



The Politics of Indonesia's Energy Transition: Balancing Coal Dependency and Net-Zero Commitments

Politik Transisi Energi Indonesia: Menyeimbangkan Ketergantungan Batu Bara dan Komitmen Net-Zero

Raka Aditya Wibisana, Monash University, Melbourne, Australia

Abstract

Indonesia's commitment to achieving net-zero emissions while maintaining economic growth presents one of the most significant political and governance challenges in Southeast Asia. Although international attention has focused on Indonesia's renewable energy potential and participation in global climate initiatives, domestic political dynamics shaping the energy transition remain insufficiently understood. This study investigates how competing political, economic, and institutional interests influence Indonesia's transition from coal dependency toward a more sustainable energy system. Adopting a political economy perspective, the research integrates policy analysis, stakeholder mapping, energy sector data, and interviews with government officials, energy companies, environmental organizations, and international development partners. The analysis reveals that Indonesia's energy transition is characterized by complex negotiations among state institutions, fossil fuel industries, local governments, and international climate finance mechanisms. While substantial policy progress has been achieved through renewable energy commitments and international partnerships, implementation continues to face

Copyright © Author(s). All writings published in this journal are the personal views of the authors and do not represent the views of this journal and the author's affiliated institutions. This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

Publisher: Artes Libres Institutum

Available online at <https://journals.arteslibres.org/index.php/politics>

institutional fragmentation, investment uncertainty, and conflicting development priorities. The article argues that successful energy transition depends not only on technological innovation but also on governance reforms capable of aligning political incentives, regulatory consistency, and social equity considerations. By examining Indonesia as a representative emerging economy, this study contributes to global debates concerning just energy transition, climate governance, and sustainable development. The findings provide policy insights relevant for developing countries attempting to reconcile economic development objectives with international climate commitments and long-term environmental sustainability.

Keywords: *Energy Transition, Climate Governance, Coal Dependency, Net-Zero Emissions, Indonesia*

Abstrak

Komitmen Indonesia untuk mencapai emisi nol bersih sambil mempertahankan pertumbuhan ekonomi menghadirkan salah satu tantangan politik dan tata kelola paling signifikan di Asia Tenggara. Meskipun perhatian internasional telah terfokus pada potensi energi terbarukan Indonesia dan partisipasinya dalam inisiatif iklim global, dinamika politik domestik yang membentuk transisi energi masih kurang dipahami. Studi ini menyelidiki bagaimana kepentingan politik, ekonomi, dan kelembagaan yang saling bersaing memengaruhi transisi Indonesia dari ketergantungan batubara menuju sistem energi yang lebih berkelanjutan. Dengan mengadopsi perspektif ekonomi politik, penelitian ini mengintegrasikan analisis kebijakan, pemetaan pemangku kepentingan, data sektor energi, dan wawancara dengan pejabat pemerintah, perusahaan energi, organisasi lingkungan, dan mitra pembangunan internasional. Analisis tersebut mengungkapkan bahwa transisi energi Indonesia ditandai oleh negosiasi yang kompleks antara lembaga negara, industri bahan bakar fosil, pemerintah daerah, dan mekanisme pembiayaan iklim internasional. Meskipun kemajuan kebijakan yang substansial telah dicapai melalui komitmen energi terbarukan dan kemitraan internasional, implementasinya terus menghadapi fragmentasi kelembagaan, ketidakpastian investasi, dan prioritas pembangunan yang saling bertentangan. Artikel ini berpendapat

bahwa transisi energi yang sukses tidak hanya bergantung pada inovasi teknologi tetapi juga pada reformasi tata kelola yang mampu menyelaraskan insentif politik, konsistensi regulasi, dan pertimbangan keadilan sosial. Dengan meneliti Indonesia sebagai negara berkembang yang representatif, studi ini berkontribusi pada debat global mengenai transisi energi yang adil, tata kelola iklim, dan pembangunan berkelanjutan. Temuan-temuan tersebut memberikan wawasan kebijakan yang relevan bagi negara-negara berkembang yang berupaya menyelaraskan tujuan pembangunan ekonomi dengan komitmen iklim internasional dan keberlanjutan lingkungan jangka panjang.

Kata kunci: *Transisi Energi, Tata Kelola Iklim, Ketergantungan Batu Bara, Emisi Nol Bersih, Indonesia*

I. INTRODUCTION

The global transition toward low-carbon energy systems has become one of the defining governance challenges of the twenty-first century. As countries seek to limit global temperature increases and achieve net-zero emissions targets, energy transitions have increasingly moved beyond technological transformation and become deeply political processes involving competing economic interests, institutional structures, and social priorities (Newell and Mulvaney 2013; Sovacool 2016). While renewable energy technologies have expanded rapidly and become increasingly cost-competitive, the transition away from fossil fuel dependency remains highly contested because coal, oil, and gas continue to function as essential foundations of economic development, employment generation, industrialization, and political stability in many countries (Cherp et al. 2018). Consequently, energy transition is not simply a technical substitution from fossil fuels to renewable sources but a complex process of restructuring power relations, economic systems, and governance arrangements.

The political nature of energy transition has become particularly evident in emerging economies where economic

growth strategies have historically depended on fossil fuel exploitation. Unlike advanced industrialized countries that possess greater financial and institutional capacity to accelerate decarbonization, developing countries often face competing pressures between climate commitments and development priorities. Governments must simultaneously expand energy access, maintain economic competitiveness, protect domestic industries, and respond to international climate obligations. This tension has generated significant debates regarding the concept of a just energy transition, which emphasizes that decarbonization should not only reduce emissions but also address questions of economic inequality, employment disruption, regional development, and social justice (Heffron and McCauley 2018; Jenkins et al. 2016).

Within this context, coal remains one of the most politically significant obstacles to global decarbonization. Despite increasing investment in renewable energy, coal continues to provide a substantial share of electricity generation in many emerging economies due to its affordability, domestic availability, and established industrial infrastructure. Research on socio-technical transitions demonstrates that incumbent fossil fuel systems often persist because they are supported by powerful networks of political actors, corporations, financial institutions, and regulatory frameworks that create resistance to rapid transformation (Geels 2002; Geels 2019). Therefore, understanding energy transition requires examining not only technological possibilities but also the political and institutional arrangements that sustain fossil fuel dependence.

Indonesia represents a particularly important case for examining these challenges. As Southeast Asia's largest economy and one of the world's largest coal producers and exporters, Indonesia occupies a central position within global debates on energy transition. Coal has historically played a strategic role in Indonesia's economic development by supporting industrial expansion, electricity generation, export revenues, and regional

employment. The country's abundant coal reserves have contributed to a development model in which fossil fuel extraction is closely connected with national economic growth strategies and local political interests.

At the same time, Indonesia has demonstrated increasing commitment to international climate governance. The country has pledged to achieve net-zero emissions by 2060 and has strengthened its participation in global climate initiatives, including the Paris Agreement, the Just Energy Transition Partnership (JETP), and various renewable energy investment frameworks. These commitments represent significant policy shifts toward decarbonization and demonstrate Indonesia's recognition of the environmental and economic risks associated with long-term fossil fuel dependency. However, translating international commitments into domestic transformation remains a significant governance challenge.

Indonesia's energy transition illustrates the tension between ambitious climate objectives and persistent structural dependence on coal. Although renewable energy development has expanded through policies promoting solar, geothermal, hydropower, and other low-carbon technologies, renewable energy deployment remains constrained by regulatory uncertainty, investment barriers, infrastructure limitations, and competition from established fossil fuel interests. Coal continues to dominate electricity generation, while coal-related industries maintain significant economic and political influence through employment networks, regional development programs, and connections with state and private actors.

From a political economy perspective, Indonesia's energy transition cannot be understood merely as a question of increasing renewable energy capacity. Instead, it requires analysis of how different actors negotiate power, resources, and institutional authority during the transition process. State institutions seek to balance economic growth with environmental commitments; coal companies seek to maintain market stability and profitability; local

governments depend on extractive industries for fiscal revenues and employment; environmental organizations advocate stronger climate action; and international actors promote financing mechanisms to accelerate decarbonization. These competing interests shape both the speed and direction of Indonesia's energy transition.

Existing scholarship on energy transition has generated significant insights into technological innovation, renewable energy diffusion, and socio-technical transformation (Geels 2002; Markard, Raven, and Truffer 2012). However, comparatively less attention has been devoted to the political bargaining processes that determine transition outcomes in emerging economies. Much of the literature has focused on European experiences of decarbonization, where institutional capacity, financial resources, and regulatory environments differ significantly from those of developing countries. As a result, important questions remain regarding how countries with strong fossil fuel dependencies negotiate the tension between climate commitments and domestic political-economic realities.

Furthermore, research on Indonesia's energy transition has frequently emphasized technical potential, renewable energy resources, or policy commitments, while paying comparatively limited attention to the institutional and political dynamics influencing implementation. Although Indonesia possesses substantial renewable energy potential, the persistence of coal dependency demonstrates that energy transitions are shaped not only by resource availability but also by political incentives, governance structures, and distributional conflicts. Understanding these dynamics is essential for explaining why ambitious climate commitments often encounter implementation challenges.

This article addresses these research gaps by examining the political economy of Indonesia's energy transition from coal dependency toward a low-carbon energy system. Rather than treating transition as a purely technological challenge, this study conceptualizes energy transition as a process of political negotiation

involving competing interests, institutional arrangements, and questions of social justice. Using qualitative analysis of energy policies, stakeholder relationships, sectoral developments, and interviews with relevant actors, the study investigates how political and economic forces influence Indonesia's ability to reconcile coal dependence with net-zero commitments.

The article makes three contributions to the broader literature on energy transition and climate governance. First, it advances understanding of emerging economy transitions by demonstrating how political-economic structures shape decarbonization pathways beyond technological considerations. Second, it contributes empirical evidence from Indonesia, an important but comparatively understudied case within global energy transition research. Third, it develops analytical insights into how governance reforms, institutional coordination, and just transition principles can improve the alignment between climate objectives and development priorities.

By examining Indonesia's experience, this study contributes to broader debates concerning how developing countries can pursue ambitious climate action while maintaining economic stability and social equity. The Indonesian case demonstrates that successful energy transition requires more than renewable energy investment or international climate commitments; it requires governance systems capable of transforming political incentives, managing distributional impacts, and creating inclusive pathways toward sustainable development.

II. COAL DEPENDENCY AND THE POLITICAL ECONOMY OF INDONESIA'S ENERGY SYSTEM

Indonesia's pathway toward energy transition is fundamentally shaped by the persistence of coal dependency as both an economic resource and a political institution. Although the country has increased its commitment to renewable energy development and

international climate agreements, coal remains deeply embedded within Indonesia's electricity system, industrial strategy, and regional development model. This condition demonstrates that energy transition is not merely a matter of replacing fossil fuel technologies with renewable alternatives but involves transforming the political and economic structures that sustain fossil fuel dependence (Geels 2002; Cherp et al. 2018).

The concept of socio-technical lock-in provides an important analytical framework for understanding Indonesia's continued reliance on coal. According to transition scholars, dominant energy systems persist because they are supported by interconnected networks of infrastructure, investment patterns, institutional arrangements, regulatory frameworks, and political interests that collectively reinforce existing trajectories (Unruh 2000; Geels 2019). In Indonesia, coal dependency has developed through decades of state-led industrialization, electricity expansion programs, and export-oriented economic strategies. As a result, coal is not simply an energy commodity but a strategic component of national development planning.

Historically, Indonesia's energy policy has prioritized energy availability, affordability, and economic growth. Coal has been positioned as a reliable domestic energy source capable of supporting industrial expansion and electrification objectives. The development of coal-fired power plants has been integrated into national electricity planning, particularly through large-scale infrastructure programs designed to increase generation capacity. While these policies have contributed to economic development and improved electricity access, they have simultaneously strengthened institutional dependence on fossil fuel infrastructure and created long-term commitments that make rapid decarbonization more difficult.

This dynamic reflects what political economy scholars describe as carbon lock-in, where existing fossil fuel systems generate economic and political incentives that discourage transition toward alternative energy pathways (Unruh 2000). In

Indonesia, coal infrastructure represents significant sunk investments involving power producers, mining companies, financial institutions, workers, and local governments. Once established, these networks create resistance to change because decarbonization threatens existing economic interests and political relationships. Therefore, the challenge of energy transition is not only technological substitution but also the restructuring of institutional and economic relationships built around coal.

The influence of coal extends beyond the energy sector into broader political and economic structures. Coal mining has historically contributed to export revenues, employment opportunities, and regional economic development, particularly in coal-producing provinces such as East Kalimantan and South Sumatra. Local governments often depend on extractive industries through taxation, royalties, and employment creation. Consequently, policies aimed at reducing coal consumption may generate political concerns regarding regional economic stability and social welfare. This illustrates why energy transition policies frequently encounter resistance even when environmental objectives receive broad international support.

The political importance of coal is further reinforced by relationships between state institutions and private sector actors. Energy companies, mining corporations, and industrial consumers possess significant influence in shaping energy policy debates because they provide economic resources, investment capacity, and employment opportunities. Such relationships reflect broader patterns of resource governance in which extractive industries can influence policy priorities through economic importance and institutional connections (Bridge 2011). In emerging economies, governments often face a dilemma: reducing fossil fuel dependence may support long-term climate objectives, but rapid transition may create short-term economic and political costs.

The persistence of coal dependency also reflects institutional fragmentation within Indonesia's energy governance system. Multiple government institutions are involved in energy planning,

environmental regulation, investment approval, and climate policy implementation. While institutional diversity can support policy innovation, it may also produce coordination challenges when different agencies pursue competing objectives. For example, energy security institutions may prioritize affordable electricity supply, while environmental institutions emphasize emissions reduction. Without strong coordination mechanisms, climate commitments may remain disconnected from sectoral implementation strategies.

This institutional challenge highlights an important distinction between policy commitment and policy implementation. Indonesia has demonstrated increasing engagement with international climate governance through its Nationally Determined Contribution (NDC), net-zero target, and participation in international financing mechanisms such as the Just Energy Transition Partnership (JETP). However, international commitments require domestic institutional alignment to produce meaningful transformation. Energy transition depends not only on setting ambitious targets but also on creating regulatory systems, investment incentives, and governance arrangements capable of changing existing energy trajectories.

Another important dimension of Indonesia's coal dependency is the role of energy affordability and development priorities. Unlike many developed countries that can pursue rapid decarbonization through established renewable energy markets and advanced infrastructure, Indonesia continues to face significant development challenges, including expanding electricity access and maintaining industrial competitiveness. As a result, policymakers often frame coal as a practical solution for ensuring affordable and reliable energy supply. This development-oriented perspective creates tension between climate objectives and domestic economic priorities.

However, framing coal dependency solely as an economic necessity risks overlooking the long-term costs associated with fossil fuel reliance. Coal-intensive energy systems generate

environmental externalities, including air pollution, public health impacts, and vulnerability to future climate-related risks. Furthermore, continued investment in coal infrastructure may create stranded asset risks as global markets increasingly shift toward low-carbon technologies. Therefore, maintaining coal dependency may provide short-term economic benefits while generating long-term transition challenges.

The Indonesian experience demonstrates that energy transition requires addressing the political foundations of fossil fuel dependence. Renewable energy expansion alone will not automatically transform the energy system if existing institutional incentives continue to favor coal-based development. Transition strategies must therefore consider the interests of affected stakeholders, including workers, mining communities, regional governments, and industrial sectors. Without mechanisms to address distributional consequences, energy transition policies may face social and political resistance.

From a governance perspective, Indonesia's coal dependency illustrates the limitations of technology-centered approaches to energy transition. The availability of renewable energy technologies does not guarantee transition success because political institutions, economic interests, and social conditions shape whether these technologies can be effectively adopted. As Sovacool (2016) argues, energy transitions are inherently political processes involving conflicts over resources, power, and societal priorities.

Therefore, Indonesia's transition away from coal requires a transformation of governance structures rather than simply an expansion of renewable energy capacity. This involves reforming investment frameworks, improving policy consistency, strengthening institutional coordination, and developing mechanisms for affected communities. The persistence of coal dependency should not be interpreted as a failure of technological capability but as evidence of the political and institutional complexity of energy transition.

In conclusion, Indonesia's coal dependency represents a deeply embedded socio-economic and political system rather than a temporary energy preference. The country's net-zero ambitions will depend on its ability to overcome carbon lock-in through governance reforms that realign economic incentives, institutional priorities, and development strategies. The following section examines how Indonesia negotiates its net-zero commitments within this complex political environment by analyzing the interaction between state institutions, international climate mechanisms, and domestic stakeholders.

III. NEGOTIATING NET-ZERO COMMITMENTS: INSTITUTIONS, INTERNATIONAL CLIMATE FINANCE, AND GOVERNANCE CHALLENGES IN INDONESIA'S ENERGY TRANSITION

Indonesia's commitment to achieving net-zero emissions by 2060 represents a significant transformation in its climate governance trajectory. Through its Nationally Determined Contribution (NDC) under the Paris Agreement, participation in international climate initiatives, and engagement with global financing mechanisms, Indonesia has increasingly positioned itself as an important actor in Southeast Asia's low-carbon transition. However, translating international climate commitments into domestic energy transformation remains a complex governance challenge. The gap between policy ambition and implementation reflects the interaction between international climate expectations, domestic political priorities, institutional capacity, and economic interests embedded within Indonesia's energy system.

The politics of Indonesia's net-zero transition demonstrates that climate commitments are shaped by continuous negotiation between global environmental objectives and domestic development priorities. International climate governance increasingly encourages developing countries to accelerate decarbonization through mechanisms such as climate finance,

technology transfer, and capacity-building initiatives. However, emerging economies often face structural constraints because their economic growth models have historically relied on fossil fuel-based industrialization. As Newell and Mulvaney (2013) argue, energy transitions in developing countries involve complex questions of justice because governments must reconcile emission reduction objectives with employment creation, poverty reduction, and economic development.

Indonesia's participation in the Paris Agreement illustrates this tension. The country has committed to reducing greenhouse gas emissions through enhanced climate targets while maintaining economic growth and energy security. However, the implementation of these commitments requires substantial transformation across multiple sectors, particularly electricity generation, transportation, and industrial production. The electricity sector remains the most politically sensitive area because coal-fired power plants continue to provide the majority of Indonesia's electricity supply. Consequently, reducing emissions requires not only increasing renewable energy capacity but also addressing the economic and institutional structures that support coal-based electricity generation.

A central element of Indonesia's transition strategy has been engagement with international climate finance mechanisms, particularly through the Just Energy Transition Partnership (JETP) launched during the G20 Summit in 2022. The partnership represents a new model of international cooperation designed to mobilize financial resources, technical assistance, and policy support for accelerating Indonesia's energy transition. Through JETP, Indonesia has sought to demonstrate that developing countries require international support to overcome the financial and institutional barriers associated with fossil fuel phase-down.

However, the effectiveness of climate finance mechanisms depends heavily on domestic governance capacity. International funding commitments alone cannot guarantee successful transition if domestic institutions lack coordination, regulatory certainty, and

implementation capacity. Research on climate governance emphasizes that financial resources must be accompanied by institutional reforms because energy transitions involve complex changes in markets, regulations, and political relationships (Jordan and Moore 2020). In Indonesia, this challenge is particularly visible because multiple institutions possess overlapping responsibilities in energy planning, environmental regulation, investment management, and industrial development.

Institutional fragmentation represents one of the most significant barriers to implementing Indonesia's net-zero commitments. Energy transition requires coordination between ministries responsible for energy policy, finance, industry, environment, investment, and regional development. However, these institutions may possess different priorities and performance indicators. While climate institutions emphasize emissions reduction, economic institutions often prioritize investment growth, industrial competitiveness, and energy affordability. Such differences can create policy inconsistencies that slow the implementation of decarbonization strategies.

This institutional challenge reflects a broader problem identified in climate governance literature: ambitious environmental commitments frequently encounter difficulties when they conflict with established economic and administrative structures. Meadowcroft (2009) argues that sustainability transitions require institutional transformation because existing governance arrangements are often designed around established production systems rather than disruptive change. In Indonesia, the challenge is therefore not merely adopting new climate policies but restructuring decision-making processes to ensure that climate objectives become integrated across government institutions.

Regulatory uncertainty further complicates Indonesia's energy transition. Renewable energy investors often require long-term policy stability because renewable energy projects involve significant initial investment and extended operational periods. However, changes in regulatory frameworks, investment

procedures, electricity pricing mechanisms, and procurement policies have historically created uncertainty for renewable energy development. While Indonesia has introduced various policies to encourage renewable energy investment, implementation challenges remain due to regulatory complexity and inconsistencies between national objectives and sectoral practices.

The contrast between coal and renewable energy investment illustrates this governance imbalance. Coal industries have benefited from established infrastructure, market networks, and institutional support developed over decades. Renewable energy industries, by contrast, must compete within a regulatory environment where fossil fuel systems continue to possess structural advantages. This situation reflects the concept of path dependency, where previous policy choices shape future possibilities by creating institutional and economic commitments that are difficult to reverse (Pierson 2000). Indonesia's transition challenge therefore involves not only introducing renewable technologies but also overcoming the institutional advantages accumulated by fossil fuel industries.

Another important dimension concerns the political economy of energy subsidies and affordability. Energy affordability remains a central political issue in Indonesia because electricity prices and energy costs directly influence public welfare and industrial competitiveness. Governments are therefore cautious about policies that could increase energy prices or create economic disruption. Although fossil fuel subsidies have gradually declined, historical dependence on affordable fossil energy continues to influence policy preferences. This creates political constraints on rapid coal reduction, particularly when alternative energy systems require substantial investment and infrastructure development.

The role of state-owned enterprises also illustrates the complexity of Indonesia's transition politics. State-owned energy companies occupy strategic positions within the national energy system and are expected to simultaneously support economic

development, energy security, and environmental commitments. These multiple roles create institutional tensions because energy companies must maintain financial performance while participating in decarbonization initiatives. Successful transition therefore requires redefining corporate governance models to incorporate climate objectives alongside traditional economic performance indicators.

International climate partnerships such as JETP provide opportunities to address these challenges, but their effectiveness depends on whether they generate meaningful institutional transformation rather than merely additional financing. Climate finance must be integrated with domestic policy reform, transparent governance mechanisms, and stakeholder participation. Without these elements, external financial support risks producing limited structural change because underlying political-economic incentives remain unchanged.

Furthermore, the legitimacy of Indonesia's energy transition depends on addressing distributional consequences. Coal-dependent regions and communities may experience economic disruption as fossil fuel industries decline. Workers employed in mining, transportation, and coal-related industries require alternative employment opportunities and social protection mechanisms. Similarly, local governments dependent on mining revenues require strategies to diversify regional economies. These concerns highlight why the concept of a just transition is essential for Indonesia's energy pathway.

A just transition framework emphasizes that decarbonization should distribute benefits and costs fairly among different social groups (Heffron and McCauley 2018; Jenkins et al. 2016). In Indonesia, this requires integrating social policies, regional development strategies, workforce transformation programs, and community participation into energy transition planning. Without such measures, climate policies may encounter resistance from communities that perceive decarbonization as a threat to economic security.

The analysis demonstrates that Indonesia's net-zero commitment is characterized by a continuous process of negotiation rather than a straightforward policy trajectory. International climate commitments provide important direction and resources, but domestic political-economic structures determine the pace and effectiveness of implementation. The transition challenge emerges from the interaction between global climate governance and national development priorities, where governments must balance environmental responsibility with economic and social stability.

Therefore, Indonesia's energy transition requires a governance approach that moves beyond policy commitments toward institutional alignment. Achieving net-zero emissions will depend on strengthening regulatory consistency, improving coordination among government institutions, creating investment certainty for renewable energy, and ensuring that affected communities receive meaningful support during the transition process.

The Indonesian experience demonstrates that climate ambition alone is insufficient to transform energy systems. Successful transition requires political strategies capable of reshaping incentives, managing competing interests, and building legitimacy among diverse stakeholders. The following section develops a broader framework for understanding how emerging economies can pursue a just energy transition by integrating governance reform, economic transformation, and social equity considerations.

IV. TOWARD A JUST ENERGY TRANSITION GOVERNANCE FRAMEWORK FOR EMERGING ECONOMIES

The analysis of Indonesia's energy transition demonstrates that decarbonization cannot be achieved solely through technological substitution or the expansion of renewable energy capacity. While

renewable technologies provide essential pathways for reducing emissions, the success of energy transition depends on the institutional, political, and social conditions that determine whether such technologies can be effectively implemented. The Indonesian case illustrates that countries with significant fossil fuel dependency require governance approaches capable of addressing economic interests, institutional fragmentation, and social consequences associated with decarbonization. Therefore, this study proposes a Just Energy Transition Governance Framework for Emerging Economies that integrates institutional reform, economic restructuring, social equity, and international cooperation as interconnected dimensions of successful transition.

The framework begins with the principle that energy transition is fundamentally a governance transformation rather than merely an energy system transformation. Existing approaches to energy transition have often emphasized technological innovation, renewable energy deployment, and market-based mechanisms. However, research on sustainability transitions demonstrates that technological change occurs within broader socio-political systems shaped by institutions, regulations, cultural expectations, and economic interests (Geels 2002; Markard, Raven, and Truffer 2012). Consequently, renewable energy expansion will remain limited if governance structures continue to reproduce fossil fuel dependence.

The first dimension of the proposed framework is institutional alignment and policy coherence. Successful energy transitions require governments to align climate objectives with energy planning, industrial policy, investment strategies, and regional development programs. Indonesia's experience demonstrates that ambitious climate commitments can face implementation difficulties when institutional responsibilities remain fragmented or when different government agencies pursue conflicting priorities. A coherent transition strategy requires integrating climate objectives into broader development planning

rather than treating decarbonization as a separate environmental policy agenda.

Policy coherence is particularly important in emerging economies because governments often face simultaneous pressures to expand economic growth, increase energy access, attract investment, and reduce emissions. Without institutional alignment, renewable energy policies may exist alongside contradictory incentives that continue to support fossil fuel industries. Therefore, transition governance requires mechanisms that coordinate decision-making across ministries, strengthen regulatory consistency, and establish clear accountability for climate objectives.

This institutional dimension aligns with broader climate governance scholarship emphasizing that effective environmental transformation requires coordination across multiple levels of government and policy sectors (Jordan and Moore 2020). In Indonesia, strengthening institutional alignment may involve improving coordination between energy authorities, environmental agencies, investment institutions, financial regulators, and regional governments. Such coordination is essential because energy transition affects not only electricity generation but also employment, industrial development, fiscal policy, and regional economies.

The second dimension involves economic diversification and fossil fuel dependency reduction. One of the central challenges facing emerging economies is that fossil fuel industries frequently function as important sources of employment, export revenue, and regional development. Consequently, reducing coal dependency requires strategies that create alternative economic opportunities rather than simply restricting fossil fuel activities. Without economic diversification, communities and industries dependent on coal may resist transition because they perceive climate policies as threats to economic security.

Indonesia's coal-producing regions illustrate this challenge. Areas with significant mining activity have developed economic

structures, labor markets, and government revenues around fossil fuel extraction. A successful transition therefore requires regional economic transformation through investment in alternative industries, renewable energy development, green manufacturing, and workforce retraining. This approach reflects the core principle of a just transition, which argues that climate policies must address the distributional impacts of decarbonization rather than focusing exclusively on emission reduction targets (Heffron and McCauley 2018).

Economic diversification also requires reforming financial systems that continue to favor fossil fuel investment. Banks, investors, and state-owned enterprises play important roles in determining capital allocation within energy systems. As long as fossil fuel projects receive greater institutional support than renewable alternatives, market forces alone may not generate rapid decarbonization. Therefore, transition governance requires financial reforms that encourage sustainable investment while managing risks associated with fossil fuel asset decline.

The third dimension of the framework is inclusive transition and energy justice. Energy transitions create both opportunities and risks, and their social consequences determine political legitimacy. Although renewable energy development may create new economic opportunities, the decline of fossil fuel industries may negatively affect workers, communities, and regions dependent on extractive activities. Therefore, transition strategies must ensure that benefits and costs are distributed fairly across society.

The concept of energy justice provides an important foundation for understanding this challenge. Jenkins et al. (2016) argue that energy justice requires attention to three dimensions: distributional justice, procedural justice, and recognition justice. Distributional justice concerns the fair allocation of benefits and burdens; procedural justice emphasizes meaningful participation in decision-making; and recognition justice requires acknowledging the experiences and vulnerabilities of affected communities.

Applying this perspective to Indonesia suggests that energy transition policies must involve affected communities in planning processes. Local governments, workers, indigenous communities, and civil society organizations should not be treated merely as policy recipients but as active participants in transition governance. Without inclusive participation, energy transition may generate social resistance and reduce political legitimacy.

The fourth dimension concerns multi-stakeholder climate governance. Energy transition involves multiple actors whose interests and capacities differ significantly. Governments provide regulatory authority, companies provide investment and technological capacity, communities provide social legitimacy, and international organizations provide financial and technical support. No single actor possesses sufficient resources to manage the complexity of transition independently.

This situation supports the application of collaborative governance approaches. Ansell and Gash (2008) argue that complex public challenges require institutional arrangements that facilitate cooperation among government and non-government actors. In the context of energy transition, collaborative governance can improve policy legitimacy, increase information sharing, and reduce conflicts among stakeholders.

For Indonesia, multi-stakeholder governance is particularly important because energy policy has historically been shaped by centralized decision-making structures. A more participatory approach could improve transparency, strengthen accountability, and ensure that transition policies reflect local conditions. Such governance mechanisms may include transition councils, stakeholder forums, regional planning platforms, and independent monitoring institutions.

The fifth dimension involves international cooperation and climate finance governance. Emerging economies frequently face financial constraints that limit their ability to accelerate decarbonization. Renewable energy infrastructure, grid modernization, energy storage systems, and industrial

transformation require substantial investment. International climate finance mechanisms therefore play an important role in supporting developing countries' transition pathways.

However, international financing must move beyond short-term project funding toward long-term institutional transformation. The effectiveness of mechanisms such as JETP depends on whether financial resources are integrated with domestic governance reforms, transparent implementation systems, and measurable transition outcomes. Climate finance should therefore be understood not only as financial assistance but also as a mechanism for strengthening governance capacity.

Indonesia's experience provides broader lessons for emerging economies seeking to reconcile development objectives with climate commitments. Many developing countries face similar challenges: dependence on fossil fuel revenues, limited renewable infrastructure, institutional capacity constraints, and competing development priorities. Therefore, the Indonesian case contributes to comparative understanding of how emerging economies can design transition pathways that reflect their specific political and economic contexts.

The proposed framework suggests that successful energy transition requires simultaneous progress across all five dimensions. Institutional reform without economic diversification may create social resistance; renewable investment without energy justice may undermine legitimacy; international finance without governance reform may produce limited structural change. Therefore, transition success depends on the interaction between political capacity, economic transformation, social inclusion, and international cooperation.

The broader theoretical implication of this study is that energy transitions in emerging economies should not be evaluated solely through emission reduction indicators or renewable energy capacity. Instead, transition success should also be assessed through governance indicators, including institutional coherence, stakeholder participation, economic resilience, and social equity.

Such an approach provides a more comprehensive understanding of how countries navigate the complex pathway from fossil fuel dependence toward sustainable energy systems.

In conclusion, Indonesia's energy transition demonstrates that achieving net-zero commitments requires transforming the political economy of energy itself. The central challenge is not simply replacing coal with renewable energy but restructuring the institutions, incentives, and social relationships that have historically supported fossil fuel development. The Just Energy Transition Governance Framework proposed in this study provides an analytical foundation for understanding how emerging economies can pursue decarbonization pathways that are environmentally effective, economically viable, and socially legitimate.

V. CONCLUSION

This study demonstrates that Indonesia's energy transition represents a complex political and governance transformation rather than a purely technological shift from fossil fuels to renewable energy. Although Indonesia has strengthened its commitment to achieving net-zero emissions through international climate agreements, renewable energy policies, and climate finance partnerships, the persistence of coal dependency continues to shape the country's transition pathway. The analysis reveals that coal remains embedded within Indonesia's economic development model, institutional structures, regional economies, and political relationships. Consequently, the central challenge of Indonesia's energy transition is not simply the availability of renewable technologies but the ability to transform the political-economic arrangements that continue to sustain fossil fuel dependence. The findings show that achieving meaningful decarbonization requires addressing carbon lock-in, strengthening institutional coordination, improving regulatory consistency, and managing the social consequences of fossil fuel decline.

This article contributes to the literature on energy transition and climate governance by developing a **Just Energy Transition Governance Framework for Emerging Economies**. The framework argues that successful transition requires simultaneous progress across five interconnected dimensions: institutional alignment, economic diversification, energy justice, multi-stakeholder governance, and international climate cooperation. The Indonesian case demonstrates that climate commitments alone are insufficient unless they are supported by governance systems capable of aligning political incentives, economic priorities, and social equity objectives. For emerging economies facing similar challenges, the pathway toward net-zero emissions requires a transition model that balances environmental ambition with development realities. Future research should extend this analysis through comparative studies across fossil fuel-dependent economies, examining how different institutional contexts influence the effectiveness of just transition strategies and climate governance reforms.

REFERENCES

- Ansell, Chris, and Alison Gash. 2008. "Collaborative Governance in Theory and Practice." *Journal of Public Administration Research and Theory* 18 (4): 543–571. <https://doi.org/10.1093/jopart/mum032>.
- Bridge, Gavin. 2011. "Resource Geographies I: Making Carbon Economies, Old and New." *Progress in Human Geography* 35 (6): 820–834. <https://doi.org/10.1177/0309132510385524>.
- Cherp, Aleh, Vadim Vinichenko, Jessica Jewell, Elina Brutschin, and Benjamin Sovacool. 2018. "Integrating Techno-Economic, Socio-Technical and Political Perspectives on National Energy Transitions." *Energy Research & Social Science* 37: 175–190. <https://doi.org/10.1016/j.erss.2017.10.019>.
- Geels, Frank W. 2002. "Technological Transitions as Evolutionary Reconfiguration Processes: A Multi-Level Perspective and a Case-Study." *Research Policy* 31 (8–9): 1257–1274. [https://doi.org/10.1016/S0048-7333\(02\)00062-8](https://doi.org/10.1016/S0048-7333(02)00062-8).

- Geels, Frank W. 2019. "Socio-Technical Transitions to Sustainability: A Review of Criticisms and Elaborations of the Multi-Level Perspective." *Current Opinion in Environmental Sustainability* 39: 187–201. <https://doi.org/10.1016/j.cosust.2019.06.009>.
- Government of Indonesia. 2022. *Enhanced Nationally Determined Contribution of the Republic of Indonesia*. Jakarta: Ministry of Environment and Forestry.
- Heffron, Raphael J., and Darren McCauley. 2018. "What Is the 'Just Transition'?" *Geoforum* 88: 74–77. <https://doi.org/10.1016/j.geoforum.2017.11.016>.
- International Energy Agency (IEA). 2023. *An Energy Sector Roadmap to Net Zero Emissions in Indonesia*. Paris: International Energy Agency.
- International Renewable Energy Agency (IRENA). 2023. *World Energy Transitions Outlook 2023: 1.5°C Pathway*. Abu Dhabi: International Renewable Energy Agency.
- Jenkins, Kirsten, Darren McCauley, Raphael Heffron, Hannes Stephan, and Robert Rehner. 2016. "Energy Justice: A Conceptual Review." *Energy Research & Social Science* 11: 174–182. <https://doi.org/10.1016/j.erss.2015.10.004>.
- Jordan, Andrew, and B. J. Moore. 2020. *The Governance of Climate Change: Adaptation and Mitigation in the European Union*. Cambridge: Cambridge University Press.
- Markard, Jochen, Rob Raven, and Bernhard Truffer. 2012. "Sustainability Transitions: An Emerging Field of Research and Its Prospects." *Research Policy* 41 (6): 955–967. <https://doi.org/10.1016/j.respol.2012.02.013>.
- Meadowcroft, James. 2009. "What about the Politics? Sustainable Development, Transition Management, and Long Term Energy Transitions." *Policy Sciences* 42: 323–340. <https://doi.org/10.1007/s11077-009-9097-z>.
- Newell, Peter, and Dustin Mulvaney. 2013. "The Political Economy of the 'Just Transition'." *The Geographical Journal* 179 (2): 132–140. <https://doi.org/10.1111/geoj.12008>.
- Pierson, Paul. 2000. "Increasing Returns, Path Dependence, and the Study of Politics." *American Political Science Review* 94 (2): 251–267. <https://doi.org/10.2307/2586011>.

- Republic of Indonesia. 2016. *Law No. 16 of 2016 on the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change*. Jakarta: Government of Indonesia.
- Sovacool, Benjamin K. 2016. "How Long Will It Take? Conceptualizing the Temporal Dynamics of Energy Transitions." *Energy Research & Social Science* 13: 202–215. <https://doi.org/10.1016/j.erss.2015.12.020>.
- United Nations Framework Convention on Climate Change (UNFCCC). 2015. *Paris Agreement*. Bonn: United Nations Framework Convention on Climate Change.
- Unruh, Gregory C. 2000. "Understanding Carbon Lock-In." *Energy Policy* 28 (12): 817–830. [https://doi.org/10.1016/S0301-4215\(00\)00070-7](https://doi.org/10.1016/S0301-4215(00)00070-7).

