

Reviewing the Role of Indonesia's Performance on G20 to Accelerate Energy Transition

Every state has a road map towards carbon neutral as a form of international norms regarding decarbonizing global, including Indonesia. The two strategic steps taken by Indonesia in realizing Net Zero Emissions (NZE) in 2060 are divided into two, namely independent national efforts and international support. Foreign support is defined as one of the country's acceleration schemes in achieving NZE. Multilateralism schemes, G20, have become an important momentum for Indonesia to deliver their interest in new and renewable energy, unfortunately the government always applies conditional joint targets for any cooperation in the energy sector. This study aims to analyze of Indonesia's challenges and obstacles in achieving the NZE from cooperation of multilateralism perspectives. This research utilized the theory of constructivism in international regime and domestic politics and qualitative analysis methods. The results revealed that a policy that inward and outward looking is needed so that it is expected to receive support not only in terms of morale, but also in terms of technology transfer, low cost financing, and capacity building.

Keywords: *Energy Transition, Decarbonizing Global, Indonesia, G20, Net Zero Emissions.*



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The Reflection Analysis of Indonesia's New Renewable Energy Policy Commitment post G20 Presidency in Bali



Introduction

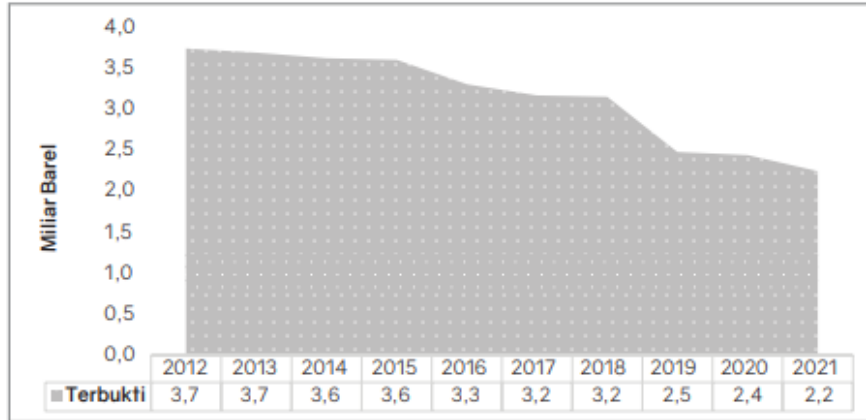


Indonesia G20 Presidency
Recover Together
Recover Stronger

- Energy transition with new and renewable energy
- Indonesia's renewable energy potential (450 MW mini/micro hydro, 50 GW biomass, 4.80 kWh/m²/day solar energy, 3-6 m/second wind energy, and 3 GW nuclear energy)
- G20 Bali and energy transition as a main priority issue
- 23% use of EBT towards clean energy transition target 2030

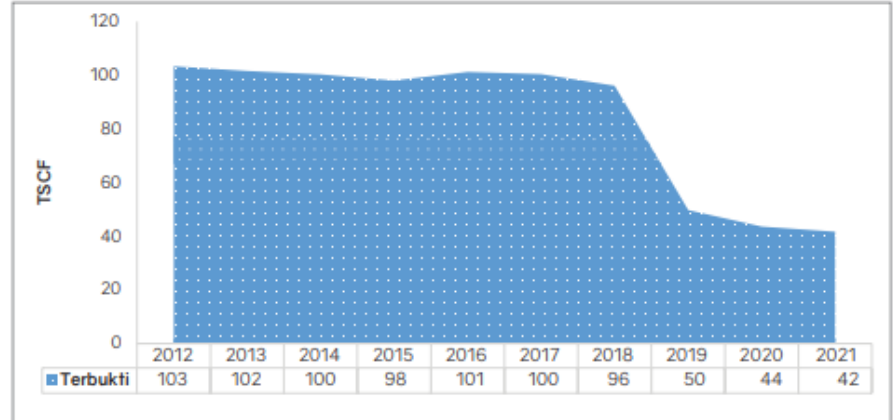


Data Cadangan Minyak Bumi (2012-2021)

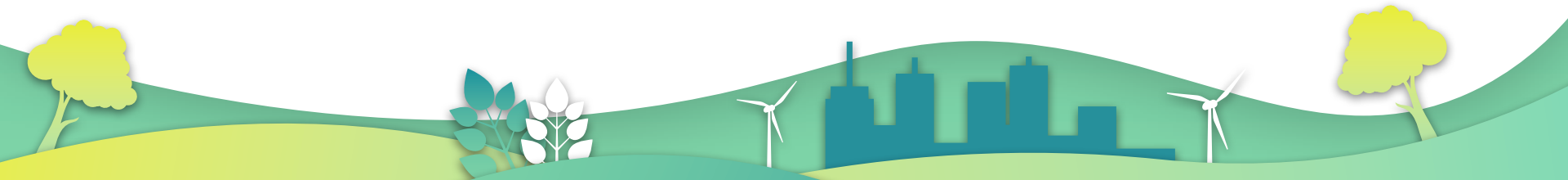


Sumber: HEESI, 2021

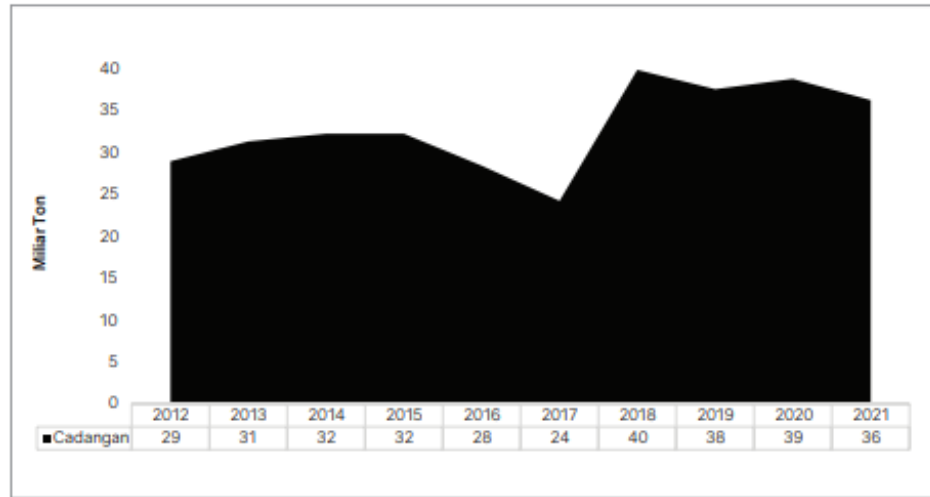
Data Cadangan Gas Bumi (2012-2021)



Sumber: HEESI, 2021



Data Cadangan Batubara (2012-2021)



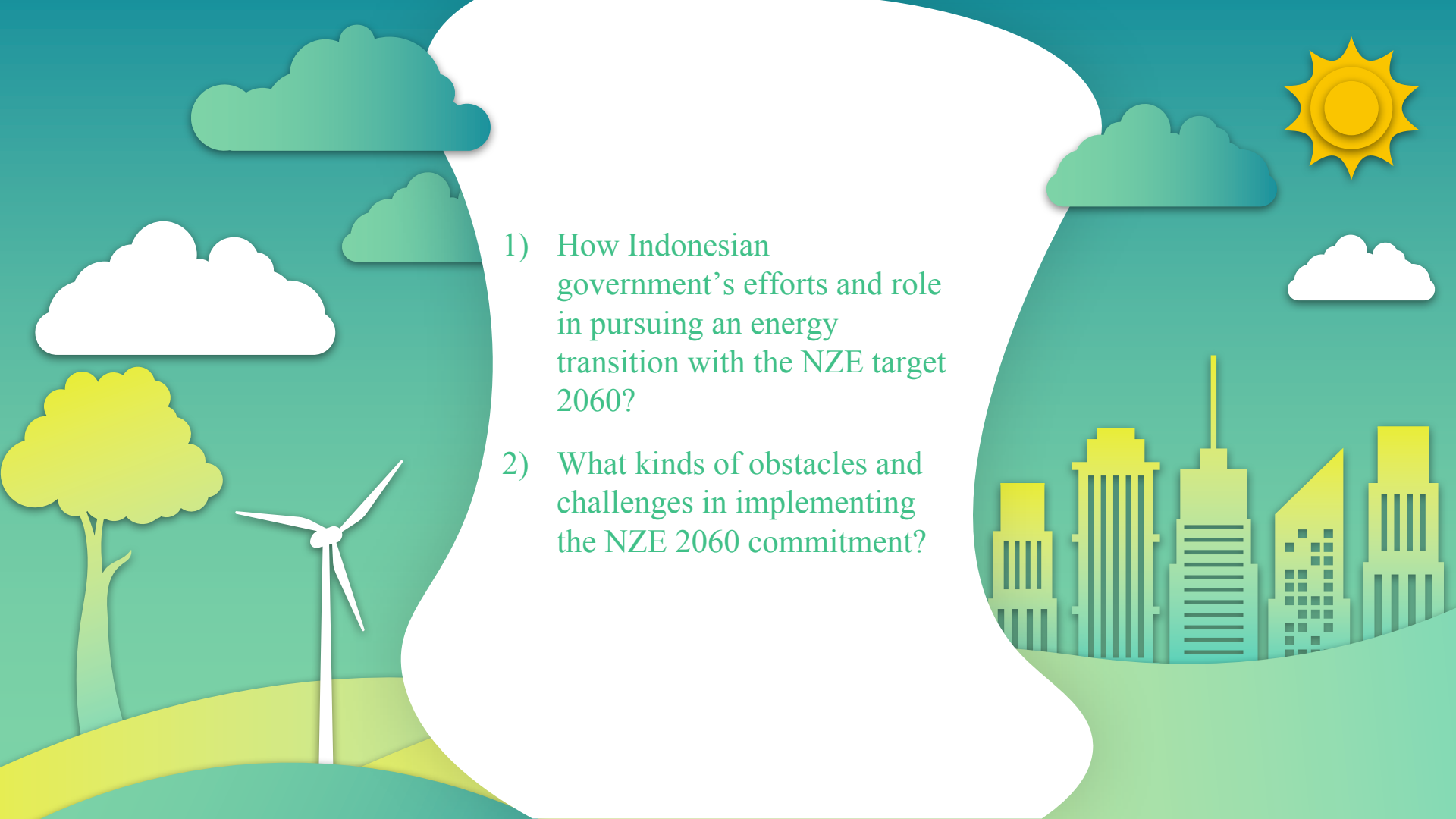
Sumber: HEESI, 2021



Potensi dan Kapasitas Pembangkit Listrik EBT (2021)

Komoditas EBT	Total Potensi 2021 (GW)	Kapasitas Pembangkit Listrik (GW)	% Pemanfaatan
Samudera	17,9	-	-
Panas Bumi	23,9	2,3	9,6%
Bioenergi	56,9	2,3	4,0%
Bayu	154,9	0,2	0,1%
Hidro	95,0	6,6	7,0%
Surya	3.294,4	0,2	0,01%
Total	3.643,0	11,6	0,3%



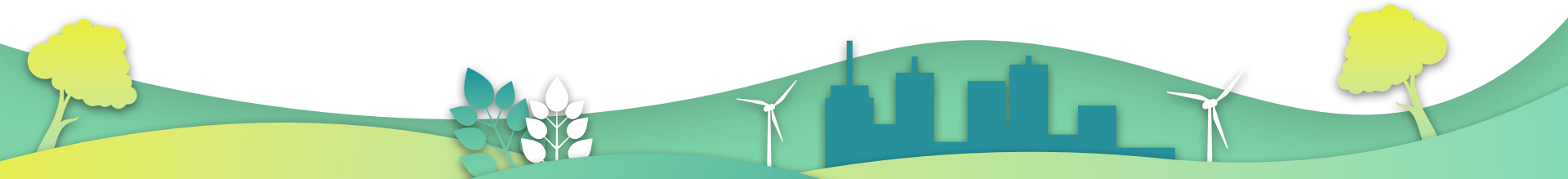
- 
- 1) How Indonesian government's efforts and role in pursuing an energy transition with the NZE target 2060?
 - 2) What kinds of obstacles and challenges in implementing the NZE 2060 commitment?

Bali G20 Presidency Result : Energy Transition Acceleration

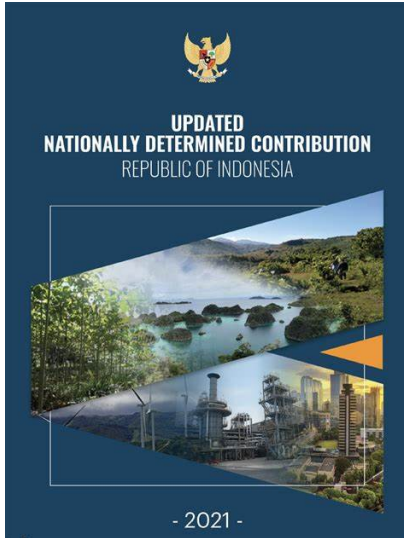
- Bali Compact, or G20 Leaders Declaration :

"We meet at a time of climate and energy crises, amidst geopolitical challenges. We are also experiencing volatility in energy prices and markets, as well as disruptions in the energy supply. We underscore the urgency of rapidly transforming and diversifying the energy system, energy resilience, security, and market stability by accelerating and ensuring a sustainable, just, affordable, and investment-inclusive energy transition. We emphasize the importance of ensuring that global energy demand is matched by an affordable energy supply."

- Energy Transition Working Group (ETWG) – Power Plant Agreement (PPA) by PLN
- Just Energy Transition Partnership with US\$ 20 billion funding



Indonesian Government Policies and Regulations for Energy Transition Acceleration: Indonesia's Global Commitment



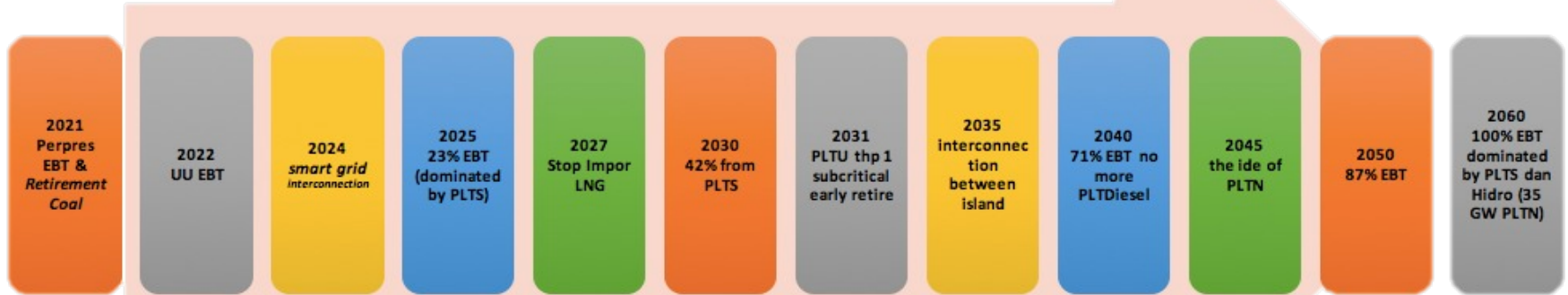
- Ratification of Paris Agreement (2015) – UU Nomor 16 Tahun 2016
- UNFCCC : Nationally Determined Contribution (NDC) Commitment 2030

Reducing 29% Green House Gas (GHG) Emission Commitment by 2030

Business-as-Usual (BAU) scheme



The Roadmap of Energy Transition towards Net Zero Emissions (NZE) Target 2060



- Indonesia achieved the reducing GHG target and even increased beyond the target, by 91.5 million metric tons



Development of Indonesia's New and Renewable Energy Regulations (Before-Post G20)

REGULATION FOR NEW RENEWABLE ENERGY MANAGEMENT IN INDONESIA

UU NO. 30/2007 TENTANG ENERGI

UU NO. 16/2016 TENTANG PENGESAHAN PERJANJIAN PARIS
TERHADAP KONVENSI KERJA PBB MENGENAI PERUBAHAN IKLIM

PP NO. 79/2014 TENTANG KEBIJAKAN ENERGI NASIONAL

Perpes No. 11/2023 tentang Urusan Pemerintahan Konkuren Tambahan di Bidang Energi dan Sumber Daya Mineral Pada Subbidang Energi Baru Terbarukan.

Perpes No. 112/2022 tentang Percepatan Pengembangan Energi Terbarukan untuk Penyediaan Tenaga Listrik.

Perpes No. 22/2017 tentang Rencana Umum Energi Nasional (RUEN).

UPSTREAM

- Rencana Umum Ketenagalistrikan Nasional (RUKN) 2019
- *Road Map* dan Strategi Pengembangan Energi Baru dan Terbarukan di Indonesia tahun 2020
- Peraturan Gubernur/ Bupati/ Walikota tentang Rencana Umum Energi

- *Conference of the Parties 26th in Glasgow 2021: Commitment to Phase Out The Fossil Energy*
- *Leaders Summit on Climate Change 2021: open for foreign investment for energy transition*
- *Energy Transition Working Group (ETWG) G20 2022*
- *Just Energy Transition Partnership (JETP) G20 2022*
- *Bali Compact 2022*

DOWNSTREAM

- *Nationally Determined Contribution (NDC)* tahun 2015
- Permen ESDM No. 12/2018 Tentang Pelaksanaan Kegiatan Fisik Pemanfaatan Energi Baru dan Energi terbarukan Serta Konservasi Energi
- Permen ESDM No. 4/ 2020 Tentang Pemanfaatan Sumber Energi Terbarukan untuk Penyediaan Tenaga Listrik
- Permen ESDM No. 5/ 2023 Tentang Tentang Tata Cara Pengenaan, Penghitungan, Serta Pembayaran dan/atau Penyetoran Penerimaan Negara Bukan Pajak Pada Direktorat Jenderal Energi Baru, Terbarukan, dan Konservasi Energi
- Peraturan Menteri Energi dan Sumber Daya Mineral No. 3/2023 Tentang Pedoman Umum Bantuan Pemerintah dalam Program Konversi Sepeda Motor dengan Bahan Bakar Berbasis Baterai.



Barriers and Challenges of Indonesia's Energy Transition Acceleration towards NZE 2060

01

Challenge : Eliminating Dependence on the Use of Coal Fossil Fuel

- Coal as Indonesia's 60% electrical energy input (2019)
- The vital influence of coal, domestically and globally
- EBT project finance, much more expensive than coal

Barrier : Dependence of State Budgets on Coal

- Increasing coal production project as non-tax state revenue
- Protest against coal export banning
- International relations pressure from coal-exporting countries, such as South Korea and Japan

02

Weakness of Funding and Technology of Clean Energy

- Subsidies for the consumption and production of fossil fuels
- Domination of coal-fired power plants against EBT power plants
- 23% renewable energy share on national energy supply mix, by 2025

03



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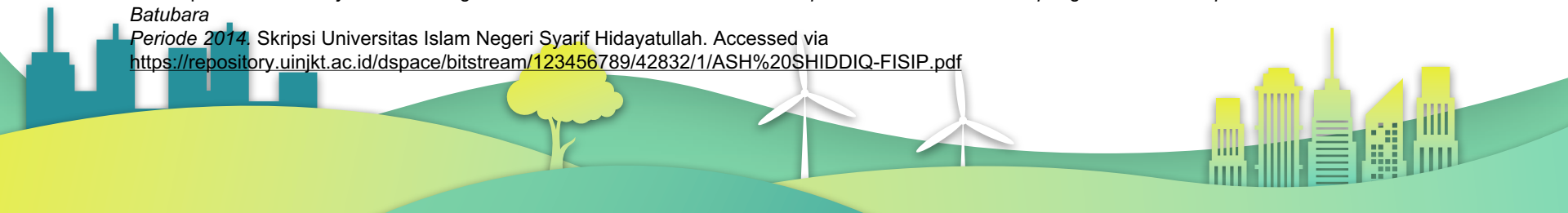
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Thanks!

any questions?

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The Reflection Analysis of Indonesia's New Renewable Energy Policy Commitment Post G20 Presidency in Bali

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Abstract

This article reviews Indonesia's commitment to accelerating the national energy transition after raising the issue of energy transition during the 2022 G20 Presidency in Bali. Net zero emissions (NZE) in 2060 is a target for Indonesia in the national energy policy roadmap and its commitment to fulfil the NDC. The Bali Compact has recorded 52 points of agreement between heads of state, of which two specifically relate to energy. The G20 Leaders are committed to ensuring that the energy transition is sustainable, carried out fairly, affordable for all groups, and inclusive of investments. Reflections on Indonesia's commitment at the international and upstream levels can be reduced to downstream-level policies, which are easier to read in terms of "real work" directions. President's Decree No. 11 of 2023 became a regulation of the accelerator of new and renewable energy utilization at the national and regional levels in order to the NZE target. Indonesian acceleration efforts are also supported by the cooperation of aid to the financing of the transition of new energy and the renewables through the Just Energy Transition Partnership (JETP). This article uses mixed-methods analysis. The author collects data from literature studies and conducts in-depth interviews with sources according to the topic being researched. The analytical approach pattern of this research maps the commitment to uniform policy at the national and regional levels in supporting actions to accelerate the energy transition, which is still relatively weak. Furthermore, the Indonesian government's attitude after the Bali G20 Summit did not structurally respond to the commitments built into the Bali Compact agreement on energy acceleration. It was found that post-G20 downstream policies in 2022 were only downstream solutions but had not touched upstream areas. This presents a recommendation for the consolidation between the stakeholders in order to harmonize the national new and renewable energy transition policies.

Keywords: *Energy Transition, New Renewable Energy, Bali Compact, upstream-downstream policy, Indonesia*

1. Introduction

This article reviews Indonesia's role, challenges, and obstacles in accelerating the national energy transition after raising the issue of energy transition during the 2022 G20 Presidency, which was held in Bali. In simple terms, the energy transition is an effort made to replace the use of fossil-based energy sources that damage the environment with the use of environmentally friendly energy sources or clean energy, or what is usually called new

renewable energy or NRE [1]. New renewable energy, often abbreviated as NRE, according to the International Energy Agency, is energy that comes from nature, such as wind and solar power, which can be a source of electricity, hydropower, biomass, and geothermal power, which can continue to be used and produced without having to wait a long time [2]. Why are countries in the world taking a role and making NRE a priority, including Indonesia? In terms of global construction, the value of the importance of overcoming climate change is the entry point for the development of the energy transition. Specifically, the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement are international norms that lead to the penetration of the value of changes in the behaviour of countries in the world regarding the development of energy issues [3]. This change in the country's behaviour has made countries around the world feel the need to take real action, namely efforts to carry out an energy transition. The main goal is to help reduce the earth's temperature due to the use of coal and save the earth from various disasters due to climate change. Indonesia itself is a country that has quite large renewable energy potential, including mini/micro hydro of 450 MW, biomass of 50 GW, solar energy of 4.80 kWh/m²/day, wind energy of 3-6 m/sec, and nuclear energy of 3 GW [4]. Indonesia is a country that has and will implement various policies, programs, targets, and multilateral cooperation in order to support national and international energy policies as a step-in energy transition efforts. The international step taken by Indonesia through the 2022 G20 Bali High Level Conference (Summit) meeting was to issue an agreement that the issue of energy transition was a priority issue and was stated in the G20 Bali declaration.

Indonesia's commitment to accelerate the renewable energy transition in the G20 Indonesia, in the Paris Agreement, has set a target for reducing greenhouse gas emissions in its commitment to support Net Zero Emissions (NZE) 2060. Indonesia's commitment to supporting NZE 2060 is described in the form of a Nationally Determined Contribution (NDC). The Nationally Determined Contribution (NDC) is a draft plan and target for reducing gas emissions. Indonesia has ratified and stated the NDC target through Law Number 16 of 2016, and in 2020 it is to reduce gas emissions by 26% with its own efforts [5]. Furthermore, President Jokowi, while attending the UNFCCC Summit, conveyed Indonesia's commitment to reducing carbon emissions by 2030 by 29% with its own efforts and up to 41% with assistance and cooperation from developed countries. The G20 Net Zero Emission (NZE) Summit in 2060 is a target for Indonesia in the national energy policy roadmap as the government's real commitment after the 2015 Paris Agreement globally introduced it (esdm.go.id). According to the definition from the Ministry of Energy and Mineral Resources

(ESDM) of the Republic of Indonesia, net zero emissions, or zero carbon emissions, is a condition where the amount of carbon emissions released into the atmosphere does not exceed the number of emissions that the earth can absorb. To achieve this, a transition is needed from the energy system currently used to a clean energy system in order to achieve a balanced balance between human activities and natural balance [6].

The G20 Bali Summit, which includes developed countries, has committed to helping and supporting developing countries in accelerating the energy transition, including Indonesia. During the G20 meeting, several work programs were launched in the Energy Transitions Working Groups (ETWG). Based on the press release of the Coordinating Ministry for Economic Affairs of the Republic of Indonesia, number HM.4.6/367/SET.M.EKON.3/07/2022 [7]. The Working Groups at the G20 Summit in Bali consisted of the Energy Transitions WG, Environment Deputies Meeting (Climate Sustainability WG), Development WG, and Anti-Corruption WG. These various working groups are a follow-up to the initiation of concrete deliverables at the G20 Presidency [7]. Quoting from Tempo, concrete deliverables are projects, programs, or initiatives that produce real benefits for the people of Indonesia and the world, which can be followed up on from the G20 Summit WG by member countries in the future, including Indonesia [8]. The next question is whether Indonesia's efforts to accelerate the clean energy transition or NRE have been implemented after this commitment at the G20, considering that the use of NRE is still around 11.5% even though the government's target in 2030 is to reach 23% [9].

So based on the background of this problem, this article will analyse the extent of the efforts and role of the Indonesian government in pursuing an energy transition with the NZE target in 2060. Then this article will analyse what kinds of obstacles and challenges the Indonesian government faces in implementing this commitment. Apart from that, this article will analyse the extent of the policies that have been made: Are they only limited to making policies that regulate the use of NRE, or are they able to change human behaviour? In answering this, the author will use an upstream-downstream policy synergy approach. This approach will focus on analysing policies that have been created to accelerate efforts to accelerate the transition to new and renewable energy in Indonesia. In this approach, policy capacity at the national and regional levels will be explained by their firmness in supporting actions to accelerate the energy transition. So, we will see the concrete policy of the Indonesian

government's commitment to realizing and pursuing the agreed NDC.

2. Methods

In writing this article, the author used a mix-methods analysis. The author collects data from literature studies and conducts in-depth interviews with sources according to the topic being researched. Literature study is the collection of materials such as books, journals and articles related to the research theme. In this study, the sources of information (in-depth interview) used during the research process were obtained from the actors/informants. The technique used in selecting informant sampling is the purposive sampling technique, namely data collection techniques with certain considerations. The parties used as research informants are as follows:

1. The Ministry of Foreign Affairs and the Director General of Multilateral Cooperation; represented by Ibu Kusumanegari, M. P.
2. National Research and Innovation Agency of Republic of Indonesia (BRIN) in Energy Conservation and Conservation Research Centre; represented by Dr. Cuk Supriyadi
3. International Relation academic with a focus on Development Studies; represented by Ade Maruf Wirasenjaya, MA

The data obtained will be processed and then analysed. Theoretical data is also obtained from journals, official government websites, and news articles on the Internet [10]. Data processing is carried out during and after data collection, both data in the field (primary data) and secondary data. The data that has been collected is then tabulated simply. After being tabulated, the data were analyzed according to the appropriate data analysis method. Data analysis carried out data entry, data transfer, data editing, data processing, and Data analysis carried out data entry, data transfer, data editing, data processing, and data interpretation as all aspects of the data management process.

1. Descriptive data analysis was employed to tackle the first difficulty, which involved figuring out how to explain and describe in detail of New Renewable Energy Policy Agenda in G20 in Bali the data and information gathered by researchers;
2. Descriptive data analysis is utilized to answer the second problem, which entails sorting out the factors that influence Indonesia's New Renewable Energy Policy; and

3. The SWOT analysis approach is used to tackle the third problem, which is the construction of an alternative strategy for Indonesia's New Renewable Energy Policy Commitment Post G20 Presidency. The strategy is developed by combining internal and external strategic aspects and paying attention to internal and external negative variables.

3. Concept and Analysis

3.1 Results of the 2022 Bali G20 Presidency in Accelerating the Energy Transition from Work Program Plans to Funding Assistance from G20 Developed Countries

Indonesia holds the G20 Presidency, the peak of which will be held from November 10 to 17, 2022, in Bali. The G20 is a multilateral cooperation forum consisting of 19 major countries and the European Union. Forum that focuses primarily on international economic cooperation and major international economic issues [11]. In the Bali Declaration, 52 points of agreement were recorded by the heads of G20 countries. Of the 52 points, there are two specific points related to the energy sector, where the G20 Leaders are committed to ensuring that the energy transition is sustainable, carried out fairly, affordable for all groups, and that investments are inclusive. This commitment is stated in the Leaders Declaration of the G20 Bali Summit, which contains 52 paragraphs summarized from 24 communiqué documents, recommendations, and input from the results of discussions of the G20 Working Group and Ministerial Meeting [12]. Plus, an attachment to the Strong Inclusive Recovery Action Agenda. The total declaration document and attachments are 1,186 pages. This document can be accessed openly.

"We meet at a time of climate and energy crises, amidst geopolitical challenges. We are also experiencing volatility in energy prices and markets, as well as disruptions in the energy supply. We underscore the urgency of rapidly transforming and diversifying the energy system, energy resilience, security, and market stability by accelerating and ensuring a sustainable, just, affordable, and investment-inclusive energy transition. We emphasize the importance of ensuring that global energy demand is matched by an affordable energy supply."

In the G20 sequence, the results of the work program in the Energy Transitions Working Groups (ETWG) are crucial. The 2022 G20 Energy Transition Forum consists of a series of

meetings, starting from [13]:

1. ETWG-1 in Yogyakarta will be held March 24–25, 2022;
2. ETWG-2 in Labuan Bajo will be held June 23–24, 2022;
3. ETWG-3 in Bali will be held from August 30 to September 1, 2022;
4. The Energy Transition Ministerial Meeting (ETMM) in Bali will be held on September 2, 2022.

One of the initiations of the ETWG work program in Indonesia is the signing of a power purchase agreement (PPA) for new renewable energy (NRE) generators represented by the Indonesian State Electricity Company (PLN). A power purchase agreement, hereinafter referred to as a PPA, is an electricity purchase agreement carried out by PT. PLN (Persero), or a state electricity company, with private electricity developers. PLN carried out a power purchase agreement (PPA) for two projects, namely the development of a PLTS, or solar power plant, in Bali with Medco Power and the development of a PLTM, or Microhido Kukusan-2, 5.4 MW power plant, in Lampung with Arkora Energi Baru. PLN also carried out a financial close of PLTM Sukarame with a capacity of 7 MW in Lampung by Lampung Hydroenergy [14].

The target to gain the National Determined Contribution/NDC is carried out in two forms, namely, using the APBN and secondly, with international support. This international support takes the form of funding. In the G20, developed countries committed to providing funds to Indonesia to accelerate the energy transition. Unfortunately, this funding commitment has not yet been disbursed. According to an explanation from the Ministry of Foreign Affairs, the Directorate General of Multilateral Cooperation said that it is necessary to review the provision of funding in the form of dNRE because this does not make things easier for the government; on the contrary, it is burdensome.

"The problem is that sometimes it's not all the aid; yes, sometimes it's also a negotiation process with the countries that provide it with us, which form they want to give. We cannot receive all of this support because sometimes it takes the form of dNRE." Well, when it comes to dNRE, we have to recalculate the money; we've already allocated our APBN, for example, PLN." (Interview with Maria Kusumanegari, 2023) [15].

The Minister of Finance of the Republic of Indonesia, Sri Mulyani, also asked developed countries to commit to donating US\$ 100 billion or the equivalent of IDR 1,493 trillion (assuming an exchange rate of IDR 14,938 per US dollar) per year for the energy transition in Indonesia [16]. Along the way, developing countries doubted the seriousness of developed

countries in helping with funding because the promised funding of US\$100 billion per year had not been fulfilled. Climate finance must be constructive, not in the form of dNRE.

Through the Just Energy Transition Partnership, or JETP initiative, led by the US and Japan, it has also promised US\$ 20 billion, or around Rp 311 trillion (assuming an exchange rate of Rp 15,564 per US\$), to Indonesia. This commitment was conveyed by Biden at the G20 Summit in Bali. Unfortunately, until now, the funds have not been disbursed [17]. Funding for the acceleration of Indonesia's energy transition is an effort from the Conditional Joint Targets scheme. The Ministry of Foreign Affairs, through an interview with the author, confirmed the commitment of the Conditional Joint Targets scheme implemented by Indonesia.

"So we always use the term conditional joint targets. In terms of support, yes. If the support doesn't work, if the commitment is only up front but the money doesn't come down, it's the same. So we always give it a conditional joint target. And if you look at it, for example, we already have two strategies. " A strategy based on our capabilities and a strategy if, for example, we get international support." (Interview with Maria Kusumanegari, 2023) [15].

3.2 Indonesian Government Policies and Regulations for Accelerating the Energy Transition: Indonesia's Global Commitment

Indonesia has long been known as one of several lung countries in the world. This status means that Indonesia never escapes world attention in the environmental context. It is believed that Indonesia's chosen stance on environmental issues will have a significant influence not only in Indonesia itself but also on the world. This also applies in the context of energy, which is believed to be the main cause of climate change. The commitment and energy policies chosen by Indonesia will always receive special attention from the international community. So far, Indonesia has always shown a positive attitude in global environmental forums. Indonesia's positive attitude can be seen in its commitment to ratifying the Paris Agreement in 2015. From the Paris Agreement, Undang-Undang Nomor 16 of 2016 was born regarding the Ratification of the Paris Agreement on the United Nations Working Convention on Climate Change [18]. The presence of this law is a concrete form of Indonesia's positive commitment to take part in efforts to maintain global temperatures against the threat of climate change.

The Paris Agreement is a regime that was born from the meeting of UNFCCC member countries at the 21st Convention. Through this regime, it was stipulated that the world agree to maintain a global average temperature of no more than 2 degrees Celsius. It should be noted that before the birth of the Paris Agreement, there was a framework for dealing with climate change called the Kyoto Protocol, which ended in 2012. However, this framework was not

proven to be successful due to the lack of positive commitment from industrial countries to reducing emissions. Thus, a new framework called the Paris Agreement was born [18]. Within the framework of the Paris Agreement, Indonesia has set a commitment contained in the Nationally Determined Contribution (NDC) of 29% to reduce greenhouse gas (GHGs) emissions by 2030. The commitment confirmed in 2015 is carried out with a Business-As-Usual (BAU) scheme, which means it is carried out without conditions and with calculations based on Indonesia's national capabilities. However, if there is an international assistance scheme involved in Indonesia's efforts to reduce emissions, then the 29% figure will increase to 41% in 2030 [19]. Then, in 2021, Indonesia renewed its commitment while reaffirming the previously established commitment. With greater optimism, Indonesia proposed additional commitments to achieve net zero emissions (NZE) by 2060 [19]. This following picture showed the road map Indonesia to achieve net zero emissions (NZE) by 2060 :



Figure 1. The Roadmap of Energy Transition to Achieve net zero emissions (NZE) by 2060
**Results of the Presentation "Development of New Renewable Energy as a Form of Energy Transition Towards Net Zero Emissions" by Muhammad Hasyim Sidqi, 2022.*

The commitment that Indonesia has made so far has shown positive results. In the last three years, the achievement of reducing GHGs emissions has experienced a positive trend that continues to increase beyond the target. The Ministry of Energy and Mineral Resources (2023) stated in its press release that in 2020, the realization of reducing emissions succeeded in exceeding the target of 58 million tons to 64.4 million tons. Then it will increase to 70 million tons in 2021 from the target of 67 million tons. This figure will increase significantly in 2022. With a target of 91 million metric tons, Indonesia has succeeded in reducing GHGs emissions by 91.5 million metric tons. So, if we see a positive trend in GHGs reduction that can be achieved. Indonesia's NDC target, namely reducing GHGs emissions by 29% with the Business-As-Usual scheme and 41% with the international assistance scheme, can be achieved

and even exceed the set target [20].

3.3 Development of new and renewable energy regulations in Indonesia: before-after G20 in Bali

Indonesia's positive performance regarding its commitment to determining the NDC cannot be separated from national policies in the energy sector. Indonesia has become aware of the threats caused by non-renewable energy since the issuance of UU No. 30 of 2007 concerning Energy (UU Energi). Until 2023, Indonesia will have at least four national policies aimed at implementing the energy transition [21]. Apart from the 2007 UU Energi, there are three other national policies, namely Peraturan Pemerintah No. 79 of 2014 concerning National Energy Policy (PP KEN), Peraturan Presiden No. 22 of 2017 concerning the General National Energy Plan (Perpres RUEN), and Presidential Regulation Number 112 of 2022 concerning the Acceleration of Renewable Energy Development for the Supply of Electric Power (Perpres Akselerasi Perkembangan Energi Terbarukan).

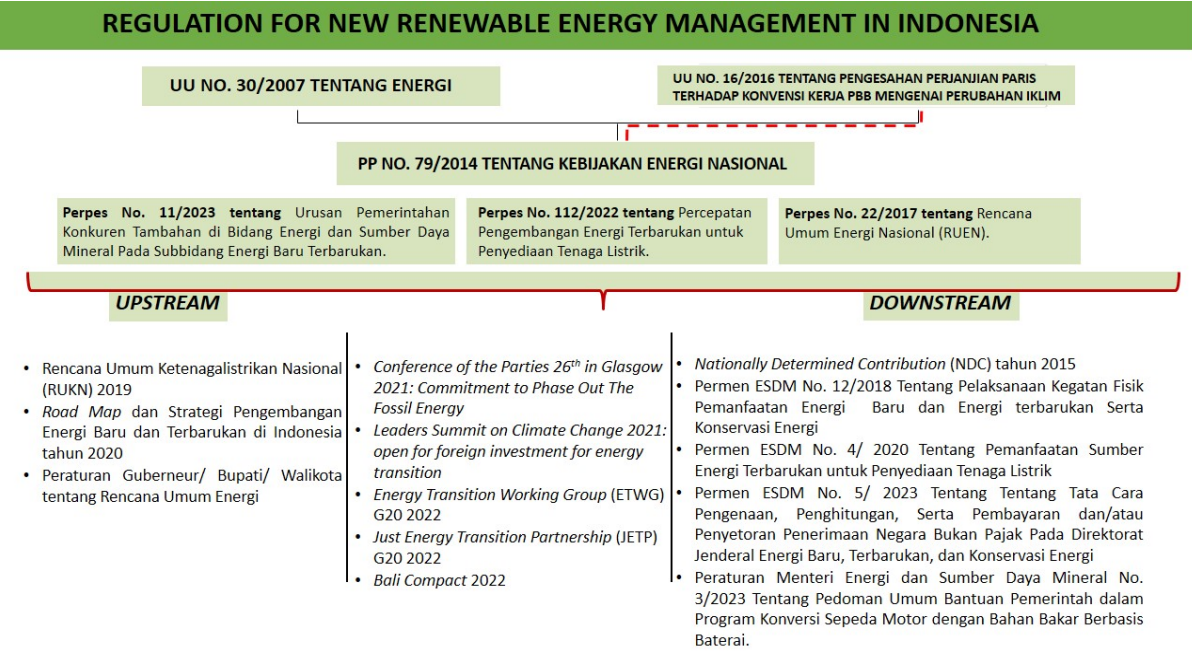
One of the commitment Indonesia in national level is Undang-Undang No. 30 of 2007 concerning Energy (UU Energy), that policy generally aims to encourage the development and use of sustainable energy resources and reduce dependence on a single resource. Through this law, the government provides incentives and a regulatory framework to develop renewable energy sources such as solar, wind, and biomass power. Apart from that, with this law, the National Energy Council was born, which was tasked with being the locomotive for the energy transition in Indonesia [22].

Regulations that were created and became an accelerator of the UU Energy is Presidential Decree No. 79, 2014 concerning National Energy Policy (PP KEN). This PP contains four main policy aspects of national energy management. These aspects include the availability of energy to meet national needs, priorities for developing energy, utilization of national energy resources, and the obligation to provide national energy reserves. This is also supported by diversification, energy conservation, and energy studies on environmental impacts. The target in this KEN is achieved maximally by 2025 [23].

Furthermore, another law is created and called Presidential Regulation Number 22 of 2017 concerning the General National Energy Plan (Perpres RUEN). This Presidential Decree is the basis for preparing more technical plans in the future, such as the General Plan for the Supply of Electricity by PLN, plans for preparing APBN/APBD by relevant Ministries, Institutions, and Regional Governments, guidelines for Ministries and Institutions for preparing strategic plans, as well as government guidelines for the Province to prepare a General

Provincial Regional Energy Plan (RUED-P) [24].

Most recently, before the G20 was held, there was a presidential decree called Presidential decree (Perpres) No. 112 of 2022 concerning the Acceleration of Renewable Energy Development for the Supply of Electric Power (Perpres Akselerasi Perkembangan Energi Terbarukan) is intended as a step to accelerate the achievement of a renewable energy mix. In this presidential decree, the State Electricity Company (PLN) is given the mandate to provide environmentally friendly energy sourced from renewable energy sources and prohibits the construction of new PLTUs but does not interfere with existing power plants. It is hoped that the presence of this presidential regulation will accelerate efforts to transition towards renewable energy and reduce greenhouse gas emissions (GHGs) [25]. The following picture are the regulations for renewable energy management in Indonesia, from the national level to the regional level mapped in the upstream and downstream analysis:



Picture 2. Regulations for New Renewable Energy Management in Indonesia
 *Processed from various sources

The policies mentioned above also require commitment and strategic steps from regional governments. From the regional level, according to the official website of the Ministry of Energy and Mineral Resources, each regional government needs to prepare a General Regional Electricity Plan (RUKD) in accordance with Undang-Undang Ketenagalistrikan No. 30 of 2009. RUKD is prepared based on the General National Electricity Plan (RUKN) and determined by the Regional Government after consultation with the People's Representative Council. There are two RUKNs prepared by the government, namely RUKN 2008–2027 and

RUKN 2019–2038 [26].

Arsita, Saputro, and Susanto (2021) stated that the presence of the General Regional Electricity Plan (RUKD) in practice is not able to fully answer Indonesia's main problems in realizing New Renewable Energy (NRE). PLN, as the only buyer of NRE in Indonesia, is experiencing difficulties because the demand and supply needed for NRE are not balanced. This is because the costs required are automatically high when switching to NRE sources. Meanwhile, in providing electricity to the community, if the tariff is set at the same figure, so this is a threat because the budget is swelling, which can lead to high state NRE. In actual application, Minister of Energy and Mineral Resources Regulation No. 4/2020 Concerning the Utilization of Renewable Energy Sources for Providing Electric Power was born as one of PLN's references in providing renewable energy for the Indonesian people. In the midst of the polemic about the high cost of renewable energy funds, a policy has emerged, namely Regulation of Minister of Energy and Mineral Resources No. 4/2020 Concerning the Utilization of Renewable Energy Sources for Providing Electric Power, which was born as one of PLN's references in providing renewable energy for the people of Indonesia.

Apart from the problem of PLN as the sole NRE player in Indonesia, Indonesia's geographical conditions, which are divided into diverse landscapes, make it difficult to reach access to realize the NRE transition [15]. For this reason, Indonesia, as a country that has a high commitment to efforts to accelerate the energy transition when there is investment made by both the private sector and the state, is focused on providing access to regions in Indonesia. This is a manifestation that the RUKD prepared by the regional government will always be accompanied by a positive commitment from the central government. So, the accessibility aspect of NRE will be accessible to all citizens at affordable prices and, of course, without damaging the environment.

In fact, PLN's problems as the sole NRE player and accessibility problems have not sufficiently disturbed the process of accelerating the NRE transition in Indonesia. There are other aspects that are challenges and obstacles, for example, related to international assistance, which has conditional joint targets. This creates uncertainty in the implementation process. If we look back, international assistance is not an important obstacle to accelerating the NRE transition in Indonesia because, basically, the Business-As-Usual scheme is already able to answer the NRE transition process. However, when international assistance is finally able to be obtained by Indonesia, the process of achieving the NRE transition can be achieved in a

shorter time or within a larger target [15].

3.4 Analysis of Barriers and Challenges in Accelerating the Energy Transition in Indonesia Towards Net Zero Emissions in 2060

3.4.1 Challenges of Eliminating Dependence on the Use of Coal Fossil Fuels in Indonesia

Based on 2019 data in the electricity sector, 60% of Indonesia's electrical energy input comes from coal. This is also inseparable from relatively competitive coal prices and high domestic coal supply [27]. This black gold has had an important role as an energy source for centuries. Apart from being used as a fuel for power plants, coal is also the main fuel for steel production, cement, alumina processing centres, paper factories, and the chemical and pharmaceutical industries. Then there are also coal by-products, including soap, aspirin, solvents, dyes, plastics, and fibre [28]. Unfortunately, the use of coal as a fossil fuel has various vital issues ranging from environmental impacts (air pollution, greenhouse gas effects, pollution of land and water sources) to social problems (land grabbing, poor health and quality of life, and social conflict). Starting from these complex problems, the government, as a policy maker and implementer, presents energy transition innovations to replace coal fossil fuels, which damage the environment, with environmentally friendly energy sources or clean energy (new renewable energy/NRE) by targeting net zero emissions (NZE) or zero carbon emissions by 2060 for Indonesia in the national energy policy roadmap.

The transition efforts undertaken to substitute energy certainly experience various challenges, one of which is eliminating dependence on the use of fossil fuels like coal. Efforts made by the Indonesian Government to encourage the development of NRE, especially in the electricity sector, are through regulations outlined in the form of PP No. 79 of 2014 concerning National Policy, which mandates that the achievement of the national energy mix targets the amount of NRE in the primary energy mix to be at least 23% in 2025 and 31% in 2030. Apart from that, other efforts being made towards Net Zero Emission (NZE) include the removal of plans to build a 13 Giga Watt (GW) coal-fired steam power plant (PLTU) project from the Electricity Supply Business Plan (RUPTL) [29].

From the explanation above, it can be underlined that the Indonesian Government's commitment to fulfilling national interests is accelerating the energy transition through several targets to be achieved, namely meeting Net Zero Emissions (NZE) by 2060 or sooner and setting an energy mix target from new renewable energy (NRE) of 23% in 2025. However, this decarbonisation effort has obstacles and challenges that are not easy because it requires political, regulatory, and reform processes, considering the vital influence of coal domestically

and globally. The Ministry of Energy and Mineral Resources noted that mineral and coal PNPB had reached IDR 70.05 trillion as of December 10, 2021. This figure had reached 179.14 percent of the previous target, namely IDR 39.1 trillion. On the other hand, investment in the mineral and coal subsector has reached USD 3.5 billion, or 81.3 percent of the target of USD 4.3 billion. The existence of strong incentives means that coal remains one of the main economic generators because royalties significantly contribute to the APBN and APBD [30].

The affordability of coal prices is also the reason why NRE (new and renewable energy) cannot yet become a full substitute for energy. Even though the costs of developing NRE are currently cheaper, financing NRE projects in Indonesia is much more expensive than coal, especially for private electricity suppliers, or IPPs (Independent Power Producers), who bear higher interest rates on dNRE for their projects. Apart from that, political risk is still a threat to the progress of NRE and is a major obstacle to increasing financing for NRE projects [30].

However, Indonesia is blessed with abundant renewable energy resources, especially geothermal, solar, and wind power. Internationally, the cost of generating renewable energy has reached parity with traditional electricity technologies such as thermal coal [31]. Renewable energy is far superior to coal and other fossil fuels if air pollution and health impacts are included in real cost calculations [32]. Based on these facts, the government is still pursuing the challenge of eliminating dependence on the use of fossil fuel coal in Indonesia through regulations and various policies, but of course it takes time because they are interdependent and require a gradual process in the energy transition towards new renewable energy (NRE).

3.4.2 The Dependence of State Budget on Coal: as a Barriers

As a country, Indonesia has national interests as a benchmark for the direction of decision-makers in formulating and implementing domestic and foreign policies. Interpretively, there are several perspectives on the concept of national interests, such as the constructivist view that national interests are interpreted as "*identity*", liberalism is interpreted as "*market institutionalization*," and the English school expresses national interests as "the formation of international society" [33]. From that, international political figure Hans Morgenthau, in his article Another Great Debate: The National Interest of the United States, said: "Every country does what they have to do: protect the physical (territorial), political, and cultural identity of the country concerned vis-à-vis other countries." [34].

Likewise, Indonesia, in its national interests, certainly desires a prosperous state and society, as summarized in the preamble to the 1945 Constitution, paragraph 4, namely, "to protect the entire Indonesian nation and all of Indonesia's blood, and to promote general welfare, educate the life of the nation, and participate in implementing a world order based on

freedom, eternal peace, and social justice." National interests represented through national development aim to create a just and prosperous society and develop the Indonesian human being. This target is in accordance with the direction of the President of the Republic of Indonesia regarding sustainable growth with equity, or growth that is sustainable and fair.

Developed and developing countries are ambitious about transitioning from fossil energy to renewable energy. The Ministry of Energy and Mineral Resources (ESDM) projects an increase in coal production of around 637 million metric tons to 664 million metric tons in 2022. This is the government's way of increasing non-tax state revenue (PNBP) from the coal sector. This projected figure increases compared to the 2021 production target of 625 million tons [35]. The coal industry is an important economic sector that makes a large contribution to the government budget. It can be said that coal is not only promoted for reasons of supporting the national economy but also has influence in regional and national politics.

The majority of coal mining is carried out by the private sector in Indonesia, but there is one large state-owned company, PT Bukit Asam (Persero) Tbk, which is also engaged in coal mining. Quite a lot of coal-fired power plants are under the control of other state-owned companies, namely PT Perusahaan Listrik Negara (PLN). And what is worth noting is that Law No. 19/2003 mandates that SOEs are not only profit-oriented but also act for the public benefit and provide guidance and assistance to SMEs, cooperatives, and community groups. The country's main sources of income from coal mining are as follows [36]; [37]:

1. Coal royalties: In the majority of PKP2B and IUP, the amount is set at between 3 percent and 7 percent of the selling price, depending on the grade of coal.
2. Corporate income tax
3. VAT: This applies to the majority of services and goods purchased and also to the sale of coal.
4. Dividends from Indonesian government equity in PT Bukit Asam Batu Bara (BUMN)
5. Fixed Land Rental Fee (Dead Rent): Producers are required to pay concession area reservation fees.
6. Land and Building Tax (PBB)
7. Import tax: VAT on import value.

In 2015–2016, for coal and other minerals, average tax revenues were IDR 30 trillion (USD 2.5 billion) per year, while non-tax revenues were almost the same [38]. Based on this data, tax and non-tax revenues from coal can be considered to be around 40 percent. Accordingly, the Indonesian government collects tax and non-tax revenues from coal at the

rate of IDR 25 trillion (USD 2 billion) per year [35].

Apart from that, in an effort to actualize national interests in international relations, the Indonesian Government, through a letter signed by the Director General of Mineral and Coal, Ridwan Jamaluddin, numbered B-1611/MB.05/DJB.B/2021, contains a coal export ban policy dated December 31, 2021. The letter contains a policy of banning coal exports aimed at three parties: first, the Director General of Foreign Trade; second, the Director General of Customs and Excise; and third, the Directors General of Sea Transportation, as authorities related to export bans. This effort was made because of concerns about low supply for domestic power plants and companies that do not comply with domestic coal supply policies or the Domestic Market Obligation (DMO). Provisions regarding DMO are contained in Minister of Energy and Mineral Resources Decree No. 139.K/HK.02/MEM.B/2021. This provision regulates the obligation of business actors to supply 25 percent of their total coal production for domestic needs.

This policy of banning coal exports received protests from several coal-importing countries, such as Japan and South Korea [39]. This protest was due to the serious impact on economic activity in the country due to its dependence on Indonesian coal. Based on data from the Handbook of Energy and Economic Statistics of Indonesia 2020, Indonesia exported 26.97 million metric tons to Japan in 2020. Tosiho Nakamura, General Manager of Mitsui & Co. Metal Raw Materials, stated that no other country could replace Indonesia's position in meeting the supply of raw minerals and coal needed by Japan, both in quantity and quality. The Japanese government's statement of attitude and foreign policy that refused was shown in various ways, such as in the form of an official rejection through a letter sent to the President of the Republic of Indonesia, strong protests in the APEC international forum, negotiation activities at various levels or diplomatic forums, and even threats to bring problems. This is to be resolved through the WTO DSB mechanism [40].

Apart from being the Sakura country, South Korea is also the fourth-largest Indonesian coal export market after Japan. Meanwhile, the amount of Indonesian coal exported to South Korea in 2020 was recorded at 24.78 million tons [41]. This policy of banning coal exports did not last long, only lasting approximately two weeks. On the other hand, the Deputy for Investment and Mining at the Coordinating Ministry for Maritime Affairs and Investment, Septian Hario Seto, said that steps to lift the ban on coal exports due to the coal crisis experienced by PLN were under control and would be evaluated. So the government revoked the policy of banning coal exports.

In the energy transition in Indonesia, it appears that the government is still experiencing

a dilemma where domestically it requires coal as income and a supplier of electrical energy, but on the other hand, there are various vital issues caused by coal production. Just like the energy transition, the Indonesian government must also carry out a fiscal transition by abandoning tax and non-tax revenues from coal, considering the various targets to be realized. Of course, this requires transparency and comprehensive dialogue. Then, international relations came under pressure from coal-exporting countries such as Japan and South Korea. This is a dynamic in the domestic political structure that requires a long process to convert coal energy to renewable energy, even though the government has targeted this energy transition policy.

3.4.3 Weakness of Funding and Technology of Clean Energy

Renewable energy can be one of the sectors that drives Indonesia's economic diversification and fiscal transition away from fossil fuels. Renewable energy technologies have now become much more cost-competitive and, internationally, much more preferable than fossil fuels, especially in terms of costs and impacts in the form of air pollution and public health. The Indonesian government has announced its target to increase the share of renewable energy in the energy supply mix from 7 percent in 2015 to 23 percent in 2025, but is experiencing difficulties in achieving this target.

Renewable energy can be one of the sectors that drives Indonesia's economic diversification and fiscal transition away from fossil fuels. Renewable energy technologies have now become much more cost-competitive and, internationally, much more preferable than fossil fuels, especially in terms of costs and impacts in the form of air pollution and public health. The Indonesian government has announced its target to increase the share of renewable energy in the energy supply mix from 7 percent in 2015 to 23 percent in 2025, but is experiencing difficulties in achieving this target [31]. Indonesia is blessed with various renewable energy sources, such as geothermal, solar, and wind. For the geothermal sector in Indonesia, fiscal treatment is still similar to that applied to the oil and gas sector in terms of schemes for tax and non-tax revenues. Revenue from the geothermal sector is relatively stable compared to fluctuating oil and gas prices, but its size is consistent with its small role in energy production. To grow the renewable energy sector in Indonesia, it is necessary to eliminate subsidies for consumption and production of fossil fuels and electricity, as well as create a more conducive investment climate [31].

However, Indonesia is blessed with abundant renewable energy resources, especially geothermal, solar, and wind power. Internationally, the cost of generating renewable energy has reached parity with traditional electricity technologies such as thermal coal [31].

Renewable energy is far superior to coal and other fossil fuels if air pollution and health impacts are included in real cost calculations [32]. Fiscal revenues from the NRE sector in Indonesia are still relatively small in accordance with its size. Renewable energy producers benefit from certain tax exemptions but are still subject to various other taxes like other electricity producers, including income tax. For the geothermal sector, fiscal treatment is still similar to that applied to the oil and gas sector in terms of schemes for tax and non-tax revenues. Therefore, NRE in Indonesia has the potential to contribute more to the budget if its share in the energy mix is increased, especially considering that fiscal revenues from renewable energy do not experience the same volatility as revenues from oil and gas. For comparison, non-tax revenues from the oil and gas sector amounted to IDR 44 trillion (USD 3.3 billion) in 2016 and IDR 78 trillion (USD 6.1 billion) in 2017, with variances determined by oil and gas prices on world markets. Meanwhile, non-tax income from the geothermal sector remained stable and amounted to IDR 0.9 trillion (USD 70 million) in 2016 and 2017 [42].

The government will also implement a carbon tax at a rate of IDR 30 per kg of CO₂ carbon. This tariff will come into effect on April 1, 2022, for PLTUs with a cap and tax scheme. In the oil and natural gas subsector, the government is preparing other strategies to reduce carbon emissions, namely plans to implement carbon capture utilization and storage (CCUS) to reduce carbon emissions while increasing oil and gas production, limiting routine flaring, optimizing the use of natural gas for households and transportation, and reducing methane emissions. Indonesia is estimated to have an abundant NRE potential of more than 3,000 GW sourced from solar, wind, hydro, geothermal, bioenergy, and marine energy. The potential and technology of NRE are the main capital for implementing the energy transition strategy towards net zero emissions by 2060. Jisman said that as of the first semester of 2020, the total national installed electricity-generating capacity had reached 71 GW. Coal-fired power plants still dominate the supply of electrical energy in Indonesia. Meanwhile, NRE power plants account for 14.69% of the total national installed power generation capacity.

Coordinating Minister for Maritime Affairs and Investment Luhut Binsar Panjaitan said Indonesia is ready to reduce carbon emissions by between 41% and 50%, provided it receives sufficient international funding support. Minister of Finance Sri Mulyani said that Indonesia needs at least US\$365 billion, or the equivalent of IDR 5,131 trillion, to reduce 29% of carbon emissions by 2030. In fact, up to US\$479 billion, or IDR 6,734 trillion, if we want to reduce 41% [35].

Renewable energy technologies have now become much more cost-competitive and, internationally, much more preferable than fossil fuels, especially in terms of costs and impacts

in the form of air pollution and public health. The Indonesian government has announced its target to increase the share of renewable energy in the energy supply mix from 7 percent in 2015 to 23 percent in 2025, but is experiencing difficulties in achieving this target [31]. Indonesia is blessed with various renewable energy sources, such as geothermal, solar, and wind. For the geothermal sector in Indonesia, fiscal treatment is still similar to that applied to the oil and gas sector in terms of schemes for tax and non-tax revenues. Income from the geothermal sector is relatively stable compared to fluctuating oil and gas prices, but its size is commensurate with its small role in energy production. To grow the renewable energy sector in Indonesia, it is necessary to eliminate subsidies for consumption and production of fossil fuels and electricity, as well as create a more conducive investment climate [31].

4. Conclusion

At the G20 conference held in Bali, Indonesia, as the only developing country included in the G20 forum, played an important role in efforts to accelerate the transition to new and renewable energy. In line with efforts to accelerate the energy transition, Indonesia's role in climate change action was present long before the G20 Summit was held. This is reflected in the birth of policies at the national and regional levels that regulate energy, more specifically in efforts to accelerate new and renewable energy. Some of the policies present are Undang-Undang No. 30/2007 concerning Energy and Law No. 16/2016 concerning Ratification of the Paris Agreement on the UN Working Convention on Climate Change, PP No. 79/2014 concerning Energy Policy, Peraturan Presiden No. 22/2017 concerning the General National Energy Plan (RUEN), which will later be included in regional policy in the form of the General Regional Energy Plan (RUED), and Peraturan Presiden No. 112/2022 concerning the Acceleration of Renewable Energy for Electricity Supply. Moreover, Indonesia's commitment to accelerating new renewable energy has also been clearly stated in Nationally Determined Contribution (NDC), which targets a reduction in earth temperature of no more than 2 degrees Celsius and NZE by 2060. The policy map that is present will ultimately strengthen Indonesia's position in the G20 in Bali. With Indonesia's commitment, one of which is supporting the issue of accelerating the energy transition, a real commitment was born in the form of a roadmap and strategy for the development of new renewable energy in 2020, the Bali Compact 2022, the Energy Transition Working Group (ETWG) G20 2022, and the Just Energy Transition Partnership (JETP) G20 2022.

Behind Indonesia's positive commitment to accelerating the issue of the New and Renewable Energy Transition within the G20. There are challenges and obstacles that

characterize these efforts. These challenges and obstacles are Indonesia's dependence on coal fossil fuels, support for non-renewable energy in the state budget, funding and technology that are still weak, so investment is needed to be able to reach all regions in Indonesia, especially in remote areas, as well as accessibility barriers in Indonesia, which are limited by geographical differences factor. Beside these, the concrete results in downstream level only show the presence of two policies that encourage Indonesia's commitment to the G20. These two policies are Peraturan Menteri ESDM No. 5/2023 Concerning Procedures for the Imposition, Calculation, and Payment and/or Deposit of Non-Tax State Revenues at the Directorate General of New, Renewable Energy, and Energy Conservation, as well as Regulation of the Minister of Energy and Peraturan Menteri ESDM No. 3/2023 Concerning General Guidelines for Government Assistance in the Motorcycle Conversion Program with Battery-Based Fuel. This indicates that the government is currently still focused on solving problems at the downstream level but has not been able to change synergistically from the upstream level because of existing obstacles. Furthermore, in the area of national policy, there has been no consolidation or harmonization of the direction of the new and renewable energy transition policy by the Ministry of Foreign Affairs, the ESDM Ministry, and other stakeholders as policy makers. Hence, we purpose the consolidation not only among the government, but also inviting society and private sector in harmonizing the goals of NRE.

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