International Journal of Sustainable Law, 2(2), (2025)

Government Policy on Blending Ethanol into Pertamina's Fuel: Implications and Challenges

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Article history
Received: 12 November 2025
Revised: 10 December 2025
Accepted: 15 December 2025

Keywords
Government
Policy
Blending
Ethanol

Abstract
The Indonesian government has embraced renewable energy policies as part of its commitment to reducing reliance on fossil fuels and mitigating the effects of climate change. Among these policies is the integration of ethanol into the nation's fuel supply, specifically through blending with Pertamina's fuel. This study investigates the implications and challenges of Indonesia's ethanol blending policy, with a focus on its legal, economic, and environmental dimensions. The research adopts a normative legal methodology, examining existing laws, regulations, and policies related to biofuels and ethanol blending, as well as analyzing key stakeholders' roles in implementing the policy. Through the review of legal documents, interviews with experts, and relevant case studies, the study highlights the benefits of ethanol blending in terms of energy security and environmental sustainability, while also discussing the barriers to its full implementation. The findings suggest that while ethanol blending holds potential for reducing carbon emissions and supporting the local biofuel industry, the policy faces challenges such as infrastructure readiness, cost-effectiveness, and market acceptance. The study concludes with recommendations for enhancing the policy's effectiveness and its alignment with Indonesia's broader renewable energy goals.

1. Introduction

Indonesia, a nation that heavily relies on imported fossil fuels for its energy needs, has increasingly turned toward renewable energy as part of its broader commitment to addressing climate change and ensuring energy security. Among the strategies to diversify the energy mix, the government has introduced an ethanol blending policy, which mandates that ethanol be mixed with gasoline to form biofuel blends. This initiative is part of Indonesia’s vision to transition toward sustainable energy sources and reduce dependence on fossil fuels. Ethanol blending is seen as a vital step in decreasing greenhouse gas emissions, improving air quality, and reducing Indonesia’s vulnerability to fluctuating global oil prices.

The ethanol blending policy is not new; it has been gradually implemented over the years. However, the current push by the Indonesian government to significantly increase the ethanol blend in gasoline represents a major effort to foster a greener, more energy-independent future. The government's goal is to incorporate more ethanol into the national fuel supply, beginning with a blend of 10% ethanol (E10) in 2020, and gradually increasing this percentage as the necessary infrastructure and market demand evolve. Pertamina, Indonesia's state-owned oil company, plays a crucial role in this policy, acting as the central distributor of biofuels in the country.

Ethanol in Indonesia is primarily produced from food crops like sugarcane and cassava, raising significant questions regarding the balance between food production and energy production. This has led to ongoing debates about the potential socio-economic impacts, particularly on food prices and the

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doi: https://doi.org/10.71131

livelihoods of farmers. As Indonesia works to implement the blending policy, a variety of challenges emerge both at the legal and infrastructural levels as well as in terms of market readiness and public acceptance.

The main objective of this research is to examine the implications and challenges of the government's ethanol blending policy in Indonesia. The research specifically focuses on the legal, economic, and environmental dimensions of this policy. By investigating the legal framework, economic impacts, and the environmental sustainability of ethanol blending, this study aims to offer recommendations on how the policy can be strengthened and implemented more effectively.

This study utilizes normative legal research to analyze existing laws, regulations, and policy documents related to biofuels and ethanol blending. Additionally, interviews with relevant stakeholders—including government officials, Pertamina executives, industry experts, and environmental advocates—will provide further insights into the challenges and opportunities associated with the policy. Through this investigation, the study will provide a comprehensive understanding of the ethanol blending policy's role in Indonesia's renewable energy strategy and offer policy recommendations to enhance its implementation.

2. Methodology

This study utilizes normative legal research as its primary methodology. Normative legal research focuses on analyzing legal norms and principles, such as statutes, regulations, and case law, to understand their implementation and potential for reform. The research is structured around three main components: Legal Framework Analysis: A review of the legal documents, such as laws, regulations, and government policies, that pertain to ethanol blending and biofuels in Indonesia. This includes examining the laws that govern biofuel production, environmental protection, and energy security, as well as any international agreements that influence Indonesia's biofuel policies.

Stakeholder Analysis: Through interviews and expert opinions, the research seeks to understand the perspectives of key stakeholders, including government agencies, Pertamina, the agricultural sector, environmental groups, and the general public. This helps to identify potential legal gaps, concerns, and recommendations for improving the implementation of the ethanol blending policy.

Case Study Review: The study will include a review of existing case studies related to ethanol blending in Indonesia and other countries, focusing on the legal challenges they faced and the solutions they implemented. This comparative analysis will provide insights into best practices that could be adopted in Indonesia.

The research approach combines both primary and secondary legal sources, ensuring a comprehensive understanding of the subject matter from a legal standpoint. The primary data will be gathered through interviews with key informants, including policymakers, legal experts, and representatives from Pertamina and the agricultural sector. Secondary data will be collected from legal databases, government reports, and scholarly articles on biofuels and renewable energy policy.

3. Result and Discussion

The analysis of Indonesia's ethanol blending policy reveals several important aspects that affect the successful implementation of the policy. These can be categorized into legal challenges, economic

implications, environmental sustainability, and social acceptance. Each of these elements is crucial to understanding the barriers and opportunities associated with the policy.

1. Legal and Regulatory Challenges

Indonesia's legal framework for biofuels, particularly in ethanol blending, is currently fragmented and lacks coherence in several key areas. While the Ministerial Regulation No. 12/2015 on the Use of Biofuels for Transport sets ambitious targets for blending ethanol with gasoline, the lack of uniformity in the application of these regulations is a significant issue. Inconsistencies in the implementation of biofuel-related laws often create confusion among stakeholders and hinder smooth policy execution.

One of the core legal challenges is the absence of clear, centralized oversight and coordination between the various government ministries responsible for biofuels, energy, agriculture, and environmental issues. For instance, the Ministry of Energy and Mineral Resources (MEMR) handles fuel blending policies, while the Ministry of Agriculture is responsible for the agricultural side of biofuel production. This division often leads to conflicting policies and regulations, with each sector prioritizing its own agenda. In practice, this means that ethanol producers are faced with a complex regulatory environment that complicates their ability to plan and invest in sustainable ethanol production methods.

Additionally, the certification and standardization of biofuels remain underdeveloped. The Indonesian government has yet to implement a comprehensive certification system for ethanol blends, which is necessary to ensure the quality and consistency of the fuel. This lack of regulation has a ripple effect on market confidence and undermines the long-term sustainability of the ethanol blending policy. As a result, ethanol producers are often unsure about the regulatory environment in which they are operating, and fuel consumers face uncertainty about the quality of ethanol-blended fuels available in the market.

The legal concerns surrounding the use of food crops for ethanol production also persist. The reliance on food crops such as cassava and sugarcane raises questions about food security and agricultural sustainability. There are concerns that the increasing demand for ethanol could divert resources away from food production, potentially driving up food prices and increasing the economic burden on low-income households. These legal and regulatory gaps underscore the need for more integrated, clearer policies that balance energy, agricultural, and environmental concerns.

2. Economic Implications of Ethanol Blending

The economic impacts of the ethanol blending policy in Indonesia are multifaceted. Ethanol blending offers a potential solution to the country’s dependency on imported fossil fuels, particularly in terms of reducing fuel imports and diversifying the energy mix. However, the economic feasibility of blending ethanol with gasoline faces significant challenges.

First, the cost of producing ethanol in Indonesia is high, especially when sourced from food crops like cassava and sugarcane. The economic viability of this production is heavily influenced by the price of these crops, the availability of land, and labor costs. While the government has provided subsidies to support biofuel production, the high cost of production remains a key barrier to the scalability of ethanol blending in Indonesia. In addition, the price of ethanol tends to fluctuate, which could result in unpredictable fuel prices for consumers.

Moreover, the need for large-scale investment in infrastructure to support ethanol production and distribution is another economic challenge. Pertamina, as the main distributor of ethanol-blended fuel, is

responsible for upgrading its infrastructure to accommodate these new biofuels. This includes expanding fuel storage facilities, updating transport systems, and ensuring that fuel pumps can dispense ethanol-blended fuels at the required quality standards. The costs associated with these infrastructure upgrades could place a financial strain on Pertamina, which may need additional support from the government or private sector.

Another economic concern is the potential impact on food prices. The shift toward biofuels has raised fears that increasing demand for food-based ethanol will divert agricultural resources away from food production, thus driving up the cost of staple crops. This is particularly concerning in Indonesia, where food security is already an issue in certain rural areas. For instance, the price of cassava, which is used as an ethanol feedstock, could increase as demand for ethanol rises. This, in turn, could impact the affordability of food for the general population, particularly the poor.

3. Environmental Sustainability and Benefits

Ethanol is widely regarded as a cleaner alternative to fossil fuels, with the potential to reduce carbon emissions and improve air quality in urban areas. In a country like Indonesia, which faces severe air pollution, especially in cities like Jakarta, ethanol blending can play a critical role in reducing the harmful environmental impacts of fossil fuel consumption.

The environmental benefits of ethanol blending are particularly evident in the reduction of greenhouse gas emissions. Studies have shown that ethanol produces fewer emissions than conventional gasoline, making it a crucial part of Indonesia's efforts to combat climate change. The transition to renewable energy sources like ethanol also contributes to Indonesia's commitments under international climate agreements, such as the Paris Agreement.

However, ethanol production itself is not without its environmental challenges. The large-scale cultivation of crops like sugarcane and cassava for ethanol production can lead to land-use changes, deforestation, and biodiversity loss. The conversion of forests into agricultural land can result in the destruction of vital ecosystems and contribute to soil erosion. Additionally, the cultivation of biofuel crops requires significant water and fertilizer inputs, which can strain local resources and negatively impact the environment.

To ensure the sustainability of ethanol blending, the Indonesian government must take a more holistic approach to biofuel production, including promoting the use of non-food crops for ethanol production, such as jatropha or algae, which do not compete with food production and have a lower environmental impact. Moreover, sustainable farming practices and the promotion of agroforestry can help mitigate the environmental risks associated with large-scale biofuel production.

4. Social and Market Acceptance

Social acceptance of ethanol-blended fuel is essential for the success of the policy. However, there is limited public awareness of the benefits of ethanol-blended fuel and its role in reducing greenhouse gas emissions. Consumer reluctance to switch to ethanol-blended fuel may stem from concerns over its impact on vehicle performance, fuel efficiency, and overall cost.

The Indonesian government and Pertamina must work together to educate the public on the advantages of ethanol blends and dispel any myths about their potential negative impacts on vehicles. Public awareness campaigns that highlight the environmental benefits, the role of biofuels in energy

security, and the long-term cost savings associated with ethanol blending will be essential in increasing consumer acceptance.

Moreover, ensuring that ethanol-blended fuel is readily available across the country is crucial to its widespread adoption. Without adequate distribution networks and infrastructure, the ethanol blending policy may fail to achieve its intended goals. The government must prioritize investment in fuel distribution infrastructure to ensure that all regions have access to ethanol-blended fuels.

4. Conclusion

In conclusion, the Indonesian government's ethanol blending policy has significant potential to improve energy security, reduce carbon emissions, and promote rural economic development. However, the policy faces substantial challenges that must be addressed for its successful implementation. Legal inconsistencies, economic feasibility, infrastructure limitations, and social acceptance remain key hurdles to achieving the policy's objectives.

The Indonesian government needs to develop a more cohesive and streamlined legal framework that integrates the various aspects of biofuel production, distribution, and regulation. Clear guidelines and standards for ethanol production, certification, and distribution are essential to providing stability and fostering investment in the sector.

Economically, the government should focus on reducing the costs of ethanol production and ensuring that the blending policy does not have unintended negative effects on food prices or food security. Additionally, increased investment in infrastructure is critical to ensuring that ethanol-blended fuel can be distributed efficiently and consistently across the country.

Finally, public awareness campaigns and consumer education are crucial to increasing acceptance of ethanol-blended fuel. By addressing these challenges and ensuring that the ethanol blending policy is implemented effectively, Indonesia can take a significant step toward achieving a sustainable, energy-independent future.

Author Contributions

Riski Febria Nurita : Designing structure research and determine focus article scientific based on results research. Directing and coordinating all over stages writing journal , start from determination Topic until final draft preparation.Do supervision to quality content written by members team , including data consistency , style academic , and compliance to rules scientific . Doing finalization script , including editing end , check conformity with journal template purpose , and citation in accordance format . Do correspondence with journal editors , including the submission process, revisions based on reviewers, and communication administrative others .. Guarantee originality and integrity academic from submitted manuscript . **Yusuf Eko Nahuddin** : Do review library , collection references , and preparation of bibliography in the appropriate format . Arrange the sections certain in articles , such as study literature , methodology , results and discussion , according to with distribution internal tasks . Doing analysis of the data obtained from study field or studies literature . Editing and revising script in accordance with directions chairman researchers and reviewers. Helping in checking plagiarism , manuscript formatting , and preparation of supporting files

Funding

No funding support was received.

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