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Green Energy Co-operation Mechanisms Between China and Countries along the Belt and Road: The Role of Chinese Local Governments and International Organizations

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Abstract: As global climate issues have intensified, promoting green energy has become the key to solving the problem. This paper explores the role of Chinese local governments and international organizations in promoting green energy cooperation under the Belt and Road Initiative (BRI). It highlights the importance of such partnerships for accelerating energy transitions in underdeveloped countries. The study argues that local governments in China have translated central policies into local action, supporting the development of green energy projects along the Belt and Road through policy responses, promoting local projects, and mobilizing local businesses to invest. At the same time, this article classifies the international organizations participating in the BRI as platform-type organizations and participatory organizations. The former provides effective financial tools for Belt and Road green energy projects, and the latter uses existing influence to promote the construction of an international discourse on a consensus-driven green Belt and Road. Effective green energy cooperation requires a multi-level approach that includes policy adaptations, infrastructure construction, and knowledge-sharing mechanisms. Research on the role and influence of actors within cooperation networks and the relationships among multiple actors may provide a reference for broader green cooperation on a global scale.

Keywords: Belt and Road, green energy, local government, international organization.

1. Introduction

The Belt and Road Initiative (BRI), proposed by China, serves as a platform for cooperation by offering conceptual, instrumental, and institutional public goods [1]. This initiative meets the needs of participating countries, particularly developing nations, to integrate into global value chains. As the leader of the initiative, China has continuously strengthened its collaboration with host countries along the BRI. By June 2023, China had signed over 230 cooperation agreements with more than 150 countries and over 30 international organizations. These agreements span multiple fields, including international trade, infrastructure construction, and cultural exchange, demonstrating China's growing commitment to global governance and presenting a challenge to existing international economic regimes [2].

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Amidst the global push for reducing carbon emissions and the transition to green energy, the energy cooperation between China and BRI countries has drawn significant attention. It is especially considering that most of the BRI's green energy collaborations occur among developing countries, which often lack sufficient energy investments and emission reduction funds to transition to green energy promptly. The policy impacts of the BRI on developing countries and the resulting technology spillovers will help them better cooperate with developed countries [3].

China's cooperation with countries along the Belt and Road in green energy relies on partnerships that are formed, which are reflected in multilateral or bilateral consensus documents such as memoranda of understanding and cooperation plans [4]. Additionally, China signals cooperation through guidance documents and policies at various national levels, including the speeches of China's top leaders at various international conferences, the guiding opinions of the programmatic documents of the Chinese Communist Party, and the white papers. Under this policy framework, the Chinese government uses its strong mobilization capabilities to drive investments from state-owned enterprises, private companies, and policy banks into numerous large-scale green energy projects. It also continuously improves the legal and regulatory frameworks and establishes stable high-level dialogue platforms by deepening bilateral and multilateral diplomatic relations. It attempts to embed high-level policy intentions into the mechanisms of operation.

Some perspectives argue that the BRI has a positive impact on the growth of green energy and has favorable effects in promoting economic development and job creation [5, 6]. It enhances the energy security of recipient countries and has significant development potential [7]. At this stage, China places more emphasis on developing the foundation of the new energy industry rather than focusing on end consumers [8]. These infrastructures will serve as a basis for the sustainable development of countries along the route. However, there are also views that the above impacts are limited. Despite the continuous release of green policy signals by the Chinese government and financial institutions, it is applied insufficiently due to a lack of green finance action [9]. In the long run, the BRI can bring environmental benefits, but it is not conducive to the economic and industrial development of relatively underdeveloped countries [10].

Existing research focuses mainly on the impact of the BRI, which has generated extensive debate through the analysis and prediction of policy outcomes. The main research subjects are the actions and policies of the central government, ignoring the academic value of the BRI as a joint action by multiple international social actors to address climate change through green energy cooperation. This paper attempts to analyze the role of Chinese local government and international organizations to explore the intermediate mechanism of how BRI is implemented as a project, to uncover the "black box" between actions and impacts, and to provide a reference for energy transition and investment cooperation mechanisms in developing countries.

2. Belt and Road Green Energy Cooperation

Under the BRI, green energy cooperation exhibits characteristics of a China-centric model that radiates to the participating countries. Within this policy framework, China has formed an international development cooperation model for renewable energy, which consists mainly of overseas Engineering, Procurement, and Construction (EPCs), opening overseas production facilities, mergers and acquisitions, and research and development (R&D). The evolution of the BRI's green energy cooperation has progressed from equipment supply to engineering contracting and then to investment. In 2023, China's renewable energy investments hit a record high, with significant funds directed toward solar and wind energy. Specifically, green energy investments totaled $7.9 billion, constituting about 28% of the total energy investments for the year, along with an additional 6% going into hydropower projects. Local governments in China and various international organizations have played an indispensable role in the construction of the cooperation model, forming a collaborative

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mechanism, as shown in Figure 1. It presents how governments and enterprises at all levels in China influence the green energy industry in countries along the Belt and Road through a chain-like mechanism of influence transmission, and how different types of international organizations play a role in the external relations between nations. More detailed explanations are provided in the following sections.

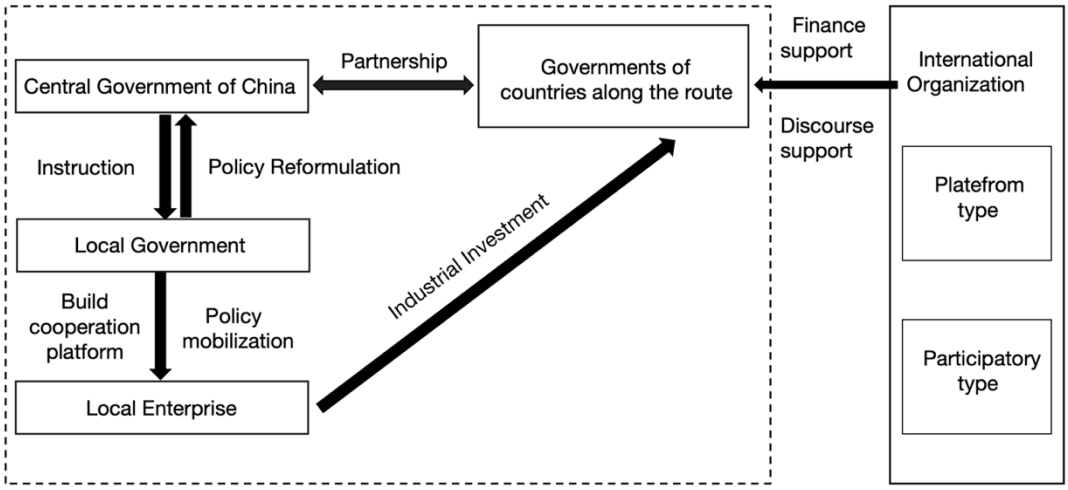


Figure 1: BRI's green energy cooperation mechanism.

3. The Role of Chinese Local Government

Under the BRI, the cooperation in green energy between China and the country along the route relies on Chinese local governments as important planning and executing bodies. The relationship between the central government and local governments continuously shapes the construction and implementation of cooperation mechanisms, especially in the creation of China-led cooperation platforms and investment layouts in the countries along the route. This article argues that Chinese local governments mainly play three roles in the cooperation process: policy response, local project support, and local enterprise driving. These roles help to specify responsible entities and ensure better execution of the central government's generally abstract policies, ultimately achieving the goals of the Belt and Road green energy cooperation.

3.1. Policy Response

Under the influence of China's central-local relations, Chinese local governments will reformulate central policies during implementation, transforming the central government's guiding policies into locally operable action policies [11, 12]. Since 2013, when the "Silk Road Economic Belt" and "21st Century Maritime Silk Road" cooperation initiatives were proposed, leadership groups for Belt and Road construction have been established in each province to specifically coordinate related tasks. Local governments at the provincial and municipal levels in China have successively introduced implementation plans for BRI, reflecting different policy preferences depending on local advantages and characteristics. Based on public information from local governments in China, Table 1 below summarizes some representative keywords from local government policies.

Geographical location and industrial advantages are important factors influencing local government policy formulation. In its 2015 implementation plan, Jiangxi Province, a hub for China's photovoltaic industry, emphasized the importance of advancing the development and application of photovoltaic products. The plan also highlighted the need for international cooperation through

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contracting projects to explore new markets and establishing production bases or investing in photovoltaic power stations abroad. Guangxi Province, which borders the Association of Southeast Asian Nations (ASEAN) countries, emphasized in its 2017 action plan the cooperation with ASEAN countries in green energy, proposing to expand the function of the "China-ASEAN" cooperation forum and to build an international energy resource cooperation base.

Table 1: Policy response to BRI green energy cooperation.

City/Province	Year	Keywords
Beijing	2021	Green Silk Road; Carbon Neutrality;Green Finance Beijing green industry exchanges and cooperation platform
Shanghai	2017	Solar equipment; Special purpose loan; Shanghai Pilot Free Trade Zone;Green technology
Jiangxi Province	2015	Photovoltaic New Energy; Distributed Solar Power Generation Overseas Investment
Guangdong Province	2016	Solar Photovoltaic Projects; Electric power cooperation
Guangxi Province	2016	ASEAN; New energy cooperation
Chengdu	2016	Infrastructure projects; High-tech industrial park

3.2. Support for Local Projects

Many provinces and cities in China border several countries along the Belt and Road route, possessing natural geographical advantages that make them important windows for China to promote cooperation with these countries in green energy. Local governments follow the policy directions of higher-level governments and fully exercise their autonomy to, on the one hand, establish platforms for green energy cooperation between China and the countries along the route. On the other hand, they attract investment and draw in green energy companies to form clusters, providing enterprises with faster and more convenient channels for the entry of their products, technologies, and investments into these countries.

The "China-ASEAN Hydrogen Energy Industry Base", located in Baise city, Guangxi Province, is one of the phased achievements in the development of green energy cooperation under the BRI and has already attracted 21 enterprises to settle in. The local government of Guangxi Province has issued and compiled policy documents such as the "Guangxi Hydrogen Energy Industry Development Mid-to-Long Term Plan (2023–2035)" and the "Action Plan to Accelerate the High-Quality Development of Guangxi's Hydrogen Energy Industry (2024–2027)," which provide an overall plan for the development of the local hydrogen energy industry. Baise City Government has clarified the responsibilities of various departments, delineating the roles of the Baise City Development and Reform Commission, the Investment Promotion Bureau, and the management committee of Baise East New District (Baise High-Tech Zone) in hydrogen energy industry layout, investment attraction policies, and park construction. Utilizing intergovernmental and government-business dialogues for investment attraction, it fully mobilizes relevant industrial enterprises to set up operations, with the first phase of the project introducing Beijing Yihuatong, a leading enterprise in the hydrogen chain, to build a hydrogen fuel cell engine production base and a hydrogen energy equipment industry base. Additionally, the Baise City Government, serving as a hub for government and social resources, links with universities' technological R&D strengths to establish the "China-ASEAN Hydrogen Energy Industry Research Institute," forming a closed-loop industry chain from R&D to manufacturing.

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3.3. Promotion of Local Enterprise

In China, the main types of enterprises investing in Belt and Road green energy projects include central state-owned enterprises, local state-owned enterprises, and private enterprises. In the 1990s, the Chinese government implemented tax-sharing reform, considering both responsibilities and financial powers and distributed taxes accordingly. For local state-owned and private enterprises, the direct mobilization effect of central policies is limited due to the lack of direct financial incentives. However, local governments can directly mobilize these enterprises to invest in specific areas through tax policies, thus fully exploiting the potential of businesses in the green energy cooperation sector. Additionally, the performance evaluation and promotion of local Chinese officials are closely linked to local economic development indicators, such as investment, trade, and tax revenue, which further facilitates the mutual interaction between local governments and enterprises. This interaction helps in seizing investment opportunities in the Belt and Road green energy sector and reflects the local government's contribution to this cooperation mechanism.

For example, Chengdu's five-year plan to integrate enterprises into the Belt and Road national strategy answers how to enhance the level of economic and trade cooperation between local Chengdu enterprises and countries along the Belt and Road from multiple dimensions, such as technological innovation, brand cultivation, and platform construction.

4. The Role of International Organization

The successful implementation and operations of the BRI will also be largely determined by its relationship with various international organizations. This paper argues that international organizations involved in Belt and Road green energy project cooperation can be divided into two types: "platform-type" international organizations and "participatory" international organizations. China often acts as the most powerful member in platform-type ones, giving it strong mobilization capabilities within these organizations. Typically, platform-type ones are regional, while participatory-type ones tend to be global entities like the United Nations, impacting BRI green energy projects through their specific functions, such as environmental protection or technological support.

4.1. Platform Type

Platform-type international organizations provide a window for the implementation of the BRI, with both sides influencing each other. These organizations nurture and safeguard the BRI by providing essential tools and resources. This article uses the Shanghai Cooperation Organization (SCO) and the Asian Infrastructure Investment Bank (AIIB) as examples. Even before the BRI was proposed, SCO member states had already established some cooperation and networks of interest. After the introduction of BRI, SCO member states actively signed memoranda of understanding with China, which can be described as a two-tiered trust relationship.

The Green Development Forum, organized under the SCO, overlaps significantly with the BRI green energy cooperation projects in terms of participants and topics, focusing on the implementation of infrastructure projects like solar and wind power. The member states of the SCO are also key regions for implementing green energy projects under the BRI. China's bilateral relationships with countries along the BRI have been placed on a multilateral cooperation platform, expanding the reach and effectiveness of the BRI.

The AIIB, similarly, is an international financial institution initiated by China, functioning as a tool for government climate policy. China is the largest shareholder with the most voting power. The AIIB's goal is to have at least 50% of its approved financing focused on climate by 2025. As a significant investor in BRI green energy projects, AIIB participates in green cooperation under the BRI framework through infrastructure investments and green finance. Financial institutions such as

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the AIIB are also actively involved in the strategy and preparation of 'upstream' projects, assisting borrower countries in formulating their priorities into concrete financial proposals and playing a role in the borrower countries' environmental management systems.

4.2. Participatory Type

Participatory-type international organizations also contribute to the BRI green energy cooperation by providing institutional and conceptual support, often in the form of memoranda of understanding. For example, China and the United Nations Environment Programme (UNEP) have signed a cooperation agreement to signal their policy commitments and willingness to collaborate on green initiatives. Additionally, through joint calls and initiatives, they have mobilized the establishment of more green international organizations. The Belt and Road Initiative Green Development International Alliance, founded in 2014, also serves as a research institution, integrating China's private sector resources, introducing higher education institutions, and conducting research, dialogue, and seminars to provide knowledge-based public goods.

4.3. International Organizations and Green Energy Cooperation

Compared with local governments in China, international organizations play a more diverse role in promoting Belt and Road green energy cooperation. Firstly, international organizations can leverage their influence to attract more resources from the international community to invest in green energy projects or organize the provision of public goods and financial assistance. This enriches the forms and sources of investment. International organizations can incorporate Belt and Road green energy cooperation into their agendas, which is conducive to forming organizational consensus and norms and enhancing the resilience of cooperation projects. Secondly, the multilateral nature of international organizations can deepen cooperative relations between countries and build more trusting national relationships beyond BRI.

There are still problems with green energy cooperation projects, such as insufficient consensus and insufficient investment. The introduction of international organizations into the Belt and Road green energy cooperation projects has allowed them to act as a platform for cultivating project cooperation. Some international organizations with extensive influence have even involved this important cooperation into the mainstream international discourse system, making it an international consensus.

5. Conclusions

The use and promotion of green energy are critical for achieving carbon reduction goals. However, it requires substantial infrastructure and investment, which poses significant challenges for governments and enterprises in some underdeveloped countries. These nations often lack the financial resources and technical support to independently transition to green energy in a short period. The BRI offers a valuable attempt to address this issue by providing a practical mechanism for global cooperation on green energy between states and non-state actors.

The paper argues that partnerships between countries, based on policy consensus and supported by investment, can accelerate energy transitions in underdeveloped countries by establishing green energy infrastructure. Furthermore, certain countries within the cooperation framework can offer knowledge-based public goods, helping partner nations acquire useful expertise in technology and management. As the initiator of this cooperation, China effectively leverages the influence of local governments. Through a "chain-like" policy mobilization, it transforms the central government's guiding and initiative-driven policies into actionable local government strategies. The effectiveness of these actions depends on local governments' performance incentives and tax revenue needs.

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Adapting to local conditions, local governments respond to central policies by refining implementation points and supporting the development of local green energy industrial parks and projects based on factors such as geography and industrial advantages. They also mobilize local enterprises to invest in countries along the BRI route.

Beyond the governmental framework, this paper incorporates international organizations into its analysis, categorizing them into platform-based and participant-based organizations. The former often have stronger cooperative ties and consensus among member states in the green energy sector and can provide financial tools for implementing projects in BRI countries. The latter, which are typically influential international organizations, can mobilize broader international resources and promote green energy cooperation within the BRI under more persuasive discourse frameworks, helping to form a wider international consensus.

However, as a qualitative study, this paper supports its arguments with key aspects of the case but lacks in-depth analysis of the cases themselves. While the paper tentatively introduces local governments and international organizations into the research framework of BRI green energy cooperation, it does not thoroughly explore the limitations and challenges of their participation. For instance, it remains unclear whether local governments' policy responses are sufficiently effective, or how their own circumstances, such as changes in leadership, might affect cooperation. Similarly, the paper has not yet fully investigated the impact of the relationship between international organizations and the initiative's sponsoring countries, or how the structure and philosophy of these organizations influence cooperation. Future research could focus on single-case studies or comparative case studies to provide more comprehensive insights by giving empirical data.

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