

China-ASEAN Collaborative Governance of Energy Transition under the Belt and Road Initiative: Status, Challenges and Approaches

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Abstract. This paper offers a comprehensive analysis of the collaborative governance practices between China and the Association of Southeast Asian Nations (ASEAN) in the realm of energy transition. It examines how the actions of Chinese energy-related entities have fostered political trust among ASEAN member states under the Belt and Road Initiative (BRI). The process of energy transition is characterized by its regional nature, high investment, and prolonged transition period. ASEAN member states have demonstrated a commitment to achieving regional energy transition, yet they are deficient in the critical elements necessary to translate proposals into actionable practices. Supported by the BRI, various spatial levels of Chinese entities have entered ASEAN to participate in cooperative governance of energy transition. The cooperation between the China-ASEAN community on the issue of energy transition has enabled an orderly and efficient progression of energy transition in Southeast Asia. Concurrently, it has bolstered the trust of ASEAN member states in China, reducing their indecisiveness in regional affairs.

Keywords: China-ASEAN relations, the Belt and Road Initiative, Collaborative governance, Energy transition.

1. Introduction

The energy transition is necessary to meet the growing global energy demand while protecting the environment for future generations. It is also necessary to mitigate climate change by reducing greenhouse gas emissions, ensuring energy security through the diversification of energy sources, and promoting sustainable development. However, due to the strong externalities of energy transition, as well as the interdependence among nations, energy transition is a revolution that can never be handled by a single government. It's a systematic governing arrangement that needs oriented consensus and cooperation among different spatial levels of actors within a region.

Collaborative governance, a public management strategy that involves multiple stakeholders in the decision-making process, is particularly relevant in the context of energy transition [1]. It is an arrangement where citizens, civil society organizations and industry sectors are involved in the complex interplay of public and private interests, the need for new technologies, and the social and environmental impacts of transitioning to a low-carbon energy system.

China-ASEAN is one of the most important bilateral relationships in the world, with abundant interactions in the process of energy transition [2]. Aiming to promote sustainable economic development and enhance technological and cultural exchanges, the Belt and Road Initiative paves the way for the energy collaborative governance in this region [3]. As an open framework, governments, businesses, social organizations, and residents of China and ASEAN are involved in the process of energy transition. This endows carbon reduction with richer vitality and support, turning green development from vision into reality. At the same time, energy issues, as a low-politics field, also provide opportunities for China-ASEAN countries to engage in cooperation, enhancing trust and interdependence among nations. This has led to a shift in traditional positions in both the economic and political fields for Southeast Asian countries, with China's influence in the region growing stronger.

2. Literature Review

Transnational energy governance has grown to be an important field in international politics over the past few years. On October 3, 2013, during an address to the Indonesian Parliament, Chinese President Xi Jinping introduced the idea of fostering a China-ASEAN community with a shared future [4]. China and ASEAN have established the comprehensive strategic partnership and have long-term economic cooperation under the Belt and Road Initiative and other mature regional mechanism, thus holding significant research value in energy transition cooperation. The current institutional architecture of the “green BRI” relies on voluntary corporate self-governance and a multitude of international and transnational sustainability initiatives [5].

BRI represents a new era of globalization, with China taking on a more proactive role [6]. China's unique advantages for energy cooperation with ASEAN include resource, capital, and tech complementarity with neighbors, and geographical strengths for energy and electricity interconnection, enabling close collaboration under BRI [7]. ASEAN is China's biggest trading partner, having a robust connection with China mainly through the BRI [8]. What ASEAN faces is carbon-lock in situation in value chains and high dependence on carbon-intensive infrastructure, technologies, or energy sources [9]. With the gradual implementation of governance, researchers focus swift to current decentralization movements, develop a conceptual framework for the mechanism of local renewable energy cooperatives, which supports the concept of the positive role of multi-agent collaborative governance in the regional energy transition [10].

Currently, research on China-ASEAN energy transition cooperation is limited to analyzing the cooperation process in different energy sectors, or from the perspective of industrial and supply chains, such as analyzing cooperation in hydrogen energy and the new energy vehicle industry. The analyses are confined to the fields of energy investment and green technology cooperation, without giving due attention to the special role of social advocacy and mobilization in carbon reduction actions. Moreover, existing studies lack a macro policy system combing of the China-ASEAN new energy transition and overlook the significant role of energy system cooperation in promoting the political relations between China and ASEAN.

3. The Status and Challenges of Decarbonizing Cooperation under BRI

China, the largest developing nation in Asia, has managed to strike a balance between development and decarbonization. China's share of global consumption of clean energy reached 26.4% in 2023, up 10.9 percent from the previous year. The overall installed capacity of renewable energy generation achieved 1.7 billion kilowatts, or 58.2% of the total installed power capacity, out of the 2.92 billion kilowatts of total installed power capacity [11]. Currently, China's installations in hydro power, wind power, and photovoltaic power generation all rank first in the world. China is the major player in the innovation of renewable energy technologies, contributing to 40–80% of the manufacturing capacity for technologies such as batteries, heat pumps, solar photovoltaic panels, and wind turbines.

ASEAN countries have their own pace in dealing with the carbon reduction task. ASEAN member states are projected to experience substantial economic expansion in the forthcoming decades. The economic boom, coupled with a rising population, will inevitably lead to a surge in energy demand across the region. Southeast Asia's emerging economies have seen a consistent 5% increase in their GDP each year for the last ten years, whereas the demand for electricity has surpassed this growth, escalating at an average annual rate of 5.7%. According to Standard & Poor's Global Commodity insights, ASEAN is expected to continue expanding at a similar pace through 2050, which is significantly higher than the global average growth of 2.5%. With strong development needs come substantial energy demands. The electricity intensity(EI) of six major ASEAN markets is 1.18 over a ten-year period (2011-2021), much higher than the global average EI of 0.9, revealing the situation that ASEAN's development is heavily dependent on energy [12].

Besides, serious problems are rooted in ASEAN's energy structure. Heavy dependence on fossil fuels and carbon locking in energy investments have severely limited ASEAN's energy transition and

green economic development. In light of the current energy crisis, a major drawback of regional development has been its excessive reliance on fossil fuels [13].

Based on data from ACE2023, fossil fuels dominate energy consumption in ASEAN, accounting for a staggering 80% share of total primary energy supply [14]. The carbon lock-in crisis is also serious in this region. This area is also experiencing a severe carbon lock-in situation. Currently, fossil fuel power plants supply the majority of the region's energy, accounting for 75% of the power supply, with coal making up 55% of total generation [12]. As one of the most climate-vulnerable regions on Earth, ASEAN is working to strike a balance between economic growth and energy system transition while addressing environmental concerns. The GDP of the ASEAN region may suffer a loss of 11% by 2100, with 87 million people living in areas at risk of flooding if the impacts of climate change are not taken into account [14].

4. Collaborative Governance of Energy Transition

Collaborative governance is a multi-level governance model. It accomplishes the division of labor in the governance process between different levels, is open and welcomes interaction between actors, and is particularly suitable for the practice of transnational energy transition. In the process of energy transition, there is a high degree of coupling between domestic and international politics, making the effect of collaborative governance more prominent. Governments of other countries, private sectors, and non-governmental organizations may deeply intervene in a country's economic and social planning within the cooperation framework, or directly establish contacts with local governments and local groups to construct a cross-hierarchical and low-border transnational governance network. Figure 1 illustrates the main functions of the different spatial levels of actors in the transnational energy transition collaborative governance. The governance process can include multiple components, such as the construction of clean energy projects, providing specialized technical and financial support, helping to formulate legal and policy mechanisms to promote clean energy development, cultivating green awareness among the public through people-to-people diplomacy, and carrying out scientific research and training projects related to energy transition.

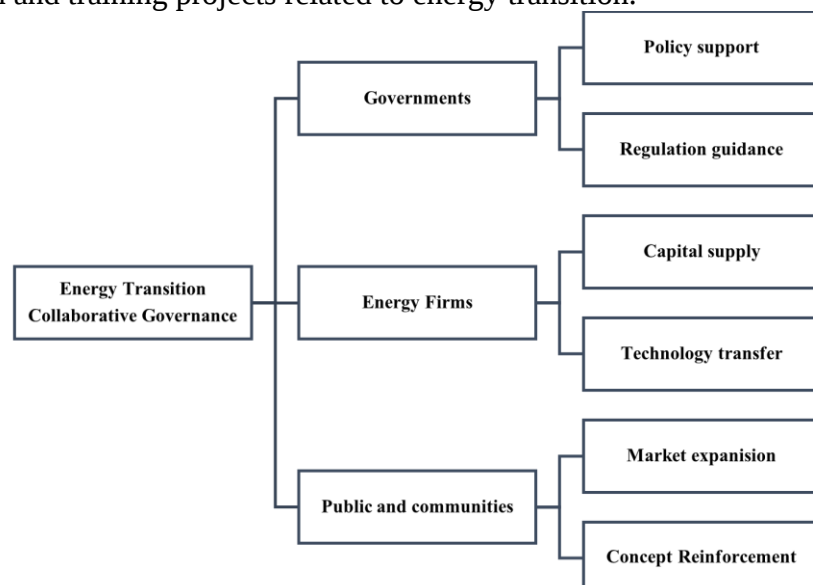


Figure1. The collaborative cooperation in energy transition

4.1. Government Collaboration

Persistent political commitment is necessary to see these reforms through, especially when they link politically sensitive policy spheres and directly contradict entrenched interests like high-carbon sectors. The Chinese government frequently forms bilateral agreements with ASEAN while simultaneously entering into separate agreements with specific nations like Indonesia and Thailand

when negotiating the ASEAN region's carbon reduction goal. In addition to open activities in which enterprises and other sub-national entities can participate, these activities are carried out at the governmental level. The primary actions involve releasing joint statements, holding frequent high-level discussions with the aim of negotiating and consulting to create a strategic consensus, and offering regulatory guidance and policy support for bilateral energy cooperation.

In the intergovernmental energy cooperation mechanism, China and ASEAN have established a mature dialogue mechanism and determined basic cooperation documents. Leader from China and the Southeast Asian region have reaffirmed their robust dedication to strengthening collaborative efforts in the realm of clean energy transition. The ASEAN-China Strategic Partnership Vision 2030, which was endorsed during the 21st ASEAN-China Summit in 2018, highlighted the imperative of a collective regional strategy to foster the advancement of clean energy. In the year 2021, the Plan of Action to Implement the ASEAN-China Strategic Partnership for Peace and Prosperity (2021–2025) was introduced. This paper functions as a crucial manual for stepping up collaboration in areas that benefit both parties, with clean energy being one of the key areas of emphasis. The Joint Statement on Strengthening China-ASEAN Common Sustainable Development is another important document that marks a turning point in the collaboration on decarbonization released at the 25th ASEAN-China Summit. Following that, at the 26th ASEAN-China Summit in 2023, the ASEAN-China Joint Statement on Mutually Beneficial Cooperation on the ASEAN Outlook on the Indo-Pacific was unveiled. This declaration underlined once more how important it is to work together to achieve sustainable green growth and the shift to renewable energy.

The existing multi-party cooperation platform is China-ASEAN Clean Energy Week (CACEW), which serves as an all-encompassing platform aimed at fostering collaboration among ASEAN Plus three countries. It focuses on joint efforts to tackle the intertwined challenges of economic growth and the shift to clean energy within the region. CACEW focuses on cooperation in the field of clean energy, covering technology transfer, project implementation, and capacity building. It is a centralized activity platform with the participation of governments, enterprises and scholars to promote concrete cooperation between China and ASEAN countries in the clean energy transition at the practical level.

The platform represents an expansion of previous significant initiatives on clean energy cooperation, including the East Asia Summit Clean Energy Forum, the ASEAN+3 Clean Energy Round Table Dialogue, and the China-ASEAN Clean Energy Capacity Building Program. Previously, these platforms functioned independently. However, they have been consolidated under the umbrella of the China-ASEAN Clean Energy Week in 2023, marking an unprecedented level of cooperative engagement.

In some energy transition sub-areas, China and ASEAN are also trying to reach an institutional consensus. In the areas of energy trade, investment, production capacity and technology, China and ASEAN have already had initial cooperation, the core purpose of which is to regulate standards, guide investment or support pioneering infrastructure. The ASEAN-China Partnership on Science, Technology and Innovation (ACPA-STI) plays a structural role in facilitating the energy transition between China and ASEAN. The cooperation, began at the 16th China-ASEAN Leaders' Meeting in 2013, is designed to address the growing demand for scientific and technological cooperation between China and ASEAN countries. It is committed to promoting scientific and technological collaboration and talent exchange within the region. Under BRI, the latest green finance cooperation to boost energy transition, the Green Investment and Finance Partnership, was proposed at the 3rd Belt and Road Forum for International Cooperation in 2023. It serves as a significant complement to the Asian Infrastructure Investment Bank (AIIB) and the Asian Development Bank (ADB). This partnership, focused on green investment, aims to utilize BRI funds as well as carbon finance supported by Core Climate, a subsidiary of the Hong Kong Exchanges and Clearing Limited (HKEX), to finance renewable energy projects in ASEAN countries. It highlights the important position of facilitating energy transition in developing countries within China's Belt and Road Initiative.

4.2. Enterprise Collaboration

Cooperation at the enterprise level is also deeply influencing the energy transition process in the ASEAN region. ASEAN Secretary-General Koh Kim Hong said at the China-ASEAN Clean Energy Cooperation Week in 2023 that energy demand in the ASEAN region is expected to increase three to four times by 2050. In the energy investment in ASEAN region, Chinese energy enterprises are the key subjects of investment. Over the past two decades, China has supported more than 150 energy projects in ASEAN countries through development assistance and investment financing [15]. China's public investment in renewable energy projects in ASEAN countries accounted for 60% of the foreign public investment received by ASEAN from 2000 to 2020 [16]. In the energy sector, China has established a presence in ASEAN by leveraging its state-owned giants to address the region's growing power needs. China's state-owned enterprises are important micro-entities in the economic and trade relations of energy transition, playing an important role in technology transfer and capital support. To invest in projects where ASEAN has needs and China has strengths, China overseas enterprises accelerate the localization process and helping ASEAN turn their energy transition proposals into reality. China Energy Construction Corporation Limited (CEEC) secured \$33.8 billion worth of new contracts in ASEAN countries between 2020 and 2023, indicating an annual growth rate of 17%. Another State-owned enterprise, China Huadian Corporation, has a total of 9 operational and under-construction projects in ASEAN countries, with an installed capacity of 4.6626 million kilowatts [17]. China State Power Investment Corporation Limited has facilitated power transmission from Yunnan to Vietnam and Laos and integrated Myanmar's hydropower into Yunnan's grid. Large-scale investment and technical assistance have greatly accelerated the energy transformation in ASEAN. The Jurong Island Energy Storage Project in Singapore, which uses a full set of smart liquid-cooled energy storage systems, and some management systems provided by the Chinese Envision Energy Group, has promoted the transformation of Jurong Island into a sustainable energy and chemical park, helping Singapore to complete the goal of deploying at least 200 megawatts of energy storage systems by 2025 ahead of schedule [18]. The Thailand Sirindhorn Dam Integrated Floating Photovoltaic Project, undertaken by the China Energy Construction Group, has a total installed capacity of 58.5 megawatts and can reduce carbon dioxide emissions by about 47,000 tons annually after operation. Another project undertaken by the group in ASEAN, the Vietnam Gia Lai 300-megawatt wind power project, is expected to generate 900 million kilowatt-hours of electricity annually after completion.

4.3. Public and Community Collaboration

The public and the community are important nodes of energy transformation. This level of cooperation includes academic dialogue, public diplomacy, energy concept publicity, green city construction, green community construction, etc. It is a process from concept to practice, from high-level dialogue to low-level practice, and from green energy supply to green energy consumption. Although this is the end of the collaborative governance of the energy transition, it is in fact the core of the energy system and the most important part of energy justice. In the transnational collaborative governance of China and ASEAN, the main subjects of this level are mainly from the local communities of ASEAN countries, mainly local community residents, community organizations, and academic organizations. Their main contribution is to fully participate in the pilot areas of the energy transition, to successfully serve as a demonstration of the use of new energy sources, or to promote the concept of energy transition to the public and raise public environmental awareness.

China and Laos are working together to turn the Saysertha Comprehensive Development Zone, a new urban area in Vientiane, the capital of Laos, into a low-carbon demonstration zone, and promote the development of Vientiane New City as a model of low-carbon and environmentally friendly cities in Laos and even Southeast Asian countries. A total of 3,000 sets of solar streetlights will be installed in the development area, and after the new energy vehicles assisted by China are put into use in the area, the local carbon emissions can be reduced by about 1,243 tons per year, which is equivalent to planting more than 100,000 trees [19]. Apart from establishing low-carbon demonstration areas, China has collaborated with Vietnam, Myanmar, and the Philippines on climate change adaptation

and mitigation projects to support ASEAN's transition to a green and low-carbon economy. The assistance includes provision of clean burners, environmental monitoring devices, photovoltaic power generation structures, new energy vehicles, and other related materials. In addition, China and ASEAN countries continue to carry out cooperation on China-Asean Mangrove research and low-carbon schools, successfully held the China-Asean Dialogue on Climate Change and Ecological Environment and supported the relevant work of the ASEAN Cooperation Center on Climate Change, making positive contributions to promoting regional response to climate change. The China-Asean Green Emissary Program, launched in 2011, has strengthened mutual visits of scholars and students from both sides, enhanced bilateral awareness of regional ecological and environmental governance and public environmental awareness, and further promoted sustainable recovery and inclusive growth of the regional economy.

5. Cross Level Engagement and Political Trust Building

In the process of collaborative governance in regional energy transition, policies and regulations can be compared to the skeleton of an organism, which provides the necessary structure and framework. Capital and technology then serve as the flesh and blood, giving form to the skeleton and enabling the system to function and grow. Community cooperation and the spread of awareness about decarbonization embody the soul, animating the entire endeavor with purpose and vitality. It is through this synergy of structure, function, and spirit that effective governance truly comes to life. China-ASEAN regional energy transition cooperation is processing through the cross-level and transnational engagement. Cross-level interactions can not only transfer funds and resources downward but also convey political trust upward. This helps lower-level actors to deeply understand policies and strengthens the high-level ASEAN's confidence in joining China's Belt and Road cooperation. In contrast, other traditional regional governance areas lack trust among actors, especially in cooperation between a regional big power and its surrounding small states. ASEAN's apprehension towards China may stem from a misconception of China's rise, including geopolitical disputes or concerns about economic dependence [20]. In the process of energy transition, through the engagement of community actors, the traditional Giver-Receiver model of investment and technical assistance was complemented by the collaborative governance model. In-depth and pragmatic cooperation has also accumulated energy transition experience for China and ASEAN countries, enabling energy cooperation models that fit Asian communities, business models, and political models to gradually mature. ASEAN is possible to become models for the green transformation of energy-intensive developing countries. The large-scale spillover effects generated by energy transition governance will significantly promote peaceful relations between China and ASEAN.

6. Summary

China and ASEAN have a broad prospect in the collaborative governance of energy transition. Both China and ASEAN share the same determination to reduce carbon emissions and have a high degree of complementarity in implementing initiatives. Under the framework of China's Belt and Road Initiative, the cooperation on energy transition between China and ASEAN unfolds at three levels: government, industry sectors, and the public and community. With the help of China, the collaborative governance involving multiple stakeholders has allowed ASEAN's energy transition to move away from the traditional single-government governance model, representing an important practice of decentralized energy transition. The new model of collaborative governance enables direct communication between energy entities of different countries, with businesses and the public engaging in stable and peaceful interactions based on intergovernmental agreements. This not only brings direct economic, environmental, and social benefits to China and ASEAN member states but

also, thanks to the spillover effects of energy collaborative governance, this low-political-level interdependence ultimately helps the two sides to build a higher level of mutual trust.

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