallel financial-sector reforms. Green-bond markets and risk-sharing facilities, for instance, require more than lowering tariffs to support fast growth in capacity.

Regulatory efficiency. Detailed permit timelines reveal a median of 412 days from land-lease application to commercial-operation date for projects < 50 MW, versus 270 days regional benchmark (UNDP, 2021). Bottlenecks reside in the cadastre (land rezoning) and technical-conditions (grid connection) stages. Absence of a one-stop digital portal forces paper submissions to five separate offices.

Investor trust. Survey data from UNDP (2021) shows that about 63% of international respondents still see Kazakhstan as a medium-risk country compared to its regional neighbors. They often point to the 2015 retroactive FIT haircut as a key reason why they feel that way. Establishment of an emissions-trading system in 2018 improved rankings marginally but not enough to reclassify the market as low-risk.

Grid integration. KEGOC's north-centric 500 kV backbone forces southern PV farms to curtail at peak generation; curtailment averaged 8.7 % of potential output in 2022, up from 4 % in 2019. Battery-storage pilots are confined to a 10 MWh demo plant near Almaty. Transmission upgrades totalling USD 1.8 billion are planned but unfunded.

International cooperation. Kazakhstan's renewable build-out has relied on three principal multilateral programmes. First, the Renewable Energy Framework arranged by the European Bank for Reconstruction and Development (EBRD) together with the Green Climate Fund provides a credit envelope of roughly USD 500 million in senior loans and risk-sharing instruments; between 2018 and 2023 it financed seven utility-scale plants totalling about 830 MW. Second, the Asian Development Bank's Solar Power Support Facility–backed by a USD 200 million sovereign guarantee–has underwritten three photovoltaic parks (≈ 270 MW). Third, the Regional Green Economy Facility managed by UNDP and co-funded by JICA supplies around USD 90 million in blended grants and concessional loans; to date it has supported Kazakhstan's first grid-friendly battery-storage pilot (10 MWh near Almaty).

Together these programmes have supplied roughly 30 percent of total utility-scale capital expenditure. Project developers commend the EBRD's standardised PPA template for lowering due-diligence costs, but also note that donor environmental-and-social safeguards lengthen approval timelines by six to nine months. Misalignment persists–for instance, Kazakh law exempts projects below 50 MW from a full environmental-impact assessment, whereas multilateral lenders still require one–leading to duplicated procedures and higher transaction costs.

This synthesis weaves together the six thematic findings–policy stability, financial incentives, regulatory efficiency, investor trust, grid integration and international cooperation–to explain why Kazakhstan's headline progress (falling tariffs, quadrupled capacity) co-exists with stalled investment momentum. It then situates those dynamics in the broader theoretical debates on energy transitions in resource-dependent economies.

Interdependence of incentives and institutions. At first glance Kazakhstan has ticked every policy box: a feed-in-tariff (FIT) era to kick-start the market, technology-specific auctions to lower costs, tax breaks to sweeten early cash-flows, and concessional credit lines to relieve borrowing costs. Yet the three most-frequent investor complaints–tariff volatility, expensive debt and curtailment risk–each trace back to institutional domains that lie outside the energy ministry's remit as Macroeconomic policy: The 2013–2015 currency devaluation, which forced a 22 % FIT haircut, originated in central-bank and fiscal choices unrelated to renewables.

The 13% commercial loan rate primarily indicates underlying risks within the banking sector, such as non-performing assets and limited bond market activity, rather than being directly driven by energy policy.

Grid governance: Transmission planning and financing fall to KEGOC, a state-owned monopoly with its own budget constraints and political oversight.

This supports what Steffen (2018) argued: policy tools only work as trustworthy signals when the supporting institutions are strong. Absent that alignment, risk premiums remain high even when tariff design is world-class.

Qualitative coding revealed that a single event–the 2015 retroactive FIT cut–still shapes investor sentiment in 2024. Foreign developers still tend to increase their required return by about 2 to 3 percentage points when working on projects in Kazakhstan, even after legal protections are in place. This finding extends the notion of the credibility premium beyond advanced economies (e.g., Spain, Czechia) to a post-Soviet context, illustrating path dependence in policy risk: once credibility is lost, multiple cycles of consistent behaviour are required to restore it.

Financing as the new bottleneck. Cost-of-capital now eclipses tariff design as the dominant constraint. With solar strike prices at USD 0.11 kWh–near regional best practice–further tariff declines yield diminishing returns. By contrast, reducing debt pricing from 13 % to 9 % would cut LCOE by roughly USD 15 MWh, more than the last two auction rounds combined. This re-weights policy priorities toward green-finance architecture: credit guarantees, currency-hedge facilities, tenge-denominated green bonds and Basel-aligned risk weightings for RE loans.

Grid readiness as a overall limit. Curtailment currently averages around 8.7%, with projections suggesting it could rise above 12% by 2027 if no upgrades are made. This points to a looming limit on market growth similar to the surge seen during Vietnam's solar boom in 2019.Grid saturation converts technical constraints into financial risk by undermining revenue certainty. Hence, transmission and storage investments are no longer "nice-to-have" but are pre-conditions for the next investment wave.

The study also points out that investor confidence in auction PPAs depends heavily on their trust in the dispatch rules. A tariff that's accurately priced doesn't hold much value if energy can't be reliably supplied. Grid policy is therefore endogenous to perceived tariff risk–another illustration of cross-domain interdependence.

Role of international partners–catalyst yet insufficient. Multilateral frameworks (EBRD, ADB, UNDP/JICA) finance about 30 % of capex and import global standards–standardised PPAs, environmental safeguards, financial due-diligence. Developers praise these features but criticise duplicated approval timelines caused by misaligned safeguards. The implication is twofold such as Catalytic but partial – concessional funds lower early risk but cannot scale the market alone and Norm-diffusion depends on domestic absorption capacity – until national EIA laws converge with donor rules, duplicated reviews will remain a hidden transaction cost.

Implications for theory and practice. Theoretically, Kazakhstan exemplifies the "resource-trap paradox" in energy transition studies: a hydrocarbon-rich state can legislate ambitious green targets and sophisticated incentives, yet investment stalls unless macro-financial and grid institutions co-evolve.

The synthesis emphasizes several key areas for future reforms. (i) locking-in credibility through legal insulation of tariff indexation, (ii) crowding-in low-cost domestic capital via green-bond frameworks and credit guarantees, and (iii) ring-fencing grid-upgrade budgets through transparent, performance-based PPPs.

Without such system-level interventions, incremental tweaks–e.g., marginal tariff adjustments–will deliver limited additional capacity and risk missing the 2030 10 % renewable-electricity milestone.

Conclusion

This study looked at how well Kazakhstan's renewable energy policies are working and tried to identify what's stopping investment from happening. A careful qualitative analysis was performed on thir-

ty-eight key legal documents, cross-referenced with thirty-seven external sources, following a detailed thematic coding approach to ensure thoroughness and accuracy.

Feed-in tariffs and auctions demonstrably lowered strike prices (solar −42 %, wind −37 %) and catalysed a four-fold capacity increase (0.8 GW → 3.2 GW, 2015-2024). Three structural impediments persist–policy volatility remnants, high cost-of-capital (13 % local debt), and north-weighted grid congestion causing up to 9 % curtailment. International co-finance covers 30 % of capex but could scale if domestic permitting and grid bottlenecks are addressed. Lock in PPA indexation clauses and publish a three-year rolling auction calendar; avoid ad-hoc capacity adjustments. Expand DBK's concessional window, enable tenge-denominated green bonds under IFRS-aligned disclosure, and pilot credit-guarantee schemes for local banks. Launch a one-stop e-portal integrating land, cadastre and grid-connection approvals with statutory deadlines (< 120 days). Ring-fence KEGOC's USD 1.8 billion transmission plan within a public-private partnership and deploy at least 200 MWh battery capacity by 2027. Harmonise national EIA thresholds with multilateral standards to eliminate dual review.

This study is constrained by the absence of first-hand stakeholder interviews. The research team attempted a virtual interview campaign in March 2024 but achieved a response rate below 20 %–insufficient for thematic saturation. Consequently, perception analysis relies primarily on UNDP's 2021 investor survey and EBRD consultation minutes. This introduces a potential time-lag bias: investor sentiment may have evolved after the 2022–23 auction rounds. Triangulation with thirty-eight legal documents and fifteen multilateral reports mitigates the risk of single-source dominance; nonetheless, future work should incorporate a Delphi or mixed-method survey once travel and access constraints ease. Finally, because the study centres on Kazakhstan, institutional findings may not fully transfer to other post-Soviet grids without additional comparative cases (e.g., Georgia or Uzbekistan).

Future research could pair this qualitative map with econometric panel analysis once more granular investment data emerge, and could integrate stakeholder interviews to refine perception metrics.

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