From Tin Crisis to Thorium Transition: Energy Justice, Youth Acceptance, and Participation in Bangka Belitung's Nuclear Future

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Abstract

Bangka Belitung, Indonesia's tin heartland, entered a compound crisis in 2024: provincial economic growth slowed to 0.77% after a crackdown on corruption in the tin trade, while about 167,000 hectares of land remain critically degraded. In 2025 the province also received Indonesia's first regulatory approval for a nuclear power project, a site-evaluation program for a 500-megawatt thorium molten salt reactor on Kelasa Island. This study asks under what conditions youth acceptance of the project would be just and how acceptance could become participation in its governance. Using a qualitative explanatory case study that combines an integrative literature review with document analysis of regulatory, statistical, industry, and media sources, it evaluates four theoretical propositions through pattern matching. The evidence shows that the regulator has demonstrated technical rigor but procedural inclusion remains thin; that local support is driven mainly by expected economic benefits under conditions of crisis; that benefit-sharing arrangements remain undefined; and that the only site-specific acceptance survey predates the crisis and was co-authored by developer staff. The youth research team therefore designed a Youth Energy Justice Lab linking project benefits to ex-mining land restoration and youth-led monitoring.

Keywords: energy justice; youth participation; nuclear power acceptance; thorium molten salt reactor; post-mining transition

1. Introduction

Indonesia's electricity system remains among the most coal-dependent in the world. Coal generated 61.8% of the country's electricity in 2023, a higher share than in Poland or China, and fossil fuels still met 82% of demand in 2024, while wind and solar together supplied only 0.5% [1,2]. At the 2024 G20 Summit, the government nevertheless pledged to phase out coal power by 2040 [3]. To reconcile rising demand with this pledge, national planners have reopened a long-deferred option. The 2025–2034 electricity supply business plan (RUPTL) allocates 500 MW to nuclear

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power, divided equally between the Sumatra and Kalimantan grids, with commercial operation targeted for 2032–2033 and a longer-term ambition of about 7 GW by 2040 [4]. A presidential regulation establishing a Nuclear Energy Program Implementing Organization (NEPIO) was reported to be awaiting the President's signature in January 2026 [5].

Nowhere are the stakes of this transition more concentrated than in the Bangka Belitung Islands Province, the center of Indonesia's tin industry for centuries and, increasingly, of its nuclear ambitions. The province's economy has long rested on tin, and that foundation cracked in 2024. Following investigations into corruption in the tin trade within the concessions of state-owned PT Timah between 2015 and 2022, auditors calculated state losses of IDR 300.003 trillion, of which IDR 271.07 trillion was attributed to environmental damage [6], a valuation that defendants and local groups have since contested [7]. As enforcement disrupted tin supply chains, provincial growth slowed from 4.38% in 2023 to 0.77% in 2024 [8]. The ecological legacy is equally stark. The provincial government reports about 167,000 ha of critical land [9], and inventories list more than 12,000 abandoned mining pits, locally known as *kolong*, covering some 15,580 ha, several of which have claimed children's lives [10]. Young people bear a distinctive share of these costs. Nationally, youth open unemployment stood at 11.78% in 2025 [11], and the rector of a local university reported that 10–15% of students in the province were unable to pay tuition fees each even semester as tin incomes fell [12].

It is in this setting of crisis that Indonesia's first concrete step toward nuclear power has been taken. In January 2025, PT ThorCon Power Indonesia, a subsidiary of Singapore-based ThorCon International, applied to the Nuclear Energy Regulatory Agency for approval of a site-evaluation program for the TMSR-500, a thorium molten salt reactor proposed for Kelasa Island in Central Bangka Regency. After rejecting the first submission in April 2025 for failing to meet technical requirements [13], the agency approved the revised program by decree on 30 July 2025, following a review of 126 working days [14,15]. This was the first licensing approval related to a nuclear power plant in Indonesia's history [16]. The approval authorizes detailed site studies only. Under the agency's Regulation No. 1 of 2022, a plant must still obtain a site permit, a construction permit, a commissioning permit, and an operating license [17], and the Ministry of Energy and Mineral Resources has stressed that no site permit has yet been issued [18]. The developer nonetheless targets construction from 2027 and full power by 2031 [16], and the generation subsidiary of the state electricity company has signed a memorandum of understanding to study the project's feasibility [19].

Whether this project can become a legitimate part of the province's recovery depends on more than engineering. Nuclear power has among the lowest life-cycle emissions of any electricity source [20], yet its history in Indonesia is one of contested legitimacy: plans for a plant on the Muria Peninsula in Central Java stalled amid grassroots distrust of the state's capacity to manage high-risk technology [21,22]. Bangka Belitung appears different. A survey of 1,500 residents found that 73.73% accepted the development of a nuclear power plant in the province [23]. Three features of this evidence, however, limit its policy value. First, the data were collected in April 2021, before the tin crisis and before any licensing decision. Second, three of the survey's nine authors were affiliated with the project developer [23], which makes independent assessment valuable. Third, and most importantly, acceptance is not consent. On Bangka itself, Rosyida and Sasaoka [24] showed how compensation secured a coastal village's formal acceptance of offshore tin dredging even as fishers' opposition was stifled by local politics, and energy-justice scholarship warns more broadly that headline acceptance can conceal deficits in procedural and recognition justice [25,26].

Young people are largely absent from this evidence base, even though they will live with the plant throughout its operating life and form the workforce that any post-tin economy requires. Their labor-market position makes the question urgent: youth open unemployment in Indonesia

is about twice the national rate, and more than a third of employed young people work in jobs that do not match their level of education [27]. Studies of Indonesian and Southeast Asian students suggest cautious and conditional attitudes rather than straightforward support [28,29], and research on youth climate engagement emphasizes agency and participation rather than passive acceptance [30,31]. Responding to these gaps and to the theme of youth-led resilience, this study asks three questions. The first is which conditions, according to theory and the available evidence, shape public and particularly youth acceptance of the proposed thorium plant. The second is how the tin crisis conditions the way in which the project's benefits and risks are framed and weighed. The third is what governance innovation could turn youth acceptance into just and meaningful participation.

The study makes four contributions. Theoretically, it integrates the trust–risk–benefit model of technology acceptance [32] with energy-justice theory and introduces tin-crisis exposure as a contextual condition, proposing that economic distress can produce a distinct, crisis-driven form of acceptance. It also distinguishes acceptance from participation, treating young people as potential co-governors rather than an audience to be persuaded. Empirically, it offers the first systematic and independent assessment of the evidence surrounding Indonesia's first licensed nuclear project, including a critical appraisal of the only site-specific acceptance survey. Practically, it presents a governance model designed by young researchers, the Youth Energy Justice Lab, which links the benefits of a new energy industry to repairing the damage of tin mining. For policy, it identifies concrete entry points for NEPIO, the regulator's public-engagement procedures, and provincial transition planning.

2. Literature Review

This review is organized around four debates that frame the study: the climate case for nuclear power and its critics, the determinants of public acceptance, energy justice in post-extractive transitions, and the role of young people. It concludes with a synthesis of research gaps and the study's conceptual framework and propositions.

2.1. Nuclear Power in Low-Carbon Transitions: Promise and Contestation

Life-cycle assessments consistently place nuclear power among the lowest-carbon electricity sources. UNECE [20] estimates 5.1–6.4 g CO_2-eq/kWh for nuclear power, compared with 403–513 g for natural gas combined cycle plants and 751–1,095 g for coal, values consistent with the medians assessed by the Intergovernmental Panel on Climate Change [33]. Historical nuclear generation is estimated to have avoided about 64 Gt CO_2-eq of emissions and 1.84 million air-pollution deaths between 1971 and 2009 [34]. However, Sovacool et al. [35], analyzing 123 countries, reported that nuclear deployment was not associated with lower national emissions and argued that nuclear and renewable programs tend to crowd each other out. Fell et al. [36] reanalyzed the same data with panel methods and found that both nuclear and renewable energy are associated with lower per-capita CO_2 emissions of similar magnitude, undermining the crowding-out claim. Power-system models add that firm low-carbon resources, which are available on demand regardless of weather, substantially lower the cost of deep decarbonization [37,38]. For a coal-dependent archipelago, the relevant question is therefore less "nuclear versus renewables" than which firm low-carbon options can earn social legitimacy.

The Bangka Belitung project rests on molten salt reactor (MSR) technology, one of the Generation IV concepts [39]. MSRs dissolve fuel in a liquid fluoride salt and operate near atmospheric pressure, enabling passive safety features such as draining the fuel into cooled tanks, and they

can be configured to breed fissile uranium-233 from thorium [40]. The technology resonates locally because thorium-bearing monazite is a by-product of tin mining; the national electricity plan reports measured resources of about 4,729 t of thorium in the province [41], far below speculative estimates exceeding 120,000 t that circulated earlier [42]. Yet Ashley et al. [43] caution that thorium fuel cycles are not intrinsically proliferation-proof, because protactinium-233 can be chemically separated to obtain weapons-usable uranium-233, and Lyman [44] argues that most non-light-water "advanced" designs have not yet demonstrated safety or security advantages over existing reactors and remain at the experimental or demonstration stage. These critiques shift the question from technology to governance, namely safeguards, regulatory capacity, and transparency.

Small modular reactors (SMRs), generally defined as designs of 300 MWe or less, are promoted for factory fabrication, lower upfront capital, and suitability for small island grids, an apparent fit for Indonesia, whose initial nuclear allocation consists of 250 MW blocks [4]. Mignacca and Locatelli [45], however, conclude from a systematic review that the economic competitiveness of SMRs remains uncertain and depends heavily on assumptions about learning and serial production. Krall et al. [46] further estimate that the SMR designs they examined could increase the volume of nuclear waste requiring management by factors of 2 to 30 per unit of energy. Developers contested the generalization of this three-design analysis to all SMRs [47], and the dispute remains unresolved in the peer-reviewed literature. For the present study, the implication is that reactor waste should be treated not as a settled technical fact but as a dimension of perceived risk whose salience depends on trust in those who manage it.

2.2. Determinants of Public Acceptance: Risk, Benefit, Trust, and Knowledge

Social acceptance of energy technologies operates at socio-political, community, and market levels [48], and psychological research has converged on a set of proximate determinants. Huijts et al. [32] synthesize these into a framework in which trust in responsible actors shapes perceived costs, risks, and benefits, which in turn shape attitudes and acceptance, with perceived fairness and affect also playing a role. In the nuclear domain, the psychometric tradition shows that technologies perceived as dreaded and unfamiliar attract heightened risk perceptions [49], while perceived climate and supply-security benefits independently raise acceptance [50].

A long-standing assumption holds that public resistance reflects a deficit of knowledge, and some studies do find that more knowledgeable individuals perceive less risk and express more support [51]. Ho, Leong, et al. [52], however, meta-analyzed 34 studies covering 32,938 participants and found that trust and perceived benefits were among the most consistent predictors, with effects moderated by country and period. Indonesian evidence points in the same direction. In a survey of 360 science and engineering students, arguably the country's best-informed young people on this subject, Abdullah et al. [28] found cautious optimism tempered by persistent concerns about safety and waste. Knowledge thus appears necessary but insufficient for durable acceptance.

Trust occupies a central place in this literature. In the trust–risk tradition, social trust in managing institutions substitutes for personal knowledge, lowering perceived risk and raising perceived benefit [53]. Poortinga and Pidgeon [54] qualify this view by showing that public trust is multidimensional and often takes the form of "critical trust," a combination of reliance and skepticism, so a high aggregate trust score may conceal low confidence in particular actors. Southeast Asian evidence supports a differentiated approach: Thai and Vietnamese participants judged stakeholders separately on expertise, transparency, and empathy, and valued economic benefits above environmental ones [55,56]. Wang et al. [57] further identify public engagement as

a factor associated with acceptance in China, which suggests that participation may be a source, and not only an outcome, of acceptance.

Acceptance is also sensitive to events and frames. Major accidents depress support across countries [58,59]. Yet Visschers and Siegrist's [60] longitudinal study in Switzerland showed that, although acceptance fell after Fukushima, the structure of its determinants, namely perceived benefits, perceived risks, and trust, remained stable, and Jang and Park [61] similarly examine how public perceptions shaped acceptance in Korea after the accident. Framing matters as well. When nuclear power is presented as climate mitigation, British respondents expressed a "reluctant acceptance" [62], but later work found that such support was tied as much to energy security as to climate concern and remained conditional [63]. In a province whose economy has just slowed sharply, economic security may matter more than either.

2.3. Energy Justice and the Just Transition from Extractive Economies

Energy-justice scholarship reframes acceptance as a question of legitimacy. It distinguishes distributive justice, which concerns who bears the costs and receives the benefits; procedural justice, which concerns who takes part in decisions and how; and recognition justice, which concerns whose identities and vulnerabilities are acknowledged [25,64]. Empirically, Visschers and Siegrist [65] found perceived procedural and outcome fairness to be associated with acceptance of Swiss decisions to rebuild nuclear power plants. In Indonesia, however, Setyowati [26] shows that energy policy has focused narrowly on distributive access to electricity while leaving procedural and recognition justice largely unaddressed, and Elliott and Setyowati [66] document how some low-carbon initiatives have created new injustices. The Bangka case sharpens the point: compensation can produce formal acceptance of extractive projects while silencing affected groups [24]. Assessing procedural and distributive justice alongside acceptance is therefore essential to distinguish legitimate support from resigned acquiescence.

Indonesia's nuclear history illustrates why. Amir [21,22] traces how the proposed plant on the Muria Peninsula became a focal point for an anti-nuclear alliance rooted in distrust of the state, with nuclear technology serving as an arena of state–society contestation in the post-authoritarian era. Two decades later, the institutional model has changed. The Bangka project is proposed by a private independent power producer and licensed by an independent regulator, and Kurniawan et al. [67] argue that its success depends on building public trust in both government and industry through transparency and openness. The state has meanwhile pursued an experimental power reactor program partly to build human resources and public acceptance [68]. Whether the shift to a private developer resolves the trust problem or merely relocates it, from the state to corporations and regulators, remains an open question.

Two further dimensions of justice are especially salient for young people in Bangka Belitung. The first is intergenerational equity, which Sovacool and Dworkin [64] list among the core principles of energy justice. Nuclear power concentrates its benefits in the decades of operation while its waste obligations extend far beyond them, so the generation now entering adulthood is the one that will both receive the jobs and inherit the liabilities. The second is recognition of coastal communities. The proposed site is an island, and earlier offshore tin dredging marginalized fishing households whose livelihoods depend on the surrounding waters [24]. For young people from such households, concerns about marine ecology and fisheries may weigh more heavily than abstract accident risks. Place attachment adds a related consideration, since strong emotional bonds to a place can motivate opposition to projects perceived as threatening it, independent of technical risk assessments [69].

The tin crisis adds a final dimension. Resilience thinking treats crises as windows of opportunity

for transformation rather than mere recovery [70] and links social and ecological resilience through communities' dependence on natural resources [71]. Just-transition scholars caution, however, that transitions can reproduce the injustices of the economies they replace by concentrating costs on communities already dependent on extractive or fossil industries [72,73]. For Bangka Belitung, a thorium plant could become a just post-tin pathway or a new enclave economy with weak local linkages. Responsible innovation offers a yardstick for distinguishing the two, requiring that innovation be anticipatory, inclusive, reflexive, and responsive to public concerns [74].

Wang and Lo's [75] review shows that just transition has been conceptualized in five partly overlapping ways, as a labor-oriented concept, an integrated framework linking environmental, climate, and energy justice, a theory of socio-technical transition, a governance strategy, and a matter of public perception, and it urges researchers to specify which strand they use. This study draws mainly on the labor, integrated-justice, governance, and public-perception strands. Two debates they identify are especially relevant. The first concerns for whom a transition should be just: labor-oriented approaches focus on fossil-fuel workers, whereas holistic approaches also include low-income, rural, and other vulnerable households, a question that in Bangka Belitung spans tin-dependent households, coastal fishing communities, and young people who will inherit the plant's liabilities. The second concerns power: the concept can be co-opted by powerful actors, and power relations among stakeholders remain under-examined [75]. The review also calls for more empirical studies of just transition in practice and for more attention to developing countries, and it notes a tension between the urgency of decarbonization and the time that inclusive deliberation requires [75]. A post-mining Indonesian province considering a nuclear option speaks directly to these gaps, and P1 to P3 below accordingly treat procedural and distributive justice as conditions of acceptance.

2.4. Youth as Stakeholders and Agents in Energy Transitions

Young people occupy an ambivalent position in this literature. They are often portrayed as the most climate-concerned generation: in a ten-country survey of 10,000 people aged 16–25, 59% reported being very or extremely worried about climate change, and many expressed negative views of their governments' responses [76]. Their political engagement ranges from "dutiful" participation in established channels to "disruptive" and "dangerous" forms of dissent that challenge existing systems [30]. Yet climate concern does not translate automatically into support for nuclear power. College students in the regions surrounding the never-operated Bataan plant in the Philippines perceived more drawbacks than benefits [29], and in Indonesia female students were more cautious than male students about nuclear technology and safety [28], echoing the gender gap documented by Sundström and McCright [77].

What converts concern into engagement? Ojala [31] shows that constructive hope, grounded in trust in collective and institutional action, rather than worry alone, predicts environmental engagement among young people. This implies that institutional channels offering young people real influence may convert ambivalence into agency. Indonesian law defines youth as citizens aged 16 to 30 [78], a cohort that will form much of the workforce and electorate throughout the plant's planned operating life. To our knowledge, however, no published study has examined how the youth of Bangka Belitung are positioned in relation to the project or how they might take part in governing it.

2.5. Synthesis and Research Gaps

Three gaps emerge from this review (Table 1). First, the determinants of nuclear acceptance are well established in high-income countries and increasingly in Southeast Asia, but they have not been examined in a region where the prospective host community is itself in economic and ecological crisis; existing models treat context as background rather than as a condition that changes how people weigh benefits and risks. Second, Indonesian evidence on acceptance at the proposed site predates both the tin crisis and the regulatory approval, covers the adult population as a whole, and was co-produced with the developer. Third, the literature treats the public mainly as a source of acceptance or resistance and rarely as a partner in governance, even though both the energy-justice and youth-engagement literatures emphasize voice and agency. The present study addresses these gaps by building crisis exposure into its framework, by appraising the post-approval evidence independently of the developer, and by treating participation as an outcome linked to a youth-designed governance innovation.

Table 1: *Synthesis of research gaps and the study's response*

Gap	Evidence to date	Response of this study
Context as a condition	Trust–risk–benefit models validated mainly in stable settings [32,52]	Builds tin-crisis exposure into the framework (Proposition 3)
Timing and independence of local evidence	One survey from April 2021, before the crisis and approval, co-authored by developer staff [23]	Appraises that evidence against post-2024 conditions, independently of the developer
Justice dimensions	Indonesian policy emphasizes distributive access over procedure and recognition [26]	Treats procedural and distributive justice as conditions of acceptance (Propositions 1 and 2)
Youth as co-governors	Youth studied as concerned or cautious publics [28,76]	Treats participation as an outcome (Proposition 4) and designs a youth-led governance model

Taken together, these gaps indicate that the central question in Bangka Belitung is not simply whether people accept the project, but under what conditions their acceptance can be considered just and how it can be translated into participation. The framework presented in the next subsection is designed to address this question.

2.6. Conceptual Framework and Propositions

Figure 1 integrates these strands into a framework of four propositions. They are theoretical propositions rather than statistical hypotheses: in an explanatory case study, propositions direct attention to what should be examined and are evaluated by comparing the patterns they predict with the patterns observed in the evidence [79]. Each proposition is explained below together with the literature that supports or contests it and the pattern it predicts for the Kelasa case.

The first proposition (P1) holds that trust in the institutions responsible for the project, namely the regulator, the developer, and local government, depends on whether the decision process is perceived as fair, and that this trust in turn raises perceived benefits and lowers perceived risks. It draws on the trust–risk tradition, in which social trust substitutes for personal expertise when people evaluate complex technologies [53], and on evidence that procedural fairness is associated with acceptance of nuclear decisions [65]. It is qualified by the concept of critical

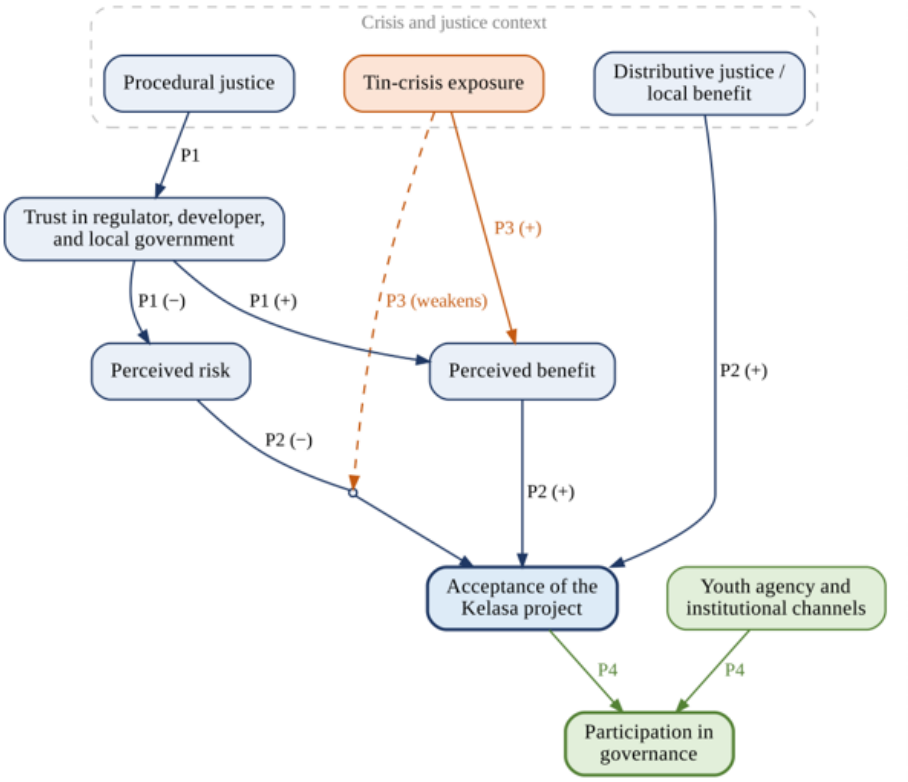


Figure 1: *Conceptual framework and propositions. Source: Authors' synthesis based on Huijts et al. [32], K. Jenkins et al. [25], and Ajzen [80].*

trust [54], which implies that trust in one actor need not transfer to another, so the proposition is examined separately for each institution. For Kelasa, P1 predicts that durable support should be accompanied by visible procedural rigor and by inclusive consultation of the communities, including young people, who will host the plant.

The second proposition (P2) states that acceptance rises with perceived benefits and falls with perceived risks, and that perceived distributive justice, the expectation that jobs, revenue, and risks will be shared fairly, raises acceptance independently of the benefit–risk balance. Its first part reflects the core of the acceptance literature [32,49,50]. Its second part reflects energy-justice theory, which holds that a project may deliver large aggregate benefits and still be judged unjust if those benefits bypass host communities [25,72]. For Kelasa, P2 predicts that support will be strongly benefit-oriented and that its durability will depend on whether concrete arrangements for local employment and benefit sharing exist.

The third proposition (P3), the framework's principal novelty, holds that exposure to the tin crisis increases the perceived economic benefits of the project and weakens the restraining effect of perceived risk on acceptance, producing what this study calls crisis-driven acceptance. Two bodies of work support it. Studies of framing show that people may accept nuclear power reluctantly when it is presented as the answer to an urgent problem [62], and Southeast Asian publics weigh economic benefits above environmental ones [55]. On Bangka itself, compensation has previously secured acceptance of a risky extractive activity [24]. The proposition is contested, however, by

evidence that the determinants of acceptance remain stable even after major shocks [60], which suggests that a crisis may change the level of support without changing its logic. For Kelasa, P3 predicts that project discourse and public support will be framed predominantly in economic terms and that such support will be sensitive to whether economic promises are fulfilled.

The fourth proposition (P4) holds that acceptance alone does not produce participation; rather, the intention of young people to take part in governance depends on their sense of agency and on the availability of channels that offer real influence. It builds on the theory of planned behavior, in which intentions follow from attitudes, social norms, and perceived control [80], and on research showing that constructive hope rather than worry sustains youth engagement [31] and that youth participation ranges from dutiful to disruptive forms depending on the opportunities available [30]. For Kelasa, P4 predicts a gap between young people's capacity and willingness to engage, on the one hand, and the institutional channels open to them, on the other.

3. Methods

3.1. Research Design

The study adopted a qualitative explanatory case study design [79], which is suited to examining a contemporary phenomenon within its real-world context when the boundary between phenomenon and context is not clear. The case is the proposed TMSR-500 nuclear power plant on Kelasa Island, examined at the stage between the regulatory approval of site evaluation and the issuance of a site permit. The design combined three steps. The first was an integrative literature review [81], which synthesized research on nuclear acceptance, energy justice, just transitions, and youth engagement to derive the propositions presented in Section 2.6. The second was a document analysis [82] of regulatory, statistical, industry, and media sources on the case, which provided the evidence against which the propositions were evaluated. The third was a design step that translated the findings into a governance innovation. Because all three authors are university students aged 20 to 22 who grew up in or have ties to the province, the innovation is youth-led in a literal sense: it was conceived and designed by members of the generation it concerns.

This design was preferred over a survey at the present stage for two reasons. First, the project is at an early licensing stage in which documents, not yet attitudes formed through direct experience, are the main traces of how the project is being governed and framed. Second, the only existing site-specific survey has the limitations described above, so a careful appraisal of the evidence base is a necessary step before new primary data are collected. **The propositions are therefore also specified as testable hypotheses for a subsequent youth survey.**

3.2. Case Selection, Setting, and Period

Bangka Belitung was selected as a critical case [79] because it combines two conditions rarely found together: it hosts the first nuclear power licensing approval in Indonesia and is simultaneously in acute post-extractive crisis. The province comprises six regencies (Bangka, West Bangka, Central Bangka, South Bangka, Belitung, and East Belitung) and the city of Pangkalpinang, with a population of about 1.5 million [83]. Central Bangka Regency, which contains Kelasa Island, had about 204,700 residents in 2025 [84]. The analysis covers developments from the April 2021 acceptance survey to January 2026, the latest available evidence on the NEPIO regulation. Documents were collected and verified in October 2026.

3.3. Data Sources and Sampling

Two corpora were assembled. The literature corpus was identified through keyword searches of academic search engines and publisher platforms, combining terms such as "nuclear," "public acceptance," "trust," "energy justice," "just transition," "youth," "Indonesia," "thorium," and "molten salt reactor," followed by backward citation tracking from key studies. Works were retained if they were peer-reviewed articles or authoritative books and reports, addressed at least one construct in the framework, and reported empirical findings or established theory; 51 works were retained for synthesis.

The document corpus was assembled through purposive sampling of publicly available sources on the case. Priority was given to primary sources such as regulatory releases, legislation, and official statistics; news and trade media were included where they reported statements by officials or the developer, or where primary documents were not publicly available. The final document corpus comprised 42 sources (Table 2); all are listed in the reference list.

Table 2: *Composition of the document corpus*

Source type	**n**	**Examples**
Regulatory, legal, and international guidance	5	BAPETEN regulation and press release; laws on youth and on the environment; IAEA milestones guidance
Official statistics and fiscal reports	5	BPS provincial growth release; youth statistics; regional fiscal report
Energy-data, technical, and industry reports	7	Ember electricity data; UNECE life-cycle assessment; IPCC annex; PT Timah thorium presentation
News and trade media	25	Reports on licensing decisions, RUPTL allocations, NEPIO, tin-case valuation, and developer statements
Total	**42**	—

Note. Peer-reviewed studies used for synthesis (51 works) are counted separately as the literature corpus.

The corpus is weighted toward news and trade media because many licensing and policy developments in the case have been communicated mainly through public statements rather than published documents. To limit the effect of this imbalance, every figure drawn from a news report was attributed to the official or institution quoted and, where possible, checked against a primary source, a principle that also guided the coding procedure described next.

3.4. Analytical Framework and Coding

Documents were analyzed through qualitative content analysis using a deductive coding frame derived from the four propositions, supplemented by inductive codes for themes not anticipated by the framework [82, 85]. Table 3 presents the coding frame. For each proposition, the frame specifies the constructs involved, the observable indicators sought in the documents, and the main types of source in which such indicators were expected. Numerical figures were extracted verbatim, recorded with their date and origin, and cross-checked against a second source where possible. Figures that are disputed, such as the valuation of environmental losses in the tin case, are reported as contested rather than as settled facts.

Table 3: *Coding frame derived from the propositions*

Proposition	Constructs	Indicators sought in documents	Main source types
P1	Procedural justice; trust in regulator, developer, local government	Licensing decisions and their justification; transparency measures; consultation mechanisms; corrections of misinformation; trust measures in surveys	Regulatory releases; ministry statements; surveys
P2	Perceived benefits and risks; distributive justice	Benefit and risk perceptions in surveys; announced investment, jobs, and local content; benefit-sharing arrangements; offtake and capacity allocation	Surveys; developer statements; RUPTL reporting
P3	Tin-crisis exposure; economic framing	Economic indicators of the crisis; economic framing in project discourse; precedents of compensation-based acceptance	Official statistics; fiscal reports; news; prior studies
P4	Youth agency; institutional channels; participation	Youth capacity and willingness to engage; formal participation channels and their accessibility to youth	Prior studies; legislation; regulatory releases

Each proposition was then evaluated through pattern matching [79]. The pattern predicted by the proposition was compared with the empirical pattern in the evidence, and each proposition was rated as supported, partially supported, or not supported. A proposition was rated as supported when the predicted pattern was observed across at least two independent source types and no strong contrary evidence was found; as partially supported when the pattern was observed in part, or when key evidence was missing; and as not supported when the evidence contradicted the predicted pattern. Missing evidence was recorded explicitly, because the absence of a mechanism, for example a benefit-sharing scheme, is itself a finding in a case at an early stage of governance.

3.5. Trustworthiness

Trustworthiness was pursued through the criteria of credibility, transferability, dependability, and confirmability [86]. Credibility was supported by triangulating across source types and by privileging primary sources; where a figure appeared only in news media, it is attributed as such. Transferability was supported by describing the case context in detail so that readers can judge its relevance to other candidate sites. Dependability and confirmability were supported by an audit trail, consisting of the coding frame, the evidence matrix reported in the Results, and the complete list of sources in the reference list, and by peer debriefing among the three authors, who coded the documents separately and resolved differences through discussion. The authors also recorded reflexive notes on how their own positions might shape interpretation. They are students of international relations with no affiliation to the developer, and one author's origin in Pangkalpinang informed the reading of local sources while being treated as a potential source of bias.

3.6. Ethical Considerations

The study analyzed only publicly available documents and published data and involved no human participants, so formal ethical clearance was not required. Ethical care was nevertheless exercised throughout. Sources were cited accurately and contested claims were labeled as such; no individual was identified in connection with illegal mining; and the appraisal of the earlier survey concerns its design and authorship, not the integrity of its authors. The authors declare no financial or institutional relationship with the project developer, the state electricity company, or any nuclear industry body, and the study received no external funding.

4. Results and Discussion

4.1. Results

4.1.1 Contextual Baseline: A Province in Compound Crisis

Tables 4 and 5 summarize the conditions under which the project is being proposed. Table 4 documents the energy, economic, and ecological dimensions of the crisis, and Table 5 traces the project's regulatory pathway. Two features stand out. First, the crisis is both acute and chronic: an economic shock in 2024, with growth slowing to 0.77% before rebounding to 4.60% year on year in the first quarter of 2025 [8, 87], is layered on decades of ecological degradation. The province's public finances add a structural vulnerability, since its regional fiscal independence index stood at 0.27, reflecting heavy dependence on transfers from the central government [87]. Second, the nuclear project sits at its most open stage. The regulator has approved site studies, but no permit that would commit the province to construction has been issued. The decisions that matter most for justice, namely site licensing, benefit sharing, and the design of public consultation, therefore still lie ahead.

Table 4: *Energy, economic, and ecological indicators of the compound crisis*

Indicator	Value	Source
Share of coal in Indonesia's electricity generation (2023)	61.8%	Ember [1]
Share of wind and solar in Indonesia's electricity (2024)	0.5%	Ember [2]
Provincial GRDP growth, 2023 and 2024	4.38% $\rightarrow$ 0.77%	BPS Provinsi Kepulauan Bangka Belitung [8]
Provincial GRDP growth, Q1 2025 (year on year)	4.60%	Kanwil DJPb Provinsi Bangka Belitung [87]
Regional fiscal independence index	0.27	Kanwil DJPb Provinsi Bangka Belitung [87]

Table 4: *Energy, economic, and ecological indicators of the compound crisis (continued)*

Indicator	Value	Source
State losses in the tin-trade corruption case (2015–2022)	IDR 300.003 trillion, incl. IDR 271.07 trillion environmental damage (contested)	CNN Indonesia [6]; detikFinance [7]
Critical land in the province	≈167,000 ha	Antara Babel [9]
Abandoned tin-mining pits (*kolong*)	>12,000 pits; ≈15,580 ha	Mongabay Indonesia [10]
Youth open unemployment, Indonesia (2025)	11.78%	BPS [11]
Measured thorium resources in the province	≈4,729 t	Kumparan [41]

Note. GRDP = gross regional domestic product. The environmental-damage valuation was disputed in court and by local organizations.

Table 5: *Licensing and policy milestones for nuclear power in Bangka Belitung*

Date	Milestone	Source
April 2021	Survey of 1,500 residents records 73.73% acceptance	Kartono et al. [23]
March 2023	Developer announces IDR 17 trillion investment and requests a presidential regulation for legal certainty	Antara Babel [88]
2024	Tin-trade corruption case; provincial growth slows to 0.77%	CNN Indonesia [6]; BPS Provinsi Kepulauan Bangka Belitung [8]
21 January 2025	PT ThorCon Power Indonesia applies for site-evaluation approval for Kelasa Island	BAPETEN [89]
April 2025	First submission rejected as not meeting technical requirements	Indonesia Business Post [13]
June 2025	Ministry states that no official partner has yet been designated for the 500 MW nuclear allocation	Listrik Indonesia [90]
24 July 2025	PLN Nusantara Power and ThorCon sign memorandum on a feasibility study	Investortrust [19]
30 July 2025	Decree approving the site-evaluation program and management system	Kontan [15]; BAPETEN [89]
August 2025	Ministry confirms that no site permit has been issued; six inter-ministerial working groups coordinate policy	detikFinance [18]; Tanahair.net [91]
2025	RUPTL 2025–2034 allocates 2 × 250 MW (Sumatra and Kalimantan systems); operation 2032–2033	detikFinance [4]
January 2026	NEPIO presidential regulation awaiting signature	Warta Ekonomi [5]
2027 and 2031 (targets)	Start of construction and full power (developer targets)	World Nuclear News [16]

The chronology reveals a mismatch of pace. Technical licensing moved quickly in 2025, from the

first submission to rejection and then approval within about six months, whereas the institutional and distributive arrangements that would determine who decides and who benefits, namely the NEPIO regulation, the designation of an official partner, and any benefit-sharing scheme, remained unresolved in the latest available evidence. The following subsections examine how this mismatch bears on each proposition.

4.1.2 Proposition 1: Procedural Justice and Trust

The documents provide mixed evidence for P1. On the side of technical procedure, the regulator's record is substantive. It rejected the first submission in April 2025 for failing technical requirements, approved a revised program after a review of 126 working days, stated that safety and security are the foundation of its oversight, and committed to publishing licensing information through an online oversight portal for nuclear power plants [13,14,89]. The Ministry of Energy and Mineral Resources also publicly corrected reports suggesting that a site permit had been granted [18]. These are precisely the signals of competence, independence, and honesty that the literature associates with institutional trust [53,55].

On the side of procedural inclusion, however, the evidence is thin. The documents describe technical review and coordination among six inter-ministerial working groups [91], but none of the sources reviewed describes a mechanism for structured public participation in siting decisions, still less one designed for young people. The developer has stated that it will be "working closely with the local community and governor" [92], but no process accompanies this commitment in the public record. Moreover, the only measures of local trust, namely 92.53% expressing trust in the developer's good faith and 93.53% in the competence of a future operator, come from the survey co-authored by developer staff [23]. P1 is therefore rated as partially supported: the regulator has created conditions for competence-based trust, but the procedural route to trust that the literature identifies as decisive [65] remains underdeveloped, and independent, actor-specific trust data are missing.

4.1.3 Proposition 2: Benefits, Risks, and Distributive Justice

The evidence that support is benefit-oriented is strong. In the 2021 survey, 94.27% of respondents agreed with statements about the plant's benefits, against 70.93% for the items on risk, and overall acceptance stood at 73.73% [23]. Acceptance was also conditional on distance, as 1,185 of the 1,500 respondents preferred that a plant be located about 30 km from residential areas. This benefit orientation mirrors the Southeast Asian pattern in which economic gains dominate evaluations [55], while the persistent concerns about safety and waste among Indonesian students [28] show that risk remains salient for the young.

The evidence on distributive arrangements, by contrast, points to a gap. Project communications emphasize scale: the developer announced an investment of IDR 17 trillion [88] and a plan to locate a fuel facility and logistics center in the province alongside the plant [93]. Yet the most significant local manufacturing benefit is conditional. The reactor was to be built in South Korea and towed to Indonesia, with a domestic factory promised after 2030 [94] or if eight units were implemented by 2035 [93]. No benefit-sharing framework, local hiring target, or compensation scheme for coastal communities could be identified in the documents reviewed. National planning adds uncertainty about offtake. The RUPTL allocates 250 MW to the Sumatra system, which may include Bangka Belitung [95], whereas the developer proposes 2 × 250 MW [13]; the state utility has indicated that the initial 500 MW would use small modular reactor technology [96]; and in June 2025 the ministry stated that no official partner had been designated [90]. Timelines vary as well, from reported efforts to bring the first 250 MW online by 2029 [97] to commercial

operation in 2032–2033 under the RUPTL [4]. P2 is therefore rated as supported for its benefit–risk component, while the distributive-justice conditions it identifies as necessary for durable support are not yet in place.

4.1.4 Proposition 3: Crisis-Driven Acceptance

The contextual conditions predicted by P3 are clearly present. The tin crackdown slowed provincial growth to 0.77% in 2024 [8], the province depends heavily on central transfers [87], and the crisis reached households and students directly [12]. Project discourse aligns with the predicted economic framing. The developer's public statements foreground investment, the need for legal certainty, and the replacement of coal [88], and the head of the state electricity company has identified political and social support as central challenges for nuclear development [4] A local precedent for compensation-based acceptance also exists in offshore tin dredging [24].

The attitudinal mechanism itself, however, cannot be confirmed with existing data. The only site-specific survey was conducted in April 2021, before the crisis, and therefore cannot show whether economic distress has altered how residents weigh benefits and risks. **P3 is rated as partially supported: the conditions and discourse that the proposition predicts are present, but whether crisis exposure has changed the logic of acceptance, and not only the conditions around it, remains to be tested with post-crisis data in future research.**

4.1.5 Proposition 4: From Acceptance to Participation

The evidence supports the predicted gap between youth capacity and institutional channels. On the side of capacity, Indonesian science and engineering students reported that they felt involved in advancing environmentally sustainable nuclear technology and believed they possessed the relevant skills [28], while young people internationally combine high concern with negative views of government responses [76]. On the side of channels, general instruments exist: Indonesian environmental law requires community involvement in environmental impact assessment [98], and the regulator has committed to an online oversight portal [89]. Yet none of these channels is designed for young people, the institution that will coordinate the national program has not yet been established [5], and international guidance stresses that stakeholder involvement should begin early in a national nuclear program [99]. P4 is therefore rated as supported: young people have both the motivation and the capacity to participate, but there is no channel through which their participation could exert real influence.

4.1.6 Summary of the Evidence

Table 6 summarizes the evaluation of the four propositions, setting the supporting evidence for each against the contrary or missing evidence identified in the documents.

Read across its rows, the matrix reveals a consistent pattern. The technical and economic dimensions of the project are well documented, whereas its procedural and distributive dimensions, and the place of young people within them, are largely undefined. Two propositions are supported and two are partially supported, and in both partial cases the limiting factor is missing rather than contrary evidence. The Discussion therefore treats these absences as findings about the current state of governance and of the evidence base.

Table 6: *Evidence matrix for the four propositions*

Proposition	Supporting evidence	Contrary or missing evidence	Assessment
P1: Procedural justice and trust	Rejection then approval after 126 working days; transparency portal; ministry correction of misinformation	No structured public or youth participation mechanism in reviewed documents; trust data only from developer-co-authored survey	Partially supported
P2: Benefits, risks, and distributive justice	Benefits 94.27% vs risks 70.93% (2021); economic benefits dominate regionally; youth concern about safety and waste	No benefit-sharing scheme or local hiring target; conditional local manufacturing; uncertain capacity allocation and partner	Supported (benefit–risk); distributive conditions absent
P3: Crisis-driven acceptance	Growth of 0.77% in 2024; fiscal dependence; economic framing in project discourse; dredging precedent	No post-crisis attitudinal data	Partially supported
P4: From acceptance to participation	Students feel capable and involved; general consultation channels exist; IAEA calls for early involvement	No youth-specific channel; NEPIO not yet established	Supported

4.2. Discussion

4.2.1 Competence Without Inclusion: The Procedural Gap

The first finding is that the project has built competence without yet building inclusion. The regulator's willingness to reject a deficient submission before approving a revised one is a meaningful trust signal, and it distinguishes the Kelasa process from the Muria episode, in which distrust of the state's technical capacity was a central grievance [21, 22]. Yet the energy-justice literature suggests that competence alone does not secure legitimacy. Visschers and Siegrist [65] show that perceived procedural fairness is associated with acceptance of nuclear decisions, and Poortinga and Pidgeon [54] warn that trust in experts can coexist with skepticism toward decision processes. In Indonesia, where policy has historically emphasized distributive access over procedural and recognition justice [26], the absence of a defined participation mechanism is therefore not a minor omission but the central weakness of the current process. The finding also refines Kurniawan et al.'s [67] argument that transparency and openness are preconditions for trust: transparency about decisions, which the regulator has begun to provide, is distinct from participation in them, which no actor has yet offered.

4.2.2 Crisis-Driven Acceptance and Its Fragility

The second finding is that the project's social foundations rest heavily on economic expectations formed under conditions of crisis. This pattern parallels the reluctant acceptance observed when nuclear power is presented as the answer to an urgent problem [62], but its driver here is economic

rather than climatic, consistent with the regional weighting of economic over environmental benefits [55]. It also echoes the Bangka dredging case, in which compensation secured acceptance that masked unresolved grievances [24]. Crisis-driven acceptance is therefore likely to be fragile. If the promised benefits are delayed or bypass local residents, as the conditional nature of local manufacturing makes possible, support built on economic distress could reverse quickly, as just-transition scholars warn [72,73]. Visschers and Siegrist's [60] finding that the structure of acceptance remains stable after shocks offers a counterpoint, implying that trust and perceived benefit will continue to matter whatever the economic climate. The two views converge on a practical conclusion: the most reliable way to stabilize support is to convert economic expectations into binding and verifiable commitments.

Place adds a further dimension. The offshore location of the proposed site may reassure residents who, in the 2021 survey, preferred a plant at a distance from settlements [23], yet it shifts perceived exposure toward the marine environment on which coastal households depend. Given the history of offshore tin dredging [24], recognition justice for coastal youth, and not only distributive compensation, is likely to be needed to secure their support, and place attachment may sharpen their concerns [69].

4.2.3 Rethinking the Evidence Base for Acceptance

The third finding concerns the evidence base itself. The 73.73% acceptance figure is frequently cited, but it was collected before the crisis and before any licensing decision, it covers adults in general, and it was produced with the participation of developer staff [23]. None of these features invalidates the survey, yet together they mean that it cannot serve as evidence of informed, post-crisis, youth acceptance. The point has wider relevance. Social acceptance operates at socio-political, community, and market levels [48], and acceptance measured at one level and one moment should not be generalized to others. Independent, longitudinal measurement that tracks attitudes as the project moves through the licensing stages would provide a sounder basis for policy, and young people are a natural population with which to begin, because they combine the longest exposure to the project's consequences with the greatest stake in its benefits.

4.2.4 The Youth Energy Justice Lab: A Youth-Led Governance Innovation

The findings point to a specific institutional gap: a channel through which young people can influence the project's governance and through which its benefits can be tied to local recovery. The authors therefore designed the Youth Energy Justice Lab (YEJ-Lab), drawing on responsible-innovation principles [74] and the three tenets of energy justice [25]. Its governance structure is shown in Figure 2 and its design in Table 7.

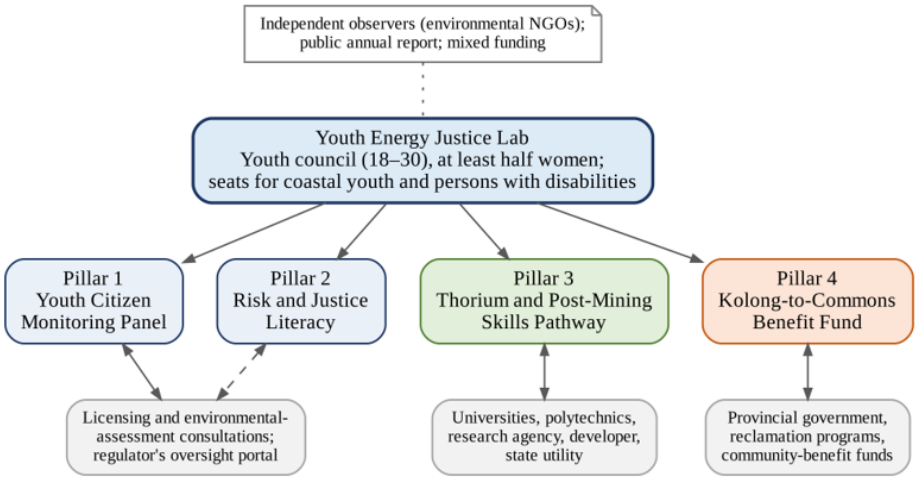


Figure 2: *Governance structure of the Youth Energy Justice Lab. Source: Authors' design.*

The YEJ-Lab is a youth council for people aged 18 to 30, at least half of whom are women, with reserved seats for coastal youth and persons with disabilities, organized around four pillars. A Youth Citizen Monitoring Panel would give young people a formal role in public consultations on site licensing and environmental impact assessment and would publish plain-language reports on the monitoring data released by the operator and the regulator. A Risk and Justice Literacy program would train peer educators to present evidence from both proponents and critics, addressing trust deficits rather than seeking to persuade. A Thorium and Post-Mining Skills Pathway would link local universities and polytechnics with the developer, the state electricity company, and the national research agency to prepare young people for work in radiation protection, instrumentation, and environmental restoration. Finally, a Kolong-to-Commons Benefit Fund would earmark part of any community-benefit or corporate social responsibility funds for rehabilitating abandoned mining pits and supporting youth enterprises such as aquaculture and ecotourism, so that the benefits of a new energy industry visibly repair the damage of the old extractive one.

Table 8 assesses the design against four criteria derived from the responsible-innovation literature [74]: inclusiveness, feasibility, sustainability, and expected impact. The assessment draws on the evidence reported in Section 4.1 and on the legal and institutional resources already available in the province.

As Table 8 shows, the design scores highest on inclusiveness and expected impact, while sustainability is its main point of vulnerability. Its feasibility rests on the fact that the YEJ-Lab does not require new legal foundations so much as a youth-centered use of existing ones. Environmental law already requires community involvement in environmental impact assessment [98], and the regulator has committed to publishing licensing information online [89], so the monitoring panel can build on both. This incremental design increases feasibility, while the benefit fund and skills pathway give the arrangement material substance beyond consultation. The principal risks are capture by a single sponsor and tokenism. The design therefore combines public, academic, and private funding, gives observer seats to environmental organizations, and requires an annual public report.

Table 7: *Design of the Youth Energy Justice Lab*

Pillar	**Justice dimension and proposition**	**Main activities**	**Potential partners**	**Impact indicators**
Youth Citizen Monitoring Panel	Procedural and recognition (P1, P4)	Youth seats in licensing and environmental-assessment consultations; plain-language monitoring reports	Regulator; provincial environment agency; local universities	Young people trained; consultations attended; reports published
Risk and Justice Literacy	Recognition and procedural (P1, P2)	Peer-to-peer digital and village sessions presenting proponents' and critics' evidence	Universities; campus media; youth organizations	Reach; change in knowledge and trust in follow-up surveys
Thorium and Post-Mining Skills Pathway	Distributive (P2, P3)	Vocational and degree pathways in radiation protection, instrumentation, and land restoration	Universities; polytechnics; developer; state utility; research agency	Graduates certified; share of local hires
Kolong-to-Commons Benefit Fund	Distributive and restorative (P2, P3)	Rehabilitation of abandoned pits; seed funding for youth aquaculture and ecotourism	Provincial government; reclamation programs; corporate social responsibility funds	Hectares rehabilitated; youth enterprises funded

Note. Inclusion quotas: at least half women, with reserved seats for coastal youth and persons with disabilities.

Table 8: *Assessment of the Youth Energy Justice Lab against four criteria*

Criterion	**Assessment**	**Basis and risk mitigation**
Inclusiveness	High	Quotas for women, coastal youth, and persons with disabilities; literacy program reaches villages offline; critics included as observers
Feasibility	Moderate to high	Builds on existing consultation duties and the regulator's oversight portal; partners already present in the province; requires a governor's regulation
Sustainability	Moderate	Mixed funding reduces dependence on one sponsor; skills pathway embedded in university curricula; risk of fading if the project stalls, mitigated by linking the fund to post-mining restoration that is valuable regardless of the plant
Impact	High potential	Addresses the procedural gap (P1), undefined benefit sharing (P2), crisis fragility (P3), and the participation gap (P4); measurable indicators in Table 7

Institutionalization through a governor's regulation, a pilot in Central Bangka, and later replication at other candidate sites in the national plan would provide a pathway to scale, consistent with international guidance that stakeholder involvement should begin early in a nuclear program [99]. Because the benefit fund is tied to post-mining restoration, which is valuable whether or not the plant is eventually built, the Lab would retain its purpose even if the project were delayed. **The pilot would be co-designed with a wider group of young people before it is launched.**

4.2.5 Theoretical, Practical, and Policy Implications

Theoretically, the study contributes in three ways. It shows that technology-acceptance models need a contextual layer when applied in crisis-affected regions, because a crisis can reshape both the framing of a project and the conditions under which benefits and risks are weighed. This extends trust–risk–benefit frameworks that have been validated mainly in stable settings [32, 52], and it is consistent with Wang and Lo's [75] view that just-transition outcomes depend on political and socio-economic context rather than on a single pathway. It demonstrates the value of separating acceptance from participation, which have different antecedents and different policy implications. Lo's [100] mixed-method study of China's solar photovoltaic poverty alleviation initiative (PVPA) shows why the separation matters. Roughly 62% of the 116 surveyed households judged their consultation to have been adequate or very adequate, and a similar share were satisfied with the material outcome, yet only 24.1% had been consulted on the size of the PV station, the parameter that determined household benefits, and village leaders reported having no input into design decisions that county governments made. In other words, satisfaction and acceptance coexisted with limited influence over the decisions that shaped outcomes, although the sample was recruited through the research team's personal network and may overstate satisfaction. The Kelasa evidence shows the same structure at an earlier stage: a high measured level of acceptance [23] without any defined channel through which affected residents, let alone young people, could influence the project. This pattern also supports Wang et al.'s [57] suggestion that engagement may be a source of acceptance and not only its outcome. It also connects the psychology of acceptance with energy-justice theory by treating procedural and distributive justice as conditions of acceptance rather than as normative commentary. Lo's [100] case refines this connection: procedural justice should be assessed not only by whether consultation takes place but by which decisions are open to it, a point that responds to Wang and Lo's [75] call for empirical studies of how just-transition principles operate in practice and for closer attention to power relations.

Practically, the YEJ-Lab offers a model that can be piloted with existing partners. Lo [100] attributes the PVPA's procedural performance to institutionalized mechanisms mandated by the central government, namely approval by village assemblies or village-representative assemblies, public disclosure of how income is distributed, and an annual distribution plan that must be endorsed and displayed publicly. The Youth Citizen Monitoring Panel and the publication of benefit-sharing arrangements proposed here are analogous, and the PVPA experience suggests that such mechanisms are more reliable when embedded in regulation than when left to developer discretion, which supports both the governor's regulation route and the formal youth seats recommended below. Lo [100] also reports that some villages used project income for health insurance and for public welfare posts that employed poor households, which resembles the way the Kolong-to-Commons Benefit Fund and the skills pathway tie project revenue to collective local benefits. His respondents, however, often considered the benefits too small, a reminder that benefit sharing must be sized realistically and verified independently, as the indicators in Table 7 are intended to do.

These parallels must be drawn with caution. The PVPA is a state-led poverty-alleviation program in an authoritarian setting, whereas the Kelasa project is a commercial venture proposed by a private developer in a democracy. Lo [100] himself attributes the PVPA's emphasis on justice partly to its pro-poor policy intention, in contrast to the coal-to-gas campaign, and acknowledges that it is unclear whether such a top-down mode can produce sustained just outcomes. The transferable lesson is therefore not that a top-down mandate is sufficient, but that participation and disclosure need to be specified, mandated, and open to scrutiny, and that consultation should reach the decisions that determine outcomes, such as siting and benefit design, and not only their communication. In Indonesia, formal participation exists, for example in environmental impact assessment [98], but it is not designed for young people, which is the gap the YEJ-Lab addresses.

For policy, three implications follow. The regulator and the forthcoming NEPIO should institutionalize youth participation in site-licensing consultations; the provincial government should integrate any nuclear benefit sharing with its post-mining land restoration agenda; and the developer should commit to measurable local hiring and training targets that are verified independently. These recommendations are consistent with Lo's [100] conclusion that a successful just transition requires a collaborative, multilevel approach in which actors with command of resources and stakeholders with local knowledge both take part, and with Wang and Lo's [75] call for research that treats power dynamics and political context as central to just transition.

4.2.6 Limitations

Several limitations qualify these findings. The analysis relies on publicly available documents, which record statements and decisions but not the deliberations behind them, and some figures are available only through news reports. The project is at an early stage, so the absence of a participation or benefit-sharing mechanism may reflect timing rather than intent. The attitudinal mechanism proposed in P3 could not be tested with existing data. Finally, the YEJ-Lab is a design whose feasibility has been assessed analytically but not yet piloted. These limitations define the agenda for the next phase of research.

5. Conclusion and Recommendations

This study asked which conditions shape youth acceptance of Indonesia's first proposed nuclear power plant, how the tin crisis conditions that acceptance, and what governance innovation could turn acceptance into participation. Three conclusions emerge. First, the regulator has demonstrated competence, but the procedural route to trust, through inclusive participation, remains undeveloped. Second, local support is benefit-driven and has been shaped by economic expectations in a province in crisis, while the distributive arrangements that would make it durable, such as benefit sharing and local hiring, are undefined. Third, young people have the motivation and capacity to participate, but no channel exists through which their participation could exert influence.

Taken together, these findings suggest that the transition from tin to thorium will be resilient only if it is just. Nuclear technology may help to decarbonize a coal-dependent grid, but its legitimacy in a post-extractive province will depend on whether those who bore the costs of tin, including coastal communities, former mining households, and the young people who inherit degraded land, gain a fair share of the benefits and a real voice in decisions.

Four recommendations follow. First, the regulator and NEPIO should create formal youth seats in public consultations on site licensing and environmental assessment. Second, the provincial government should adopt the Youth Energy Justice Lab through a governor's regulation, beginning

with a pilot in Central Bangka. Third, the developer and the state electricity company should publish binding local employment and training targets and fund skills pathways with local universities. Fourth, benefit-sharing arrangements should give priority to rehabilitating abandoned mining pits.

Future research should test the four propositions with an independent survey of young people across the province using an instrument that operationalizes the four propositions and analyze the data with partial least squares structural equation modeling, repeating the survey as the project moves through site licensing and construction. Comparative studies with other candidate regions, such as West Kalimantan, would show how far the findings transfer, and the YEJ-Lab should be piloted and evaluated against the indicators proposed here.

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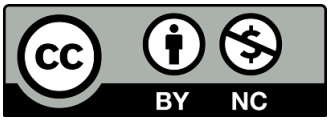
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