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From Tariff Reform to Policy Balance: Maintaining a Dynamic Energy Security–Affordability Equilibrium in Kyrgyzstan's Power Sector

by Anna Arkhangelskaya

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Executive summary

Electricity tariff reform has become one of the central policy challenges for the Kyrgyz Republic, affecting not only electricity prices but also energy security, financial sustainability, investment mobilization, and household welfare. While higher tariffs are essential for modernizing the power sector and supporting the country's energy transition, they also create important social and political challenges. This policy brief argues that tariff reform should be evaluated as a strategic governance instrument rather than solely as a pricing policy.

This policy brief puts forward the Dynamic Energy Security–Affordability Equilibrium (DESAE), a new governance framework for evaluating electricity tariff reforms during energy transition. The analysis indicates that the current Medium-Term Tariff Policy (2025–2030) broadly maintains this balance. Despite average annual tariff growth of approximately 11.7 percent, projected household electricity expenditure remains below internationally recognised affordability thresholds, while sector revenues improve and investment in renewable energy and electricity infrastructure accelerates.

The findings suggest that the objective of tariff policy should not be to maximise cost recovery or minimise electricity prices, but to maintain a sustainable balance between competing policy objectives. Achieving this equilibrium requires gradual and predictable tariff adjustments, targeted social protection, diversified investment financing, enhanced transparency – including greater disclosure of Power Purchase Agreements – and systematic monitoring of affordability, financial sustainability, and energy security.

Keywords: Electricity tariff reform; Energy affordability; Energy security; Financial sustainability; Energy transition; Dynamic Energy Security–Affordability Equilibrium; Kyrgyz Republic.

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List of Acronyms

Acronym	Definition
DESAE	Dynamic Energy Security–Affordability Equilibrium
GHG	Greenhouse Gas
HPP	Hydropower Plant
IEA	International Energy Agency
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
JSC	Joint Stock Company
KGS	Kyrgyz Som
MoE	Ministry of Energy of the Kyrgyz Republic
NDC	Nationally Determined Contribution
PPA	Power Purchase Agreement
RES	Renewable Energy Sources
SME	Small and Medium-sized Enterprise
USD	United States Dollar

Introduction and Policy Challenge

Electricity tariff reform has become one of the most consequential and politically sensitive policy challenges facing the Kyrgyz Republic. The issue extends far beyond utility pricing, lying at the intersection of energy security, financial sustainability, social protection, investment mobilisation, and the low-carbon energy transition. As electricity systems become increasingly capital-intensive and climate risks intensify, tariff policy is evolving from a purely economic instrument into a central element of strategic energy governance.

For decades, Kyrgyzstan maintained one of the lowest electricity tariffs in the post-Soviet space. Supported by abundant hydropower resources, low tariffs helped ensure universal access to electricity but also created persistent structural distortions. Similar approaches across transition economies initially promoted social welfare but gradually weakened utility finances, discouraged investment, and delayed infrastructure modernization.[1] This challenge has been particularly evident in the Kyrgyz Republic, where electricity revenues remained below the cost of supply, limiting investment in maintenance, the rehabilitation of ageing assets, and the installation of new generation capacity. Consequently, tariff policy evolved from a social protection instrument into a structural source of financial vulnerability.

These structural weaknesses have become increasingly evident over the past decade as electricity demand has grown steadily owing to population growth, urbanization, rising household incomes, expanding economic activity, and the widespread use of electricity for residential heating. At the same time, climate change has increased hydrological uncertainty and seasonal supply risks. The Kyrgyz Republic has gradually shifted from a country with seasonal electricity surpluses to one experiencing recurring winter shortages. According to the Ministry of Energy, the national electricity deficit reached approximately 3.8 billion kWh in 2024, more than thirteen times higher than in 2014. At the same time, electricity sector losses increased from KGS 6.2 billion to approximately KGS 8.6 billion, reflecting rising import costs, network expenditures, and delayed infrastructure investment. Under these conditions, tariff reform has become essential for restoring both the financial sustainability and long-term resilience of the electricity sector.

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[1] Foster, V. and Rana, A., *Rethinking Power Sector Reform in the Developing World*, World Bank, 2020.

The policy context has also changed fundamentally. Through its updated Nationally Determined Contribution (NDC 3.0), the Kyrgyz Republic has committed to accelerating renewable energy deployment, rehabilitating hydropower assets, expanding transmission infrastructure, and strengthening regional electricity integration.[2] Analytical estimates prepared for the energy sector during the development of NDC 3.0 suggest investment needs of approximately USD 17.1 billion for mitigation actions and USD 8.8 billion for adaptation measures. Given existing fiscal constraints, electricity tariffs will increasingly serve not only to recover sector costs but also to mobilize domestic resources, leverage concessional finance, and attract private investment for electricity sector modernization.

However, tariff reform also entails significant socioeconomic and distributional risks that require careful policy design. As demonstrated in the Just Transition Readiness Assessment conducted for the Kyrgyz Republic, higher electricity tariffs may reduce the affordability of electricity and essential goods and services, particularly for low-income and vulnerable households, including women-headed households, and those comprising the elderly, persons with disabilities, and residents of newly urbanized areas relying on electricity for heating during winter.[3] Higher energy costs may also undermine the competitiveness of businesses – especially SMEs and energy-intensive industries – by increasing operating costs and reducing profitability, potentially leading to higher consumer prices, lower investment, and job losses. At the same time, maintaining the current system of universal electricity subsidies is fiscally unsustainable and economically inefficient. Residential consumers receive approximately USD 70 million in implicit electricity subsidies annually, yet only around 13 percent accrue to the poorest income quintile, while approximately one-third accrue to the wealthiest households. Conversely, well-designed tariff reform could substantially strengthen the financial sustainability of the power sector by generating additional resources for long-overdue investments in network modernization and infrastructure renewal, thereby improving system reliability and reducing technical losses. International experience further demonstrates that successful tariff reforms depend not only on the pace

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2 Kyrgyz Republic, *Nationally Determined Contribution 3.0 (NDC 3.0)*, United Nations Framework Convention on Climate Change, 2025.

3 United Nations Development Programme, *Navigating Energy Poverty: Sustainable Solutions for Kyrgyz Households in Chui and Jalal-Abad,* United Nations Development Programme, 2025.

of price adjustments but, more importantly, on the availability of well-targeted social protection measures, transparent communication, and credible governance mechanisms that ensure additional revenues are reinvested in improving energy services.[4]

Tariff reform is not solely an economic exercise. Electricity remains an essential service, particularly in the Kyrgyz Republic where many households rely on electricity for winter heating. Consequently, maintaining social acceptability through affordability and targeted protection measures is an equally important objective of tariff policy.[5,6]

Affordability, however, depends not only on electricity prices themselves but also on the evolution of household incomes and broader economic conditions. In practice, the social and political feasibility of tariff reform is determined by the relationship between electricity expenditure and household ability to pay, rather than by tariff levels alone. Maintaining affordability therefore requires not only well-designed tariff adjustments but also sustained income growth and targeted social protection for vulnerable consumers.[7,8] Recent academic literature increasingly argues that electricity tariff policy cannot be evaluated solely through the lens of utility finance or consumer affordability. Tariff decisions simultaneously influence investment incentives, electricity demand, energy security, market development, decarbonization pathways and the political acceptability of sector reforms.[9,10,11] Consequently, electricity tariffs have evolved from a technical pricing instrument into a central mechanism of energy sector governance.[12]

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4 Arkhangelskaya A., Rescalvo M., Buhain J., Sulaimanova B., Just Transition Readiness Assessment for the Kyrgyz Republic, UNDP, 2025.

5 Foster, V. and Rana, A., Rethinking Power Sector Reform in the Developing World, World Bank, 2020.

6 Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R., *Energy justice: A conceptual review*, *Energy Research & Social Science,* 11 (2016): 174–182.

7 Boardman, B., *Fuel Poverty: From Cold Homes to Affordable Warmth*, Belhaven Press, 1991.

8 Komives, K., Foster, V., Halpern, J., and Wodon, Q., *Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?* World Bank, 2005.

9 Klug, T. W., Beyene, A. D., Meles, T. H., Toman, M. A., Hassen, S., Hou, M., Klooss, B., Mekonnen, A., and Jeuland, M., A review of impacts of electricity tariff reform in Africa, *Energy Policy,* 170 (2022): 113226.

10 Pacudan, R. and Hamdan, M., Electricity tariff reforms, household welfare and energy access: International lessons for developing countries, *Energy Strategy Reviews,* 26 (2019): 100401.

11 Foster, V. and Rana, A., *Rethinking Power Sector Reform in the Developing World*, World Bank, 2020.

12 International Energy Agency, *Electricity 2024: Analysis and Forecast to 2026*, IEA, 2024.

Against this background, the key policy question is no longer whether tariffs should gradually move towards cost recovery, but how tariff policy can simultaneously strengthen energy security, restore financial sustainability, maintain household affordability, and mobilize investment for the energy transition.

To address this challenge, this policy brief proposes the use of the Dynamic Energy Security–Affordability Equilibrium (DESAE) – a governance framework for evaluating electricity tariff policy across four interdependent policy objectives: energy security, financial sustainability, household affordability, and the energy transition. Rather than optimizing any single objective, DESAE conceptualises tariff policy as a continuous balancing process in which these four dimensions evolve simultaneously and must be managed through coherent governance rather than isolated policy interventions. The following sections apply this framework through long-term affordability modelling, sectoral analysis, and international experience to identify a balanced pathway towards a secure, financially sustainable, and affordable electricity sector capable of supporting the energy transition.

From Tariff Reform to Policy Balance: The Dynamic Energy Security–Affordability Equilibrium

Electricity tariff policy has traditionally been assessed against two objectives: ensuring utility cost recovery and maintaining electricity affordability. While both remain essential, they no longer capture the broader role of tariff policy in electricity systems undergoing structural transformation.

As discussed above, recent literature shows that electricity tariffs influence far more than utility finances and consumer prices, they shape investment incentives, electricity demand, energy security, market development, decarbonization pathways, and political acceptance of reforms, and have consequently evolved from a technical pricing instrument into a central mechanism of energy sector governance.[13,14]
This evolution is particularly evident in the Kyrgyz Republic. Historically,

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13 Klug, T. W., Beyene, A. D., Meles, T. H., Toman, M. A., Hassen, S., Hou, M., Klooss, B., Mekonnen, A., and Jeuland, M., *A review of impacts of electricity tariff reform in Africa, Energy Policy,* 170 (2022): 113226.

14 Pacudan, R. and Hamdan, M., *Electricity tariff reforms, household welfare and energy access: International lessons for developing countries, Energy Strategy Reviews*, 26 (2019): 100401.

electricity tariffs were designed primarily to fulfil a social function by ensuring universal access to inexpensive electricity. Today, however, the sector operates in a fundamentally different environment characterised by seasonal supply deficits, ageing infrastructure, rising investment needs, climate uncertainty, and ambitious renewable energy targets. As a result, tariff policy affects not only household electricity bills but also infrastructure financing, energy security, private investment, and the country's long-term energy transition.

Despite this broader role, tariff reforms continue to be evaluated primarily through cost recovery and household affordability. While indispensable, these indicators provide only a partial assessment. Financially sustainable tariffs may become socially unacceptable if affordability deteriorates, whereas persistently low tariffs can undermine investment, increase import dependence, and weaken long-term system reliability. Likewise, restoring utility revenues alone does not guarantee renewable energy deployment where regulatory uncertainty discourages private investment. As an integrated framework for evaluating electricity tariff policy , the Dynamic Energy Security–Affordability Equilibrium (DESAE) put forward in this policy brief addresses these trade-offs. Unlike conventional approaches, DESAE treats financial sustainability, energy security, affordability, and the energy transition as interconnected objectives within a continuously evolving system (Figure 1).

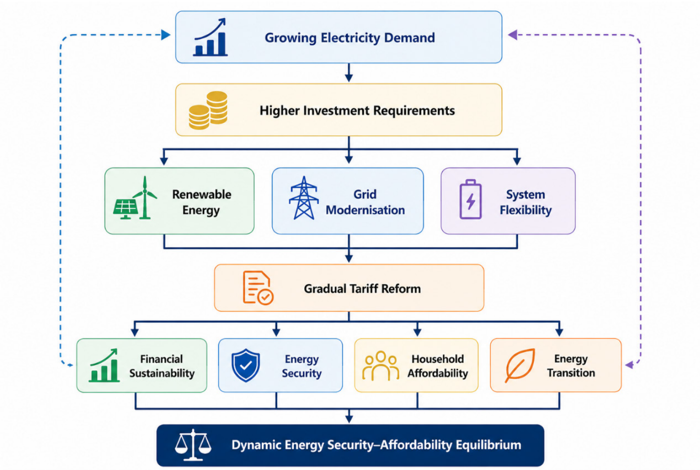

Figure 1. *Conceptual Pathway from Electricity Demand Growth to the DESAE*

Source: *Author's strategic governance framework.*

Improving one dimension inevitably affects the others. For example, higher tariffs may strengthen financial sustainability, expand investment, and improve energy security; however, without targeted support they can weaken affordability, reduce public acceptance, and increase regulatory uncertainty. Conversely, universal electricity subsidies may lower household expenditure in the short term while weakening utility finances, encouraging inefficient electricity consumption for heating, and reducing fiscal space for infrastructure investment.

DESAE therefore does not seek to maximise any single objective but to maintain an adaptive equilibrium among all four dimensions. Instead of searching for an "optimal tariff," it evaluates whether pricing policy preserves an appropriate balance between competing priorities under changing economic and technical conditions.

This perspective has three implications for policy design. First, electricity pricing should be embedded within a broader policy package combining targeted social protection, residential energy efficiency, transparent investment governance, competitive renewable energy procurement, and predictable regulation. Second, affordability should be treated as a dynamic outcome influenced by household incomes, energy efficiency, and targeted support, rather than tariff levels alone. Third, tariff reforms should be assessed according to their contribution to maintaining the DESAE over time, rather than against isolated financial or social indicators.

The following sections operationalize the DESAE through long-term scenario modelling of alternative tariff pathways for the Kyrgyz Republic. By comparing their implications for affordability, financial sustainability, and energy security, the analysis illustrates how different pricing strategies affect the overall balance among the four dimensions of the framework.

3. The Dynamic Energy Security–Affordability Equilibrium in Kyrgyzstan

3.1. Energy Security: From Managing Electricity Supply to Managing System Adequacy

In the Kyrgyz Republic, energy security has traditionally been associated with the availability of domestic hydropower resources and annual electricity generation. However, rapid demand growth, increasing climate variability, and the changing structure of the power system mean that ensuring annual energy sufficiency alone is no longer sufficient.[15] Contemporary electricity security frameworks emphasize that secure power systems depend not only on adequate energy resources but also on system adequacy, operational flexibility and network resilience, particularly during periods of peak demand and supply stress.[16,17]

Forecasts indicate that maximum daily power demand will continue increasing steadily over the coming decade, placing growing pressure on generation capacity, transmission infrastructure, and system flexibility.[18] As demand grows faster than the expansion of existing generation assets, maintaining system adequacy increasingly depends on timely investment in new capacity and supporting infrastructure.

For the Kyrgyz Republic, the key challenge is therefore no longer simply producing sufficient electricity over the course of a year, but ensuring that the power system can reliably meet winter peak demand under increasingly variable hydrological conditions. In hydropower-dominated systems, electricity security is determined not only by total annual generation but also by the availability of dispatchable capacity, transmission capability, and operational flexibility during critical periods. International experience shows that, as variable renewable energy expands, investment in networks, balancing resources, and system flexibility becomes as important as investment in generation

15 International Energy Agency, *Analytical Frameworks for Electricity Security*, IEA, 2021.

16 Cherp, A. and Jewell, J., *The concept of energy security: Beyond the four As, Energy Policy*, 75 (2014): 415–421.

17 International Energy Agency, *Electricity Market Report,* IEA, 2023.

18 Arkhangelskaya, A. and Muktarbek kyzy, A., Climate Change and Electricity Demand: Empirical Evidence and Forecasts for Kyrgyzstan (December 01, 2025), available at SSRN: https://ssrn.com/abstract=6587159 or http://dx.doi.org/10.2139/ssrn.6587159

itself.[19,20] International experience demonstrates that, in hydropower- and renewable-based electricity systems, investments in transmission networks, reserve capacity, storage, and system flexibility become increasingly important for maintaining security of supply as electricity demand grows and generation becomes more variable.[21,22]

Government projections indicate that most new generating capacity expected before 2030 will come from renewable energy projects, including solar, wind, and small hydropower plants developed under long-term Power Purchase Agreements (PPAs). Nevertheless, electricity imports are expected to remain an important component of system adequacy. Although planned imports are projected to decline from approximately 4.2 TWh in 2026 to 0.3 TWh in 2028, they are expected to increase moderately thereafter as electricity demand continues to expand. This suggests that accelerated renewable energy deployment will strengthen domestic supply capacity but is unlikely to eliminate the need for strategic electricity imports in the medium term.

Within the DESAE framework, these developments reinforce the importance of tariff policy as a strategic investment instrument. Cost-reflective tariffs are required not only to maintain the financial sustainability of the power sector but also to mobilise investment in the renewable generation, transmission infrastructure and system flexibility necessary to ensure long-term system adequacy under growing demand and increasing climate uncertainty. Viewed from this perspective, tariff reform contributes directly to strengthening energy security by enabling investments that enhance the reliability, resilience, and adequacy of the electricity system over the long term.

3.2. Financial Sustainability: Tariff Reform Is Financing Transformation Rather Than Closing the Financing Gap

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19 Newbery, D. Shifting demand and supply over time and space to manage intermittent generation: The economics of electrical storage. Energy Policy, 113 (2018): 711–720. https://doi.org/10.1016/j.enpol.2017.11.044

20 International Energy Agency, *Electricity 2024: Analysis and Forecast to 2026*, IEA, 2024.

21 International Energy Agency, *Analytical Frameworks for Electricity Security*, IEA, 2021.

22 Newbery, D. Shifting demand and supply over time and space to manage intermittent generation: The economics of electrical storage. Energy Policy, 113 (2018): 711–720. https://doi.org/10.1016/j.enpol.2017.11.044

Financial sustainability has traditionally been assessed by whether electricity tariffs generate sufficient revenue to recover the costs of electricity supply.[23,24] In the Kyrgyz Republic, however, this perspective is no longer sufficient. As the electricity sector undergoes large-scale modernization, financial sustainability should be evaluated by its ability to finance infrastructure investment, expand generation capacity, and support the energy transition.

Recent tariff reforms have substantially strengthened the sector's financial position. Under the Medium-Term Electricity Tariff Policy, electricity sector revenues are projected to increase from KGS 38.3 billion in 2025 to KGS 79.6 billion by 2030, nearly doubling within five years. At the same time, sector expenditures are also projected to rise – from KGS 40.7 billion to KGS 80.5 billion – reflecting the scale of investment required to modernize the electricity system rather than rising operating costs alone (Table 1).

Table 1. *Projected Financial Balance of the Electricity Sector*

Year	Total Revenue (KGS billion)	Total Expenditure (KGS billion)	Financial Balance (KGS billion)	Cost Recovery Ratio*
2026	45.8	48.0	–2.2	95.5%
2027	52.7	62.2	–9.5	84.7%
2028	60.0	69.3	–9.2	86.6%
2029	68.9	73.3	–4.4	94.0%
2030	79.6	80.5	–0.9	98.9%

Source: *Department of Fuel and Energy Complex Regulation*

Although financial deficits persist throughout most of the planning period, they should not be interpreted as evidence of policy failure. Instead, they reflect an investment-intensive phase of sector transformation. A growing share of expenditure is directed towards renewable energy deployment, transmission upgrades, integration of independent power producers under long-term PPAs, and improvements in system reliability.

23 Jamasb, T. and Pollitt, M. G., Incentive regulation of electricity distribution networks: Lessons of experience from Britain, Energy Policy, 36 (2008): 616–625.

24 Foster, V. and Rana, A., *Rethinking Power Sector Reform in the Developing World*, World Bank, 2020.

This trend is particularly evident in renewable energy procurement. Electricity purchases from renewable energy producers are projected to increase from approximately 130 GWh in 2024 to more than 7.5 TWh by 2030, while annual procurement costs are expected to rise from KGS 474 million to over KGS 36 billion. These expenditures represent investment in new generation assets rather than higher operating costs, strengthening long-term energy security and reducing dependence on seasonal electricity imports.

Nevertheless, tariff revenues alone will not finance the scale of investment required over the coming decade. International experience shows that successful electricity transitions combine gradual tariff reform with concessional finance, climate funds, multilateral development financing, and private investment supported by predictable regulation.[25,26]

Within the DESAE framework, financial sustainability should therefore be understood not simply as eliminating annual deficits, but as creating the financial capacity to support long-term investment while preserving affordability and strengthening energy security.

3.3. Energy Transition: From Low-Cost Hydropower to An Investment-Driven Electricity System

The energy transition in the Kyrgyz Republic extends beyond climate policy. It represents a structural transformation of the electricity sector, changing the economics of electricity supply, investment requirements, and the role of tariff policy.

As mentioned above, for decades, the electricity system relied on large Soviet-era hydropower plants that provided low-cost electricity but required limited reinvestment. While this model enabled some of the lowest electricity tariffs in the region, it also contributed to underinvestment in generation and network infrastructure.

Today, this model is changing rapidly. Government plans increasingly rely on a diversified portfolio of renewable energy projects – including

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25 International Energy Agency, *World Energy Investment 2023*. IEA, 2023.

26 International Renewable Energy Agency, *World Energy Transitions Outlook 2023: 1.5°C Pathway*, IRENA, 2023.

utility-scale solar, wind, and small hydropower – developed under long-term PPAs. According to Central Asia.

Hydropower will remain the backbone of the electricity system, while solar and wind capacity are expected to expand rapidly after 2027, creating a more diversified and climate-resilient generation mix. This diversification is expected to reduce seasonal import dependence, improve system resilience, and strengthen long-term energy security.

At the same time, the transition fundamentally changes the financial structure of the electricity sector. Renewable energy projects require substantial upfront investment and depend on predictable long-term revenue streams. Electricity tariffs thus increasingly function not only as a mechanism for cost recovery but also as a signal of investment credibility, influencing the bankability of renewable energy projects and the ability to attract private capital.

Moreover, expanding renewable energy requires investment not only in generation capacity but also in transmission networks, balancing resources, electricity storage, and overall system flexibility. International experience demonstrates that grid integration often represents a greater long-term investment challenge than renewable generation itself.[27] The experience of Germany's *Energiewende* illustrates that rapid deployment of wind and solar generation without corresponding expansion of transmission infrastructure and system flexibility can create significant operational and investment challenges.[28] These additional infrastructure requirements further reinforce the importance of gradual tariff reform that can mobilize long-term investment across the entire electricity system, rather than in generation assets alone.[29]

Figure 2 illustrates the projected expansion of renewable energy capacity in Kyrgyzstan through 2035. The projected growth underscores that the energy transition is not merely a shift in generation technologies but a system-wide transformation requiring sustained investment in generation, networks, and system flexibility. Consequently, tariff policy increasingly serves as a strategic mechanism for mobilizing the financial resources necessary to support this transformation.

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[27] International Energy Agency, *Electricity Grids and Secure Energy Transitions*. IEA, 2023.

[28] Agora Energiewende, *The Energy Transition in Germany: State of Affairs 2022*, Agora Energiewende, 2022.

[29] World Bank, *Scaling Up to Phase Down: Financing Energy Transitions in the Power Sector*, World Bank, 2023.

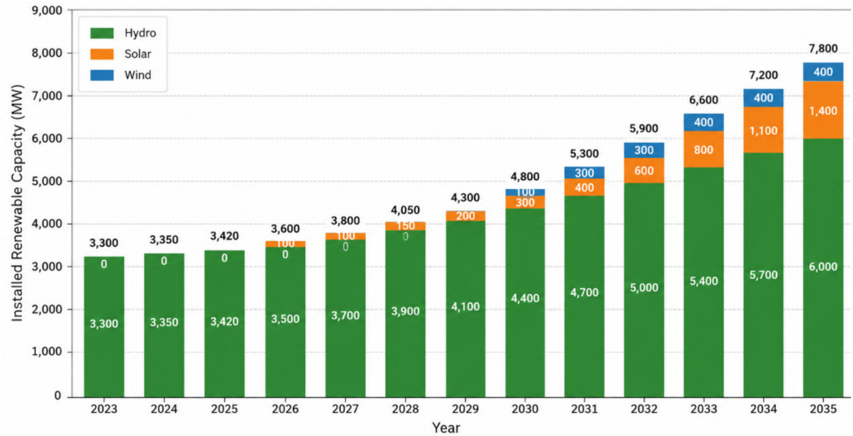

Figure 2. *Projected Renewable Energy Capacity Expansion in Kyrgyzstan (2023–2035)*

Source: *Author's compilation based on the Ministry of Energy of the Kyrgyz Republic (2025).*

International experience shows that successful renewable energy deployment depends not only on adequate tariffs but also on transparent procurement, predictable regulation, and bankable contractual arrangements.[30,31] In this context, improving PPA transparency – including disclosure of standard contract templates, tariff methodologies, and risk allocation principles – would strengthen investor confidence, reduce regulatory risk, and enhance public trust in tariff reform.[32]

Within the DESAE, the energy transition should therefore be viewed not as a competing policy objective but as a cross-cutting driver that simultaneously strengthens energy security, financial sustainability, and long-term affordability, provided that tariff reform is implemented gradually and supported by effective sector governance.

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30 International Energy Agency, *World Energy Investment 2023*, IEA, 2023.

31 International Renewable Energy Agency, *Renewable Energy Finance: Institutional Capital*, IRENA, 2024.

32 Organisation for Economic Co-operation and Development, *Transparency Frameworks for Infrastructure Investment and Public Governance*, OECD Publishing, 2024.

3.4. Energy Affordability: The Social Boundary of The Dynamic Energy Security–Affordability Equilibrium

Among the four DESAE dimensions, affordability serves as the primary indicator of whether tariff reform remains socially acceptable and politically sustainable.

International practice increasingly measures affordability by the share of household income spent on electricity rather than by electricity prices alone.[33,34,35] Although no universal benchmark exists, electricity expenditure exceeding 10 percent of disposable household income is widely regarded as an indicator of elevated affordability risks. This expenditure-based approach is particularly relevant for the Kyrgyz Republic, where electricity is widely used for residential heating during winter. As a result, tariff increases directly affect household welfare, influence the risk of energy poverty, and shape public acceptance of electricity sector reform. Affordability, therefore, represents the social boundary of tariff reform, linking its economic objectives to its political and social sustainability.

To evaluate the social implications of tariff reform, three optional tariff pathways were modelled over the period 2025–2044: (i) the baseline Medium-Term Tariff Policy, (ii) a tariff adjustment scenario with modest acceleration, and (iii) a tariff adjustment scenario with high acceleration. Household electricity expenditure was projected as a share of disposable income under each scenario and compared with the internationally recognised affordability benchmark. The results are presented in Figure 3.

The long-term projections presented in this policy brief should not be interpreted as forecasts but as policy scenarios designed to illustrate how alternative tariff pathways may affect the balance between affordability, financial sustainability, energy security, and the energy transition. As the projection horizon extends, uncertainty inevitably increases owing to macroeconomic conditions, demographic change, technological development, and climate variability. The value of the scenarios therefore lies not in predicting exact outcomes but in comparing the relative implications of alternative policy choices under plausible assumptions.

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33 Boardman, B., *Fuel Poverty: From Cold Homes to Affordable Warmth,* Belhaven Press, 1991.

34 Komives, K., Foster, V., Halpern, J., and Wodon, Q., *Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?* World Bank, 2005.

35 Foster, V. and Rana, A., *Rethinking Power Sector Reform in the Developing World,* World Bank, 2020.

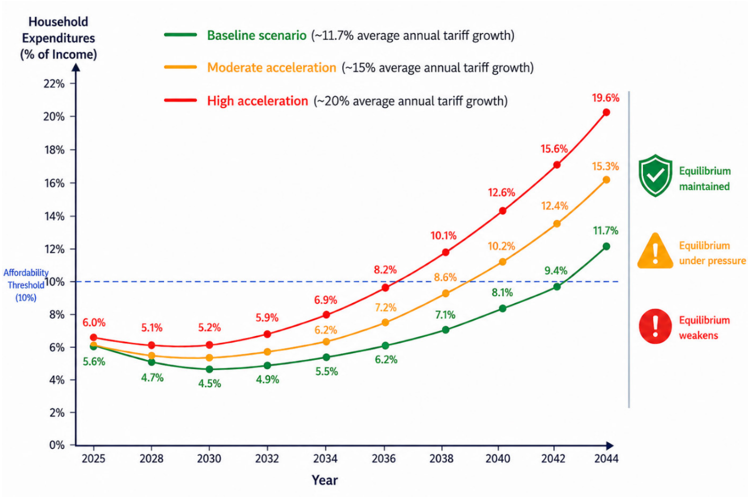

Figure 3. *Projected Household Electricity Affordability under Alternative Tariff Pathways (2025–2044)*

Source: *Author's model based on the Medium-Term Electricity Tariff Policy.*

Figure 3 demonstrates that the three tariff pathways follow similar affordability trajectories during the initial years of the projection period. However, they gradually diverge over time as differences in tariff growth accumulate. The baseline scenario maintains the lowest household electricity expenditure throughout most of the projection period and preserves affordability within acceptable limits. A moderate tariff acceleration gradually narrows the affordability margin and approaches the affordability threshold over the long term. By contrast, the high-acceleration scenario leads to the fastest increase in household electricity expenditure, crossing the affordability threshold earlier and indicating growing risks for household welfare and the political acceptability of tariff reform.

At the same time, affordability represents only one dimension of tariff policy performance. Higher tariffs may improve sector finances and strengthen investment capacity, while lower tariffs may protect consumers but undermine long-term energy security. To capture these broader policy trade-offs, Table 2 compares the three tariff pathways across all four DESAE dimensions.

Table 2. *Comparative Assessment of Alternative Tariff Pathways across The Dynamic Energy Security–Affordability Equilibrium Framework*

Policy pathway	Energy affordability	Financial sustainability	Energy security	Energy transition	Overall assessment
Baseline scenario *(~11.7% average annual tariff growth)*	Maintained	Gradually improving	Improving	Supported	**Balanced equilibrium**
Moderate acceleration *(~15% average annual tariff growth)*	Affordability under pressure	Strong improvement	Strengthened	Accelerated investment	**Financially higher, manageable social risks**
High acceleration *(~20% average annual tariff growth)*	Affordability threshold exceeded	Strongest cost recovery	Strong	Fastest investment mobilisation	**Financially strongest, socially high-risk**

Source: *Author's elaboration.*

The comparison demonstrates that no tariff pathway simultaneously optimises all policy objectives. The baseline scenario provides the most balanced outcome, maintaining household affordability while gradually strengthening financial sustainability, improving energy security, and supporting renewable energy deployment. The moderate acceleration scenario delivers stronger financial performance and investment capacity but places increasing pressure on affordability. Under the high acceleration scenario, financial sustainability improves most rapidly; however, household electricity expenditure exceeds the affordability threshold over the long term, increasing social and political risks.

These findings reinforce the central argument of this policy brief: Electricity tariffs should be viewed not merely as a pricing mechanism but as a strategic governance instrument. Maintaining the DESAE therefore requires not only gradual and predictable tariff reform but also complementary measures, including targeted social protection, diversified sources of investment finance, and greater transparency in renewable energy procurement, particularly through improved disclosure of Power Purchase Agreements (PPAs).

3.5. Towards a More Comprehensive Dynamic Energy Security-Affordability Equilibrium Framework

The DESAE proposed in this Policy Brief is intended as a practical policy framework rather than an exhaustive evaluation methodology. To ensure transparency and operational applicability, the present analysis focuses on four strategic dimensions that are directly influenced by electricity tariff policy: energy affordability, financial sustainability, energy security, and the energy transition.

This simplified framework captures the principal policy trade-offs currently facing Kyrgyzstan's electricity sector. However, the long-term sustainability of electricity sector reforms depends on a broader range of economic, institutional, technical, and environmental factors that extend beyond the scope of this policy brief.

Future applications of the DESAE framework could incorporate additional indicators on electricity system reliability, climate resilience, economic competitiveness, energy poverty, institutional quality, investment mobilization, and environmental performance, providing a more comprehensive basis for assessing the long-term sustainability of electricity sector reforms.

The framework could also be operationalized through a composite DESAE Index, enabling policymakers to monitor the evolution of the electricity sector over time and evaluate how individual policy decisions affect the overall balance between strategic objectives. Such an index would provide a more comprehensive evidence base for future tariff reviews and electricity sector planning.

Accordingly, the framework presented in this policy brief should be viewed as a foundation for further methodological development rather than a definitive assessment tool. Expanding the range of indicators and strengthening their quantitative measurement represent important priorities for future research and policy analysis in Kyrgyzstan.

Concluding Remarks

Electricity tariff reform has become one of the defining policy challenges of Kyrgyzstan's energy transition. No longer simply a mechanism for recovering electricity sector costs, tariff policy now shapes energy security, financial sustainability, household welfare, and investment in a low-carbon electricity system.

This policy brief demonstrates that evaluating tariff reform through a single objective – whether affordability, cost recovery, or renewable energy deployment – is no longer sufficient. Instead, effective reform requires maintaining a DESAE that balances four interdependent objectives: energy security, financial sustainability, household affordability, and energy transition.

The analysis suggests that the current Medium-Term Tariff Policy broadly maintains this balance. Although tariffs are projected to increase gradually, household electricity expenditure is projected to remain below internationally recognised affordability thresholds, while the higher revenues will strengthen the financial foundations needed to modernize infrastructure and expand renewable energy. Medium-term financial deficits should therefore be viewed as part of an investment-intensive transition rather than as evidence of policy failure.

The DESAE analysis suggests that electricity tariff reform should evolve from a pricing policy into an integrated instrument of energy sector governance. Maintaining the DESAE requires coordinated action across tariff policy, investment planning, social protection, and institutional reform.

Recommendations

1. Maintain a predictable and investment-oriented tariff trajectory

Continue implementing gradual tariff adjustments broadly consistent with the Medium-Term Tariff Policy while avoiding abrupt tariff corrections. Predictable tariff trajectories reduce regulatory uncertainty, improve investor confidence, and allow households and businesses to adapt progressively. Future tariff reviews should be linked to long-term electricity demand forecasts, investment requirements, and macroeconomic conditions rather than short-term fiscal pressures alone.

2. Move from universal subsidies to targeted energy affordability policies

Universal electricity subsidies should be progressively replaced by targeted support for vulnerable households. The analysis shows that current subsidies are poorly targeted, with a substantial share accruing to higher-income consumers. Future social protection should combine targeted electricity assistance with regular monitoring of household electricity expenditure as a share of disposable income, ensuring that affordability remains within acceptable limits while allowing utilities to recover costs.

3. Link tariff reform directly to investment delivery

Public acceptance of tariff reform depends on visible improvements in electricity services. The government should therefore establish a transparent mechanism linking additional tariff revenues to clearly identified investments in renewable energy, hydropower rehabilitation, transmission expansion, digitalization, energy storage, and system flexibility. Regular public reporting on the use of tariff revenues would strengthen accountability and increase public trust.

4. Strengthen renewable energy investment governance

Renewable energy deployment should be supported by a more transparent and predictable investment framework. Priority actions include publishing standard PPA templates, tariff-setting methodologies, risk allocation principles, and procurement procedures while respecting commercial confidentiality. Improved transparency would enhance bankability, reduce perceived regulatory risk, and strengthen investor confidence.

5. Diversify financing for the energy transition

Tariff revenues alone cannot finance the scale of investment required. The energy transition should therefore combine domestic tariff reform with concessional finance, climate funds, development bank lending, blended finance instruments, green bonds, and private sector investment. This diversified financing approach would reduce pressure on electricity tariffs while accelerating infrastructure modernization.

6. Integrate DESAE into electricity sector governance

Future tariff reviews should move beyond narrow cost-recovery objectives and instead assess against four complementary dimensions: affordability, financial sustainability, energy security, and investment mobilization. Establishing a Dynamic Energy Security–Affordability Equilibrium (DESAE) monitoring framework with regular reporting would strengthen evidence-based decision-making and improve policy coherence across the electricity sector.

7. Strengthen long-term planning under climate uncertainty

Given increasing hydrological variability and rapidly growing electricity demand, tariff policy should be integrated with long-term resource adequacy planning. Future planning should incorporate climate scenarios, demand forecasting, system flexibility requirements, regional electricity trade, and reserve capacity planning to ensure that tariff decisions support long-term electricity security rather than short-term financial objectives.

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