

Multilevel Governance and Sustainable Energy Transition: Exploring the Role of Regional Energy Planning in Indonesia

Syarifah AMELIA, Doctoral Student ITB, Indonesia

Abstract

Indonesia grapples with a pressing energy dilemma, characterized by high greenhouse gas emissions, reliance on fossil fuels, and significant energy imports. ¹Transitioning to a sustainable energy system is imperative. Multi-Level Governance (MLG) offers a promising framework to engage diverse stakeholders in energy planning and decision-making processes. This research investigates the role of MLG in regional energy planning in Indonesia, focusing on the provinces of West Java and Bangka Belitung. By employing the POAC framework, this study aims to contribute to the development of more sustainable and effective energy planning strategies. The findings emphasize the need for robust monitoring and evaluation mechanisms aligned with Provincial Regional Energy Plans (RUED-P). Additionally, enhancing stakeholder capacity, fostering inter-sectoral cooperation, and leveraging technology are crucial for optimizing RUED implementation in these regions.

Keywords

Energy transition, Multi-Level Governance (MLG), POAC System, Regional Energy Planning, West Java, Bangka Belitung

1. Introduction

Indonesia is grappling with a complex energy dilemma. The country's energy landscape is characterized by high greenhouse gas emissions, significant reliance on fossil fuels, and substantial energy imports. In 2022, fossil fuels accounted for 86.2% of Indonesia's energy mix, with oil and natural gas imports constituting 25.4% of total energy needs (Ministry of Energy and Mineral Resources, 2022). To address these challenges and ensure a sustainable energy future, Indonesia must transition to a clean and renewable energy system (Widyasari, 2021).

A key strategy for achieving this transition is through effective multi-level governance (MLG). MLG involves multiple levels of government and stakeholders working collaboratively to address complex issues like energy transition (Bulkeley & Betsill, 2005; Hoogstra & Kohler, 2002). By fostering coordination, collaboration, and knowledge sharing, MLG can enhance the effectiveness of energy policies and facilitate the integration of diverse perspectives and interests.

This research aims to investigate the role of MLG in regional energy planning in Indonesia. By examining two case studies - West Java and Bangka Belitung - this study seeks to understand the specific challenges and opportunities associated with MLG in different regional contexts. West Java, with its large population and high energy demand, faces significant challenges in balancing economic growth with environmental

sustainability. Bangka Belitung, on the other hand, possesses abundant renewable energy resources but requires effective governance mechanisms to harness its potential.

Through a comparative analysis of these two provinces, this research aims to identify key factors that influence the effectiveness of MLG in regional energy planning. The findings will contribute to the development of more effective and sustainable energy policies and strategies for Indonesia.

2. Materials and Methods

2.1. Research Approach

This study employs a qualitative research approach to delve into the complex and context-specific nature of MLG in regional energy planning. A qualitative approach enables a deep understanding of the social, political, and economic factors influencing energy decision-making processes. By utilizing methods such as interviews, observations, and document analysis, this research aims to gather rich, contextual data and uncover nuanced insights.

The selection of a qualitative approach is justified by the need to explore the subjective experiences, perceptions, and motivations of key stakeholders involved in MLG. This approach allows for a more nuanced understanding of the challenges and opportunities associated with MLG implementation in the context of Indonesia's energy transition.

2.2. Data Collection Method

This research employed a qualitative case study approach to delve into the intricacies of MLG in regional energy planning. Data collection involved a combination of in-depth interviews and document analysis.

In-depth interviews were conducted with key stakeholders involved in energy planning and decision-making processes in West Java and Bangka Belitung. These stakeholders included government officials, policymakers, energy planners, and representatives from civil society organizations. The interviews were semi-structured, allowing for flexibility in exploring relevant themes and emerging issues.

Document analysis was conducted to examine a range of documents, including energy policies, regional energy plans, research reports, and news articles. This analysis provided valuable contextual information and supported the findings from the interviews.

By combining these data collection methods, this research aimed to capture a comprehensive understanding of MLG practices and their impact on energy planning in the two case study regions.

2.3. Data Collection Method

To gather the necessary data for this research, a mixed-methods approach was employed. This approach involved both qualitative and quantitative data collection techniques.

- Qualitative data was collected through in-depth interviews with key stakeholders involved in energy planning in West Java and Bangka Belitung provinces. A semi-structured interview guide was used to ensure that the interviews were focused and systematic. Additionally, document analysis was conducted to examine relevant policy documents, reports, and news articles. A document analysis guide was developed to facilitate a comprehensive and systematic review of the documents.

- Quantitative data was collected through the analysis of secondary data, such as energy statistics, economic indicators, and demographic data. This data was used to quantify trends and patterns in energy consumption, production, and emissions.

Legal Basis

The formulation and implementation of Regional Comprehensive Energy Plans (RUED) in Indonesia are anchored in several key laws and regulations.

- **Law Number 30 of 2007 on Energy** mandates that regional governments formulate RUEDs aligned with the National General Energy Plan (RUEN). It further emphasizes the government's responsibility to ensure adequate, reliable, and affordable energy supply, as well as the promotion of renewable energy sources.
- **Law Number 12 of 2011 on the Formation of Legislation** outlines the procedures for drafting and approving regional regulations, including RUEDs. This law ensures that RUEDs are developed and implemented in accordance with national laws and regulations.
- **Presidential Regulation Number 79 of 2014 on National Energy Policy** positions RUEDs as crucial instruments for achieving the goals outlined in the National Energy Policy. This regulation prioritizes the development of renewable energy sources and energy efficiency, encouraging active participation from regional governments in energy management.

These legal frameworks provide a strong foundation for analyzing the role of Multi-Level Governance (MLG) in regional energy planning. MLG, as a governance approach involving multiple levels of government and stakeholders, is expected to enhance the effectiveness of the energy transition in Indonesia.

2.4. Data Analysis Method

This research employed a qualitative data analysis approach, drawing upon various techniques to interpret and analyze the collected data. The data analysis involved a combination of thematic analysis and the application of the POAC management framework.

1. **Qualitative Descriptive Analysis**, a qualitative descriptive analysis was employed to examine the RUED policies of West Java and Bangka Belitung. This analysis focused on three key aspects:
 - **Policy Determinants:** This aspect explored the factors influencing the formulation of RUED policies, including political, economic, social, environmental, and technological factors.
 - **Policy Substance:** This analysis delved into the content and substance of the RUED policies, examining their goals, objectives, strategies, and programs.
 - **Policy Impact:** This aspect assessed the impact of RUED policies on the energy transition in both provinces, considering both positive and negative outcomes.

To conduct this analysis, a systematic approach was employed, drawing on the principles of qualitative data analysis outlined by Miles and Huberman (1994). The data collected through document analysis was carefully examined and categorized.

2. **POAC Management Model**, The POAC management model (Planning, Organizing, Actuating, and Controlling) was utilized to analyze the implementation of MLG in regional energy planning. This model provided a structured framework for understanding the various stages of the MLG process.

- **Planning:** This stage involved examining the planning processes for RUEDs, including the identification of goals, objectives, and strategies.
- **Organizing:** The organization stage focused on the establishment of institutional arrangements, allocation of resources, and the assignment of responsibilities for implementing RUEDs.
- **Actuating:** This stage involves the implementation of RUEDs, including the mobilization of resources, the coordination of stakeholders, and the monitoring of progress.
- **Controlling:** The control stage involved the evaluation of RUED implementation, the identification of deviations from planned outcomes, and the implementation of corrective actions.

By applying the POAC model, this research aimed to identify the strengths, weaknesses, and opportunities for improvement in the implementation of MLG in the two case study provinces.

3. Findings and Analysis

3.1. Qualitative Descriptive Analysis

1. Policy Determination of Factors

The formulation of Regional Comprehensive Energy Plans (RUED) in West Java and Bangka Belitung is influenced by a multifaceted array of factors. These factors encompass both national and regional considerations, ensuring that the RUEDs are tailored to the specific needs and circumstances of each province.

Energy Potential and Needs Assessment: A comprehensive assessment of the energy potential and needs of each region is crucial. This involves analyzing available energy resources, such as fossil fuels and renewable energy sources, as well as the energy demand patterns of various sectors, including residential, commercial, and industrial.

Regional Contextual Factors: Geographical, economic, social, and cultural factors play a significant role in shaping RUEDs. These factors include the region's topography, climate, population density, and socio-economic conditions. Understanding these factors enables policymakers to develop policies that are aligned with local realities and priorities.

Stakeholder Engagement: Involving a diverse range of stakeholders, including government agencies, private sector entities, and civil society organizations, is essential for the successful formulation and implementation of RUEDs. Engaging with these stakeholders ensures that their perspectives and concerns are considered, leading to more inclusive and sustainable energy policies.

By carefully considering these factors, policymakers can develop RUEDs that are both ambitious and achievable. These plans should aim to balance economic growth with environmental sustainability, promote energy efficiency, and accelerate the deployment of renewable energy sources.

2. Policy Substance

The RUEDs of West Java and Bangka Belitung outline specific and measurable energy targets, demonstrating a strong commitment to achieving energy resilience and sustainable development. These plans prioritize the development of renewable energy sources, such as solar and wind power,

to reduce reliance on fossil fuels. Additionally, they emphasize energy efficiency measures across various sectors, including industry, households, and transportation.

The RUEDs also establish a framework for implementing these targets through specific strategies and programs. These strategies include:

- **Renewable Energy Development:** Identifying and developing renewable energy resources suitable for each region.
- **Energy Efficiency:** Promoting energy-efficient technologies and practices in various sectors.
- **Energy Conservation:** Encouraging energy-saving behaviors and implementing policies to reduce energy consumption.

By focusing on these key areas, the RUEDs aim to contribute to a more sustainable and resilient energy future for West Java and Bangka Belitung.

3. The Impacts of Policy

The RUED policies in West Java and Bangka Belitung have far-reaching implications, extending beyond technical aspects of energy. These policies contribute to energy resilience by reducing dependence on fossil fuels and diversifying the energy mix. Additionally, they play a crucial role in climate change mitigation by reducing greenhouse gas emissions. Furthermore, RUEDs promote equitable access to energy, ensuring that all segments of society can benefit from affordable and environmentally friendly energy. By stimulating the development of renewable energy industries and fostering energy efficiency, these policies also contribute to economic growth and job creation. Ultimately, the implementation of RUEDs demonstrates a commitment to sustainable development, balancing economic growth with environmental protection and social equity.

3.2. POAC Management Model

1. Planning

Energy policy planning in Indonesia is a crucial step in supporting sustainable development and fulfilling global commitments. The dynamics of national energy policy show a positive trend, with an increasing focus on the renewable energy transition (Ayu Arsita et al., 2021). The principles of postmodern planning, which emphasize communication, participation, inclusion, and collaboration, have become an important foundation in formulating RUED in West Java and Bangka Belitung.

Analysis shows that the RUED planning process in both provinces has been carried out well and thoroughly. There are RUED documents containing clear visions, missions, targets, strategies, and programs. This planning process refers to Presidential Regulation of the Republic of Indonesia Number 1 of 2014 concerning Guidelines for the Preparation of the National General Energy Plan. However, there are several knowledge gaps that need to be considered to improve the effectiveness of RUED planning. First, a more in-depth analysis needs to be conducted regarding the assumptions and projections used in the process of formulating targets and strategies. This is important to ensure that RUED is realistic and achievable in dynamic conditions. Second, a more comprehensive stakeholder mapping and in-depth analysis of the roles and responsibilities of each party need to be carried out. This will help in developing effective coordination and collaboration strategies among stakeholders.

2. Organizing

Implementation of RUED in West Java and Bangka Belitung has been accompanied by the establishment of institutions to support the smooth running of the process. However, analysis shows that coordination among stakeholders still needs to be improved to ensure the effectiveness of RUED implementation. This is a crucial area that needs to be addressed to optimally achieve the goals of RUED. Building a clear and structured coordination mechanism is an essential first step. This can be achieved through the formation of a communication and joint decision-making forum involving all relevant stakeholders. This forum will be a forum for exchanging information, discussing problems, and formulating solutions together collectively.

The next step is to increase institutional capacity through training and human resource development. Stakeholders need to be equipped with adequate knowledge and skills to carry out their duties and functions in the implementation of RUED. This can be done through training programs, seminars, and workshops focused on RUED-related issues such as renewable energy, energy efficiency, and energy management.

In addition, providing incentives and rewards for stakeholders who contribute to the implementation of RUED should also be considered. This can be a motivator for stakeholders to actively participate and make the best contributions to achieving RUED targets. The form of incentives and rewards can vary, such as non-monetary awards such as certificates and diplomas, as well as financial incentives that can help reduce the operational burden of institutions. By building effective coordination, increasing institutional capacity, and providing appropriate incentives, the organization of RUED implementation in West Java and Bangka Belitung can be optimized. This will pave the way for the realization of a sustainable RUED that provides maximum benefits for the community and the environment.

3. Actuating

While socialization and education about RUED have been conducted in West Java and Bangka Belitung, these efforts need to be intensified to stimulate greater public awareness and participation. This is a crucial key to driving effective and sustainable RUED implementation. More effective and targeted communication and education strategies need to be developed. This needs to consider the culture, characteristics, and needs of the community in the area. Personalized and relevant approaches will be more easily accepted and understood by the public. The involvement of local mass media, community leaders, and community organizations can also help expand the reach of education and increase public participation.

Empowering the community is the next crucial step. Through training and mentoring, the community needs to be equipped with the knowledge and skills to utilize renewable energy and apply the principles of energy efficiency in their daily lives. This can be done through technical training programs, workshops, and direct field mentoring. The role of regional leaders cannot be ignored. Regional leaders need to demonstrate strong commitment and leadership in encouraging public participation and garnering support from various stakeholders. This can be done through pro-RUED policies, intensive education and socialization, and active involvement of the community in the energy decision-making process. By building strong public awareness and participation, and strengthening the commitment and leadership of stakeholders, direction in the implementation of RUED in West Java and Bangka Belitung will be more effective. This will pave the way for a sustainable energy transition and provide maximum benefits for the community and the environment.

4. Controlling

Monitoring and evaluation (M&E) systems have been implemented in West Java and Bangka Belitung to monitor the progress and impacts of RUED. This is an important step to ensure the accountability and effectiveness of RUED implementation. However, analysis shows that the M&E system still needs to be strengthened to achieve its goals optimally. The development of clear, measurable, achievable, relevant, and time-bound (SMART) performance indicators is an essential first step. These indicators must be able to measure various aspects of RUED implementation, such as the achievement of renewable energy targets, energy efficiency, greenhouse gas emissions reduction, and socio-economic impacts. SMART indicators will help in monitoring progress objectively and measurably, as well as identifying areas that need improvement.

The implementation of a periodic and transparent reporting and evaluation system is also key. Data and information on the progress of RUED implementation need to be collected, analyzed and reported periodically to all stakeholders. These reports must be transparent and easily accessible to the public, to increase accountability and public trust in the implementation of RUED. The use of information and communication technology (ICT) can also help strengthen the M&E system. Digital platforms can be used to collect data, monitor progress, and generate reports in real-time. This will increase the efficiency and effectiveness of the M&E system, and facilitate decision-making based on accurate and up-to-date data.

By strengthening the M&E system through the development of SMART indicators, the implementation of periodic and transparent reporting and evaluation, and the utilization of ICT, the control of RUED implementation in West Java and Bangka Belitung will become more effective and accountable. This will ensure that RUED is implemented correctly and achieves its goals of realizing a sustainable energy transition and providing maximum benefits for the community and the environment.

4. Key Findings and Recommendations for Indonesia's Energy Transition

4.1. Strengthening Multi-Level Governance (MLG) for Effective Energy Transition

This research has revealed compelling evidence that the implementation of Multi-Level Governance (MLG) in the Regional General Energy Plans (RUED) of West Java and Bangka Belitung has proven effective in enhancing coordination and integration among stakeholders. This is a crucial key in overcoming various obstacles faced in Indonesia's energy transition. The findings indicate that MLG can be a strategic instrument in fostering collaboration among parties, ranging from central and regional governments, the private sector, to the community. With strong coordination and integration, various barriers to energy transition, such as lack of coordination among stakeholders, overlapping policies, and limited resources, can be addressed more effectively.

Furthermore, this research recommends strengthening the implementation of MLG in national and regional energy transition policies and strategies. This can be done by:

- **Building a clear and structured institutional framework:** Establishing clear roles and responsibilities for each stakeholder in the energy transition process.
- **Enhancing communication and coordination mechanisms:** Building effective communication platforms to facilitate information exchange and coordination among stakeholders.
- **Developing joint programs and activities:** Designing joint programs and activities that involve the active participation of all parties.

- **Strengthening stakeholder capacity:** Improving the knowledge and skills of stakeholders in understanding and implementing the energy transition.

The implementation of MLG in the RUED of West Java and Bangka Belitung can serve as a model for other regions in implementing MLG for energy transition. This model demonstrates that with strong collaboration and integration, the energy transition can proceed more effectively and achieve the desired targets. Strengthening the implementation of MLG is a crucial step in realizing a sustainable energy transition in Indonesia. With solid collaboration among parties, Indonesia can achieve renewable energy targets and build a clean, environmentally friendly, and sustainable energy system for a better future.

4.2. Enhancing Stakeholder Capacity

Indonesia's energy transition requires the active role of various parties, from the government to the private sector and the community. To effectively achieve the goals of the energy transition, strengthening stakeholder capacity is key. This research shows that stakeholders, whether government, private sector, or community, need to have a deep understanding of the energy transition, including its principles, goals, and benefits. This can be achieved through the development of comprehensive and targeted training and education programs. These programs must be designed considering the needs and characteristics of each stakeholder.

In addition, easy and broad access to information about the energy transition also needs to be increased. This can be done through various media, such as websites, publications, seminars, and workshops. With adequate information, stakeholders can understand their role in the energy transition and take appropriate actions to support the process. Strengthening stakeholder capacity and increasing access to information are two strategic steps that need to be prioritized in realizing a successful energy transition in Indonesia. By increasing knowledge, skills, and access to information, stakeholders can become key actors in driving change toward a more sustainable energy system.

4.3. Utilization of Technology

The energy transition does not only rely on changes in policies and behavior but also on the utilization of appropriate technology. This research shows that three aspects of technology, namely the development of renewable energy (RE) technology, the utilization of information technology, and the development of energy infrastructure, play an important role in supporting an effective energy transition in Indonesia. First, the development of competitive and sustainable new and renewable energy (RE) technologies is key to reducing dependence on fossil fuels. RE technologies such as solar, wind, and hydropower need to be continuously developed to be more efficient, affordable, and accessible. Second, the utilization of information technology can improve the efficiency and effectiveness of energy management. Technologies such as smart grids, energy monitoring systems, and energy data platforms can help optimize energy use, reduce waste, and increase transparency in the energy system. Third, the development of energy infrastructure that supports the energy transition is equally important. This includes the construction of durable and flexible power grids, efficient energy storage systems, and infrastructure for the distribution of RE.

Overall, this research shows that the combination of MLG, RUED, and POAC management systems, and the utilization of appropriate technology can be a powerful formula for achieving an effective energy transition in Indonesia. With the support of appropriate policies and strategies, Indonesia can realize a clean, sustainable, and resilient energy system for a better future.

5. Conclusions and Recommendations

5.1. Conclusions

This research analyzed the role of Multi-Level Governance (MLG) in regional energy planning in Indonesia, focusing on case studies in West Java and Bangka Belitung. The results showed that MLG, Regional General Energy Plans (RUED), and the POAC management system are crucial instruments in Indonesia's energy transition. Effective implementation of MLG and RUED, supported by a robust POAC management system and appropriate policies and strategies, can help Indonesia achieve renewable energy targets and realize a sustainable energy transition. Key findings of this study include:

- **Importance of MLG:** MLG has proven effective in enhancing coordination and integration among stakeholders and addressing various barriers in the energy transition.
- **Role of RUED:** RUED, as a regional energy planning document containing strategies and targets for achieving energy resilience in the region, has proven effective in guiding the energy transition in West Java and Bangka Belitung.
- **Effectiveness of the POAC management system:** The implementation of POAC (Planning, Organizing, Actuating, Controlling) in the RUED of West Java and Bangka Belitung has shown positive results in achieving renewable energy targets.
- **Importance of strengthening stakeholder capacity:** Strengthening the capacity of stakeholders, including government, private sector, and the community, to understand and implement the energy transition is crucial for the success of the energy transition.
- **Utilization of technology:** The utilization of renewable energy (RE) technology, information technology, and the development of energy infrastructure that supports the energy transition is essential to increasing the efficiency and effectiveness of the energy transition.

In summary, the research highlights the importance of a multi-faceted approach to energy transition, involving strong governance, effective planning, capacity building, and technological innovation. By implementing these recommendations, Indonesia can successfully achieve its renewable energy targets and build a sustainable energy future.

5.2. Recommendations

Based on the research findings, several important steps are recommended to enhance the effectiveness of the energy transition in Indonesia. These steps include:

- **Strengthening the implementation of Multi-Level Governance (MLG):** This can be done by building a clear institutional framework, enhancing communication and coordination mechanisms among stakeholders, developing joint programs and activities, and strengthening stakeholder capacity in understanding and implementing the energy transition.
- **Improving Regional General Energy Plans (RUED):** RUEDs should be improved by more clearly defining the roles and responsibilities of stakeholders, strengthening monitoring and evaluation systems to track the progress and impact of RUEDs, and developing RUEDs that are contextual and suitable to the conditions and needs of the region.
- **Increasing stakeholder capacity:** Stakeholder capacity can be strengthened by developing training and education programs on the energy transition, increasing access to information for

stakeholders, and encouraging active participation of stakeholders in the energy transition process.

- **Utilizing technology:** The appropriate use of technology is crucial to supporting the energy transition. This can be done by developing competitive and sustainable new and renewable energy (RE) technologies, utilizing information technology to improve the efficiency and effectiveness of energy management, and developing energy infrastructure that supports the energy transition.
- **Formulating appropriate policies and strategies:** Policies and strategies supporting the energy transition need to be formulated considering various aspects, including social, economic, and environmental factors. These policies and strategies must be comprehensive, measurable, achievable, relevant, and time-bound (SMART).

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