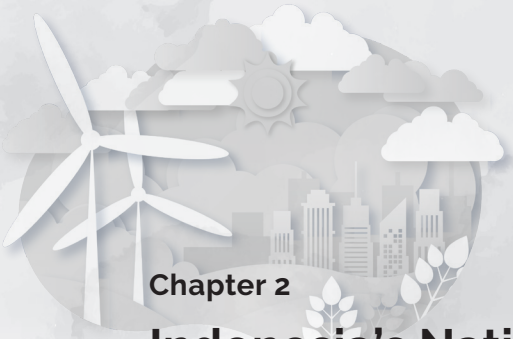

Chapter 2

Indonesia's National Strategy and Commitment towards Transition to Renewable Energy

Elisa Wahyuni & Harun Ardiansyah

A. Overview of Indonesia's Position on the Global Stage

Indonesia is set to take on global leadership. Furthermore, Indonesia has been actively engaged on the international stage and getting some recognition globally. In previous years, Indonesia has been more than once to become a non-permanent member of the United Nations Security Council (UNSC) (Ministry of Foreign Affairs, 2019). In 2022, Indonesia hosts the G20, the forum of the world's 20 biggest countries to meet and discuss multiple things. It shows that Indonesia has started showing itself to the world. However, this is not the case for the problem of climate change. Indonesia has set ambitious plans to achieve net-zero carbon emission, which is not reflected by the policies enacted within the country. Indonesia is still one of the larg-

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est coal importers in the world. Indonesia is also one of the largest polluters in the world (International Energy Agency (IEA), 2020).

This chapter explores Indonesia's current position and strategy based on the bills and laws that have been ratified. The draft of the New and Renewable Energy Bill (RUU EBT), National Energy Policy of 2014 (KEN/ PP no. 79 Tahun 2014), National Medium-Term Development Plan (RPJMN), and General Plan for Electric Power Supply (RUPTL) will be part of the references used in the following chapters. This chapter also explores Indonesia's commitment toward Net-Zero Carbon Emission 2060 which President Joko Widodo has announced.

B. Development of National Energy Policy in Indonesia

The role of government in the energy sector starts from the policy. Given this importance, developing of policies for the energy sector in Indonesia has undergone several renewals. Chronologically, the energy sector got special attention in the 1980s with the General Policy on Energy (KUBE) publication in 1981. KUBE went through two renewals in 1987 and 1991. KUBE focuses on the intensification, diversification, and conservation in the energy sector by considering energy industry, investment climate, and energy price mapping aspects (KESDM, 2006). Furthermore, KUBE got its third update by making the environment and energy prices the main aspects in 1998.

In the next decade, the Government issued Presidential Decree no. 5 of 2006 concerning National Energy Policy (KEN). The purpose of KEN is the setting of goals and objectives policies as initial guidelines for the General National Energy Plan (RUEN). However, KEN cannot stand alone without legal protection from Law, which then in 2007 Law no. 30 the year 2007 about Energy which is still used as the primary legal protection related to energy today. That regulation also determines the establishment of the National Energy Council (DEN) as a committee assigned to formulating KEN. In 2014, KEN as Presidential Decree No. 5/2006 was revoked along with the update of PP No. 79 of 2014 concerning the National Energy Policy

which is used as the foundation for the RUEN (issued as Presidential Regulation No. 22 of 2017 focused on the General National Energy Plan). Until now, the 2017 version of RUEN is the main guideline for deciding the direction of energy development in Indonesia until 2050.

In its implementation, Law no. 30/2007 about Energy, could not stand alone, which was then supported by the authorization of the Law No. 30 of 2009 concerning Electricity used as the foundation of the Plan General Electricity National (RUKN) and Law no. 32 years 2009 on Environmental Protection and Management. Apart from these two regulations, there are still many other policy instruments related to the energy sector in Indonesia. Apart from historical aspects, the complexity of policy and bureaucracy is one of the reasons why investment in the energy sector is difficult. Renewable energy is developing in Indonesia; therefore, innovation is needed in policies to facilitate the development of New and Renewable Energy.

As of March 2022, the House of Representatives of Indonesia (DPR RI) is still finalizing the New and Renewable Energy Draft Bill. This bill is supposed to be the comprehensive legal base of Indonesia's commitment to new and renewable energy. Current regulations are still scattered in many bills and presidential regulations. With the mandate from this bill, it is expected that the investment in new and renewable energy in Indonesia will become more accessible and more accommodating. Thus, the energy transition that the Indonesian Government has planned can become an actual realization.

As a comprehensive bill, this bill includes the A–Z of new and renewable energy, the road map and transition to new and renewable energy, and all legal matters that can push the investment of new and renewable energy in a progressive way. This bill defines new energy as all types of energy that come from new non-renewable technology or non-renewable energy sources. This includes nuclear energy and other types of energy which will be defined by Government Regulation. In terms of nuclear energy, this bill would provide a legal case to start the investment on nuclear energy. Nuclear energy is no longer considered "the last option" of energy to be deployed. In some discussions, new

energy includes hydrogen, and carbon-based new energy/storage systems such as gasified coal, methane, and others.

This draft bill provides a legal case to justify the investment in renewable energy, which is defined as, among others, solar energy, wind energy, hydropower, geothermal, biomass, and waste energy. This bill is intended to create a sustainable climate to invest in renewable energy in Indonesia. It includes regulations on the business permit of renewable energy suppliers, supply and demand regulations, health and safety environment, renewable energy cost, incentives, and many more.

One distinct topic that will also be included in this bill is the renewable energy portfolio standard. It is defined as a standard to be fulfilled by non-renewable energy suppliers and operators to produce electricity using non-renewable energy sources. This portfolio standard will be based on the carbon emission targets defined in the National Energy Policy and National General Energy Plan (DPR RI, 2021; *Rancangan Undang-Undang Energi Baru Dan Terbarukan*, 2021).

Carbon capture technologies such as Bioenergy with Carbon Capture and Storage (BECCS) and Integrated Gasification with Combined Cycle and Carbon Capture and Storage (IGCC + CCS) are also potential to be part of the effort to transition from fossil fuel technologies to new and renewable technology. Undoubtedly, these technologies will be important to change Indonesia's energy mix drastically. However, this chapter focuses on the primary energy source, as defined in the New and Renewable Energy draft bill.

C. Indonesia's Nationally Determined Contribution along the Years

The Copenhagen accord is one of the outcomes of the 15th Conference of Parties (COP) that highlights the importance of global efforts to tackle climate change. The accord was drafted by the United States and the BASIC countries (Brazil, South Africa, India, and China). Although this accord is not legally binding, it underlines the importance

of a strong political will to cut greenhouse gasses with "principal of commons but differentiated responsibilities and respective capabilities. This accord also endorses the continuation of the Kyoto Protocol and the establishment of the "Copenhagen Climate Fund" to support the efforts to reduce greenhouse gas emissions (UNFCCC, 2009). As a result, the countries that ratified this accord included their emission pledges, including Indonesia.

Indonesia, through the National Council on Climate Change, has pledged to reduce the CO_2 emission by 26% to 41% by 2020. To fulfill such a plan, a National Action Plan would be enacted through a Presidential Decree, said to be released by March 2010 (Dewan Nasional Perubahan Iklim, 2010). There are seven major areas to focus on to reduce CO_2 emissions. They are peatland, forestry, agriculture, energy, industry, transportation, and waste.

In December 2015, the Paris Agreement, a global agreement adopted by Paris climate conference (COP21), was launched as the first-ever universal, legally binding global climate change agreement. Today, 193 parties (192 countries and the European Union) have joined the agreement. The agreement includes pledges from all countries to decrease their emissions level and collaborate to adapt to the effects of climate change, as well as a call for countries to strengthen their pledges over time. The agreement paves a pathway for developed countries to assist the developing countries with their climate mitigation and adaptation efforts while also establishing a framework for transparent monitoring and reporting of the Governments' climate targets. The Paris Agreement set a long-term framework to guide the global effort for decades. The agreement is the start of a world with zero emissions. The implementation of the agreement is also very critical to achieve the Sustainable Development Goals.

Today, the Governments agreed to keep the global average temperature below 2 degrees Celsius compared to pre-industrial levels and 1.5 degrees Celsius as the maximum increase could be achieved. To contribute to the agreement's objectives, all parties must submit a comprehensive national climate plan known as national determined

contributions (NDC). Besides, all countries must come together every five years to assess their progress to achieve the agreed long-term goals and upgrade their NDC. Those countries also have to report transparently to the public how the implementation process works and track their progress on their commitments under the agreement through a strong transparency and accountability system.

In this event, the Government of Indonesia pledged its commitment to reduce the emissions to 29% by 2030 unconditionally (business as usual) or up to 41% conditionally or with international support. The unconditional target is increased by 3% compared to 2010 in the Copenhagen Accord. In the first term of the Joko Widodo presidency, the priority actions within the national *Nawa Cita* (Nine Priority Agendas) framework was determined and implemented. These include protecting the Indonesian citizens, encouraging rural and regional development, improving the quality of life, and increasing productivity and global competitiveness. These fundamental missions align with the country's commitment to a low-carbon, climate-resilient development path, with climate change adaptation and mitigation as a central and cross-cutting goal in the National Medium-Term Development Plan (RPJMN).

According to the agreement, countries should come together five years later to update their objectives. The 26th session of the conferences of the Parties or COP 26 was initially scheduled to take place from November 9–19, 2020 in Glasgow, United Kingdom. However, due to COVID-19, the event was postponed to October 31–November 13, 2021. This event was attended by 120 heads of state and governments. On November 13, 2021, all countries in COP26 Glasgow agreed to the Glasgow Climate Pact to keep the 1.5 degrees Celsius and finalize the outstanding elements of the Paris Agreement. The Glasgow Climate Pact also concluded that many countries wish to fully integrate science into the decision-making process. It recognizes the significance of the Intergovernmental Panel on Climate Change (IPCC) according to most recent report. The Pact frames the action in science here and in later sections, demonstrating that COP26 is responding to what scientists believe needs to happen to keep 1.5 degrees Celsius in reach.

At this event, Indonesia recognized for the appearance of its President, Joko Widodo, was attracting global attention. One of the main issues of COP26 was deforestation and Indonesia was one of the countries known for this issue. The Indonesian President pledged during the event that the forestry sector, which contributed 60% of Indonesia's emissions, will reach the carbon net sink by 2030 (Suoneto & Paramitha, 2021). Besides the forestry sector, the energy sector is the other main contributor to Indonesia's emissions. In this sector, Joko Widodo added that Indonesia utilizes new renewable energy, including biofuels, and develops clean energy-based industries, one of which is the construction of the world's largest green industrial area in North Kalimantan province (Sekretriat Kabinet RI, 2021).

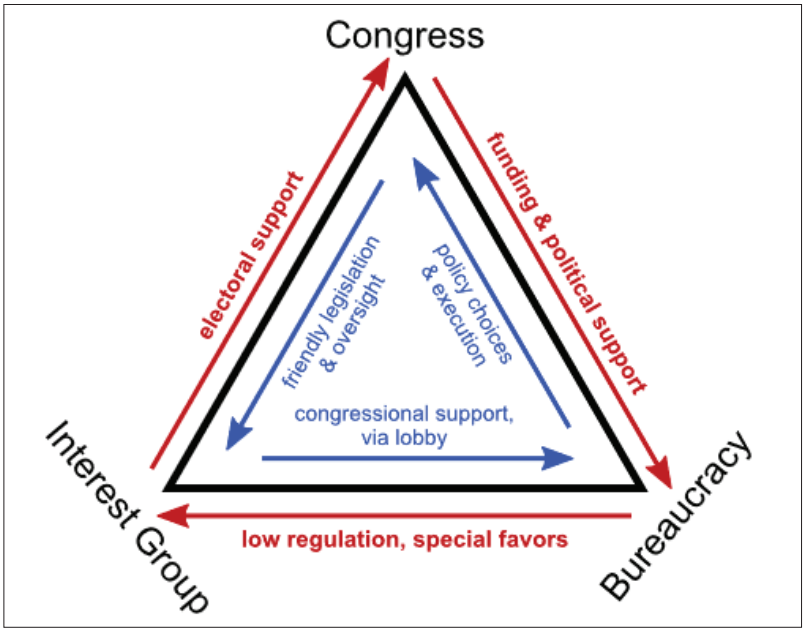
In the updated version of Indonesia's NDC for COP26, Indonesia has pledged to reduce carbon emissions and prepared a long-term strategy (LTS) that defines the pathways to achieve low carbon emissions by 2050. In the energy sector, Indonesia has pledged to increase the use of new and renewable energy by at least 23% of the total energy mix in 2025 and at least 31% of the total energy mix in 2050; reduce the use of oil for energy mix less than 25% in 2025 and less than 20% in 2050; reduce the use of coal for energy mix by minimum 30% in 2025 and minimum 25% in 2050; and reduce the use of gas for energy mix by minimum 22% in 2025 and minimum 24% in 2050. It is a rather ambitious target since Indonesia is one of the main coal exporters in the world.

D. Stakeholders in Indonesia's Energy Ecosystem

Energy is a unique topic. The ecosystem consists of many stakeholders that play a significant role in understanding how Indonesia's energy system works in terms of industry and policy making. In United States politics, there is a concept called the *Iron Triangle*. Iron Triangle is a concept of policy making and governance relationship between three major stakeholders in the United States: the House of Representatives (Congress), the State/Federal Government (Bureaucracy), and the interest groups that may consist of the lobbyist, non-governmental

organizations, and many others. The relationships between those three institutions highly affect the policy-making process in the United States. Those relationships are shown in Figure 2.1. Meanwhile, Indonesia is not like the United States, though the relationship between the energy stakeholders in Indonesia is quite similar to the United States. These three groups have influenced each other to implement energy policy in Indonesia.

Indonesia's electricity grid is centralized. It means that PT PLN Persero has the control to provide a reliable grid throughout the country. PT PLN Persero is one of the stakeholders in the bureaucracy part (PT Perusahaan Listrik Negara, 2021). The Ministry of Energy and Mineral Resources (MEMR) is also one of the stakeholders of energy in Indonesia. The role of MEMR is to regulate the energy industry from the front-end to the back-end.



Source: Hayden (2002)

Figure 2.1 The Illustration of Iron Triangle

The House of Representatives plays the role to oversight the implementation of energy policies in Indonesia. The House of Representatives, in collaboration with the executive branch, has a role to legislate new rules and policies to be implemented in Indonesia to foster Indonesia's energy market.

Another stakeholder that is rarely talked about is the interest groups. Interest groups are individuals or organizations with the same concern on energy policy in Indonesia and try to push a specific agenda on energy to be implemented in Indonesia. In many countries, interest groups push policies to benefit society. These groups are, for example, non-government organizations and inter-government organizations. However, these groups are still very limited in numbers and influence in Indonesia. It is, in fact, important to have interest groups control and balance the policies in Indonesia.

E. Energy Distribution from Generators to End Users

PT PLN Persero considers the realization of the power load and the completion of power plant projects and various indicators affecting the condition of electricity supply such as economic growth, then prepares a business plan for providing electricity from 2021–2030. The main activities in the electricity supply business plan include general policies and assumptions, demand forecasting, generation planning, transmission planning, distribution planning, GI planning, isolated generation planning, and consolidation. The realization of this activity is divided into several operational areas: Sumatra, Java, Madura and Bali, Kalimantan, Sulawesi, Maluku, Papua, and Nusa Tenggara (PT Perusahaan Listrik Negara, 2021). Since energy distribution is centralized in PT PLN Persero, it plays a huge role in energy transition.

PT PLN Persero has planned the electricity supply in Indonesia through the Electricity Supply Business Plan (RUPTL). In this plan, PT PLN Persero has mapped out some plans for adding new renewable energy producers and the reliability of the transmission grid.

F. Indonesia's Current Energy Targets

National Energy Policy was introduced by Government Regulation No. 79 the year 2014. National Energy Policy is an energy management policy based on a principle of fairness, sustainability, and environmental insight for the independence of national energy and energy resilience. National energy policy covers both demand and supply side policy and underlines the need for immediate implementation of energy conversion in all sectors to reduce the dependence on oil fuel, diversify energy, alleviate poverty, increase economic growth, and promote environmentally friendly development. A clear target is set for each type of energy in 2025: the share of oil will be reduced to no more than 25%, natural gas to 22%, coal no more than 30%, new (nuclear energy) and renewable energy (geothermal, biomass, hydro, solar cell, and wind, coal bed methane, etc.) up to 23%. In 2050, the share of oil will be reduced to no more than 20%, natural gas to 22%, coal no more than 24%, and NRE will increase by up to 31% (Indonesia, 2014). This regulation has been the legal basis of Indonesia's renewable energy target. Since then, the investment in renewable energy has been boosted. However, in 2019, the National Energy Council reported that the share of renewable energy in Indonesia's energy mix is still less than 15% (National Energy Council of Indonesia, 2020). It proves that more aggressive regulations and enforcement are necessary to achieve the carbon emission target.

Furthermore, Indonesia sets new goals for the COP26. Indonesia's National Determined Contribution updated 2021 highlights greenhouse gas reduction of 26% by 2020 and 41% by 2030; limiting global temperature rise to 2°C by 2015–2019 and presses it to 1.5°C after 2019. In this chapter, we only limited the climate factors to greenhouse gas (Ministry of Environment and Forestry Directorate General of Climate Change, 2021). On the other hand, the Ministry of Energy and Mineral Resources released its roadmap toward net-zero carbon

emission. The plan includes a solar power-dominated renewable energy mix that will account for 23% of Indonesia's energy mix by 2025; 42% of renewable energy in Indonesia's energy mix by 2030; 71% of renewable energy by 2040; Commercial Operation Date (COD) of Indonesia's first nuclear power plant by 2045; 87% of renewable energy by 2050; and finally, 100% of renewable energy by 2060.

The Ministry of Energy and Mineral Resources (MEMR) made an Energy projection scenario in Indonesia Energy Outlook 2019 with three scenarios: Business as Usual (BaU), Sustainable Development (PB), and Low-Carbon (RK) with any assumption as shown in Table 2.1. MEMR uses two programs that synergize them to get optimal results: LEAP for the energy total model and Balmorel for the electricity model. Based on the projection, the primary energy mix for the BaU scenario in 2025 is 21% NRE, 24% gas, 34% coal and 21% oil, while the primary energy mix in 2050 is 29% NRE, 23% gas, 32% coal and 16% oil. The energy mix target mandated in National Energy Policy has not been reached. The primary energy mix in the PB scenario in 2025 is 23% NRE, 21% oil, 24% gas, and 32% coal. In 2050, it will become 32% NRE, 15% oil, 24% gas, and 29% coal. Compared to the target in National Energy Policy, the NRE target in 2025 can be reached and the NRE target in 2050 is higher than the National Energy Policy's target. The primary energy mix in the RK scenario in 2025 is 36% NRE, 19% oil, 21% gas and 24% coal. In 2050, it will become 58% NRE, 8% oil, 12% gas, and 22% coal. Compared to the target in National Energy Policy, the NRE share in 2025 and 2050 is very optimistic and higher than the target in National Energy Policy. In conclusion, the NRE share target of 23% by 2025 and 31% by 2050 can be achieved by at least by implementing assumptions in the PB scenario (National Energy Council of Indonesia, 2020).

Table 2.1 Scenarios of Assumptions towards Net-Zero Emission

Assumption	BaU	PB	RK
Economic Growth	5.6% (Based on 2045 Indonesian Vision-Bappenas)		
Population Growth	0.7 % (Based on Statistics Indonesia-Bappenas 2045)		
Biodiesel Target	2025: 20%	2025: 30%	2025: 30%
	2050: 30%	2050: 30%	2050: 100%
Bioethanol Target	2025: 5%	2025: 20%	2025: 20%
		2050: 50%	2050: 85%
City gas development	Year 2025: 4.7 million household connection	The development of 1 million household connection/ Year starting from 2020	The development of > 1 million household connection/Year starting from 2020
Substitution of LPG to Induction Stove	2025: 0.5%	2025: 1%	2025: 2%
		2050: 2%	2050: 5%
LPG substitution with DME	2050: 20%	2025: 20%	2025: 20%
Electric Car Target (% toward total vehicle population)	2025: 0.01%	2025: 0.01%	2025: 0.5%
	2050: 0.07%	2050: 0.24%	2050: 1.18%
Electric Motorcycle Target (% toward total vehicle population)	2025: 1.38%	2025: 1.44%	2025: 1.18%
	2030: 1.5%	2030: 1.7%	2030: 3%
Power Plant	RUPTL	RUEN	Emission reduction > RUEN
		Switching 10% capacity of Steam PP to Biomass PP	Switching 30% capacity of Steam PP to Biomass PP
		25% of luxury houses use Rooftop Solar	30% of luxury houses use Rooftop solar

Source: National Energy Council of Indonesia (2020)

From the calculation of CO_2 emission based on IPCC, the total projection of emission in 2030 will increase to 912-million-ton CO_2-eq (BaU), 813-million-ton CO_2-eq (PB), and 667-million-ton CO_2-eq (RK). Thus, the CO_2 emission projection in three scenarios is lower

than the emission target in NDC for the energy sector (National Energy Council of Indonesia, 2020). This questions Indonesia's commitment to the transition to renewable energy. Moreover, no official document (other than NDC and its LTS) currently describes and enforces Indonesia's plan and strategy toward net-zero carbon emission. Some presentation documents from several ministries might be found to address this problem. Still, an official statement from the government (probably through Presidential Regulations) is also important to enforce Indonesia's commitment. A necessary intervention from the Government is crucial to achieve Indonesia's target of net-zero carbon emission. More investment in the development and deployment of carbon-free and renewable energy should be pushed harder by the Government.

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