

Development Situation and Strategy of China's New Energy Industry under the Global Clean Energy Partnership

Dawei Yang, Yuanyuan Deng*

College of ASEAN Studies, Guangxi Minzu University, Nanning 530000, China

*Author to whom correspondence should be addressed.

Abstract: *Against the backdrop of the Global Clean Energy Partnership, China's new energy industry faces significant opportunities, including expanding overseas market demand, reforming energy governance mechanisms, upgrading technologies, and expanding application scenarios. However, it also faces multiple challenges, including international trade barriers, disorderly technological competition, and supply chain risks. By strengthening technological innovation and joint R & D, optimizing production capacity layout and industrial chain collaboration, improving standards and industry norms, and promoting policy support and overseas expansion, we are exploring a path for high-quality development of the new energy industry that adapts to the current market environment and helps China maintain its leading role in the global energy transition.*

Keywords: Global Clean Energy Partnership; New Energy; Industrial Strategy.

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1. Introduction

As the global climate continues to warm and energy security issues become increasingly severe, the development and utilization of more environmentally friendly new energy and the reduction of economic development's dependence on traditional energy have gradually become a consensus among countries. In June 2022, President Xi Jinping proposed at the High-level Dialogue on Global Development that China will “promote the establishment of a global clean energy partnership (hereinafter referred to as the partnership)” to inject new impetus into the global energy transformation. The development of China's new energy industry has ushered in an important period of opportunity [1]. Faced with the increasingly complex competition and cooperation in the global energy field, the academic community has widely discussed this, but has not paid enough attention to the new characteristics of the development of the new energy industry under the background of the partnership. [2-5] Therefore, this paper intends to use qualitative research methods to explore the importance of high-quality development of China's new energy industry, analyze the current opportunities and challenges, and finally propose strategic references for its future development from a global perspective.

2. The Importance of High-quality Development of the New Energy Industry Under Partnership

The high-quality development of the new energy industry is based on the actual needs of China's economic construction, energy security and environmental protection, and is also a full grasp of the international trend of low-carbon transformation. Its importance is mainly reflected in three dimensions.

2.1 Key Engine for Promoting Economic and Social Development and Scientific and Technological Innovation

Traditional energy sources with high carbon emissions, limited reserves, and uneven geographical distribution, new energy sources are clean, environmentally friendly, renewable, and widely distributed, providing relatively

balanced development opportunities for all countries. With technological advancements, cost reductions, and expanded application scenarios, new energy sources are gradually alleviating energy poverty and enabling sustainable social development. The current sluggish global economic recovery and the proposed partnership reflect the urgency of developing new energy sources worldwide. Mastering key technologies and achieving efficiency gains and energy reductions will enable us to seize the initiative in the green economy. As a capital- and technology-intensive industry with a wide reach and a long industrial chain, the new energy industry can create numerous high-value-added jobs across the entire supply chain, foster a concentration of cutting-edge talent, improve the innovation ecosystem, and promote coordinated regional development. Technological innovation not only enhances the competitiveness of its own industry but also drives the upgrading of related industries such as equipment manufacturing. For example, CATL's sodium-new 24V heavy-duty truck starter-station integrated battery reduces costs by 61% , contributing to technological breakthroughs in new energy vehicles. [6]

2.2 Strategic Fulcrum for Building a Modern Industrial System and Low-carbon Energy Structure

The development of the new energy industry is related to the optimization of the national industrial structure and the improvement of production efficiency. It covers multiple links such as research and development, processing, construction, and operation. By integrating across industries and creating emerging industrial clusters, it can effectively reduce the cost of the real economy. It can also drive the coordinated development of cutting-edge fields such as smart grids, promote the leap of industrial models from traditional factor-driven to innovation-driven, and give birth to new business forms such as “hydropower + cultural tourism”, and achieve deep integration of the primary, secondary and tertiary industries. China's resource advantages can also be fully transformed into economic advantages, narrowing the development gap between the east and the west and between urban and rural areas, and promoting the rational layout of industries. [7] After the establishment of the partnership, China can provide more powerful support for the stability of the global industrial chain and supply chain with its product advantages. In addition, the development of local new energy industries is conducive to reducing the external risks of energy supply and reducing China's dependence on imported energy. Diversified sources are also conducive to building a resilient energy system with multiple energy complementarity, avoiding systemic problems caused by the interruption of a single energy supply, and the dual improvement of energy efficiency and environmental protection provides a reliable guarantee for industrial development.

2.3 An Important Tool for Enhancing National Comprehensive Strength and Responding to International Risks

The new energy industry is the focus of comprehensive national strength competition and the key to China's expansion of global influence. By deepening international capacity cooperation and exporting high-quality products, services and technical standards, China's voice in the formulation of international energy rules will be enhanced. With the help of partnerships, China can expand its high-level opening up to the outside world, support the development and utilization of new energy in the global South, ensure its energy security, shape a new pattern of global energy governance, and provide a stable international environment for China's economic development. At present, China has carried out new energy project cooperation with more than 100 countries and regions. For example, the UAE photovoltaic project undertaken by Chinese companies can guarantee the electricity demand of 200,000 households and reduce carbon emissions by 2.4 million tons per year. [8] Such cooperation not only provides a broad market space for China's new energy industry, but also reduces the impact of international energy price fluctuations on the domestic economy, resists the risk of “chain breakage”, enhances macroeconomic stability, and facilitates the international community to work together to resolve development problems and share green opportunities.

3. Current Development Situation of China's New Energy Industry

Under the background of partnership, China's new energy industry has taken the lead in the world in terms of market scale, technological level and industrial chain capacity, showing the development characteristics of total volume increase and structural optimization, technological breakthroughs and bottleneck constraints, and global opportunities and risks and challenges coexisting.

3.1 China's New Energy Industry is in a Critical Period of Capacity Expansion and Quality Improvement

From the initial full-set introduction to the gradual realization of full domestic production of the supply chain, China has now become the world's largest new energy equipment manufacturing country and application market. [9] In terms of market size, the production capacity of hydropower, photovoltaic, wind power and other industries ranks among the top in the world. In 2024, the national new energy investment will reach 625 billion US dollars, accounting for one-third of the world, and the newly added new energy installed capacity will be 300 million kW. China's silicon wafers account for more than 90% of the world. In terms of technical level, Chinese companies have made remarkable achievements in lithium battery energy density and other aspects, and the number of scientific research patents is leading the world; the digital transformation of energy is steadily advancing, and the market size of virtual power plants is expected to reach 10.2 billion yuan in 2025; the new energy storage industry has also ushered in changes, and the cost of energy storage cells has been greatly reduced. In terms of industrial chain capabilities, China has the most complete new energy industry chain system and supporting capabilities in the world, with obvious cluster advantages, becoming a global production and supply stabilizer. The production capacity of upstream materials such as polysilicon is sufficient, and the production capacity of midstream power batteries accounts for about 60% of the world. Downstream system integration and market applications are also leading. In the first quarter of 2025, the export volume of new energy vehicles reached 441,000 units, a year-on-year increase of 43.9%. [10]

3.2 Opportunities for the Development of China's New Energy Industry Under Partnership

The global energy transition is currently entering a rapid phase, and a country's position in industries, technologies, and markets is crucial to its future power dynamics. As partnerships grow closer, the development potential of China's new energy industry is closely tied to the green productivity of the global energy system. Reduced development costs and improved economic efficiency are creating new opportunities. Countries are proposing "dual carbon" goals, updating energy policies, and increasing green investment. By 2025, global energy storage system installed capacity is expected to increase by over 130% year-on-year, creating a massive market. In June of the same year, the European Union released the Clean Industry Agreement State Subsidy Framework (CISAF) to promote hydrogen energy development, encouraging Chinese companies to upgrade their technology and expand exports. Demand for cooperation among countries along the Belt and Road Initiative is surging, creating emerging markets to be explored. In regions like the Middle East, where instability and other factors have impacted traditional power generation, there is a strong demand for new energy. Furthermore, the development of international carbon mechanisms, such as the Global Carbon Footprint Management System, will help Chinese products gain carbon cost advantages in the international market and enhance their international competitiveness.

3.3 Challenges in the Development of China's New Energy Industry Under Partnership

The increasingly complex international environment is the primary challenge. Western developed economies are attempting to reshape the global new energy industry chain through a dual approach of subsidies and trade barriers. The United States has set a 45% domestic component content requirement for public energy storage systems, and the European Union has imposed a 35% tariff on Chinese electric vehicles. Trade protectionism has increased market access costs, and unhealthy competition has limited the expansion of partnerships. Another challenge is the risk of technological iteration. New energy technologies are evolving rapidly, while China's high-end technologies account for a limited proportion. The commercialization rate of technologies like smart grids remains below 50%. Without continued advancement, China will quickly lose its competitive advantage. Some power facilities struggle to be efficiently utilized, exposing bottlenecks in grid connection and consumption technology. Dependence on imported key minerals and components raises supply chain security risks. Some countries, under the guise of partnerships, are creating exclusive "cliques." Geopolitical shifts and international price fluctuations threaten industry stability. Finally, there is the risk of adapting to international rules. Currently, the global reserves of funds, technology and talent for the development of new energy are limited, while the overall cost of project financing in China is relatively high; policies, regulations, technical standards and grid adaptability vary from region to region, and international projects are in urgent need of management talent familiar with the local area; there is still a large gap in development levels between the north and the south, and the recognition of China's standards needs to be improved.

4. Strategic Choices for High-quality Development of the New Energy Industry Under Partnership

In response to the current problems and challenges in the development of the new energy industry, the Chinese government, enterprises and all sectors of society should work together to explore a path of high-quality development that accurately grasps the current situation and promotes China's new energy products and technologies to move towards cutting-edge fields.

4.1 Strengthening Technological Innovation and Joint R&D

The new energy industry should seize the opportunities of the current scientific and technological revolution and increase R&D investment in cutting-edge technologies such as hydrogen energy storage. Based on the diverse needs of the market, the industry should deeply integrate multidisciplinary technologies such as materials science, automation, and power engineering. Enterprises should be encouraged to assume primary responsibility for innovation, spontaneously improve technologies and products, build socialized innovation service platforms, and enhance the added value and differentiated competitiveness of new energy products. Infrastructure should be improved to reduce the development and delivery costs of new energy, expand its application scenarios, and create a complete industrial ecosystem. Furthermore, the industry should actively participate in international scientific and technological exchanges, support partner countries in developing technology promotion pathways that adapt to local needs based on their own resource endowments and market characteristics, and jointly create demonstration innovation projects. Through partnerships, the industry should promote the international transfer and promotion of innovative new energy technologies, deeply integrate into global innovation networks, establish scientific research communities, and strengthen joint research on key technologies and the sharing of dividends. The industry should coordinate the use of domestic and international market resources and production factors to promote scientific and technological achievements across the threshold of commercial application. By drawing on the development experience of other advanced countries in the new energy industry, the industry should help countries in the South accelerate the bridging of the technological gap.

4.2 Optimizing Production Capacity Layout and Industrial Chain Collaboration

Faced with the external risks brought about by the accelerated transformation of the global energy system, Chinese companies, while pursuing scale expansion, must also continuously optimize their resilient layout that prioritizes both quality and safety, and provide holistic solutions covering the entire chain, including design, construction, and operation and maintenance. They should rely on the large domestic market to stabilize the basic foundation, deploy integrated wind, solar, and water storage bases in the western clean energy-rich areas, and coordinate with high-end manufacturing, R&D, and application projects in the developed eastern coastal areas. At the same time, they should integrate into the international cycle, invest and build factories in Southeast Asia and other places, be close to the terminal market, and avoid trade barriers, thus forming an industrial model of “China R&D, global manufacturing, and world sales.” In addition, they should participate in the construction of the global new energy market and industrial division of labor, share China's supply chain advantages, and establish a new energy special project library under partnerships. They should deepen the connection between major producers and consumers of key minerals and create stable market price expectations. Alternatively, they should assist southern countries with a relatively good industrial base in building a new energy equipment supply chain system, strengthen the full chain coordination from production to operation and maintenance, reduce the cost of local new energy development, and work together to deal with unilateral behavior that politicizes the supply chain, thereby enhancing the scale and resilience of the global supply chain. [11]

4.3 Improve the Standard System and Industry Norms

The construction of a standard system is the cornerstone for driving the new energy industry towards high quality. China needs to give priority to improving the standards of cutting-edge key technologies such as power generation and grid connection management, build a solid industry bottom line for safety and environmental protection, and use industry standards to guide the direction of research and development, and provide technical support for the development and utilization of green electricity. At the same time, it is necessary to standardize the management and service requirements of the entire chain, such as project design, engineering construction, production safety, and operation and maintenance, strengthen planning connection and management standard updates, formulate “anti-involution” standards to rectify disorderly competition, improve the overall operational efficiency, product quality and market competitiveness of the new energy industry, and thus provide a better Chinese solution in the partnership. In addition, all parties should promote international standardization cooperation in the new energy industry, strengthen the connection and mutual recognition of domestic and foreign standards, and reduce the

market access barriers of China's technologies and products through the multilingual translation of standards; or use digital technology to connect China's "green certificate" system with the international carbon market investment standards to create an open and collaborative environment for new energy technology innovation; it can also encourage strong new energy companies to participate in the formulation of international standards and rules, jointly respond to challenges through international industry alliances, and strive for more international green financing.

4.4 Promoting Policy Support and Overseas Expansion

Relevant departments in China need to deepen the market reform of electricity, innovate pricing mechanisms, incentive policies and green financial tools, and improve the fiscal support system and regulatory service framework. In overseas project cooperation, efforts should be made to ease the financing constraints of the development of new energy in southern countries, provide diversified financial tools, and broaden the sources of funds. Explore the guiding role of financial institutions, make energy accessibility the focus of foreign aid, establish a management mechanism that meets the needs of low-carbon industry financial services, and guide the optimal allocation of resources by building an efficient market mechanism and policy environment. In addition, flexible and targeted international cooperation models should be adopted based on the national conditions of the partner countries, focusing on their relatively advantageous industries and technology areas to prioritize cooperation. [12] Relying on the mechanisms such as the International Energy Transformation Forum provided by the partnership, promote policy communication, technology sharing and talent training among various economies, and promote the incubation of innovative cooperation projects. Give full play to the channel role of "two parallel tracks", gather the power of global think tanks, provide intellectual support to government departments, industry associations and energy companies, and facilitate global new energy industry cooperation.

5. Conclusions

China's new energy industry is currently in a critical transition period, shifting from scale expansion to quality improvement. The Global Clean Energy Partnership has injected new momentum into this process. Although China's new energy industry already possesses relative advantages in terms of market size, technological advancement, and industrial chain capabilities, it still faces numerous risks and challenges in its future high-quality development. Factors such as trade protectionism, global supply chain restructuring, and geopolitical risks are exacerbating external uncertainties. Domestic issues such as imperfect power market mechanisms, bottlenecks in key technologies, and supply chain security risks still need to be addressed. Therefore, China's new energy industry needs to accurately grasp the current situation, deeply integrate into the Global Clean Energy Partnership network, actively participate in global energy technology innovation and product development, and build an integrated and interconnected industrial chain, supply chain, and technical standards system. By strengthening technological innovation and joint R&D, optimizing production capacity layout and industrial chain coordination, improving the standard system and industry norms, and promoting policy support and overseas expansion, China can explore a path to sustained, healthy, and high-quality development, making significant contributions to addressing climate change and promoting global sustainable development.

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Author Profile

Dawei Yang born in 1999, male, is a Master's student majoring in political science at College of ASEAN Studies, Guangxi Minzu University. His main research direction is Country-specific Studies on Myanmar, China-ASEAN relations, Governance of Non-traditional Security.

Yuanyuan Deng born in 2002, female, is a Master's student majoring in political science at College of ASEAN Studies, Guangxi Minzu University. Her main research direction is Country Studies in Southeast Asia, China-ASEAN relations.

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