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Policy Diffusion on New and Renewable Energy in Indonesia

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Abstract

This research emphasizes the need for a specific legal framework to harmonize new and renewable energy (NRE) policies in Indonesia, as current efforts to develop and implement NRE have been slow. By exploring policy diffusion, this study aims to offer solutions for accelerating NRE usage through relevant policies. Using a qualitative approach, it examines four policy diffusion mechanisms from Ring's framework: (i) learning, (ii) competition, (iii) imitation, and (iv) coercion. The 2015 Paris Agreement, which Indonesia ratified in 2016, plays a key role in diffusing NRE policies, especially through coercive mechanisms.The study's findings suggest that (i) the Paris Agreement's global benchmarks provide a basis for Indonesia to adopt a learning mechanism, using insights from other countries that have met their NDCs; (ii) the competition mechanism could help Indonesia attract funding from developed countries by positioning itself as a viable candidate for climate aid; (iii) through imitation, Indonesia can adopt successful NRE policies from other countries, adapting them to local needs; and (iv) coercive mechanisms require Indonesia, as a Paris Agreement signatory, to enforce NRE policies aligned with international climate goals. The research concludes that Indonesia should integrate all four policy diffusion mechanisms into its NRE strategy and advocates for a specific NRE law. This law would unify related regulations, align policies with international standards, attract investment, and support Indonesia's NRE goals under the Paris Agreement.

Keywords: *Policy Diffusion, New and Renewable Energy, Indonesia.*

Introduction

Population growth and industrial activity in Indonesia continue to increase rapidly, which has an impact on increasing the demand for energy in large quantities (Hasan et al., 2012; Dutu, 2016). Energy sources that are still dominated by fossil fuels, such as oil, natural gas, and coal, are the mainstay to meet energy needs in various sectors, from transportation to the manufacturing industry. Dependence on fossil fuels not only triggers increased energy consumption but also accelerates the depletion of limited fossil energy reserves (Okoh, 2022; Nalule et al., 2022). Over time, these energy reserves continue to shrink, resulting in a threat to national energy security in the future if there are no significant efforts to switch to more environmentally friendly and sustainable energy (Burns, 2019; Rabbi et al., 2022)..

In addition to the risk of limited resources, the use of fossil fuels also has a negative impact on the environment. The process of burning fossil fuels produces greenhouse gas emissions, such as carbon dioxide (CO_2), which are the main causes of global warming and climate change (Wuebbles & Jain; Yoro & Daramola, 2020. The impact of climate change is already being felt in the form of increasingly frequent na)tural disasters, such as floods, droughts, and extreme weather. In addition, air pollution due to pollutants from fossil fuel combustion has a negative impact on public health, increasing the risk of respiratory and cardiovascular diseases (Kampa & Castanas, 2008; Perera, 2018). Therefore, Indonesia needs to immediately accelerate the transition to renewable energy, such as solar, wind, and biomass, as an effort to protect the environment, support sustainability, and ensure energy availability in the future (Yana et al., 2022; Pambudi et al., 2023).

To address the increasing demand for energy and the resulting environmental impacts, accelerating the development and utilization of New and Renewable Energy (NRE) is very important. Indonesia has abundant NRE potential, such as solar, wind, biomass, and geothermal energy, which are spread across various regions (Langer ey al., 2021; Alhamid et al., 2016). However, the utilization of this potential is still far from optimal, and its contribution to national energy needs is still low. Various challenges, such as

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inadequate infrastructure, high investment costs, and limited regulations, need to be overcome so that Indonesia can maximize its NRE potential (Silalahi et al., 2021; Paundra & Nurdin, 2022). The transition to NRE can not only help reduce dependence on fossil fuels, but also increase the sustainability of national energy and support Indonesia's efforts to mitigate climate change. With stronger regulations and support from the government, NRE can become the main foundation in developing a more environmentally friendly energy system, supporting a green economy, and reducing risks to the environment and public health (Rennings, 2000; Omer, 2008).

New and renewable energy is the management of energy and natural processes that are sustainable and used as alternative energy and are environmentally friendly so that they contribute to overcoming global warming and reducing carbon dioxide emissions (Panwar et al., 2011). Based on Government Regulation Number 79 of 2014 concerning National Energy Policy, Indonesia targets the use of new and renewable energy of at least 23% in 2025 and 31% in 2050. By looking at the Regulation above, the targeting of the use of new and renewable energy is certainly further enhanced and implemented continuously and continuously through Energy Conservation, Energy Diversification and Energy Intensification in order to achieve 23% in 2025 and 31% in 2050.

Based on the 2023 Indonesia Energy Outlook Book published by the Secretary General of National Energy Board of Indonesia, the total NRE potential for power generations stands at 3,687 GW. However, until 2022, only 0.3% or 12.6 GW of this potential has been utilized. The following table provides a breakdown of the potential and utilization of different types of NRE.

Types of NRE	Total Potential (GW)	Utilization (GW)	% Utilization
Sea	63	-	
Geothermal	23	2.4	10.30%
Bio Energy	57	3.1	5.40%
Wind	155	0.2	0.10%
Hydro	95	6.7	7.00%
Solar	3,294	0.3	0.01%
Total	**3,687**	**12.6**	**0.30%**

Under Presidential Regulation No. 22 of 2017 on the National Energy General Plan (PR 22/2017), Indonesia commits to increase its NRE portion in the national energy mix for at least 23% by 2025 and 31% by 2050. However, as of 2022, the progress has been slower than anticipated, with NRE accounting for only about 12.3% of the total energy mix. The primary energy landscape is still dominated by fossil fuels in which coal is the largest contributor at 42%, followed by oil at 31%, and natural gas at 14%. This heavy reliance on fossil fuels presents significant challenges for Indonesia in reaching its energy diversification targets. The slow development of NRE infrastructure, regulatory hurdles, and the continued prioritization of coal for power generation are key factors contributing to the gap between the targets and the current achievements. Accelerating NRE development, attracting investment, and addressing regulatory and logistical barriers are significant steps for Indonesia to reach its future NRE goals.

The Paris Agreement has indeed been a significant catalyst for the development and implementation of NRE worldwide (Savaresi, 2016), including in Indonesia. In supports of the Paris Agreement's goals, Indonesia has enacted a series of regulations and policies aimed at promoting NRE which includes, among other things, Government Regulation No. 79 of 2014 on National Energy Policy (GR 79/2014), Presidential Regulation No. 4 of 2010 on the Assignment of PLN for the Acceleration of Development of NRE, Coal, and Gas Power Plants, Presidential Regulation No. 4 of 2016 on the Acceleration of Development of Electricity Infrastructure, Presidential Regulation No. 22 of 2017 on the National Energy General Plan (PR 22/2017), Presidential Regulation No. 112 of 2022 on the Acceleration of Renewable Development for Power Provision, and Regulation of the Minister of Energy and Mineral Resources No. 50 of 2017 on the Utilization of Renewable Sources for Power Provision.

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These regulations reflect Indonesia's commitment to diversifying its energy mix and increasing its reliance on NRE sources. However, despite these policy initiatives, an umbrella law specifically for NRE is still absent and this absence creates certain gaps in regulation and policy implementationn (Mujianto & Tiess, 2013). The completion and enactment of a dedicated NRE law would help consolidate existing regulations, provide legal certainty, and create a more coordinated and coherent policy framework. For Indonesia to meet its 2025 and 2050 NRE targets, the swift enactment of the NRE law, alongside the harmonization of existing regulations, is crucial. It would also help attract more investment, streamline the regulatory process, and provide a solid foundation for the country's NRE transition.

From a public policy perspective, the study and development of NRE are crucial for Indonesia's successful implementation of its commitments under the Paris Agreement. However, despite the government's efforts to promote NRE, numerous obstacles still hinder the optimal utilization of these resources.

Methodology

The research method used is qualitative, using a descriptive approach. In this approach, the researcher aims to explore and understand how policy diffusion is adopted in Indonesia's NRE sector by gathering insights from participants who hold authority, possess relevant data and information, and have key relationships within the sector. The researcher is expected to thoroughly and accurately present the findings based on existing data and facts, while addressing the relevant issues identified during the research.

Result

The findings of this study highlight that Indonesia can learn from countries that have successfully met their Nationally Determined Contributions (NDC) targets within the framework of the Paris Agreement. Countries like Germany, Denmark, and Norway have made rapid progress in the development and implementation of renewable energy (RE) through well-planned and comprehensive policies. For instance, they offer fiscal incentives, provide subsidies for RE industry players, and implement strict regulations on carbon emissions. By studying and understanding the approaches of these countries, Indonesia can identify effective strategies and potentially tailor RE policies more accurately to meet NDC targets, while also accelerating the domestic clean energy transition. This is crucial because the success of these advanced countries demonstrates that consistent RE development can be achieved through strong commitment from all stakeholders, from the government to the private sector.

As a developing nation, Indonesia needs to compete with other developing countries in attracting financial support from developed nations for RE development and implementation. Given budget and technological limitations, funding from developed countries is one of the key factors in Indonesia's RE initiatives. These funds can be utilized for research and development in renewable technology, building RE infrastructure, and upskilling the workforce in the RE sector. In addition, this support can accelerate technology transfer and reduce reliance on imported technology by encouraging local production and technological development. However, to attract these funds, Indonesia needs to show a clear commitment to global climate goals, including compliance with the Paris Agreement and the proactive implementation of RE policies. This step not only opens opportunities for international funding but also strengthens Indonesia's global position as a nation serious about addressing climate change.

Furthermore, Indonesia can adopt and adapt policies and regulations from other countries that align with its own environmental and social conditions. Each country has unique geographic, social, and economic conditions, so it's important for Indonesia to select and adjust policies that are well-suited to local characteristics. For instance, countries rich in geothermal resources, such as Iceland, can serve as a model for Indonesia in maximizing geothermal energy. By adapting regulations that have proven effective in these countries, Indonesia can establish a more effective and efficient framework to develop its renewable energy potential, whether in geothermal, hydro, wind, or solar energy. Proper policy adaptation will help Indonesia avoid implementation barriers that may arise from differences in social and environmental conditions compared to the countries where the policies originated.

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Finally, as part of its commitment to the Paris Agreement, Indonesia is obligated to ensure that RE policies and regulations are aligned with global climate targets. In this context, coercive mechanisms can serve as a critical foundation for the diffusion of RE policies across various sectors. This means that RE regulations in force must be adhered to by all stakeholders, including industries and local governments, to make the commitment to reduce carbon emissions more uniformly achievable. These coercive mechanisms could include the introduction of emission limits, fines for industries failing to meet environmental standards, and incentives for companies transitioning to renewable energy. Through this approach, Indonesia can not only improve its RE performance but also ensure that all stakeholders support the achievement of national and international climate targets.

Discussion

The Paris Agreement, signed by Indonesia on 22 April 2016 and enacted on 25 October 2016, was entered primarily to (a) enhance the implementation of the United Nations Framework Convention on Climate Change (UNFCCC), adopted in New York on 9 May 1992, with the goal of stabilizing greenhouse gas concentrations at levels that prevent dangerous human-induced interference with the climate system, and (b) strengthen the global response to climate change within the context of sustainable development and poverty eradication, which includes: (i) limiting the global temperature rise to well below 2°C above pre-industrial levels, while pursuing efforts to limit it to 1.5°C, as this would significantly reduce the risks and impacts of climate change; (ii) enhancing adaptation to the adverse effects of climate change and fostering climate resilience and low-emission development without compromising food security; and (iii) ensuring that financial flows align with pathways toward low-emission and climate-resilient development.

To achieve the long-term temperature goals of the Paris Agreement, participating countries are expected to reduce emissions and reach net zero emissions (NZE) between 2050 and 2060. They are also required to submit their NDC as a commitment to combat climate change. Indonesia, for its part, has committed by 2030 to reducing its greenhouse gas emissions by 31.89% unconditionally and by 43.20% conditionally (subject to international support in financing, technology transfer, and capacity building) and further, Indonesia aims to achieve NZE by 2060.

One key approach to achieving the goals of the Paris Agreement is through the energy sector by maximizing the use of NRE. For this purpose, Indonesia, under GR 79/2014, has established a target for NRE to be at least 23% of the country's primary energy mix by 2025, and 31% by 2050. In addition, PR 22/2017 provides a strategy to meet this target by increasing NRE utilization for electricity generation in which Indonesia particularly aims to achieve a minimum NRE power generation capacity of 45.1 GW by 2025 and 167.6 GW by 2050. These targets should be feasible given Indonesia's vast potential for NRE, which is estimated at 3,687 GW for power generation alone.

The Paris Agreement requires its signatories to prepare, communicate, and maintain successive NDCs that outline their climate targets, along with the necessary information to ensure clarity, transparency, and understanding. Further, all parties are required to formulate and communicate long-term strategies for low greenhouse gas emission development, taking into account the objectives of the Paris Agreement and adhering to the principle of common but differentiated responsibilities and respective capabilities, considering national circumstances. In this respect, developed countries are expected to lead by adopting economy-wide absolute emission reduction targets, while also supporting developing countries in implementing the Paris Agreement.

In light of the above, Indonesia should learn from other countries, particularly developed countries, that have successfully optimized NRE utilization to meet their NDCs. The learning mechanism can take various forms, enabling policymakers to design, formulate, and implement NRE-related regulations that positively impact all Indonesian stakeholders. By aligning these policies with the NDC targets Indonesia has committed to under the Paris Agreement, Indonesia can effectively work towards meeting its obligations, contributing to global efforts to limit the rise in average temperature and achieve the agreement's long-term climate goals.

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One of the key roles and commitments of developed countries under the Paris Agreement is to provide financial resources through various sources, instruments, and channels. In doing so, developed countries must consider the strategies, priorities, and needs of developing countries and as part of this dynamic, developing countries, including Indonesia, are implicitly encouraged to compete for financial support from developed nations. To succeed in this competition, Indonesia must be able to formulate and implement NRE-related policies and regulations that offer distinct value propositions, making the country an attractive destination for investment in the NRE sector so that Indonesia can secure funding through diverse financial mechanisms, boosting its ability to meet its climate commitments under the Paris Agreement.

As a party to the Paris Agreement, Indonesia should be able to gain broad access to collect, study, adapt, share, and exchange NRE-related regulations and policies with other member countries. As part of policy diffusion, Indonesia can imitate successful NRE strategies from other countries. However, this imitation should not be a direct replication of existing regulations and policies from other countries. The Paris Agreement emphasizes that each party should develop greenhouse gas emission strategies while considering their common but differentiated responsibilities and respective capabilities, in light of their unique national circumstances. Given that Indonesia's NRE sources may have distinct characteristics compared to those of other countries, any imitated policies must be carefully adapted to suit Indonesia's specific environmental and social conditions. Also, it is crucial to ensure that these imitated policies remain consistent with Indonesia's regulatory framework.

Indonesia ratifies the Paris Agreement through Law No. 16 of 2016. This ratification marks the beginning of Indonesia's obligations to forcibly develop and implement NRE related regulations that shall be in line with the objectives of the Paris Agreement. This coercion mechanism serves as a driving force, pushing Indonesia to formulate regulations that support its climate action goals in which Indonesia is then encouraged to engage with other diffusion mechanisms to strengthen its NRE policies, including learning from the successful strategies of other countries in NRE development, competing with other developing countries to attract financial and technical support from developed countries, and imitating foreign NRE policies in a way that is compatible with Indonesia's unique environmental and social context. By doing so, Indonesia is expected not only meet its commitments under the Paris Agreement but also enhance its role in global climate change mitigation efforts.

Conclusion

The research emphasizes the critical need for Indonesia to adopt a more integrated and strategic approach in developing its NRE policies, in line with its commitments under the Paris Agreement. Despite the Indonesia's substantial NRE potential, Indonesia still faces challenges in achieving its energy mix targets due to regulatory gaps, reliance on fossil fuels, and slow infrastructure development.

The research concludes that Indonesia should integrate and incorporate all four mechanisms of policy diffusion, i.e., learning, competition, imitation, and coercion into its NRE policy framework. This would allow Indonesia to benefit from global best practices, compete for financial supports from developed countries, adapt successful models from other countries to its local context, and comply with its obligations under the Paris Agreement. To optimize and accelerate NRE utilization, the research advocates for the enactment of a specific law on NRE, which would provide a comprehensive legal framework for the harmonization of related regulations in Indonesia. This legal umbrella would ensure that Indonesia's policies align with international standards, drive investment, and facilitate the achievement of the nation's NRE goals in accordance with the Paris Agreement.

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