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The Legal Construction of New and Renewable Energy in Indonesia Towards Net Zero Emissions: A Normative Study on the Policy Development and Utilisation of Renewable Energy in New Zealand

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Abstract

The increase in greenhouse gas concentrations and carbon emissions in the atmosphere caused by non-renewable energy sources, known as fossil fuels, has resulted in global warming. Efforts to mitigate such increases involve the development and utilization of non-fossil energy consisting of new and renewable energy. However, in optimizing these efforts, the Indonesian government lacks a comprehensive legal framework to regulate them. This research is a normative juridical study using a statutory approach, with descriptive methods and prescriptive analysis. The results show that the key to New Zealand's success in developing and utilizing non-fossil energy is the existence of special regulations governing it. Given that Indonesia's non-fossil energy regulations are scattered in several regulations, it is necessary to construct a law that comprehensively regulates them within a single law. This step aims to provide Indonesia with a comprehensive legal framework related to the development and utilization of non-fossil energy.

Keywords: Legal Construction, Indonesia, New and Renewable Energy, Net Zero Emission, New Zealand

1. Introduction

Energy is crucial for human life as it is needed to produce light, heat, and movement necessary for various human activities. The currently available sources of energy are fossil energy sources, also known as non-renewable energy sources, and non-fossil energy sources, which consist of renewable energy sources and new energy sources. For thousands of years, humanity has relied on fossil energy, including using fossil energy as fuel for electricity generation. The use of fossil energy causes global warming by increasing the accumulation of carbon pollutants from fossils in the atmosphere, which traps the long-wave radiation from the sun (infrared or heat waves) emitted by the earth, preventing it from being released into space and resulting in rising atmospheric temperatures (A.Handoyo, 2021). To prevent the increasing concentration of greenhouse gases (GHGs) and carbon emissions in the atmosphere, the Indonesian government must transition from using fossil energy sources to non-fossil energy sources. Fossil energy significantly contributes to the rising concentration of GHGs and carbon emissions in the

atmosphere (Causes of Climate Change) which is essential for achieving carbon dioxide (CO₂) neutrality, known as Net Zero Emissions.

The increased concentration of GHGs and carbon emissions in the atmosphere results in global warming, an event where the average temperature of the earth's atmosphere, seas, and land rises, impacting the earth's surface and humanity (Bernadinus, 2009). According to the 2023 report by the Intergovernmental Panel on Climate Change, the earth's climate system is changing due to global warming, causing increased land, ocean, and atmospheric temperatures, extensive and rapid changes in the atmosphere, oceans, cryosphere, and biosphere, rising average global rainfall, altered snow cover regions, melting polar ice, and rising average sea levels. Climate change and global warming severely affect life on earth, prompting the international community, including Indonesia, to address these issues collectively. The Indonesian government's efforts to prevent increasing GHG concentrations and carbon emissions in the atmosphere include ratifying climate change conventions into laws, joining the G20 or Group of Twenty, adapting cultures that support energy transition, and, since 2018, drafting new and renewable energy laws to serve as a legal framework for transitioning from fossil energy to non-fossil energy.

Indonesia has significant potential for non-fossil energy such as solar, wind, and geothermal energy, which can be utilised as energy sources. However, there are many challenges in developing and using these energy sources, including technical, economic, and policy aspects, unattractive renewable energy electricity purchase prices for developers, limited fiscal incentives, and frequently changing policies, which hinder the utilisation of non-fossil energy in Indonesia (Dewan Energi Nasional Indonesia, 2023). This situation might hinder Indonesia's ability to meet its commitment under the Paris Agreement to achieve Net Zero Emissions by 2060 or sooner, as stated several times by the Indonesian government to the United Nations Framework Convention on Climate Change (UNFCCC) in the updated Nationally Determined Contribution (NDC) document, which outlines GHG emission reduction targets. Moreover, Indonesia's domestic oil production will deplete in nine years without new reserve discoveries, natural gas and coal production are projected to run out in twenty-two (22) and sixty-five (65) years respectively, according to the Minister of Energy and Mineral Resources, Arifin Tasrif. Therefore, he stated that energy transition is imperative as Indonesia has abundant untapped new and renewable energy (NRE) (Verda, 2023). To maximise the utilisation of non-fossil energy to replace fossil energy, regulatory availability for non-fossil energy utilisation is necessary.

The realisation of *ius constituendum* for non-fossil energy utilisation requires in-depth scientific study. Previous research on new and renewable energy laws has been conducted by researchers like Rosyid Ridlo Al Hakim and colleagues, producing the study "Preliminary Study of Juridical Aspects of Renewable Energy Draft Law In Indonesia: An Academic Perspective" (Al Hakim, et al., 2024), Researchers Abel Parvez and colleagues conducted the study "Reformulation of the New Renewable Energy Bill as a Transition Towards Environmentally Friendly Energy Based on Green Legislation" (Parvez, et al., 2023), Researchers Bahrayn Majma and Fatma Ulfatun Najicha conducted the study "The Urgency of Enacting the New and Renewable Energy Bill (RUU EBT) for Sustainable National Energy Management" (Majma, 2024). The first study criticises the juridical aspects of the New and Renewable Energy Draft Law, noting the suboptimal regulation of renewable energy sources in Indonesia while still including new energy in the New and Renewable Energy Draft Law. The second study finds that the New and Renewable Energy Draft Law does not align with the green legislation concept based on Article 28 H (1) and Article 33 (4) of the 1945 Constitution and the Paris Agreement's mandate by including new energy in the Draft Law, allowing non-renewable new energy like coal and nuclear, which can degrade environmental quality in water, soil, air, and human health. The third study discusses the urgency of enacting the New and Renewable Energy Bill, providing a crucial legal foundation for renewable energy development, thus supporting economic development and creating a clean and healthy environment for future generations.

Based on the researchers' studies, it is identified that there is no specific regulation on the development and utilisation of new and renewable energy, resulting in the absence of a dedicated legal framework. This situation arises due to the scattered regulations on developing and utilising new and renewable energy, leading to poorly structured regulations. Law plays a vital role in regulating the energy sector to meet public needs, functioning as a tool to encourage energy transition from fossil energy sources to non-fossil energy sources. Therefore, this research differs from previous studies by conducting normative legal research on renewable energy regulations in

New Zealand. The country has successfully transitioned energy through specific policies for non-fossil energy development and utilisation, achieving one of the highest proportions of non-renewable energy usage globally (60% fossil energy and 40% non-fossil energy). New Zealand's success is supported by abundant renewable energy like hydropower and geothermal energy and favourable regulations.

Reflecting on New Zealand's practices, the researchers recognise that the lack of specific regulations for non-fossil energy development and utilisation in Indonesia can hinder progress in this sector. Thus, the identified issue is the effort to provide specific regulations for new and renewable energy development and utilisation in Indonesia by formulating new laws through legal construction by reformulating the current draft law on new and renewable energy, currently being prepared by the Indonesian government. The aim is for the development and utilisation of non-fossil energy in Indonesia towards Net Zero Emissions to be comprehensively regulated in a single law.

2. Method

This study is a normative juridical research with a statutory approach. The study material is analysed using a descriptive method and provides prescriptive argumentation.

3. Results and Discussion

3.1. Construction of New and Renewable Energy Law Through the Reformulation of the New and Renewable Energy Bill (RUU EBT)

Non-fossil energy in Indonesia comprises new and renewable energy, which originates from sources that can be indefinitely renewed (Setyono, 2019). Based on the Republic of Indonesia Law Number 30 of 2007 on Energy, new energy sources are produced through new technologies from both renewable and non-renewable energy sources, such as nuclear, hydrogen, coal bed methane, liquefied coal, and gasified coal. Renewable energy sources are generated from sustainable energy resources if managed properly, including geothermal, wind, bioenergy, solar radiation, water flow and waterfalls, as well as ocean movements and temperature differences (Article 1, paragraphs (4), (6), (7), and (8) of Law No. 30 of 2007 concerning Energy). With its strategic astronomical and geographical location, Indonesia is endowed with abundant renewable and non-renewable energy sources. Astronomically, Indonesia lies between 6° North Latitude - 11° South Latitude and 95° East Longitude - 141° East Longitude, positioning it in the tropical zone with year-round sunlight and high rainfall, which fosters abundant renewable energy sources such as solar, water, and wind. Geologically, Indonesia's location on the convergence of three tectonic plates—Eurasian, Pacific, and Indo-Australian—results in numerous volcanoes, contributing to a diverse range of energy and mineral resources, including geothermal and various non-renewable energy sources like coal, oil, and gas.

Historically, Indonesia was a leading exporter of fossil energy, rich in coal, oil, and gas (Nugroho, 2021). However, this role has diminished due to the depletion of fossil energy supplies and global pressures against the negative impacts of fossil energy usage, such as increased greenhouse gas emissions (pollution), global warming, climate change, health issues, ecosystem damage, and depletion of natural resources.

According to the 2022 performance report from the Directorate General of Oil and Gas, there is a declining trend in oil and gas production in Indonesia due to natural reservoir performance decline and the lack of new major reserves to replace the depleted ones. Operational challenges, particularly from major oil and gas producers, have also led to lower-than-expected production outcomes (Kementerian Energi Dan Sumber Daya Mineral, 2021). With rising energy consumption and dwindling fossil energy availability in recent years, the utilisation and development of renewable energy is a necessary step for Indonesia to mitigate and adapt to climate change, supported by its abundant renewable energy sources (Erdiwansyah, 2020). Regulations on non-fossil energy remain poorly organised and scattered across various laws, including Law Number 30 of 2007 on Energy, Law Number 30 of 2009 on Electricity as amended by Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation, and Law Number 21 of 2014 on Geothermal Energy as amended by Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation. Supporting the utilisation and development of non-fossil energy,

several implementing regulations exist, such as Government Regulation Number 79 of 2014 on National Energy Policy, Presidential Regulation Number 22 of 2017 on General National Energy Plan, and Presidential Regulation Number 112 of 2022 on Accelerating the Development of Renewable Energy for Electricity Supply. Therefore, the Indonesian government needs to promptly enact a specific law governing the utilisation and development of non-fossil energy. This step is expected to provide a strong legal foundation for delivering justice, legal certainty, and benefits to the community.

In line with this, the Indonesian government began by preparing an academic basis through the academic manuscript of the New and Renewable Energy Bill in 2018, which has undergone several revisions, with the latest in 2022. The discussion on the New and Renewable Energy Bill, which has been revised six times since 2018, culminated in the latest version dated 30 May 2022. The final version of the New and Renewable Energy Bill (RUU EBT) dated 30 May 2022 consists of fourteen chapters and sixty-two articles. The scope of regulation in RUU EBT includes a) control; b) transition and roadmap; c) new energy sources and renewable energy sources; d) licensing and business operations of new and renewable energy; e) provision and utilisation of new and renewable energy; f) environmental management and occupational health and safety; g) research and development; h) pricing of new and renewable energy; i) incentives; j) new and renewable energy funds; k) guidance and supervision; and l) public participation.

The control scope referred to in RUU EBT means that new energy sources and renewable energy sources, which are natural resources crucial to public welfare, are controlled by the state and utilised for the maximum benefit of the people, implemented through policies, regulations, management, administration, and supervision (Article 5 of the Draft Law on New and Renewable Energy). The transition and roadmap in RUU EBT (Article 5 to 8 of the Draft Law on New and Renewable Energy) refer to developing new and renewable energy to replace non-renewable energy through a gradual, measurable, rational, and sustainable energy transition over a certain period, considering the supply and demand for electricity and the readiness of the national electricity system through the construction of new and renewable energy power plants, conversion and/or utilisation of advanced technology to reduce carbon emissions from non-renewable energy power plants. The regulation on the domestic market obligation (DMO) mechanism for coal sales to meet domestic needs is also included in the RUU EBT concerning the energy transition. The roadmap for developing new and renewable energy aligns with national energy policy, encouraging the transportation, industrial, and household sectors still based on fossil fuels to gradually switch to electric-based equipment to reduce carbon emissions.

The definition of new energy sources in the RUU EBT (Articles 9 of the Draft Law on New and Renewable Energy) includes a) nuclear; b) hydrogen; c) coal bed methane; d) coal liquefaction; e) coal gasification; and f) other new energy sources. Specific regulations for nuclear energy are included in the RUU EBT (Articles 10 of the Draft Law on New and Renewable Energy). Meanwhile, renewable energy sources in the RUU EBT (Articles 30 of the Draft Law on New and Renewable Energy) comprise a) geothermal; b) wind; c) biomass; d) solar radiation; e) water flow and waterfalls; f) waste; g) agricultural and plantation waste; h) livestock waste; i) ocean movements and temperature differences; and j) other renewable energy sources. Additional regulations for geothermal, biomass, and waste are stipulated in separate laws, and other renewable energy sources classified as renewable through technological advancements are regulated by Government Regulation.

Regarding licensing and business operations for new energy in the RUU EBT (Articles 16 of the Draft Law on New and Renewable Energy) businesses engaged in new energy must obtain licensing from the central government. For renewable energy, licensing can be granted by the Central Government and/or Regional Governments according to their authority (Articles 32 of the Draft Law on New and Renewable Energy). Business operations of new and renewable energy are used for electricity generation, supporting industrial activities, transportation, and other activities, prioritising domestic products and potentials, such as local labour, technology, materials, and components (Articles 31 to 40 of the Draft Law on New and Renewable Energy). For the provision and utilisation of both new and renewable energy (Articles 25 to 29 of the Draft Law on New and Renewable Energy) the RUU EBT stipulates that the provision of such energy is prioritised in underdeveloped, remote, and rural areas using local new or renewable energy sources (Articles 41 to 47 of the Draft Law on New and Renewable Energy). The central government may assign state-owned electricity companies, state-owned oil and gas

companies, or private enterprises to purchase electricity or fuel produced from new or renewable energy, providing incentives.

Environmental management and occupational health and safety are among the topics regulated in the RUU EBT (Articles 48 to 49 of the Draft Law on New and Renewable Energy) to ensure that businesses managing new and renewable energy maintain environmental management standards and quality as well as occupational health and safety, as further regulated by Government Regulation. Regarding research and development of new and renewable energy (Articles 50 to 52 of the Draft Law on New and Renewable Energy), the Indonesian government aims for the implementation of research and development activities in the RUU EBT. To support this, the Central and Regional Governments, according to their authority, must facilitate research and development of new and renewable energy through funding, procurement, improvement, and addition of infrastructure, enhancement of human resources, application of technology, and licensing for research, either independently or in cooperation with third parties, cross-sectors, and international entities.

Pricing for new and renewable energy in the RUU EBT (Articles 53 to 54 of the Draft Law on New and Renewable Energy) is determined by agreement between the parties and the Central Government's determination of the highest benchmark price. To attract investors to invest in the utilisation and development of new and renewable energy in Indonesia, the RUU EBT (Articles 55 of the Draft Law on New and Renewable Energy) offers fiscal incentives, such as tax or import facilities, and/or non-fiscal incentives for a certain period for businesses. State-owned electricity companies are provided additional incentives by the Central Government and/or Regional Governments, such as land and infrastructure provision, licensing facilitation for land and infrastructure procurement, and Government guarantees to secure funding. The Central and Regional Governments are obligated to develop new and renewable energy by securing funds for infrastructure financing, incentives, compensation for businesses developing new and renewable energy, research and development, human resource capacity and quality improvement, and renewable energy price subsidies when prices are uncompetitive with non-renewable energy (Articles 56 of the Draft Law on New and Renewable Energy). Therefore, the RUU EBT regulates the sources of such funds, namely a) State Revenue and Expenditure Budget; b) Regional Revenue and Expenditure Budget; c) export levies on non-renewable energy; d) carbon trading funds; e) renewable energy certificates; and/or f) other legitimate sources that comply with legislation.

Guidance and supervision of new and renewable energy in the RUU EBT (Articles 57 to 58 of the Draft Law on New and Renewable Energy) are carried out by the Central Government and/or Regional Governments according to their authority and may collaborate with third parties, including universities, state-owned enterprises, regional-owned enterprises, village-owned enterprises, private enterprises, individuals, communities, community groups, and social organisations. Additionally, the public has the right to participate in the management of new and renewable energy as regulated in the RUU EBT, ensuring access to information related to new and renewable energy business activities, deriving benefits from these activities, and gaining employment opportunities from the implementation of new and renewable energy. Given the scope of regulation in the RUU EBT, several issues need addressing and suggestions can be made to enhance the RUU EBT's effectiveness and alignment with Indonesia's commitment to achieving Net Zero Emissions.

Firstly, the inclusion of articles accommodating the utilisation of fossil energy in the RUU EBT is one of the issues causing the Indonesian government's steps to contradict its commitment in Article 28H (1) and Article 33 (4) of the 1945 Constitution of the Republic of Indonesia (UUD NRI 1945) to provide a constitutional guarantee for the right to a good and healthy environment for all people and the aim of ratifying the Paris Agreement To The United Nations Framework Convention On Climate Change through Law of the Republic of Indonesia Number 16 of 2016 on the Ratification of the Paris Agreement To The United Nations Framework Convention On Climate Change, which is the increase of renewable energy in controlling climate change (Explanation of the Law of the Republic of Indonesia Number 16 of 2016 Concerning the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change-Paris Agreement on the United Nations Framework Convention on Climate Change). The inclusion of new energy in the RUU EBT is a loophole for non-renewable fossil energy to be used as an energy source, which contradicts environmental conservation efforts, such as nuclear and coal managed with new technologies like coal bed methane, liquefied coal, and gasified coal, derived from

non-renewable energy sources (Parvez, et.al, 2023). However, Indonesia has significant renewable energy potential, with a total of 419 GW from water flow and waterfalls (94.3 GW), geothermal (23.7 GW), bioenergy (32.6 GW), solar radiation (207.8 GW), and wind (60.6 GW) (Pambudi et al., 2023).

Secondly, the inclusion of nuclear energy in the RUU EBT poses a potential threat to the environment (Surahman, 2024). This is due to the environmental impact of nuclear energy, which is far more dangerous than coal energy, and the radioactive waste produced can be hazardous to humans for thousands of years.

Thirdly, the emergence of regulations regarding the domestic market obligation (DMO) mechanism for coal sales for the needs of non-renewable energy power plants in the RUU EBT is an idea that does not align with the considerations in the RUU EBT. Regulations on DMO should not be included in the RUU EBT because they are specifically regulated in the Decree of the Minister of Energy and Mineral Resources of the Republic of Indonesia Number 267.K/MB.01/MEM.B/2022 on Meeting Domestic Coal Needs, amended by the Decree of the Minister of Energy and Mineral Resources of the Republic of Indonesia Number: 399.K/MB.01/MEM.B/2023 on Amendments to the Decree of the Minister of Energy and Mineral Resources Number 267.K/MB.01/MEM.B/2022 on Meeting Domestic Coal Needs. Furthermore, DMO is a form of subsidy from the Indonesian government for the use of fossil energy.

Fourthly, the inclusion of hydrogen as one of the types of new energy sources is also a form of accommodation by the Indonesian government to continue utilising fossil energy, unless it is explicitly stated that only green hydrogen, which is produced from renewable energy sources, is included in the new energy sources. Hydrogen is an energy source that uses new technology in its creation, requiring adjustments in all fields, including law. There are several methods for producing hydrogen as fuel, differentiated by colour based on the production process:

- Green hydrogen is produced through the process of electrolysis, powered by low-carbon energy sources generated from renewable energy such as solar, wind, and water. Green hydrogen refers to hydrogen that is produced through the electrolysis process using 100% renewable energy sources, including solar, wind, and water (ESMAP, 2020)
- Blue hydrogen is produced from natural gas using Carbon Capture and Storage (CCS) technology.
- Grey hydrogen is produced from natural gas or methane, causing carbon dioxide emissions in the process.
- Turquoise hydrogen is produced through pyrolysis of fossil fuels, with solid carbon as a by-product.
- Pink hydrogen is produced from electrolysis powered by nuclear energy.

Of all the types of hydrogen mentioned above, green hydrogen is the most environmentally friendly because the electrolysis process breaks down water compounds into oxygen and hydrogen using electricity from renewable sources, making this process clean without leaving greenhouse gas emissions. Indonesia, as an archipelagic country, has abundant water resources, providing a significant potential for producing green hydrogen as a clean fuel.

Fifthly, concerning the licensing provisions regulated in the RUU EBT, the Indonesian government's commitment should be explicitly stated that businesses are given assurance of comprehensive licensing facilitation by the Central Government and/or Regional Governments, not only during the initial licensing process but also during the construction phase until the operational phase. This assurance of licensing facilitation will become an attraction for investors who want to invest in non-fossil energy in Indonesia as a host country, besides economic opportunity (investment can provide economic returns for investors) and political stability (investment is highly influenced by political stability) (Pancras, 1979).

Sixthly, the obligation of businesses in the non-fossil energy sector to prioritise domestic products and potentials, including Indonesian labour, domestic technology, domestic materials, and other domestic components related to non-fossil energy in the RUU EBT, becomes an additional issue. This should be improved by adding provisions regarding the consideration of availability or capability of domestic products and potentials to ensure that the price of non-fossil energy remains competitive.

Seventhly, to attract investors to develop non-fossil energy utilisation in Indonesia, in addition to providing incentives as regulated in Article 55 of the RUU EBT, subsidies should also be added and explained in more detail in the RUU EBT, similar to the subsidies provided by the Indonesian government for fossil energy in the form of DMO. Although information about subsidies for renewable energy prices is briefly mentioned in the use of new and renewable energy funds in Article 56 Paragraph (3) (f) of the RUU EBT, it needs further elaboration.

Eighthly, the mechanism for managing new and renewable energy funds in Article 56 Paragraph (4) of the RUU EBT, which is managed by two ministries, namely the ministry responsible for energy affairs and the ministry responsible for finance, is a potential issue that could lead to conflicts in its implementation. It would be better if the responsibility for managing the funds were assigned to the ministry responsible for energy affairs, with the utilisation process requiring coordination with the ministry responsible for finance.

The issues within the RUU EBT indicate the need for improvements. Suggestions for improving the RUU EBT include adding provisions for an accelerated energy transition by utilising co-firing technology to increase the use of biomass waste as a fuel mixture in coal-fired power plants before the RUU EBT is enacted into law. This ensures that the provisions align with the 1945 Constitution and meet the commitments of the Paris Agreement. In light of the above and the absence of a legal framework for the development and utilisation of non-fossil energy in Indonesia, the legal construction through the reformulation of the RUU EBT is a solution to create a specific regulation that accommodates the development and utilisation of non-fossil energy in Indonesia.

3.2. Renewable Energy Development and Utilisation Policies in New Zealand

New Zealand is a country located in the southwest Pacific Ocean, approximately 2,000 kilometres east of Australia, consisting of two main islands, the North Island and the South Island, separated by the Cook Strait, as well as other smaller islands. Situated on the “Ring of Fire” and traversed by the Alpine Fault, New Zealand possesses abundant fossil fuel resources for a country of its size making it an exporter of coal. It also has renewable energy sources such as geothermal, hydro, solar, and wind energy (OECD, 2023). The majority of energy in New Zealand comes from fossil fuels, used for electricity, transportation, and industry. However, a substantial portion of the electricity generated comes from renewable energy sources (80-85%) as a commitment to reducing dependence on fossil fuels in the future (Energy Efficiency and Conservation Authority, 2024) and to meet New Zealand’s NDC targets under the Paris Agreement by reducing net GHG emissions by 50% below gross 2005 levels by 2030 (Energy Efficiency and Conservation Authority, 2024).

New Zealand’s steps to achieve these NDC targets include increasing the share of renewable energy to meet long-term energy demand and ensure a secure and affordable energy supply. New Zealand relies on its existing energy sources, including wind, solar, hydro, geothermal, biomass, and green hydrogen (Energy Efficiency and Conservation Authority, 2024). High average wind speeds make wind a useful power generation resource in New Zealand. Currently, more than 6% of New Zealand’s electricity is generated from wind turbines, with an expected increase of 20-34% by 2035 (Energy Efficiency and Conservation Authority, 2024). As of October 2022, data from New Zealand’s electricity authority indicated that installed solar power systems contribute 1% of the country’s total electricity production, with 43,641 installed systems and a total capacity of 240 MW. The New Zealand government aims to increase the use of solar power as an energy source to 1-6% by 2035 (Energy Efficiency and Conservation Authority, 2024). With abundant hydro resources, hydropower has on average provided 57% of New Zealand’s electricity needs per year since 2010. However, the contribution of hydropower has declined due to varying rainfall caused by global warming and climate change, resulting in an annual contribution of 46-50% (Energy Efficiency and Conservation Authority, 2024).

Geothermal energy is a crucial renewable energy source for New Zealand, contributing 18% of the country’s electricity needs. Geothermal power generation is expected to grow over the next decade and will continue to be one of the largest renewable energy sources in the country, contributing 15-19% by 2035 (Energy Efficiency and Conservation Authority, 2024). Biomass accounts for about 7% of New Zealand’s total primary energy use. Of this, 73% is used in the industrial sector (primarily wood product manufacturing and pulp and paper manufacturing) for process heat and some electricity generation. The remaining 13% is used for heating in

households. The use of biomass as a direct energy source is expected to increase in New Zealand until 2035 to 12-14%, as it is a low-emission, affordable renewable fuel source (Energy Efficiency and Conservation Authority, 2024).

The latest addition to New Zealand's renewable energy portfolio is green hydrogen. Although green hydrogen is still being explored both internationally and domestically, it has the potential to play a significant role in New Zealand's energy transition with support from the Ministry of Business, Innovation and Employment. The New Zealand government is currently drafting a Hydrogen Roadmap, targeted for completion by the end of 2024, which will be integrated into New Zealand's Energy Strategy (Energy Efficiency and Conservation Authority, 2024). To facilitate the utilisation of renewable energy to ensure supply security, promote renewable energy, and maintain renewable energy assets towards Net Zero Emission, the New Zealand central government has issued three policies governing the use and operation of renewable energy: i) the Electricity Industry Participation Code or the Electricity Industry Act 2010 ("Code"); ii) New Zealand's emissions trading scheme ("NZ ETS"); and iii) the Resource Management Act 1991 ("RMA") (Munir, 2022).

The Code is the electricity law in New Zealand. The Code was approved on 5 October 2010 and has undergone several amendments, with the latest version dated 23 December 2023. The Code is a set of rules governing the electricity industry in New Zealand, covering generation, transmission, system operation, supply security, market regulation, metering, distribution, and retail (Electricity Industry Participation Code of New Zealand, 2023). The provisions within the Code are similar to those in Law Number 30 of 2009 concerning Electricity, which is applicable in Indonesia. This law allows private enterprises, cooperatives, and community organisations, in addition to state-owned enterprises and regional-owned enterprises, to participate in electricity supply both upstream and downstream (Paryono, 2019).

The NZ ETS is one of a series of renewable energy utilisation policies implemented by the New Zealand government to meet commitments under the Paris Agreement to reduce greenhouse gas emissions. This policy is reinforced by the Climate Change Response (Zero Carbon) Amendment Act 2019, approved on 13 November 2019, which amends the Climate Change Response Act 2002, approved on 18 November 2002, to regulate New Zealand's energy transition towards a low-emission economy. The New Zealand government's goal in enacting the Climate Change Response (Zero Carbon) Amendment Act 2019 is to ensure that climate regulations are contained within a single law. There are four (4) key aspects regulated in the Climate Change Response (Zero Carbon) Amendment Act 2019: i) setting greenhouse gas (GHG) emission reduction targets; ii) establishing an emissions budget, which is the allowable amount of emissions within each emissions budget period as a net amount equivalent to carbon dioxide; iii) requiring the New Zealand government to develop and implement climate change adaptation and mitigation policies; and iv) establishing an independent climate change commission to provide advice and oversight to help the New Zealand government achieve the net GHG emission reduction target of 50% below 2005 gross levels by 2030. In relation to renewable energy utilisation policies, Indonesia also has a regulation similar to New Zealand's Climate Change Response (Zero Carbon) Amendment Act 2019, namely Presidential Regulation of the Republic of Indonesia Number 98 of 2021 on the Implementation of Carbon Economic Value for Achieving Nationally Determined Contribution Targets and Controlling Greenhouse Gas Emissions in National Development.

The latest policy related to renewable energy utilisation in New Zealand is the RMA. The RMA was enacted by the New Zealand government on 22 July 1991 and has been amended several times, with the latest amendment on 24 August 2023. The RMA regulates, among other things: i) energy end-use efficiency; ii) the impact of climate change; iii) the benefits of using and developing renewable energy; and iv) the authority of local governments to plan for climate change mitigation. The RMA focuses on developing and utilising renewable energy available in New Zealand, such as solar, wind, water, geothermal, biomass, tidal, wave, and ocean currents. The RMA plays a central role in regulating renewable energy development in New Zealand. It aims to ensure that natural and physical resources—such as land, air, water, and buildings—are managed sustainably. Meanwhile, Indonesia has yet to have a specific law regulating the development and utilisation of non-fossil energy.

Based on the above explanation, New Zealand's success in developing and utilising non-fossil energy towards Net Zero Emission lies in three (3) policies: i) the Code; ii) the NZ ETS, reinforced by the Climate Change Response (Zero Carbon) Amendment Act 2019; and iii) the RMA. To achieve similar success, Indonesia needs to adopt these three (3) forms of New Zealand's policies. Currently, Indonesia has only two (2) policies on the development and utilisation of non-fossil energy similar to New Zealand's: Law Number 30 of 2009 concerning Electricity, which is akin to the Code, and Presidential Regulation of the Republic of Indonesia Number 98 of 2021 on the Implementation of Carbon Economic Value for Achieving Nationally Determined Contribution Targets and Controlling Greenhouse Gas Emissions in National Development, which aligns with the NZ ETS. However, there is no legislation equivalent to the RMA in Indonesia. Therefore, concrete steps must be taken to promptly establish a specific law regulating the development and utilisation of non-fossil energy in Indonesia towards Net Zero Emission.

4. Conclusion

Legal construction governing the development and utilisation of non-fossil energy through the reformulation of the Draft Law on New and Renewable Energy (RUU EBT) must be promptly undertaken. This should involve eliminating elements related to fossil energy sources, removing regulations concerning DMO (Domestic Market Obligation), affirming that only green hydrogen is recognised as new energy, and including the Indonesian government's commitment to ensuring ease of licensing from the initial stage through construction to the operational phase. Additionally, provisions regarding the obligation to use domestic products and potential must consider the availability or capability of domestic products and potential. Adding provisions on subsidies in addition to incentives, and offering the option to accelerate energy transition by utilising co-firing technology to increase the use of biomass waste as a fuel mixture in Steam Power Plants (PLTU), are also important considerations. With a law specifically regulating the development and utilisation of non-fossil energy, Indonesia can have a legal framework that supports the acceleration of the development and utilisation of environmentally friendly energy towards Net Zero Emission, as seen in New Zealand.

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