



Analysis of Implemented Policy Strategies and Innovations in Legal Management of Natural Resources and Renewable Energy in Indonesia

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Abstract. *This research analyzes strategies and policy innovations in managing natural resources and renewable energy laws in Indonesia. Using a qualitative approach, this study examines the implemented environmental policies, the roles of central and regional governments, and the challenges in their implementation. The results show that Indonesia has implemented various policies and regulations to support sustainable natural resource management. Law No. 32 of 2009 on Environmental Protection and Management is the main foundation, followed by its derivative rules. However, policy implementation still faces challenges such as land conflicts, environmental degradation, and overexploitation of natural resources. In the context of renewable energy, the government has issued fiscal and non-fiscal incentives to promote its adoption. Presidential Regulation No. 112 of 2022 is an example of a policy that provides various tax incentives and licensing facilities for renewable energy projects. This study concludes that Indonesia needs a comprehensive and collaborative approach to address challenges and optimize natural resource management and renewable energy development. Recommendations include simplifying bureaucratic procedures, increasing transparency in procurement processes, and strengthening investment guarantee mechanisms to enhance private sector participation in renewable energy infrastructure development.*

Keywords: *Natural resources, Renewable energy, Environmental policy*

1. INTRODUCTION

The role of natural resources (SDA) in national development is crucial, especially in the context of economic and community welfare. Natural resources provide raw materials and energy sources that support various industrial, agricultural and infrastructure sectors. Proper use of natural resources can increase state income and create jobs, thereby contributing to sustainable economic growth. However, unplanned exploitation of natural resources can cause environmental damage and threaten the resources' sustainability. Therefore, natural resource management must be carried out with the principle of sustainability and paying attention to the balance of the ecosystem to ensure that future generations can enjoy the benefits.

From a constitutional perspective, especially Article 33 of the 1945 Constitution, natural resource management is mandated to be controlled by the state and used as much as possible for the prosperity of the people. This emphasizes the state's responsibility in managing and utilizing natural resources wisely for the benefit of the wider community. The constitution also emphasizes the importance of an economy based on economic democracy, which means that all levels of society must feel the results of using natural resources, not just a handful of individuals or groups. Thus, natural resource management must align with social justice principles and preserve the environment to support inclusive and sustainable development.

Natural resource management in the modern era faces various complex challenges, especially related to sustainability issues. Rapid economic growth often comes at the expense of the environment, with negative impacts such as pollution, climate change and a decline in biodiversity. In this context, continuous innovation becomes very important to ensure that current needs can be met without compromising the capabilities of future generations. The concept of sustainability includes three main pillars: environmental, economic, and social sustainability, which are interrelated and influence each other. Implementing these principles in business policies and practices is necessary to balance economic growth and environmental conservation.

Moreover, adopting green innovation is a critical step in overcoming these challenges. Green innovation includes the development of environmentally friendly technologies and practices that aim to reduce negative impacts on ecosystems. Examples include the use of renewable energy and recyclable products. However, the success of green innovation does not depend solely on the private sector; support from the government through regulations that encourage sustainable practices and public awareness of the importance of sustainability is also vital. Collaboration between various parties will create the synergy needed to achieve long-term sustainability goals and preserve natural resources for future generations.

The growth of energy needs in Indonesia is expected to increase by around 5.4% in 2023, reaching 137 tons equivalent, which is in line with economic and population growth. This energy need is dominated by the transportation sector, which has experienced a significant increase due to the number of vehicles. To face this challenge, the government has developed an energy transition strategy emphasizing using new and renewable energy (EBT) to reduce dependence on fossil fuels and increase national energy security. In this context, the energy economic theory developed by figures such as Herman Daly becomes relevant. Daly argues for the importance of sustainability in using natural resources and advocates for economic models that consider ecological constraints, thereby encouraging a shift to renewable energy sources.

Energy Economics Theory also aligns with the Energy Transition Theory approach popularized by Vaclav Smil. This approach explains how society shifts from one form of energy to another along with technological and social developments. Smil emphasized that this transition requires time and significant investment to build new infrastructure and change energy consumption habits. In the Indonesian context, applying these theories can help formulate policies that meet current energy needs and are sustainable for the future, focusing on developing renewable energy sources such as solar and wind power.

Increasing global awareness of the importance of law in supporting sustainable management is relevant to the rules and regulations in Indonesia, primarily through Law Number 32 of 2009 concerning Environmental Protection and Management (UUPPLH). In Article 2, this law emphasizes various principles that form the basis of environmental management, including the principles of preservation and sustainability, which require every individual to be responsible for future generations and make efforts to preserve the ecosystem's carrying capacity.

Furthermore, Article 3 of the UUPPLH stipulates that environmental management must be based on principles such as harmony and balance, integration and justice. The principle of harmony and balance emphasizes the importance of paying attention to economic, social, and cultural aspects and ecosystem protection in every activity utilizing natural resources. In addition, the principle of integration implies the need for synergy between various components in environmental protection and management.

UUPPLH also regulates the state's responsibility to guarantee citizens' rights to a good and healthy living environment and prevent environmental pollution or damage. In this case, Article 87 explains the principle of "polluter pays," which requires parties who cause pollution to bear the costs of environmental restoration. This shows that the law functions as an enforcement tool and a driving instrument to achieve sustainable development goals.

The law plays a crucial role in supporting sustainable environmental management through clear regulations in the UUPPLH. These legal principles serve as guidelines for the government and society in carrying out their responsibilities towards the environment and encourage active participation from all parties to maintain a balance between economic development and environmental sustainability.

Strategy and policy innovation are needed to overcome obstacles in managing Indonesia's natural resources (SDA) and renewable energy. One approach can be applied is participatory planning, where local communities are involved in decision-making. This not only increases transparency but also ensures that the policies produced are in line with the needs and aspirations of local communities. In addition, community-based monitoring can empower citizens to monitor the use of natural resources to minimize the potential for misuse and overexploitation.

Technology innovation is also the key to increasing the efficiency of natural resource management. Investments in research and development of environmentally friendly technologies, such as renewable energy technologies and sustainable farming methods, can help reduce environmental negative impacts. In addition, strict law enforcement against illegal

activities, such as unauthorized mining and forest encroachment, must be strengthened to ensure that all parties comply with existing regulations.

It is also essential to create economic incentives for sustainable management practices. The government can provide financial or tax support for companies that implement environmentally friendly methods in their operations. In this way, a balance will be created between economic growth and environmental sustainability. Through this combination of strategies, it is hoped that the management of natural resources and renewable energy in Indonesia can be carried out more effectively and sustainably, providing long-term benefits for society and the environment.

This research aims to identify policy strategies implemented in the legal management of natural resources (SDA) and renewable energy in Indonesia, as well as analyze policy innovations that have been developed to achieve sustainability. In this context, research will explore the various approaches taken by governments and other stakeholders in formulating policies that effectively manage natural resources and respond to the environmental and social challenges they face. By mapping these strategies, this research aims to provide a comprehensive picture of how existing policies can adapt to community needs and dynamic environmental conditions.

In addition, an analysis of policy innovations will be carried out to evaluate the success and effectiveness of the new measures that have been implemented. This research will assess various initiatives, such as incentive programs for using renewable energy, development of green technology, and collaboration between government, the private sector and civil society in managing natural resources. By understanding these innovations, it is hoped that constructive recommendations can be produced to improve future policies so that the management of natural resources and renewable energy in Indonesia can be carried out sustainably and provide maximum benefits for society and the environment.

The benefits of this research are very significant in managing natural resources (SDA) and renewable energy in Indonesia, primarily through the existing legal framework. First, this research will increase academic insight regarding critical issues in natural resource management and renewable energy, focusing on legal and policy aspects. By analyzing various implemented policy strategies and innovations, it is hoped that this research can contribute to developing knowledge in environmental law and sustainability and enrich existing literature with new perspectives.

Second, the results of this research will provide concrete policy recommendations for decision-makers in Indonesia. This research can help the government and stakeholders

formulate strategic steps for sustainable natural resource management by presenting an in-depth analysis of existing policies and required innovations. The recommendations will focus not only on regulatory aspects but also on best practices that can be adopted to increase the effectiveness of natural resources and renewable energy management. Thus, it is hoped that this research can contribute to achieving sustainable development goals in Indonesia and improving community welfare and environmental sustainability.

Therefore, researchers will examine the policy strategies implemented in Indonesia's legal management of natural resources. By identifying legal and regulatory policies implemented in natural resource management. It will also analyze the effectiveness of these policies in supporting sustainable development and environmental conservation. Next, the researcher will explain the policy innovations developed to manage renewable energy in Indonesia by examining policy innovations that focus on developing renewable energy (for example, solar power, wind, and bioenergy). It will also analyze the impact of innovative policies on investment and development of renewable energy in Indonesia.

2. RESEARCH METHODS

This research uses normative legal research methods with a statutory and conceptual approach. The main data source used is secondary data consisting of primary legal materials in the form of laws and regulations related to managing natural resources and renewable energy in Indonesia, such as Law No. 32 of 2009 concerning Environmental Protection and Management and Presidential Regulation No. 112 of 2022. Secondary legal materials include textbooks, scientific journals, and articles relevant to the research topic. Data analysis was carried out qualitatively using a descriptive-analytical method, where researchers studied and interpreted existing laws, regulations and policies, then analyzed the effectiveness and challenges of their implementation in the context of natural resource management and renewable energy development in Indonesia. The analysis results are then synthesized to produce constructive conclusions and policy recommendations.

POLICY STRATEGY IN NATURAL RESOURCE MANAGEMENT

Environmental Policies Implemented in Indonesia: Related Laws and Regulations

In Indonesia, environmental policy is clearly outlined in the Law of the Republic of Indonesia no. 32 of 2009 concerning Environmental Protection and Management. This law specifies six main environmental management stages: planning, utilization, control, maintenance, supervision, and law enforcement.

Law No. 32 of 2009 is based on sustainability and environmental preservation principles. These principles include state responsibility, preservation and sustainability, harmony and balance, integration, benefits, prudence, justice, ecoregions, biodiversity, pollution pays, participatory, local wisdom, good governance, and regional autonomy.

Management Stages

1. Environmental Inventory: Article 11 of Law No. 32 of 2009 specifies environmental inventory as the first step in environmental management.
2. Environmental Protection and Management Plan: The second step is to design an inclusive, science-based environmental protection and management plan.
3. Environmental Impact Analysis (AMDAL): AMDAL is an important instrument for assessing a project's potential environmental impact in accordance with Article 33 of Law No. 32 of 2009.
4. Environmental Quality Standards: Environmental quality standards stipulated in Article 20 paragraph (4) of Law no. 32 of 2009 to ensure optimal environmental quality.
5. Standard Criteria for Environmental Damage: These criteria are designed to measure the level of environmental damage by Article 21, paragraph (5).
6. Environmental Management and Monitoring Efforts (UKL-UPL): UKL-UPL is an important instrument for sustainable environmental monitoring and management.
7. Environmental Economic Instruments: These instruments measure environmental costs and motivate companies to reduce their negative environmental impacts.

Environmental policy in Indonesia has been formulated in detail and comprehensively through various relevant laws and regulations, reflecting the country's commitment to ecological sustainability. Apart from Law No. 32 of 2009 concerning Environmental Protection and Management, one of the important regulations promulgated is Government Regulation No. 22 of 2021. This regulation regulates various important aspects of environmental management, including environmental approval, protection and management of water, air, and sea quality, and control of environmental damage.

PP No. 22 of 2021 stipulates that every business and/or activity that has the potential to impact the environment significantly must have an Environmental Approval as a condition for obtaining a business permit. This aims to ensure that every project implemented pays attention to economic aspects and the social and environmental impacts that may arise. With this approval, the government can conduct a more in-depth evaluation of potential environmental impacts before the activity.

This regulation also introduces a waste management system for B3 (Hazardous and Toxic Materials) and non-B3 waste and establishes administrative sanctions for violations of existing provisions. This approach shows the government's efforts to increase corporate accountability and responsibility in maintaining environmental quality. Apart from that, PP No. 22 of 2021 encourages the use of transparent ecological information systems to facilitate monitoring and supervision of the implementation of environmental policies.

Thus, environmental policy in Indonesia is normative and operational, with clear and measurable legal instruments. This creates a better framework for achieving sustainable development goals, where economic, social, and environmental aspects can coexist without harming each other. These policies are expected to overcome increasingly complex environmental challenges and support efforts to conserve natural resources for the welfare of future generations.

The Role of Regional and Central Governments in Natural Resources Management

The roles of regional and central governments in managing natural resources in Indonesia are critical and complementary. The central government is responsible for establishing national policies oriented towards sustainability and management of natural resources, including legal and regulatory arrangements governing exploitation and environmental protection. This policy covers forest, mining and fisheries management to balance economic use and environmental conservation. For example, the central government implemented a moratorium on new permits for clearing primary forest land to reduce deforestation and required mining companies to carry out reclamation after operational activities.

Central and regional governments have an essential role in managing natural resources by implementing environmental ethical principles (environmental ethics). At the central level, the government has established a national regulatory and policy framework, such as Law Number 32 of 2009, concerning Environmental Protection and Management. This law is the basis for regional governments in formulating environmental management policies and programs at the local level.

Regional governments play an essential role in implementing environmental policies by preparing Strategic Environmental Studies (KLHS), providing Green Open Space (RTH), and creating regional regulations and policies related to the environment. For example, the Gresik Regency Government has established several regional regulations related to spatial planning and green open spaces to support sustainable environmental management.

On the other hand, regional governments have more specific authority in managing natural resources in their respective regions. Based on the principle of decentralization

regulated in Law No. 32 of 2004, regional governments are given autonomy to manage natural resources according to local needs and potential. This allows local governments to design policies more responsive to local conditions, including involving communities in the natural resource management process. However, challenges remain, such as budget limitations and coordination between regional and central governments, which are often not optimal and can result in poorly integrated policies and less effective in dealing with environmental issues.

In implementing environmental ethics, central and regional governments must consider principles such as responsibility, fairness, prudence and community participation. The government is also required to implement good environmental governance (good environmental governance) through transparency, accountability and public involvement in formulating and implementing environmental policies.

The government's concrete efforts include reforestation programs, waste management using the 3R principle (reduce, reuse, recycle), and regulation of industrial waste disposal. The government also encourages the use of renewable energy and environmentally friendly vehicles, although this still needs to be improved, considering that most power plants still use non-renewable energy sources.

The synergy between central and regional governments and active community participation is needed to increase the effectiveness of environmental management. Education and outreach about ecological ethics are also essential to increasing public awareness of preserving nature and resources. With a comprehensive and sustainable approach, it is hoped that natural resource management can be carried out more responsibly and sustainably.

Collaboration between the central and regional governments is necessary to sustain natural resource management. Both parties must support each other in formulating policies and implementing them for the welfare of society and environmental sustainability.

Challenges in implementing policies

Implementing policies, especially those related to managing natural resources and the environment, is often faced with complex, interrelated challenges. Land conflict is one of the main issues that hinders effective policy implementation, where overlapping claims of ownership and land use between local communities, companies, and the government often trigger social tensions and impede sustainable development. Continued environmental degradation, including deforestation, soil erosion, and water pollution, adds complexity to this challenge, threatening the balance of ecosystems and the livelihoods of communities dependent on natural resources. Overexploitation of natural resources, driven by short-term economic interests, often conflicts with the principles of sustainability and conservation on which much

environmental policy is based. These challenges reinforce each other, creating a negative cycle that is difficult to break without a holistic and collaborative approach from multiple stakeholders.

Policy implementation in the context of natural resource and environmental management faces several main interrelated challenges:

1. Land Conflict

Land conflict is one of the most complicated issues in implementing policies related to natural resources. This problem often arises due to:

- a. Unclear land ownership status
- b. Overlapping claims between Indigenous communities, companies and the government
- c. Unequal access to land resources

These conflicts hinder policy implementation, trigger broader social tensions, and disrupt societal stability.

2. Environmental Degradation

The next challenge is ongoing ecological degradation, including:

- a. Deforestation threatens biodiversity
- b. Soil erosion reduces land productivity
- c. Water pollution that endangers public health and aquatic ecosystems

This degradation is often the result of ineffective policies or weak implementation, creating a vicious cycle in which environmental degradation makes it increasingly difficult to achieve policy goals.

3. Exploitation of Natural Resources

Excessive exploitation of natural resources is a significant challenge in realizing sustainable development. This involves:

- a. Uncontrolled mining
- b. Illegal logging of forests
- c. Overfishing in sea and land waters

These practices are often driven by short-term economic interests instead of long-term sustainability principles. Facing these challenges requires a comprehensive and multidisciplinary approach. Better coordination between government agencies, active participation of local communities, and collaboration with the private sector is needed to create sustainable solutions. Strengthening law enforcement, increasing transparency in resource management, and educating and empowering communities is critical to overcoming these obstacles. Only by holistically addressing the root of the problem can natural resource and

environmental management policies be implemented effectively, ensuring ecological sustainability and community welfare.

POLICY INNOVATION IN RENEWABLE ENERGY MANAGEMENT

Analysis of Incentive and Regulatory Policies to Promote Renewable Energy.

Policy innovation in managing renewable energy in Indonesia has shown significant development, primarily through implementing various fiscal and non-fiscal incentives and supporting regulations. The government has issued a series of policies to accelerate the adoption and development of renewable energy, as stated in Presidential Regulation No. 112 of 2022. This policy includes providing tax incentives for business entities that develop New and Renewable Energy (EBT) based power plants, including Income Tax facilities in the form of tax relief, exemption from Import Duty for imports of EBT power plant components, as well as relief or exemption from Land and Building Tax for projects. -related projects. The government also offers non-fiscal incentives, such as easier licensing and simpler procurement processes for renewable energy projects.

Analysis of this policy shows that the government is trying to create a more attractive investment climate for the renewable energy sector. However, the effectiveness of this policy still needs to be improved, considering that the renewable energy mix target of 23% by 2025 has not been fully achieved. Further policy innovation is necessary, especially in terms of harmonizing regulations between sectors and levels of government, as well as increasing support for research and development of renewable energy technologies. It is hoped that preparing a comprehensive New and Renewable Energy Law, as currently being discussed in the DPR RI, will provide a more robust legal umbrella to encourage accelerated adoption of renewable energy. With a more integrated and innovative policy approach, Indonesia has the potential to not only achieve the renewable energy targets that have been set but also become a regional leader in the transition to a low-carbon economy.

National and International Initiatives in Renewable Energy Development

Indonesia has firmly committed to developing renewable energy through national and international initiatives. At the national level, the government has set ambitious targets to achieve a 23% renewable energy mix by 2025 and Net Zero Emissions (NZE) by 2060 or sooner. To support the achievement of this target, the government has issued various policies and incentives, including tax allowance, exemption from import duties, and tax holidays for investors in the renewable energy sector. In addition, programs such as Patriot Energy have

been launched to involve youth in developing renewable energy in remote areas, focusing on PLTS, PLTMH and PLTP.

Indonesia actively collaborates with various countries and institutions at the international level to accelerate the energy transition. One example is the extension of the MENTARI program with the UK until 2027, which aims to improve renewable energy planning and procurement and implement pilot projects in eastern Indonesia. Other international collaborations include collaboration with USAID through the Sustainable Energy for Indonesia's Advancing Resilience (SINAR), which supports the development of an energy transition roadmap and accelerated implementation of renewable energy systems. Besides that, national companies such as Pertamina NRE are also actively establishing global partnerships, such as with Masdar from the United Arab Emirates, to develop PLTS and PLTB projects in Indonesia and other countries. These initiatives demonstrate Indonesia's commitment to accelerating the energy transition and attracting global investment in the renewable energy sector, with projected investment needs reaching USD 1 trillion by 2060 for renewable energy generation and transmission.

Use of New Technology and the Role of the Private Sector in Driving Innovation

The use of new technology and the role of the private sector play a crucial role in driving innovation and economic growth in the digital era. Digital technologies such as artificial intelligence, big data, cloud computing, and the Internet of Things have changed how businesses operate, creating new opportunities for greater efficiency, productivity and competitiveness. With its resources, creativity and expertise, the private sector is at the forefront of adopting and developing these technologies to create innovative products, services and business models.

Private companies invest in research and development to create technological breakthroughs to improve operational efficiency and open new markets. Through collaboration with research institutions and academia, the private sector drives innovation driven by market needs and is commercially relevant. The development of business technologies such as customer relationship management (CRM) systems and platform e-commerce has enabled the company to provide a better customer experience and reach global markets more easily.

The private sector also plays a vital role in developing digital infrastructure that supports innovation. Private investment in telecommunications networks, data centres and other IT infrastructure creates a strong foundation for the digital economy. Partnerships between the private sector and government are also crucial in creating a conducive environment for

innovation through supportive policies, intellectual property protection, and access to financing.

However, using new technology also brings challenges that must be overcome. Cybersecurity, data privacy and the digital divide are some issues that require attention from the private sector and government. It is also essential to ensure that the benefits of technological innovation are distributed evenly across society, avoiding digital exclusion and greater inequality.

In facing this challenge, collaboration between the private sector, government and civil society is essential. By adopting a human-centred and ethical approach to technology development and implementation, we can maximize the benefits of innovation while reducing risks and negative consequences. Through this joint effort, the use of new technologies and the role of the private sector can be a powerful driver of innovation, economic growth and social progress in the digital era.

Challenges in policy implementation

Implementing infrastructure policy in Indonesia faces several significant challenges that must be overcome to increase development effectiveness and efficiency. One of the main challenges is the limited existing infrastructure, especially in remote areas. These limitations include physical infrastructure, such as roads, ports and airports, and digital infrastructure, which is increasingly important in the modern era. This limitation hampers connectivity and economic growth evenly throughout Indonesia.

The next challenge is investment-related, especially in the context of Government Cooperation with Business Entities (KPBU) or Public-Private Partnership (PPP). Even though the PPP scheme is seen as a solution to overcome government budget limitations, its implementation still faces various obstacles. One is the complexity of procedures and bureaucracy at the central and regional levels, which can slow the project development. Land acquisition issues and regulatory uncertainty are also factors that reduce private investors' interest in participating in infrastructure projects.

Regulatory compliance is also a challenge in implementing infrastructure policies. Frequent regulatory changes and sometimes overlaps between central and regional regulations create legal uncertainty for stakeholders. This affects investors and makes it difficult for local governments to align local policies with national policies. Furthermore, weak law enforcement and lacking capacity to monitor infrastructure projects hinder compliance with established quality and safety standards.

To overcome these challenges, a comprehensive approach involves improving regulations, increasing institutional capacity, and strengthening stakeholder coordination. Simplifying bureaucratic procedures, increasing transparency in the procurement process, and enhancing investment guarantee mechanisms can help increase private participation in infrastructure development. In addition, developing innovative financing instruments and expanding the capacity of local governments to plan and implement infrastructure projects are also crucial to overcoming financing gaps and improving the quality of infrastructure development in Indonesia.

3. CONCLUSION

Based on the analysis that has been carried out, it can be concluded that the management of natural resources and renewable energy in Indonesia has experienced significant developments through the implementation of various strategies and policy innovations. The government has issued a series of regulations and incentives to encourage renewable energy development, as stated in Presidential Regulation No. 112 of 2022. However, land conflicts, environmental degradation and over-exploitation of natural resources are still the main obstacles to effective policy implementation. Collaboration between central and regional governments and active participation from the private sector and society is the key to overcoming these challenges and realizing sustainable natural resource management.

4. SUGGESTION

To increase the effectiveness of natural resource and renewable energy management in Indonesia, several suggestions can be considered: 1) Strengthen regulatory harmonization between sectors and levels of government to reduce policy overlap; 2) Increase investment in research and development of renewable energy technology; 3) Developing a more inclusive community participation mechanism in the decision-making process related to natural resource management; 4) Strengthen law enforcement against environmental violations and illegal exploitation of natural resources; and 5) Increasing transparency and accountability in policy implementation through a more effective monitoring and evaluation system.

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