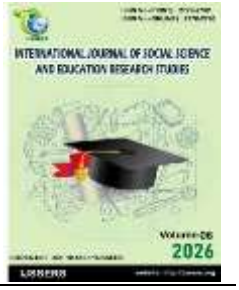
International Journal of Social Science and Education Research Studies

ISSN(print): 2770-2782, ISSN(online): 2770-2790

Volume 06 Issue 03 March 2026

DOI: https://doi.org/10.55677/ijssers/V06I03Y2026-09, Impact Factor: 7.573

Page No : 300-309



Determinants of Policy Effectiveness in Attracting Investment for the Energy Transition in Vietnam

Ha Kieu Oanh

VNU University of Economics and Business, 144 Xuan Thuy, Cau Giay, Ha Noi, Vietnam

ABSTRACT

Investment in energy transition projects is an effective way to promote sustainable economic growth. Although the sector has strong potential and receives policy support in many countries, projects in developing economies have not yet attracted sufficient investment. This study examines the determinants of policy effectiveness in attracting investment for energy transition projects in Vietnam. The study uses a survey of 296 stakeholders involved in renewable energy projects and applies exploratory factor analysis, confirmatory factor analysis, and structural equation modeling to process and analyze the data. The results show that infrastructure and administrative and governance capacity have positive and statistically significant effects on investment attraction. The findings contribute to the theoretical basis of factors that influence the effectiveness of policies to attract investment for the energy transition and provide practical implications to mobilize private capital in the near future.

Published Online: March 19, 2026

KEYWORDS:

energy transition; investment attraction; policy effectiveness; administrative capacity; Vietnam

1. INTRODUCTION

In the context of the growing depletion of traditional energy supplies, the energy transition has become one of the global strategic priorities, strongly driven by sustainable development goals and the urgent requirement to reduce greenhouse gas emissions in response to climate change. The energy transition plays a vital role in ensuring national energy security, transforming the economy toward a green orientation, and influencing all sectors related to energy use. In Vietnam, the energy transition process significantly reduces dependence on traditional fossil energy sources such as coal and oil, which are the leading causes of environmental pollution and CO_2 emissions. Instead, the country is increasing the share of renewable energy in the electricity structure, especially solar power, wind power, biomass, and, more recently, research on developing green hydrogen.

Although renewable energy development has achieved certain results in Vietnam, there are still many difficulties in policy mechanisms, finance, and technology. Accordingly, the government has issued various policies and circulars related to energy transition programs. The Prime Minister also issued Decision No. 876/QD-TTg dated July 22, 2022, approving the Action Program on Green Energy Transition, Carbon and Methane Emission Reduction in the Transport Sector, with the overall objective of developing a green transport system that operates entirely on electricity or green energy by 2050, in alignment with Vietnam's net-zero emission target. In addition, in December 2022, Vietnam joined the Just Energy Transition Partnership (JETP). The Government's commitment to achieving net zero emissions by 2050 at COP26 demonstrates a strong political will and opens major investment opportunities in renewable energy. This requires a fundamental change in the national energy development model, shifting from the goal of ensuring sufficient electricity supply to sustainable, green, and smart development.

Although many relevant policies have been promulgated, implementing and attracting green energy transition projects still face many shortcomings. Since 2021, solar power projects have no longer been eligible for the Feed-in Tariff (FIT) mechanism, while the new bidding mechanism has not yet been issued. Moreover, applying a uniform nationwide FIT has led to the concentration of solar projects in areas with high solar radiation but low electricity demand, resulting in long-distance transmission and social inefficiency. In addition, the lack of standards and technical regulations for renewable energy projects has confused investors and manufacturers (Nguyen Thuy Anh and Tran Ngan Ha, 2023).

Corresponding Author: Ha Kieu Oanh

Cite this Article: Oanh, H.K. (2026). Determinants of Policy Effectiveness in Attracting Investment for the Energy Transition in Vietnam. International Journal of Social Science and Education Research Studies, 6(3), 300-309

Based on the above analysis, this study uses primary data from a survey of 296 respondents working in Vietnam's organizations, enterprises, and agencies related to renewable energy projects. The study aims to measure the impact of policy-related factors on the effectiveness of investment attraction for the energy transition in Vietnam, thereby proposing implications to improve policies and enhance their effectiveness in attracting investment for the energy transition in the future.

2. THEORETICAL FRAMEWORK AND RESEARCH MODEL

2.1. Energy transition

The concept of energy transition has become increasingly prevalent as the world faces the urgent need to reduce greenhouse gas emissions and achieve carbon neutrality by the middle of the twenty-first century. The study by Markard and Rosenbloom (2023) indicates that the energy transition is a profound process of technological, organizational, political, and institutional transformation aimed at eliminating or offsetting CO_2 emissions across the entire energy system. This process is cross-sectoral and unfolds over multiple stages.

According to the International Energy Agency (IEA, 2023), the energy transition is the transformation of the entire energy system to achieve a low-emission future, ensure energy security, and place people at the center through pathways of clean energy use. Similarly, IRENA (2024) defines the goal of the energy transition as replacing the fossil fuel-based energy system with zero-emission sources to maintain global temperature increases below 1.5°C. Meanwhile, the Cambridge CISL (2024) report emphasizes that the energy transition is shifting from dependence on fossil fuels to using renewable sources such as wind, solar, hydro, and biomass, while electrifying the industrial, transportation, and household sectors.

From these perspectives, energy transition can be defined as the comprehensive transformation of the energy system from a fossil-based foundation to clean and low-emission sources to achieve greenhouse gas reduction, carbon neutrality, and sustainable development. The energy transition is a systemic and cross-sectoral process that extends beyond the power sector to transportation, industry, and society. Its defining feature is the pursuit of net-zero emissions while ensuring a just transition for all groups and maintaining long-term energy security.

Compared with traditional investment forms, investment in the energy transition is characterized by large capital requirements, as renewable energy projects, storage systems, and transmission networks typically require very high initial investments ranging from hundreds of millions to billions of USD per project. Such projects often involve long payback periods, commonly between 15 and 25 years, creating long-term risks. Offshore wind, large-scale solar, and green hydrogen projects face technological risks due to the immaturity of certain technologies and market risks related to electricity price competition and grid absorption capacity. Accordingly, government support policies are the most critical factor determining success in mobilizing capital for the energy transition. Feed-in tariffs (FIT), long-term power purchase agreements (PPA), carbon pricing, and tax incentives are considered prerequisites for investor decision-making.

In addition, attracting investment for the energy transition in developing countries depends largely on access to and management of international climate finance flows through cooperative programs and innovative financial instruments such as green bonds, green credit, and global carbon markets. These programs require efficient and transparent capital management and the capacity to ensure timely disbursement and alignment with climate goals.

2.2. Research model

2.2.1. Institutions and policy framework

According to institutional theory, institutional quality and the stability of the legal framework directly affect investors' perception of risk, especially in large-scale, long-term projects such as renewable energy. The study by Wüstenhagen and Menichetti (2012) shows that in European countries, even minor policy changes can significantly increase capital costs up to 150 basis points, discouraging investors and directly affecting long-term investment decisions. Kitzing (2014) compares support models such as feed-in tariffs (FIT) and premium-based schemes in Europe and finds that FIT provides more stable revenue streams for investors, significantly reducing financial risks and thus lowering total project investment costs. The analysis by Steffen et al. (2025) on offshore wind projects in Europe demonstrates that the contract for difference (CfD) mechanism mitigates market price volatility, directly reducing capital costs by 1–1.5%, thereby creating strong incentives for large-scale private investment.

The World Bank (2024) confirms that in countries with stable and consistent institutional and policy frameworks, private capital mobilized for renewable energy can be twice as high as in countries with frequent policy changes. This finding is significant in intensifying global competition, implying that countries like Vietnam must quickly establish and maintain a transparent, stable, and attractive institutional framework to effectively attract international investment for the energy transition in the coming years.

Hypothesis H1: The institutional and policy framework has a positive impact on the effectiveness of attracting investment for the energy transition.

2.2.2. Administrative and governance capacity of public agencies

Public agencies' administrative and governance capacity directly determines the investment environment's

attractiveness. Eberhard and Gratwick (2017), through an analysis of 33 independent power producer (IPP) projects in African countries, found that effective coordination between ministries such as the Ministry of Energy, the Ministry of Finance, and grid operation agencies accounted for two-thirds of project success. This indicates that an efficient public governance system with seamless inter-agency coordination is a prerequisite for the success of large, complex energy projects. Klaaßen and Steffen (2023) also support this view, emphasizing that state investment banks and public financial institutions are essential in strengthening public sector governance capacity. Their study shows that the presence of state investment banks can reduce borrowing costs by approximately 1% on average, due to their ability to share and mitigate policy risks for private investors.

The IEA Global Energy Investment Report (2024) highlights that beyond policy stability, governance capacity is reflected in the provision of transparent and accurate information and effective system operation. This is increasingly important as energy systems become more diverse and complex with the participation of multiple renewable and decentralized sources. Strong governance and operational capacity in public agencies can reduce operational risks and enhance the attractiveness of both domestic and foreign investors.

Hypothesis H2: Administrative and governance capacity of public agencies has a positive impact on the effectiveness of attracting investment for the energy transition.

2.2.3. Infrastructure

Infrastructure, particularly power transmission and storage systems, is a key factor determining investment attractiveness in renewable energy. As the share of renewable electricity increases, maintaining grid stability and absorption capacity becomes increasingly critical. The IEA's World Energy Investment 2024 report shows that global investment in power grids and storage is rising rapidly and, for the first time, has surpassed total investment in oil, gas, and coal. This demonstrates that countries will struggle to attract private capital for renewable energy projects without timely infrastructure investment. In addition, a study draft by Kjersti Berg (2024) points out that investment in storage technologies, thermal or battery, should be optimized to balance investment costs and system benefits, rather than focus solely on new transmission lines. This approach helps optimize resources and shorten the payback period for investors.

Hypothesis H3: Domestic infrastructure has a positive impact on the effectiveness of attracting investment for the energy transition.

2.2.4. Technological development and innovation

Technological development and innovation play a crucial role in enhancing the effectiveness of policies aimed at attracting investment in the energy transition. An effective innovation system depends on the interaction among various actors, including government, enterprises, academic institutions, support organizations, knowledge infrastructure, and policy frameworks. When this network operates efficiently, it facilitates the' development, adaptation, and diffusion of clean technologies.

Previous studies have emphasized the role of technological development and innovation in improving policy effectiveness and attracting public investment. Painuly, (2001) show that stable electricity pricing policies and R&D support mechanisms create favorable conditions for technological innovation in renewable energy. The IMF (2023) study finds that countries with clear regulatory frameworks, research funding, and preferential tax policies have achieved substantial increases in clean technology patents and investment. Bettencourt et al. (2013), using data from 1970–2009, also find that market scale and R&D costs jointly determine the pace of innovation; reduced R&D costs combined with a large market size lead to significant growth in patent numbers. This provides clear evidence that market-oriented policies must go hand in hand with research support to enhance technology investment efficiency.

Hypothesis H4: Technological development and innovation have a positive impact on the effectiveness of attracting investment for the energy transition.

2.2.5. Financial resources

According to the capital structure theory, the weighted average cost of capital (WACC) determines the competitiveness and attractiveness of clean energy projects, which typically feature long payback periods, large initial capital requirements, and high fixed costs (Pratt and Grabowski, 2010). Recent research by the OECD (Montague et al., 2024) confirms that reducing capital costs is a prerequisite for effectively attracting investment into renewable energy projects in developing countries. The study shows that a one percent reduction in capital costs can increase total clean energy investment by tens of billions of US dollars, demonstrating the significant spillover effect of financial support and risk mitigation policies.

In the current global context, capital costs are rising due to interest rate pressures and market risks, slowing clean energy investment growth, particularly in emerging economies. In-depth research on financing for new technologies such as green hydrogen and energy storage (electrochemical batteries) shows that immature technologies and markets hinder access to finance. Recent OECD (2024) analyses emphasize that a lack of transparency in risk assessment and capital valuation is the main reason for higher capital costs for green hydrogen projects in developing countries. Therefore, improving transparency in technology risk and investment performance data is necessary to enable emerging technologies to access capital more efficiently. This requires financial support policies and stable, sustainable electricity pricing mechanisms to create an attractive

investment environment and promote the large-scale deployment of renewable energy projects.

Hypothesis H5: Financial resources have a positive impact on the effectiveness of attracting investment for the energy transition.

4. RESULT AND DISCUSSION

4.1. Cronbach's Alpha reliability testing

To ensure the reliability of the measurement scale and assess internal consistency, the research team conducted Cronbach's Alpha testing for all components of the hypothesized model. The results show that the Cronbach's Alpha values of all latent variables exceed 0.6, indicating high internal consistency among the observed items (Table 1). Therefore, the scale is considered reliable and suitable for subsequent analyses. The detailed results of Cronbach's Alpha testing are presented below.

Table 1. Reliability testing results of the measurement scale

No.	Code	| Item-Total Correlation	Cronbach's Alpha if Item Deleted
(1) Institutions and Policy Framework Cronbach's Alpha = 0.819			
1	TCCS1	.664	.770
2	TCCS2	.698	.756
3	TCCS3	.828	.676
4	TCCS4	.439	.852
(2) Administrative and Governance Capacity of Public Agencies Cronbach's Alpha = 0.716			
5	QTDH2	,498	,674
6	QTDH3	,556	,601
7	QTDH4	,562	,594
(3) Infrastructure Cronbach's Alpha =0.692			
8	CSHT1	,552	,542
9	CSHT2	,484	,630
10	CSHT3	,487	,625
(4) Technological Development and Innovation Cronbach's Alpha = 0.880			
11	CNDM1	,640	,882
12	CNDM2	,763	,837
13	CNDM3	,842	,804
14	CNDM4	,728	,851
(5) Financial Resources Cronbach's Alpha = 0.843			

15	NLTC1	,635	,819
16	NLTC2	,657	,811
17	NLTC3	,742	,772
18	NLTC4	,683	,799
(6) Investment Attraction Cronbach's Alpha = 0.805			
19	THDT1	,707	,673
20	THDT2	,720	,659
21	THDT3	,538	,843

Source: *Summary of the authors' analysis*

4.2. Exploratory factor analysis (EFA)

The cumulative variance extracted of the factors was examined to evaluate the overall explanatory power of the model. The results show that the total variance explained and the cumulative percentage reached 52.461%, exceeding the 50% threshold, which meets the standard requirement. Based on these indicators, the study concludes that the observed measurement variables explain 52.461% of the variance in the factors. After conducting the KMO and Bartlett's Test, the study examined factor loadings to assess the correlation between observed variables and the latent constructs that influence investment attraction for energy transition projects in Vietnam. After two rounds of exploratory factor analysis (EFA) with matrix rotation, five variables that did not meet the threshold were removed. All remaining variables had factor loadings greater than 0.50, satisfying the requirement for convergent validity. The results indicate that five independent factors were formed, comprising 21 observed measurement variables (Table 2). This confirms that the observed variables are interrelated and collectively reflect the dimensions influencing policy effectiveness in attracting investment. The detailed results of the exploratory factor analysis are presented in the table below.

Table 2. Final Results of Exploratory Factor Analysis (EFA)

Rotated Component Matrix

	Component					
	1	2	3	4	5	6
CNDM3	,894					
CNDM2	,857					
CNDM4	,851					
CNDM1	,784					
NLTC3		,862				
NLTC4		,818				
NLTC2		,810				
NLTC1		,794				
TCCS3			,880			
TCCS1			,821			
TCCS2			,811			
TCCS4			,659			
THDT2				,871		
THDT1				,861		
THDT3				,733		

QTDH3					,815	
QTDH4					,812	
QTDH2					,711	
CSHT1						,812
CSHT3						,743
CSHT2						,709

Source: *Summary of the authors' analysis*

4.3. Confirmatory factor analysis (CFA)

After completing the exploratory factor analysis, the study assessed the model fit of each factor affecting investment attraction for energy transition projects through confirmatory factor analysis (CFA). The regression weights of the observed variables within each factor ranged from 0.5 to 1. The fit indices showed that GFI = 0.931 and CFI = 0.973, both greater than 0.9. The value of CMIN/df = 1.390 < 3 and RMSEA = 0.036 < 0.06, indicating that the model fits the market data well and satisfies the requirement for unidimensionality (Figure 1).

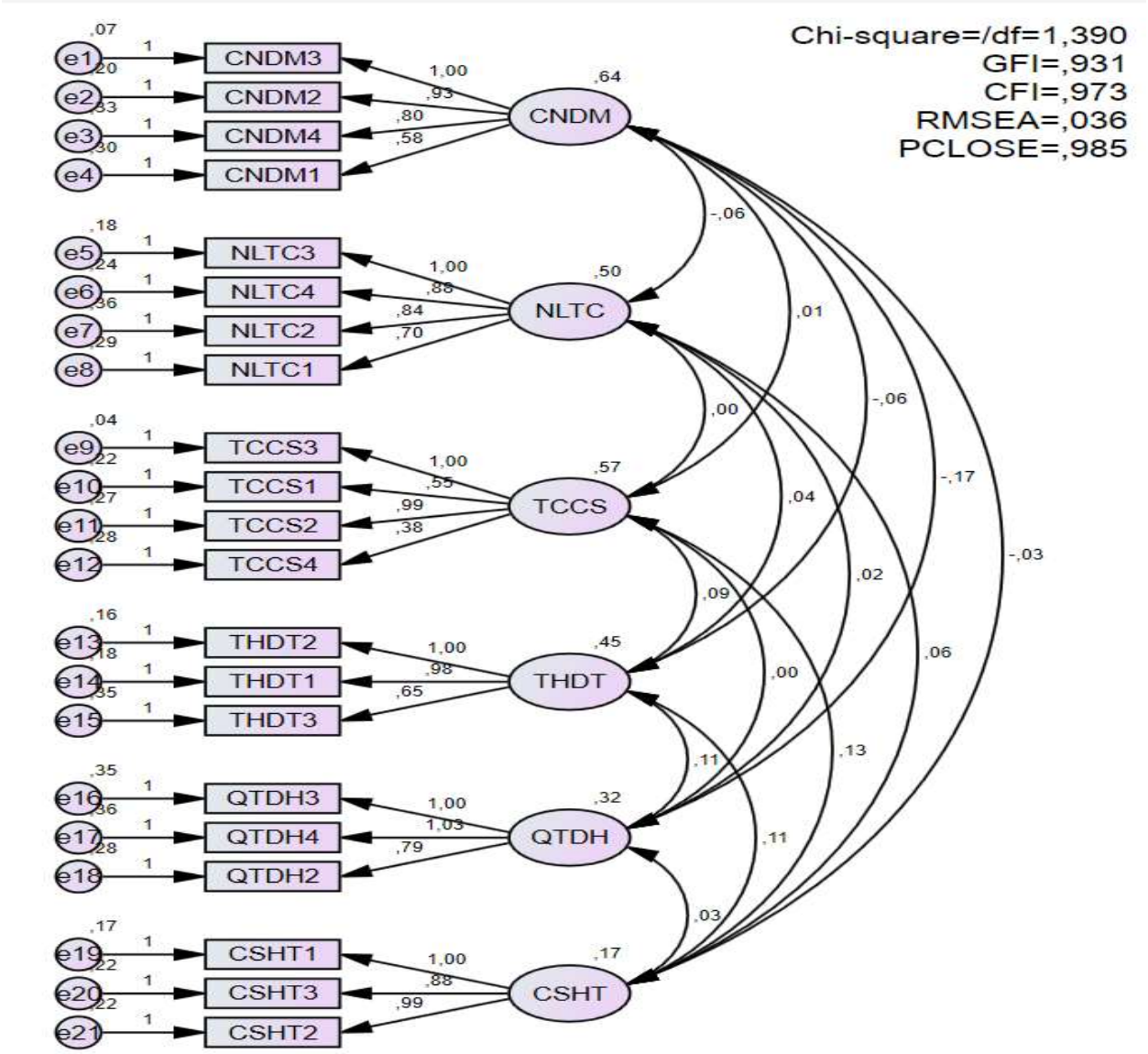


Figure 1. Confirmatory Factor Analysis (CFA) Model
Source: Summary of the authors' analysis

4.4. Hypothesis testing

After verifying the overall model fit, all valid observed and latent variables were included in the structural equation model (SEM) to test the research hypotheses. The results of the SEM analysis show that the model achieved good fit indices, with CMIN/df = 1.761 < 3, CFI = 0.945, and GFI = 0.912, all exceeding the 0.9 threshold, and RMSEA = 0.051 < 0.06 (Figure 2). Therefore, the model is considered to fit the data well.

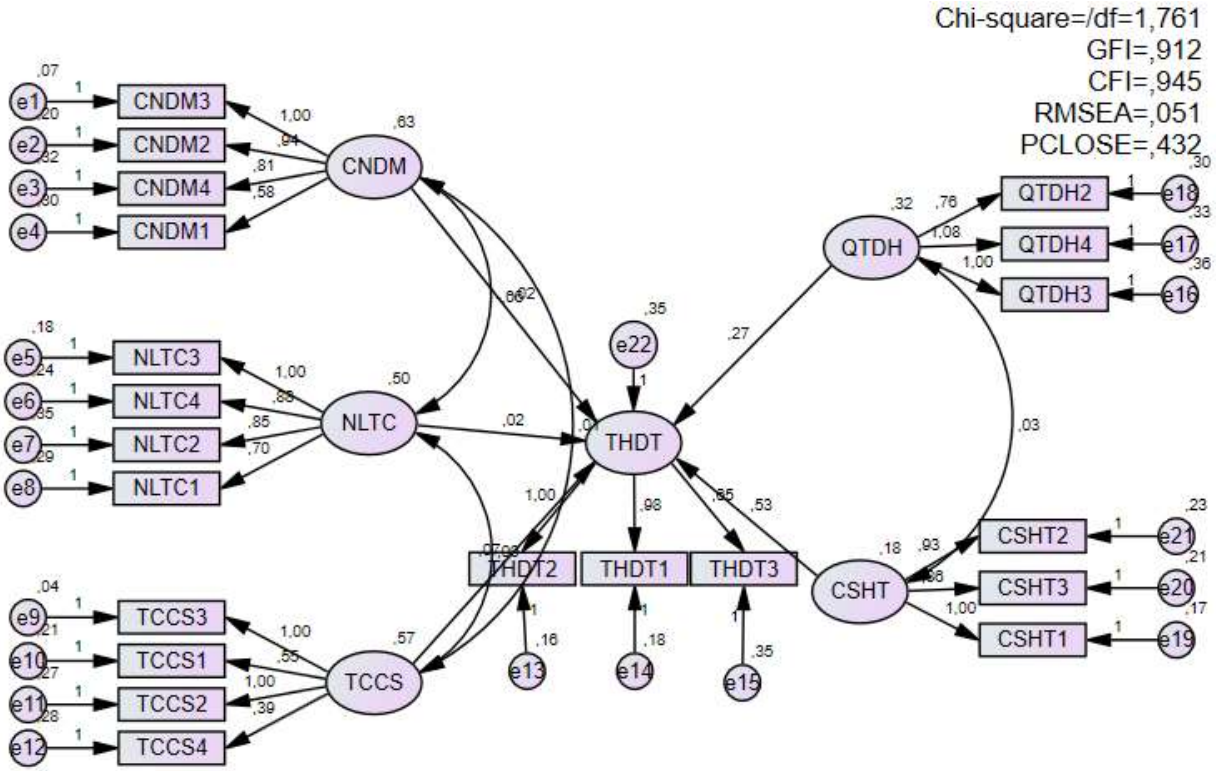


Figure 2. Structural Equation Modeling (SEM) Model
Source: Summary of the authors' analysis

After confirming the model fit, the results of the hypothesis testing are presented through the Regression Weights and Standardized Regression Weights tables. The table below shows the standardized regression coefficients, in which the positive coefficients indicate that the relationships among the factors are positive. The standardized regression results in Table 3 reflect the degree of influence of each factor on the effectiveness of investment attraction for the energy transition in Vietnam.

Infrastructure (CSHT) has the strongest effect among the five tested factors, with a standardized coefficient β = 0.341. This result indicates that when the transmission grid, connection systems, technical facilities, and supporting infrastructure are well-developed, investors feel more confident about the feasibility and long-term prospects of clean energy projects in Vietnam. The next factor, administrative and governance capacity of public agencies (QTDH), has a standardized coefficient β = 0.230, highlighting the essential role of coordination, transparency, efficiency in administrative procedures, and the proactive, professional performance of government agencies in assisting, guiding, and resolving challenges for investors. When administrative institutions operate effectively, project implementation is accelerated, and unnecessary risks and costs are reduced. The institutional and policy framework (TCCS) also shows a positive effect with a standardized coefficient β = 0.077. Although this impact is not as prominent as the previous two factors, it still demonstrates the importance of legal stability, transparency, predictability, regulatory planning, and incentive mechanisms in creating a favorable investment environment and strengthening investor confidence domestically and internationally. Financial resources (NLTC) also have a positive impact (β = 0.024), suggesting that access to capital, green credit, and financial incentives plays a supportive role in attracting investment for the energy transition. However, compared with the factors of infrastructure, governance, and institutional framework, the effect of financial resources remains limited, implying that financial flows will only be truly effective when the foundational conditions related to infrastructure, policy, and management are sufficiently established. Meanwhile, technological development and innovation (CNDM) have a small negative and statistically insignificant coefficient (β = -0.029), indicating that in current practice, factors related to innovation and technology transfer, although receiving attention, have not yet translated into strong investment

attractiveness. The possible reason lies in the existing implementation barriers, high costs, and the lack of comprehensive protection and support mechanisms for adoption of new technology.

Table 3: Results of hypothesis testing

Hypothesis	Description	Standardized Estimate (β)	Result
H1	The institutional and policy framework has a positive impact on the effectiveness of attracting investment for the energy transition	,077	Supported
H2	Administrative and governance capacity of public agencies has a positive impact on the effectiveness of attracting investment for the energy transition	,230	Supported
H3	Domestic infrastructure has a positive impact on the effectiveness of attracting investment for the energy transition	,341	Supported
H4	Technological development and innovation have a positive impact on the effectiveness of attracting investment for the energy transition	-,029	Not supported
H5	Financial resources have a positive impact on the effectiveness of attracting investment for the energy transition	,024	Supported

The research findings confirm the central role of institutions and the policy framework in attracting investment for the energy transition in Vietnam. A stable, transparent, and long-term-oriented legal system is a prerequisite for investors to confidently implement clean energy projects. The issuance of Power Development Plan VIII by the Government of Vietnam, which clearly defines the objectives of gradually phasing out coal, prioritizing renewable energy, and identifying specific capital requirements up to 2030, has provided a crucial reference framework enabling investors to plan long-term strategies. In addition, the development of specific implementation mechanisms such as direct power purchase agreements (DPPA), capacity auction frameworks, and foreign currency guarantee commitments has helped reduce financial risks and increase the competitiveness of the domestic renewable energy market. Narassimhan et al. (2018) point out that the stability, consistency, and predictability of policy have a decisive influence on capital flows into renewable energy, even more than tax incentives or conventional financial support.

The second factor, administrative and governance capacity of public agencies, plays a vital role. An effective, transparent governance system with strong inter-agency coordination directly affects time costs, legal risks, and investor confidence in renewable energy project implementation. According to Kaufmann and Kraay (2008), the quality of public governance is a fundamental condition that facilitates energy infrastructure investment by reducing transaction costs, shortening administrative processing time, and improving transparency in project licensing and documentation. In practice, emerging economies have clearly demonstrated the relationship between governance quality and the pace of clean energy investment. In Vietnam, recent years have witnessed several efforts to improve governance and administrative capacity in renewable energy. The implementation of the online public service portal for the electricity sector has shortened grid connection procedures to about 60 days, while Circular No. 02/2023/TT-BCT allows for parallel appraisal of ODA-funded projects, helping to remove administrative bottlenecks (MOIT, 2024). However, many challenges persist, such as overlapping procedures for forest land conversion and environmental impact assessment (EIA) among ministries and local authorities, and lengthy power purchase agreement (PPA) negotiations. These obstacles increase opportunity costs for enterprises and lead to capacity curtailment, particularly in wind and solar projects across several provinces.

The third factor, infrastructure, especially power transmission and grid connection, has been identified as the most important determinant influencing investment decisions in renewable energy projects in Vietnam. The findings indicate that this factor exerts the strongest effect, reflecting that clean energy development can only be sustainable and attractive when supported by a modern technical infrastructure system capable of absorbing new power sources, operating stably, and efficiently evacuating generated capacity. Steffen and Schmidt (2019) argue that in emerging economies, grid transmission limitations and regional connectivity gaps significantly increase project capital costs and reduce the willingness of international investors to commit funds.

The fourth factor, technological development and innovation, is universally regarded as the core driver of global energy transition. Numerous international studies have confirmed that technological progress plays a decisive role in reducing costs, improving efficiency, and expanding access to new clean energy sources. Huenteler, Schmidt, Ossenbrink, and Hoffmann (2016) show that continuous innovation in photovoltaic and wind turbine technologies has contributed to an 80% reduction in global solar and wind power costs over the past two decades, making renewable energy increasingly competitive with traditional electricity sources. However, the findings in Vietnam indicate that technological development and innovation have not yet become a major driver of investment flows at this stage. In reality, most renewable energy projects in Vietnam still rely heavily on imported technology, while domestic capabilities in equipment localization, supply chain development, and research and development activities remain limited. Furthermore, innovation support mechanisms such as technology sandboxing, risk-sharing frameworks, and R&D credit incentives are still incomplete or inconsistently implemented, leading to cautious attitudes toward investment in high-cost emerging technologies.

The fifth factor, financial resources, plays a central role in driving the energy transition, particularly since renewable energy projects typically require large-scale capital, long payback periods, and higher risks compared to traditional energy investments. Steffen (2021) notes that in many emerging economies, capital only becomes a true growth catalyst for the clean energy sector when institutional and infrastructural conditions are strong enough to reduce the risk premiums imposed by financial institutions. In recent years, the total volume of committed green credit for renewable energy projects has risen significantly, surpassing 1.9 billion USD in 2022 (IFC, 2024). However, actual disbursement progress remains slow, mainly due to persistent issues in land clearance, grid connection, and the absence of bankable power purchase agreements ensuring stable cash flows. The World Bank (2020) also reports that the weighted average cost of capital (WACC) for wind and solar power projects in Vietnam remains considerably higher than in several neighboring countries, due to exchange rate risks, suboptimal PPA quality, and limited access to government guarantee mechanisms.

5. CONCLUSION

The study integrates prior theory on policy effectiveness and investment attraction for the energy transition and proposes a model tailored to Vietnam. Using validated multi item constructs and structural equation modeling, we find that infrastructure is the strongest driver of investment attraction. Administrative and governance capacity also exerts a positive and statistically significant effect. Institutions and the policy framework show a smaller positive effect. Financial resources and technological development and innovation do not display statistically significant effects in the current setting. These findings extend the literature by underscoring the central role of state capability and physical readiness in an emerging economy context.

The results indicate clear priorities for action. First, accelerate investment in transmission and distribution networks and in logistics to reduce bottlenecks and curtailment risk. Second, simplify permitting and licensing through transparent timelines, digital procedures, and a single window approach to strengthen administrative credibility and reduce uncertainty. Third, reinforce contract enforcement and regulatory commitment to anchor investor confidence, while deploying targeted de risking tools such as credit guarantees and blended finance where fiscal space allows and where projects meet objective readiness criteria. Support for innovation should be selective and tied to measurable productivity and cost outcomes rather than broad subsidies, and capacity building for provincial authorities should be expanded to ensure consistent application of rules.

The analysis relies on a cross sectional survey and perception based measures, which may not capture dynamic policy shifts or realized project performance. The model does not fully incorporate financial variables such as the cost of capital or currency risk, nor does it track outcomes over time. Future work should combine panel data with project level indicators, examine heterogeneity across technologies and provinces, and exploit policy changes to identify causal effects. This agenda will help refine the sequencing of reforms needed to mobilize private capital for Vietnam's energy transition.

REFERENCES

1. Berg, K., Rana, R., Taxt, H., & Dynge, M. F. (2024, October). Economic assessment and grid impact of different sharing keys in collective self-consumption. In *2024 IEEE PES Innovative Smart Grid Technologies Europe (ISGT EUROPE)* (pp. 1-5). IEEE.
2. Bettencourt, L. M., Trancik, J. E., & Kaur, J. (2013). Determinants of the pace of global innovation in energy technologies. *PloS one*, *8*(10), e67864.
3. Eberhard, A., Gratwick, K., Morella, E., & Antmann, P. (2017). Accelerating investments in power in sub-Saharan Africa. *Nature Energy*, *2*(2), 1-5.
4. Huenteler, J., Schmidt, T. S., Ossenbrink, J., & Hoffmann, V. H. (2016). Technology life-cycles in the energy sector—Technological characteristics and the role of deployment for innovation. *Technological Forecasting and Social Change*, *104*, 102-121.
5. International Renewable Energy Agency (IRENA). (2023). *Global landscape of renewable energy*

finance 2023 [Report]. Abu Dhabi: IRENA. Retrieved July 7, 2025, from https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Feb/IRENA_CPI_Global_RE_finance_2023.pdf

6. International Energy Agency (IEA). (2024). *World energy investment 2024* [Report]. Paris: IEA. Retrieved July 7, 2025, from https://iea.blob.core.windows.net/assets/d829545d-fab6-4c98-b266-28556d86ce8d/WorldEnergyInvestment2024.pdf
7. IFC-CommDev. (2024). Reducing costs and time through single-window approaches in offshore wind projects. International Finance Corporation.
8. International Monetary Fund. (2023). Environmental policies and innovation in renewable energy (IMF Working Paper 23/196)
9. Klaaßen, L., & Steffen, B. (2023). Meta-analysis on necessary investment shifts to reach net zero pathways in Europe. *Nature Climate Change*, *13*(1), 58-66.
10. Kitzing, L. (2014). Risk implications of renewable support instruments: Comparative analysis of feed-in tariffs and premiums using a mean–variance approach. *Energy*, *64*, 495-505.
11. Kaufmann, D., & Kraay, A. (2008). Governance indicators: where are we, where should we be going?. *The World Bank Research Observer*, *23*(1), 1-30.
12. Montague, C., Raiser, K., & Lee, M. (2024). Bridging the clean-energy investment gap: Cost of capital in the transition to net-zero emissions (OECD Environment Working Papers No. 245). OECD Publishing. https://doi.org/10.1787/1ae47659-en
13. Narassimhan, E., Gallagher, K. S., Koester, S., & Alejo, J. R. (2018). Carbon pricing in practice: A review of existing emissions trading systems. *Climate Policy*, *18*(8), 967-991.
14. Painuly, J. P. (2001). Barriers to renewable energy penetration; a framework for analysis. *Renewable energy*, *24*(1), 73-89.
15. Pratt, S. P., & Grabowski, R. J. (2010). *Cost of capital in litigation: applications and examples* (Vol. 647). John Wiley & Sons.
16. Steffen, B., Egli, F., Gumber, A., Đukan, M., & Waidelich, P. (2025). A global dataset of the cost of capital for renewable energy projects. *Scientific Data*, *12*(1), 1624.
17. Schmidt, T. S., Steffen, B., Egli, F., Pahle, M., Tietjen, O., & Edenhofer, O. (2019). Adverse effects of rising interest rates on sustainable energy transitions. *Nature Sustainability*, *2*(9), 879-885.
18. Steffen, B., & Schmidt, T. S. (2021). Strengthen finance in sustainability transitions research. *Environmental Innovation and Societal Transitions*, *41*, 77-80.
19. Wüstenhagen, R., & Menichetti, E. (2012). Strategic choices for renewable energy investment: Conceptual framework and opportunities for further research. *Energy policy*, *40*, 1-10.
20. World Bank. (2024). World energy investment report 2024: Accelerating clean-energy finance. World Bank Publications