WEP Warwick Evans Publishing

Transactions on Economics, Business and Management Research
ISSN: 2960-1789, eISSN: 2960-2254 | Volume 16
EMFT 2025

Research on Green M&A Performance of China National Nuclear Power From The Perspective of Resource Orchestration

Ying Wang

Department of accounting, Nanjing University of Science and Technology, Nanjing, China

Abstract. With the Chinese government attaching increasing importance to development concepts such as "carbon peaking and carbon neutrality" and "green sustainable development", clean energy has gradually become a key focus area for power enterprises in their transformation. The society's demand for clean energy is constantly rising, and the new energy industry is showing a trend of rapid development. At present, new energy technologies such as solar energy and wind energy have become relatively mature, and innovative technologies are continuously expanding the development scale and efficiency of the new energy industry. In terms of the policy environment, countries around the world have introduced a series of policy measures to promote the development of the new energy industry. China has provided strong policy support for new energy, and through the implementation of a series of large-scale policies, the government has given great attention and support to the development of the new energy industry. In addition, international organizations such as the International Energy Agency (IEA) and the United Nations Environment Programme (UNEP) have strengthened international cooperation and experience sharing by releasing a series of policy reports and recommendations. Against this background, China National Nuclear Power Co., Ltd. (CNNP) officially completed the acquisition of China Nuclear Energy Engineering Co., Ltd. (CNEEC) in 2020, which has exerted a significant impact on the development of CNNP in various aspects. Enterprises often obtain and occupy richer resources through mergers and acquisitions (M&A) and restructuring, but merely retaining resources within the enterprise cannot create competitive advantages. In contrast, the resource orchestration process focuses on the effective mobilization and utilization of resources to exert any potential advantages. Therefore, it is of great significance to explore how enterprises use M&A to enhance corporate value from the dynamic perspective of resource orchestration.

Keywords: Green Mergers and Acquisitions; Resource Orchestration Theory; Green M&A Performance.

1. Introduction

With the continuous development of the economy, the concept that "lucid waters and lush mountains are invaluable assets" has gradually permeated all aspects of the Chinese government's work. While preventing and controlling pollution, clean energy is not only a "powerful tool" for accelerating green transformation and addressing climate change, but also a "booster" for China's economic transformation and high-quality development. As an important way for enterprises to optimize resource allocation and obtain advantageous resources, M&A enables acquiring enterprises to quickly obtain target enterprises' green resources, core technologies and management experience, thus realizing industrial transformation and upgrading as well as green development. Green M&A refers to the M&A activities in which enterprises rapidly acquire clean energy, green products, green services and technologies to meet the requirements of environmental legitimacy and achieve their own sustainable development transformation. Enterprises can obtain and occupy richer resources through M&A and restructuring, but merely retaining resources within the enterprise cannot create competitive advantages. On the contrary, the resource orchestration process focuses on the effective mobilization and utilization of resources to exert any potential advantages. Although existing studies emphasize that effective resource orchestration and core capabilities can create corporate competitive advantages and realize value, there is a lack of in-depth discussion on the resource orchestration process of corporate green M&A. Against the backdrop of the country's vigorous development of renewable energy, the nuclear power industry will become the main battlefield for the green

transformation of clean energy. As a type of clean energy, nuclear power is one of China's major power sources. China National Nuclear Power Co., Ltd. is an important subsidiary of China National Nuclear Corporation. Guided by strategic goals and market development trends, in December 2020, CNNP launched the acquisition of CNEEC, vigorously developing non-nuclear clean energy to help achieve the enterprise's development strategy and green transformation.

2. Resource Orchestration Theory

Sirmon et al. first systematically proposed the concept of "resource orchestration" in 2007. The theory holds that an enterprise's competitive advantage does not simply come from the quantity or quality of resources, but depends on the enterprise's dynamic resource orchestration capability—that is, the process in which enterprises identify, acquire, integrate and utilize internal and external resources to adapt to changes in the external environment and achieve strategic goals. In the context of M&A, resource orchestration is the process in which the acquirer systematically manages its own resources and the target enterprise's resources, with the core goal of maximizing resource value and synergy effects through optimized resource allocation.

The core contribution of the Resource Orchestration Theory is to shift the perspective of strategic management from static resource ownership to dynamic resource management, clarifying that orchestration capability is the key to an enterprise's competitive advantage. Due to its dynamic nature and operability, the Resource Orchestration Theory has been widely applied in different scenarios. It not only provides enterprises with a practical framework for how to allocate, integrate and utilize resources, but also offers a theoretical explanation for why enterprises with similar resources have huge performance differences. In the current complex and volatile environment, "being able to orchestrate resources" is more crucial to an enterprise's survival and development than "owning resources".

The core connotation of resource orchestration includes three interrelated and dynamically cyclical dimensions, which together constitute a complete resource orchestration system: resource structuring, resource bundling and resource leveraging. In the context of M&A, the application of the Resource Orchestration Theory needs to be combined with the phased characteristics of M&A. Before M&A, the focus of resource orchestration is resource structuring: the acquirer needs to accurately identify its own resource gaps and the target enterprise's core resources, and select appropriate target enterprises and acquisition methods. During M&A, the focus of resource orchestration is resource bundling: the acquirer needs to restructure and integrate the resources of both parties to eliminate resource conflicts. After M&A, the focus of resource orchestration is resource leveraging: the acquirer needs to put the integrated resources into operation to realize resource value transformation. For example, in the process of CNNP's acquisition of CNEEC, before the acquisition, through resource structuring, CNNP identified its own new energy resource gaps and CNEEC's core resources, and obtained resources through equity acquisition; during the acquisition, through resource bundling in business, technology, human resources and other aspects, a synergistic resource portfolio was formed; after the acquisition, resources were utilized through optimizing project operation, R&D and innovation, ultimately achieving performance improvement.

3. Case Overview

3.1. Introduction to Both Parties of the Merger and Acquisition

3.1.1. Acquirer: China National Nuclear Power Co., Ltd.

China National Nuclear Power Co., Ltd. (referred to as "CNNP") is the core nuclear power operation platform under China National Nuclear Corporation. It was established on January 21, 2008, restructured into a joint-stock company on December 31, 2011, and successfully listed on the A-share market on June 10, 2015, becoming China's first A-share listed enterprise focusing on nuclear power as its core business. CNNP's core positioning is to "develop nuclear power safely and efficiently, and

promote the green transformation of energy", committed to becoming a world-leading clean energy service provider. As of 2024, CNNP has become one of the enterprises with the largest installed nuclear power capacity, the most operational units and the most advanced nuclear power technology in China, playing an important role in ensuring national energy security and achieving the dual carbon goals.

3.1.2. Target Enterprise: China Nuclear Energy Engineering Co., Ltd.

China Nuclear Energy Engineering Co., Ltd. (referred to as "CNEEC") was established in 2011. It is a wholly-owned subsidiary of China National Nuclear Corporation specializing in new energy business, with a core positioning of "developing, constructing and operating clean energy projects such as wind power and photovoltaic power", committed to becoming a leading domestic new energy developer and operator. In December 2012, a wind power project was completed in the Gansu Mining Area, marking CNEEC's entry into the wind power market. In January 2014, CNEEC established China Nuclear Energy Engineering Offshore Wind Power Co., Ltd. together with its controlling shareholder, providing an exclusive platform for offshore wind power development, as well as a professional platform for the development, construction and operation of CNEEC's new energy, laying a solid foundation for its stable development in the future. Since then, CNEEC has gradually independently completed a number of photovoltaic projects, such as the Hami Wind Power Project at the end of 2015, which was CNEEC's first independently developed photovoltaic power generation project. The layout of CNEEC's projects has gradually expanded to southern China, where a number of wind power projects have been completed one after another.

3.2. M&A Process

January 2017: CNNP officially launched the pre-M&A preparation work and simultaneously began to gradually take over the various management work of CNEEC.

February 2019: To further verify the synergy feasibility of the "nuclear power + new energy" model, CNNP entrusted CNEEC with the management of new energy development projects participated by its subsidiary, China Nuclear Shandong Energy Co., Ltd.

December 11, 2020: The board of directors of CNNP officially reviewed and approved the acquisition plan for CNEEC, clarifying the core transaction terms—it planned to purchase 100% of CNEEC's shares from China National Nuclear Corporation by means of cash payment, with an agreed transaction price of 2.11 billion yuan, and announced the acquisition the next day.

December 28, 2020: After the approval by the board of directors, CNNP held a general meeting of shareholders to perform the final decision-making procedure on the M&A matter, and officially signed the equity transfer agreement with China National Nuclear Corporation, the former controlling shareholder of CNEEC, at the meeting.

January 6, 2021: CNEEC was officially placed under the 100% management and control of CNNP, marking the completion of equity delivery and control transfer of this green M&A.

4. Analysis of the Resource Orchestration Process in CNNP's Green M&A

The Resource Orchestration Theory emphasizes that enterprises achieve maximum resource value and build competitive advantages through the actions of "resource structuring, resource bundling and resource leveraging". CNNP's green acquisition of CNEEC is essentially a systematic orchestration process centered on new energy resources—from identifying resource gaps before the acquisition, to resource delivery and initial integration during the acquisition, and then to in-depth utilization and value transformation after the acquisition. The resource orchestration behaviors in each stage are closely aligned with the "nuclear power + new energy" synergy strategy, ultimately realizing the landing of green M&A value. The following disassembles the core logic of this M&A process from the perspective of resource orchestration stages.

4.1. Resource Structuring in CNNP's Green M&A

Resource structuring refers to the process in which enterprises acquire and accumulate resources, which will provide resource support for the subsequent resource bundling and resource leveraging processes.

4.1.1. Accumulation of Market Resources

Through the acquisition of CNEEC, CNNP has achieved remarkable results in the acquisition and accumulation of market resources. In terms of installed capacity, before the acquisition in 2020, CNNP mainly focused on the nuclear power field, with a large-scale installed nuclear power capacity but almost zero new energy installed capacity. At that time, CNEEC had already made deployments in the new energy power generation field such as wind power and photovoltaic power, with a certain number of operational and under-construction projects. After the completion of the acquisition, by the end of 2024, the controlled operational installed new energy capacity of CNNP had soared to 29.5962 GW, including 9.5789 GW of wind power and 20.0173 GW of photovoltaic power, as well as 1.4010 GW of controlled independent energy storage power stations. The total newly added installed new energy capacity of the company in 2024 reached 14.3582 GW, including 2.3717 GW of wind power and 11.9865 GW of photovoltaic power. Such rapid growth has rapidly expanded CNNP's market share in the new energy power generation market, greatly enhancing its voice in the clean energy market. In terms of market regional coverage, CNEEC had previously carried out new energy projects in many regions, with an extensive project layout covering areas in China rich in wind and solar energy resources. After the acquisition, relying on CNEEC's existing layout, CNNP quickly penetrated into these regional markets, achieving horizontal expansion of the market scope and laying a solid foundation for the continuous expansion of subsequent business.

4.1.2. Accumulation of Green Technology Resources

In terms of green technology resources, CNEEC has a number of technological achievements and patents related to wind power and photovoltaic power. According to incomplete statistics, before the acquisition, CNEEC had invested tens of millions of yuan in R&D of new energy power generation technologies, mastered a series of key technologies to improve the efficiency and stability of new energy power generation, such as high-efficiency photovoltaic module application technology and intelligent wind power operation and maintenance technology, accumulated rich operational experience in new energy business, and possessed multiple capabilities such as engineering construction, safe operation and maintenance, and scientific and technological R&D. Through the acquisition, CNNP has incorporated these green technology resources into its own, greatly enriching its technological reserve.

4.1.3. Accumulation of Human Resources

CNEEC has accumulated a group of professional talents in the new energy field, covering multiple links such as project development, engineering construction and operation management. Before the acquisition, CNEEC had hundreds of professional and technical personnel in new energy, among whom 30% had intermediate and senior titles. Through the acquisition, CNNP directly absorbed this group of professional talents and quickly built its own new energy talent team: in terms of technological R&D, CNNP obtained comprehensive technologies for the development, construction and operation of CNEEC's new energy business, and cultivated its own R&D team; in terms of management, CNEEC provided a professional management team for CNNP to carry out business docking, stable management, organizational integration, and fully grasp information on assets, business personnel, etc. In addition, CNEEC also sent talents in professional fields such as operation, law and finance to CNNP, greatly accumulating and supplementing the company's human resources.

4.2. Resource Bundling in CNNP's Green M&A

In the previous stage, CNNP constructed a post-M&A resource portfolio, but resource structuring alone cannot form the enterprise's core competitiveness. Therefore, CNNP needs to carry out resource

bundling—that is, take a series of effective actions on the constructed resource portfolio to form its own competitive advantages in the market.

4.2.1. Building a Dual-Business Development Model

After the acquisition, CNNP actively integrated CNEEC's advanced technical conditions, upgraded and transformed traditional nuclear power equipment, improved production capacity, and fully built a "nuclear power + new energy" dual-business development model, achieving good results. The synergy effect of the dual-business model has gradually emerged. For example, in terms of power supply stability, nuclear power, as a baseload energy source, provides stable power output, while new energy can flexibly supplement the energy demand changes in different periods. The two complement each other, improving the stability and reliability of the company's overall power supply and enhancing its competitiveness in the power market.

4.2.2. Building a Multi-Dimensional Resource Platform

In terms of the capital platform, relying on the advantages of being a listed company and the improved credit brought by the expanded scale after the acquisition, CNNP has gained more convenience in financing. During 2021-2024, the company successfully issued multiple phases of green bonds with a total financing amount of over 20 billion yuan, and the financing cost was reduced by about 1 percentage point compared with that before the acquisition. On the technology sharing platform, CNNP integrated the R&D resources of nuclear power and new energy, and established a joint R&D center. Since its establishment, the R&D center has carried out more than 20 cross-business technology R&D projects every year, such as researching how to use nuclear power waste heat to provide auxiliary energy for new energy equipment and improve the comprehensive energy utilization efficiency. On the market synergy platform, CNNP integrated the market channels of nuclear power and new energy, and carried out unified market promotion and customer service. Taking the petrochemical industrial park in Xuwei New Area of Lianyungang as an example, relying on the integrated market platform, CNNP provided the park with both nuclear power and new energy power packages, meeting the diversified energy needs of the park and improving customer satisfaction and market share.

4.2.3. Improving the Internal Corporate Governance System

In terms of improving the internal corporate governance system, after the acquisition, CNNP optimized and adjusted its organizational structure, set up a special new energy business management department responsible for coordinating the development, construction and operation of new energy projects, realizing the professional management of nuclear power and new energy businesses. In terms of management systems, CNNP adopted advanced intensive management methods, centralized the shared functions within the entire system for unified allocation, provided standardized and high-quality services for each member unit, and achieved the management goals of low cost and high efficiency. In terms of decision-making process optimization, a cross-business decision-making committee was established, which can make quick and efficient decisions on major project decisions involving the coordinated development of nuclear power and new energy, shortening the project decision-making cycle and improving the company's operational efficiency. In terms of performance appraisal system, differentiated appraisal indicators were designed according to the characteristics of nuclear power and new energy businesses, while focusing on the setting of synergy indicators to motivate employees to actively promote the coordinated development of the dual businesses. Therefore, through the above bundling of human resources, CNNP has improved its enterprise management capabilities, laying a foundation for the subsequent enhancement of R&D innovation and the improvement of operation and management efficiency.

4.3. Resource Leveraging in CNNP's Green M&A

In the Resource Orchestration Theory, the ultimate purpose of resource structuring and bundling is to realize resource leveraging, that is, to form capabilities that can create value for enterprises and their

owners. At this stage, CNNP actively identifies and seizes market opportunities, and uses the capability advantages formed by resource integration to promote enterprise transformation and upgrading.

4.3.1. Gradual Improvement of Industrial Chain Layout

In the manufacturing link of new energy power generation equipment, through investment and cooperation, CNNP has established close ties with a number of wind power and photovoltaic equipment manufacturers, and increased investment in installed capacity in the wind power and photovoltaic fields. In terms of the supply chain, CNNP has signed long-term agreements with nuclear fuel procurement and processing enterprises under the group to ensure stable fuel supply and stable prices. In the power transmission and sales link, it has actively participated in power grid construction projects and strengthened cooperation with power grid enterprises. As of 2024, the length of new energy transmission lines invested and constructed by the company has exceeded 500 kilometers, improving the external transmission capacity of new energy power. In the energy storage link, it has also started deployment, invested in and constructed a number of energy storage demonstration projects, with an energy storage installed capacity of 500,000 kWh, effectively solving the intermittency problem of new energy power generation, improving the stability and reliability of power supply, and further enhancing the company's competitiveness in the clean energy industrial chain. In terms of market development, with the continuous improvement of new energy technologies, CNNP has continuously explored the international market, signed a number of major project contracts in succession and steadily promoted them, increasing its market share. Through the above measures, relying on CNEEC's experience and advantages in the development of the new energy industry, CNNP has realized the integration of its own new energy industry resources, opened up the upstream and downstream industrial chains, and further increased its control over existing products and markets. Therefore, after CNNP's green M&A, resource leveraging has promoted the gradual improvement of the enterprise's industrial chain, and the full industrial chain layout has provided support for enterprise resource leveraging. The two interact with each other to accelerate the pace of enterprise transformation and upgrading.

4.3.2. Gradual Strengthening of Comprehensive Nuclear Energy Utilization

In the process of resource leveraging, on the basis of efficiently, stably and cleanly meeting electricity demand, CNNP has actively developed new tracks for comprehensive nuclear energy utilization. Traditional heat and steam supply is mainly completed by thermal power. Under the dual carbon goals, as industrial and daily necessities, clean nuclear energy heating and steam supply have prominent advantages. Therefore, combining the technical advantages of small modular reactors and high-temperature gas-cooled reactors, CNNP has realized multiple functions such as nuclear energy heating and steam supply, nuclear energy hydrogen production and seawater desalination, providing support for the deep decarbonization of production and daily life.

4.3.3. Gradual Improvement of Green Operation Capability

In the resource leveraging stage, green operation capability is a key indicator to judge the success of an enterprise's green M&A behavior. Nuclear power itself belongs to clean energy. After the green M&A, CNNP pays more attention to carbon emission levels and environmental friendliness. On the one hand, on the premise of ensuring production safety and ecological protection, CNNP has intensified efforts to develop wind power and photovoltaic power generation industries, accelerated the formation of a new power system dominated by new energy, and continuously improved various measures for pollution reduction and carbon reduction. On the other hand, relying on the clean advantages of nuclear energy, it has promoted steam extraction heating and industrial steam supply in nuclear power plants, cooperated with communities around the operation to promote the development of "zero-carbon future cities", built a national high-quality development demonstration zone of "zero-carbon energy, green development", and realized low-carbon sharing of production and life. Driven by the dual carbon policies, industries such as the energy industry are key development sectors for energy conservation and carbon reduction. CNNP has carried out low-carbon

transformation by means of green M&A of new energy enterprises, which is deeply in line with China's energy structure adjustment strategy and conducive to enhancing the enterprise's core competitive advantages.

In summary, CNNP has promoted resource orchestration in three stages for the green acquisition of CNEEC. In the resource structuring stage, it first clarified the gaps in business, technology and channels, locked in CNEEC's advantages, and then built a green resource library through pre-management intervention, equity delivery and subsequent accumulation. In the resource bundling stage, it activated the synergy potential of resources through initial integration, building a dual-business model, constructing multi-platforms and improving the governance system. In the resource leveraging stage, it improved the industrial chain, strengthened comprehensive nuclear energy utilization and enhanced green operation capability, realizing resource value transformation and enterprise transformation and upgrading. From the perspective of resource orchestration, after the green M&A, CNNP has effectively managed and coordinated the resources obtained from the green M&A, improved the performance of the green M&A, and achieved dual improvement of economic and non-economic benefits.

5. Research Conclusions

Through the progressive and mutually supportive three stages of resource orchestration, CNNP has provided core motivation for the improvement of M&A performance. In the resource structuring stage, based on its own strategic positioning, CNNP accurately identified resource gaps and locked in CNEEC as the target. Through pre-management intervention and equity delivery, it obtained core resources, and continuously accumulated diversified resources after the acquisition, building a green resource reserve library, solving the problem of resource reserve and laying a solid foundation for subsequent development. In the resource bundling stage, centering on the "nuclear power + new energy" dual-business strategy, CNNP integrated and adapted the resources constructed in the early stage. It built a dual-business development model, constructed resource platforms for capital, technology sharing and market synergy, improved the internal governance system, and activated the potential for performance growth. In the resource leveraging stage, CNNP focused on the scenario-based application and value realization of resources, opened up the links of new energy power generation equipment manufacturing, supply chain, power transmission and energy storage, enhanced control over the industrial chain, actively strengthened comprehensive nuclear energy utilization, expanded business boundaries, vigorously improved green operation capability, and promoted the comprehensive value increment of performance. The three stages of resource orchestration are not isolated, but form an interlocking supporting relationship. Together, they constitute systematic synergy, becoming the core logical support for the improvement of M&A performance.

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