Jurnal PUBLIQUE

Vol. 7, No. 2. Nov 2026
p-ISSN 2829-5323; e-ISSN 2829-5625
DOI: 10.15642/publique.2026.7.2.267-286

POST-ENERGY CRISIS POLICY IMPLICATIONS: A COMPARATIVE ANALYSIS OF COMMUNITY RESILIENCE AND MOBILIZATION IN SULAWESI AND KALIMANTAN

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Abstrak

Kelangkaan bahan bakar dan gangguan distribusi merupakan isu strategis yang tidak hanya berdampak pada perekonomian, tetapi juga memengaruhi kehidupan sosial masyarakat di berbagai wilayah di Indonesia. Dampak yang dirasakan berbeda-beda di setiap wilayah, bergantung pada karakteristik sosial, ekonomi, dan geografisnya. Dalam konteks ini, masyarakat tidak sekadar menjadi pihak yang terdampak, melainkan juga menunjukkan berbagai bentuk respons kolektif melalui gerakan sosial dan penguatan ketahanan komunitas. Studi ini bertujuan untuk menganalisis serta membandingkan bentuk-bentuk gerakan sosial dan ketahanan komunitas dalam merespons kelangkaan bahan bakar di Kota Makassar (Sulawesi Selatan) dan Kabupaten Berau (Kalimantan Timur), sekaligus mengidentifikasi implikasinya terhadap dinamika sosial di tingkat nasional. Penelitian ini menggunakan metodologi kualitatif melalui tinjauan pustaka sistematis, analisis data sekunder, dan riset dokumen. Data diperoleh dari jurnal ilmiah, laporan pemerintah, dokumen kebijakan, pemberitaan media, serta publikasi lembaga penelitian terkait, kemudian dianalisis melalui tahapan reduksi data, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa di Makassar, respons publik terutama diwujudkan melalui mobilisasi gerakan sosial yang melibatkan mahasiswa, kelompok transportasi, dan organisasi kemasyarakatan dalam menyuarakan tuntutan

Article History: Received xx Month 20xx, Revised xx Month 20xx, Accepted xx Month 20xx, Available online 01 May 2024
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terkait stabilitas pasokan serta kebijakan bahan bakar. Sementara itu, di Berau, respons publik cenderung ditunjukkan melalui penguatan ketahanan komunitas khususnya oleh masyarakat pesisir, nelayan, dan pelaku usaha lokal yang mengembangkan berbagai strategi adaptasi untuk menghadapi keterbatasan akses serta meningkatnya biaya operasional. Meskipun bentuk responsnya berbeda, kedua wilayah tersebut menunjukkan bahwa masyarakat berperan aktif dalam menyikapi dampak krisis energi. Studi ini menyimpulkan bahwa gerakan sosial dan ketahanan komunitas merupakan dua mekanisme yang saling melengkapi dalam merespons kelangkaan bahan bakar, serta memberikan pelajaran penting bagi upaya penguatan kebijakan energi yang lebih inklusif dan berkeadilan di Indonesia.
Kata kunci: Ketahanan Komunitas, Studi Komparatif, Kelangkaan Bahan Bakar, Indonesia, Gerakan Sosial.

Abstract

Fuel shortages and distribution disruptions are strategic issues that not only impact the economy but also affect the social lives of communities across various regions of Indonesia. The impact is felt differently in each region depending on its social, economic, and geographic characteristics. In this context, communities are not only the affected parties but also demonstrate various forms of collective response through social movements and the strengthening of community resilience. This study aims to analyze and compare the forms of social movements and community resilience in response to fuel shortages in Makassar City, South Sulawesi, and Berau Regency, East Kalimantan, as well as to identify their implications for social dynamics at the national level. The study employs a qualitative methodology using a systematic literature review, secondary data analysis, and documentary research. Data were obtained from scientific journals, government reports, policy documents, media reports, and relevant research institution publications, and were analyzed through the stages of data reduction, data presentation, and drawing conclusions. The results show that in Makassar, public responses were primarily manifested through the mobilization of social movements involving students, transportation groups, and community organizations in voicing demands related to fuel supply stability and fuel policy. Meanwhile, in Berau, public responses tended to be demonstrated through the strengthening of community resilience, particularly by coastal communities, fishermen, and local business owners who developed various adaptation strategies to cope with limited access and rising operational costs. Although their responses differ in nature, both regions demonstrate that communities play an active role in addressing the impacts of the energy crisis. This study concludes that social movements and community resilience are two complementary mechanisms for responding to fuel shortages, and they offer important lessons for strengthening more inclusive and equitable energy policies in Indonesia.
Keywords: *Community Resilience, Comparative Study, Fuel Shortages, Indonesia, Social Movement.*

A. Introduction

In recent years, the energy crisis has evolved from an issue of supply disruptions into a matter of energy, economic, and social resilience. Globally, the COVID-19 pandemic had previously disrupted supply chains and energy markets,

and the Russia-Ukraine conflict in 2022 further intensified pressure on the global energy market. Following Russia's invasion of Ukraine, oil prices rose from US$92.77 per barrel on February 24, 2022, to US$123.64 per barrel on March 8, 2022. This rise in energy prices demonstrates that geopolitical disruptions can rapidly affect global energy stability and the global economy. These conditions have also impacted Indonesia. Shofiyana et al.[1] explain that Indonesia experienced a "triple shock" during the pandemic: a decline in energy demand, fluctuations in global energy prices, and changes in the rupiah exchange rate all of which were further exacerbated by the impact of the Russia-Ukraine conflict on energy conditions. This global impact is evident in the rise of the Indonesian Crude Price (ICP) from US$85.89 per barrel in January 2022 to US$95.72 per barrel in February 2022.

At the national level, the challenge of energy security is also evident in Indonesia's energy mix, which remains dominated by fossil fuels. In 2023, coal accounted for 40.46% of the energy mix, crude oil for 30.18%, natural gas for 16.28%, while renewable energy accounted for only 13.09%. Sekaringtias et al.[2] indicate that high dependence on fossil fuels, along with conflicts of interest, inconsistent regulations, and limited implementation capacity, pose challenges to Indonesia's energy transition process. Thus, the dynamics of the energy crisis from the global to the national level demonstrate that energy security is not only related to the availability of supply but is also influenced by economic conditions, energy dependence, the quality of governance, and the government's ability to respond to global changes.

An energy crisis, in essence, does not merely highlight issues of limited or scarce energy resources, but also reveals the vulnerability of energy supply, transportation, and distribution systems, as well as the government's capacity to respond to disruptions. Tahir[3] points out that energy crises must be understood in the context of energy security and energy sector governance, particularly because disruptions to infrastructure and shifting demands can increase the vulnerability of the energy system. In line with this, Luqman et al.[4] emphasize that preparing for an energy crisis requires public policies capable of integrating communication and coordination among various parties, as energy issues involve many actors and interests.

Normatively, the government's obligations in addressing such conditions already have a legal basis. Article 6 of Law No. 30 of 2007 on Energy stipulates that an energy crisis is a condition of energy shortage, while an energy emergency is a

[1] Shofiyana et al. (2022).
[2] Sekaringtias et al. (2023).
[3] Tahir, A. H. (2023). Analisis Strategi Kebijakan Ekonomi Politik Preventif Indonesia Menghadapi Krisis Energi Tahun 2021. Mandar: Social Science Journal, 2(2).DOI : https://doi.org/10.31605/mssj.v2i2.3254.
[4] Luqman et al. (2017).

disruption in supply resulting from the interruption of energy facilities and infrastructure; if such conditions disrupt governance, social life, or economic activities, the government is obligated to take the necessary mitigating actions. This provision is reinforced by Presidential Regulation No. 41 of 2016, which governs the management of energy crises and/or emergencies through the release of energy reserves, increased imports, restrictions on exports or consumption, accelerated infrastructure development, energy diversification, and measures to restore supply. Meanwhile, Government Regulation No. 40 of 2025 emphasizes the importance of the reliability of energy production, storage, transportation, and distribution systems, as well as the provision of buffer reserves to address energy crises and emergencies. Thus, an energy crisis must be viewed as a governance issue that requires the government not only to ensure energy availability but also to guarantee distribution, maintain infrastructure reliability, determine energy supply priorities, and establish mitigation and recovery mechanisms in the event of disruptions.

In this context, the government's capacity to respond to an energy crisis is also determined by its ability to provide public information, establish interagency coordination, establish complaint mechanisms, and involve the public in mitigation and recovery efforts. Ramadani[5] demonstrates that organizational communication within the energy sector plays a role in supporting policy formulation and implementation, particularly through coordination, the dissemination of policy messages, and the use of various communication channels between departments and among stakeholders. These findings indicate that effective communication and coordination are necessary for the integrated implementation of energy policies. More recent findings by Wibowo et al.[6] also indicate that Indonesia's energy challenges are not limited to resource availability but also encompass infrastructure constraints, distribution disparities, weak inter-agency coordination, and institutional capacity in energy policy implementation. Therefore, the government must ensure that information regarding supply conditions, disruptions, and mitigation measures reaches the public accurately and in a timely manner. This aligns with Law No. 14 of 2008 on Public Information Disclosure, which requires public agencies to provide accurate and truthful information and to immediately disclose information that could threaten the public's livelihood and public order.

[5] Ramadani, T. (2020). Komunikasi organisasi pada Biro Fasilitasi Kebijakan Energi dan Persidangan Sekretariat Jenderal Dewan Energi Nasional. Jurnal Komunikasi, 14(2), 119–DOI : https://doi.org/10.21107/ilkom.v14i2.7076.

[6] Wibowo, T., Mangar, I., & Rhozaq, M. (2026). The Impact of the Global Energy Crisis on Energy Law Policy and Regulatory Effectiveness in Indonesia. Journal of Development Research, 10(1), 92–99. DOI: https://doi.org/10.28926/jdr.v10i1.521.

In addition, the complaint mechanism is part of public service responsibilities because Pasal 36 Undang-Undang Nomor 25 Tahun 2009 requires organizers to provide a complaint mechanism, manage complaints, and follow up on the results. In terms of coordination, Peraturan Presiden Nomor 41 Tahun 2016 authorizes the Minister of Energy and Mineral Resources to coordinate with ministries/agencies, local governments, business entities, and relevant parties, as well as to formulate a crisis response work plan; local governments may also coordinate, improve infrastructure, conduct monitoring, and allocate budgets in accordance with their respective authorities. Thus, the post-energy-crisis response must be framed as a governance process that integrates energy distribution, public communication, institutional coordination, public complaints, mitigation, and recovery.

The island of Sulawesi has geographical characteristics consisting of a relatively diverse landmass spread across several regions, resulting in varying levels of development and infrastructure provision across these regions. From an economic development perspective, infrastructure is a key factor, as road, water, and electricity infrastructure have been shown to positively impact regional economic growth in Sulawesi and Kalimantan, with electricity infrastructure having the greatest impact compared to road and water infrastructure.[7] In terms of electricity distribution, conditions also vary across regions in the Sulawesi region. West Sulawesi, North Maluku, Maluku, Gorontalo, Southeast Sulawesi, Central Sulawesi, and North Sulawesi are classified as regions with high levels of electricity distribution, while South Sulawesi is classified as a region with low levels of electricity distribution.[8] These differences indicate that regional characteristics, infrastructure development, and energy distribution in Sulawesi are key factors in assessing a region's ability to cope with energy pressures and disruptions.

Meanwhile, the island of Kalimantan has distinct geographical characteristics, as most of its territory consists of vast land areas with non-volcanic soil conditions and covers a very large area within Indonesia.[9] These characteristics also influence infrastructure needs and development to support economic activities and interregional energy distribution. Research by Dewanti and Fauzi[10] shows that road, water, and electricity infrastructure have a positive impact on regional economic growth in Kalimantan and Sulawesi, with electricity infrastructure exhibiting the highest elasticity. In terms of electricity distribution, several regions

[7] Dewanti & Fauzi (2022).
[8] Sari & Wijaya (2025).
[9] Estiningtyas, W., Surmaini, E., Suciantini, Susanti, E., Mulyani, A., Kartiwa, B., Sumaryanto, Perdinan, Apriyana, Y., & Alifia, A. D. (2024). Analysing food farming vulnerability in Kalimantan, Indonesia: Determinant factors and adaptation measures. PLoS ONE, 19(1), e0296262. https://doi.org/10.1371/journal.pone.0296262.
[10] Dewanti & Fauzi (2022).

in Kalimantan such as Central Kalimantan and West Kalimantan fall into the group with high electricity distribution rates, while South Kalimantan, as well as East and North Kalimantan, are in the group with lower distribution rates.[11] These differences in geographic, economic, infrastructure, and energy distribution characteristics indicate that Sulawesi and Kalimantan face the energy crisis under different conditions, making a comparison between the two relevant in the context of energy security and resilience.

Previous research on energy crises can be grouped into four main streams. First, studies on energy resilience focus on communities' capacity to cope with disruptions in energy supply; Fitra and Asirin[12] found that community resilience to the electricity crisis in South Lampung was still lacking, particularly in the dimensions of leadership and strategy, although the socio-economic dimension was relatively resilient. Second, studies on governance and government responses emphasize the role of institutions in crisis management; Stec et al.[13] analyzed local governments' adaptation strategies in Poland in response to the 2022–2023 energy crisis such as investments in renewable energy, infrastructure modernization, and the development of contingency plans but found that many local governments lacked formal procedures for managing energy crises. Third, studies on community adaptation behavior examine residents' adaptation practices in response to environmental pressures and resource constraints; research on community-based adaptation and mitigation indicates that public awareness, education, and community participation are critical factors in addressing energy, food, and environmental crises. Fourth, studies on social mobilization highlight the process of strengthening collective community participation in energy issues; Bomberg and McEwen[14] explain that energy community mobilization is influenced by structural and symbolic resources, political context, shared identity, and the aspiration for community self-reliance. Unlike these studies, which generally address aspects of energy resilience, governance, community adaptation, or social mobilization separately, this study integrates these four aspects to analyze the policy implications of the post-energy crisis on community resilience and mobilization in Sulawesi and Kalimantan. The comparative focus on these two regions sets this study apart, as it allows for the identification of similarities and differences in government responses, community adaptation strategies, and forms of social mobilization following the energy crisis.

[11] Sari & Wijaya (2025).
[12] Fitra & Asirin (2018).
[13] Stec et al. (2025).
[14] Bomberg & McEwen (2012).

This study aims to conduct a comparative analysis of community resilience and mobilization in Sulawesi and Kalimantan, as well as their implications for post-energy-crisis policy. This objective is broken down into three specific goals. First, to identify the government's response to the pressures of the energy crisis. Second, to compare patterns of community mobilization in the two regions. Third, to assess the governance factors that shape community resilience namely, local knowledge, stakeholder collaboration, and multilevel participation in both regions. The results of the analysis are intended to inform policy implications that bridge the gap between regulation and implementation.

B. Research Methods

This study employs a comparative qualitative approach to analyze the implications of post-energy-crisis policies on community resilience and mobilization in Sulawesi and Kalimantan. The qualitative approach is used to understand the phenomena based on journals, policy documents, reports, statistics, and digital sources, while the comparative method is used to systematically compare the two regions. The study focuses on three aspects: resilience, community mobilization, and the implications of post-energy-crisis policies. Resilience is analyzed through energy access, communities' ability to adapt to energy disruptions, and socioeconomic conditions, while community mobilization is examined in terms of participation, engagement, and responses to energy issues. The study's scope covers Sulawesi, comprising six provinces, and Kalimantan, comprising five provinces, for a total of 11 provinces. Since secondary data was used, these two regions serve as geographical areas for comparison rather than locations for field data collection. A similar comparative approach was used by Damayanti et al.[15] in comparing energy resilience based on a number of indicators, while Lesmana et al.[16] explained that literature-based research is not tied to a specific physical research location.

The research data consists of secondary data obtained from scientific journal articles, government statistics, institutional reports, policy documents, and official digital publications, including sources from the Central Statistics Agency, the Ministry of Energy and Mineral Resources, the State Electricity Company, and the National Development Planning Agency, covering the period 2021–2026. Data collection was conducted through literature reviews and documentation by searching Google Scholar, GARUDA, scientific journal portals, and the official

[15] Damayanti et al. (2026).

[16] Lesmana, C., Melati, P. ., & Ardiyawan, Y. . (2026). Analisis Kritis Sistem Perekonomian Indonesia: Tantangan Dan Peluang Di Era Disrupsi Digital Pasca-Pandemi: Critical Analysis Of Indonesia's Economic System: Challenges And Opportunities In The Post-Pandemic Digital Disruption Era. Citizen : Jurnal Ilmiah Multidisiplin Indonesia, 6(1), 43–46. https://doi.org/10.53866/jimi.v6i1.1169.

websites of relevant institutions using keywords related to the energy crisis, energy resilience, community mobilization, Sulawesi, Kalimantan, and energy policy. The data were then selected based on relevance, regional applicability, publication period, and source reliability. Abdurrahman[17] explains that the literature review was conducted by searching various sources through databases and online platforms. Subsequently, the data were analyzed using the interactive model proposed by Miles and Huberman, which involves the stages of data collection, data reduction, data presentation, and verification or drawing conclusions. The data were compared based on indicators of energy access, socioeconomic conditions, adaptive capacity, community engagement, and policy responses to identify similarities, differences, and emerging patterns in Sulawesi and Kalimantan. A similar analytical model was also applied by Maulinas et al.,[18] in their comparative study.

C. Result and Discussion

a. Profile of the Energy Crisis in the Study Area

The energy crisis in Sulawesi is evident from the disruptions that occurred in the Southern Sulawesi power system. In 2023, a prolonged El Niño event affected the water supply for hydroelectric power plants. As a result, the Southern Sulawesi system experienced a supply shortfall of approximately 600 MW in the fourth quarter of 2023. This incident demonstrates that the stability of the power system remains vulnerable to changes in climate conditions and the availability of energy sources.[19] On the other hand, Sulawesi's energy challenges are also linked to the development of renewable energy, which continues to face several obstacles. These include limitations in infrastructure, funding, regulations, as well as levels of public acceptance and understanding. A study of 400 respondents across several regions in Sulawesi showed that only 27% of respondents understood the basic concepts of renewable energy. Meanwhile, in some rural areas, more than 70% of the surveyed population was unaware of technologies or policies related to renewable energy.[20]

[17] Abdurrahman.(2024). Metode penelitian kepustakaan dalam pendidikan Islam. Adabuna: Jurnal Pendidikan dan Pemikiran, 3(2), 102–113. https://doi.org/10.38073/adabuna.v3i2.1563.

[18] Maulinas, M., Mulia Putra, & Zahraini, Z. (2024). Studi Komparatif Implementasi Manajemen Mutu Sekolah Berfokus Pada Standar Pendidikan dan Tenaga Kependidikan di SMP Negeri Pada Kecamatan Labuhanhaji Timur Kabupaten Aceh Selatan. Ranah Research : Journal of Multidisciplinary Research and Development, 6(4), 1169-1177. https://doi.org/10.38035/rrj.v6i4.934.

[19] Indriyanto, P., & Lystianingrum, V. (2025). The selection of energy storage in the Southern Sulawesi electricity system with AHP-TOPSIS method. JAREE (Journal on Advanced Research in Electrical Engineering), 9(2), 80–87. https://doi.org/10.12962/jaree.v9i2.452..

[20] Aslinda, A., Akmal, M. I., & Nahruddin, Z. (2024). Energy policy and climate change: Challenges for public sector organizations in South Sulawesi. International Journal Papier Public Review, 5(2), 25–38.

Meanwhile, the energy situation in Kalimantan indicates that electricity supply is generally relatively secure, but there remains a need to strengthen infrastructure and ensure equitable access to energy. In March 2025, the Ministry of Energy and Mineral Resources reported that Kalimantan's electricity system had a reserve margin of 38%, with a net supply capacity of 3,334 MW and a peak load of 2,412 MW. These figures indicate that overall supply capacity remains sufficient, but infrastructure upgrades are still necessary to maintain system reliability. In terms of household electricity access, the percentage of households using electricity as their primary lighting source in 2025 reached 99.16% in West Kalimantan, 99.65% in Central Kalimantan, 99.86% in South Kalimantan, 99.97% in East Kalimantan, and 99.89% in North Kalimantan. Thus, energy issues in Kalimantan are not only related to the volume of supply but also to the equitable distribution of electricity and the system's ability to reach more remote areas.

b. Community Resilience and Mobility

1. Economic Dimension

The energy crisis is closely linked to economic activity because electricity is a vital need for households, the commercial sector, and industry. In South Sulawesi, electricity demand comes from various user groups, with households, the commercial sector, and industry accounting for the bulk of electricity consumption. Furthermore, research indicates that household income is positively correlated with electricity consumption levels, meaning that the community's economic conditions also influence energy needs.[21] From the perspective of system restoration, strengthening the electricity grid also has economic implications. Research on Sulawesi's electricity system indicates that interconnections between systems can reduce generation costs compared to systems operating in isolation. These findings suggest that enhancing grid connectivity can support cost efficiency in electricity supply across the Sulawesi region.[22]

https://doi.org/10.47667/ijppr.v5i2.304; Torro, S., Rusdi, R., Manda, D., Saleh, S., Akib, H., Darmayanti, D. P., & Ardin, H. (2024). Assessing public awareness and stakeholder influence in renewable energy implementation: A case study from Sulawesi, Indonesia. Journal of Asian Energy Studies, 8, 95–109. https://doi.org/10.24112/jaes.080007.

[21] Asmiani, N. (2024). Analisis supply-demand energi listrik untuk memenuhi kebutuhan PLN Sulawesi Selatan. Journal of Mining Insight, 2(2), 29–34. https://doi.org/10.58227/jmi.v2i2.273; Romadhoni, B., Akhmad, A., Ansaar, A., Alam, S., & Mauliana, D. (2025). Factors affecting urban and rural household electricity demand in South Sulawesi Province, Indonesia. International Journal of Energy Economics and Policy, 15(6), 468–474. https://doi.org/10.32479/ijeep.21226.

[22] Sarjiya, S., Putranto, L. M., Tumiran, T., Budi, R. F. S., Novitasari, D., & Deendarlianto, D. (2023). Generation expansion planning with a renewable energy target and interconnection option: A case

Energy is closely linked to economic activity in Kalimantan, particularly because economic activities in some regions are closely tied to the mining and natural resources sectors. East Kalimantan, for example, has significant export activity, and the commodities sector is a key component of its economy. These conditions indicate that the availability of energy and infrastructure are critical factors in ensuring the sustainability of economic activity. On the other hand, energy development is also needed to support the productivity of communities and businesses in border and remote areas. The government of North Kalimantan, for instance, is promoting the provision of electricity to villages in the region to support community productivity and micro, small, and medium-sized enterprises. This aligns with research by Dewanti and Fauzi,[23] which found that road, water, and electricity infrastructure have a positive and significant impact on regional economic growth in Kalimantan and Sulawesi, with electricity exhibiting the greatest elasticity of influence compared to other forms of infrastructure.

2. Social Dimension

Energy issues are not only related to the availability of electricity but can also affect the socioeconomic activities of communities. Research in Eastern Indonesia shows that energy poverty is associated with a reduction in working hours of approximately 1,808 hours per week, while energy poverty is also understood as a multidimensional issue encompassing access, affordability, consumption, and modern energy services. In Sulawesi, social challenges are also evident in the public's limited knowledge of renewable energy. A survey of 400 respondents across several regions in Sulawesi revealed that only 27% of respondents possessed basic knowledge about renewable energy, whereas more than 70% of respondents in the rural areas studied were unaware of renewable energy technologies or policies.[24]

These conditions indicate that strengthening energy resilience requires more than just infrastructure development; it also necessitates capacity building and community engagement. Educational level and income were found to be correlated with public awareness of renewable energy,

study of the Sulawesi region, Indonesia. Renewable and Sustainable Energy Reviews, 183, Article 113489. https://doi.org/10.1016/j.rser.2023.113489.

[23] Dewanti & Fauzi (2022).

[24] Kristanti, H. D., Hartono, D., & Suhendra. (2024). Energy poverty and labor supply in Eastern Indonesia. Economics Development Analysis Journal, 13(4), 560–569. https://doi.org/10.15294/edaj.v13i4.19893; Rizal, R. N., Hartono, D., Dartanto, T., & Gultom, Y. M. L. (2024). Multidimensional energy poverty: A study of its measurement, decomposition, and determinants in Indonesia. Heliyon, 10(3), e24135. https://doi.org/10.1016/j.heliyon.2024.e24135; Torro et al. (2024).

while in South Sulawesi, social acceptance, economic constraints, regulations, infrastructure, and technology represent some of the challenges in implementing energy policies. Therefore, public education, awareness-raising, and the engagement of communities and stakeholders are crucial aspects in building a social response and supporting community mobilization in the face of energy system transformation.[25]

In the social dimension, the main energy issues in Kalimantan still revolve around equitable access and the impact of changes in the energy system on communities. Although the percentage of households using electricity as their primary source of lighting is already high, this does not fully indicate that all regions have equal access to energy. The West Kalimantan government estimates that by 2025, there will still be approximately 700 villages without access to electricity, so equitable energy access remains a critical issue. Furthermore, the dependence of certain economic activities and the workforce on extractive sectors such as mining can create social challenges during the transition to cleaner energy. Therefore, the energy transition must take into account the readiness of communities and the workforce to ensure that changes in the economic structure do not create increasingly vulnerable groups. The International Labour Organization (ILO) also emphasizes the importance of improving workforce skills and readiness to support a just energy transition.

3. Institutional Dimension

Institutionally, energy management in South Sulawesi is grounded in the 2021–2050 Regional Energy Development Plan (RUED-P), established under South Sulawesi Provincial Regulation No. 2 of 2022. Strengthened governance is also evident from the energy conservation evaluation conducted by the South Sulawesi Regional Office of the Financial and Development Supervisory Agency in 2024, which included an assessment of governance, control, and risk management. On the other hand, the implementation of energy policies requires adequate capacity within public organizations, particularly in coordination, oversight, planning, and stakeholder engagement. Thus, institutional framework is a key element in ensuring energy sustainability and resilience in South Sulawesi.[26]

Although a policy and institutional framework is in place, the implementation of energy policies still faces challenges in fostering

[25] Torro et al. (2024); Aslinda et al. (2024).
[26] Badan Pengawasan Keuangan dan Pembangunan Perwakilan Provinsi Sulawesi Selatan. (2024, October 16). Bergerak bersama jaga keberlangsungan energi nasional. BPKP; Aslinda et al. (2024).

cooperation among stakeholders. Research in South Sulawesi has identified sectoral ego within the government, political interference in electric vehicle programs, and a lack of clarity regarding the benefits of public-private partnerships for both investors and the public. These conditions highlight the importance of strengthening cross-sectoral coordination, clarifying the roles of each actor, and building more integrated collaboration in the implementation of energy policies. Strengthening these aspects can be a crucial part of efforts to enhance institutional resilience in the wake of an energy crisis.[27]

Meanwhile, the energy crisis and transition in Kalimantan require strong coordination among the central government, local governments, energy operators, the business sector, academia, and the public. This need is evident in local governments' efforts to establish forums and coordination mechanisms to address economic transformation and the energy transition. The East Kalimantan government, for example, has formed a regional energy forum involving local government officials to discuss economic transformation and the energy transition. At the same time, the transition process in South Kalimantan requires alignment between national and regional policies, as well as the involvement of various stakeholders. This demonstrates that energy security depends not only on the technical capacity to provide electricity but also on the institutional capacity to align policies, interests, and responsibilities among different actors.

4. Technology and Information Dimensions

The utilization of technology is a key aspect in strengthening the energy system in Sulawesi, particularly through the development of renewable energy sources tailored to the region's characteristics. South Sulawesi possesses a number of energy sources with development potential, such as solar, wind, biomass, and hydropower. Furthermore, the geographical conditions of Central Sulawesi which encompass mountainous and island regions require a technology-driven approach to electrification planning so that the selection of renewable energy sources can be tailored to the region's needs and conditions.[28]

[27] Aslinda, A., Siraj, M. L., & Akmal, M. I. (2023). Actor collaboration in realizing new zero emission 2060 through renewable energy acceleration in South Sulawesi Province. Jurnal Office: Jurnal Pemikiran Ilmiah dan Pendidikan Administrasi Perkantoran, 9(1), 69–76. https://doi.org/10.26858/jo.v9i1.47321; Aslinda et al. (2024).

[28] Dwiputra, F., & Saputri, F. R. (2024). Analysis of renewable energy potential in South Sulawesi, Indonesia. G-Tech: Jurnal Teknologi Terapan, 8(2), 1157–1165. https://doi.org/10.33379/gtech.v8i2.4116; Zakiyyah, N. Z., & Siswanto, J. (2025). Development of

Beyond the development of energy sources, technology is also needed to enhance the power system's capacity to effectively manage and integrate various energy sources. Research on South Sulawesi's power system indicates that the use of electricity demand forecasting and optimization methods can help determine the development of power plants and transmission networks. This approach can support the utilization of renewable energy while maintaining the reliability of the power grid. Thus, the use of data, analytical technologies, and grid planning is a crucial component in building a more flexible and resilient energy system in Sulawesi.[29]

Technology and information also play a crucial role in improving the reliability and efficiency of energy systems in Kalimantan, particularly in regions facing geographical challenges and growing electricity demand. Research by the National Research and Innovation Agency in West Kalimantan shows that rising electricity demand including that driven by industrial growth requires the development of clean energy sources such as hydropower and solar power. Technology can help monitor energy conditions more quickly, detect disruptions earlier, and support more efficient energy distribution. Thus, strengthening information technology not only serves to improve energy services but can also support regional energy monitoring and resilience systems.

c. Post-Crisis Policy Implications

1. **Vulnerability-based policies;** Energy security policies must be formulated based on the conditions and vulnerability levels of each region. Priorities for intervention must take into account regional characteristics, vulnerable community groups, the level of dependence on specific energy sources, and conditions regarding energy access and distribution. This is crucial because the geographical, economic, and infrastructure conditions in Sulawesi and Kalimantan differ, meaning that the requirements for addressing an energy crisis may also vary. Bappenas[30] emphasizes that development policies must be adaptive, data-driven, and tailored to regional characteristics and needs.

electrification planning method with renewable energy technology: Case study in Central Sulawesi. ITB Graduate School Conference, 4(1). https://gcs.itb.ac.id/proceeding-igsc/index.php/igsc/article/view/460.

[29] Astuty, & Sudirman, Z. (2025). Sustainable generation and transmission expansion planning using MOPSO-BPSO in electrical grid. Jurnal Nasional Teknik Elektro dan Teknologi Informasi, 14(3), 226–234. https://doi.org/10.22146/jnteti.v14i3.20795; Dwiputra & Saputri (2024).

[30] Badan Perencanaan Pembangunan Nasional. (2025, March 12). Sinergikan perencanaan pembangunan pusat-daerah, Bappenas bersama Kemendagri gelar Rakortekrenbang 2025. Kementerian PPN/Bappenas.https://share.google/rlKx4VIubZVHdMBi9.

In line with this, Solihat et al.[31] indicate that the growing demand for electricity in West Kalimantan must be addressed through energy planning that aligns with regional conditions and the expansion of industrial activities.

2. **Early warning system;** The government needs to establish an early warning system that provides information on energy stocks, distribution, disruptions, prices, and areas at risk of shortages. The availability of this information can help the government detect disruptions earlier and determine the necessary actions before problems escalate into a larger crisis. Solihat et al.[32] highlight the importance of planning and modeling electricity demand to align energy supply with evolving needs in West Kalimantan. Meanwhile, Patrianti et al.[33] explain that risk communication can support community energy resilience in the face of uncertainty and various disruptions. Therefore, early warning systems need to be integrated with decision-making processes and the rapid dissemination of information to the public.
3. **Community-based energy resilience;** Energy resilience must be built by involving the public, communities, businesses, local governments, and energy operators. The public and communities can play a role in the utilization of renewable energy and the management of local energy sources, while businesses need to be involved because economic activities depend on energy availability. Local governments play a role in adapting policies to regional conditions, while energy operators are responsible for maintaining energy reliability and distribution. Patrianti et al.[34] demonstrate that community engagement and risk communication can support community-based energy resilience, although institutional barriers remain. Rumah Energi[35] also highlights the importance of community-based renewable energy models that position communities as integral participants in energy production, management, and utilization.
4. **Strengthening crisis communication;** the government needs to provide official information, real-time updates, complaint channels, and mechanisms for clarifying information during energy disruptions. The

[31] Solihat, S., Driejana, R., & Setiaji, A. B. W. (2025). Potensi penurunan emisi CO_2 sektor ketenagalistrikan di Provinsi Kalimantan Barat melalui bauran energi bersih. Jurnal Teknologi Lingkungan, 26(1), 046–055. https://doi.org/10.55981/jtl.2025.912.
[32] Solihat et al. (2025).
[33] Patrianti, T., Swarnawati, A., El Adawiyah, S., Purnamasari, S., & Iqbal, N. M. (2026). Risk communication and energy resilience in urban Indonesia: Insights from the community program for climate. Frontiers in Communication, 11, 1751626. https://doi.org/10.3389/fcomm.2026.1751626.
[34] Patrianti et al. (2026).
[35] Ramadhan, F. (2026, March 30). Building resilience from villages amid the threat of a global energy crisis. Rumah Energi. https://www.rumahenergi.org/en/2026/03/30/building-resilience-from-villages-amid-the-threat-of-a-global-energy-crisis.

information provided must explain the current situation, the affected areas, the actions taken by the government, and the progress of recovery efforts. Timely and clear communication is essential to reduce public uncertainty and prevent the spread of misinformation. Bappenas[36] emphasizes the importance of adaptive, data-driven government communication in building public trust. Additionally, Patrianti et al.[37] demonstrate that risk communication and public engagement can strengthen community resilience in the face of energy disruptions.

5. **Institutionalization of community participation;** Community involvement during an energy crisis should not end once the crisis is over, but must be integrated into policies and institutional mechanisms. Community participation can be incorporated into disaster contingency planning, policy forums, complaint mechanisms, crisis simulations, and regional energy resilience policies. In this way, the community becomes not merely a recipient of policies but can also be involved in the process from planning through to the evaluation of energy resilience. Bappenas[38] emphasizes the importance of synergy between the central and local governments in tailoring policies to regional characteristics. Additionally, the 2026–2027 Indonesia Action Plan encourages public participation in planning and decision-making processes to support a just and inclusive energy transition.

D. Conclusion

Based on the discussion above, the energy crisis has evolved from a mere technical supply disruption into a multidimensional governance challenge, encompassing economic, social, institutional, and technological dimensions. Crisis phenomena such as the impact of El Niño on the power grid in Southern Sulawesi and the challenges of equitable energy distribution in remote areas of Kalimantan demonstrate that energy vulnerability is heavily influenced by geographical conditions and regional characteristics. Strengthening energy resilience depends not only on the reliability of physical infrastructure and the availability of fossil fuel supplies but also on institutional readiness to align policies, strengthen grid interconnections, and expand public education on the transition to renewable energy.

To build long-term resilience, post-crisis responses must be implemented through adaptive policies tailored to each region's specific vulnerability levels. The

[36] Badan Perencanaan Pembangunan Nasional. (2026, June 15). Bappenas–Bakom RI perkuat sinergi komunikasi pemerintah yang adaptif dan berbasis data. Kementerian PPN/Bappenas. https://share.google/tgmdJfR2NXVBtqSsI.
[37] Patrianti et al. (2026).
[38] Bappenas (2025).

government needs to strengthen interagency coordination, operate an early warning system, and optimize crisis communication and transparent public complaint mechanisms. Furthermore, community engagement must be institutionalized not merely limited to incidental participation during crises through a community-based energy resilience approach and opportunities for participation in regional planning. The integration of responsive governance and structured community participation is key to bridging the gap between regulation and implementation in order to achieve a just, equitable, and sustainable energy transition.

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