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**Public Acceptance and Institutional Trust in Nuclear Energy
Transition Policies in Indonesia**

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Abstract: This study investigates how socioeconomic characteristics and governance perceptions influence public acceptance of Indonesia's energy transition, with a particular focus on nuclear energy and institutional trust. As Indonesia moves to reduce fossil-fuel dependence and diversify its energy mix, public support becomes critical to the legitimacy and implementation of transition policies. Using survey data from 189 residents of the Bangka Belitung Islands, this study applies a Probit regression model to estimate the effects of age, education, income, and governance-related perceptions, including regulatory compliance, political influence, and freedom of expression. The results show that age has a statistically significant negative effect on acceptance, indicating that older individuals are less likely to support nuclear energy development. By contrast, respondents who perceive government institutions as more compliant with regulations and more responsive to public concerns are more likely to support the transition. Other socioeconomic variables show limited explanatory power. These findings suggest that institutional trust and governance quality are more influential than socioeconomic status in shaping public acceptance of nuclear energy in Indonesia's energy transition context.

Keywords: Public Acceptance, Nuclear Energy, Probit Model Analysis, Technological Change, Choices and Consequences

Introduction

In recent years, nuclear energy has gained increasing attention in global policy and academic debates, particularly in the context of accelerating the shift toward low-carbon and sustainable energy systems. The viability of civilian nuclear power initiatives depends substantially on the degree of public acceptance of this technology. Past nuclear incidents, including the accidents at Three Mile Island and Chernobyl, have demonstrated that societal perceptions play a pivotal role in determining the long-term prospects of nuclear energy

development (Flynn et al., 1992; Nguyen & Yim, 2018; Slovic, 1987). Nonetheless, recent studies report a notable shift in public attitudes, with increasing support for nuclear energy across various nations, including the United States (Brenan, 2025; World Nuclear News, 2025).

The need to examine and strengthen societal acceptance of nuclear energy has driven the emergence of psychometric research on perceptions of nuclear risk, a field that originated in the 1970s. Initial studies indicated that nuclear power was perceived by the public in the United States as among the most hazardous technologies, largely because of its potential for large-scale catastrophic outcomes and its perceived lack of controllability (Fischhoff et al., 1978). However, contemporary research has expanded this framework to incorporate cultural value orientations and novel computational approaches such as language embeddings to predict risk perception (Chassang, 2024; Hussain, 2024).

In Indonesia, the proposed development of a nuclear power plant (NPP) on Kelasa Island, Central Bangka, represents a strategic step toward energy diversification. The selection of Kelasa Island is grounded in rigorous technical, environmental, and socioeconomic criteria, making it a promising site for clean, sustainable energy production. The exploratory phase of this project includes comprehensive environmental impact assessments, safety analyses, and participatory processes with local stakeholders to build trust and transparency. These activities involve collaboration among local governments, community leaders, and environmental experts, and aim to align nuclear energy development with Indonesia's long-term goals of energy transition and national energy sovereignty.

The proposed nuclear power plant on Kelasa Island has created a contentious local socio-economic landscape characterised by social resistance, perceived inequality in the distribution of risks and benefits, and heightened public concern over environmental and livelihood security. Media reporting suggests that some residents view the project as driven by investor promises that are not matched by credible safeguards for environmental protection and community welfare, thereby intensifying distrust toward both investors and state institutions (Tempo.co, 2025). Additional reporting portrays the project as a test of the government's ability to manage nuclear safety and regulatory risk. At the same time, local criticism emphasises the limited disclosure of supporting studies and the potentially disproportionate burden that would fall on fishing-dependent coastal communities in the event of ecological disruption or technological failure (Kompas.com, 2025; Radar Bahtera, 2025). Public anxiety has also been reinforced by concerns over radioactive waste, radiation exposure, and marine ecosystem damage surrounding Pulau Gelasa (Babel Aktual, 2026). Although the project is still reported to be at the site-permit approval stage rather than the construction phase, these tensions already demonstrate that risk perception and institutional trust are central to the early social acceptance of nuclear energy policy (Redaksi, 2026). This pattern is consistent with recent literature showing that public acceptance of nuclear energy is shaped not only by technical considerations but also by perceived risk, social and institutional trust, media-driven interpretations, and broader concerns related to climate change and energy security (Durdovic et al., 2024; S S Ho et al., 2025; Y. Wang et al., 2024; J. Yang et al., 2022).

To analyze public attitudes toward nuclear energy, theoretical models have been developed to assess how individuals and groups evaluate the Technology. (Siegrist et al., 2000) proposed a framework consisting of three key components influencing nuclear attitudes: risk perception, benefit perception, and trust in institutions. Risk perception refers to individuals'

subjective evaluations of potential harm associated with nuclear energy, encompassing concerns about nuclear accidents, long-term environmental effects, and radioactive waste management. Media coverage, previous experiences, and public knowledge often shape these perceptions. Conversely, benefit perception relates to beliefs in the advantages of nuclear energy, such as its reliability, sustainability, and capacity to reduce greenhouse gas emissions. The efficacy of public communication strategies mediates these beliefs.

Existing research identifies institutional trust as a central determinant of public acceptance of nuclear energy, yet the specific mechanisms through which trust operates remain contested. The literature distinguishes between general trust in government and trust in sector-specific regulatory authorities, with the latter often exerting a more pronounced influence on risk perception and acceptance of nuclear technologies (Mlejnkova & Patelli, 2021; Pauer, 2024). Institutional transparency, procedural fairness, and regulatory competence are commonly theorized as core dimensions of social trust. This study conceptualizes trust in nuclear regulatory agencies as a multidimensional construct, emphasizing the importance of credible oversight and transparent governance in shaping public attitudes. The analysis interprets observed associations between institutional trust and nuclear acceptance as indicative of the mediating role of regulatory credibility, while recognizing that the strength and direction of these effects may vary across contexts.

The literature on institutional trust in developing countries highlights persistent ambiguity regarding the relative importance of technical competence, regulatory credibility, and institutional neutrality as determinants of public confidence (Ahmed et al., 2025; Qudrat-Ullah, 2025). Within the nuclear sector, perceived politicization of policy decisions is identified as a potential mechanism that may erode institutional legitimacy and diminish public acceptance (S S Ho et al., 2025). The analysis operationalizes perceived politicization as an indicator of governance legitimacy, capturing the extent to which policy processes are viewed as impartial and oriented toward collective welfare. In contexts such as Indonesia, where political influence over policymaking is salient, this variable enables the estimation of how politicization conditions the relationship between institutional processes and public acceptance of nuclear energy. The findings are interpreted as evidence that transparent and insulated governance structures may mitigate the negative effects of politicization on institutional trust, consistent with prior research (Ahmed et al., 2025; S S Ho et al., 2025).

This study focuses on the Bangka Belitung Islands, a region endowed with abundant natural resources and untapped energy potential. It seeks to explore how local socioeconomic dynamics influence public Acceptance of nuclear energy. In this context, factors such as education, income, and access to information are expected to shape public perceptions significantly (S S Ho et al., 2010). The methodological approach of this research incorporates both quantitative and qualitative methods to gather comprehensive data on public attitudes, perceptions, and Acceptance of nuclear energy in the region.

Previous empirical efforts have provided valuable insights into nuclear Acceptance in Bangka Belitung. Kartono et al., (2023) conducted a large-scale mixed-methods study involving 1,500 respondents to assess the Acceptance of nuclear energy. Their analysis focused on five key dimensions: perceived risks and benefits, trust in developers' benevolence and competence, and preferences regarding distance between residential areas and the proposed NPP site. The findings revealed a relatively high acceptance rate (73.73%), driven by substantial perceived benefits (94.27%) and trust in developer competence (93.53%). However, their quantitative

analysis was limited to descriptive statistics and chi-square tests, thereby failing to support causal inference or probabilistic modeling. Furthermore, the study did not control for structural socioeconomic variables, such as age, income, or political trust, when explaining levels of Acceptance.

This study addresses existing gaps in the literature by adopting a micro-level empirical approach to examine public Acceptance of nuclear energy within the broader context of Indonesia's energy transition. While previous studies have mainly analyzed public attitudes in aggregate or descriptive terms, this research incorporates individual-level socioeconomic and perceptual variables, including education, age, income, perceived political influence, regulatory compliance, and freedom of expression, to provide a more nuanced understanding of public responses to energy transition policies. By employing a limited-dependent-variable framework, this study enables a more precise assessment of how institutional trust and governance-related perceptions shape public Acceptance of complex energy technologies.

Moreover, this research contributes to the literature by providing geographic specificity, focusing on Kelasa Island in the Bangka Belitung Islands. This proposed nuclear energy development site is rarely examined in national-level analyses. By combining micro-level socioeconomic evidence with spatial context, this study extends existing research on nuclear energy acceptance in developing countries. Accordingly, the primary objective of this study is to identify and analyze the socioeconomic and institutional determinants of public Acceptance of nuclear energy development and to derive policy-relevant insights that support socially legitimate and institutionally credible energy transition strategies in Indonesia.

Literature Review

Theoretical Foundations: The Risk–Benefit–Trust Framework

Public acceptance of nuclear energy can be formally represented as a function of perceived benefits, perceived risks, and institutional trust, such that

$$A_i = f(B_i, R_i, T_i)$$

where A_i denotes the acceptance propensity of individual i , B_i is perceived benefit, R_i is perceived risk, and T_i is trust in the institutions responsible for regulation and risk management. This formulation is consistent with the broader risk-perception literature, although it should be interpreted as an analytical synthesis rather than a direct equation explicitly proposed by Siegrist et al. In the trust-based framework developed by Siegrist et al. (2000), social trust increases perceived benefits and reduces perceived risks, implying the structural relations

$$B_i = \alpha_0 + \alpha_1 T_i + u_i, \alpha_1 > 0$$

and

$$R_i = \gamma_0 + \gamma_1 T_i + v_i, \gamma_1 < 0$$

For nuclear power, their final structural model shows that the standardized effect of trust on perceived benefit is positive, whereas the effect of trust on perceived risk is negative and

larger in absolute magnitude, indicating that trust primarily operates as a mechanism for attenuating perceived risk rather than merely amplifying perceived benefit. They also show that, once trust is controlled for, the inverse association between risk and benefit perceptions diminishes, although it remains substantial in the case of nuclear power.

To estimate the probability that individual i accepts nuclear energy as a function of observable socioeconomic and perceptual attributes, this study applies the binary Probit model. Let y_i^* denote the latent acceptance propensity:

$$y_i^* = \beta_0 + \beta_1 Educ_i + \beta_2 Age_i + \beta_3 Inc_i + \beta_4 PolP_i + \beta_5 Comply_i + \beta_6 PersP_i + \varepsilon_i, \quad \varepsilon_i \sim N(0,1) \quad \dots (2)$$

The observed binary outcome is $y_i = 1$ if $y_i^* > 0$, and 0 otherwise, yielding:

$$P(y_i = 1 | X_i) = \Phi(X_i' \beta) \quad \dots (3)$$

where $\Phi(\cdot)$ is the standard normal cumulative distribution function. The average marginal effect (AME) of covariate x_k the quantity of direct policy relevance is:

$$\partial P / \partial x_k = \varphi(X_i' \beta) \cdot \beta_k \quad \dots (4)$$

Because $\varphi(\cdot) > 0$ always, the sign of β_k fully determines the direction of the marginal effect, while its magnitude depends on the evaluation point $X_i' \beta$ (Wooldridge, 2010). This specification bridges the risk-benefit-trust model of Siegrist et al. (2000) with individual-level empirical estimation, mapping the theoretical constructs governance perceptions, regulatory compliance, and socioeconomic characteristics onto observable predictors of acceptance probability.

Demographic, Social, and Political-Economic Aspects of Public Acceptance

Public acceptance is a critical condition for the success of energy transition policies and the diffusion of renewable and smart energy technologies. The literature increasingly shows that acceptance is not determined solely by technological efficiency or environmental benefits, but by a broader interaction among demographic characteristics, socioeconomic conditions, political perceptions, institutional trust, and perceived risk. In this respect, households and citizens are not passive recipients of transition policies; rather, they are central actors whose judgments about costs, benefits, fairness, and legitimacy directly shape adoption outcomes and policy effectiveness (Ilhan & Söylemez, 2024; Araújo, 2014; Relva et al., 2021). Existing studies further suggest that public acceptance should be understood as a multidimensional construct, influenced simultaneously by individual-level characteristics and by wider governance and infrastructural conditions (Ji & Chan, 2019; Long et al., 2022; J.-Y. Yang & Dodge, 2024). Building on this perspective, the present review synthesizes prior literature through three interrelated dimensions: demographic, social, and political-economic determinants; risk-related factors associated with energy, nature, and alternative technologies; and the mediating role of institutions and infrastructure.

Demographic variables represent an important entry point for explaining variation in public acceptance of energy transition policies and technologies. Age has frequently been identified as a relevant factor, although its direction of influence is not always uniform across contexts.

Some studies suggest that older individuals are more likely to support or adopt certain renewable technologies, particularly when they possess accumulated financial resources or greater concern for energy security (Eshchanov et al., 2021). However, other findings imply that the effect of age is often indirect, operating through differences in experience, risk tolerance, information processing, and familiarity with innovation (He & Veronesi, 2017; Long et al., 2022). Accordingly, age should not be interpreted as an isolated determinant, but as a proxy for broader socioeconomic and cognitive dispositions.

Education constitutes another significant predictor of acceptance. Individuals with higher educational attainment generally exhibit stronger awareness of climate-related problems, greater ability to assess technological performance, and higher capacity to evaluate long-term costs and benefits. These attributes tend to increase support for renewable energy adoption and energy-saving behavior (Irfan et al., 2021; Mamun et al., 2022; Masukujjaman et al., 2021). Education also contributes to perceived behavioral control and self-efficacy, both of which are consistently associated with stronger adoption intentions in the energy literature (Ji & Chan, 2019; Waris et al., 2022). From this perspective, education does not simply provide information; it also shapes confidence in one's ability to engage with new technologies and adapt to policy change.

Income remains one of the most robust socioeconomic determinants of public acceptance. The adoption of renewable and smart energy technologies often requires substantial upfront investment, making household income a decisive factor in determining both willingness and actual capacity to adopt. Higher-income households are better positioned to absorb installation costs, cope with uncertainty regarding payback periods, and respond positively to green pricing schemes (Ankrah Twumasi & others, 2022; Jiang et al., 2022; Shaik et al., 2025). By contrast, lower-income groups are more sensitive to perceived cost burdens and may interpret the energy transition as financially exclusionary, particularly when policy support is weak or unevenly distributed (Loaiza-Ramírez et al., 2022; Qamar et al., 2022; Zahari & Esa, 2018). This indicates that public acceptance is closely linked to distributive capacity and the affordability of participation.

Beyond demographic and economic characteristics, compliance with government and trust in public authority substantially shape acceptance outcomes. Public willingness to support transition policies tends to be stronger where governments are perceived as competent, consistent, and capable of managing social and economic trade-offs. Regulatory clarity, policy stability, and credible incentives can increase public confidence in the transition process and reduce perceived uncertainty (Ilhan & Söylemez, 2024; Luthra et al., 2015; Relva et al., 2021). Conversely, weak institutions, policy inconsistency, and perceived regulatory capture undermine legitimacy and reduce support for transition initiatives, particularly in developing-country settings where institutional credibility remains uneven (Inglesi-Lotz, 2024; Mirzania et al., 2023; Qi, 2024).

Perceptions of freedom of expression are also relevant because they affect whether citizens regard the transition process as participatory and procedurally fair. Public acceptance is more likely to emerge when individuals believe they can voice concerns, question policy decisions, and participate meaningfully in energy governance. Studies on public engagement and social legitimacy indicate that open communication and inclusive deliberation strengthen support for energy reforms by enhancing perceptions of fairness and transparency (Schneider & van der Linden, 2023; J.-Y. Yang & Dodge, 2024). In this sense, freedom of expression is not

merely a political value; it is also a governance condition that shapes how energy policies are socially received.

Political perceptions further influence how energy transition is interpreted by citizens. Perceptions of ideology, state intervention, and political priorities affect whether transition policies are viewed as environmentally necessary, economically burdensome, or politically motivated. Previous research demonstrates that norms, values, and ideological orientations shape climate risk perception and behavioral willingness, thereby influencing support for renewable energy and clean technology adoption (Awais et al., 2022; Schneider & van der Linden, 2023). Public acceptance, therefore, cannot be reduced to economic rationality alone; it is embedded in wider political meanings and social interpretations.

Risk Factors Related to Energy, Nature, and Other Technologies

Risk perception is another central dimension in the literature on public acceptance. Even when renewable energy technologies are recognized as environmentally beneficial, adoption remains conditional upon how individuals assess financial, technical, and social risks. Economic risk is among the most frequently identified barriers. High installation costs, uncertain returns, maintenance expenses, and the perceived premium of green electricity reduce willingness to adopt renewable technologies, particularly among cost-sensitive users (Jiang et al., 2022; Loaiza-Ramírez et al., 2022; Qamar et al., 2022). Since many renewable technologies involve delayed benefits rather than immediate gains, individuals often engage in cautious cost-benefit appraisal before committing to adoption (Klößner & Nayum, 2016; Roy, 2021).

Technical risk is similarly important. Public acceptance tends to rise when technologies are perceived as reliable, useful, and easy to operate. Attitudes toward technical performance, perceived usefulness, awareness, and self-efficacy have all been shown to influence adoption intentions positively (Irfan et al., 2021; Ji & Chan, 2019; Masukujjaman et al., 2021). By contrast, uncertainty about technological reliability or compatibility with existing systems may reduce acceptance, even in contexts where environmental awareness is relatively high (Relva et al., 2021).

Environmental risk perception also plays a significant role. Individuals who perceive climate change and ecological degradation as serious threats are generally more inclined to support low-carbon technologies and conservation-oriented behavior (Mamun et al., 2022; Schneider & van der Linden, 2023). However, environmental concern alone is often insufficient. In some contexts, economic and regulatory motivations outweigh ecological considerations, suggesting that pro-environmental attitudes interact with broader material and institutional incentives rather than determining acceptance independently (Fabisch, 2022).

In addition, public acceptance may be constrained by competition with other technologies and by behavioral biases. Myopia, inertia, and herding behavior may discourage households from investing in solar or smart energy systems, even when long-term benefits are acknowledged (Kurnuthever et al., 2022). Likewise, personality traits and risk preferences can influence green decision-making, particularly when costs are high and outcomes are uncertain (Busi-Soncic et al., 2022; He & Veronesi, 2017). These findings suggest that perceived risk is not purely objective; it is socially and cognitively constructed.

Institutional and Infrastructural Mediation of Public Acceptance

The broader institutional and infrastructural environment mediates the relationship between demographic factors, perceived risks, and public acceptance. Strong institutions provide regulatory certainty, reduce investment risk, and increase the legitimacy of energy transition policies. Transparent governance, effective regulation, and policy coherence create conditions in which citizens are more likely to trust the transition process and support associated technologies (Ilhan & Söylemez, 2024; Inglesi-Lotz, 2024).

At the same time, adequate infrastructure is essential for transforming acceptance into actual adoption. Smart grids, storage systems, and reliable distribution networks reduce technical uncertainty and improve the visible performance of renewable technologies, thereby reinforcing public trust (Leorngan et al., 2023; Relva et al., 2021; J.-Y. Yang & Dodge, 2024). In contrast, infrastructural deficits and weak institutional capacity can turn energy transition into a source of public skepticism, especially in developing countries where governance and service delivery gaps remain pronounced (Chipangamata & Nwaila, 2024; Maswabi et al., 2022; Mirzania et al., 2023).

Overall, the literature indicates that public acceptance of energy transition is shaped by a layered structure of determinants. Demographic and socioeconomic characteristics influence the capacity and willingness of individuals to engage with transition policies; perceptions of political legitimacy and freedom condition whether the process is viewed as fair and trustworthy; perceived risks related to cost, technology, and environmental uncertainty shape adoption behavior; and institutional as well as infrastructural quality mediate the translation of intention into acceptance and action. Consequently, a comprehensive understanding of public acceptance requires an integrated perspective that combines individual, societal, and governance dimensions.

Methods

This chapter identifies the factors that influence public Acceptance of nuclear energy, with a focus on demographic and economic variables, as well as individuals' perceptions of political and social issues. In an effort to gain a deeper understanding of the dynamics that shape these attitudes, this research adopts a quantitative approach, using the Limited Dependent Variable method, specifically the Probit model, to analyze data obtained through a survey. The Probit model is chosen for its ability to effectively handle binary dependent variables, which in this study pertains to respondents' Acceptance or rejection of nuclear energy.

To ensure representative and reliable data, the study collects survey responses from 100 individuals. Respondents were selected through a sampling process designed to reflect a broad socioeconomic and geographical distribution, ensuring that the study covers a wide range of perspectives and backgrounds. The use of individual surveys enables this research to gather detailed quantitative data on education, age, income, and perceptions of political influence, compliance, and freedom of expression, all of which are key variables in this analysis. The perception of political framing is used as a proxy for institutional trust, particularly reflecting the extent to which individuals perceive nuclear energy policies as being influenced by political interests. By combining a rigorous methodological approach with a socioeconomically and geographically representative sample, this chapter aims to identify and analyze the relationships between these variables and attitudes toward nuclear energy,

providing valuable insights into the factors influencing public Acceptance of this energy technology.

Empirical Model

To understand how education, age, income, and perceptions (political, compliance, and freedom of expression) influence individual attitudes toward nuclear energy, we can formulate an empirical model using the Probit approach. This model estimates the probability of a positive or negative attitude toward nuclear energy using these independent variables. The following is a basic representation of the proposed empirical model:

$$\Phi^{-1}(P_i) = \beta_0 + \beta_1 Educ_i + \beta_2 Age_i + \beta_3 Inc_i + \beta_4 Poli P_i + \beta_5 Comply_i + \beta_6 Pers P_i + Error$$

where:

- P_i : The probability that individual i holds a positive attitude toward nuclear energy.
- $Educ_i$: The number of years of education completed by individual iii, reflecting their education level.
- Age_i : The age of individual iii, indicating generational experience.
- Inc_i : The annual income of individual i, indicating their economic status.
- $Poli P_i$: The perception of individual i regarding the political framing of nuclear energy issues.
- $Comply_i$: The level of compliance of individual i with regulations or social norms, possibly reflecting their stance toward energy policies.
- $Pers P_i$: The perception of freedom of expression by individual i, indicating how freely they feel they can express their opinions on nuclear energy without negative repercussions
- $Error$: Captures all other factors influencing individual attitudes toward nuclear energy that are not explained by the model's variables.

Sampling Technique

This study uses a final sample of 189 respondents drawn from an adult population of 1,038,800 individuals in the Bangka Belitung Islands (Dinas Kependudukan dan Pencatatan Sipil Provinsi Kepulauan Bangka Belitung, 2025). Given the known population size, sample adequacy can be assessed using a simplified finite-population approach based on Slovin's formula:

$$n = \frac{N}{1 + Ne^2}$$

where n denotes sample size, N denotes population size, and e denotes the tolerated margin of error.

Rather than using the formula to justify a smaller minimum threshold, this study proceeds directly from the realized sample size of 189 respondents and evaluates its statistical adequacy in terms of descriptive precision. By rearranging Slovin's expression, the implied margin of error associated with the achieved sample can be estimated as follows:

$$e = \sqrt{\frac{N - n}{nN}}$$

Substituting $N = 1,149,574$ and $n = 189$, the implied margin of error is approximately:
 $e \approx 0.0727$

or 7.27%. This indicates that the realized sample provides a level of precision that is acceptable for identifying general population tendencies in attitudes toward nuclear energy. In other words, the sample size is sufficiently large to support inference at the aggregate level, particularly for estimating broad relationships between demographic and perceptual variables and public acceptance.

The same conclusion can be reinforced using the conventional survey-based approximation for a population proportion at the 95% confidence level. Under the most conservative assumption, where the population proportion is set at $p = 0.5$, the margin of error is:

$$MOE \approx 1.96 \times \sqrt{\frac{0.25}{189}} \times \sqrt{\frac{N - n}{N - 1}} \approx 0.0713$$

or approximately $\pm 7.13\%$. This estimate confirms that the achieved sample has adequate descriptive power for population-level interpretation, especially when the objective is to evaluate overall patterns rather than to estimate highly specific subgroup parameters.

From a methodological perspective, such a sample size is feasible and defensible for cross-sectional analysis of binary outcomes, including Probit estimation, provided that the sampling frame is clearly defined and the model is correctly specified. In applied econometric analysis, inferential validity is not determined by sample size alone, but by the interaction between sample adequacy, sampling assumptions, and model specification. Standard econometric texts emphasize that cross-sectional inference remains analytically valid when the realized sample is sufficient to generate stable parameter estimates and meaningful variation across observations. In the survey-sampling tradition, precision is similarly evaluated in terms of standard errors and finite-population adjustment rather than by relying on arbitrary numerical thresholds alone. On this basis, the use of 189 respondents in the present study can be regarded as methodologically appropriate for examining the determinants of public acceptance of nuclear energy at the population level.

Accordingly, the final sample of 189 respondents is considered adequate to represent broad public opinion patterns in the study area. At the same time, this level of precision should be interpreted as more suitable for general inference than for highly disaggregated subgroup analysis. Thus, the sample is appropriate for the purposes of this study, namely, to estimate the effects of age, education, income, compliance, freedom of expression, and political perception on the probability of accepting nuclear energy through a Probit framework (Greene, 2018; Wooldridge, 2010).

Findings

This chapter reports the findings of the empirical analysis investigating the determinants of public acceptance of nuclear energy, drawing on the demographic, economic, and perceptual factors outlined in the preceding chapter. The analysis employs a Probit regression model, which is appropriate for estimating relationships involving a binary outcome variable namely, whether individuals accept or oppose nuclear energy. The primary objective is to elucidate the extent to which education, age, income, and perceptions related to political and social conditions influence public attitudes toward nuclear power.

The chapter begins with a descriptive analysis of the key variables used in the study, followed by an in-depth discussion of the results from the Probit regression. This section highlights the relationship between the independent variables (education, age, income, political perception, compliance, and freedom of expression) and the likelihood of positive or negative attitudes toward nuclear energy. Furthermore, this chapter includes hypothesis testing to determine the significance of each variable and its contribution to the overall model. Special attention is given to the interpretation of marginal effects, which provide a better understanding of the practical implications of each variable for the probability of nuclear energy acceptance.

This section examine the descriptive statistics of the variables included in the model. Table 1 reports the summary statistics for the dependent variable, public acceptance of nuclear energy, and the main explanatory variables, namely education, age, income, compliance, freedom of expression, and political perception.

Table 1. Descriptive Statistics Analysis

Variable	Observations	Mean	Std. Dev.	Min	Max
Public Acceptance (y)	189	0.6084656	0.4893898	0	1
Education (years)	189	13.30159	2.25007	9	22
Age (years)	189	29.65079	11.15008	19	65
Income (monthly)	188	2,972,105	2,692,463	500,000	15,000,000
Compliance (1-5)	189	3.359788	0.7633019	1	5
Freedom of Expression (1-5)	189	3.153439	0.7528325	1	5
Political Perception (1-5)	189	3.100529	0.7111945	1	5

Table 1 presents descriptive statistics for the variables analyzed. The mean public acceptance of nuclear energy is 0.608, suggesting that approximately 61 percent of respondents express support. The average educational attainment is 13.30 years, with a range of 9 to 22 years, reflecting moderate variation in schooling. The mean respondent age is 29.65 years, spanning 19 to 65 years, which demonstrates substantial generational diversity. Reported monthly income averages IDR 2,972,105 across 188 valid cases, with a large standard deviation and a range from IDR 500,000 to IDR 15,000,000, indicating considerable socioeconomic heterogeneity. Mean scores for compliance, freedom of expression, and political perception are 3.36, 3.15, and 3.10, respectively, on a five-point scale. These statistics demonstrate meaningful variation across demographic, economic, and attitudinal dimensions, providing a robust basis for examining associations with public acceptance of nuclear energy.

Probit Regression Results

This study aims to examine the factors influencing public acceptance of nuclear energy by analyzing demographic and perceptual variables using a Probit model. The explanatory variables included in the model are education, age, income, compliance with social norms, freedom of speech perception, and political perception. The model is intended to estimate the probability that individuals express support for nuclear energy, thereby identifying the socioeconomic and governance-related factors associated with acceptance. By focusing on these variables, the analysis provides empirical insight into the determinants of public attitudes toward nuclear energy within the broader context of Indonesia's energy transition.

Table 2. Probit Regression Analysis Results

Variable	Coefficient	Std. Error	z-value	p-value
Education	0.072	0.050	1.460	0.145
Age	-0.020	0.008	-2.390	0.017
Income	0.015	0.143	0.100	0.918
Compliance	0.453	0.145	3.140	0.002
Freedom of Speech Perception	0.072	0.137	0.530	0.597
Political Perception	-0.078	0.138	-0.560	0.572
Cons	-1.770	1.944	-0.910	0.363

The Probit regression results indicate that age and compliance are the only statistically significant predictors of public acceptance of nuclear energy. The negative coefficient on age suggests that older respondents are less likely to support nuclear energy, whereas the positive coefficient on compliance indicates that respondents with stronger orientation toward rules, institutional order, and regulatory adherence are more likely to accept it. This pattern suggests that public acceptance in Bangka Belitung is shaped less by conventional socioeconomic position and more by institutional-regulatory orientation. Such a result is consistent with recent evidence showing that attitudes toward nuclear energy are strongly conditioned by trust in governance, perceived institutional credibility, and evaluations of risk–benefit trade-offs rather than by socioeconomic attributes alone. Durdovic et al. (2024) for example, conclude that support for nuclear energy is generally associated positively with energy security concerns and perceived benefits, whereas climate concern alone does not automatically translate into support for nuclear energy. Likewise, Ho et al. (2025) show that institutional trust is positively associated with benefit perception and, through this channel, strengthens support for nuclear energy in Southeast Asia. More broadly, recent work on energy transition in developing countries also emphasizes that institutional quality, regulatory coherence, and governance capacity are central to transition feasibility and public legitimacy (Ahmed et al., 2025; Hwang & Venter, 2025; Inglesi-Lotz, 2024; Satrianto et al., 2024; Q. Wang et al., 2024). In this respect, the positive compliance effect found in this study is substantively aligned with a growing body of literature that interprets trust, transparency, and procedural order as foundational conditions for acceptance of complex energy technologies.

The present findings are also broadly compatible with studies that situate public acceptance within the classic risk–benefit–trust framework. Ho et al. (2025) report that trust in scientists, business operators, governments, and environmental organizations is positively associated with benefit perception, while benefit perception itself is positively related to support for nuclear energy; by contrast, risk perception reduces support. This structure is also reinforced

by recent studies on trust and acceptability, which show that trust in government and nuclear-related institutions tends to increase benefit perception and willingness to accept nuclear facilities, although the strength of this relationship varies across contexts (Nam-Speers et al., 2023; Pauer, 2024; Quadrat-Ullah, 2025). Similarly, recent studies on public acceptance and energy transition suggest that institutional transparency and governance quality moderate how citizens interpret the costs, risks, and distributive implications of new energy systems (Ahmed et al., 2025; Q. Wang et al., 2024). From this perspective, the positive coefficient on compliance in the present study can be interpreted as an empirical manifestation of institutional trust: respondents who are more oriented toward rule compliance may also be more likely to believe that nuclear governance can operate safely, predictably, and within acceptable regulatory boundaries. This interpretation is further supported by studies in emerging-market and developing-country settings that identify institutional quality as a decisive enabling factor in transition outcomes (Chipangamate et al., 2024; Hwang & Venter, 2025; Satrianto et al., 2024).

At the same time, several findings in this study differ from parts of the existing literature. First, education does not exert a statistically significant effect, despite its positive sign. This differs from studies that associate higher education, knowledge, or science literacy with stronger support for nuclear energy, but it is consistent with work suggesting that education has a conditional and context-dependent effect, particularly when institutional credibility remains uncertain (Ho et al., 2025; Ho & Chuah, 2021). Second, income is not significant, which contrasts with strands of literature that link economic security, development level, or material interest to energy preferences and transition support. Instead, the current result suggests that household economic status does not independently structure nuclear acceptance in the Bangka Belitung case. Third, freedom of speech perception and political perception are not statistically significant, although political perception retains the expected negative sign. This partially diverges from recent governance literature that emphasizes politicization, transparency, and inclusion as major determinants of trust in nuclear governance, but it may indicate that these factors work indirectly through institutional confidence rather than directly through acceptance itself (Ahmed et al., 2025; Quadrat-Ullah, 2025). Overall, the results support a synthesis in which public acceptance of nuclear energy in Indonesia is best understood as institutionally mediated: generational orientation matters, but governance-related confidence matters more than socioeconomic position. This conclusion is fully compatible with recent regional evidence showing that, in Southeast Asia, trust in relevant institutions and perceived benefits are stronger determinants of support than broad demographic characteristics alone (Ho et al., 2025), while recent review evidence similarly indicates that energy security arguments often persuade the public more effectively than abstract climate arguments (Durdovic et al., 2024).

Average Marginal Effects from Probit Model

In regression frameworks involving binary outcome variables, accurately interpreting the linkage between explanatory variables and the dependent outcome is essential. The probit model is commonly applied in such contexts, as it is designed to estimate the likelihood of an event occurring here, the probability that individuals accept nuclear energy. However, the coefficients from a Probit model are not directly interpretable as probabilities. To provide more intuitive insights, we calculate the Average Marginal Effects (AMEs).

The average marginal effects from the Probit model indicate that age and compliance are the only variables with statistically significant effects on the probability of accepting nuclear energy. Age has a marginal effect of -0.0073 and is significant at the 5 percent level ($p = 0.010$), implying that each additional year of age reduces the probability of supporting nuclear energy by approximately 0.73 percentage points. This result confirms that older respondents are less likely to express acceptance of nuclear energy. By contrast, compliance has a positive marginal effect of 0.1528 and is highly significant ($p = 0.001$), indicating that a one-unit increase in compliance raises the probability of accepting nuclear energy by about 15.28 percentage points. This finding suggests that attitudes related to regulatory adherence and institutional order play an important role in shaping public support.

Table 3. **Average Marginal Effects from Probit Model**

Variable	Marginal Effect (dy/dx)	Std. Error	z-value	p-value
Education	0.0211	0.0180	1.17	0.24
Age	-0.0073	0.0028	-2.57	0.01
Income	8.3900	1.6100	0.52	0.602
Compliance	0.1528	0.0458	3.34	0.001
Freedom of Expression	0.0259	0.0465	0.56	0.577
Political Perception	-0.0290	0.0472	-0.61	0.54

The remaining variables do not exhibit statistically significant marginal effects. Education has a positive marginal effect of 0.0211 ($p = 0.240$), but the coefficient is not statistically different from zero. Income also remains statistically insignificant ($p = 0.602$), indicating that differences in economic status do not substantially alter the probability of acceptance in this model. Likewise, freedom of expression shows a small positive but insignificant marginal effect of 0.0259 ($p = 0.577$), while political perception has a negative but insignificant marginal effect of -0.0290 ($p = 0.540$). Overall, the AME results reinforce the conclusion that public acceptance of nuclear energy is driven more by age and compliance-related institutional attitudes than by broader socioeconomic or political-perception variables.

The goodness-of-fit test indicates that the Probit model fits the data adequately. Based on 188 observations grouped into 10 categories, the Hosmer-Lemeshow test yields $\chi^2(8) = 10.81$ with $p = 0.2125$. Because the p-value is greater than the conventional significance level of 0.05, the null hypothesis that the model fits the data well cannot be rejected. In substantive terms, this means that there is no statistically significant difference between the observed outcomes and the probabilities predicted by the model. Therefore, the Probit specification can be considered appropriate for explaining variation in public acceptance of nuclear energy.

Number of observations	= 189
Number of groups	= 10
Hosmer-Lemeshow $\chi^2(8)$	= 10.81
Prob > χ^2	= 0.2125

The Hosmer-Lemeshow goodness-of-fit test was used to evaluate whether the predicted probabilities from the Probit model were consistent with the observed outcomes. Based on 188 observations grouped into 10 categories, the test produced a chi-square value of 10.81 with a p-value of 0.2125. Since the p-value exceeds the 5 percent significance level, the null

hypothesis of adequate model fit cannot be rejected. This indicates that the Probit model fits the data reasonably well and that there is no statistically significant discrepancy between the observed and predicted values.

Conclusion

The findings indicate that public acceptance of nuclear energy is mainly influenced by age and compliance-related attitudes, not broader socioeconomic characteristics. Probit model estimates show that age has a statistically significant negative effect, meaning older individuals are less likely to support nuclear energy development. Conversely, compliance has a statistically significant positive effect, showing that those with a stronger orientation toward rules, regulatory order, and institutional discipline are more likely to accept nuclear energy. Education, income, freedom of expression, and political perception do not show statistically significant effects in the model. These results suggest that public acceptance of nuclear energy in Indonesia is shaped more by institutional confidence and perceptions of regulatory credibility than by socioeconomic status. Support depends not only on the perceived benefits of the technology but also on public confidence in its safe, transparent, and responsible governance. Although this study focuses on Bangka Belitung within the broader context of nuclear development in Indonesia, the main implication is generalizable: enhancing trust in governance and regulatory capacity is essential to increase public acceptance of nuclear energy policy.

First, policy communication should emphasise clear, detailed explanations of nuclear technology, especially regarding reactor safety, accident prevention, waste management, and environmental protection. Second, the government and relevant institutions should strengthen regulatory transparency and public trust by providing consistent, evidence-based information on how risks are monitored, controlled, and mitigated over time. Third, public engagement should be a continuous process that addresses societal concerns through credible institutional communication rather than one-way policy messaging. Finally, future policy design should prioritise institutional credibility and governance quality, as the results show public acceptance depends more on confidence in the regulatory order than on socioeconomic background.

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References

- Ilhan, M. K., & Söylemez, A. (2024). Governance Frameworks for Renewable Energy Development: Energy Transition and Public Governance. *Revista de Gestão Social e Ambiental*, 18(11).

- Ahmed, M., Araral, E., & Khan, M. A. (2025). Barriers to just energy transition: Institutional and infrastructure challenges in developing countries. *Sustainable Futures*, 10, 101414. <https://doi.org/10.1016/j.sftr.2025.101414>
- Ankrah Twumasi, M., & others. (2022). *Smart Energy Adoption, Income, Cost, and Financial Literacy*.
- Araújo, K. (2014). The Emerging Field of Energy Transitions: Progress, Challenges, and Opportunities. *Energy Research & Social Science*, 1, 112–121. <https://doi.org/10.1016/j.erss.2014.03.002>
- Awais, T. M., Fatima, T. M., & Awan, T. M. (2022). Assessing Behavioral Intentions of Solar Energy Usage Through Value-Belief-Norm Theory. *Management of Environmental Quality: An International Journal*, 33(6), 1329–1343. <https://doi.org/10.1108/MEQ-09-2021-0227>
- Babel Aktual. (2026). {PLTN} {Thorcon} di {Pulau Gelasa}: Limbah dan risiko radiasi mengancam. <https://www.babelaktual.com/pltn-thorcon-di-pulau-gelasa-limbah-dan-risiko-radiasi-mengancam/>
- Brenan, M. (2025). *Nuclear energy support near record high in U.S.* <https://news.gallup.com/poll/659180/nuclear-energy-support-near-record-high.aspx>
- Busi-Soncic, A., Czap, N. V., & Fuerst, F. (2022). The Role of Personality Traits in Green Decision Making. *Journal of Economic Psychology*, 90, 102506. <https://doi.org/10.1016/j.joep.2022.102506>
- Chassang, I. (2024). Cultural values, risk characteristics, and risk perceptions. *Journal of Risk Research*. <https://pubmed.ncbi.nlm.nih.gov/39210832/>
- Chipangamata, N. S., & Nwaila, G. T. (2024). Assessment of Challenges and Strategies for Driving Energy Transitions in Emerging Markets: A Socio-Technological Systems Perspective. *Energy Geoscience*, 5(2), 100257. <https://doi.org/10.1016/j.engesg.2023.100257>
- Chipangamate, N. S., Nwaila, G. T., Hwang, Y. K., Venter, A., Inglesi-Lotz, R., Satrianto, A., Ikhsan, A., Dirma, E. Y., Candrianto, C., Juniardi, E., Gusti, M. A., Wang, Q., Yang, Z., Li, R., Oyarzún-Aravena, A. M., Chen, J., Brownbridge, G., Akroyd, J., Kraft, M., ... Chuah, A. S. (2024). Extending the coverage of the trust-acceptability model: The negative effect of trust in government on nuclear power acceptance in South Korea under a nuclear phase-out policy. *Energy Policy*, 14(5), 352–360. <https://doi.org/10.1016/j.apenergy.2024.125107>
- Dinas Pemberdayaan Perempuan, Perlindungan Anak, Administrasi Kependudukan, Pencatatan Sipil, dan Pengendalian Penduduk Keluarga Berencana Provinsi Kepulauan Bangka Belitung. (2025). *Profil kependudukan Provinsi Kepulauan Bangka Belitung tahun 2024*. Pemerintah Provinsi Kepulauan Bangka Belitung.
- Durdovic, M., Turcanu, C., Sala, R., Geysmans, R., López-Asensio, S., & Gonçalves, L. (2024). The outlooks of nuclear energy in society: Unraveling public attitudes in the context of climate and energy security challenges. *Progress in Nuclear Energy*, 174, 105286. <https://doi.org/10.1016/j.pnucene.2024.105286>
- Eshchanov, B., Abdurazzakova, Q., Yuldashev, R., & Salahodjaev, B. (2021). Is There a Link Between Cognitive Abilities and Renewable Energy Adoption: Evidence from Uzbekistan Using Micro Data. *Renewable and Sustainable Energy Reviews*, 141, 110819. <https://doi.org/10.1016/j.rser.2021.110819>
- Fabisch, J. K. P. V. U. N. (2022). Motivations Behind Individuals' Energy Efficiency Investments and Daily Energy-Saving Behavior: The Case of China. *International Economics and Economic Policy*, 19, 155–195. <https://doi.org/10.1007/s10368-021-00521-6>

- Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S., & Combs, B. (1978). How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy Sciences*, 9(2), 127–152. <https://doi.org/10.1007/BF00143739>
- Flynn, J., Slovic, P., & Mertz, C. K. (1992). Decidedly different: Expert and public views of risks from a radioactive waste repository. *Risk Analysis*, 12(4), 643–648.
- Greene, W. H. (2018). *Econometric Analysis* (8th ed.). Pearson.
- He, P., & Veronesi, M. (2017). Personality Traits and Renewable Energy Technology Adoption: A Policy Case Study from China. *Energy Policy*, 107, 472–479. <https://doi.org/10.1016/j.enpol.2017.05.017>
- Ho, S S, Jia, W., & He, C. (2025). Media attention and institutional trust: examining public risk and benefit perceptions of nuclear energy in Southeast Asia. *Journal of Risk Research*, 28(8), 929–944. <https://doi.org/10.1080/13669877.2025.2553877>
- Ho, S S, Roser-Renouf, C., & Leiserowitz, A. (2010). Influence of specific media exposure on perceived risk of nuclear power facilities and other environmental issues. *Public Understanding of Science*, 19(4), 410–426.
- Ho, Shirley S, & Chuah, A. S. (2021). Why support nuclear energy? The roles of citizen knowledge, trust, media use, and perceptions across five Southeast Asian countries. *Energy Research & Social Science*, 79, 102155. <https://doi.org/10.1016/j.erss.2021.102155>
- Ho, Shirley S, Jia, W., He, C., & Chuah, A. S. (2025). Why support nuclear energy? The roles of citizen knowledge, trust, media use, and perceptions across five Southeast Asian countries. *Energy Research & Social Science*, 79(8), 102155. <https://doi.org/10.1080/13669877.2025.2553877>
- Hussain, Z. (2024). Novel embeddings improve the prediction of risk perception. *EPJ Data Science*, 13(1), 1–15. <https://epjdatascience.springeropen.com/articles/10.1140/epjds/s13688-024-00478-x>
- Hwang, Y. K., & Venter, A. (2025). The impact of the digital economy and institutional quality in promoting low-carbon energy transition. *Renewable Energy*, 238, 121884. <https://doi.org/10.1016/j.renene.2024.121884>
- Ingesi-Lotz, R. (2024). Exploring the impact of institutional quality to South Africa's transition to renewables. *Energy Sources, Part B: Economics, Planning, and Policy*, 19(1), 2291433. <https://doi.org/10.1080/15567249.2023.2291433>
- Irfan, M., Zhao, Y. Z., Rehman, A., Ozturk, I., & Li, H. (2021). Consumers' Intention-Based Influence Factors of Renewable Energy Adoption in Pakistan: A Structural Equation Modeling Approach. *Environmental Science and Pollution Research*, 28, 432–445. <https://doi.org/10.1007/s11356-020-10504-w>
- Ji, W., & Chan, E. H. W. (2019). Critical Factors Influencing the Adoption of Smart Home Energy Technology in China: A Guangdong Province Case Study. *Energies*, 12(7), 1119. <https://doi.org/10.3390/en12071119>
- Jiang, R., Wu, P., Song, C., Wu, P., Wang, Y., & Zhong, Z. (2022). Factors Influencing the Adoption of Renewable Energy in the U.S. Residential Sector: An Optimal Parameters-Based Geographical Detector Approach. *Renewable Energy*, 201, 450–461. <https://doi.org/10.1016/j.renene.2022.09.084>
- Kartono, D. T., Hastjarjo, S., Sajidan, Effendi, B. S., Ashari, D. K., Wijayanto, P. K., Saraswati, Z. N., Sulistyawan, H. G., & Andriani, L. (2023). Mapping Survey of Public Acceptance on Development Nuclear Power Plant in Bangka Belitung Province. *Aspirasi: Jurnal Masalah-Masalah Sosial*, 14(1), 119–131. <https://doi.org/10.46807/aspirasi.v14i1.3143>

- Klößner, C. A., & Nayum, A. (2016). Specific Barriers and Drivers in Different Stages of Decision-Making About Energy Efficiency Upgrades in Private Homes. *Frontiers in Psychology*, 7, 1362. <https://doi.org/10.3389/fpsyg.2016.01362>
- Kompas.com. (2025). {PLTN} {Pulau Gelasa} dan ujian tata kelola risiko. <https://lestari.kompas.com/read/2025/11/02/132837286/pltn-pulau-gelasa-dan-ujian-tata-kelola-risiko?page=all>
- Kurnuthever, H., Polise, A., & Spellmeyer, Q. (2022). Addressing Biases That Impact Homeowners' Adoption of Solar Panels. *Climate Policy*, 22(8), 993–999. <https://doi.org/10.1080/14693062.2022.2038064>
- Leorngan, K., Suter, N., & Sansavini, G. (2023). Energy Systems Modelling for Just Transitions. *Energy Policy*, 183, 113791. <https://doi.org/10.1016/j.enpol.2023.113791>
- Loaiza-Ramírez, J. P., Reimer, T., & Moreno-Mantilla, C. E. (2022). Who Prefers Renewable Energy? A Moderated Mediation Model Including Perceived Comfort and Consumers' Protected Values in Green Energy Adoption and Willingness to Pay a Premium. *Energy Research & Social Science*, 91, 102753. <https://doi.org/10.1016/j.erss.2022.102753>
- Long, R., Wang, J., Chen, Q., Li, M., Wu, J., & Tan-Soo, J. S. (2022). Applying Multilevel Structural Equation Modeling to Energy-Saving Behavior: The Interaction of Individual- and City-Level Factors. *Energy Policy*, 162, 112734. <https://doi.org/10.1016/j.enpol.2022.112734>
- Luthra, S., Kumar, D., Garg, D., & Haleem, A. (2015). Barriers to Renewable/Sustainable Energy Technologies Adoption: Indian Perspective. *Renewable and Sustainable Energy Reviews*, 41, 762–776. <https://doi.org/10.1016/j.rser.2014.08.077>
- Mamun, A. A., Hayat, N., Masud, M. M., & Yang, Q. (2022). Energy Conservation Behaviour Among Malaysian Youth: A Study Under the Premises of Value-Belief-Norm Model. *Frontiers in Energy Research*, 10, 902619. <https://doi.org/10.3389/fenrg.2022.902619>
- Masukujjaman, M., Shah, S., & Siwar, C. (2021). Purchase Intention of Renewable Energy Technology in Rural Areas in Bangladesh: Empirical Evidence. *Renewable Energy*, 170, 639–651. <https://doi.org/10.1016/j.renene.2021.01.125>
- Maswabi, M., Chun, J., & Chung, Y. (2022). Barriers to Energy Transition: A Case of Botswana. *Energy Policy*, 168, 112514. <https://doi.org/10.1016/j.enpol.2022.112514>
- Mirzania, P., Gordon, J. A., Balta-Ozkan, N., Sayan, R. C., & Marais, L. (2023). Barriers to Powering Past Coal: Implications for a Just Energy Transition in South Africa. *Energy Research & Social Science*, 101, 103122. <https://doi.org/10.1016/j.erss.2023.103122>
- Mlejnkova, K., & Patelli, E. (2021). Public trust in nuclear regulatory institutions: A stronger impact on risk perception and acceptance than general trust in government. *Journal of Risk Research*, 24(1), 1–18. <https://doi.org/10.1080/13669877.2020.1788888>
- Nam-Speers, J., Berry, F. S., & Choi, D. (2023). Examining the role of perceived risk and benefit, shared concern for nuclear stigmatization, and trust in governments in shaping citizen risk acceptability of a nuclear power plant. *The Social Science Journal*, 60(4), 695–714. <https://doi.org/10.1080/03623319.2020.1750846>
- Nguyen, V. P., & Yim, M.-S. (2018). Examination of different socioeconomic factors that contribute to the public acceptance of nuclear energy. *Nuclear Engineering and Technology*, 50(5), 767–772. <https://doi.org/https://doi.org/10.1016/j.net.2018.02.005>
- Pauer, S. (2024). Is the effect of trust on risk perceptions a matter of subjective knowledge? *Social Psychological and Personality Science*. <https://journals.sagepub.com/doi/full/10.1177/19485506241263884>
- Qamar, S., Ahmad, M., Oryani, B., Zhang, Q., & Hussain, A. (2022). Solar Energy

- Technology Adoption and Diffusion by Micro, Small, and Medium Enterprises. *Environmental Science and Pollution Research*, 29, 49385–49403.
<https://doi.org/10.1007/s11356-022-19406-5>
- Qi, W. (2024). *Revisiting the Resource Curse in the Age of Energy Transition: Cobalt Reserves and Conflict in Africa*.
- Qudrat-Ullah, H. (2025). Trust, Equity, Transparency and Inclusion in Nuclear Energy Governance: Empirical Synthesis of the Q-NPT Framework. *Energies*, 18(20), 5423.
<https://doi.org/10.3390/en18205423>
- Radar Bahtera. (2025). {PLTN} {Pulau Gelasa} menuai penolakan, Bung Dodoy: Kajian minim, risiko terlalu tinggi. <https://www.radarbahtera.com/pltn-pulau-gelasa-menuai-penolakan-bung-dodoy-kajian-minim-risiko-terlalu-tinggi/>
- Redaksi. (2026). *Pembangunan {PLTN} di {Pulau Gelasa} masih tahap persetujuan izin tapak*.
<https://kaltara.antaranews.com/berita/519118/pembangunan-pltn-di-pulau-gelasa-masih-tahap-persetujuan-izin-tapak>
- Relva, S. G., Silva, V. O. D., Gimenes, A. L. V, Udaeta, M. E. M., Ashworth, P., & Peyerl, D. (2021). Enhancing Developing Countries' Transition to a Low-Carbon Electricity Sector. *Energy*, 220, 119659. <https://doi.org/10.1016/j.energy.2020.119659>
- Roy, S. (2021). Problems of Adoption of Solar Power and Subsequent Switching Behavior in India. *International Journal of Energy Sector Management*.
<https://doi.org/10.1108/IJESM-08-2020-0015>
- Satrianto, A., Ikhsan, A., Dirma, E. Y., Candrianto, C., Juniardi, E., & Gusti, M. A. (2024). The effect of institutional quality on renewable energy: Evidence from developing countries. *International Journal of Energy Economics and Policy*, 14(5), 678–686.
<https://doi.org/10.32479/ijeep.16794>
- Schneider, C. R., & van der Linden, S. (2023). Pro-Climate Social Norms as a Powerful Lever for Motivating Pro-Climate Actions. *One Earth*, 6(4), 346–351.
<https://doi.org/10.1016/j.oneear.2023.03.014>
- Shaik, A. S., Alsabban, A., Kautish, P., & Yaqub, M. Z. (2025). Moving Markets Towards Climate Change for Sustainable Development. *Sustainability*, 17, 10042.
- Siegrist, M., Cvetkovich, G., & Roth, C. (2000). Salient value similarity, social trust, and risk/benefit perception. *Risk Analysis*, 20(3), 353–362.
- Slovic, P. (1987). Perception of risk. *Science*, 236(4799), 280–285.
<https://doi.org/10.1126/science.3563507>
- Tempo.co. (n.d.). *Warga tolak proyek {PLTN} {Pulau Gelasa}, ungkap iming-iming dari investor*.
<https://www.tempo.co/lingkungan/warga-tolak-proyek-pltn-pulau-gelasa-ungkap-iming-iming-dari-investor--2066453>
- Wang, Q., Yang, Z., & Li, R. (2024). Bridging energy transition and income inequality: The moderating effect of institutional transparency. *Sustainable Development*, 32(5), 5031–5057. <https://doi.org/10.1002/sd.2953>
- Wang, Y., Jia, Q., Zhang, S., & Zhou, J. (2024). How government stereotypes affect life satisfaction: A good government matters more than a government that does good. *Applied Research in Quality of Life*. <https://doi.org/10.1007/s11482-024-10359-0>
- Waris, I., Hameed, I., & Ali, R. (2022). Predicting Household Adoption of Solar Energy. *International Journal of Energy Sector Management*. <https://doi.org/10.1108/IJESM-06-2021-0010>
- Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data* (2nd ed.). MIT Press.
- World Nuclear News. (2025). *Surveys show US public support for nuclear energy*.
<https://www.world-nuclear-news.org/articles/surveys-show-widespread-us-public->

support-for-nuclear-energy

- Yang, J.-Y., & Dodge, J. (2024). Local Energy Transitions as Process: How Contract Management Problems Stymie a City's Sustainable Transition to Renewable Energy. *Energy Policy*, 184, 118893. <https://doi.org/10.1016/j.enpol.2023.118893>
- Yang, J., Wang, J., Zhang, X., Shen, C., & Shao, Z. (2022). How social impressions affect public acceptance of nuclear energy: A case study in {China}. *Sustainability*, 14(18), 11190. <https://doi.org/10.3390/su141811190>
- Zahari, A. R., & Esa, E. (2018). Drivers and Inhibitors of Renewable Energy Adoption in Malaysia. *International Journal of Energy Sector Management*, 12(4), 581–600. <https://doi.org/10.1108/IJESM-08-2020-0015>