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Political Factors and Renewable Energy Development: The Role of Social Mechanisms

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Abstract

In the midst of the global energy transition, addressing climate change is crucial. This study examines the political factors influencing renewable energy development through social factors. Based on data from 98 professionals in the renewable energy industry and using PLS-SEM analysis, the results indicate that political factors have a significant positive influence on both social factors and renewable energy development. Further, social factors significantly promote renewable energy development and mediate the relationship between political factors and renewable energy development. The study demonstrates that, within a policy-driven environment, government measures further encourage the development of renewable energy, with social perceptions and behaviours serving as a link mechanism to explain this.

Keywords:

Political factors; Social factors; Renewable energy development; Institutional theory; PLS-SEM

Introduction

With the intensification of global climate change, countries are accelerating their energy transition, and renewable energy development has become a key path to achieving sustainable development (International Energy Agency et al., 2025). As a developing country, Malaysia has been continuously promoting renewable energy development in recent years through policies such as feed-in tariffs (FiT), net metering (NEM), and large-scale solar utilities (LSS). These policies have, to some extent, promoted the growth of installed capacity, demonstrating the government's leading role in the energy transition. Despite ongoing policy initiatives, the development of renewable energy continues to face numerous challenges. Such challenges include insufficient social acceptance, differing public perceptions, and resistance during project

implementation (Tsiaras et al., 2025). In Malaysia, these social factors are also considered important constraints affecting the implementation of renewable energy projects (Fernandez et al., 2024). This shows that relying solely on policy promotion may not be sufficient to fully achieve renewable energy development goals, and that social factors play a crucial role.

Existing research identifies many critical influence factors affecting renewable energy development across political, social, economic, technological, and environmental dimensions (Wang et al., 2023). However, political and social factors are often analysed as direct drivers. The relationships between them and between political factors and renewable energy development through social mechanisms are scarce. In fact, social acceptance is considered an important prerequisite for the successful implementation of renewable energy projects (Segreto et al., 2020). Public awareness, attitudes, and support for renewable energy impact the efficiency and outcomes of project implementation (Lucas et al., 2021). Meanwhile, government policies provide institutional support and shape social perceptions and behaviours through information guidance, incentives, and specific policy implementation mechanisms (Tummers, 2019).

Based on this, this study examines the relationship between political factors and renewable energy development from an institutional perspective, and further examines the mediating role of social factors in this relationship.

Literature Review

Energy transition involves not just technological change but also political and social transformation. This study is grounded on Institutional Theory, which posits that the institutional environment comprises three pillars: regulatory, normative, and cognitive (Scott, 2014). The regulatory pillar emphasises formal rules and policy constraints, while the normative pillar reflects social values and behavioural expectations. In this study, political factors serve as external environmental variables reflecting regulatory institutional pressure. It includes regulatory stability (Boute, 2020), policy support (Hashemizadeh et al., 2024), and the degree of government intervention (Akhtaruzzaman et al., 2025). Social factors also serve as external environmental variables that reflect the power of normative institutions. It mainly encompasses social acceptance (Ellis & Ferraro, 2016), public perception (Jeong et al., 2023), and the degree of social support (Hakam et al., 2025). Renewable energy development refers to the overall performance of an industry or region in the adoption, promotion, and development of renewable energy (Frank et al., 2018). The proposed conceptual framework of this study is shown in Figure 1.

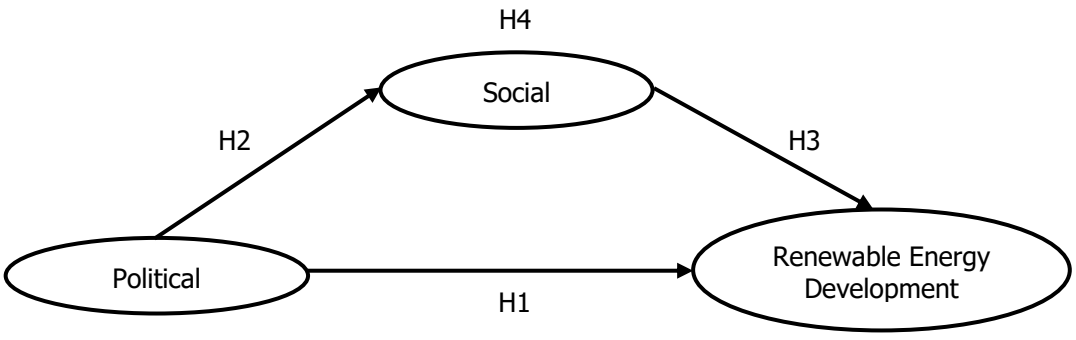


Figure 1. Proposed Conceptual Framework

Political factors are hypothesised to have a significant positive impact on renewable energy development, given their role in creating stable investment environments and supportive policy frameworks. Saadaoui (2022) demonstrated that institutional and political factors play a key role in promoting renewable energy transition. Improving these factors can lead to decarbonisation of the energy sector in the long run. Meanwhile, Belaïd et al. (2021) confirmed that political stability positively impacts renewable energy production by fostering investments in the renewable energy sector. Additionally, Tu et al. (2022) found that active political participation promotes renewable energy development in EU countries. Sweidan (2021) showed that geopolitical risk actually stimulates renewable energy deployment in the United States as countries seek energy independence. These findings suggest that stable political environments, effective governance, and supportive political participation create the necessary conditions for renewable energy investments and policy implementation. Therefore, political factors are widely considered a key driver of renewable energy development. Based on the above, this study proposes:
H1: Political factors have a significant positive influence on renewable energy development.

Political factors positively influence social factors by serving an expressive function. Empirical evidence showed that when individuals learn about policy passage by democratically elected institutions, they increase their beliefs about public support for those policies (Syropoulos et al., 2024). Conservative political ideology was significantly associated with greater acceptance of green hydrogen. Trust in the government's climate change response emerged as a key political factor influencing acceptance (Cho & Lee, 2025). Research demonstrated that political variables, such as partisan support, have both direct and indirect effects on acceptance of renewable energy. This means that individuals who supported the president were more likely to accept solar energy technology, independent of other factors (Hwang et al., 2024). Similarly, political variables were shown to influence attitudes and social dynamics affecting energy policy acceptance, as political leaders and policy debates actively shape public opinion and social norms (Dutta, 2025). Based on the findings, political mechanisms may serve as catalysts for enhancing social acceptance, community engagement, and public support for renewable energy initiatives. Thus, this study proposes the following hypothesis:
H2: Political factors have a significant positive influence on social factors in renewable energy.

Besides, social factors also play an important role in the energy transition. Based on emerging empirical evidence, social factors are hypothesised to have a significant positive impact on renewable energy development. This hypothesis is grounded in recent research demonstrating a paradigm shift from economic-financial determinants to sociocultural factors as primary drivers of renewable energy adoption (Zhindon-Almeida & Ruiz-Carrillo, 2025). Systematic reviews of 49 studies confirm that citizen participation, social capital, and community trust are critical drivers of renewable energy success (Simone et al., 2025). Social acceptance has proven to be a significant determinant in renewable energy implementation, with low local acceptance hindering project development despite high overall acceptance (Segreto et al., 2020). Additionally, social development is associated with renewable energy consumption in a significant long-term manner (Khribich et al., 2021). In the renewable energy context, higher social acceptance may reduce resistance to project implementation and

promote cooperation among stakeholders. Therefore, social factors are considered an important social foundation for promoting renewable energy development. Based on this, this study proposes:

H3: Social factors have a significant positive influence on renewable energy development.

Energy transition is not only a technological process but also a political and social transformation. MacKuen and Brown (1987) noted that social factors function as intervening mechanisms shaped by the political environment rather than as independent sources of influence. Based on the above hypotheses 1 to 3, political factors may directly influence renewable energy development and indirectly affect it through social factors. Social factors, as a key mechanism, serve as a bridge in translating policies into actual development outcomes. Therefore, it is necessary to examine this mechanism from a mediating perspective. Based on this, this study proposes:

H4: Social factors play a mediating role between political factors and renewable energy development.

Methodology

This study employed quantitative research methods. Using questionnaires as the primary data collection tool to examine the relationship between political factors, social factors, and renewable energy development. The study participants were professionals from the renewable energy industry. Meanwhile, G*Power analysis showed a minimum required sample size of 76. This study collected 98 valid samples, exceeding the above standards, indicating that the sample size had sufficient statistical power and analytical applicability.

The questionnaire design was adapted from existing literature, and all items used a five-point Likert scale. Political factors, social factors, and renewable energy development were measured in terms of policy support, social support, and adoption level, respectively. Example items for each construct include: "Political interference in renewable energy tender processes is being reduced to ensure fair and transparent project implementation", "Local communities are playing an increasingly active role in the successful implementation of renewable energy projects" and "The adoption of renewable energy technologies in Malaysia has increased".

Data analysis was conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM). This study first evaluated the measurement model, including factor loadings, composite reliability (CR) and average variance extracted (AVE) as shown in Table 1. All the measures exceeded the suggested thresholds, establishing reliability and validity. The coefficients of determination (R^2) are 0.632 for Social Factors and 0.586 for Renewable Energy Development, indicating strong explanatory power. Afterwards, the structural model was tested, and the significance of each path was assessed using bootstrapping. All paths were significant, with P-values less than 0.05 (Table 2). Furthermore, to examine the mediating role of social factors, this study employed indirect effects analysis to assess the impact of political factors on renewable energy development through social factors. By comparing the significance of direct and indirect effects, this study further confirmed that the mediating effect was valid (Table 3).

Table 1. Item Loadings, Internal Consistency, and Convergent Validity

Constructs	Items	Outer loadings	CR	AVE
PF	PF1	0.816	0.909	0.713
	PF2	0.864		
	PF3	0.877		
	PF4	0.820		
SF	SF1	0.845	0.902	0.697
	SF2	0.775		
	SF3	0.853		
	SF4	0.864		
RED	RED1	0.890	0.932	0.774
	RED2	0.875		
	RED3	0.870		
	RED4	0.884		

Note. PF=Political Factors, SF=Social Factors, RED=Renewable Energy Development

Table 2. Structural Equation Modelling Results

Hypotheses	β	t-values	p-values	Results
H1: PF -> RED	0.441	3.259	0.001	Supported
H2: PF -> SF	0.795	16.789	0.000	Supported
H3: SF -> RED	0.366	2.400	0.016	Supported

Note. PF=Political Factors, SF=Social Factors, RED=Renewable Energy Development

Table 3. Mediation Results

	Indirect Effects of PF on RED			Direct Effects (PF -> RED)			Total Effects (PF -> RED)		
Hypotheses	β	t-value	p-value	β	t-value	p-value	β	t-value	p-value
H4: PF -> SF -> RED	0.291	2.330	0.020	0.441	3.259	0.001	0.732	10.400	0.000

Note. PF=Political Factors, SF=Social Factors, RED=Renewable Energy Development

Results and Discussion

The research results support all hypotheses. Specifically, political factors have a significant positive influence on renewable energy development, indicating that government policies play a crucial role in driving industry development. This result is consistent with existing research, demonstrating that a stable policy environment and government support can effectively reduce investment uncertainty, thereby promoting the implementation of renewable energy projects (Belaïd et al., 2021; Saadaoui, 2022). In policy-driven scenarios, the government remains the primary driver of the energy transition.

Meanwhile, political factors also have a significant positive influence on social factors, indicating that policies have a crucial impact on public perception and social attitudes at the institutional level. This finding is consistent with existing research showing that the political environment can shape social attitudes and public support (Cho & Lee, 2025; Syropoulos et al., 2024). Specifically, government policies, through information guidance and incentive mechanisms, can enhance public awareness and acceptance of renewable energy (Tummers, 2019). This finding supports the institutional theory that regulatory forces influence normative forces, further illustrating how the political environment can shape the foundation of social behaviour.

Furthermore, social factors have a significant positive influence on renewable energy development, further validating their crucial role in the energy transition. The result aligns with previous studies, indicating that social acceptance is a significant determinant in renewable energy implementation (Segreto et al., 2020). When the public holds a positive attitude towards renewable energy, resistance to project implementation is significantly reduced, thereby improving policy implementation efficiency and project success rates. This shows that promoting policies alone is not enough to achieve renewable energy goals. Gaining social support is just as important.

The mediation analysis reveals that social factors mediate the relationship between political factors and renewable energy development. This implies that political factors influence the development of renewable energy both directly and indirectly through social mechanisms. In other words, social factors act as a bridge in translating policies into concrete development results. This finding empirically supports the "policy-society-development" pathway and provides a deeper explanation for understanding the mechanisms by which institutional factors operate.

Overall, this study demonstrates that in a policy-driven environment, governments promote renewable energy development both through direct intervention and indirectly by shaping social perceptions and behaviours. This finding enriches research on the mechanisms by which institutional factors exert their influence and provides important insights for policymaking. In promoting renewable energy development, greater emphasis should be placed on the role of social factors to enhance the effectiveness of policy implementation.

Conclusion

This study demonstrates that political factors indirectly influence the development of renewable energy through social factors, empirically supporting the institutional theory that regulatory forces exert their influence through normative mechanisms. Findings of this study highlight that, in a policy-driven environment, social factors play a crucial role in translating policies into concrete development outcomes, providing important insights for improving energy policy design.

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