

Indonesia's Energy Policy as a Forum for Justice in the Global Green Transition

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ARTICLE INFO

Keywords:

Decarbonisation, Economic growth, Energy policy, Green transition, Socio-ecological

DOI:

10.65586/jpr.v2i2.110

Article History:

Submitted: 30-07-2026

Revised: 10-08-2026

Accepted: 13-08-2026

Published online: 15-08-2026

Published by:

Mahkota Science Publishers

ABSTRACT

In the context of the global green transition, Indonesia's energy policy has become a contested arena where decarbonisation agendas, power relations and distributive justice collide. This study analyses how policies, configurations of actors, discourses and power relations shape the distribution of the benefits and burdens of the energy transition, determining the prospects for a just transition. A qualitative approach is employed, using a critical case study design complemented by descriptive quantitative analysis. The findings suggest that Indonesia's energy transition involves more than just a shift from fossil fuels to low-carbon energy. It also constitutes an arena for the redistribution of power, benefits and risks. Coal production illustrates a paradox in that it contributes to state revenue, energy security and the regional economy, while also concentrating socio-ecological costs. Conversely, nickel and electric vehicles demonstrate that the green economy can perpetuate extractivism and generate new dependencies when resource advantages are not transformed into technological proficiency and equitable value distribution. These findings suggest that energy injustice arises not only as a consequence of policy, but also through political mechanisms determining who reaps the benefits, bears the risks and influences the direction of the transition.

A. Introduction

The debate on the global energy transition has evolved from technical issues concerning emissions reduction to an economic and political arena that determines the distribution of benefits, burdens, risks and power (Fabra & Reguant, 2024). The transition to a low-carbon energy system demands not only technological change, but also the restructuring of policies, investment, employment, resource management, and the relationships between states, markets and society. In this context, international commitments through the Paris Agreement, Nationally Determined Contributions, climate finance, the phasing out of fossil fuels, and the development of low-carbon technologies are increasingly influencing the direction of national energy policy (Janzwood & Harrison, 2023). However, countries' capacity to respond to this agenda is not distributed equally. Developing countries face a more complex dilemma, as the demands of decarbonisation must be balanced against the need for economic growth, energy security, industrialisation, job creation and the reduction of inequality.

Indonesia is a key case study in these dynamics, as it occupies a dual position. It remains dependent on fossil fuels whilst possessing significant potential in renewable energy and strategic minerals required for a low-carbon economy (Murthi et al., 2025). Coal still plays a vital role in the electricity system, government revenue, regional economies, investment and employment, whilst the decarbonisation agenda is driving the acceleration of renewable energy, transport electrification, the development of the battery industry, the downstream processing of critical minerals, and the phasing out of coal-fired power stations. This situation means that Indonesia's energy transition is not linear, but rather unfolds through a negotiation between energy security, the national development agenda, industrialisation, corporate interests, global financing, and climate commitments. These interactions involve central and local governments, energy companies, state-owned enterprises, international financial institutions, investors, civil society, workers, and local communities, all of whom possess unequal interests, resources, and political capacity.

These conditions underscore that Indonesia's energy policy is an arena of justice. The framework of energy justice provides a conceptual basis for assessing these dimensions through distributive justice, procedural justice and recognition justice (Van Uffelen et al., 2024). Distributive justice relates to how economic benefits, access to energy, employment opportunities, transition costs and ecological risks are allocated amongst different groups and regions (Apergi et al., 2024). Procedural justice relates to access to information, transparency of processes, representation, and the capacity of affected communities to influence decisions. Recognition justice demands that social, economic and cultural differences, as well as communities' vulnerabilities and dependence on resources, are not overlooked in the policy-making process. These three dimensions are inseparable, as the distribution of benefits and costs is often a direct result of decision-making structures and of unequal recognition of certain groups.

The literature on energy justice and just transition has shown that a low-carbon transition can generate new inequalities when social and ecological costs are concentrated in specific communities, whilst economic benefits are largely enjoyed by actors with access to capital, technology and political power (Dwarkasing, 2023; Siksnyte-Butkiene & Streimikiene, 2026). Studies on the energy transition also show that the shift from fossil fuels to low-carbon systems does not automatically eliminate extractivism, but may displace it through increased demand for critical minerals for batteries, electric vehicles and clean energy infrastructure (Boateng & Klopp, 2024; Dunlap & Marin, 2022). These findings expand our understanding that the success of the transition cannot be measured solely through decarbonisation indicators. Rather, it must be analysed through the political and institutional structures that determine who reaps the benefits, who bears the risks, and who has a say in policy-making.

In the Indonesian context, previous studies have made significant contributions regarding the potential of renewable energy, policy reform, transition financing, the phasing out of coal, the development of electric vehicles, mineral downstream processing, energy poverty, and the socio-ecological impacts of energy projects. Some studies emphasise technical and economic aspects, whilst others focus on regulation, institutions, the workforce, or affected communities (Cooke et al., 2022; Magni et al., 2024). The literature on energy justice in Indonesia is also beginning to develop, addressing energy access, the impact of the transition on workers, public participation, and regional inequalities (Astuti et al., 2026; Nurhidayah et al., 2024). Nevertheless, these studies generally still examine justice as a sectoral impact or a consequence of specific policies. Consequently, they do not yet fully explain how such injustices are produced through the interplay between policies, actor configurations, power relations, and discursive constructions that shape the direction of the energy transition.

The main research gap in this study lies in the absence of an integrated analysis explaining how energy justice is politically produced through the interplay between policy structures, power relations amongst actors, discursive constructions, and the distribution of material consequences within Indonesia's energy transition. The existing literature has been quite robust in identifying end outcomes such as distributional inequalities, participation issues, or the vulnerability of certain groups. Still, it remains limited in explaining the political mechanisms linking the policy-making process to its equity consequences. This limitation is significant because injustice does not merely arise after policies are implemented, but can be shaped from the very outset, during the stages of problem definition, priority setting, incentive formulation, funding allocation, project site selection, and the legitimisation of specific interests.

This gap becomes increasingly relevant as Indonesia develops its decarbonisation strategy alongside the downstream processing of critical minerals. Indonesia's position within the nickel, battery and electric vehicle supply chains creates opportunities to strengthen industrialisation and derive added value from the global green economy (Soamole & Mokodompit, 2025). However, such strategies may also give rise to ecological pressures, land-use changes, resource conflicts, high energy demands and inequalities in the distribution of benefits between industrial growth centres and extraction regions. These conditions demonstrate that 'green' does not automatically equate to 'fair'. Policies supporting global decarbonisation may still result in injustice at the local level when economic benefits are centralised, ecological costs are concentrated, or affected groups have limited bargaining power in decision-making.

To address these issues, this study positions Indonesia's energy policy as an arena where the global decarbonisation agenda, national development, industrialisation, corporate interests, demands for energy security, and public interests interact. This approach allows energy policy to be analysed not merely as a regulatory instrument, but as the outcome of contestation and negotiation amongst competing interests. By integrating the framework of energy justice with an analysis of the configuration of actors, power relations, and policy discourses, this study seeks to elucidate the relationship between political processes and the material consequences of the energy transition. This approach also enables an examination of how narratives such as green growth, energy security, downstream development, a just transition, and decarbonisation are used to shape legitimacy, determine priorities, and organise the distribution of benefits and risks.

This study aims to analyse how Indonesia's energy policy shapes the distribution of justice within the global green transition by examining the interactions between policies, actors, interests, power relations, discursive constructions, and socio-economic-environmental impacts. Specifically, this study evaluates how distributive, procedural and recognition-based justice is realised or constrained within the energy transition process, and how global pressures are translated into national policies and local consequences. The significance of this

study lies in its contribution to broadening the analysis of energy justice from an outcome-oriented approach towards one that explains the political mechanisms through which justice is shaped, whilst providing an analytical foundation for energy transition policies that are not only effective in terms of decarbonisation, but also more transparent, inclusive, and sensitive to the distribution of benefits and risks amongst actors and across regions.

B. Method

This study employs a qualitative approach using a critical case study design, supplemented by complementary descriptive quantitative analysis, to examine Indonesia's energy policy as an arena of justice within the context of the global green transition. This design was chosen as it allows for an in-depth analysis of the interactions between policies, institutions, actors' interests and the distribution of the consequences of the energy transition. These interactions cannot be reduced to linear relationships between variables. The units of analysis include national energy policies and regulations, energy planning and transition documents, institutional reports, official statistical data, and relevant academic literature, selected through purposive sampling based on substantive relevance, source credibility, recency, and their relevance to the period and issues under investigation. The focus of the analysis is operationalised through an energy justice framework, which encompasses distributive justice, as the distribution of the benefits, costs and risks of the energy transition. Procedural justice, as transparency, access, representation and participation in decision-making processes, and recognition justice, as the acknowledgement of the interests, vulnerabilities and positions of affected social groups.

Data were systematically collected through the search, selection, verification, extraction and coding of documents, using an analysis protocol and coding framework developed deductively from theory and refined inductively based on empirical findings. Data validity was ensured through triangulation of sources and theory, audit trails, checks on coding consistency, and cross-referencing between qualitative findings and supporting quantitative data (Almusaed et al., 2025). Analysis was conducted using thematic analysis and critical policy discourse analysis to identify policy patterns, contestations of interest, power relations, and constructions of justice within the energy transition, whilst quantitative data was used descriptively to reinforce the context and test the consistency of interpretations. Thus, the overall analytical procedure produced explanations that were transparent, traceable, and methodologically sound in accordance with the study's objectives.

C. Results and Discussion

1. The Green Transition as a New Arena for Global Inequality

The green transition is normatively promoted as a collective response to the climate crisis. Still, in practice, the process does not take place within a neutral global economic and political structure. The transformation towards a low-carbon energy system is, in fact, taking place amidst historical inequalities in technological control, fiscal capacity, access to finance, capital ownership, and the ability of states to set standards and determine the direction of development (Ogwu & Izah, 2026). Consequently, the green transition has the potential to alter, but not in itself to eliminate, the structures of inequality previously shaped by a fossil-fuel-based economy.

The relationship between the centre and the periphery, which for decades has been characterised by the flow of raw materials from developing countries to the global industrial centre, may be reproduced in new forms, such as the extraction of critical minerals, dependence on low-carbon technologies, the dominance of international financing, and unequal integration into green technology value chains. This perspective reveals that the central issue of the energy transition is not merely a matter of changing energy sources, but rather a shift in the configuration of power that determines who controls the technology, who

finances the transformation, who sets the standards, who reaps the added value, and who bears the socio-ecological costs.

Indonesia's position clearly illustrates this contradiction. Within the conventional energy structure, Indonesia has long been heavily reliant on coal as a source of electricity, an export commodity, a source of revenue, investment, and the economic foundation of numerous regions (Reyseliani et al., 2024). Within the emerging green economy, this position is beginning to transform through the expansion of renewable energy, the electrification of transport, the development of the battery industry, and the downstream processing of strategic minerals, particularly nickel. This shift could enhance Indonesia's position within the low-carbon technology value chain, but it does not automatically alter the underlying power distribution structure. Indonesia may transition from being a supplier of fossil fuels to a supplier of strategic raw materials for green technologies without gaining commensurate control over the technology, financing, patents, industrial design and end markets.

This phenomenon can be explained through a contemporary interpretation of dependency theory. Whilst classical dependency was primarily shaped by the export of primary commodities and unequal terms of trade between industrial centres and peripheral states, the green transition introduces more complex forms of dependency through technology, financing, carbon standards, critical minerals, and the architecture of global supply chains. In this context, dependency is no longer synonymous with a lack of industrialisation. Developing countries may undergo industrialisation whilst remaining in a subordinate position if core technologies, market access, financing structures and standard-setting remain controlled by external actors. The experiences of lithium-producing countries in Latin America, critical mineral-producing countries in Africa, and nickel-producing countries in South-East Asia reveal a similar pattern. Rising global demand for low-carbon technologies increases the strategic value of producer nations, but also creates new extractive pressures and competition to control the value added within the green industrial chain.

In the case of Indonesia, transition financing mechanisms represent one arena in which these power relations are negotiated (Setyowati & Quist, 2022). The Just Energy Transition Partnership represents a new form of transition cooperation that combines the interests of decarbonisation, international financing, policy reform and energy investment. Normatively, this approach presents significant opportunities, as it can expand fiscal and investment space to accelerate the phase-out of coal-fired power stations, expand renewable energy, modernise the grid, and provide social protection for affected groups. However, financing is never purely technical. The mix of grants, soft loans, commercial financing, guarantees and private investment determines who ultimately bears the costs of the transition. If financing is dominated by debt instruments or investments that require a specific rate of return, fiscal and financial risks may shift to the recipient country, whilst a portion of the economic benefits continues to accrue to the capital providers.

A global comparison shows that the capacity to undertake the transition is heavily influenced by a country's position within the global economic structure. Developed countries have greater capacity to provide subsidies for green industries, support domestic innovation, develop network infrastructure, and mitigate investment risks through public fiscal measures. Developing countries, by contrast, are often required to implement structural changes with more limited fiscal capacity and higher capital costs. This disparity gives rise to the climate justice paradox, as countries that have historically contributed less to cumulative emissions often face relatively higher transition costs compared to their economic capacity. When the principle of 'common but differentiated responsibilities' is not fully translated into a proportional sharing of financial and technological burdens, the decarbonisation agenda risks creating asymmetrical development pressures (Nazar et al., 2026). From a climate justice perspective, this situation underscores that transitional justice is not merely a matter of

domestic distribution. Still, it is also linked to the sharing of responsibilities, capacities and resources at the international level (Brankovic, 2023).

These asymmetries are subsequently reflected in national policies. It is here that the green transition becomes a political arena rather than merely a technocratic process. Governments do not merely choose technologies or energy sources also determine which sectors receive incentives, which actors are granted concessions, which regions become investment destinations, which groups are afforded protection, and what forms of risk are deemed acceptable. Policies regarding the early decommissioning of coal-fired power stations, energy subsidies, the development of electric vehicles, mineral downstream processing, the development of industrial estates, and the expansion of renewable energy are thus instruments of distribution (Jermain et al., 2024). Every decision creates a configuration of winners and those who bear the losses. The decision to promote the battery industry, for example, may increase investment and national value added. Still, the distribution of these benefits depends on ownership structures, the uptake of local labour, technology transfer, local government revenue, and the ability of surrounding communities to derive benefits proportionate to the ecological burdens they bear.

These dimensions underscore the relevance of energy justice in analysing Indonesia's transition policies. In terms of distributive justice, the issue goes beyond whether the benefits of the transition are available. It concerns how those benefits are shared relative to the risks and costs incurred. Workers in coal-mining regions, low-income households, resource-producing local governments, communities near mines, and communities surrounding energy projects do not possess the same capacity to absorb economic shocks. A transition that successfully reduces national emissions may still be unjust if job losses, reductions in local government revenue, rising energy costs, or ecological damage are concentrated amongst certain groups, whilst economic benefits, investment incentives and industrial profits are concentrated elsewhere.

Procedural justice reveals a further layer of injustice. In many transition policies, formal participation may be available without resulting in any substantive redistribution of power. Public consultations, multi-stakeholder forums, or community engagement do not always mean that affected groups have an equal capacity to set the agenda, evaluate policy options, or reject certain risks. Disparities in access to technical information, organisational capacity, economic resources, political networks and institutional legitimacy can result in participatory processes remaining dominated by state actors, corporations or financing institutions (Zandieh, 2026). Consequently, the quality of procedural justice must be assessed not merely by the existence of consultation mechanisms, but by the extent to which such processes enable a redistribution of influence. In this context, power relations are a crucial element, as policies may appear procedurally inclusive whilst still maintaining an unchanged decision-making hierarchy.

Recognition justice offers a more fundamental dimension, as injustices often stem from the way policies define who is considered relevant and which interests are deemed legitimate. Local communities, informal workers, indigenous peoples, women, low-income groups, and regions dependent on extractive economies face different forms of vulnerability (Shiquan et al., 2022). However, this diversity can be lost when the transition is framed through aggregate categories such as green growth, investment, job creation, or emissions reduction. Inadequate recognition of communities' social, cultural, economic and ecological relationships with their territories can result in policies that are economically efficient but socially illegitimate. Recognition justice is therefore not merely a demand to include vulnerable groups on a list of beneficiaries, but a need to acknowledge the systems of knowledge, needs, rights, histories and structural interdependencies that shape their position within the transition.

The relationship between these three dimensions demonstrates that justice does not emerge as an outcome separate from the policy process. Rather, the distribution of benefits

and risks is shaped through procedures that determine who has a voice, whilst those procedures are in turn influenced by structures of recognition that determine who is considered a legitimate actor from the outset. This is the political mechanism that explains how injustice is produced in the energy transition. When certain groups are not adequately recognised, their capacity to participate is weakened. When their participation is weak, the distribution of benefits and risks tends to follow the preferences of more dominant actors.

Discursive construction plays a crucial role in this process. Terms such as 'green transition', 'clean energy', 'green downstreaming', 'low-carbon growth' and 'just transition' possess strong legitimising power because they link economic policy to the normative goal of sustainability. However, from a critical policy discourse perspective, these terms must also be examined as instruments that shape the boundaries of discourse. When mineral industry development is categorised as part of the green economy, for example, public attention may be directed towards its contribution to batteries and electric vehicles, whilst emissions from production processes, land degradation, the use of fossil fuels in processing, or land-use conflicts are potentially relegated to secondary concerns.

This is evident in the rise of 'green extractivism', a situation where the decarbonisation agenda remains dependent on the expansion of material extraction to meet the needs of low-carbon technologies. The development of electric vehicles, solar panels, wind turbines, energy storage and electricity grids requires large quantities of minerals (Huber & Steininger, 2022). Consequently, the green economy does not eliminate extraction, but rather shifts the types of commodities in demand. For producing countries such as Indonesia, this situation creates opportunities for industrialisation whilst also posing the risk of reproducing old patterns of extractivism.

Nickel can strengthen Indonesia's position in the battery value chain, but this success must be distinguished between an increase in export value and an enhancement of national structural capacity (Schröder & Iwasaki, 2024). A more equitable transformation requires technological mastery, improvements in the quality of the workforce, the expansion of domestic industrial linkages, a fairer distribution of revenues, and the internalisation of environmental costs into the production structure (Insani & Karimullah, 2023; Purba et al., 2025). Without these, value addition may proceed hand-in-hand with the externalisation of ecological costs onto local communities.

A comparison with other mineral-rich countries shows that resource ownership does not in itself guarantee a stronger bargaining position. Countries may achieve increased investment and production capacity, but still face limitations in technological and market mastery (Wang et al., 2023). Therefore, the global value chain approach is relevant for distinguishing between 'participation' and 'upgrading'. Indonesia may be becoming increasingly integrated into green technology supply chains, but economic justice depends on its ability to move towards functions with higher value-added, knowledge and control. From this perspective, downstream processing only constitutes structural transformation if it results in a lasting increase in domestic capacity, rather than merely relocating processing activities to locations closer to mineral sources.

The political power of domestic actors also determines how these opportunities and risks are distributed. The state is not a single actor free to determine the direction of the transition, but is embedded within a network of relationships with energy companies, the mining industry, financial institutions, state-owned enterprises, local governments, international investors, civil society groups and affected communities. These actors possess different resources with which to influence the policy agenda.

Corporations can utilise their investment capacity and technical expertise. Governments use their regulatory powers. International institutions employ financing and standards, whilst communities often rely on social mobilisation and participatory mechanisms. Transition policies are ultimately the product of negotiations amongst actors

whose capacity to influence is uneven. This is why energy injustice cannot be adequately explained as a failure of implementation, as inequalities may be embedded from the very design of the policy through asymmetrical structures of representation and power distribution.

From a just transition perspective, similar issues are evident in the process of reducing dependence on coal (Pandey et al., 2025). The closure or early decommissioning of coal-fired power stations is crucial for reducing emissions, but such policies create differing economic consequences for workers, suppliers, local businesses and local governments. Experiences of transition in coal-producing regions across various countries demonstrate that financial compensation alone is insufficient if the changes are not accompanied by economic diversification, skills development, alternative productive investment, income protection and regional development strategies. In the Indonesian context, the dependence of several regions on the coal economy means that the transition must be designed as a regional transformation, not merely a transformation of electricity technology. Without such an approach, national emissions reductions could result in a concentration of social costs in energy-producing regions.

Indonesia's energy policy serves as a mechanism linking global pressures to the distribution of domestic consequences (Setiawan et al., 2025). Global decarbonisation pressures are not mechanically translated into national policy, but are instead selected, negotiated and adapted to development agendas, industrialisation strategies, corporate interests and domestic institutional configurations. It is this process of translation that determines the form of justice that emerges. Global financing schemes can open up investment opportunities whilst simultaneously reinforcing financial dependence. Mineral industrialisation can strengthen the national economy whilst expanding extraction. Phasing out coal can reduce emissions whilst creating regional vulnerabilities, and the expansion of renewable energy can enhance energy security whilst giving rise to spatial conflicts if local participation is insufficient.

In the Indonesian context, energy justice is shaped through an interlinked series of global agendas that create both pressures and opportunities. Domestic policy structures translate these agendas into priorities, incentives and projects. The configuration of actors determines the distribution of the capacity to influence decisions. Policy discourse provides legitimacy for certain choices, and the entire process results in differing distributions of benefits, burdens, risks and recognition across groups and regions (van Uffelen et al., 2025). Inequality is thus not merely a by-product of the transition, but can become a structural consequence of decision-making mechanisms if unequal power relations are not rectified. Consequently, the quality of Indonesia's energy transition cannot be assessed solely based on the percentage of renewable energy, the volume of green investment, the reduction in coal-fired power generation capacity, or the growth of the electric vehicle industry.

The evaluation must encompass who controls assets and technology, how financial risks are shared, whether the creation of added value leads to domestic upgrading, how ecological costs are distributed, the extent to which workers and regions dependent on the fossil fuel industry are provided with viable economic alternatives, and whether affected communities have a genuine capacity to shape decisions. This approach shifts the concept of a 'just transition' from a normative slogan towards a principle of governance that can be tested through distribution, procedures, recognition and the configuration of power. Thus, the green transition can serve as an instrument to correct global inequalities only if technological change is accompanied by a transformation of the economic and political structures that govern financing, control over technology, the distribution of value added, participation and risk management.

For Indonesia, the strategic issue is not a choice between joining or rejecting the global transition, but rather determining the capacity to shape that transition so that it does not

reproduce patterns of subordination in new forms (Setyowati & Quist, 2022). Energy sovereignty in this context does not mean isolation from financing, technology or international cooperation, but rather the state's ability to negotiate these relationships based on the public interest, strengthen domestic capacity, distribute benefits more proportionately, and ensure that socio-ecological costs are not shifted onto groups with the least bargaining power. A just green transition thus demands change not only in the energy sources used, but also in the power structures that determine how energy, capital, technology, benefits and risks are distributed.

2. Coal and the National Energy Justice Paradox

The paradox of energy justice in Indonesia becomes all the more apparent when coal is viewed not merely as a source of carbon emissions, but also as the cornerstone of the national energy economy and politics. In global discourse, coal is positioned as a commodity that must be phased out immediately, as it is a major contributor to greenhouse gas emissions (Wright et al., 2022). However, in the Indonesian context, coal serves a far more complex function than that of a mere energy source. For more than two decades, this commodity has evolved into a strategic instrument underpinning energy security, state revenue, fiscal stability, regional economic growth, and the competitiveness of national industry (Ivančík & Dušek, 2026). Consequently, the debate over phasing out coal cannot be reduced to a purely environmental issue, but must be understood as a matter of the redistribution of economic benefits, changes in the structure of production, and the transformation of the relationship between the state, the market and society (Karimullah, 2024). These circumstances demonstrate that energy justice in Indonesia is shaped by the tension between global decarbonisation demands and the state's need to maintain economic stability and domestic welfare.

Economically, coal makes a significant contribution to the state's fiscal capacity (Roemer & Haggerty, 2022). Revenue from royalties, taxes, dividends from state-owned enterprises, non-tax state revenue, and export earnings make the coal mining sector one of the main pillars of the State Budget, particularly when global commodity prices rise. These revenues enable the government to expand public spending capacity through infrastructure development, funding for education and health services, energy subsidies, social protection, and various regional development programmes. At the macroeconomic level, coal exports also bolster foreign exchange reserves, maintain a balanced trade balance, and provide exchange-rate stability when other export sectors experience a slowdown.

Coal's contribution is also evident in the context of energy security. Indonesia's electricity system remains dominated by coal-fired steam power stations due to their ability to generate electricity on a large scale at relatively competitive production costs compared to most renewable energy sources, which still require high initial investment and energy storage systems. Through the Domestic Market Obligation (DMO) policy, the government imposes an obligation on producers to supply domestic coal requirements at controlled prices, thereby helping to keep electricity generation costs lower. This policy indirectly contributes to the stability of national electricity tariffs, safeguards people's purchasing power, and enhances the competitiveness of the manufacturing sector, which is heavily reliant on affordable energy supplies. From the perspective of distributive justice, this situation demonstrates that coal has long served as a state instrument to expand access to energy and distribute economic benefits more widely amongst the population (Minocha et al., 2025).

At the regional level, the coal industry also shapes the economic structure of producing regions such as East Kalimantan, South Kalimantan, South Sumatra and parts of Central Kalimantan (Surbakti, 2025). Mining activities create a multiplier effect through the generation of direct and indirect jobs, the development of supporting service sectors, increased trade activity, the development of transport infrastructure, and increased local government revenue through revenue-sharing schemes and various other fiscal instruments.

In many regions, coal has become the backbone of the local economy. Consequently, policy shifts towards phasing out production or reducing coal consumption affect not only mining companies but also the socio-economic structure of communities dependent on the industry's value chain. Therefore, the energy transition has the potential to incur high social costs if it is not accompanied by strategies for economic diversification, workforce upskilling, and the creation of alternative sources of economic growth. However, it is here that the paradox of energy justice becomes particularly evident. The economic benefits of coal, which are distributed through fiscal mechanisms and national energy security, come at the cost of environmental, health and social burdens that are not distributed proportionally.

From an energy justice perspective, the distribution of benefits and the distribution of burdens occur asymmetrically (Volodzkiene & Streimikiene, 2025). The economic benefits of coal are enjoyed nationally through government revenue, economic growth and energy stability, whilst the majority of the ecological costs in the form of environmental degradation, air and water pollution, changes to the landscape, loss of biodiversity, land-use conflicts and health risks are borne predominantly by communities living near mining areas and power stations. In other words, coal results in a redistribution of benefits on a national scale, whilst simultaneously creating a concentration of risks in specific regions. This phenomenon demonstrates that the core issue is not merely the existence of coal, but rather the political mechanisms that determine how these benefits and costs are allocated.

This paradox becomes increasingly complex as Indonesia faces global pressure to accelerate the phase-out of coal-fired power stations. From the perspective of international climate policy, accelerating the coal phase-out is a crucial prerequisite for achieving global temperature rise limitation targets (Walk & Stognief, 2022). However, from the perspective of domestic political economy, phasing out coal means a reduction in state revenue, a contraction of economic activity in producing regions, an increased risk of unemployment, and the emergence of a massive financing requirement to replace existing power generation capacity (Ohlendorf et al., 2022). These conditions demonstrate that the decision to phase out coal is not merely a technological decision, but rather an economic redistribution decision that determines who loses out, who gains new opportunities, and who must bear the costs of this transformation.

Comparisons with various countries show that nations with high dependence on fossil fuels also experience a similar paradox. Germany's experience through the Coal Commission demonstrates that phasing out coal can only be politically acceptable when accompanied by fiscal compensation, regional development investment, labour protection, and regional economic diversification. South Africa faces similar challenges as its energy transition must account for communities' economic dependence on the coal industry, whilst Poland continues to face social resistance due to the sector's significant role in the nation's economic identity and employment. These experiences demonstrate that the success of the energy transition is not determined solely by emission reduction targets, but by a country's ability to manage the distribution of benefits and costs fairly.

From a political economy perspective, these conditions indicate that coal in Indonesia cannot be positioned dichotomously as either a 'dirty' energy source that must be abandoned immediately or as a strategic asset that must be preserved indefinitely. Coal is a resource that has shaped the social contract between the state and society through mechanisms such as state revenue, the provision of affordable energy, regional development and job creation. Therefore, the main challenge of the green transition is not to eliminate the role of coal instantly, but to transform the economic benefits it has long generated into capital for the development of a cleaner, fairer and more sustainable energy system. In this context, the fiscal benefits from coal should not merely be treated as a source of short-term revenue, but as a strategic instrument to finance investment in renewable energy, strengthen domestic industrial capacity, improve

the quality of human resources, and provide protection mechanisms for workers and regions affected by the transition process.

3. Nickel, Electric Vehicles, and the Dark Side of Indonesia's Green Economy

The transition from coal to low-carbon technologies does not, in itself, end the extractive logic that has long underpinned the global energy system. On the contrary, the electrification of transport, energy storage, the development of electricity grids, and the expansion of renewable energy are increasing the strategic importance of critical minerals such as nickel, lithium, cobalt, copper, graphite and rare-earth elements. Within this new framework, nickel places Indonesia in a very different position compared to that under the fossil fuel regime. Indonesia is no longer merely a country facing pressure to reduce emissions. Still, it is simultaneously becoming one of the key supply hubs for raw materials for the global low-carbon economy. By 2025, Indonesia is set to account for around 67 per cent of global nickel mining production and around 43 per cent of the world's nickel refining capacity, demonstrating a remarkable concentration within the global critical minerals supply chain. This position affords significant economic leverage, but simultaneously raises fundamental questions about whether this dominance over resources truly leads to greater technological sovereignty and more equitable prosperity, or instead creates a new configuration of extractivism under the guise of a green economy.

Indonesia's nickel downstream strategy can be understood as an active response to the structure of the global value chain, which for years has relegated mineral-producing countries to the role of raw material suppliers. The ban on nickel ore exports and the development of refining capacity are aimed at shifting part of the value creation process domestically, driving the development of smelters, precursor materials, cathode materials, battery cells and electric vehicles. The government has subsequently expanded this strategy through the development of an integrated battery ecosystem, stretching from nickel mining in East Halmahera to the production of electric vehicle batteries in Karawang. From an economic-political perspective, this move constitutes a form of resource-based industrial policy, as the state utilises its control over strategic resources to enhance its position within the global value chain and avoid the trap of exporting primary commodities (Khoj et al., 2026). A World Bank study on Indonesia's nickel export ban policy also indicates that the policy is indeed aimed at promoting industrialisation and expanding domestic processing capacity.

From a development perspective, this strategy has strong rationale. The economic value of minerals increases substantially as commodities move from extraction through refining, processing, battery materials, battery cells, and on to end products. The United Nations Conference on Trade and Development (UNCTAD) highlights that processed and refined minerals have a far higher value than their raw forms, and that developing countries' ability to move into the processing and manufacturing sectors is one of the most important factors in securing a larger share of the critical minerals economy.

The issue is that shifting refining activities domestically does not automatically equate to a transfer of technological expertise, capital, knowledge and innovation capacity. This is where the distinction between value addition and structural upgrading becomes crucial. A country may record an increase in the value of its exports and industrial investment without securing an equivalent strategic position in the value chain if core technologies, production machinery, financing, product design, intellectual property rights or market access remain under the control of external companies.

China's dominance illustrates how power within the battery economy is not primarily determined by ownership of mineral reserves, but rather by the ability to control multiple stages of the value chain simultaneously. The IEA notes that China is the leading refiner for 19 out of 20 strategic minerals analysed, with an average share of around 70 per cent, and controls

at least 80 per cent of many midstream and downstream segments of the global battery industry.

This comparison reveals a key distinction between Indonesia's resource-based industrialisation model and China's technology-driven industrialisation model. Indonesia's strength lies in extraction and is growing in nickel refining, whilst China is building its dominance through vertical integration encompassing material processing, component manufacturing, batteries, electric vehicles, production technology, research, and the domestic market. The strength of the green economy therefore does not lie solely in who owns the minerals, but in who controls the points with the highest level of knowledge and added value within the production chain. From the perspective of global economic justice, this situation means that the success of Indonesia's downstream processing should not be measured solely by increases in smelter output, investment, or exports of intermediate products, but rather by the ability to facilitate technology transfer, develop workforce skills, foster domestic suppliers, drive national innovation, and secure ownership of the high-value segments of the battery supply chain (Soamole & Mokodompit, 2025).

The experience of the Democratic Republic of the Congo illustrates, in an even more extreme manner, the risks that arise when a transformation of the production structure does not accompany ownership of resources. The country is projected to account for around 74 per cent of global cobalt mining production by 2025. However, its dominant position at the extraction stage is not matched by control over the refining, battery manufacturing or end-use technology stages. The case of the DRC demonstrates that the scarcity and dominant position of a resource do not automatically result in economic sovereignty if the majority of high-value processes take place outside the producer's territory. Indonesia is attempting to break free from this pattern through downstream processing. However, this comparison also serves as a warning that downstream processing can only be categorised as structural transformation if the relationship between extraction and the domestic economy develops beyond the industrial enclave model.

Chile offers a different point of comparison. Alongside Australia, Chile is one of the world's leading producers of lithium. Still, the policy debate in the country is increasingly shifting from merely increasing extraction towards how the state can generate added value, build technological capacity, manage ecological impacts, and maintain strategic control over minerals. UNCTAD highlights that Latin American countries, including Chile, Argentina and Brazil, are developing different governance models but face the same challenge: how to link mineral wealth to industrial development that extends beyond extractive activities. A comparison with Chile reveals that the key issue for Indonesia is no longer simply whether nickel should be processed downstream, but rather what type of downstream processing can generate domestic technological capabilities whilst ensuring environmental sustainability.

Australia provides another contrast, as the country possesses relatively strong mining capacity and governance standards. However, its experience with critical minerals demonstrates that even a nation with advanced institutions can struggle to transition from being a mineral producer to mastering battery manufacturing if it lacks an integrated industrial and technological ecosystem. This reinforces the argument that reserve ownership is not the sole determinant of a country's position in the global value chain. China demonstrates the strength of industrial integration. The Congo illustrates the risks of extraction-led dominance without downstream control. Chile highlights the importance of the debate over resource control and domestic development, whilst Indonesia is attempting to carve out a position between these four configurations through an aggressive downstream development strategy.

This is where the paradoxical nature of Indonesia's green economy comes to the fore. Globally, batteries and electric vehicles have gained legitimacy as instruments for reducing emissions in the transport sector (Hidayat et al., 2026). However, the underlying production

chain still requires large-scale material extraction. When environmental impacts are calculated solely at the vehicle's usage stage, electric vehicles appear to be an almost entirely clean technology (Lubis et al., 2026; Purbajati et al., 2026). When the scope of analysis is expanded from the mine to the vehicle, the picture becomes more complex. Mining, ore processing, battery material production, the development of industrial estates, water and land use, energy consumption in smelters, and waste management are all integral parts of the ecological footprint of electric vehicles. The World Bank has highlighted that the increase in nickel smelting capacity driven by Indonesia's downstream processing is a relatively emission-intensive activity, whilst there are also concerns regarding the capacity of domestic nickel production to expand without significant ecological impacts.

The concept of 'green extractivism' explains this contradiction more accurately. The low-carbon transition reduces dependence on fossil fuels but does not eliminate dependence on materials, as this demand is instead shifting towards critical minerals. Electric vehicles require nickel, lithium, cobalt, graphite, copper and various other materials, whilst renewable energy systems require large-scale grids and energy storage. Global demand for critical minerals is therefore continuing to rise alongside electrification. UNCTAD warns that this situation could present an opportunity for structural transformation in developing countries, but could also reinforce extractive dependence if producer nations fail to secure added value, technological capabilities and a broader distribution of benefits. A green transition could thus alter the objects of extraction without changing the politics of extraction.

In the context of energy justice, this issue directly illustrates how injustice is produced through the interplay between policies, actors, discourses and the distribution of material consequences. At the policy level, downstream processing and electric vehicles are framed as industrialisation strategies as well as Indonesia's contribution to a low-carbon economy (Zahari & McLellan, 2024). At the level of actors, their implementation brings together the state, business entities, international investors, vehicle manufacturers, battery companies, mining operators, local governments, workers and local communities within relationships characterised by differing bargaining power. At the level of discourse, terms such as 'downstreaming', the 'EV ecosystem', 'green industry' and 'value-added' provide strong legitimacy for development. At the material level, benefits in the form of investment, exports, jobs, revenue and industrial capacity building coexist with costs in the form of environmental pressures, energy demands, spatial changes, and risks concentrated in extraction and industrial areas.

Inequity in the energy transition is not merely a consequence that arises after projects have been implemented. Inequity can be produced from the very moment policy design determines which commodities are prioritised, which investors are facilitated, which regions are designated as production centres, the form of incentives provided, the technologies selected, and the types of impacts that gain or lose visibility within the development narrative. In other words, distributive justice is the result of procedural configurations and recognition justice. When macroeconomic interests are given greater weight than the experiences of communities bearing local externalities, this hierarchy of recognition influences the design of decision-making processes. When access to decision-making is unequal, the distribution of benefits and costs ultimately follows existing power structures. Nickel thus demonstrates empirically that energy justice is politically produced, rather than arising automatically from the 'green' character of a technology (Lehtonen & Shakeel, 2025).

The distributional dimension becomes increasingly clear when the geographical scale of the analysis is expanded. The benefits of downstream processing can be quantified at the national level through investment, exports, industrial growth, government revenue and an improved position in the value chain, whilst some externalities are concentrated in mining regions and industrial zones. This configuration creates the potential for a spatial justice problem. Benefits are distributed on a national and global scale, whilst some of the ecological

costs are localised. Electric vehicle consumers in urban centres may benefit from low-operational-emission transport technology, whilst the material impacts of its production lie far from the consumption sphere.

This phenomenon bears similarities to the cobalt supply chain in the Congo and the lithium supply chain in South America. The transition to electric vehicles in consumer nations may reduce domestic transport emissions, but the demand for raw materials creates extraction pressures in producer nations. This is one manifestation of cross-border injustice. The success of decarbonisation in one region may depend on the transfer of some material and ecological costs to other regions (Malakar et al., 2023). Within the framework of global environmental justice, the issue is not that electric vehicles should be rejected, but rather that their climate benefits must be achieved through supply chains that do not turn producer communities into 'sacrifice zones' for global consumer decarbonisation.

European Union policy demonstrates a different approach to addressing this problem. The EU's battery regulations are moving towards a life-cycle approach by raising requirements for the recovery and recycling of critical minerals (Hoarau & Lorang, 2022). Rules to be implemented in 2025 set targets for recycling efficiency and material recovery, including a 90 per cent recovery target for nickel and cobalt by 2027, rising to 95 per cent by 2031. These developments are significant for Indonesia as they indicate that the future battery economy will be determined not only by the capacity for primary extraction, but also by the ability to meet standards for sustainability, traceability, material efficiency and the circular economy.

Recycling could even reshape the long-term geopolitical calculus for minerals. The IEA estimates that increased recycling could reduce the need for new mine development by around 25 per cent for nickel by mid-century, provided countries' climate commitments are met (Hyman et al., 2026). Consequently, industrialisation strategies that rely too heavily on a primary extraction advantage carry the risk of path dependency. Indonesia's strength today stems from its abundance of nickel, but long-term green economic advantage may shift towards countries that master battery design, advanced materials, recycling systems, second-life batteries, vehicle software, and next-generation technologies.

Shifts in global battery chemistry exacerbate this risk. The IEA notes that lithium iron phosphate (LFP) batteries, which do not use nickel as their primary cathode material, have grown from less than 10 per cent of the global electric vehicle battery market in 2020 to nearly half the market, primarily due to falling costs and improved performance. This shift is a crucial strategic variable for Indonesia's downstream industrialisation policy. Dominance in nickel production should not lead to the assumption that demand for nickel-based batteries will continue to rise linearly. Innovations in LFP, sodium-ion, solid-state batteries and other storage technologies demonstrate that the strategic value of minerals can shift in line with technological developments.

Indonesia's electric vehicle policy faces a second paradox. A strategy designed to reduce dependence on fossil fuels may create a new dependence on a single technological pathway and a single mineral commodity. If the economic success of EVs is overly identified with nickel, whilst the global market moves towards diversification of battery chemistries, then a resource advantage could turn into technological lock-in. From a political economy perspective, this issue distinguishes resource sovereignty from technological sovereignty (Porak, 2024). Resource sovereignty means possessing and being able to regulate strategic minerals. Technological sovereignty means having the ability to adapt as technology changes, so that economic value is not lost when a particular commodity ceases to dominate.

A comparison with China is once again relevant. That country's advantage does not depend on a single type of mineral or a single battery chemistry. China, in fact, dominates the majority of the LFP supply chain, and the IEA notes that over 98 per cent of LFP cathode materials and battery cells in 2024 will be produced in China (Miswanto et al., 2026). This demonstrates that a resilient green energy industrialisation strategy must shift from a

geologically-based comparative advantage towards an innovation-based competitive advantage. For Indonesia, nickel should be positioned as an entry point for building such capabilities, rather than as the end goal of industrialisation. Consequently, the criteria for measuring the success of downstream processing need to be broadened. Growth in nickel product exports and smelter capacity is important, but insufficient to demonstrate structural transformation.

The evaluation must include the proportion of value retained within the domestic economy, the quality and safety of jobs, technology transfer, the development of national suppliers, research capacity, mastery of battery materials, technological diversification, recycling capabilities, local acceptance, and the internalisation of environmental costs. In the context of energy justice, these measures must be supplemented by the distribution of benefits across regions, the quality of public participation, ecological restoration, and the ability of affected groups to influence investment design. This simultaneously highlights the fundamental difference between green growth and just green transformation.

Green growth allows for increased investment, production, and exports of low-carbon technologies without automatically altering the structure of power distribution. Conversely, a just green transformation requires that economic value growth be accompanied by enhanced national capacity, the redistribution of benefits to producer regions, ecological protection, substantive community involvement, and a shift in the state's position within the global technology chain (Rosyid et al., 2025). Nickel can generate green growth by boosting the production of electric vehicles. Still, it only becomes an instrument of just transformation if the resulting economic, technological and social added value outweighs the externalities passed on to the extraction regions.

The dark side of Indonesia's green economy does not lie in the existence of nickel or electric vehicles themselves, but in the possibility that the decarbonisation process may reproduce old structures in a new form. Extraction remains concentrated in peripheral regions, benefits remain concentrated among capital-rich actors, local communities bear a disproportionate share of the externalities, and strategic technologies remain controlled outside the national production chain (Ye et al., 2026). Conversely, Indonesia's nickel wealth also affords it an opportunity, one not available to many other countries, to renegotiate this position. UNCTAD emphasises that the boom in critical minerals can either pave the way for structural transformation in developing countries or reinforce extractive patterns, depending on the ability of policy to link processing, technology transfer, skills, diversification and sustainability.

Indonesia's green economic justice cannot be achieved merely by shifting the economic focus from coal to nickel or from fossil-fuelled vehicles to electric vehicles (Lombardozzi, 2026). A more fundamental transformation requires a shift from an extractive economy to a knowledge-based and circular economy, from downstreaming to technological upgrading, and from end-product-based green legitimisation to a life-cycle assessment of justice. Indonesia has the opportunity to avoid the fate of countries that remain trapped as mere mineral suppliers, whilst learning from those that have successfully built higher technological capabilities. Within this framework, nickel is not the end goal of the green transition, but rather a test of Indonesia's political capacity in the energy sector to transform its resource wealth into technological capacity, social welfare, ecological protection, and a fairer bargaining position within the global low-carbon economy.

D. Conclusion

Indonesia's energy transition is a political arena in which justice is produced through the interplay of policy design, the configuration of actors, power relations, discursive constructions and the distribution of material consequences. Consequently, energy justice cannot be understood merely as the result of the decarbonisation process. Coal illustrates the

paradox between its fiscal function, energy security and domestic economic dependence on the one hand, and the concentration of socio-ecological costs on the other, whilst nickel and electric vehicles demonstrate that the green economy can reproduce extractivism and new forms of dependence when resource advantages are not accompanied by technological mastery, the redistribution of value and the protection of affected communities. These findings expand the framework of energy justice by demonstrating that distributive, procedural and recognition-based justice operate as mutually constitutive mechanisms, rather than as standalone dimensions, and that the success of the transition depends on the state's ability to transform resource advantages into structural capacity and technological sovereignty.

In policy terms, this calls for a shift from an approach focused on decarbonisation and downstream processing targets towards a transition governance framework that integrates social protection, substantive participation, the distribution of benefits across regions, technology transfer, and the internalisation of ecological costs. The study's limitations lie in its reliance on document analysis and secondary data. Consequently, further research should test these mechanisms through comparative studies across regions, sectors and countries, as well as actor-based empirical evidence. Consequently, the measure of the success of Indonesia's green transition must move beyond emissions reductions and increased investment towards the capacity of energy transformation to simultaneously redress power imbalances, expand social justice, and strengthen ecological sustainability.

E. Acknowledgements

The authors gratefully acknowledge the editor and anonymous reviewers for their constructive and insightful comments, which substantially improved the quality of the manuscript.

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