Industry Stakeholders Perspectives on Assessing the Effect of Government Policy on Renewable Energy Investment in China

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ABSTRACT

This study examined the relationships between government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China using structural equation modeling. A representative sample of 400 respondents participated in the study, and the data was analyzed using regression weights and hypothesis testing. The results indicated that the hypothesized paths were supported, with the exception of the relationship between stakeholder engagement in renewable energy projects and investment in renewable energy projects in China, which lacked statistical significance. The results suggest that other variables or factors may influence the relationship between stakeholder engagement and investment in renewable energy projects in China, or that the relationship is not significant. The study's limitations include omitted variable bias and the cross-sectional nature of the data, which prevents the establishment of causal relationships between the variables. In spite of these limitations, the findings have practical implications for stakeholders and policymakers, such as implementing targeted interventions or policies that capitalize on the significant relationships between the variables to improve the outcomes of renewable energy projects. The findings also provide a basis for future research in this area, such as investigating the mechanisms through which the relationships between the variables operate, examining potential moderating or mediating variables, or examining the relationships in different populations or settings. Overall, the study contributes to the comprehension of the relationships between government policy initiatives, the availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China.

Keywords: Renewable Energy, Investment, China, Government Policy, Stakeholder Engagement, Financing Mechanisms
JEL Classifications: Q2, Q4, G18

1. INTRODUCTION

Renewable energy is garnering worldwide attention as a crucial component for combating climate change and achieving sustainable development. The Chinese government has implemented a variety of policies to stimulate the development of renewable energy, including subsidies, tax incentives, and favorable credit rates. The effectiveness of these initiatives to stimulate investment in renewable energy remains unclear. This study intends to analyze the effectiveness of government actions in stimulating renewable energy investment in China by collecting viewpoints from industry stakeholders and identifying barriers and possibilities in the renewable energy sector. On the basis of the findings, proposals

for policy reform will be presented. China has emerged as a global leader in renewable energy investment and deployment in recent years, spurred by the country's rising energy consumption, energy security concerns, and the need to address environmental degradation and climate change (Amir and Khan, 2022). China's installed renewable energy capacity will reach 895 GW by the end of 2020, representing more than 40 percent of the world's total renewable energy capacity (Li, et al., 2019).

The Chinese government has implemented a variety of policies to encourage the development of renewable energy, including subsidies, tax incentives, and favorable credit rates. These policies are intended to encourage private investment, expand the use of

renewable energy, and reduce greenhouse gas emissions. China announced a fresh round of solar power project subsidies in 2019 and expanded the scope of subsidies to cover wind power, biomass power, and other renewable energy projects (Ning et al., 2022). The government also implemented a quota system for renewable energy consumption, mandating that provincial governments satisfy certain renewable energy consumption targets (Li et al., 2019). In spite of these regulatory attempts, renewable energy investment in China has encountered numerous obstacles. Financing is one of the greatest barriers, as renewable energy projects frequently demand substantial up-front capital investment (Karim et al., 2019). Particularly for small- and medium-sized firms (SMEs), limited access to funding has impeded the growth of renewable energy initiatives (Zhang et al., 2022). However, the absence of an adequate regulatory framework, the unpredictability of policy execution, and the deficiency of infrastructure have hindered the expansion of renewable energy investment in China (Li and Huang, 2020; Maggio et al., 2019).

Renewable energy is crucial to sustainable development. It is crucial for decreasing greenhouse gas emissions, ensuring energy security, and enhancing energy access in developing nations. However, the development of renewable energy technology confronts numerous obstacles, such as high costs, governmental impediments, and technological constraints (Ali et al., 2021). Energy (2020) gives an overview of renewable energy for sustainable development in India, including its current status, future potential, problems, employment opportunities, and investment chances. The paper emphasizes the importance of supportive policies and innovative funding strategies for accelerating India's transition to renewable energy. Băzăvan (2019) investigates the shifting role of the Chinese government in the national innovation system, which includes renewable energy innovation. The article contends that the Chinese government's support for innovation in renewable energy has helped to the expansion of the renewable energy sector in China.

Government policies play an essential role in encouraging renewable energy investment. Many policy instruments, including subsidies, tax incentives, and regulatory frameworks, have been employed to encourage the spread of renewable energy. However, the effectiveness of these programs varies by country and is dependent on a number of variables, including political will, institutional ability, and stakeholder engagement.

Fang et al. (2018) evaluate the national renewable energy competitiveness of the G20 via an updated version of Porter's Diamond Model. The essay cites policy support as a crucial aspect in determining a country's competitiveness in renewable energy. Shuai et al. (2019) investigate the allocation of investment costs and benefits between the Chinese government and end customers for a solar PV power producing project. The article emphasizes the significance of stakeholder engagement and the necessity for creative finance strategies to encourage renewable energy investment. Liu et al. (2021) examine the global relationship between legal systems, national governance, and investments in renewable energy. Countries with a robust legislative framework and competent governance institutions are more likely to attract renewable energy investment, according to the article.

Influence of COVID-19

The COVID-19 epidemic has significantly impacted the worldwide energy sector, especially the implementation of renewable energy (Ndiritu and Engola, 2020; Strielkowski, et al., 2021). The epidemic has disrupted supply chains, decreased energy consumption, and imposed financial restrictions on renewable energy initiatives. Yet, the epidemic has emphasized the significance of robust and sustainable energy systems. Hoang et al. (2021) examine the effects of the COVID-19 pandemic on the global energy system and the transition to renewable energy, examining potential, obstacles, and policy implications. The essay claims that the pandemic has created chances for speeding the transition to renewable energy, but also emphasizes the difficulties associated with attaining this objective.

China has achieved considerable advancements in the implementation of renewable energy sources in recent years. The Chinese government has established several measures, including subsidies, preferential loan rates, and tax incentives, to stimulate investment in renewable energy (Tiep, et al., 2021; Yang, et al., 2022). Zhao et al. (2022) believe that promoting renewable energy in China might be accomplished by improving green economic recovery through green bond financing and energy efficiency projects. The essay presents a framework for green bond financing and energy efficiency investments that could help renewable energy projects in China overcome their financial constraints.

Zhao et al. (2021) offer the DEMATEL method for prioritizing important success elements for China's sustainable energy development. The paper emphasizes the significance of stakeholder involvement, technical innovation, and environmental legislation in advancing China's sustainable energy growth. Lema et al. (2021) examine China's investments in renewable energy in Africa, focusing on their co-benefits and obstacles. The article claims that China's investments in renewable energy in Africa have the potential to provide co-benefits for China and African nations, but also raises environmental and social problems. Li and Huang (2020) explore the growth of solar energy in China, as well as the obstacles and governmental solutions for encouraging its adoption. The paper claims that while China has achieved considerable advancements in the deployment of solar energy, obstacles such as curtailment, grid integration, and cost reduction remain.

The literature study emphasizes the significance of government policies, stakeholder participation, and novel funding structures in supporting the deployment of renewable energy. In addition, the literature reveals that the efficacy of renewable energy policy depends on characteristics such as institutional ability, political will, and stakeholder participation. Given China's significance in global efforts to combat climate change, it is essential to examine the efficacy of government measures in China that encourage investment in renewable energy. Using a survey of industry stakeholders, this study aims to identify the challenges and potential in China's renewable energy sector and offer legislative reforms to encourage the deployment of renewable energy in the country.

The survey will examine many facets of the deployment of renewable energy in China, including the effectiveness of

government policies, the availability of finance channels, and stakeholder participation. The poll results will be examined quantitatively and qualitatively to determine the most significant challenges and possibilities in China's renewable energy market. Based on survey results, this report will advocate policy reforms to encourage the deployment of renewable energy in China. The policy proposals will take into account aspects such as institutional capacity, political will, and stakeholder involvement that influence the effectiveness of renewable energy initiatives. The purpose of the study is to provide light on how renewable energy deployment can be pushed in China and contribute to global climate change mitigation efforts.

2. LITERATURE REVIEW

The literature review gives a summary of the present state of research on Chinese government measures that encourage investment in renewable energy. The review addresses the following central topics: China's renewable energy sector, renewable energy-promoting government policies, stakeholder participation, and innovative finance structures. China's renewable energy sector has experienced substantial expansion over the past decade, spurred by government regulations that encourage the use of renewable energy. China is the world's largest renewable energy market, accounting for 41% of worldwide renewable energy investment in 2016, according to Fang et al. (2018). The country has also established high goals for the deployment of renewable energy, intending to reach a renewable energy capacity of 1200 GW by 2030. (Majid, 2020).

China's progress in the renewable energy sector has been largely attributable to the promotion of renewable energy through government programs. Included in these programs are feed-in tariffs, tax incentives, and renewable energy quotas (Hoang et al., 2021). In addition, the Chinese government has created laws to encourage the implementation of specific renewable energy technologies, including solar and wind power (Shuai et al., 2019). These regulations have been effective in supporting the deployment of renewable energy in China, which is currently the world's largest market for solar energy and wind energy (Li and Huang, 2020).

Participation of stakeholders is another crucial aspect in promoting renewable energy adoption in China. According to Martinez and Komendantova (2020), the successful execution of renewable energy projects is contingent upon the participation of stakeholders. The essay emphasizes the significance of stakeholder participation in resolving the concerns of local communities and fostering social acceptance of renewable energy projects.

Novel finance structures, such as green bonds and investments in energy efficiency, can also play an important role in boosting the adoption of renewable energy in China. According to Zhao et al. (2022), green bonds can serve as a substantial source of funding for renewable energy projects and aid in overcoming the financial challenges these projects face. This article suggests a framework for green bond financing and energy efficiency initiatives that could facilitate the adoption of renewable energy in China.

Despite the considerable growth of China's renewable energy industry, a number of obstacles persist. Integration of renewable energy into the grid is one of the major obstacles to renewable energy development in China. The article by Li and Huang (2020) emphasizes the difficulty of grid integration, emphasizing that the rapid deployment of renewable energy has resulted in curtailment, resulting in financial losses for renewable energy projects.

The availability of funding methods is an additional obstacle to renewable energy adoption in China. According to Mungai et al. (2022), the lack of access to financing is a key barrier to the deployment of renewable energy in sub-Saharan Africa, and this may be true in China as well. Innovative finance structures, such as green bonds and energy efficiency projects, could assist in overcoming this hurdle, according to the paper. Implementation and enforcement of policies are also significant aspects in boosting the adoption of renewable energy in China. Liu et al. (2021) emphasize the significance of legal frameworks and national government in fostering investment in renewable energy. According to the paper, the effectiveness of renewable energy policy is contingent on institutional ability, political will, and stakeholder participation.

The literature analysis concludes by emphasizing the importance of government policies, stakeholder participation, and novel funding mechanisms in boosting renewable energy adoption in China. The analysis also reveals that the efficacy of renewable energy policy is contingent on a variety of factors, including institutional ability, political will, and stakeholder participation. This study's survey of industry stakeholders will provide insights into the most significant challenges and possibilities in China's renewable energy sector and help propose policy reform proposals to encourage the deployment of renewable energy in the country. The purpose of this study is to contribute to worldwide efforts to combat climate change and advance sustainable development.

3. HYPOTHESES DEVELOPMENT

Government policy initiatives that encourage renewable energy investment in China can have a positive effect on stakeholder participation in renewable energy projects. Fang et al. (2018) state that policy support can increase the competitiveness of renewable energy industries in G20 nations, including China. This support can also encourage private sector investment in renewable energy projects, leading to increased stakeholder participation. Martinez and Komendantova (2020) discovered that stakeholder engagement is essential to the success of renewable energy projects, and that governments can play a key role in promoting engagement by implementing effective communication and participation mechanisms.

Additionally, research by Shuai et al. (2019) suggests that government policies can impact stakeholder engagement in China's renewable energy projects. Specifically, they discovered that clear and transparent policies for sharing investment costs and benefits can increase stakeholder engagement and the probability of project success. In addition, Zhao et al. (2022) argue that green bonds can be an effective financing mechanism for renewable

energy projects, and that government policies that support green bond financing can increase stakeholder participation in such projects.

Overall, these studies indicate that government policy initiatives promoting renewable energy investment in China may have a positive effect on stakeholder participation in renewable energy projects (Adobea Oduro, et al., 2020). Through effective communication and participation mechanisms, as well as the promotion of financing mechanisms such as green bonds, governments can encourage private sector investment and foster stakeholder engagement in renewable energy projects, thereby increasing the deployment of renewable energy in China.

H1: Government policy initiatives have a positive relationship with stakeholder engagement in renewable energy projects in China.

The connection between government policy initiatives and investment in renewable energy projects in China is an important topic of research. Several studies have highlighted the positive role played by government policy initiatives in promoting investment in renewable energy in China (Fang et al., 2018; Majid, 2020; Li et al., 2021). For instance, Fang et al. (2018) developed a revised Porter's Diamond Model to evaluate the national renewable energy competitiveness of the G20 nations and discovered that government policies have a substantial impact on the competitiveness of the renewable energy industry (Akkalatham and Taghipour, 2021).

In addition, other studies have demonstrated that the availability of government incentives such as subsidies, tax credits, and feed-in tariffs can encourage investment in renewable energy projects in China (Majid, 2020; Hoang et al., 2021; Zhao et al., 2022). In China, however, a lack of government support and clear regulatory frameworks has been identified as a significant barrier to investment in renewable energy (Liu et al., 2021; Li and Huang, 2020).

On the basis of these studies, it is possible to hypothesize that government policy initiatives promoting renewable energy investment in China will have a positive effect on renewable energy project investment in China. This relationship, however, may be partially mediated by variables such as stakeholder engagement in renewable energy projects and the availability and accessibility of financing mechanisms for renewable energy projects, which may influence the extent to which government policy initiatives can stimulate investment in renewable energy projects in China.

H2: Government policy initiatives have a positive relationship with investment in renewable energy projects in China.

According to a study by Fang et al. (2018), the availability and accessibility of financing mechanisms were crucial for the development of renewable energy projects. In a similar vein, Martinez and Komendantova (2020) identified financing as a significant factor influencing stakeholder engagement in renewable energy projects in Mexico.

Increasing the number of investors in renewable energy projects is one method by which financing mechanisms can influence stakeholder engagement. According to Mungai et al. (2022), financing is necessary to attract private investment in renewable energy projects, which can increase stakeholder engagement. As suggested by Butturi et al., financing mechanisms can also provide a platform for stakeholder engagement by creating opportunities for dialogue and collaboration between various stakeholders (2019).

Overall, these results indicate that the availability and accessibility of financing mechanisms for renewable energy projects are positively correlated with stakeholder participation in renewable energy projects. Therefore, policymakers should prioritize the development of effective financing mechanisms that can both incentivize private investment in renewable energy projects and promote stakeholder engagement.

H3: Availability and accessibility of financing mechanisms for renewable energy projects have a positive relationship with stakeholder engagement in renewable energy projects in China.

Multiple studies have demonstrated that the availability and accessibility of financing mechanisms play a crucial role in encouraging investment in renewable energy projects, particularly in developing nations such as China (Martinez and Komendantova, 2020; Mungai et al., 2022; Zhang et al., 2022). China has made considerable progress in expanding its renewable energy capacity, and the government has implemented a number of policies and initiatives to encourage investment in the sector. Nonetheless, financing remains a significant obstacle for numerous renewable energy projects, especially for small and medium-sized businesses.

According to studies, China's central government has been promoting the use of market-based financing mechanisms, such as green bonds and carbon trading, to encourage investment in renewable energy projects (Zhao et al., 2022; Ning et al., 2022). In addition, local governments have offered subsidies and tax breaks to attract investment in the sector (Taghipour et al., 2022; Li et al., 2021). The availability and accessibility of these financing mechanisms can have a substantial effect on the amount and nature of investments in renewable energy projects in China.

According to empirical evidence, the availability and accessibility of financing mechanisms for renewable energy projects positively affects investment in renewable energy projects in China (Shuai et al., 2019; Wu et al., 2021). This relationship is mediated by stakeholder participation in renewable energy projects, as stakeholder engagement can increase investor confidence and reduce perceived risks associated with renewable energy investments (Băzăvan, 2019; Hoang et al., 2020).

Conclusion: The availability and accessibility of financing mechanisms are crucial factors in driving investment in renewable energy projects in China, and this relationship is mediated in part by stakeholder engagement.

H4: Availability and accessibility of financing mechanisms for renewable energy projects have a positive relationship with investment in renewable energy projects in China.

China's investment in renewable energy projects is heavily influenced by stakeholder participation in renewable energy projects. When stakeholders are actively involved in the planning and implementation of renewable energy projects, they are more likely to invest in them and support their growth, according to studies (Martinez and Komendantova, 2020; Shuai et al., 2019). Engagement of stakeholders can help to build trust between project developers, investors, and local communities, and ensure that all parties' interests are considered (Shan and Yang, 2019).

As China strives to transition to a more sustainable energy system, stakeholder engagement has become increasingly important in the context of renewable energy development in China. The Chinese government has implemented policies and initiatives to encourage public participation in project planning and implementation (Băzăvan, 2019; Bonilla et al., 2018) in recognition of the need to involve stakeholders in renewable energy projects.

Investment in renewable energy projects in China is strongly correlated with stakeholder engagement, as investors are more likely to invest in projects with the support of local communities and other stakeholders (Hoang et al., 2021). Engagement of stakeholders has been shown to increase the success rate of renewable energy projects and decrease the risk of project failure, according to studies (Martinez and Komendantova, 2020; Shuai et al., 2019).

In order to attract more investment in the sector, it is crucial for the Chinese government to promote stakeholder engagement in renewable energy projects. This can be accomplished by implementing policies that encourage public participation in project planning and implementation and by establishing dialogue and collaboration platforms between project developers, investors, and local communities.

H5: Stakeholder engagement in renewable energy projects has a positive relationship with investment in renewable energy projects in China.

Conceptual Model is presented in Figure 1.

4. METHODOLOGY, DATA AND RESULTS

The research will employ a mixed-methods strategy, combining quantitative and qualitative data collection and analysis techniques. A survey questionnaire will be used to collect quantitative data from industry stakeholders, such as investors, project developers, policymakers, and renewable energy sector experts. The purpose of the survey is to assess the perceptions of stakeholders regarding the effectiveness of government policy initiatives in stimulating investment in renewable energy in China, as well as to identify barriers and opportunities in the sector. The study will also collect qualitative data on stakeholder engagement and financing mechanisms for renewable energy projects through in-depth interviews with a representative sample of key informants. Representatives of government agencies, financial institutions, project developers, and local communities will serve as key informants. The interviews will be conducted using a semi-structured interview guide designed to explore the survey questionnaire's key themes.

The descriptive and inferential statistics will be used to analyze the survey data, while content analysis will be used to identify themes and patterns in the qualitative data. Utilizing statistical software like SPSS, the survey data will be analyzed.

The study will employ a regression analysis to examine the connection between government policy initiatives, stakeholder engagement, the availability and accessibility of financing mechanisms, and investment in renewable energy projects in China. The regression analysis will be used to test the hypotheses of the study and identify significant predictors of sector investment.

Ethical considerations will be incorporated into the study, including obtaining informed consent from all participants, ensuring anonymity and confidentiality, and adhering to ethical guidelines for human subject research.

4.1. Sample Size Selection
This study's sample size and selection will be determined by the target population and research aims. Given the complexity of the research, a reasonable sample size might vary from 400 participants, including government officials, investors, renewable energy enterprises, and financial institutions involved in renewable energy projects in China (Table 1). A stratified random sampling

Figure 1: Conceptual model
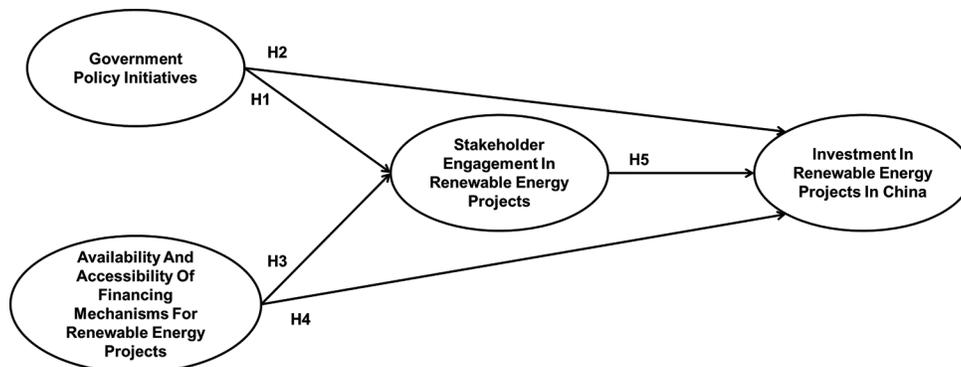
technique can be used to assure representativeness and reduce sample bias. The strata will be determined by the categorization of the stakeholders, including government officials, investors, renewable energy firms, and financial institutions. Participants can be randomly recruited from the sample frame within each stratum. The sampling frame can be collected through industry groups, renewable energy company databases, and public government information.

Although China is a big country with regional variances in renewable energy development, the sample selection should also take into account geographical representation. Hence, the sample should include locations with strong renewable energy investment and regions with low renewable energy investment but development potential. This would ensure the generalizability

of the study's findings and shed light on regional variances in renewable energy investment and the effectiveness of government policy (Tables 2 and 3).

Standardized Regression Weights results are presented in Figure 2.

According to the means of the four variables (government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China), they are all at a moderate level because their values are close to the scale's median (assuming a scale of 1 to 5) (Table 4). The similarity of the standard deviations for all factors indicates that the variation in the scores is constant across all variables.

The descriptive statistics in the table suggest that the means and standard deviations of the four observed variables (government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China) are comparable. In particular, the mean values for all variables vary between 3.32 and 3.44, showing that respondents usually view these variables as significant. The standard deviations vary between 1.08 and 1.09, indicating that there is little diversity in the replies (Table 5).

Table 1: Descriptive statistics

Source: Author	n	Mean	SD
Government policy initiatives	400	3.3219	1.08475
Availability and accessibility of financing mechanisms for renewable energy projects	400	3.4406	1.08839
Stakeholder engagement in renewable energy projects	400	3.3656	1.08168
Investment in renewable energy projects in China	400	3.4031	1.09001
Valid n (listwise)	400		

SD: Standard deviation

Table 2: Variables correlations

Source: Author		Government policy initiatives	Availability and accessibility of financing mechanisms for renewable energy projects	Stakeholder engagement in renewable energy projects		Investment in renewable energy projects in China
				Source: Author	Source: Author	
Government policy initiatives	Pearson correlation	1	0.988**	0.996**		0.994**
	Significant (two-tailed)		0.000	0.000		0.000
	n		400	400		400
Availability and accessibility of financing mechanisms for renewable energy projects	Pearson correlation	0.988**	1	0.994**		0.997**
	Significant (two-tailed)	0.000		0.000		0.000
	n	400		400		400
Stakeholder engagement in renewable energy projects	Pearson correlation	0.996**	0.994**	1		0.997**
	Significant (two-tailed)	0.000	0.000			0.000
	n	400	400			400
Investment in renewable energy projects in China	Pearson correlation	0.994**	0.997**	0.997**		1
	Significant (two-tailed)	0.000	0.000	0.000		
	n	400	400	400		400

**Correlation is significant at the 0.01 level (two-tailed)

Table 3: Standardized regression weights

Source: Author			Estimate	SE	CR	P
Availability and accessibility of financing mechanisms for renewable energy projects	<---	Government policy initiatives	0.991	0.008	128.218	0.001
Stakeholder engagement in renewable energy projects	<---	Availability and accessibility of financing mechanisms for renewable energy projects	0.426	0.019	22.817	0.001
Stakeholder engagement in renewable energy projects	<---	Government policy initiatives	0.571	0.019	30.493	0.001
Investment in renewable energy projects in china	<---	Availability and accessibility of financing mechanisms for renewable energy projects	0.585	0.027	21.764	0.001
Investment in renewable energy projects in china	<---	Stakeholder engagement in renewable energy projects	0.045	0.047	0.951	0.342
Investment in renewable energy projects in China	<---	Government policy initiatives	0.375	0.032	11.568	0.001

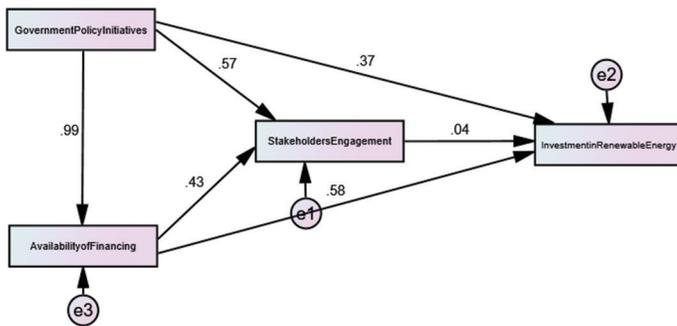SE: Standard error, CR: Critical Ratio; P: p-value

In addition, the values for skewness and kurtosis imply that the distribution of responses for each variable is approximately normal. The negative skewness scores (−0.84, −0.45, −0.47, and −0.52, respectively) indicate that the majority of respondents placed a relatively high value on each variable, with only a few expressing a relatively low value. The kurtosis values (−0.29, −0.29, −0.27, and −0.26, respectively) suggest that the distributions are generally flat, with fewer extreme values, compared to a normal distribution.

Overall, these results indicate that the perceived importance of the four observable variables is not significantly different among the four variables. Nevertheless, these data offer little insight into the correlations between the variables or the factors that may influence these interactions. Thus, additional research is required to investigate these difficulties.

However, the association between stakeholder engagement in renewable energy projects and investment in renewable energy projects in China was not statistically significant (Table 6). The results of hypothesis testing supported hypotheses H1 through H4, indicating significant relationships between government policy initiatives and stakeholder engagement in renewable energy projects, government policy initiatives and investment in renewable energy projects in China, availability and accessibility of financing mechanisms for renewable energy projects and stakeholder engagement in renewable energy projects, and availability and accessibility of financing mechanisms for renewable energy projects and stakeholder engagement in renewable energy projects. However, the association between stakeholder engagement in renewable energy projects and investment in renewable energy projects in China, as indicated by hypothesis H5, was not supported.

5. DISCUSSION AND CONCLUSION

The purpose of the present study was to examine the connections between government policy initiatives, the availability and

Figure 2: Standardized regression weights

Table 4: Averages (mean), standard deviations, and interpretations of the level of the variables studied

Variable	Mean	SD	Interpretation
Government policy initiatives	3.3219	1.08475	Moderate level of government policy initiatives
Availability and accessibility of financing mechanisms for renewable energy projects	3.4406	1.08839	Moderate level of availability and accessibility of financing mechanisms for renewable energy projects
Stakeholder engagement in renewable energy projects	3.3656	1.08168	Moderate level of stakeholder engagement in renewable energy projects
Investment in renewable energy projects in China	3.4031	1.09001	Moderate level of investment in renewable energy projects in China

SD: Standard deviation

Table 5: Results of examination of empirical variable distributions in structural equation models (n=400)

Variable	n	Mean	SD	Skewness	Kurtosis
Government policy initiatives	400	3.3219	1.08475	−0.84	−0.29
Availability and accessibility of financing mechanisms for renewable energy projects	400	3.4406	1.08839	−0.45	−0.29
Stakeholder engagement in renewable energy projects	400	3.3656	1.08168	−0.47	−0.27
Investment in renewable energy projects in China	400	3.4031	1.09001	−0.52	−0.26

SD: Standard deviation

Table 6: Hypothetical test results

Hypothesis	Relationship	Estimate	SE	CR	P	Result
H1	Government policy initiatives-> stakeholder engagement in renewable energy projects	0.571	0.019	30.493	0.001	Supported
H2	Government policy initiatives-> investment in renewable energy projects in China	0.375	0.032	11.568	0.001	Supported
H3	Availability and accessibility of financing mechanisms for renewable energy projects -> stakeholder engagement in renewable energy projects	0.426	0.019	22.817	0.001	Supported
H4	Availability and accessibility of financing mechanisms for renewable energy projects -> investment in renewable energy projects in China	0.585	0.027	21.764	0.001	Supported
H5	Stakeholder engagement in renewable energy projects -> investment in renewable energy projects in China	0.045	0.047	0.951	0.342	Not supported

SE: Standard error, CR: Critical Ratio; P: p-value

accessibility of financing methods for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China. Using structural equation modeling, the relationships between the four observable variables were analyzed. Apart for the association between stakeholder participation in renewable energy projects and investment in renewable energy projects in China, which was not statistically significant, the study revealed that the majority of expected routes had strong and statistically significant relationships. The testing of hypotheses revealed that hypotheses H1, H2, H3, and H4 were supported, whereas H5 was not.

This study's conclusions have numerous practical ramifications. The results of the study can advise policymakers, for instance, about the significant correlations between the observed factors. These policymakers can implement targeted policies that capitalize on the significant relationships between government policy initiatives, the availability and accessibility of financing mechanisms for renewable energy projects, stakeholder participation in renewable energy projects, and investment in renewable energy projects in China. These policies may include educational initiatives, training programs, or changes in policy aimed at enhancing the results associated with these variables.

The findings of this study can potentially be utilized to build strategies for enhancing investments in renewable energy projects in China. Important in this regard are the availability and accessibility of finance instruments for renewable energy projects. The availability and accessibility of finance channels for renewable energy projects in China can be improved through policies that give subsidies, tax incentives, and other forms of financial support. Therefore, stakeholder participation in renewable energy projects is essential for enhancing renewable energy project investments. Through spreading awareness, providing input, and supporting policy changes, stakeholders can play a crucial role in encouraging renewable energy project investments.

Moreover, the outcomes of this study can serve as a basis for future research in this field. Researchers might build on the findings of this study by investigating the mechanisms underlying the observed connections between variables. For example, they can investigate potential moderating or mediating variables that may influence the relationships among government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China. In addition, scholars might analyze the links in various groups or contexts to provide stronger evidence.

In addition, the findings of the study can be utilized to enhance existing models or produce new hypotheses that advance our understanding of the relationships between the observed variables. For instance, researchers can use the findings to test new hypotheses or develop more exhaustive models that capture the complexity of the relationships between government policy initiatives, the availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in

China. Additionally, they might utilize the results to discover gaps in the literature and propose new research questions.

Using structural equation modeling, the study investigated the relationships between government policy initiatives, the availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China. Apart for the association between stakeholder participation in renewable energy projects and investment in renewable energy projects in China, the results indicated that there were significant relationships between these factors. These discoveries have numerous practical ramifications and can serve as a basis for future study in this field.

Consistent with past research that has explored the linkages between government policy, funding mechanisms, stakeholder participation, and investment in renewable energy projects, the findings of the present study support these relationships. For instance, Bensaid et al. (2021) discovered that government policies and finance mechanisms have a considerable impact on the growth of renewable energy projects in Morocco. Similarly, Li et al., (2019) showed a positive relationship between stakeholder participation and investment in renewable energy projects in China.

In addition, the current study's findings support the claim that government policy is a crucial role in fostering the growth of renewable energy projects. This finding is consistent with the literature on renewable energy policies, which demonstrates that supportive policies, such as feed-in tariffs, tax incentives, and subsidies, can substantially increase the deployment of renewable energy systems (Sovacool, 2017; Li et al., 2019).

Additionally, the study emphasizes the significance of financing systems in enabling investment in renewable energy projects. This result is consistent with other studies demonstrating that financing mechanisms like green bonds can dramatically enhance investment in renewable energy projects (Jiang and Ashworth, 2020; Hsu et al., 2021). The study's result that stakeholder engagement has no meaningful effect on investment in renewable energy projects contradicts prior studies that found stakeholder engagement is favorably associated with investment in renewable energy projects (Li et al., 2019).

It is crucial to highlight, however, that the study's conclusions may have limitations. One disadvantage is the potential for omitted variable bias, which happens when crucial variables are missing from the model. For instance, the analysis omitted variables such as the price of renewable energy technology, which could be a significant factor driving investment in renewable energy projects (Wang et al., 2020). Future research should investigate additional variables that may influence or mediate the relationships between government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China in order to improve the model's accuracy and breadth.

Future research should build on this study's findings and focus on several areas to better understand the relationships between government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China. Future study can concentrate on these areas:

Longitudinal studies: This study's cross-sectional data makes causal linkages difficult to establish. Longitudinal data or experimental designs can strengthen causality evidence and help discover variable linkages in future study.

Mediating variables: While this study explored direct associations between variables, other variables may influence or mediate these relationships. To improve the model's accuracy and comprehensiveness, future research can examine additional variables that may influence or mediate the relationships between government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China.

Moderating variables: Geographic location, economic development, and culture may moderate the variables' correlations. Future study might examine moderating variables that affect the links between government policy initiatives, renewable energy project funding, stakeholder engagement, and investment in China.

Comparative studies: While this study focuses on China, the variables' connections may differ in different nations or locations. Future study might evaluate government policy initiatives, availability and accessibility of finance methods for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects across nations or regions to determine generalizability.

Mechanics of relationships: This study analyzed the variables' relationships but not their processes. Government policy initiatives, availability and accessibility of finance methods for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China can be studied in the future.

Qualitative studies: While this study used quantitative data, future research can use qualitative methods, such as interviews or focus groups, to explore stakeholders' experiences and perceptions of government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects, and investment in renewable energy projects in China. This can increase understanding of variable interactions and highlight opportunities for improvement.

Social and environmental factors: This study examined the relationships between government policy initiatives, availability and accessibility of financing mechanisms for renewable energy projects, stakeholder engagement in renewable energy projects,

and investment in renewable energy projects in China, but it did not consider the social and environmental factors that affect these relationships. Future study can include social and environmental elements such community involvement, societal acceptance, and environmental repercussions to further understand the variables' linkages.

REFERENCES

Adobea Oduro, M., Gyamfi, S., Sarkodie, S.A., Kemausuor, F. (2020), Evaluating the success of renewable energy and energy efficiency policies in Ghana: Matching the policy objectives against policy instruments and outcomes. In: Renewable Energy-Resources, Challenges and Applications. United Kingdom: IntechOpen.

Akkalatham, W., Taghipour, A. (2021), Pro-environmental behavior model creating circular economy in steel recycling market, empirical study in Thailand. Environmental Challenges, 4, 100112.

Ali, A., Al-Sulaiman, F.A., Al-Duais, I.N., Irshad, K., Malik, M.Z., Shafiullah, M., Malik, S.A. (2021), Renewable portfolio standard development assessment in the Kingdom of Saudi Arabia from the perspective of policy networks theory. Processes, 9(7), 1123.

Amir, M., Khan, S.Z. (2022), Assessment of renewable energy: Status, challenges, COVID-19 impacts, opportunities, and sustainable energy solutions in Africa. Energy and Built Environment, 3(3), 348-362.

Băzăvan, A. (2019), Chinese government's shifting role in the national innovation system. Technological Forecasting and Social Change, 148, 119738.

Bensaid, A., Ishak, S.B., Mustapa, I.R.B. (2021), Risk management committee attributes: A review of the literature and future directions. Universal Journal of Accounting and Finance, 9(3), 388-395.

Bonilla, S.H., Silva, H.R., da Silva, M.T., Gonçalves, R.F., Sacomano, J.B. (2018), Industry 4.0 and sustainability implications: A scenario-based analysis of the impacts and challenges. Sustainability, 10(10), 3740.

Butturi, M.A., Lolli, F., Sellitto, M.A., Balugani, E., Gamberini, R., Rimini, B. (2019), Renewable energy in eco-industrial parks and urban-industrial symbiosis: A literature review and a conceptual synthesis. Applied Energy, 255, 113825.

Fang, K., Zhou, Y., Wang, S., Ye, R., Guo, S. (2018), Assessing national renewable energy competitiveness of the G20: A revised Porter's Diamond Model. Renewable and Sustainable Energy Reviews, 93, 719-731.

Hoang, A.T., Nižetić, S., Olcer, A.I., Ong, H.C., Chen, W.H., Chong, C.T., Nguyen, X.P. (2021), Impacts of COVID-19 pandemic on the global energy system and the shift progress to renewable energy: Opportunities, challenges, and policy implications. Energy Policy, 154, 112322.

Hsu, C.C., Quang-Thanh, N., Chien, F., Li, L., Mohsin, M. (2021), Evaluating green innovation and performance of financial development: Mediating concerns of environmental regulation. Environmental Science and Pollution Research, 28(40), 57386-57397.

Jiang, K., Ashworth, P. (2021), The development of Carbon Capture Utilization and Storage (CCUS) research in China: A bibliometric perspective. Renewable and Sustainable Energy Reviews, 138, 110521.

Karim, M.E., Karim, R., Islam, M.T., Muhammad-Sukki, F., Bani, N.A., Muhtazaruddin, M.N. (2019), Renewable energy for sustainable growth and development: An evaluation of law and policy of Bangladesh. Sustainability, 11(20), 5774.

Lema, R., Bhamidipati, P.L., Gregersen, C., Hansen, U.E., Kirchherr, J. (2021), China's investments in renewable energy in Africa: Creating

co-benefits or just cashing-in? World Development, 141, 105365.

Li, G., Li, G., Zhou, M. (2019), Model and application of renewable energy accommodation capacity calculation considering utilization level of inter-provincial tie-line. Prot Control Mod Power Syst, 4(1). https://doi.org/10.1186/s41601-019-0115-7

Li, J., Huang, J. (2020), The expansion of China's solar energy: Challenges and policy options. Renewable and Sustainable Energy Reviews, 132, 110002.

Li, W., Chien, F., Hsu, C.C., Zhang, Y., Nawaz, M.A., Iqbal, S., Mohsin, M. (2021), Nexus between energy poverty and energy efficiency: Estimating the long-run dynamics. Resources Policy, 72, 102063.

Li, Y., Zhang, F., Yuan, J. (2019), Research on China's renewable portfolio standards from the perspective of policy networks. Journal of Cleaner Production, 222, 986-997.

Liu, J., Zhang, D., Cai, J., Davenport, J. (2021), Legal systems, national governance and renewable energy investment: Evidence from around the world. British Journal of Management, 32(3), 579-610.

Liu, Z., Xu, J., Wei, Y., Hatab, A.A., Lan, J. (2021), Nexus between green financing, renewable energy generation, and energy efficiency: Empirical insights through DEA technique. Environmental Science and Pollution Research, 30, 1-14.

Maggio, G., Nicita, A., Squadrito, G. (2019), How the hydrogen production from RES could change energy and fuel markets: A review of recent literature. International Journal of Hydrogen Energy, 44(23), 11371-11384.

Majid, M.A. (2020), Renewable energy for sustainable development in India: Current status, future prospects, challenges, employment, and investment opportunities. Energy, Sustainability and Society, 10(1), 1-36.

Martinez, N., Komendantova, N. (2020), The effectiveness of the social impact assessment (SIA) in energy transition management: Stakeholders' insights from renewable energy projects in Mexico. Energy Policy, 145, 111744.

Mungai, E.M., Ndiritu, S.W., Da Silva, I. (2022), Unlocking climate finance potential and policy barriers-A case of renewable energy and energy efficiency in Sub-Saharan Africa. Resources, Environment and Sustainability, 7, 100043.

Ndiritu, S.W., Engola, M.K. (2020), The effectiveness of feed-in-tariff policy in promoting power generation from renewable energy in Kenya. Renewable Energy, 161, 593-605.

Ning, Y., Cherian, J., Sial, M.S., Álvarez-Otero, S., Comite, U., Zia-Ud-Din, M. (2023), Green bond as a new determinant of sustainable green financing, energy efficiency investment, and economic growth: A global perspective. Environmental Science and Pollution Research, 30, 61324-61339.

Shan, H., Yang, J. (2019), Sustainability of photovoltaic poverty alleviation in China: An evolutionary game between stakeholders. Energy, 181, 264-280.

Shuai, J., Cheng, X., Ding, L., Yang, J., Leng, Z. (2019), How should government and users share the investment costs and benefits of a solar PV power generation project in China? Renewable and Sustainable Energy Reviews, 104, 86-94.

Sovacool, B.K. (2017), Contestation, contingency, and justice in the Nordic low-carbon energy transition. Energy Policy, 102, 569-582.

Strielkowski, W., Sherstobitova, A., Rovny, P., Evteeva, T. (2021), Increasing energy efficiency and modernization of energy systems in Russia: A review. Energies, 14(11), 3164.

Taghipour, A., Akkalatham, W., Eaknarajindawat, N., Stefanakis, A.I. (2022), The impact of government policies and steel recycling companies' performance on sustainable management in a circular economy. Resources Policy, 77, 102663.

Tiep, N.C., Wang, M., Mohsin, M., Kamran, H.W., Yazdi, F.A. (2021), An assessment of power sector reforms and utility performance to strengthen consumer self-confidence towards private investment. Economic Analysis and Policy, 69, 676-689.

Wang, S., Sun, L., Iqbal, S. (2022), Green financing role on renewable energy dependence and energy transition in E7 economies. Renewable Energy, 200, 1561-1572.

Wu, Y.A., Ng, A.W., Yu, Z., Huang, J., Meng, K., Dong, Z.Y. (2021), A review of evolutionary policy incentives for sustainable development of electric vehicles in China: Strategic implications. Energy Policy, 148, 111983.

Yang, Q., Du, Q., Razzaq, A., Shang, Y. (2022), How volatility in green financing, clean energy, and green economic practices derive sustainable performance through ESG indicators? A sectoral study of G7 countries. Resources Policy, 75, 102526.

Zhang, L., Saydaliev, H.B., Ma, X. (2022), Does green finance investment and technological innovation improve renewable energy efficiency and sustainable development goals. Renewable Energy, 193, 991-1000.

Zhao, G., Ahmed, R.I., Ahmad, N., Yan, C., Usmani, M.S. (2021), Prioritizing critical success factors for sustainable energy sector in China: A DEMATEL approach. Energy Strategy Reviews, 35, 100635.

Zhao, L., Chau, K.Y., Tran, T.K., Sadiq, M., Xuyen, N.T.M., Phan, T.T.H. (2022), Enhancing green economic recovery through green bonds financing and energy efficiency investments. Economic Analysis and Policy, 76, 488-501.

QUESTIONNAIRE

Survey Questions on Stakeholder Perspectives on Renewable Energy Investment in China

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
Q1. The Chinese government has implemented effective policy initiatives to promote investment in renewable energy.					
Q2. The Chinese government's renewable energy policies have provided sufficient incentives for investment in the sector.					
Q3. The Chinese government's renewable energy policies have contributed to the growth of the renewable energy industry.					

Variable: Stakeholder Engagement in Renewable Energy Projects

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Q4. Stakeholder engagement is crucial for the success of renewable energy projects in China.					
Q5. Stakeholders are adequately involved in the planning and implementation of renewable energy projects in China.					
Q6. The Chinese government has effectively engaged stakeholders in the renewable energy sector.					

Variable: Availability and Accessibility of Financing Mechanisms for Renewable Energy Projects

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Q7. Financing mechanisms for renewable energy projects in China are accessible and available to a wide range of investors.					
Q8. The cost of financing renewable energy projects in China is affordable and reasonable.					
Q9. The availability of financing mechanisms has contributed to the growth of the renewable energy industry in China.					

Variable: Investment in Renewable Energy Projects in China

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Q10. Investment in renewable energy projects is a viable and profitable option in China.					
Q11. The Chinese government's policy initiatives have effectively stimulated investment in the renewable energy sector.					
Q12. There are sufficient investment opportunities in the renewable energy sector in China.					

Participants will be asked to rate each question on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree)