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Barriers to Indonesia's Energy Transition

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Abstract

Considering the energy situation, which can no longer depend entirely on fossil energy, the energy transition is the responsibility of all countries. Indonesia has set a target for renewable technology in 2025 of 23%. However, the share of renewable energy in Indonesia's primary electricity generation will decrease to 10.4% in 2022. This figure further distances the renewable energy mix target and raises doubts among policymakers and energy academics. This article aims to determine the factors that influence the slow energy transition in Indonesia from fossil energy to renewable energy. This article is qualitative research using in-depth interview methods and documentary studies. In-depth interviews were conducted with several technocrats and bureaucrats to find out their views regarding the condition of alternative energy and Indonesia's unpreparedness for the energy transition. Qualitative research shows that the lack of energy justice in policies related to the energy transition causes the slow energy transition. First, complicated bureaucracy and overlapping or contradictory regulations cause procedural justice issues. Second, the unfulfilled distributive justice has led to losses due to policies related to renewable energy for several parties. Third, the country's failure to prioritize the environment caused the unfulfilled restorative justice. Fourth, top-down policymaking led to the field of recognition justice. Fifth, cosmopolitanism justice has yet to be fulfilled because Indonesia has not been able to become a global actor in the issue of renewable energy.

Keywords: *energy justice; energy policy; energy transition.*

1. Introduction

Since 2004, Indonesia has implemented a crude oil and gas import policy. The government adopts this policy to meet the growing industrial energy demands and complement the domestic energy supply. The increase in Gross Domestic Product (GDP) and population is a factor in the increasing energy demand. In addition, the region's economic growth also has an important influence on energy consumption. In Indonesia, population growth during 2000-2010 was 1.49 percent and decreased during 2010-2020 by 1.25, and in 2015-2020, is projected to be more than 1% but will decline to 0.5% after 2040. Unfortunately, according to Badan Pusat Statistik,2021), Indonesia's economic growth tends to decline from 5.6% due to the global economic downturn (2013-2018 (Dewan Energi

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Nasional, 2019). This situation increases energy consumption even though the ability of energy purchasing power is decreasing.

Apart from increasing consumption, the ability to provide fossil energy is also decreasing. The report of Dewan Energi Nasional (2021) shows that oil production since 2000 has shown a downward trend, from 329.3 million barrels (902 thousand bpd) in 2011 to approximately 259.2 million barrels (710.3 thousand bpd) in 2020. Old oil wells are no longer able to provide oil, while on the other hand, new wells are still limited in number, so they cannot produce the oil needed. Dependence on imported oil reaches 35% (Dewan Energi Nasional, 2019). Meanwhile, EIA (2021) notes that Indonesia still needs to improve its technology and basic infrastructure in several remote areas. Efforts have been made to improve the quality of old wells through better technology, but more needs to be done to improve the quality of these old wells (Direktorat Minyak dan Gas Bumi, 2020; Guitarra, 2022b). Technological limitations, however, also show that new wells still need to be fully implemented.

The government must import fossil energy due to the decreasing ability to provide fossil energy. In 2021, the Indonesian government imported 321 thousand barrels of gasoline, 52 thousand barrels of gasoil, 3 thousand barrels of fuel oil, and 0.2 thousand barrels of avgas in 2021 (Fadilah 2022; Setiawan 2022). Indonesia is the world's 21st largest importer of crude oil. In the same year, crude oil was Indonesia's 2nd most imported product. Indonesia imports crude oil mainly from Saudi Arabia ($1.97M), Nigeria ($1.93M), Australia ($596M), Angola ($396M), and Gabon ($270M) (OEC, 2021).

In line with Indonesia's commitment to support efforts to tackle climate change by signing the Paris Protocol in 2016, the government adopted a policy to reduce dependence on fossil energy through Presidential Decree Number 5 of 2006 concerning National Energy Policy. Through the Presidential Decree, the Indonesian government is committed to reducing the use of fossil energy, among others, oil to less than 20%, natural gas to 30%, coal to 33%, biofuel to 5%, and new renewable energy to more than 5%. Moving on from this policy, the Indonesian government continues to encourage the alternative energy mix, among others, through Government Regulation No. 79 of 2014, which mandates that the use of renewable energy must reach at least 23% by 2025 and 31% by 2050 in the energy mix.

However, the plan to achieve an energy mix of up to 23% by 2025 has been decelerated. The coal mix is increasing at the highest level. Director of the Center of Economics and Law Studies (Celios), Bhima Yudhistira said that the primary energy of power plants in Indonesia is still dominated by coal by 60.5 percent. While renewable power plants have only reached 12.3 percent (Rachma, 2022). IESR researcher, Handriyanti Pupitarini, sees the high coal mix as an obstacle to the 23% alternative energy mix target in 2025(Perdana 2022). Meanwhile, the share of renewable energy in Indonesia's primary power decreased by 11.5% in 2021 to 10.4% in 2022 (A. M. H. Putri, 2023). Institute for Essential Services Reform (IESR) considers this development to be a yellow light for the government to immediately overhaul its strategy in achieving the target of a 23% renewable energy mix by 2025 (IESR, 2023), and achieve Net Zero Emissions NZE) by 2060 or sooner (Adi, 2023).

IESR Executive Director Fabby Tumiwa said that the deceleration in achieving the energy mix target must be immediately overcome by accelerating the implementation of Presidential Regulation No. 112 of 2022 concerning the Acceleration of Renewable Energy Development for Electricity Supply by stopping the operation of coal-fired power plants and just energy transition partnerships/JETP) (Perdana, 2022). The IESR study found that closing old, inefficient power plants before 2025 would allow for a more significant influx of renewable energy. Unfortunately, the coal production target rises to 695 million tons in 2023 with projected domestic demand of 177 million tons and 518 million tons for export (Setiawan, 2023b). Unfortunately, the increase in coal production is caused by the increased domestic market, and global coal use will increase in 2022 to 1.2% or 8 billion tons (EIA, 2022). Thus, the closure of new coal mines can immediately threaten the national energy supply.

Commitments and several policies have been issued, but unfortunately, the energy transition did not happen as planned. This article will examine the background of Indonesia's deceleration energy transition and the issues surrounding the deceleration. Numerous studies have identified diverse obstacles to the adoption of renewable energy. One significant challenge is the lack of institutional regulations in the development of national and regional energy plans, which hinders the energy transition. These regulations play a crucial role in implementing the transition, but regional regulations often differ from national ones due to various factors, such as the need for stronger human resources (Fathoni, Setyowati, & Prest, 2021; Setyowati & Quist, 2022). Additionally, ongoing regulations on prices and subsidies for fossil energy make renewable energy increasingly unaffordable (Gu, 2024; Heffron et al., 2022; Shah, Raghoo, & Blechinger, 2024; Sumarno, Sihotang, & Prawiraatmadja, 2022). The need for more technology and subsidies for developing renewable energy also affects its competitiveness with fossil energy (Hosan et al., 2024). Moreover, there is a minimal investment in the development of renewable energy (Paradongan, Hakam, & Asekomeh, 2024; Saraji & Streimikiene, 2024). (Chipangamate & Nwaila, 2024) findings are intriguing as he observes that social issues, structural rigidity, energy security, and technological barriers can also influence energy transition. Similarly, Yang & Dodge (2024) highlight that low-risk and contract management capabilities could be a significant problem for the energy transition. In addition to policy issues, this article emphasizes the importance of considering energy justice, which involves human rights and the entire energy cycle, to understand the support required for the energy transition. The research utilizes qualitative methods for data collection, including library research and in-depth interviews.

2. Theoretical Framework

To call the non-achievement of alternative energy mix policies a failure is certainly not appropriate because the target of 23% is in 2025. However, the alternative energy mix will decrease to 10.4% in 2022 while coal consumption and exports increase. In that case, it is not wrong to call it a threat of failure of energy transition policies. Energy transition failure is when any energy policy does not meet local, national, and international energy and climate goals across energy lifecycle activities and where equitable outcomes are not provided (Sokołowski & Heffron, 2022).

To see the causes of failure or delay in the energy transition, Sokołowski and Heffron (2022) use the concept of energy justice to give a clear framework for considering the situation in which the collapse of the energy transition occurs. Energy justice is about applying human rights throughout the energy life cycle, from extraction, production, and operation (plus supply) to consumption to waste management (including decommissioning) (Heffron & McCauley, 2017).

The failure of the energy transition can be seen from 5 indicators in realizing energy justice: Procedural justice, Distributive justice, Restorative justice, Recognition justice, and Cosmopolitanism justice. Procedural justice bottlenecks often occur due to policy inconsistencies. Policy inconsistencies occur when a decision-maker's priorities change over time, causing conflicting preferences between different periods. The failure of the energy transition could result in existing policies being abandoned and new policies being introduced, creating confusion and chaos in the policy landscape. This inconsistency can come from policy reforms that disrupt the continuation of previous approaches and lead to adverse outcomes. Heffron and McCauley (2017) also undermine trust in policies and their implementation. They mention that inconsistent policies can also lead to real policy failures, especially when there are conflicting plans or sudden changes in action. In many hesitant policies, the government faces a dilemma between clean energy policies and people's capabilities. The government tends to choose coal as the primary source of electricity because it is cheaper. The absence of innovations related to solar power resulted in the price of electricity generated from alternative energy, such as solar energy, could not compete with the cost of electricity offered by the State Electricity Company (Perusahaan Listrik Negara / PLN) (Hamdi, 2019; Behuria, 2020). Not infrequently, energy policy is also strongly influenced by political conditions that make renewable energy projects unsustainable (Abdullahi et al.,2017) and also complicated financing that must be subject to price controls by the government and long tender processes (Lauranti, Eka, dan Djamhari, 2017).

Second, the inaction of the transition also occurred due to the need for proper implementation of distributive justice. Distributive justice occurs when a misguided organizational structure results in unequal distribution of benefits and burdens in society. This kind of structural problem results in formal policy failures, hindering the achievement of objectives due to organizational issues. Lack of coordination between government agencies can lead to the frenzy of the energy transition. Simamora (2019), and Kalpikajati dan Hermawan (2022) mark this as due to the absence of a legal umbrella at the same level as the Law. As a result, clashes between ministries responsible for climate and energy policy are frequent. In addition, regulatory inconsistencies and low capabilities at the implementation level can also be causes for the failure of the energy (Sekaringtias, Verrier, & Cronin, 2023; Setyowati & Quist, 2022). It can also result in inconsistent policies and unrealized benefits. A flawed system also hinders policy implementation.

Third, the failure of transition due to the obstruction of restorative justice occurs when there is no strong enough law enforcement for violators. Regarding energy transition, the state needs to be more strong in providing penalties for violators of energy transition policies. Several renewable energy projects fail due to the low quality of human resources, so control over the maintenance of renewable energy facilities is not guaranteed, and poor management (Adeyemo 2013; Gaurav, Chileshe, and Ma 2011). Non-compliance that is always tolerated usually occurs when countries rely instead on energy companies to realize policies (Sokołowski & Heffron, 2022). Industrial interests that diverge from global decarbonization place renewable energy development dependent on foreign technologies because it is more concerned with trading over solar energy components (Sivaram, 2018).

Differences in interest between regulators and regulated companies can lead to real failures in policy. In several countries, coal mining companies continue to get support through investment because of the very high demand from the country of origin of the investor. In Bangladesh, India, Indonesia, and Vietnam, coal companies continue to receive investment (Gallagher et al. 2021; Clark, Zucker, and Urpelainen, 2020) and support from the government by providing subsidies to coal companies (Sekaringtias et al., 2023).

Fourth, transition failures can occur when not involving everyone fairly, especially when moving to alternative energy or ignoring recognition of justice. The policy-making process should be transparent and involve many parties. They especially involved user communities or those whose land is affected by lateral energy facilities. Socialization, discussion, and agreement need to be carried out with all involved. Energy policies that fail because of the lack of recognition of justice risk causing real problems and conflicts. The community is reluctant to provide support because grid expansion policies, market formation, and transition schemes to renewable energy infrastructure do not accompany the change from coal energy to solar energy (Adachi et al., n.d.). The government also often ignores the socialization of stoned power so citizens do not feel a vital part of renewable energy management (Abdullahi et al., 2017) and are not confident in national policies (Upreti & Van Der Horst, 2004).

Energy policy failures can be caused by a lack of leaders or an understanding of science and facts. One example is climate change denial. In this regard, national energy policies must take into account international factors. The energy policy we choose not only impacts domestic conditions but also has a global impact, such as gas emissions. Having a cosmopolitan policy is important in realizing the energy transition. Thus, Cosmopolitan justice is

created in international dialogues and agreements on energy transition, climate change, and environmental issues. The country's decision to no longer support the arrangements is a genuine failure of the growth. In practice, support from international funding institutions such as the World Bank only supports projects that support climate change, not renewable energy development projects. Meanwhile, the bank's ability to provide low support causes NRE rates, and these sources of funds cannot be realized in projects (C. A. Putri, 2021). The absence of financial backing ultimately hinders the mastery of knowledge and technology as full of alternative energy (Abdullahi et al., 2017).

3. Methodology

This study uses a qualitative approach to explore the causes of delays in Indonesia's energy transition. Qualitative research is inherently inductive, with researchers delving into meanings and insights within specific contexts (Levitt, Motulsky, Wertz, Morrow, & Ponterotto, 2017; Strauss & Corbin, 2009). This approach encompasses various data collection and analysis techniques, utilizing purposive sampling and semi-structured, open-ended interviews (Dudwick, Kuehnast, Jones, & Woolcock, 2006; Gopaldas, 2016). The qualitative approach was chosen to understand more deeply the obstacles faced in the energy transition in Indonesia from several different points of view, namely bureaucrats and technocrats. The data collection methods used were in-depth interviews with policymakers and documentary studies. The government, state-owned energy utility companies, private investors, and international aid organizations are key stakeholders in Indonesia's energy transition (Ialnazov & Keeley, 2020). In-depth interviews were conducted with many bureaucrats, including officials from the Ministry of Foreign Affairs, Ministry of Energy, Resources, and Minerals and the Director General of New, Renewable Energy and Energy Conservation, technocrats represented by the Indonesian Renewable Energy Society / METI and the National Energy Council / DEN and several private energy companies. Some structured questions were prepared to explore participants' views and experiences regarding the causes of delays in the energy transition. Data from interviews will be analyzed with the support of data obtained from several documents on Indonesia's energy condition, needs and needs, technology owned, alternative energy potential, and policies produced by the Indonesian government. This in-depth interview explores stakeholders' views on Indonesia's current renewable energy policy challenges and their expectations for policies that can positively contribute to the energy transition.

Documentary study is data obtained from several documents, both policy documents and scientific literature. The literature analysis examines selected academic papers from Scopus using systematic keyword combinations and filters. The research also included direct Google search and media monitoring to gather local and national news on critical phrases, namely 'renewable energy', 'energy transition', 'renewable energy bill', and 'renewable energy presidential regulation'. Additionally, grey literature such as policy statements, conference proceedings, as well as government and other organizational reports and publications were explored and synthesized. The snowballing of bibliographies was also used and excluded documents not written in the English or Indonesian languages and those not publicly accessible. In addition, a brief analysis of the history of Indonesia's energy politics, including decentralization and domestic politics, was conducted.

4. Results and Discussions

The delay in the energy mix target indicating the failure of Indonesia's renewable energy began to be read when in 2022 it decreased to 10.4% and increased coal use. The delay in meeting the target indicates the failure of Indonesia's renewable energy project in 2025. Using Heffron's energy justice compliance indicator and Sowolaksi's argument about the framework for considering the failure of the energy transition, the 5 indicators are used to measure the condition of renewable energy projects in Indonesia.

4.1. The Barriesr to Procedural Justice

The delay in meeting the energy mix target occurred due to the government's failure to realize procedural justice. The government seems hesitant and needs to develop policies favoring the energy transition faster. The desire to provide cheap and affordable energy for the community is a wedge for the Indonesian government. The commitment to completely abandon coal as an energy source needs to be visible in the realization of energy policy. Although future energy policy is directed at the use of renewable energy, the share of fossil energy, especially oil and gas, will remain dominant. The situation can be seen from the future projection of Indonesia's primary energy mix. The share of oil and gas in 2025 and 2050 is estimated at 49% and 39% of total national energy demand based on the Business-as-Usual scenario or 45% and 44%, respectively, based on the Current Policy scenario (Setyono & Kiono, 2021). On the other hand, technology and financing issues are the biggest obstacles for the government to produce policies that favor renewable energy. Coal is still considered the cheapest source of electrical energy compared to other fossil fuels or most renewables by policymakers and power generation companies (Adzikri, Notosudjono, & Suhendi, 2017; Arinaldo & Adiatma, 2019).

The policy regarding increasing the availability of renewable energy has been started since 2007 through Law No. 30 of 2007 concerning energy. Through Government Regulation No. 79 of 2014, the Indonesian government has also declared the use of renewable energy by 23 percent by 2025 and 31 percent by 2050 in the energy mix. Presidential Regulation Number 22 of 2017 contains energy diversification and energy conservation translated into medium-term (2015-2025) and long-term (2050) primary energy mix targets. However, this policy needs to be

followed by supportive policies, such as policies regarding the availability of technology for renewable energy, which is still quite expensive. The ease of investment has yet to be seen with the unaccommodated interests of investors, such as certainty of security and sustainability of investment, the comfort of digitizing licensing, ease of business establishment, tax deductions, etc., (C. A. Putri, 2021) as well as adequate data (Kalpikajati and Hermawan 2022). Meanwhile, complicated bureaucracy has an impact on investor concerns about investing in the NRE sector in Indonesia, significantly when regulations often change (Lauranti & Eka, 2017). This complexity can be seen in the decline in the realization of renewable energy investment only to 1.51 billion US dollars from the original target of 2.04 billion US dollars (Guitarra 2022).

Meanwhile, the Renewable Energy Bill itself has yet to be immediately passed because several issues in it still need to be debated. One of the objections to several parties is that the government still needs to set which renewable energy is a priority (Sekaringtias et al., 2023). Fabby Tumiwa, Executive Director of IESR, criticized that the NRE bill was influenced by the interests of the status quo, namely the coal and nuclear industries, which sneaked in using the definition of new energy. The implication is that this bill does not focus on developing renewable energy, which needs a political push and a more robust regulatory framework (IESR, 2022). The interest can be seen in the 40 articles in the draft law using the term used to manage renewable sources, inseparable from conventional energy management. He started with planning, permits, implementation, control, and others (Kalpikajati and Hermawan 2022). Chairman of the Indonesia Center for Renewable Energy Studies (ICRES) Surya Darma said the bill has shifted because it no longer focuses on renewable energy but on nuclear (Primantoro, 2023).

4.2. The Barriers to Distributive Justice

Fair distribution and coordination between institutions related to energy transition is a problem that often arises and becomes an obstacle for Indonesia's energy transition. The absence of specific and systematic laws regulating renewable energy has made coordination between institutions one of Indonesia's biggest challenges in the energy transition. Kalpikajati and Hermawan (2022) see that Indonesia needs a legal umbrella with the force of Law that provides special regulations on comprehensive renewable energy and will later become the legal basis and reference for derivative laws and regulations. This situation creates overlapping conditions, which, in practice, will slow down the pace of acceleration of renewable energy management. As a result, clashes between ministries responsible for climate and energy policy are frequent. In addition, regulatory inconsistencies and low capabilities at the implementation level can also be causes for the failure of the energy (Sekaringtias et al., 2023; Setyowati & Quist, 2022).

Sekaringtias, Verrier, and Cronin (2023) see that the issue of energy transition occurs in the policy circle; first, the bodies related to renewable energy conflict with each other in renewable energy policy. The conflict resulted in not maximizing New Renewable energy / NRE investment so that funds for developing NRE technology increased. For example, in the case of bioethanol development in Indonesia, although the government has encouraged renewable energy since many years ago, it has yet to receive enough support from both the government and investors. Indonesia's bioethanol capacity is good and prospective to be developed (Arlianti, 2018; Siahaan, Dolant, Pabeta, & Murwanto, 2013). Still, bioethanol development is improved with good regulatory, investment, and market support (Saleh Abdurrahman (Member of BPH Migas/Downstream Oil and Gas Regulatory Agency). 2023. In-depth Interview). Meanwhile, domestically, support for research on the economic costs of bioethanol as a bio-gasoline ingredient has yet to be carried out (Andika (EBTKE) 2023. In-depth Interview). Similarly, the policy to reduce fossil energy consumption is also met with coal subsidy policies that continue to be given considering the coal market that tends to increase in several post-covid such as China and India (IEA, 2020).

The increasing price of NRE technology development, which impacts the cost of NRE energy output, further pressures PLN to continue using coal as the main source of electricity. So far, technology development policies have not been able to be in line with market conditions. Indonesia already developed turbines to meet solar and wind power needs. However, only at specific sizes have they yet to be able to meet market demand; thus, the price is still costly. Similarly, some supporting components must still be imported abroad (Andika (METI). 2023. In-depth Interview). According to Notosudjono (2006), most of the components used in Solar Home Systems can already be produced domestically. However, the challenge is that the module is the main component that must still be imported from abroad. The same applies to geothermal energy, where we depend heavily on imported products. The challenge is also reinforced by findings from the Indonesian Electricity Society, which notes that around 60% of the Steam Power Plant components still have to be imported. The level of dependence on imports applies not only to power plants but also to the energy transmission and distribution sector (Satrianegara, 2019).

Meanwhile, the status of wind energy development in Indonesia is still in the pilot stage and has yet to reach the commercial stage. The government has commissioned Lembaga Penerbangan dan Antariksa Nasional / LAPAN (the National Institute of Aeronautics and Space) to develop wind energy technology. LAPAN has conducted several pilot projects in East Nusa Tenggara, West Nusa Tenggara, Jogjakarta, and Jepara. However, in terms of ocean wave energy, the development still needs to reach a sufficient level. A few years ago, Badan Pengkajian dan Penerapan Teknologi / BPPT (the Agency for the Assessment and Application of Technology) created an Ocean Thermal Energy Conversion (OTEC) Pilot Project in Bali with a capacity of 100 kW. Unfortunately, the project faces the risk of stalling as its costs are still very high despite the positive results.

Second, policy situations outside the line with each other and even contradictory encourage reduced confidence in the RE market. Some NRE projects do not get public support because the government seems half-hearted in

making them. When the government urged people to switch to electric cars and motorcycles, the government needed to build more electric filling stations in several places and gasoline stations scattered everywhere. The price of electric cars and motorbikes, which are also expensive, makes people tend to think again about buying motorbikes or electric vehicles. Even the conversion of electric motorcycles launched by the government needed a better response from the public (Setiawan, 2023a; Umah, 2023).

The disagreement between Badan Pemeriksa Keuangan (BPK) / the Audit Board and Kementerian Energi dan Sumber Daya Mineral (KESDM) /the Ministry of Energy and Mineral Resources (MEMR) regarding the effectiveness of the Renewable Energy (ET) implementation policy in Indonesia is an example of a dispute between government agencies. BPK, in 2019, found some problems that the Ministry of Energy and Mineral Resources still needs to resolve—first, an examination of the management and non-tax state revenue of oil and gas in 2019. In the report, BPK provides many notes ranging from tariff determination and review of protracted natural gas transportation rates and the application of transportation rates that have not been under the provisions to applications to the Directorate of Fuel and Directorate of Natural Gas that have not been intended. BPK said it happens because the validity and reliability of the data in the application are still inadequate and not updated. Second, administrative sanctions from agrofuel activities amounted to IDR 821.88 billion in 2018 and potential non-payment of IDR 400.17 billion in 2019 and 2020. The Minister of Energy and Mineral Resources claimed that this was caused by biodiesel entrepreneurs who refused to pay due to distribution and transportation constraints at the factory. Third, BPK still finds problems with permits where the disturbed area in the forest area for mining activities and the infrastructure suggestions for the support of 3 companies have not been supported by Ijin Pinjam Pakai Kawasan Hutan (IPPKH) / the Forest Area Borrowing Permit covering an area of 1,021.75 ha with the potential for State Revenue for Forest Area Use Tax worth Rp. 82.46 billion. Similarly, revenues from 10 coal companies are still considered less than Rp. 205.38 billion. Fourth, BPK assesses that KESDM's performance in the construction of city gas networks and gas filling stations in 2015-2020 does not have a clear and measurable roadmap for monitoring (Hamdani, 2021); Purnama, 2021).

The third circle is the complexity of regulations at the implementation level, such as licensing and investment processes, which impacts reluctance to develop RE facilities. Improper restructuring also weakens renewable energy projects, such as changing the management structure of renewable energy facilities at the district to the provincial level, making it easier for people to get services from renewable energy facilities. Sambodo et al. (2022) research in Indonesia shows that the biggest obstacle to renewable energy support is the need for more central government's understanding of local conditions, so policy formulation related to renewable energy is often unsuitable. The withdrawal of renewable energy facilities at the provincial level ultimately makes it difficult for district governments to provide services for their communities. Local governments can only give the price of solar panels and solar light bulbs needed by residents if they are now under their authority. Loy, Rachmawati, and Karolus (2022) research in East Nusa Tenggara found that several solar light facilities were no longer available when the regional bureaucracy no longer supported them; as a result, the community itself began to be reluctant to use solar lights even though they did not have to pay for electricity to PLN.

4.3. The Barriers to Restorative Justice

Justice for society is often neglected in the energy transition, especially for developing countries with different political and geographical conditions. The mission of renewable energy to save the environment often becomes a new trap for developing countries in terms of international trade. Sivaram (2018) suspects this by warning that solar power industry companies or their political allies could become a new political force due to the rise of solar power. Several developed countries, including America, which supports solar energy and technology, control international trade in solar technology by inhibiting free trade in solar energy components and making the price more expensive. As a result, energy inequality is widespread to the extent that people in developing countries cannot access renewable energy at affordable prices (Yao et al., 2020).

The absence of sufficient control over planning documents and implementation of renewable energy facilities has resulted in many projects failing. Even though adequate funds have been provided, the auction for renewable energy power plants has yet to obtain any partners. Fabby Tumiwa, Director of IESR, said low-quality documents and human resources caused this. This situation is increasingly complex, with complicated bureaucracy regarding maintenance management and maintenance funds that do not exist at the regional government level (Primadhyta, 2018). The solar electricity research in Ngada also found the same situation. The quality of community resources could have improved; they still need assistance maintaining facilities. The economic inability of the community and local government adds to the complexity of sustaining solar electricity in Ngada (Loy et al., 2022).

In Indonesia, the government canceled plans to limit coal production in response to lobbying by coal permit owners who had included costs in construction feasibility studies (Clark et al., 2020), seeing this data as an indicator that production reductions would not increase soon. 40% of Indonesia's coal capacity is currently under construction (data as of 2020). The policy bias towards coal is the impact of industrial expansion in several industrialized countries that still need coal. While most OECD banking institutions have limited their investments in coal, China has created opportunities as an attractive lender to developing countries seeking to add new coal-fired power generation capacity. With its willingness to continue funding coal-fired power plants, China is exerting competitive pressure on the system, arguably delaying the convergence of stringent environmental standards in development aid (Gallagher et al., 2021; Mori, 2018). The dependence on financing that has an impact on the direction of the energy transition is also acknowledged by Peimani (2018) in the ADBI report. In the interview, Noam (Noam Lazuardi (Foreign Affairs staff).

2023. Indepth Invertiew) also admitted that there was pressure from other countries for Indonesia to buy their technology while pressuring Indonesia to reduce its use of coal.

4.4. The Barriers to Recognition of Justice

Community involvement is a crucial point in renewable energy sustainability. After all, they are energy users who must understand how renewable energy works and the consequences they have to bear. Technology that is new and far different from what they have been using can be an obstacle when people need more information. Concerns over impacts often limit their use of renewable energy. Thus, people tend to be reluctant to support and do not believe in alternative energy projects (Abdullahi et al., 2017; Upreti & Van Der Horst, 2004).

In Indonesia, renewable energy projects are completed using conventional top-down governance approaches commonly used in infrastructure development. The central government leads the entire process and hands over the completed renewable energy power plant to the local government as the final step in the project's development. The project aims to ensure equitable energy access for excluded communities. However, this approach needs to pay more attention to the role of multi-level stakeholders, such as local and local governments, civic groups, and civil society. Renewable energy generation distributed in small quantities does not fit into the operational structure of large-scale conventional energy systems, where the separation of decision-making, project execution, and O&M does not impact infrastructure sustainability. Thus, the central government is still dominant in the entire development process. The situation hinders local community participation and creates obstacles to the achievement of program objectives (Ha and Kumar 2021).

Unfortunately, the NRE Bill initiated by the government has not expressly included public participation and access to it. Research by Putri, Arsalan, and Mariah (2022) shows that governments must clarify what "entitled people" means in public participation. Public participation must also be followed by transparency and access to information, as well as what information must be known by the public. Thus, an energy transition outlined in investment policy will be more readily accepted by the public. At the same time, Kalpikajati and Hermawan's (2022) Chapter VI on the Provision and Utilisation of Article 20 - Article 26 encourages the provision of renewable energy by maximizing the role of Business Entities. In other articles, it needs to be explained more comprehensively about how people's access to energy and energy sources is related from a physical perspective. The scheme offered needs to be clarified so that people can enjoy renewable energy at an affordable cost or cost.

The community's reluctance to support renewable energy projects is shown by not being willing to use renewable energy facilities and not cooperating in the construction of renewable energy facilities. The unwillingness of the community can impact network expansion policies and market formation. Community resistance to relinquishing ownership of their land as land for renewable energy development often occurs. The opposition happened because residents rejected the construction of renewable energy facilities at the Batang PLTU in Central Java, claims over land ownership, price disputes, environmental pollution issues, and the emergence of land speculators (Siahaan et al., 2013). The difficulty of land acquisition and communication with residents also occurs in some geothermal projects in East Nusa Tenggara and West Nusa Tenggara (Candra, 2016).

Community mobilization to support renewable energy projects does not need to happen when they are involved in determining what renewable energy can be developed in their area. In addition to the need to share enough information with the community, community involvement can make them feel they have renewable energy facilities. What happened in Ngada, East Nusa Tenggara, is a concrete example of when residents are not involved in the planning, installation, and maintenance of rooftop solar electricity (Loy et al., 2022). As a result, they use electricity excessively and need to participate in maintaining existing facilities properly.

4.5. The Barriers to Cosmopolitan Policy

Delays in energy transition can occur due to domestic policies outside the direction of international energy transition policies. Since the Kyoto Protocol was signed in 2005, the energy transition has become part of international policy to deal with climate change. Similarly, the Paris Agreement 2015 encouraged countries to reduce carbon dioxide and greenhouse gas emissions to limit global warming. According to the OECD, governments worldwide are encouraged to phase out coal use until 2040 (Secretariat of the High-level Dialogue on Energy 2021). The issue of energy transition then becomes an international discourse that is broad enough to encourage every country to commit to reducing fossil energy and switching to renewable energy.

A green financing platform is another step aimed at supporting the energy transition. The Asian Development Bank began implementing a green financing platform to encourage countries to build projects related to clean energy, emission reduction, and green transportation for small and medium enterprises (Mehta & Andrich, 2021). Likewise, the Global Environment Facility provides guarantees to the EBRD (European Bank for Reconstruction and Development through concessional interest loans to boost energy efficiency and reduce greenhouse gas emissions in the logistics sector and guarantees and debts for land restoration (GEF, n.d.)

The UN Secretary-General also urged the transition by issuing five critical actions as a concrete step of energy transition that every country must carry out. This insistence was accompanied by a political statement, "Because without renewables, there can be no future" in 2021. In this action, the UN Secretary-General urged: 1. Make renewable energy technology a global public good. 2. Improve global access to components and raw materials; 3. Level the playing field for renewable energy technologies; 4. Shift energy subsidies from fossil fuels to renewable energy, and 5—triple investments in renewables (United Nations n.d.).

In Indonesia, the commitment to energy transition is shown by Presidential Regulation 112 of 2022 concerning the Acceleration of Renewable Energy Development for Electricity Supply. Efforts to realize the regulation are recognized through financing for faster shutdown of coal power plants to switch to renewable energy sources. Second, is funding to build new renewable energy because demand will continue growing. Third, the energy transition mechanism must pay attention to the workforce involved because it will impact income loss. The three steps of the Minister of Finance emphasize the need for domestic and global funding to help the State Budget achieve these targets (Sustainable Finance Indonesia, 2022).

However, these efforts have not received a positive response from many state leaders, including Indonesia. Despite the commitment, world energy consumption data still shows the opposite, where oil and coal consumption continue to increase until 2022, as shown in Figure 1.

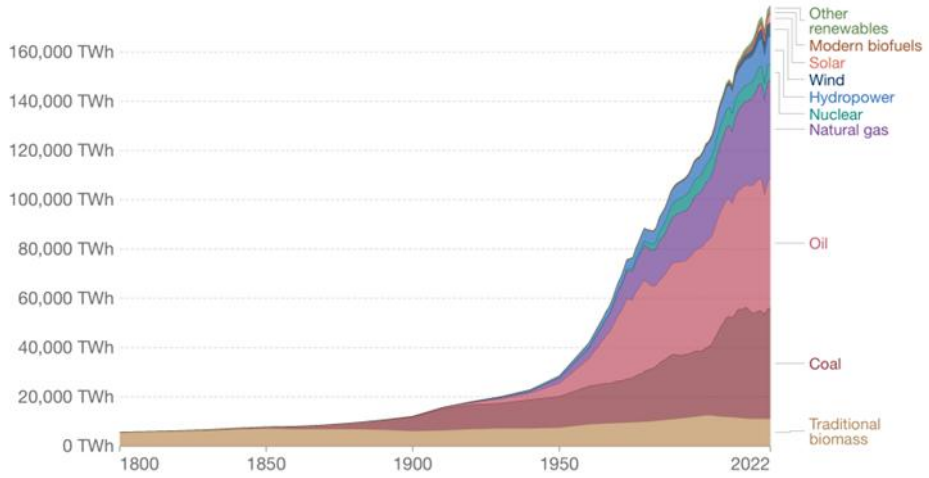

Figure. 1. Global Primary Energy Consumption by Source

Source: Our World in Data. 2023. https://ourworldindata.org/grapher/global-energy-substitution.

Indonesia itself recorded an increase in coal energy exports and domestic coal use. In 2022, Indonesia produced 687 million tons of coal and exported 494 million tons. Despite an export ban at the beginning of 2022 that caused some miners to hold back production and heavy rains that disrupted operations, output in 2022 exceeded the target of 663 million tons. Domestically, Indonesia will consume 177 million tons of coal in 2023 (Munthe & Nangoy, 2023).

In an interview, Saleh claimed that the energy transition could not be done immediately because, in reality, soft loans related to renewable energy have yet to be realized. Meanwhile, the growth requires a lot of funds related to technology and also the ability of renewable energy to replace all fossil energy (Saleh Abdurrahman (Member of the BPH Migas/Downstream Oil and Gas Regulatory Agency). 2023. In-depth Interview). Andika also believes that Indonesia is not yet fully ready because of the economic problems of technology which is still very expensive (Andika (Member Masyarakat Energi Terbarukan Indonesia/METI). 2023. In-depth Interview). Widhi (2023) confirmed that Indonesia has only mastered medium and small-scale technology. Even though the market is getting wider and technology prices are decreasing, currently there is still an overrun (Widhi (EBTKE staff). 2023. In-depth Interview). Indonesia's capability in technology and funding for renewable energy development projects still needs to be improved. In the Indonesia Sustainable Finance Outlook 2023 report by the Institute for Essential Services Reform (October 2022 in 2016-2020), financial institutions in Indonesia, including the four largest commercial banks, are still funding the development of the fossil energy sector, especially coal worth a total of IDR 216.6 trillion. The largest fund support providers are Bank Rakyat Indonesia (BRI), Rp 98.91 trillion; Bank Mandiri, Rp 83.14 trillion; Bank Negara Indonesia, Rp 30.02 trillion; and Bank Central Asia (BCA), Rp 4.53 trillion. This situation can be understood as a condition that has yet to be able to fully support the development needs of NRE projects because it means that fossil energy still receives a large enough injection of funds from the government (IESR 2023).

From the perspective of fund supporters, the situation may be more or less understandable, considering that the NRE protection has not shown certainty and efficiency. The considerable risk in the EBT project makes banks hesitant to provide loans. IESR sees that Peraturan Otoritas Jasa Keuangan /POJK (the Financial Services Authority Regulation) Number 51 of 2017 concerning the Application of Sustainable Finance for Financial Service Institutions, Issuers, and Public Companies needs to be more vital in providing funds for fossil energy development. The lack of solid regulations and external factors in unpredictable market conditions make financial institutions hesitant to finance the sustainable sector optimally (Theodora, 2022).

Not only in the funding sector that requires support from countries and international organizations, but NRE technology is also still a big challenge for Indonesia because the government cannot provide all components

domestically. The need for NRE components still primarily relies on imports (Fitrady, 2021; Notosudjono, 2006). Indonesia still urgently needs the transfer of renewable energy technology to achieve renewable energy independence and meet the energy transition target in 2030. Unfortunately, the policy to support energy independence and meet the energy transition has not been realized until now. The House of Representatives still needs to approve The New Energy and Renewable Energy Bill to clarify the direction of renewable energy development since it was submitted in 2019.

5. Conclusion

Although it cannot be called a failure, the renewable energy mix target of 23% in 2025 seems complicated to achieve, considering that in 2023, the renewable energy mix fell to 10.4%. For Heffron, the fulfillment of energy in a country must not only meet the energy trilemma set by the World Energy Council in 2010 which includes energy security, energy access, and environmental sustainability but also must be able to be energy justice. Together with Sokowloski, he explained that failure to fulfill full energy justice can explain the failure of energy policy.

The absence of Procedural justice, Distributive justice, Restorative justice, Recognition justice, and Cosmopolitanism justice can explain the deceleration of Indonesia's energy mix. The problems are so complex in renewable energy from the issue of the government's hesitation in producing laws related to renewable energy, poor coordination between related institutions, misalignment of energy transition goals between countries, institutions, and associated companies, lack of public opportunities in energy transition, and inability to go hand in hand with energy transition goals. External justice is realized if the state can enact laws and regulations that recognize the five energy justices.

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