

THE PROBLEMS OF JUST ENERGY TRANSITION IN WEST SUMATRA: ENERGY DEMOCRACY, ECOLOGICAL JUSTICE, COMMUNITY OWNERSHIP

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Abstract: The transition toward renewable energy is increasingly promoted as a pathway to decarbonisation, energy security, and sustainable development. Yet renewable-energy expansion does not automatically constitute a just energy transition. This article examines the challenges of just energy transition in West Sumatra, Indonesia, through the lenses of energy justice, energy democracy, ecological justice, and community ownership. It uses a qualitative comparative case-study approach based on documentary research and secondary analysis of the field research of the Center for Agrarian and Environmental Justice (CAEJ), Universitas Andalas, as reported in its 2026 policy brief, at three renewable-energy sites: the floating solar photovoltaic project at Danau Singkarak, the Gunung Talang geothermal project, and the Muara Laboh geothermal project. The findings reveal a persistent governance gap between centralised energy-transition policies and local territorial realities. Participation remains largely administrative rather than deliberative; customary land rights are insufficiently incorporated into project governance; community-level economic benefits remain weakly institutionalised; and local communities are positioned primarily as beneficiaries or affected populations rather than co-owners and decision-makers. These conditions generate distrust and resistance, even where communities do not reject renewable energy itself. The article argues that such resistance can represent claims for procedural, recognition, distributional, and ecological justice. It further contends that energy democracy provides a crucial

political dimension of just transition by addressing ownership and control. The article proposes a nagari-based energy-democracy framework combining deliberative participation, recognition of customary rights, ecological safeguards, binding benefit-sharing, and community or cooperative ownership. A genuinely just energy transition therefore requires redistributing not only energy benefits, but also political authority, economic value, ecological responsibility, and ownership.

Keywords: Energy Democracy; Energy Justice; Ecological Justice; Community Ownership; West Sumatra.

INTRODUCTION

The global transition from fossil fuels toward renewable energy has become one of the defining political projects of contemporary environmental governance. Climate change, energy security, technological innovation, and international commitments to reduce greenhouse-gas emissions have encouraged states to accelerate the deployment of renewable-energy technologies (International Energy Agency [IEA], 2024; International Renewable Energy Agency [IRENA], 2024; United Nations Framework Convention on Climate Change [UNFCCC], 2015). Solar photovoltaic, geothermal, hydropower, wind, biomass, and other low-carbon technologies are increasingly incorporated into national energy strategies.

At first glance, this transformation appears inherently progressive. Yet the political significance of energy transitions cannot be reduced to changes in technology. Energy systems are institutional arrangements that distribute resources, authority, risks, costs, and benefits among states, corporations, communities, workers, and consumers (Aklin & Urpelainen, 2018; Araújo, 2014; Markard, Raven, & Truffer, 2012).

Consequently, replacing fossil-fuel technologies with renewable technologies does not necessarily transform the political economy of energy. A renewable-energy project may reduce carbon emissions while reproducing centralised ownership, unequal decision-making, land dispossession, ecological degradation, and uneven benefit distribution. This possibility has become

increasingly important in the literature on energy justice, just transition, and energy democracy.

Energy-justice scholarship emphasises three foundational dimensions: distribution, procedure, and recognition (Jenkins, McCauley, Heffron, Stephan, & Rehner, 2016). Distribution concerns who receives benefits and who bears costs. Procedural justice concerns who participates in decision-making and whether participation is meaningful. Recognition concerns whether different communities, identities, histories, forms of knowledge, and territorial rights are recognised.

The concept of just transition expands these concerns into the broader transformation of energy and economic systems. Originally associated with labour movements, it has developed into a framework addressing justice, governance, socioeconomic transformation, and public participation (Heffron & McCauley, 2018; International Labour Organization [ILO], 2015; McCauley & Heffron, 2018; Newell & Mulvaney, 2013; Wang & Lo, 2021). Wang and Lo (2021) identify five approaches within this literature: labour-oriented, integrated justice, sociotechnical-transition, governance, and public-perception approaches. This article adopts a more specific definition, set out in the literature review, so that almost any desirable outcome is not simply relabelled as just transition.

Yet another question remains insufficiently addressed: who owns and controls the energy system after the transition? This is the question emphasised by energy-democracy scholarship. Energy democracy connects renewable-energy transitions with democratic control, decentralisation, public participation, cooperative ownership, and redistribution of political-economic power (Becker & Naumann, 2017; Burke & Stephens, 2017; Szulecki, 2018). From this perspective, the transition from fossil fuels to renewable energy is not only a technological transition. It can also become a transition in the ownership and governance of energy.

The distinction is critical. A solar project can be renewable but not democratic; a geothermal project can be low-carbon but not socially legitimate; a project can involve a village without being community-owned; and a project can provide

employment without redistributing economic value. Renewable-energy deployment should therefore not be treated as synonymous with just transition. This problem is particularly important in the Global South, where transitions take place within histories of colonialism, extractivism, uneven development, centralised governance, and dependence on external capital and technology, and where mainstream frameworks shaped by Global North experiences often miss the lived experiences of communities in resource-rich regions (Andreucci et al., 2023; Astuti, Raman, & Yeremia, 2025; Batel & Devine-Wright, 2017; Gather, Prowse, & Seussler, 2025; Sovacool, Martiskainen, Hook, & Baker, 2019; Stevis & Felli, 2020).

Indonesia provides a significant case for examining these tensions. The country must simultaneously reduce fossil-fuel dependence, expand renewable energy, ensure economic development, improve energy security, and respond to climate change. The Just Energy Transition Partnership (JETP) has further internationalised its transition by linking decarbonisation objectives with large-scale international finance (Secretariat of Just Energy Transition Partnership, 2023, 2025). Recent Indonesian research stresses the same tension: Yuniza, Salim, Triyana, and Triatmodjo (2024) revisit just transition in Indonesian policy, Jindal, Shrimali, Gangwani, and Lall (2024) examine just-transition finance for Southeast Asia including Indonesia, and Mulia, Wukirasih, and Suryadinata (2023) assess the Energy Transition Mechanism country platform in Indonesia. Yet national policy is implemented in particular territories, where projects require land, water, infrastructure, transmission, investment, licensing, and social legitimacy, so social and ecological consequences are experienced locally even when projects are designed and financed nationally and internationally.

West Sumatra provides an especially important case. The province has significant renewable-energy potential, including geothermal, hydropower, solar, biomass, and other renewable resources. Its regional energy planning framework seeks to increase renewable-energy development as part of the province's long-term energy transformation (Government of West Sumatra,

2019; Fajri, Yuliarti, Hanoselina, & Wahyuni, 2023). Yet the existence of renewable-energy potential does not automatically produce a just transition.

Research on renewable-energy policy in West Sumatra has identified significant policy-capacity problems. Fajri et al. (2023) find that low analytical and operational capacity, changing political priorities, weak political commitment, and insufficient transparency have constrained renewable-energy development. The authors also identify public resistance associated with inadequate transparency in policy formulation.

Research on geothermal development provides further evidence. Anggreta, Somantri, and Purwanto (2022) found substantial variation in social acceptance between geothermal projects in South Solok and Solok. Social acceptance was relatively strong where the company positioned surrounding communities as partners, whereas another project encountered weaker acceptance and resistance.

These findings suggest that the question is not simply whether communities support renewable energy. Rather, it is necessary to ask: under what institutional conditions do communities regard renewable-energy development as legitimate?

This question is central to recent research by the Center for Agrarian and Environmental Justice (CAEJ), Universitas Andalas. Its 2026 policy brief, *Transisi Energi Berkeadilan di Sumatera Barat: Dari Proyek Teknokratis menuju Tata Kelola Berbasis Nagari*, identifies a mismatch between centralised national policy and local social, customary, and economic realities. It identifies three major problems: administrative rather than substantive participation, weak recognition of customary land, and inadequate distribution of economic benefits to nagari communities (Center for Agrarian and Environmental Justice [CAEJ], 2026).

The CAEJ research examined several renewable-energy sites in West Sumatra and specifically examined the floating solar photovoltaic project at Danau Singkarak, the geothermal project at Gunung Talang, and the Muara Laboh

geothermal project (CAEJ, 2026). The findings are significant because they challenge a conventional interpretation of resistance.

Community resistance should not automatically be understood as opposition to renewable energy. Instead, it may indicate dissatisfaction with: how decisions are made; whose land is used; who is recognised; who receives benefits; who bears ecological risks; and who owns the resulting infrastructure.

The article advances three arguments. First, the principal challenge is not technological but institutional and political. Second, energy justice and energy democracy should be analysed together because justice concerns the fairness of outcomes and procedures, while democracy addresses the distribution of authority and ownership. Third, community ownership should be treated as a central mechanism of just transition because it allows communities to capture economic value and exercise durable influence over energy systems. The article therefore proposes nagari-based energy democracy as an alternative governance framework.

LITERATURE REVIEW

Energy justice, energy democracy, and ecological justice

Early energy-transition scholarship emphasised technological innovation, infrastructure, and institutional change. The multi-level perspective conceptualises transitions as interactions among technological niches, dominant regimes, and broader landscape pressures (Geels, 2002, 2011). That perspective is useful background here, but it is not the analytical framework of this article: it explains how technologies and regimes change, not by itself who decides, who owns, or who bears a project's costs. The framework below is therefore justice and democracy. Araújo (2014) argues that energy transitions are simultaneously technological, economic, political, and social, and Markard et al. (2012) similarly show that sustainability transitions involve changes in technologies, institutions, organisations, markets, user practices, and cultural meanings.

The political implications are important. Energy systems embody relations of power. The transition therefore raises questions such as: who determines the

energy agenda? Who controls investment? Who owns infrastructure? Who determines land use? Who receives economic benefits? Who bears ecological risks? These questions establish the connection between energy transition and justice.

Just transition emerged from labour and environmental movements but has expanded into a broader framework for managing the social consequences of decarbonisation. Heffron and McCauley (2018) emphasise the relationship between climate, energy, and environmental justice. That diversity is useful but creates a risk: if almost any desirable outcome is described as just transition, the concept becomes politically weak. This article therefore adopts a more specific definition: a just energy transition is a transformation of energy systems that simultaneously addresses decarbonisation, distribution, participation, recognition, ecological integrity, and control over energy resources and infrastructure. This definition deliberately incorporates energy democracy.

Energy justice provides the normative foundation for evaluating energy systems. Jenkins et al. (2016) identify three central dimensions: first, distributional justice; who benefits? Who pays? Who bears environmental and social costs? Second, procedural justice; who participates? When do they participate? Can their participation change decisions? Third, recognition justice; whose rights, identity, knowledge, history, and territorial relationships are recognised?

Sovacool and Dworkin (2015) broaden energy justice by applying it to energy production, consumption, security, and climate policy. Bouzarovski and Simcock (2017) add a spatial dimension, showing that energy injustices are geographically uneven. Sovacool et al. (2019) further demonstrate that low-carbon transitions can reproduce or generate new injustices, even in the name of decarbonisation. Cipler (2021) develops a framework moving from energy privilege to energy justice, and Govindarajan and Ganesh (2022) integrate energy governance with environmental justice. In West Sumatra, that spatial point matters directly: the territory that hosts a project is not necessarily the territory that controls or benefits from its value.

Energy democracy addresses precisely this question of power. Szulecki (2018) conceptualises it through popular sovereignty, participatory governance, and civic ownership. Burke and Stephens (2017) define it as a sociopolitical project linking renewable-energy transformation with socioeconomic and political transformation. Becker and Naumann (2017) similarly associate it with decentralised and alternative forms of energy provision and governance. The central proposition is: energy democracy concerns who decides, who owns, and who controls.

Energy justice and energy democracy are complementary. Energy justice asks: is the transition fair? Energy democracy asks: who has the power to make the transition fair? Energy justice can therefore be understood as the normative dimension, while energy democracy provides an institutional and political mechanism. Without democratic control, justice may remain dependent on state or corporate goodwill. Without justice, community ownership itself may reproduce inequality if local elites capture decision-making. The two concepts must therefore be integrated.

Energy justice must also be expanded beyond human distribution. Renewable-energy projects are not ecologically neutral. Geothermal projects affect land, water, forest, and landscape. Floating solar projects affect lake-use relations, fisheries, tourism, visual landscapes, and other ecological-social relationships. Hydropower can alter river systems and downstream livelihoods. Solar projects can generate land-use conflicts and material and waste concerns. Consequently, the transition should be evaluated through ecological justice as well as carbon reduction.

The relevant question is not simply: how much carbon does this project avoid? But also: what ecological relationships does the project transform? This is particularly relevant to Global South debates about green extractivism and decarbonisation by dispossession (Andreucci et al., 2023; Astuti et al., 2025; Batel & Devine-Wright, 2017). This concern also resonates with the concept of energy colonialism, in which apparently local energy infrastructures remain embedded in wider relations of power between external actors and local territories (Batel & Devine-Wright, 2017).

Community ownership and the limits of acceptance

Walker and Devine-Wright (2008) demonstrate that community renewable energy should be evaluated through both process and outcome. The process dimension concerns: who develops the project? The outcome dimension concerns: who benefits? Creamer, Aiken, van Veelen, Walker, and Devine-Wright (2019) demonstrate that community energy has developed into a diverse field of practices, making it necessary to distinguish between symbolic community participation and substantive community control.

Community-energy research further emphasises the importance of local participation, social impacts, institutional arrangements, and the distribution of project benefits (Brummer, 2018; Rogers, Simmons, Convery, & Weatherall, 2012; Walker, Devine-Wright, Hunter, High, & Evans, 2010).

Community ownership therefore cannot be equated with geographical proximity, local employment, corporate social responsibility, consultation, or project acceptance (Brummer, 2018; Creamer et al., 2019; Rogers et al., 2012; Walker & Devine-Wright, 2008). A stronger definition is: community ownership exists when a community possesses meaningful and durable rights over assets, revenues, or strategic decisions associated with energy production. This definition does not require complete community ownership: co-ownership, equity participation, revenue rights, or institutional representation may also constitute meaningful ownership depending on governance arrangements.

Recent research sharpens that distinction: Hogan (2024) tests energy-justice explanations for why community ownership fosters greater acceptance, Linnerud et al. (2019) show that ownership change can shift community attitudes, Lowitzsch (2019) examines renewable-energy communities and consumer co-ownership, and Minuto and Lanzini (2022) show that energy-sharing outcomes depend on the ownership scheme in place. Ownership arrangements, not proximity or consultation alone, shape whether acceptance is durable.

The literature on renewable energy often focuses on social acceptance (Devine-Wright, 2005; Gross, 2007; Wolsink, 2007; Wüstenhagen, Wolsink, & Bürer, 2007). However, acceptance can be misleading (Gross, 2007; Walker & Baxter,

2017): communities may accept a project because alternatives are unavailable, compensation is attractive, resistance is costly, information is limited, or political power is unequal. This article therefore proposes social legitimacy instead. Acceptance asks: does the community support the project? Legitimacy asks: was the project decided through fair procedures, recognised rights, equitable benefits, and ecological responsibility?

Recognition of customary rights is central to that test in Indonesia. Mulyani (2022) compares the Baduy and Minangkabau adat communities and shows that recognition of adat communities in Indonesian law is not uniform across communities, so recognition cannot be treated as a single administrative step. Ridho et al. (2025) draw lessons for energy justice and inclusive transitions from community renewable energy in Southeast Asia, and Wirawan and Gultom (2021) examine village grid electrification and poverty reduction in remote areas of Indonesia. Both are context for the local-economy dimension, not evidence about the three West Sumatran cases.

METHOD

This research employs a qualitative comparative case-study approach. Three cases were selected: Danau Singkarak; Gunung Talang; and Muara Laboh. The cases differ in technology and institutional configuration but share a common characteristic: renewable-energy development intersects with local territorial, social, economic, and ecological relations. The comparative design allows the research to identify mechanisms that cut across technological differences.

The method is documentary research combined with secondary analysis. The empirical account of the three cases is drawn from the field research of the Center for Agrarian and Environmental Justice (CAEJ), Universitas Andalas, as reported in its policy brief published on 15 April 2026 (CAEJ, 2026). This article does not claim a new programme of interviews, focus groups, or site observations, and it reports no interview sample, survey result, or site-visit count, because no such primary dataset is stated in the sources used. Its contribution is the comparative analysis of that reported evidence across the three cases and the synthesis of the nagari-based framework from it. Where this

article says the CAEJ research identifies or finds something, the claim is attributed to the CAEJ brief, not presented as a fresh field observation by this article.

Case selection followed three criteria. First, each case is a renewable-energy project in West Sumatra, so provincial policy, customary institutions, and territorial relations are shared context. Second, the cases differ in technology and configuration: floating solar at Danau Singkarak, geothermal at Gunung Talang, and geothermal at Muara Laboh under a different investment and operational profile. Third, each case intersects nagari territory, customary land, livelihoods, or ecological systems, so the same justice and democracy dimensions can be applied to all three. No claim is made that these are the only renewable-energy cases in West Sumatra, and no excluded case is characterised, because the corpus does not support such a claim.

The document corpus has four parts. First, the CAEJ policy brief of 15 April 2026 (CAEJ, 2026), which identifies the mismatch between centralised policy design and local customary and economic realities as the central problem, specifically formalistic participation, weak recognition of tanah ulayat, and insufficient benefit distribution at the nagari level. Second, government, policy, planning, and project documents, including the West Sumatra regional energy plan (Government of West Sumatra, 2019), the JETP documents (Secretariat of Just Energy Transition Partnership, 2023, 2025), and Asian Development Bank documents on Muara Laboh (Asian Development Bank, 2024, 2025). Third, academic literature on energy justice, energy democracy, community ownership, and Indonesian energy governance. Fourth, secondary reporting used only to locate project context, not as a substitute for the brief, policy documents, or peer-reviewed evidence. A document was included if it addressed renewable-energy governance in West Sumatra or, for comparative literature, the same justice, democracy, ownership, or recognition dimension in a comparable setting, and if its scope and date could be stated. Documents addressing only installed capacity or emissions, without governance, participation, recognition, distribution, or ownership content, were excluded, because they could not answer the research questions.

Analysis followed four steps. First, each case was mapped onto the five analytical dimensions in Table 1, with ecological justice as a cross-cutting dimension. Second, the three cases were compared across those dimensions in Table 2, distinguishing a pattern appearing in only one technology from one appearing across technologies. Third, each case was assessed against the ten indicators in Table 3. Table 3 is a proposed framework for judging whether a project is just, not a set of measured scores: no indicator is reported as a measured value for any case, because the corpus contains no such measurements. Fourth, the comparison was synthesised into the nagari-based framework in Figure 1. Triangulation here means checking a CAEJ finding against policy, project, and peer-reviewed sources where possible, and stating where it is not possible, rather than treating any single source as conclusive.

Table 1. Five Analytical Dimensions

Dimension	Main question
Governance	Who makes decisions?
Participation	Can local participation alter decisions?
Recognition	Are customary rights and local knowledge recognised?
Distribution	Who receives benefits and bears costs?
Ownership	Who owns and controls the energy asset?

Note. Ecological justice is treated as a cross-cutting dimension across all five dimensions in Table 1. Resistance is not treated as an independent indicator of anti-renewable sentiment. Resistance is interpreted as a potential claim for justice requiring examination of its institutional causes.

Four limitations apply throughout. First, because the empirical account is a secondary analysis of CAEJ research as reported in its brief, this article cannot report interview quotations, respondent numbers, or fieldwork procedures that the brief does not state, and it does not do so. Second, the cases differ in stage, and that asymmetry is stated rather than smoothed over: Danau Singkarak is a proposed project, Muara Laboh is described as having substantial investment and operational success, and the stage of Gunung Talang is not stated in the source used and is therefore not specified here. Comparison across stages is valid for governance mechanisms, but not for claims about operational

performance at Singkarak. Third, gender and equity findings are limited: the gender and equity dimensions of low-carbon transitions in West Sumatra (Aung et al., 2020) are used only to design safeguards, because no gender-specific finding for any case is reported in the corpus. Fourth, all findings are qualitative patterns: no capacity, investment, percentage, or count is added, and no project is scored against Table 3, because the corpus does not contain such measurements.

RESULT AND DISCUSSION

The governance gap and the problem of distance

The most significant finding is the existence of a persistent governance gap between national energy-transition objectives and local territorial realities. The dominant policy trajectory follows a largely top-down chain from the global climate agenda and national energy policies to provincial planning, project development, and local implementation. However, communities encounter renewable-energy projects through the concrete realities of land, livelihoods, customary rights (adat), ecological systems, local political relations, and community welfare.

Energy-transition policies are therefore often designed at higher levels but implemented within territories with distinct social, ecological, and institutional conditions. Project success cannot be assessed solely in terms of installed capacity, investment, or emissions reduction; it must also be judged by whether national objectives are translated into locally legitimate participation, recognition, benefit-sharing, ecological protection, and community decision-making.

The problem occurs when the first chain is imposed upon the second without adequate institutional translation. This produces what may be called a governance distance. The greater the governance distance between decision-making and affected communities, the greater the possibility that technically viable projects will experience social conflict.

Danau Singkarak: territorial legitimacy and a proposed project

The Danau Singkarak case concerns the proposed floating solar photovoltaic project (CAEJ, 2026). The project demonstrates the difference between renewable-energy legitimacy and technological feasibility. Solar energy is widely regarded as a low-carbon technology. Yet this does not resolve questions concerning: lake governance, customary relationships, local livelihoods, environmental impacts, landscape, public participation, and territorial authority.

The case therefore demonstrates that even a technologically clean project may face local resistance when communities perceive the project as externally designed. The relevant question is not: is floating solar renewable? It is: who decides whether, where, and under what conditions floating solar should be developed on a shared territorial resource? This is an energy-democracy question.

The case also demonstrates the importance of timing. If participation occurs only after the technology and location have effectively been selected, participation becomes a mechanism of project communication rather than democratic decision-making (Cass, Walker, & Devine-Wright, 2010; Walker & Devine-Wright, 2008). The appropriate mechanism is therefore deliberation before final project siting.

Comparative Indonesian floating-solar research gives a reason for that caution without supplying Singkarak data: Andini et al. (2022) evaluate lake parameters for floating solar in a mesocosm experiment, and Rifansyah and Hakam (2024) study the techno-economic feasibility of a floating solar project in Indonesia. Neither is evidence about Singkarak; both show that lake effects and feasibility must be assessed for a specific lake and governance arrangement, not assumed from the technology alone.

Gunung Talang: participation, trust, and social legitimacy

The Gunung Talang geothermal case illustrates the relationship between renewable energy and social legitimacy. Geothermal energy is strategically important for Indonesia because it provides relatively stable renewable

electricity. Yet geothermal development involves land, infrastructure, environmental risks, and long-term territorial changes. The case demonstrates that the problem cannot be reduced to whether geothermal technology is environmentally preferable to fossil fuels. The critical question is: whether communities perceive the project as a legitimate transformation of their territory.

This finding is consistent with Anggreta et al. (2022), whose study of geothermal development in West Sumatra found significant differences in social acceptance between project locations: acceptance was stronger where the company positioned communities as partners, and weaker where local relationships were weak (Anggreta et al., 2022; Walker et al., 2010). Thus, trust is not a communication outcome; it is an institutional product, developing when communities can verify information, participate in decisions, observe benefit distribution, and access grievance mechanisms (Walker et al., 2010; Rogers et al., 2012).

Comparative geothermal research supports the same reading without substituting for the Talang evidence: Yusrifa et al. (2024) examine how socio-cultural relations form community perceptions of geothermal energy in Lahendong, and Mahamoud Abdi et al. (2024) identify determinants of geothermal acceptance in Kenya. Both are comparative context for the claim that perceptions are formed through social relations and institutions, not technology alone.

Muara Laboh: distribution, ownership, and internationalised finance

Muara Laboh represents a different problem. Unlike a project that is primarily characterised by initial opposition, Muara Laboh can be interpreted as an example of a renewable-energy project with substantial investment and operational success but continuing questions about local benefit distribution. The CAEJ research identifies latent dissatisfaction concerning the relationship between the project and surrounding communities (CAEJ, 2026). The problem is particularly important because the project has become part of a broader internationalised energy-finance system.

The expansion of Muara Laboh demonstrates how renewable-energy infrastructure can mobilise international finance, development finance, private capital, state institutions, and corporate actors (Asian Development Bank, 2024, 2025). That creates a political-economic question: if global and national actors capture most of the financial value generated, what institutional mechanism ensures durable local value capture? Jindal et al. (2024) examine how just-transition finance is structured in Southeast Asia, showing that finance arrangements themselves, not only technology, shape who captures value. The point is structural, not a claim about any single loan term, which the corpus does not state.

Corporate social responsibility is insufficient. Temporary employment is insufficient. Project acceptance is insufficient. The more transformative question is: can communities participate in ownership and long-term revenue generation? This is where energy democracy becomes essential.

Table 2. Comparative Problems of JET in West Sumatra

Dimension	Danau Singkarak	Gunung Talang	Muara Laboh
Technology	Floating solar PV	Geothermal	Geothermal
Main issue	Territorial legitimacy	Participation and trust	Distribution and ownership
Participation	Risk of late/formal consultation	Conflict when participation is weak	Need for continuing participation
Recognition	Lake, customary and local territorial interests	Land and community rights	Community interests within investment structure
Distribution	Unclear long-term local value capture	Need for durable benefits	CSR does not substitute for benefit-sharing
Ownership	Strong potential for community solar/cooperative model	Potential co-governance	Potential community equity/revenue rights
Ecological justice	Lake ecology and multiple uses	Land, forest, water and landscape	Geothermal landscape and cumulative impacts
Governance challenge	Centralised project design	Trust and local legitimacy	Long-term local value capture

Democratic opportunity	Nagari/cooperative solar	Co-governance	Community equity and binding benefit- sharing
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Note. Table 2 summarises the qualitative comparison in this article. It is not a scored assessment: no cell in Table 2 is a measured value, and the stage asymmetry noted in the Method applies, since Singkarak is a proposed project while Muara Laboh is operating.

Participation, recognition, and distribution across the three cases

The cases differ, but the same structural pattern emerges: renewable-energy projects are developed through institutions whose ownership and decision-making structures remain more distant from affected communities than the ecological and social consequences of those projects. This is the central empirical finding of the article.

The CAEJ findings indicate that community participation remains largely administrative. This distinction matters. Participation can mean: being informed; attending a meeting; receiving project information; signing an agreement. But democratic participation requires: access to information; deliberation; ability to propose alternatives; ability to reject or modify aspects of the project; representation; and accountability. Therefore: attendance is not participation, and participation is not necessarily power. A just transition requires participation that changes outcomes.

The issue of tanah ulayat demonstrates why recognition justice is indispensable. Customary territory is not simply land. It can constitute identity, livelihood, political authority, ecological responsibility, collective memory, and intergenerational inheritance. When land is treated exclusively as an economic asset, these dimensions disappear from project appraisal, creating an institutional conflict between investment logic and customary-territorial logic. A just transition requires the latter to be recognised rather than treated as an obstacle to investment. The comparative context is Mulyani (2022), whose comparison of the Baduy and Minangkabau adat communities shows that recognition is not uniform across communities, so a single administrative step cannot be assumed to settle the question for a nagari.

The CAEJ research identifies weak distribution of economic benefits at the nagari level (CAEJ, 2026). This creates an important distinction between: (1) corporate social responsibility, a discretionary corporate responsibility mechanism. (2) Benefit-sharing, a binding institutional arrangement for distributing project value. (3) Ownership, a mechanism through which communities possess rights over assets and future value. These three concepts should not be treated as equivalent (Cass et al., 2010; Walker & Baxter, 2017).

The article therefore proposes a continuum from corporate social responsibility to benefit-sharing, co-ownership, and ultimately community ownership (Cass et al., 2010; Walker & Baxter, 2017; Brummer, 2018): a shift from compensatory and discretionary mechanisms toward institutionalised economic participation, decision-making power, and control over energy assets. This does not imply that corporate social responsibility has no value.

Corporate social responsibility can provide important social and environmental contributions, particularly where immediate community needs require support. However, corporate social responsibility should not be treated as a substitute for institutionalised benefit-sharing, meaningful participation, or community ownership. A just energy transition requires moving beyond corporate responsibility toward arrangements that enable communities to share not only in the benefits generated by renewable-energy projects, but also in their governance, economic value, and ownership.

From acceptance to legitimacy, and from value chain to shared value

The dominant energy model can be represented as a linear value chain: resource, investor, project company, utility, consumers, in which decision-making authority and economic value are concentrated among investors, project developers, and utilities, while local communities largely remain resource holders, affected populations, or end-users (Becker & Naumann, 2017; Burke & Stephens, 2017; Szulecki, 2018). A more democratic model would reconfigure this as: resource, community or cooperative plus investor, jointly governed project, utility or community users, shared value. The key transformation is repositioning communities as institutional actors with meaningful authority over decisions, benefit distribution, and, where feasible,

ownership, aligning investment and technical capacity with local knowledge, territorial rights, and community interests.

This does not mean eliminating external investors, which large projects often require for capital, expertise, risk management, engineering, and market access. The issue is under what terms external capital participates. A just transition should change those terms.

The cases demonstrate why carbon reduction cannot be the sole ecological indicator. A project may reduce emissions but still: alter land-use relations; affect water; transform landscapes; restrict traditional activities; or generate cumulative ecological impacts. Ecological justice therefore requires: ecological safeguards; cumulative-impact assessment; local ecological knowledge; restoration obligations; community monitoring; and transparent environmental data. The energy transition must therefore be evaluated at the landscape level rather than only at the project level.

The empirical findings suggest that the core problem of West Sumatra's energy transition is not insufficient renewable-energy potential. It is the political organisation of renewable-energy development. A technocratic model asks: how can renewable capacity be increased? A justice-oriented model asks: how can renewable capacity be increased fairly? An energy-democracy model asks: how can renewable capacity be increased while redistributing control over energy systems? The third question is the contribution of this article.

Community ownership is not merely an economic arrangement. It is a political institution: ownership determines access to revenues, strategic decision-making, accountability, investment priorities, and long-term value capture (Burke & Stephens, 2017; Szulecki, 2018; Walker & Baxter, 2017). That is why community ownership should be integrated into just-transition frameworks. A community that owns a portion of an energy asset has a different relationship with the energy system from a community that receives corporate social responsibility: the former is an economic actor, the latter remains primarily a beneficiary.

The ownership literature explains why that difference matters for acceptance itself: Hogan (2024), Linnerud et al. (2019), Lowitzsch (2019), and Minuto and Lanzini (2022) together support the claim that ownership, not consultation alone, links acceptance to legitimacy. None of these studies is evidence about West Sumatra, and none is used as such.

Nagari-based energy democracy

The most important institutional contribution of this article is the concept of nagari-based energy democracy. The nagari should not be romanticised as inherently democratic. Local institutions can contain: gender inequalities; class differences; political patronage; customary hierarchies; and elite capture. Nevertheless, the nagari provides an existing territorial institution through which energy governance can be localised.

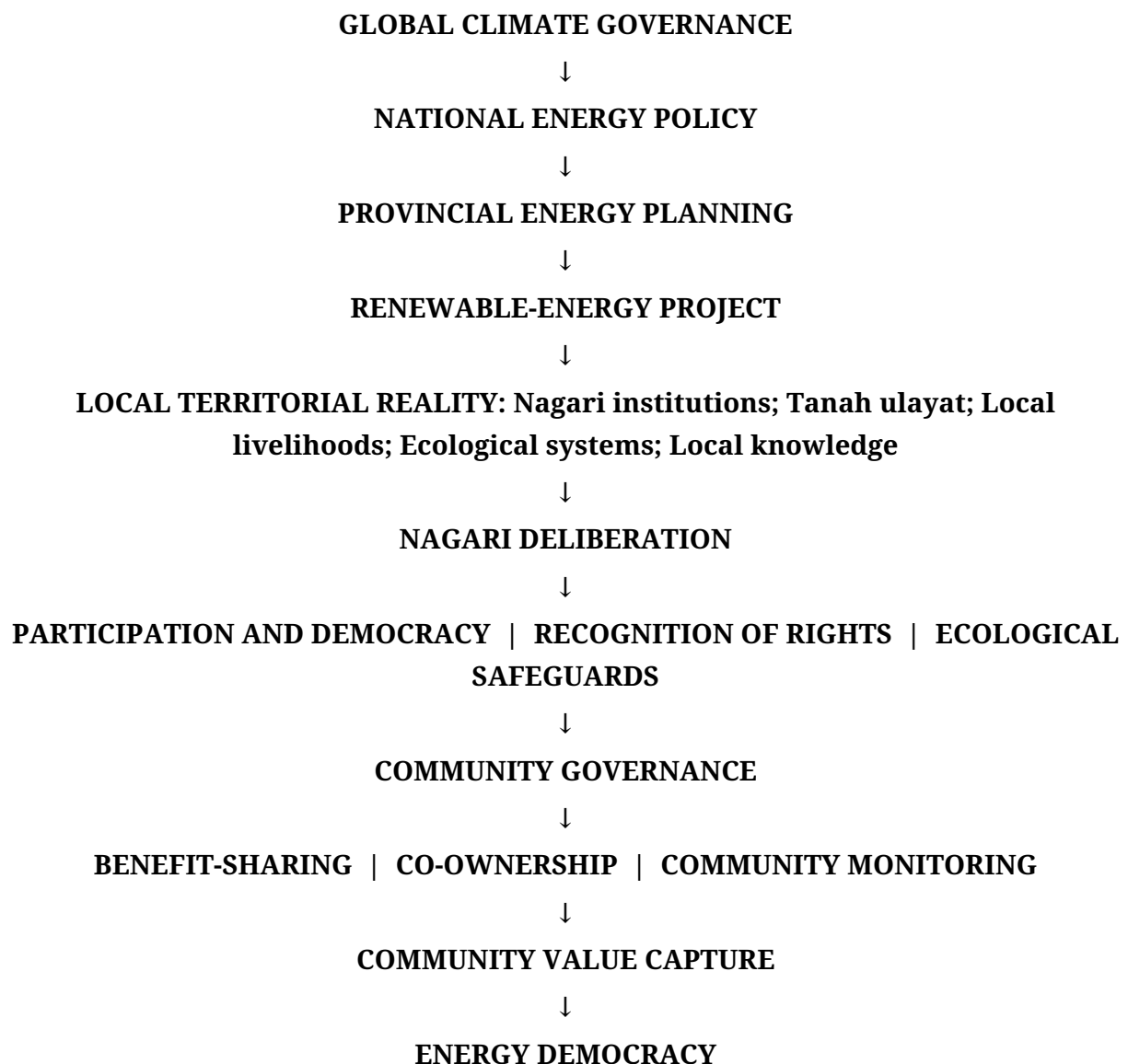
Nagari-based energy democracy consists of six components. (1) Deliberative authority: major energy projects should be deliberated through Musyawarah Nagari before final siting decisions. (2) Recognition: customary rights and territorial relationships should be assessed before project approval. (3) Transparency: project information, financing, environmental impacts, contracts, and benefit-sharing mechanisms should be publicly accessible. (4) Benefit-sharing: communities should receive legally or contractually enforceable benefits. (5) Community ownership: nagari institutions, cooperatives, BUMNag, or other community entities should have opportunities for equity participation. (6) Ecological accountability: communities should participate in environmental monitoring and grievance mechanisms.

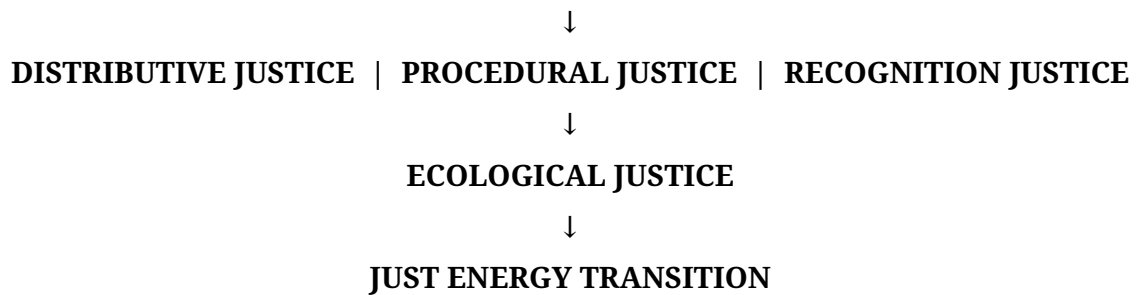
The framework differs from conventional transition models because the local institution is not positioned at the end of the policy chain. It is positioned as a governance intermediary between national objectives and project implementation.

Community ownership is not automatically democratic. There is a danger that customary elites, political elites, wealthy households, local entrepreneurs, or dominant organisations capture community energy institutions. Nagari-based energy democracy must therefore include internal safeguards, particularly

because energy transitions in West Sumatra also have gender and equity dimensions that can be obscured by institutionally narrow approaches to project governance (Aung et al., 2020). These include: one-member-one-vote principles where appropriate; transparent membership; gender, youth, and vulnerable-household representation; public financial reporting; independent auditing; conflict-of-interest rules; grievance mechanisms; and democratic leadership rotation. Thus, community ownership must be democratic ownership.

Figure 1. Nagari-Based Energy Democracy for a JET





Note. Figure 1 is rebuilt cleanly from the framework in this article. It introduces no new stage or label: each stage and each parallel item is taken from the framework text and the six nagari components.

The West Sumatra case contributes to broader debates on just transitions in the Global South. Scholarship emphasises that just-transition frameworks must account for community agency, historical inequalities, extractive relations, and differentiated local experiences rather than treating communities simply as beneficiaries or obstacles (Astuti et al., 2025; Gather et al., 2025; Sovacool et al., 2019; Stevis & Felli, 2020). Astuti et al. (2025) show the importance of moving beyond a binary of resistance versus compliance toward how communities experience, negotiate, and shape transition processes. That perspective fits West Sumatra, where opposition does not necessarily indicate rejection of decarbonisation, but may reflect demands for recognition, participation, equitable benefits, livelihood and customary-rights protection, and greater community influence over decisions.

It may be demanding: recognition; participation; transparency; compensation; ecological protection; or ownership. This means that resistance can be interpreted as a democratic resource. The implication is: a just transition should not eliminate resistance; it should create institutions through which legitimate grievances can influence energy decisions.

Six policy recommendations

The findings generate six policy recommendations. (1) Make Musyawarah Nagari a pre-siting requirement. Musyawarah Nagari should occur before: final project location; major land arrangements; technology selection where alternatives exist; and major investment commitments. This would move participation upstream. (2) Institutionalise social-adat verification. Project

licensing should include a mandatory assessment of customary rights; affected communities; livelihood dependence; local institutions; gender; vulnerable groups; ecological relationships; and conflict risks. (3) Establish binding benefit-sharing. Benefit-sharing should be legally or contractually enforceable. It may include: revenue-sharing; community development funds; cooperative equity; local procurement; environmental funds; and social dividends (Cass et al., 2010; Walker & Baxter, 2017). (4) Establish nagari energy cooperatives. The provincial government should facilitate cooperatives capable of developing rooftop solar; owning public-building solar systems; managing microgrids; providing energy services; investing in larger projects; and holding equity in renewable-energy ventures. (5) Create community energy finance. Community ownership requires finance. Possible mechanisms include: concessional loans; blended finance; revolving funds; provincial guarantees; cooperative equity; climate grants; green sukuk; and community investment mechanisms. (6) Establish community environmental monitoring. Communities should participate in water monitoring; biodiversity monitoring; land-use monitoring; social-impact monitoring; and grievance resolution (Sovacool & Dworkin, 2015; Bouzarovski & Simcock, 2017).

Table 3. Renewable-Energy Justice Indicators

Dimension	Indicator
Decarbonisation	Renewable capacity and emissions reduction
Participation	Proportion of major decisions subject to local deliberation
Recognition	Customary-rights assessment completed
Distribution	Local share of project benefits
Ownership	Community/cooperative equity
Inclusion	Representation of women, youth and vulnerable groups
Ecology	Restoration and environmental-monitoring performance
Transparency	Public availability of project information
Accountability	Functioning grievance mechanism
Local economy	Local employment and procurement

Note. Table 3 is a proposed indicator framework, not a set of results. No indicator in Table 3 is scored or measured for any case in this article, and no case is described as passing or failing any indicator, because the corpus contains no such measurements.

A renewable-energy project should not be considered successful merely because it reaches financial close; obtains a licence; achieves commercial operation; produces electricity; or reduces emissions. A just project should also demonstrate: social legitimacy; recognition; fair participation; benefit-sharing; community value capture; ecological accountability; and democratic ownership or control.

CONCLUSION

RQ1 asked: what are the principal problems of just energy transition in West Sumatra? The answer is institutional rather than technological: a governance gap between centralised policy and nagari territorial reality, participation that remains administrative rather than deliberative, weak recognition of customary land and territorial relationships, and economic benefits weakly institutionalised at the nagari level. Those problems appear across technologies and project stages, which is why they are described here as structural rather than incidental to any single project.

RQ2 asked: how do existing governance arrangements constrain energy democracy, ecological justice, and community ownership? They constrain them by keeping decision-making, ownership, and value capture distant from the communities that bear the social and ecological consequences. Participation after siting and technology choices are effectively settled cannot change outcomes. Customary territory treated only as an economic asset loses the identity, livelihood, authority, ecological responsibility, and inheritance dimensions that make recognition meaningful. Benefit arrangements that remain discretionary corporate social responsibility cannot substitute for binding benefit-sharing or ownership, because they leave communities as beneficiaries rather than actors with durable rights. Ecological assessment counting only carbon reduction misses the land, water, landscape, and livelihood relationships that projects transform.

RQ3 asked: how can nagari-based governance contribute to a more democratic and just energy transition? It can contribute by positioning the nagari as a governance intermediary rather than the administrative endpoint of national policy. Deliberative Musyawarah Nagari before final siting decisions, assessment of customary rights before project approval, publicly accessible project information, legally or contractually enforceable benefit-sharing, opportunities for community and cooperative equity, and community participation in environmental monitoring together move the nagari from being consulted about a project to governing its terms. Internal safeguards, including transparent membership, representation of women, youth, and vulnerable households, public financial reporting, independent auditing, conflict-of-interest rules, grievance mechanisms, and democratic leadership rotation, are part of the framework, not an addition to it, because community ownership without democratic safeguards can be captured by local elites.

Energy democracy adds the missing question of power: who decides and who owns? Ecological justice adds another: what happens to the ecosystems and territorial relationships through which energy is produced? Community ownership adds the political-economic mechanism: who captures long-term value? The proposed concept of nagari-based energy democracy connects these dimensions, positioning the nagari not merely as the administrative endpoint of national energy policy but as an institutional actor in energy governance.

The model does not require rejecting state institutions, PLN, private investment, or international climate finance. Instead, it seeks to democratise their relationship with local communities. This is particularly important for the Global South, where renewable-energy transitions increasingly intersect with histories of extractivism, unequal development, and territorial dispossession (Andreucci et al., 2023; Astuti et al., 2025).

The ultimate challenge is therefore not simply to accelerate renewable-energy deployment. It is to transform: who decides, who owns, who benefits, who bears risks, and whose knowledge counts. For West Sumatra, this transformation can begin with the institutional capacities already embedded within nagari governance and cooperative organisation. The goal should consequently be

understood not simply as a transition to renewable energy, but as a transition toward democratic, ecologically just, and community-owned energy systems.

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