

Research on the Path of New Energy Power Project Financing Model

Le-Yi Chen, Shi-Zhe Sun*

Beijing No.4 High School, Beijing, 100034, China

*Correspondence to: Shi-Zhe Sun, Beijing No.4 High School, Beijing, 100034, China, E-mail: Chenguanfu@tsinghua.org.cn

Abstract: New energy power projects have emerged as a crucial component of recent energy sector transformations. Given their distinct characteristics compared to traditional energy projects, these projects face significant financing challenges. Thus, exploring innovative financing pathways is essential. This paper discusses several emerging financing methods for new energy power projects, including energy service company (ESCO) models, project loan insurance, crowdfunding, and carbon emissions trading. The paper concludes with policy recommendations and practical suggestions that will hopefully help to promote the innovation and development of new energy power project financing models.

Keywords: New energy power project; financing model; path study; green energy development

1. Background of the Emergence of New Energy Power Projects

1.1 Environmental Pressures from Climate Change

The rise of new energy power projects is closely tied to current climate change issues. Accelerated industrialization and urbanization have led to significant greenhouse gas emissions from traditional fossil fuel energy sources, impacting global climate patterns. Problems such as extreme weather, rising sea levels, and glacier melting have substantially challenged human society. This scenario has heightened awareness of the need to transition to cleaner, more sustainable energy solutions. Renewable energies like solar, wind, and hydropower, known for their inexhaustible nature, have become focal points.

The background of the emergence of new energy power projects aligns with the societal demand for

clean energy and has accelerated the rapid development of the new energy industry^[1]. Solar and wind energy, which do not emit carbon dioxide or other greenhouse gases during power generation, are highly favored for their minimal environmental impact and alignment with climate change mitigation requirements. Government support, including subsidies, tax incentives, and green certificates, has created a favorable policy environment for the development of new energy power projects. Driven by collective environmental consciousness and policy support, new energy power projects have flourished globally, significantly contributing to mitigating climate change and advancing green development.

1.2 Cost Reduction Due to Technological Innovation

Another background factor for the rise of new energy power projects is the reduction in costs



due to technological innovation and advancement. Technological development has led to the maturation of technologies for solar and wind energy, with manufacturing costs of related equipment decreasing. In particular, innovations in solar photovoltaic (PV) and wind power have not only improved energy conversion efficiency and equipment reliability but also driven down production costs. In the photovoltaic industry, continuous improvements in cell efficiency, production processes, and scale have reduced the cost of PV modules. In wind energy, technological innovations and improvements in manufacturing processes have lowered installation and operational costs. Additionally, the application of intelligent monitoring and maintenance systems has enhanced equipment efficiency and reduced operational costs. As the costs of new energy power projects become increasingly competitive, choosing these projects is no longer solely an environmental consideration but also an economic and practical choice for investors and governments. The decreasing costs have not only facilitated the construction of more new energy projects but also provided a more sustainable foundation for the clean transition of the entire energy sector. With technological innovation driving progress, new energy power projects have a promising future and will continue to contribute significantly to global energy structure reform and optimization.

2. Characteristics of New Energy Power Projects

2.1 Advantages of New Energy Power Projects

New energy power projects possess many unique characteristics and significant advantages. First, one characteristic is their renewability. Solar, wind, and hydropower resources are stable and inexhaustible, making them more sustainable compared to limited fossil fuel resources. Second, new energy power projects have distribution advantages, as they can be deployed in urban, rural, and industrial areas, meeting diverse electricity needs across different regions. Third, new energy power projects offer resource conservation and environmental benefits. The power generation process of solar and wind energy does not emit greenhouse gases or harmful substances, helping to reduce environmental pollution and improve environmental quality. In practical project construction,

new energy power projects typically feature rapid deployment, shorter construction periods, and lower operational costs, injecting vitality into the energy sector.

2.2 Differences from Traditional Energy Projects

New energy power projects have a series of unique characteristics that distinguish them from traditional energy projects. They primarily utilize renewable resources such as solar, wind, and hydropower, which are stable and inexhaustible, providing long-term sustainability compared to conventional finite resources like coal and oil. New energy projects benefit from distribution advantages, allowing them to be established in areas with favorable solar or wind resources, overcoming the geographical limitations of traditional energy projects. Another notable difference is that new energy power projects typically have shorter construction periods and lower operational costs.

3. Financing Models for New Energy Power Projects

3.1 Limitations of Traditional Financing Models

Historically, traditional energy projects, characterized by long construction periods, high operational costs, and significant equipment wear and tear^[2], resulting in large amounts of financing for traditional energy projects, high guarantee requirements, long bank approval and financing periods, and unstable project returns (affected by project fuel price fluctuations). Traditional financing models, such as bank loans and government grants, were commonly used to support project construction. However, these traditional financing approaches have limitations in accommodating the development characteristics of new energy power projects, necessitating exploration of diversified financing models.

3.2 Exploration and Practice of Innovative Financing Models

In recent years, various innovative financing models for new energy power projects have been explored and practiced to meet market demands and project characteristics. One common innovative model is the joint financing model, where funds are raised from multiple channels to support project development. New energy power projects leverage policy support and government funds through public-private partnership

(PPP) models. The government provides financial subsidies, tax incentives, and other policy supports during the initial project phase, attracting social capital into new energy projects. The PPP model effectively shares project risks, lowers financing thresholds, and enhances project sustainability and growth potential^[3]. Additionally, new energy projects can utilize capital markets for financial innovation, issuing green bonds and green project loans targeting the green industry. Green bonds, fixed-income products designed to support environmental and sustainable development projects, are attracting increasing investor interest. Green project loans offer more flexible financing support for clean energy sectors, reducing project financing costs and risks. Moreover, new energy projects can explore diversified financing methods such as private equity investment and establishing new energy funds. Private equity investment has become an effective way to attract funds, providing long-term value and risk sharing for projects. Funds focused on new energy investments help raise capital, disperse risks, and strengthen the industry chain, gaining favor from more new energy investors.

3.3 Other Innovative Financing Methods

In addition to existing financing models, new energy power projects are also experimenting with other innovative financing methods. For instance, the ESCO model is a novel financing approach where energy service companies provide comprehensive energy-saving and new energy solutions, including financing, design, construction, and investment. Clients pay a portion of the energy cost savings as service fees, reducing initial investment costs and encouraging the implementation of clean energy projects. Crowdfunding, which has gained popularity in recent years, pools small funds from the public through Internet platforms, allowing individuals to invest in projects according to their preferences and capabilities. This method lowers barriers to individual investment in new energy projects and increases societal support for clean energy projects. Carbon emissions trading is another innovative financing method, widely used in mature carbon markets. Companies reduce carbon emissions to earn carbon credits, which can be traded or sold in the carbon market to obtain financial support. Carbon emissions trading promotes carbon reduction actions and provides a sustainable funding source for

enterprises.

4. Policy and Practical Recommendations

4.1 Improving Financing Policies for New Energy Power Projects

To promote the development of new energy power projects, establishing robust financing policies is crucial. Recommendations include improving fiscal subsidy policies for new energy projects to provide financial support for construction, operation, and power supply stages, thereby reducing financing pressure on enterprises. Establishing a financing guarantee system suitable for new energy projects can effectively share project risks and enhance investor confidence.

Additionally, encouraging diversified financing for new energy enterprises, including bank loans, bond financing, and equity financing, can lower financing risks. Strengthening communication and cooperation with financial institutions, formulating project financing plans, and presenting clear funding use plans to banks and other financing institutions can increase the likelihood of securing financing^[4]. Promoting government-enterprise cooperation, developing flexible financing policies, and creating multi-party cooperation mechanisms can attract more social capital into new energy projects. Enhancing regulation and standardization of the new energy project financing market, establishing information disclosure systems, and improving market transparency and regulation are essential to protect investor rights and boost market confidence.

4.2 Promoting Financial Market Innovation

To drive financial market innovation, promote financial service diversification, and enhance inclusiveness, establishing financial regulatory review mechanisms and providing experimental platforms for financial innovation is important. Encouraging financial institutions to explore new products and services and facilitating rapid financial market development is essential. Strengthening financial technology regulation, formulating relevant policies and regulations, and balancing technological advancement with financial risk management are critical to ensure the healthy development of financial markets. Cultivating financial professionals with innovative and cross-disciplinary skills provides strong talent support for financial innovation. Advocating for innovation practices

in financial institutions, encouraging traditional institutions like banks, securities, and insurance companies to set up innovation research departments or laboratories, and promoting internal innovation and external resource integration is beneficial. Establishing financial technology incubation platforms to support start-ups with technology, market promotion, and other aspects can foster the development of financial technology innovations.

Conclusion

New energy power projects are a vital means to advance clean energy industries and achieve sustainable development goals, facing both challenges and opportunities in financing. Exploring innovative financing pathways can effectively address financing challenges and attract more social capital into the clean energy sector. Increasing efforts to explore and support new energy power project financing models will accelerate the development of the clean energy industry

and contribute significantly to building a green, low-carbon society.

References

- [1] Zhang Guangjing, Gao Mang. Path study on financing mode of new energy power project[J]. South North Bridge, 2023(23):196-198. DOI: 10.3969/j.issn.1672-0407.2023.23.066.
- [2] Fan Gaoyan, Guo Zhizhong. Research on financing risks and coping strategies of new energy power projects. Journal of North China Electric Power University(Social Sciences), 2021(4), 28-34.
- [3] Wang Pengyu, Wang Mengyao. Optimization of financing structure of new energy power generation projects. Journal of Entrepreneurship in Science and Technology, 2020(7), 99-103.
- [4] Liu Wenhao, Wang Haiyan. Research on new energy project financing model based on sustainable development perspective. Finance Theory and Practice, 2021(4), 89-94.