



Research on the Cooperation Mechanisms, Obstacles, and Pathways in the Green Economy Sector between China and Pakistan

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Abstract: As a core engine of global sustainable development, the green economy has become an important direction for deepening economic and trade cooperation between China and Pakistan. Based on the theories of international direct investment and regional economic integration, this paper systematically analyzes the mechanism framework, development status, and scale characteristics of China-Pakistan green economy cooperation, revealing the effectiveness of their cooperation in energy, agriculture, environmental protection, and other fields through authoritative data and typical cases. The study finds that China-Pakistan green economy cooperation faces key obstacles such as differences in technical standards, limited financing channels, and geopolitical interference. In conjunction with the high-quality development of the "Belt and Road" initiative and Pakistan's "Economic Corridor" strategy, this paper proposes specific paths to deepen cooperation from four dimensions: rule alignment, industrial coordination, financial innovation, and risk prevention, providing theoretical support and practical reference for promoting the in-depth development of China-Pakistan green economy cooperation.

Keywords: green economy; China-Pakistan economic corridor; belt and road initiative

1. Introduction

Amid global climate governance, the green economy has become a core focus of international cooperation, with the China-Pakistan Economic Corridor upgrading from traditional infrastructure to green development. China contributes green technology, capital, and industrial advantages through its dual carbon goals and green Belt and Road strategy, while Pakistan integrates green economy into its national vision amid energy shortages and ecological challenges, demonstrating strong strategic alignment and resource complementarity.

China-Pakistan green cooperation has achieved initial results yet faces multiple obstacles: technical standards divergence, limited financing, geopolitical interference, and institutional deficiencies. Existing studies remain largely macro-level discussions lacking systematic analysis grounded in international investment and regional integration theories. This paper addresses this gap by analyzing cooperation mechanisms, current status, and obstacles, then proposing optimization pathways linked to both countries' strategies, offering practical reference for CPEC's high-quality green development and broader Belt and Road green cooperation, with both theoretical and practical significance.

2. Analysis of the China-Pakistan green economy cooperation mechanism and current situation

2.1 Construction of Collaboration Mechanism

2.1.1 Intergovernmental Coordination Mechanism

The China-Pakistan Economic Corridor Joint Cooperation Committee is the core mechanism coordinating CPEC construction, having held 11 meetings since 2015. Under its framework, both sides established specialized working groups, with energy and environment working groups addressing green economy cooperation[1]. Additionally, a dedicated Green Development Cooperation Working Group promotes green standards alignment, technological cooperation, and project coordination.

2.1.2 International Multilateral Cooperation Mechanism

(1) Support from multilateral financial institutions.

The Asian Infrastructure Investment Bank (AIIB), the Silk Road Fund, and other institutions have provided significant financial support for China-Pakistan green projects. The International Monetary Fund (IMF) approved in 2025 a fund of USD 1.4 billion for the Pakistan Resilience and Sustainability Fund (RSF), specifically supporting the development of climate-adaptive green projects[2].

(2) International organizational cooperation.

China and Pakistan collaborate with international organizations including UNDP and WWF on ecological protection and climate change projects. For instance, both sides jointly implemented the Ecological Restoration Project in Arid Areas of Pakistan with UNDP, investing USD 50 million to improve ecological conditions in Balochistan and enhance local communities' climate resilience[3].

2.2 Scale and Structure of Cooperation

2.2.1 Investment scale is steadily growing

China-Pakistan green economic cooperation investment has grown rapidly. By 2024, cumulative CPEC investment reached approximately USD 65 billion, with energy dominating. Nearly all 2024 energy projects signed are renewable — photovoltaic, wind, or hydroelectric — making green investment the dominant force. In August 2024, Pakistan reaffirmed that China-Pakistan cooperation is advancing its 2030 target of 60% renewable energy installed capacity.

2.2.2 The scope of cooperation continues to expand

(1) Renewable energy sector.

Pakistan's renewable energy capacity surged to 4.1 GW by end-2024, up 215% from June 2023. That year, it imported 13 GW from China, the largest supplier. In wind, Chinese firms like Goldwind supplied Sindh's 2 GW coastal projects, contributing to the 1.8 GW national total (IRENA 2024). In hydropower, the 884 MW Sukkur Ghinari plant, built by Chinese companies, began operations in late 2023, generating 2.8 billion kWh by end-2024.

(2) The field of ecological protection and green agriculture.

The two parties have cooperated to carry out the "China-Pakistan Economic Corridor Ecological Shelterbelt Construction Project," with a total afforested area reaching 12,000 hectares, effectively preventing land desertification along the corridor. In terms of green agricultural cooperation, Chinese enterprises have promoted water-saving irrigation technologies and green fertilizers in Punjab Province, covering 5,000 hectares of farmland, helping local farmers increase grain yields and reduce agricultural non-point source pollution[4].

3. Core Obstacles and Challenges of China-Pakistan Green Economic Cooperation

3.1 Technical barriers

There are significant differences in the green technology standards systems between China and Pakistan, which restrict cooperation efficiency. Chinese renewable energy equipment adopts GB standards, while Pakistan mainly refers to IEC international standards, resulting in some technical parameters being incompatible. In the field of carbon accounting, China uses the 'National Greenhouse Gas Inventory Guidelines,' whereas Pakistan refers to the IPCC accounting methodology, with inconsistencies in the accounting scope and data statistical criteria, affecting the progress of bilateral carbon trading cooperation.

3.2 Challenges at the financial and market levels

Sino-Pakistani green project financing relies excessively on government-led loans with underdeveloped market channels. Pakistan's small financial market offers limited green products, hindering direct financing. Its 2025 green Islamic bond raising 20-30 billion rupees falls short of massive funding needs. Low sovereign credit rating pushes financing rates to 8-10%, 3-5 percentage points higher than Chinese projects, intensifying pressure.

Low economic development curtails green product demand due to limited purchasing power, with only 12% rural solar adoption[5]. The green industry chain lacks core manufacturing, relying on imports that elevate costs and erode competitiveness. Distorted electricity pricing and rigid feed-in tariffs diminish corporate investment incentives.

4. Prospects and Pathway Design

4.1 Strengthen rule alignment and build a unified cooperation framework

Pakistan's low economic development limits green product demand due to weak purchasing power, e.g., only 12% rural solar adoption. The green industry chain is fragmented, lacking local manufacturing of key equipment, increasing project costs via imports. Additionally, "reversed electricity prices" and a rigid feed-in tariff system undermine investment incentives.

4.2 Deepen technological empowerment and improve cooperation quality

4.2.1 Build a technology transfer and R&D cooperation platform

Establish a technology transfer center under the China-Pakistan Green Technology Innovation Alliance to promote

localization of mature technologies including solar energy storage and low-carbon building materials. Create a China-Pakistan Green Technology R&D Special Fund with an annual investment of USD 200 million, supporting joint research by scientific institutions from both countries on adaptive technologies, focusing on key areas such as improving solar power generation efficiency in high-temperature and high-humidity environments and water-saving irrigation in arid regions.

4.2.2 Strengthen talent development and capacity building

Implement the China-Pakistan Green Talent Exchange Program by annually selecting 100 Pakistani energy and environmental officials and technicians for training in China to learn green development experiences and technologies. Facilitate partnerships between Chinese and Pakistani universities to establish green economy programs, jointly cultivating undergraduate and master's students to support bilateral cooperation. Establish a China-Pakistan Green Experts Database, gathering leading experts from both countries to provide technical consultation and guidance for cooperative projects.

4.3 Broaden funding channels and strengthen financial support

4.3.1 Innovate green financial products and services

Promote Pakistan to expand the issuance scale of green Islamic bonds, attracting funds from the Islamic financial market to participate in green projects. Encourage China-Pakistan financial institutions to cooperate in developing products such as green credit and green equity funds, providing differentiated financing services for small and medium-sized enterprises[6].

4.3.2 Attract the participation of multilateral financial institutions

Strengthen ties with AIIB, IMF, and World Bank to secure more concessional loans and grants. Advocate for an AIIB-led "China-Pakistan Green Cooperation Fund" targeting small renewable projects. Leverage Global Development Initiative financing to attract international capital. Build a project-sharing platform to connect quality green projects with multilateral agencies and private investors for better financing access.

5. Conclusion

This study systematically analyzes the mechanisms, status, and obstacles of China-Pakistan green economy cooperation based on international investment and regional integration theories. It finds that while a tripartite mechanism of intergovernmental coordination, multilateral support, and market participation has driven rapid growth, key obstacles remain: technical standard divergence, single financing channels, and geopolitical interference.

Compared to existing macro-level studies, this paper deconstructs specific "finance-market" challenges through data and cases, revealing practical dilemmas like the mismatch between financing costs and market returns, offering a more precise reference for future research. Theoretically, it extends international investment theory to South-South green cooperation; practically, it provides intervention targets for policymakers.

A limitation is the lack of quantitative assessment of overall project benefits, necessitating future post-evaluation research. It is recommended that both sides prioritize technical standard mutual recognition and green financial innovation to build the CPEC into a model "Green Corridor" for global green development.

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