Policy Brief

Renewable Energy Investment Ecosystem in Central Asia

-Turkmenistan

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Central Asian economies face significant climate-related challenges due to their geographical vulnerabilities and historical dependence on fossil fuels. To address these issues, a study has examined the factors influencing renewable energy investments in Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan).

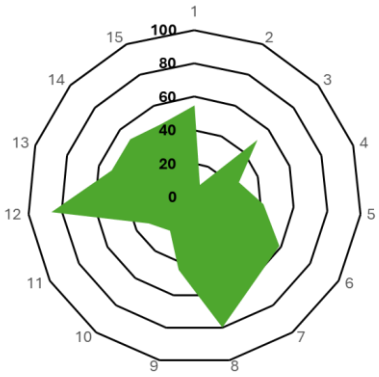
The study has recommended measures for improving the ecosystem for foreign investment into renewable energy in Central Asia, focusing on wind, solar, small-scale hydroelectric and biomass.

The research has identified constraints, challenges, and opportunities across the region through extensive data collection, assessing the capacities and potential for renewable energy investments and has recommended 15 key determining factors (see attachment) for a joint FDI ecosystem in Central Asia, comprising in total 202 distinct elements with different weightings.

Turkmenistan is the country with the lowest overall ecosystem conformance score at 47,05%. The number of non-compliant elements is 117, out of 202. This is lower than Kyrgyzstan, but the element weighting brings Turkmenistan's total score below Kyrgyzstan. Despite being top quintile for the "Public-Private Partnerships" category, the PPP regime is still not widely used for renewables.

The country is in the bottom quintile for the key determining factor "Regulatory Framework & Policy Environment", like Kyrgyzstan. They are the only bottom quintile scores in the research project.

"Market Access" and "Investment protection" reach the 4th quintile, indicating investors might assess Turkmenistan's and Tajikistan's market entry barriers similarly. Of the remaining twelve factors, eight are middle quintile, while low scores for "IPA", "In-country Skilled Workforce", and "Project Developers & EPC Companies" places them in the 2nd quintile with a significant improvement potential. This is illustrated in the figure to the right, showing score against max achievable per category.[1]



Developing a robust RE Investment Ecosystem for FDI is crucial for Turkmenistan's energy sector diversification and economic modernisation. With its heavy reliance on natural gas exports and limited experience in attracting foreign investment, establishing a comprehensive ecosystem is essential to unlock the country's vast RE potential, particularly in solar and wind resources. This ecosystem would not only attract much-needed foreign capital and expertise but also help Turkmenistan transition towards a more sustainable energy future, aligning with global climate commitments and regional cooperation initiatives. An optimised RE ecosystem can:

- Accelerate the development of its nascent renewable energy sector
- Diversify its energy mix and reduce dependence on natural gas
- Attract substantial foreign direct investment and cutting-edge technologies
- Create new job opportunities and foster local expertise in renewable energy
- Enhance energy security and promote regional energy cooperation
- Improve its international standing in climate action and sustainable development

[1] Numbers on the outer perimeter correspond to the numbers of the Key Determining Factors in the attachment.

Below, key findings and takeaways and key recommendations for Turkmenistan are summarised.

Key Climate and Renewable Energy Facts

- Renewable energy development: At a very early stage
- High reliance on natural gas for electricity generation
- Significant potential for solar and wind energy development
- National Strategy for the Development of Renewable Energy until 2030

Turkmenistan has significant untapped renewable energy potential, particularly in solar and wind resources. Despite recent initiatives to diversify its energy mix, the country faces challenges in attracting foreign direct investment due to its centralised economic structure and limited experience with large-scale renewable projects.

Turkmenistan's RE sector is in the early stages of development. As of 2024, the country's RE capacity remains limited, with only a few small-scale solar and wind projects operational. The share of renewables (i.e. hydropower) in the total electricity mix is negligible, estimated at less than 1% of total generation capacity. Several factors are propelling Turkmenistan's RE sector forward:

1. Government aims to reduce dependence on natural gas exports and diversify its energy mix.
2. Participation in global climate initiatives, including the Paris Agreement, is driving RE adoption.
3. Country seeks to attract FDI and technology to modernise its energy infrastructure.
4. Initiatives in the region are encouraging RE development and cross-border energy trade.

Over the past decade, Turkmenistan has taken initial steps towards developing its RE sector:

- **2018**: Accession to the International Renewable Energy Agency (IRENA)
- **2020**: “National Strategy for the Development of Renewable Energy in Turkmenistan until 2030”
- **2020**: Small scale off-grid solar power systems in remote settlements, managed by IDP
- **2021**: Plans to construct first renewables plant of higher capacity (10 MW solar) in Balkan region
- **2021**: MoU between Masdar and Government to explore solar and wind power projects
- **2022**: Agreement on first large-scale solar plant (100 MW) between Turkmenenergo & Masdar

Despite the low current utilisation, Turkmenistan possesses substantial renewable energy potential.

- Estimated potential includes 655 GW solar - with 2700-3100 hours of sunshine per year, 10 GW wind - particularly in western region and central Karakum, and 1.3 GW small hydropower.
- 10 MW solar-wind hybrid plant will soon be commissioned, 100 MW solar plant is agreed to be developed jointly with international renewables company.
- Biomass potential is more limited due to arid climate, but there are opportunities in agrowaste.
- National Strategy for Renewable Energy Development until 2030 still lacks specific targets.
- Upcoming Plan to strengthen international cooperation on RE, 2025-2030, and regulatory acts of Law on RES may create opportunities to make RE policy and regulations more concrete.
- Challenges include limited diversification of energy sector and complex investment environment.
- The country lacks a dedicated renewable energy investment promotion agency.
- International cooperation on policy development support and sharing of international expertise is present, with a potential for further development.

Key findings and takeaways from the study:

Major elements considered non-compliant with the joint ecosystem in Central Asia are:

1. Lack of clear, quantified renewable energy targets and implementation timelines
Mediation: Develop a comprehensive renewable energy law with specific, time-bound targets
2. Absence of a dedicated renewable energy investment promotion agency
Mediation: Establish a specialised renewable energy investment promotion agency
3. Underdeveloped regulatory framework for renewable energy projects
Mediation: Implement a feed-in tariff scheme and competitive auction system for large-scale projects
4. Limited transparency in investment procedures and project opportunities
Mediation: Create a centralised digital platform for renewable energy investment information
5. Inadequate grid infrastructure for integrating variable renewable energy sources
Mediation: Prioritise grid modernisation to accommodate variable renewable energy sources
6. Shortage of domestic expertise in renewable energy technologies
Mediation: Foster international partnerships for knowledge exchange and capacity building

Strengths:

1. Recent policy announcements and international commitments signals Government's intention to develop clean energy, including renewables.
2. Stable political environment and centralised decision-making can enable rapid implementation of policies once approved, facilitate large-scale project implementation and provide stability for long-term projects
3. Vast untapped solar and wind potential. Strong foundation in gas-fired power generation.
4. Small-scale off-grid solar projects demonstrates feasibility of RE in remote parts of country.
5. Significant reserves of critical raw materials for renewable technologies
6. Experience in bilateral and regional energy cooperation.
7. Non-discriminatory legal environment for foreign investors without local partnership mandates.
8. Potential for strategic partnerships with state-owned enterprises in the energy sector.
9. Collaboration with international organisations for feasibility studies and technical assistance is laying the groundwork for larger projects.

Weaknesses:

1. Underdeveloped regulatory framework for RE, lack of clear policies and quantified targets.
2. State-dominated economy limits private sector participation and potentially stymies foreign investment opportunities.
3. Despite significant resources, renewable energy sector remains largely undeveloped.

4. Investment activities are focusing primarily on partnerships in the oil and gas sector
5. Very high reliance on natural gas may slow down the adoption of renewable energies.
6. Lack of fiscal mechanisms and regulations with specific objectives creates investor uncertainty.
7. Limited institutional structures adapted to the renewable energy sector.
8. Low compliance with the joint pseudo RE investment ecosystem described for Central Asia.
9. No specialised agency for RE investment promotion, limiting support for foreign investors
10. Low domestic electricity tariffs due to subsidies pose challenges to the financial viability and sustainability of RE projects.
11. Underdeveloped domestic financial sector to support investments in renewable energies.
12. Minimal experience in implementing large-scale RE projects and attracting FDI to the sector.
13. Lack of clear investment guidelines for the RE sector and limited information dissemination and data availability, both for project specifics and investment procedures & opportunities.
14. Shortage of specialised expertise in renewable energy technologies.
15. Limited experience of domestic EPC companies in large-scale RE projects.
16. Existing power system may face difficulties in integrating large-scale variable RE sources.
17. Need for stronger standards and practices for ESIA and mitigating measures.

Opportunities:

1. Potential to become a leading solar panel producer due to silicon abundance
2. Development of a “green” hydrogen strategy
3. Integration of renewable energy with existing gas-fired power plants
4. International partnerships for knowledge transfer and technology adoption
5. Potential for regional cooperation in renewable energy projects and trade
6. Development of a comprehensive renewable energy regulatory framework
7. Opportunities for more PPP projects given recent legislation, and MoU with int’l company.

Threats:

1. Economic dependence on fossil fuel exports
2. Potential resistance to change from established energy interests
3. Climate change impacts, particularly in desert regions
4. Limited international exposure affecting knowledge transfer
5. Geopolitical tensions affecting regional energy cooperation

Implications for Policy Areas:

1. High-level Policies: Consider establishing comprehensive RE law and strategy with quantified targets, including long-term investment strategy with targeted RE sub-sectors.

2. Regulatory Framework: Establish a dedicated regulatory body for RE oversight and enhance coordination among government bodies to reduce bureaucratic inefficiencies. Introduce competitive auction system for large-scale RE projects. Implement streamlined and digitised tendering and permitting processes for renewable energy projects.

3. Investment Promotion and Facilitation: Create a specialised RE IPA to provide end-to-end support for foreign investors, including project identification, partner matching, and aftercare services modelled on successful agencies in the region. Establish a centralised platform for sharing up-to-date information on RE policies, projects, and investment opportunities.

4. Financial Mechanisms: Define and implement a "Green Taxonomy" to provide clear classification and benefits for RE projects. Implement a feed-in tariff scheme. Establish a renewable energy fund to support project development and risk mitigation. Develop further incentives for foreign investment in RE projects, e.g. Green Bonds to attract green finance.

5. PPPs: Leverage the PPP model to attract more private investment in RE projects. Develop specific legal framework, model contracts and guidelines for RE PPPs. Establish risk-sharing mechanism to attract private investment in large-scale projects.

6. Capacity Building and Technology Transfer: Develop comprehensive education and training programs in partnerships with international industry and institutions. Consider creating extended national RE R&D centre.

7. Tariff Reform: Implement a phased approach to electricity tariff increases, balancing financial viability and sustainability of RE projects with social protection measures.

8. Grid Modernisation: Develop comprehensive grid modernisation plan to accommodate variable renewable energy. Implement smart grid technologies and energy storage solutions. Explore opportunities for regional grid interconnections to enhance energy trade.

9. Green Hydrogen: Conduct a feasibility study for green hydrogen production using renewable energy. Develop a national green hydrogen strategy. Establish more pilot projects for green hydrogen production and use.

10. Domestic Manufacturing: Develop incentives for establishing solar panel manufacturing facilities. Create special economic zone focused on RE technology manufacturing. Implement local content requirements balanced with technology transfer objectives.

11. Regional Cooperation: Strengthen partnerships with neighbouring countries on RE and water resource management. Participate actively in Central Asian regional clean energy initiatives. Explore opportunities for cross-border RE projects and energy trading. Contribute to regional knowledge-sharing platform for RE best practices and lessons learned.

12. Climate Adaptation: Develop a comprehensive strategy for climate change adaptation in the energy sector to ensure long-term sustainability of renewable energy investments.

13. Environmental and Social Standards: Implement mandatory ESIA for all large-scale renewable projects. Develop community benefit schemes for areas hosting RE installations.

Attachment

Key Determining Factors of Ecosystem for Investment into Renewable Energy in Central Asia

1. Government Commitment & Institutional Support
2. Regulatory Framework & Policy Environment
3. Market Conditions & Potential
4. Investment Promotion Agencies
5. Resource Availability & Transparency
6. Grid Infrastructure
7. Market Access
8. Investment protection
9. Financial Environment
10. In-country Skilled Workforce
11. Project Developers & EPC Companies
12. Public-Private Partnerships (PPPs)
13. Environmental & Social Factors, Stakeholder Engagement
14. Technology & Innovation
15. Regional Cooperation