



THE NEW DIRECTION OF INDONESIA'S ENERGY TRANSITION: OPTIMIZING RENEWABLE ENERGY AMIDST FOSSIL DEPENDENCE

ARAH BARU TRANSISI ENERGI INDONESIA: OPTIMALISASI ENERGI TERBARUKAN DI TENGAH KETERGANTUNGAN PADA ENERGI FOSIL

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Abstrak

Transisi energi Indonesia akan memerlukan upaya bersama di berbagai bidang, tetapi dapat dicapai dengan kemauan politik yang kuat dan desain kebijakan yang cerdas. DPR dapat memainkan peran penting dengan memberlakukan undang-undang yang memungkinkan, meminta pertanggungjawaban lembaga, dan mengamankan dukungan anggaran untuk inisiatif ini. Dengan mengambil sikap proaktif, Indonesia dapat mengubah sektor energinya dari sumber masalah lingkungan menjadi mesin pertumbuhan berkelanjutan, memastikan energi yang andal bagi rakyatnya sambil menjaga warisan alam bangsa yang kaya untuk generasi mendatang. Melalui kebijakan yang tepat waktu dan dibuat dengan baik yang didasarkan pada data, melibatkan pemangku kepentingan, dan dipandu oleh visi keberlanjutan, Indonesia dapat muncul sebagai pemimpin dalam transisi global menuju energi bersih.

Kata kunci: energi terbarukan, fosil, bahan bakar, potensi

Abstract

Indonesia's energy transition will require concerted efforts across many fronts, but it is achievable with strong political will and smart policy design. The House of Representatives can play a pivotal role by enacting enabling legislation, holding agencies accountable, and securing budgetary support for these initiatives. By taking a proactive stance, Indonesia can transform its energy sector from a source of environmental concern into a engine of sustainable growth, ensuring reliable energy for its people while safeguarding the nation's rich natural heritage for generations to come. Through timely and well-crafted policies grounded in data, inclusive of stakeholders, and guided by a vision of sustainability, Indonesia can emerge as a leader in the global transition to clean energy.

Keyword: renewable energy, fossil, fuel, potential

INTRODUCTION

Indonesia's energy sector remains heavily reliant on fossil fuels, with coal as the primary source of electricity, while oil and natural gas dominate the primary energy supply [1][2]. Despite its vast renewable energy potential including hydropower, geothermal, solar, and wind, progress in adoption remains slow, with renewables growing at a slower rate than energy demand [1][4].

The government has set ambitious targets to increase the share of renewables to 23% by 2025 and 31% by 2050 [6]. Additionally, under the Paris Agreement, Indonesia has pledged to reduce



carbon emissions by up to 43.2% by 2030 with international support[6]. However, challenges persist, including coal dependency, slow investment, and environmental impacts such as air pollution, deforestation and water contamination, which threaten public health and ecosystems[1][8][9][10].

Indonesia's fossil fuel dependent energi development has created significant environmental challenges. Chief among these is climate change – Indonesia is a top ten greenhouse gas emitter globally, with the energy sector (especially power generation) rapidly increasing its share of emissions. The power sector is currently the largest contributor to Indonesia's fossil fuel combustion emissions[1]. Continued reliance on coal and oil means rising CO₂ output, Indonesia's ability to meet its climate targets under the Paris Agreement. Furthermore, many coal plants are young and efficient (relative to older plants), which makes them economical to run but also means their lifetime emissions could be very high if not curtailed. The impact on air quality and public health is an immediate concern. Emissions from coal-fired power plants and diesel vehicles have caused worsening air pollution, especially in urban centers like Jakarta. Over 93% of Indonesia's population lives in areas with fine particulate (PM_{2.5}) levels above the WHO's safe guide line. This pollution burden is cutting short lives – studies estimate that current particulate pollution levels reduce the average Indonesian's life expectancy by 2.5 years (and by over 5 years for residents of Jakarta). Coal power plants in particular emit harmful pollutants (SO₂, NO_x, PM_{2.5}, mercury that contribute to thousands of pre mature deaths annually. One study found that coal plant pollution was already causing around 7,500 premature deaths per year in Indonesia (as of 2011), and this toll could rise to 25,000 per year by 2030 if new planned coal plants come online without additional controls. Such health impacts – including respiratory illnesses, cardio vascular diseases, and developmental problems in children – impose huge costs on society and the healthcare system. Addressing air pollution from the energy sector has become an urgent public health priority along side climate mitigation.

Deforestation and Biodiversity Loss: Energi projects have directly and indirectly contributed to deforestation in Indonesia, a country already grappling with one of the world's highest rates of forest loss. Between 2000 and 2019, Indonesia lost more tropical forest to mining than any other country – primarily due to coal extraction in Kalimantan (Borneo)[11]. More than half (58%) of all tropical deforestation caused by industrial mining globally during that period occurred in Indonesia[11]. Vast open-pit coal mines have cleared forests and polluted land and waterways in Kalimantan and Sumatra, endangering wildlife and releasing carbon stored in peat and vegetation. Oil and gas development in frontier areas has also encroached on sensitive ecosystems. Moreover, Indonesia's push for biofuels (like palm-oil based biodiesel) raises environmental concerns: oil palm plantation expansion has historically been a major driver of deforestation and habitat loss. Though recent government moratoria on new plantations in primary forests and peatlands have slowed this trend, the risk remains if biofuel demand increases without strong safeguards. Even renewable projects can pose challenges for biodiversity if not properly managed. For instance, the Batang Toru hydro power project in North Sumatra has drawn criticism for its location in the only known habitat of the critically endangered Tapanuli orangutan. Fewer than 800 Tapanuli orangutans remain, and scientists warn the dam and associated infrastructure could fragment the forest and push this great ape species closer to extinction.

METHODOLOGY



This research employs a literature study method to examine the topic of renewable energy. A literature study is a research method that involves collecting, analyzing, and interpreting information from various existing sources, such as books, scientific journals, articles, research reports, and other relevant sources related to the research topic.

RESULTS AND DISCUSSION

The transition to sustainable energy requires progressive policies, stronger investments, and collaboration among the government, private sector, and society. Key infrastructure projects, regulatory reforms, and international partnerships, such as the Just Energy Transition Partnership (JETP (Twi global. (n.d.)), play crucial roles in achieving these goals[3][6]. If managed effectively, Indonesia can transform its energy sector, balancing economic growth with sustainability and positioning itself as a leader in the global transition to clean energy. Indonesia energy transition has been slow despite clear goals and significant renewable potential. Several barriers hinder progress in shifting away from fossil fuels.

1. Policy and Regulatory Gaps – While targets exist, inconsistent policies create investor uncertainty. Pricing regulations previously made renewables unviable, and overlapping jurisdictions delay progress. The long-awaited Renewable Energy Bill remains stalled, leaving renewable without strong legal foundation. Presidential Regulation No. 112/2022 is still in early implementation, and weak enforcement of fuel quality and emissions standards further slows the transition [6].
2. Financial and Investment Challenges – High financing costs and limited local bank support hinder investment. In 2024, only USD \$1.8 billion was invested in renewables, below the \$2.6 billion target [7]. Fossil fuel subsidies make coal power artificially cheap, and the domestic market obligation (DMO) forces coal miners to sell at low prices, discouraging renewables. While JETP offers blended finance, slow disbursement remains a problem [7].
3. Institutional and Infrastructure Limitations – PLN's near monopoly favors large coal projects, limiting competition from private renewable developers. Independent power producers (IPPs) struggle to secure power purchase agreements. Grid infrastructure upgrades are needed, especially in resource-rich but remote areas. Java-Bali's grid oversupply from coal plants makes PLN hesitant to expand renewables, while outer islands rely on costly diesel power [6].
4. Resistance from Incumbent Industries – Coal and oil industries wield significant political and economic influence. Indonesia, the world's fourth largest coal producer, faces pressure to maintain coal reliance. Industry lobbying has delayed carbon tax plans and weakened renewable targets. State-owned enterprises like PLN and Pertamina remain aligned with fossil fuel expansion [8][3].
5. Technological and Human Resource Barriers – Indonesia relies on imported technology for solar and wind. Local content rules can delay projects if domestic components are costly or unavailable [6]. Technical expertise in renewables is underdeveloped, requiring capacity building. Innovation in battery storage and EVs is still in early stages, and R&D funding is low [6].



In summary, addressing policy gaps, financial disincentives, institutional barriers, industry resistance, and technological limitations is crucial to accelerating Indonesia's energy transition [3][7].

Areas for Improvement

1. Carbon Pricing Indonesia's IDR 30,000 per ton CO₂ tax was postponed. A power sector ETS is in pilot phase [12].
2. Fossil Fuel Subsidy Reform: Fuel subsidies have declined, but electricity tariffs remain partially subsidized.
3. Grid Reform: Smart grids and direct PPAs could boost investment.
4. Coal Transition: Policies for retraining workers and economic diversification are lacking.

In summary Indonesia's energy policy is evolving, but execution remains challenging. Stronger oversight, clearer strategies, and political will are essential for real progress.

Recommendations & Solutions

Achieving Indonesia's energy transition requires bold and coordinated action. The following policy recommendations for the House of Representatives aim to balance economic growth with environmental sustainability:

1. Strengthen Renewable Energy Targets – The government should maintain its 23% renewable energy target instead of lowering it, with phased adjustments (e.g., X% by 2027, Y% by 2030). These targets must be legally codified with accountability mechanisms, requiring annual reports from the National Energy Council (DEN) and PLN. If targets are missed, corrective action plans must be provided. Aligning targets with Indonesia's NDC and JETP goals (34-44% renewable electricity by 2030)[3] will boost investor confidence.
2. Carbon Pricing & Subsidy Reforms – The House should support the implementation of the postponed carbon tax and gradually phase out fossil fuel subsidies. Savings from reduced subsidies can fund an Energy Transition Fund for energy projects, ensuring transparency and alignment with national goals.
3. Utility & Power Market Reform – PLN should be incentivized to accelerate the energy transition through performance based funding, grid modernization, and allowing large consumers to procure renewables via direct PPAs or energy wheeling. The RUPTL should align with climate goals.
4. Address Financial Barriers – Expanding the Indonesia Infrastructure Guarantee Fund, transparent competitive renewable tenders, encouraging domestic financing, and engaging international partners (JETP, World Bank, ADB, GCF) will attract large-scale clean energy investments.
5. Regulatory Reforms – The House should simplify licensing with a one stop renewable investor service, ensure clear incentives in the Renewable Energy Bill, and strengthen environmental regulations (e.g., mining reclamation, emissions monitoring).
6. Just Transition for Communities – Worker retraining in fossil fuel regions (East Kalimantan,



South Sumatra) for solar, electrical, or reclamation jobs, along with special economic zones for renewables, will prevent regional economic decline.

7. Environmental Monitoring – Power plants should install emission control technology and undergo continuous air quality monitoring. Reforestation and ecosystem restoration, funded by reclamation bonds, will mitigate environmental damage.
8. Public Awareness & Engagement – Public campaigns on energy efficiency and renewables, engaging religious and community leaders, and establishing an Energy Transition Council with private sector and civil society will enhance policy dialogue.
9. International Collaboration – Strengthening partnerships with Denmark (wind power), Japan/Korea (coal transition), and Europe (grid management), along with joint research programs on tropical solar and geothermal, will accelerate innovation and investment.
10. Balancing Growth & Sustainability – The House should champion energy transition as economic modernization, emphasizing job creation, trade balance improvement, and health benefits. Cost benefit analyses should highlight long term economic gains, reinforcing political and public support for Indonesia's clean energy future.

CONCLUSION

In conclusion, Indonesia's energy transition will require concerted efforts across many fronts, but it is achievable with strong political will and smart policy design. The House of Representatives can play a pivotal role by enacting enabling legislation, holding agencies accountable, and securing budgetary support for these initiatives. By taking a proactive stance, Indonesia can transform its energy sector from a source of environmental concern into an engine of sustainable growth, ensuring reliable energy for its people while safeguarding the nation's rich natural heritage for generations to come. Through timely and well-crafted policies grounded in data, inclusive of stakeholders, and guided by a vision of sustainability, Indonesia can emerge as a leader in the global transition to clean energy.

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