



Renewable Energy Investment Ecosystem in Central Asia Draft Concept Note

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I. Background

Central Asian economies confront a myriad of climate-related challenges stemming from their geographical vulnerabilities. These challenges encompass water scarcity due to altered precipitation patterns and accelerated glacier melting, leading to heightened risks of droughts and desertification. The region's heavy reliance on glacial-fed rivers for water resources amplifies concerns regarding floods, landslides, and disruptions in agricultural productivity. Additionally, the dependence on hydro power exposes these nations to energy insecurities amidst fluctuating water availability. Specifically, the downstream countries (Uzbekistan, Turkmenistan, Kazakhstan) depend highly on the water resources originating from upstream countries such as Kyrgyzstan and Tajikistan. Changes in water flow, quality, or availability due to climate change, upstream dam constructions, or altered water usage can significantly impact the livelihoods, **energy security**, agriculture, and economies of these downstream nations in Central Asia (CAREC Water Infrastructure Report 2023).

Climate change is predominantly fueled by the surging emissions observed globally and nationally. Central Asian countries exhibit varying levels of greenhouse gas (GHG) emissions. Turkmenistan and Kazakhstan heavily rely on hydrocarbons for their exports, resulting in notably high GHG emissions (22.45 and 19.8 CO₂ equivalent tonnes, respectively) from fugitive emissions. In contrast, the Kyrgyz Republic and Tajikistan display significantly lower GHG emission levels (3.03 and 2.25, respectively) due to their substantial utilization of hydropower within the energy sector (Our World Data, 2020).

The region grapples with four major "pain points" in its sectoral framework, contributing significantly to GHG emissions; fugitive emissions, electricity and heat production, agriculture, and buildings. Collectively, these sectors account for approximately 80% of GHG emissions across Central Asia. Notably, coal-fired power generation remains a substantial contributor, prominently impacting the electricity and heat production sectors. For instance, Kazakhstan's electricity and heat sector alone contributes 42.5% of GHG emissions, followed by 30% in Uzbekistan, 16.3% in Turkmenistan, 16.2% in the Kyrgyz Republic, and 10.6% in Tajikistan, culminating in a total of 23% emissions for Central Asia (Climate Watch and EBD, 2020). Overall, fossil fuels constitute 95% of the total energy supply in the five countries of Central Asia. UNCTAD (2022) assesses global economies based on their energy productivity capacity index, evaluating sustainability, availability, and efficiency. Central Asian countries attained an average score of 58/100, highlighting a substantial investment deficit across all three pillars of energy transition. Moreover, the majority of energy infrastructure in this region is outdated, dating back to the Soviet Union era. Consequently, these countries rank among the lowest 20% of nations globally regarding energy infrastructure (UNECE 2023). Therefore, it is crucial to implement effective measures for transitioning to renewable energy and creating a conducive investment environment in energy production, supply, and infrastructure.

Amid these rising concerns, Central Asian countries made significant pledges in the COP26 agreement to mitigate climate vulnerabilities by committing to reduce emissions by 10% to 25% by 2030, subject to international assistance. A massive shift from fossil fuels to renewable sources will require

countries to comply with their obligations under the Paris Agreement and shift to a low-carbon and sustainable energy system.

UNECE's (2023) analysis from the Carbon Neutrality Toolkit illustrates the region's necessity for a \$1.407 trillion investment between 2020 and 2050 to bolster energy resilience in a business-as-usual scenario. However, by harnessing the abundant untapped potential of renewable energy sources like hydro, wind, and solar power, transitioning to a net-zero scenario by 2050 would require just a 2.15% increase, totaling \$1.437 trillion over 30 years. To achieve this transition, increased investments are crucial in developing new generation capacity in hydro, solar, and wind power plants and upgrading water treatment facilities. Utilizing climate finance instruments from multilateral development banks (MDBs) could further expedite the region's low-carbon transformation.

Renewable energy investment faces challenges tied to infrastructure development, often carrying higher financial risks and lower returns, i.e. High upfront costs, long payback periods, and uncertain revenue streams (tariff interventions), relying solely on private investors falls short in meeting the investment needs. Hence, a complete **renewable energy ecosystem** is crucial. It requires supportive policies, robust financial structures, and incentives to attract national and international investors. This comprehensive approach fosters innovation and addresses investment gaps, essential for sustainable growth in the renewable energy sector.

II. Analytical framework and literature:

Renewable Energy Investment Ecosystem refers to the complex network of interconnected elements that influence and shape investments in renewable energy projects, including policies, regulations, financial mechanisms, market dynamics, and stakeholders. This ecosystem plays a crucial role in determining the success, growth, and sustainability of renewable energy initiatives (WEF 2023). Central Asia holds immense potential for renewable energy development, given its abundant natural resources and increasing energy demand. To harness this potential effectively and promote sustainable energy transition, understanding the renewable energy investment ecosystem in the region is essential (CAREC Energy Report 2022).

World Economic Forum underscores energy investment as a crucial pillar in facilitating the global transition towards sustainable energy systems. However, this study focuses on delving into the investment ecosystem specific to renewable energy. This Renewable Energy Investment framework (Ecosystem) intricately examines key drivers influencing investment decisions. These drivers, which include Policy and Regulatory Frameworks, Market Potential and Viability, Financial and Investment Instruments, Investment Promotion and facilitation, Technology and Innovation, Risk Assessment and Mitigation, and Regional Integration, interact and significantly impact the decisions made by governments, corporations, and financial institutions. Understanding and analyzing these elements are pivotal in fostering a conducive environment for renewable energy investment, thereby accelerating the shift towards cleaner and more sustainable energy sources.

Renewable energy investment has gained significant attention globally due to its potential to mitigate climate change and foster sustainable development. Several studies have identified various determinants influencing investment decisions in this sector. Poncelet et al. (2019) highlight the critical role of policy frameworks and regulatory stability in attracting investments in renewable energy projects. Their research emphasized the significance of supportive government policies, including incentives, subsidies, and long-term commitments, which significantly impact investor confidence. Jin et al. (2020) underscore the importance of market potential and viability in driving renewable energy investment. They suggested that regions with favorable market conditions, such as increasing energy demand, supportive market structures, and clear pathways for renewable energy

integration, tend to attract more investments. Financial and investment instruments play a crucial role in facilitating renewable energy projects.

According to Zhang et al. (2018), access to diverse financing options, such as green bonds, venture capital, and supportive financial mechanisms, significantly influences the feasibility and attractiveness of renewable energy investments and the role of technology and innovation cannot be overlooked. Wang et al. (2021) highlight that advancements in renewable energy technologies, coupled with innovation-driven solutions, reduce costs and enhance the attractiveness of investment opportunities in this sector. These determinants - policy frameworks, market viability, financial instruments, technology, and innovation - collectively shape the investment landscape for renewable energy, influencing decisions made by various stakeholders, including governments, corporations, and financial institutions.

Eyraud et al. (2013) suggest that green investment is boosted by economic growth, a sound financial system conducive to low interest rates, and high fuel prices. They find that some policy interventions, such as introducing carbon pricing schemes or “feed-in-tariffs,” which require use of “green” energy, have a positive and significant impact on green investment. Other interventions, such as biofuel support, do not appear to be associated with higher green investment. Egli (2020) investigates renewable energy technology investment risks in Germany, Italy, and the UK, revealing declining risk premiums for solar photovoltaics and onshore wind technologies due to enhanced technology reliability, lower costs, and stable policies. While policy and technology risks have diminished, curtailment and price risks are gaining prominence, offering policymakers insights to expedite the shift toward a Paris Agreement-aligned energy system.

Many studies offer comprehensive insights into renewable energy investment, policy frameworks, and challenges within specific regions. Wall et al. (2019) examine the pivotal role of policy instruments like Feed-in Tariffs and Fiscal Measures in attracting foreign direct investment (FDI) in renewable energy, emphasizing the varied impacts of carbon pricing instruments on FDI across OECD and non-OECD countries. Azhgaliyeva et al. (2023) delve into drivers of private investment in renewable energy across 13 economies, emphasizing government policy effects such as R&D expenditure and feed-in tariffs on different financing sources, alongside the influence of technology costs and energy prices. Yan et al. (2022) explore China's low-carbon strategies, demonstrating the positive impact of mixed policy scenarios on renewable energy promotion and low-carbon transformation. Shadrina (2022) focuses on Central Asia, highlighting non-hydropower renewable energy's potential for regional sustainability and emphasizing the importance of wider deployment. Junxia's (2019) emphasizes the need for policy reforms and investment facilitation measures to address corruption risks for foreign investors in energy markets, particularly in Central Asia. Azhgaliyeva et al. (2023) highlight the pivotal role of investment promotion agencies (IPAs) in attracting FDI to renewable energy sectors by emphasizing policy frameworks and incentives that contribute to the growth of green investments. These findings underscore the significance of IPAs in shaping investment environments conducive to both general investment and the specific realm of renewable or green investments.

Against the above backdrop, this concept note outlines a research initiative that comprehensively examines the factors influencing renewable energy investments in Central Asia and proposes an inclusive investment ecosystem.

III. Objectives

The objectives of the proposed study are as follows:

- To develop a framework for the assessment of the renewable energy FDI ecosystem in Central Asia;
- To identify the most important policies, measures, and regulations that governments of Central Asian countries can adopt to attract more investment into renewable energy;
- To propose a country for designing a comprehensive investment promotion program for selected sub-sectors of renewable energy based on objective prioritization criteria;
- To offer specific policy recommendations customized to the pilot country.

The study proposes to cover Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan. The primary stakeholders of the study are Ministries in charge of renewable energy development in Central Asia as well as the following Investment Promotion Agencies:

- Kazakh Invest National Company <https://invest.gov.kz/>
- National Investments Agency under the President of the Kyrgyz Republic <https://invest.gov.kg/>
- State Unitary Enterprise “Tajinvest” under the State Committee on Investment and State Property Management of the Republic of Tajikistan <https://www.tajinvest.tj/en/>
- Ministry of Finance and Economy of Turkmenistan <https://invest.gov.tm/>
- Investment Promotion Agency of Uzbekistan <https://invest.gov.uz/>

IV. Expected Outputs

This research will be documented in the following:

1. Research report;
2. Policy brief;
3. Blog article on the CAREC Institute, ICDT and IsDB websites.

The final report will be discussed with the concerned authorities and stakeholders in a validation workshop (physical or virtual).

V. Research Methodology

The methodology involves the following steps:

- Review of previous related research conducted by the CAREC Institute, ICDT, IsDB, International Renewable Energy Agency (IRENA) and other relevant regional and international organizations, including MDBs and UN Agencies/Regional Commissions;
- Review of previous publications in reputed international journals and periodicals;
- Administering a questionnaire to evaluate the core drivers of FDI into renewable energy in the Central Asian context;
- Data collection and evaluation.

VI. Report Content:

- Renewable energy profiles of Central Asian economies (current status, recent development, potential, and outlook) focusing on wind, solar, biomass and small-scale hydropower;

- Framework to assess the renewable energy FDI ecosystem (key determinants of attracting FDI into the renewable energy sector);
- Methodological approach (questionnaire);
- Key findings from the questionnaire;
- Investment promotion projects of particular interest in renewable energy;
- Policy recommendations:
 - General recommendations (regional cooperation policy framework);
 - Specific recommendations are customized to a pilot country to design a comprehensive investment promotion program for selected renewable energy sub-sectors.

VII. Implementation Plan

- Inception report with the questionnaire (20 June 2024)
- Administering the questionnaire (20 July 2024)
- Drafting the report (20 August 2024)
- Validation workshop (14 Sep 2024)
- Finalization of the report (by the end of Sep 2024)

VIII. Dissemination Events

The knowledge product will also be disseminated through workshop jointly conducted by the CAREC Institute and IsDB, interested organizations, various media, and other means planned and/or organized by the Institute.

Based on a transformed and hybrid approach, the CAREC Institute delivers blended workshops to target participants in a three-phased cascading capacity building cycle. **First phase** is the generation of digital learning materials – recordings of expert presentations and discussions that are customized and uploaded on the CAREC Institute E-Learning Platform (<https://elearning.carecinstitute.org/>). **Second phase** is face-to-face capacity building and policy dialogue engagements after materialization of 1st phase generated digital learning and other educational materials. Also, in this phase further generation of digital learning materials takes place through livestreaming of physical events and their recordings, customization and uploading on the E-Learning platform. Also, based on needs further capacity building activities will be designed for selected participants in the form of training the trainers (ToT). **Third phase** is organization and running all generated learning materials in each priority area and continuous virtual engagements with target participants and all stakeholders for further capacity building and knowledge sharing through the CAREC Institute E-Learning Platform. In this new approach, participants undergo a full capacity building cycle in a sustainable learning process.

The CAREC Institute offers knowledge support to all stakeholders with two primary types of target participants: middle- to senior-level government officials/experts from relevant ministries or agencies of CAREC member countries; and E-Learning users and stakeholders who are interested and registered in the CAREC Institute E-Learning Platform. They can access all recorded modules, expert presentations, discussions, and associated learning materials from anywhere at any time. All participants are required to have access to the internet and webinar software such as Zoom and Microsoft Teams. Age and gender are not factors in attending CAREC Institute E-Learning and face-to-face capacity-building activities. Experts representing development agencies, NGOs, and research/academic institutions are encouraged to participate and utilize CAREC Institute E-Learning Platform.

IX. References

- Azhgaliyeva, D., Beirne, J., & Mishra, R. (2023). What matters for private investment in renewable energy?. *Climate Policy*, 23(1), 71-87.
- CAREC Energy Report 2022: <https://www.carecinstitute.org/publications/sustainable-pathways-to-energy-transition-in-the-carec-region-a-governance-perspective/>
- CAREC Water Infrastructure Report 2022: <https://www.carecinstitute.org/publications/report-on-water-agriculture-energy-nexus-in-central-asia-through-the-lens-of-climate-change/>
- Climate watch and EBD 2020: <https://thediplotat.com/2023/07/how-to-increase-green-finance-inflows-in-central-asia/>
- Egli, F. (2020). Renewable energy investment risk: an investigation of changes over time and the underlying drivers. *Energy Policy*, 140, 111428.
- Eyraud, L., Clements, B., & Wane, A. (2013). Green investment: Trends and determinants. *Energy Policy*, 60, 852-865.
- Jin, Q., et al. (2020). "Market potential and investment behavior in renewable energy industry." *Journal of Cleaner Production*, 244, 118813.
- Junxia, L. (2019). Investments in the energy sector of Central Asia: Corruption risk and policy implications. *Energy Policy*, 133, 110912.
- Laldjebaev, M., Isaev, R., & Saukhimov, A. (2021). Renewable energy in Central Asia: An overview of potentials, deployment, outlook, and barriers. *Energy Reports*, 7, 3125-3136.
- Our World Data 2020: <https://ourworldindata.org/greenhouse-gas-emissions>
- Poncelet, K., et al. (2019). "Determinants of renewable energy investment: A study of the EU-28 countries." *Energy Policy*, 134, 110926.
- Shadrina, E. (2022). A double paradox of plenty: renewable energy deployment in Central Asia. *Eurasian Geography and Economics*, 63(1), 1-26.
- UNCTAD 2022: <https://unctad.org/topic/least-developed-countries/productive-capacities-index>
- UNECE 2023: <https://unece.org/climate-change/press/central-asia-would-need-massive-shift-rather-massive-increase-investment-reach#:~:text=However%2C%20given%20the%20region's%20high,30%20years%2C%20to%20%241.437%20trillion.>
- Wall, R., Grafakos, S., Gianoli, A., & Stavropoulos, S. (2019). Which policy instruments attract foreign direct investments in renewable energy?. *Climate policy*, 19(1), 59-72.
- Wang, L., et al. (2021). "Determinants of renewable energy investment: A bibliometric analysis and systematic literature review." *Energy Reports*, 7, 4024-4035.
- Yan, Y., Sun, M., & Guo, Z. (2022). How do carbon cap-and-trade mechanisms and renewable portfolio standards affect renewable energy investment?. *Energy Policy*, 165, 112938.
- Zhang, Y., et al. (2018). "The impact of financial factors on renewable energy investment: A panel data study of 16 Asia-Pacific countries." *Renewable Energy*, 129, 529-537.

