

## Indonesia's Compliance with the Paris Agreement through Energy Transition in Power Generation 2016-2020

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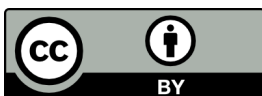
<https://doi.org/10.20885/iconish.vol2.art10>

**Abstract:** The Paris Agreement has the goal to prevent global warming from staying below 2 degrees Celsius. Energy transition of power plants is one of the mitigation action plans to reduce greenhouse gas (GHG) emission levels in the energy sector. Indonesia has great potential for renewable energy such as solar energy, wind energy, geothermal energy, and hydropower. Many developed countries have succeeded in reducing GHG emissions through the energy transition to power plants and Indonesia has the opportunity to gain valuable insights from the successful implementation of energy transition in power plants in other countries. Indonesia benefits from support provided by countries that have achieved success, as mandated by the Paris Agreement. Developed nations are obligated to assist developing countries like Indonesia. This study analyzes the form of Indonesia's compliance in implementing the energy transition in power plants using Mitchell's Compliance Theory. Researchers will analyze three indicators of influence, output, outcome, and impact. This research uses a qualitative method because the quantitative data obtained is data published by the government and ministries, which has gone through a calculation process. Researchers only use this data to see the type of Indonesian compliance through compliance theory.

**Keywords:** Paris Agreement, Energy Transition, Compliance, Output, Outcome, Impact

### 1. Introduction

On April 22, 2016, under the leadership of President Joko Widodo, Indonesia signed the Paris Agreement and ratified the Paris Agreement into Law Number 16 of 2016. The Paris Agreement is one of the IEA's (International Environmental Agreements), which limits the



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increase in the earth's temperature to remain below 2 degrees Celsius, or even better, up to 1.5 degrees Celsius, compared to pre-industrial levels. Each country that ratifies the Paris Agreement is required to determine its respective commitments through the NDC (Nationally Determined Contribution). The NDC is a reference for implementing mitigation and adaptation commitments designed by countries to achieve the goals of the Paris Agreement. Indonesia submitted its first NDC in November 2016. Indonesia's mitigation action plan is carried out by reducing GHG (greenhouse gas emissions) (Direktorat Jenderal Pengendalian Perubahan Iklim, n.d.).

In 2015, Indonesia was the fourth-largest contributor to GreenHouse Gases emissions in the world. The largest GHG emissions come from the forestry sector in the form of deforestation and forest fires. Followed by the energy sector, which comes from the mining, processing, and use of fossil energy, such as petroleum, natural gas, and coal. Indonesia's mitigation efforts in the NDC are to reduce GHG emissions by 29% to 41% with international support, with respective proportions in five sectors, including forestry (17.2%), energy (11%), agriculture (0.32%), industry (0.10%), and waste (0.38%), which is expected to be achieved in 2030 (Direktorat Jenderal Pengendalian Perubahan Iklim, n.d.).

Indonesia's energy sector is not the largest contributor to GHG emissions. However, Indonesia's energy sector, which still relies on fossil energy such as petroleum, natural gas, and coal, needs to be given more attention considering that Indonesia is included in the top five coal exporting countries and took first place in 2019 (Buchholz 2021). Sources of GHG emissions from the energy sector consist of emissions from fuel combustion, fugitive emissions or emissions that are accidentally released during fuel production and supply activities, and emissions from CO<sub>2</sub> transportation and injection in CO<sub>2</sub> storage activities in geological formations. All of these emissions come from various human activities in various sectors, which in the process require the use of electrical energy, including the forestry, agricultural, industrial, and waste sectors, which are the emission reduction targets in the NDC (Inventarisasi Emisi GRK Bidang Energi 2020,9).

One of the efforts made by Indonesia to reduce GHG emissions in the energy sector is to carry out an energy transition from using fossil energy to using EBT in power plants. In 2015, Indonesia's electricity generation mix was 56% coal, 25% gas, 8% BBM, 6% hydroelectric power, and 5% EBT ("Bauran Pembangkitan Listrik di Indonesia – Transisi Energi", n.d.). Almost all human activities currently require electricity; in fact, many transportation and household appliances have switched to using electrical energy. However, if the electricity used still comes from fossil fuel power plants, it will still produce large GHG emissions. Therefore, the energy transition in power plants needs to be a priority before the transition in the transportation, industrial, and household sectors. According to analysis from the IESR (Institute for Essential Services Reform), it is estimated that coal-fired power plant GHG emissions could reach more than 300 million tons before 2028. If electricity supply continues to depend on fossil power plants, it will be difficult for Indonesia to achieve the goals of the Paris Agreement (Saputra and Simanjuntak 2021).

In 2016, Indonesia is estimated to have an EBT potential of 801.2 GW, which can be utilized as an energy source for electricity generation. It would be a shame if the great potential that Indonesia has is not being utilized (“Directorate General of EBTKE, Ministry of Energy and Mineral Resources,” 2016). The target for the use of EBT in power plants in the NDC is 7.4 GW based on RUPTL unconditionally (CM 1) and 21.65 GW conditionally (CM 2). The unconditional target (CM1) is an emissions scenario with mitigation scenarios and sectoral development targets. The conditional target (CM2) is a more ambitious emissions scenario and takes into account sectoral development targets if international support is available (“First Nationally Determined Contribution” 2016). This research aims to find out how Indonesia complies with the Paris Agreement through the energy transition in power plants in 2016–2020.

## 2. Literature Review

Government Regulation No. 79 of 2014 is the policy that became the reference for formulating Indonesia’s first NDC. The journal entitled “Indonesia’s Transition Towards Renewable Energy,” written by Ahmad Rahma Wardhana and Wening Hapsari Marifatullah, discusses the energy trilemma consisting of energy security, energy equity, and environmental sustainability. Wardhana and Makrifatullah believe that it is difficult for Indonesia to achieve all three simultaneously. Until the end of 2018, 84.93% of power plants built still used fossil energy because, during President Joko Widodo’s leadership, Indonesia focused on accelerating development (Wardhana & Marifatullah, 2020, 271).

Indonesia succeeded in maintaining energy security and equity but failed to achieve environmental sustainability, so PP No. 79/2014 has not been achieved properly. Wardhanan and Marifatullah also believe that the NRE target of 23% still does not reflect support for environmental sustainability, and public awareness of the importance of the energy transition is still lacking. So the central and regional governments need to make passive efforts to increase public awareness and knowledge about EBT (Wardhana & Marifatullah, 2020, 281).

The journal is entitled “How Can Indonesia Achieve Its Climate Change Mitigation Goals? An Analysis of Potential Emission Reduction from Energy and Land-use Policies,” written by Arif Wijaya et al., also states that Indonesia must immediately focus more on developing EBT, or energy transition. Indonesia must also strengthen policies and regulations that regulate the use of fossil energy, the energy transition, and renewable energy. Indonesia’s potential in EBT is very large and can strengthen Indonesia. Meanwhile, Indonesia still depends on fossil energy. Indonesia needs a more ambitious GHG emission reduction scenario to achieve the conditional and unconditional NDC targets (Wijaya et al., 2017).

From a legal perspective, in a journal written by L.Y. Sulistiawati entitled “Indonesia’s climate change national determined contributions: a distant dream or possible reality?” analyze what regional governments are doing in efforts to implement NDC, namely reducing GHG emissions and preventing global climate damage. to see the gap and disjointness of regional regulations in Indonesia in supporting national regulations from the perspective of legal scholars. There are 416 city and district governments in Indonesia, and 115 regulations that mention climate change can be analyzed by Sulistiawati using normative methods. The conclusion obtained is

that direct regional and local regulations have not been found that truly support the current national strategy for implementing the NDC. This shows that there are significant gaps and disjointed local regulations, and there appear to be differences in perceptions of climate change at the national level and the district or city level. Lack of substantial understanding and vision of the core problems of climate change in the field (Sulistawati, 2020).

The three journals above focus only on how Indonesia has attempted to reduce GHG emissions and how far Indonesia has achieved, so that it only shows the nature of Indonesia’s compliance with the Paris Agreement. There is no previous research regarding how much influence the Paris Agreement has had on Indonesia in its efforts to reduce GHG emissions. In this research, the author will analyze the Paris Agreement because it is important to analyze it from two sides, namely Indonesia and the Paris Agreement, to truly understand the reasons for Indonesia’s achievements or attitude towards the Paris Agreement. The author will carry out an analysis using Ronald B. Michell’s Compliance Theory.

### 3. Method

In this research, the author uses Compliance Theory by Ronald B. Mitchell. Mitchell categorized forms of compliance into four categories: treaty-induced compliance, coincidental compliance, good faith non-compliance, and intentional non-compliance.

**Table 1.** Compliance Categories According to Law and International Relations Scholars

<p style="text-align: center;"><b>Treaty induced-compliance</b></p> <p>Legal compliance behavior and the state’s obedient and optimistic implementation of the IEA or International Environmental Agreements. The country succeeded in achieving the goals of the IEA because of the influence of the IEA.</p>	<p style="text-align: center;"><b>Coincidental compliance</b></p> <p>Legal compliance behavior in which the country succeeds in achieving the goals of the IEA, but not because of the influence of the IEA. But there are other influences.</p>
<p style="text-align: center;"><b>Good faith non-compliance</b></p> <p>Legal non-compliance behavior. However, the country tries to achieve the targets of the IEA even though it fails to achieve the standards or targets of the IEA, so the country is considered to have failed in implementing the IEA.</p>	<p style="text-align: center;"><b>Intentional non-compliance</b></p> <p>Legal non-compliance behavior. Countries do not succeed in achieving IEA standards or targets because there is no effort from the country to achieve IEA standards or targets.</p>

Lawyers and international law scholars analyze state compliance behavior through the extent to which states fulfill their commitments to the IEA (International Environmental Agreements). However, if you analyze country compliance using only one approach, namely, looking at the extent to which countries fulfill their commitments or just by looking at whether or not there is an influence of the IEA on changes in country behavior or changes in the environment, according to Mitchell, it is still insufficient. Such an analysis raises two analytical problems. First, assuming that treaty-induced compliance and coincidental compliance behavior imply state success due to the influence of the IEA is to overestimate the influence of the IEA. There

are many reasons countries can fulfill their commitments without any influence from the IEA or simply because countries happen to have the same goals as the IEA. Second, the non-compliance category, implying a lack of IEA influence, is also misleading. If countries make real efforts to achieve IEA goals but fail to fulfill commitments or achieve IEA targets, then it is categorized as good faith non-compliance (Mitchell,2017).

There is a need for further analysis of the forms of compliance and non-compliance behavior of countries in achieving IEA goals. International relations scholars analyze state compliance behavior through a broader set of questions. They look for links to changes in country behavior or environmental changes that can be linked to the IEA, whether there is influence from the IEA or not. Mitchell was invited to identify indicators of the IEA's influence, find out where the IEA's influence on the country is, and look for the IEA's shortcomings. There are three indicators of influence, namely, outputs, outcomes, and impacts. The following is a brief explanation of the three indicators of influence, according to Mitchell:

1. Output is international law in the IEA, which is adopted as national law. Can be in the form of laws, policies, and regulations.
2. Outcomes, or results, are changes in the way governments or sub-state actors behave. It can take the form of changes in the political, economic, and diplomatic actions of state actors.
3. Impact is a change in environmental quality. Are there any changes in the environment after the IEA was ratified? (Mitchell,2017). In this research, researchers collected article or journal data through official government websites and sub-actors involved in implementing the energy transition in the electricity sector. Researchers collected data, among others, from the Ministry of Energy and Mineral Resources website, the Directorate General of EBTKE, PT PLN Persero, IESR, and other sources. The flow of this research is as follows: data collection, data understanding, data analysis using compliance theory, and answering the problem formulation and conclusion.

#### **4. Results and Discussion**

Every country that has ratified the Paris Agreement is required to submit an NDC (Nationally Determined Contribution) document. In accordance with Article 4, paragraph 2, of the Paris Agreement, which states, "Each party is obliged to prepare, deliver, and maintain nationally determined contributions for the next period to be achieved, Parties must undertake domestic mitigation efforts in order to achieve the objectives of these contributions." Those referred to as parties are countries that ratify the Paris Agreement according to Article 1, Paragraph 3. The NDC contains mitigation and adaptation action plans that countries will take to reduce greenhouse gas emissions so that the goals of the Paris Agreement are achieved. Indonesia submitted its first NDC in November 2016. Indonesia's adaptation action plan is to develop and implement RAN-API (National Action Plan for Climate Change Adaptation), which provides a framework for various adaptation initiatives that have been prioritized in national development planning. Indonesia's mitigation action plan is to reduce GHG emissions. Indonesia has set an unconditional GHG emission reduction target of 29% and a conditional target of up to 41% compared to the business-as-usual scenario in 2030. With the proportion of forestry (17.2%), energy (11%),

agriculture (0.32%), industry (0.10%), and waste (0.38%), Government Regulation Number 79 of 2014 concerning National Energy Policy is the reference for formulating GHG emission reduction targets in Indonesia's NDC ("NDC Pertama Indonesia" 2016).

In the energy sector, the mitigation action plans in the NDC that Indonesia will take to reduce GHG emissions are efficiency of final energy consumption, application of CCT (Clean Coal Technology) technology, increasing the use of EBT in power plants, use of biofuels in the transportation sector, additional network gas, and the addition of gas refueling stations. The mitigation action plan is expected to accelerate the reduction of GHG emissions. Increasing the use of NRE in electricity generation needs to be carried out as soon as possible on an ongoing basis because, apart from increasing GHG emissions, the availability of non-renewable or fossil energy sources such as petroleum and coal is also decreasing. The focus of this research is to analyze Indonesia's compliance by increasing the use of EBT in power plants, which is carried out through implementing the transition from the use of fossil energy to the use of EBT in power plants. The target for the use of EBT in power plants in Indonesia's first NDC, which is sought to be achieved by 2030, is 7.4 GW based on the target in the RUPTL (Electricity Supply Business Plan) unconditionally (CM 1) and 21.65 GW conditionally (CM 2) ("NDC Pertama Indonesia" 2016).

## 4.1 Output

The output is international law in the IEA, which is adopted into national law. In 2014, Indonesia had a national energy mix target as a form of effort to reduce GHG emissions, as regulated in Government Regulation Number 79 of 2014. Furthermore, Indonesia ratified the Paris Agreement into Law Number 16 of 2016 and submitted Indonesia's first NDC in November 2016. By ratifying the Paris Agreement and submitting NDC documents, Indonesia has an obligation to commit to reducing GHG emissions. In the main material number 1, point c of Undang-Undang Nomor 16 Tahun 2016 states, "Komitmen Para Pihak untuk mencapai titik puncak emisi gas rumah kaca secepat mungkin dan melakukan upaya penurunan emisi secara cepat melalui aksi mitigasi." In English, "The commitment of the parties to reach the peak point of greenhouse gas emissions as quickly as possible and make efforts to reduce emissions quickly through mitigation actions."

Rapidly reducing emissions through mitigation actions refers to the GHG emission reduction target in Indonesia's first NDC. The state's obligation to reduce GHG emissions is written in Article 4, Paragraph 1, of the Paris Agreement. "In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gasses in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty."

## 4.2 Outcome

Outcomes, or results, are changes in the way the government or sub-state actors behave. Mitchell stated, “Behavioral change is useful as an indicator since IEAs almost always identify behavioral changes that must occur to achieve agreement goals.” According to Mitchell, changes in the way governments or sub-state actors behave are very helpful in analyzing state compliance because, in a state’s efforts to achieve the goals of the IEA, there must be visible changes in behavior. Although Mitchell also believes that there are several shortcomings in analyzing compliance through outcomes, These shortcomings are that some government or sub-state actor behavior is not easy to observe because some behavior is not transparent; some behavior is also sometimes carried out for purposes and reasons other than the IEA; and sometimes it is quite difficult to see whether the behavior is really influenced by the IEA. Sometimes significant changes in behavior are not enough to solve existing problems (Mitchell, n.d, 896.).

Indonesia already has plans to implement an energy transition, but the implementation of the energy transition in Indonesian power plants had not gone well enough before the Paris Agreement because there was still a large dependence on the use of fossil energy, especially coal. After ratifying the Paris Agreement, Indonesia has a mitigation target in the form of increasing the use of EBT in power plants to reduce dependence on coal and reduce GHG emissions. Increasing the use of EBT in power plants is carried out through the implementation of transitions in power plants. From this, it can be seen that the Paris Agreement has had an influence on efforts to implement the energy transition in power plants in terms of outcomes. The following is a further analysis of the implementation of the energy transition in power plants to find out how much the Paris Agreement influenced Indonesia’s attitude toward implementing the energy transition in power plants, as seen through outcomes or results.

Firstly, Indonesia’s outcomes in formulating and establishing the legal basis regarding the EBT sector and the electricity sector, as well as changes and additions to the legal basis regarding the EBT sector and the electricity sector. The legal basis, or regulations and policies, are important elements in implementing the energy transition in Indonesian power plants. The existence of a legal basis or policy regulations can provide much convenience in implementing the energy transition in the Indonesian electricity sector. UNAIR Energy Law Expert Indria Wahyuni said that the law must be able to accommodate three factors in the EBT transition plan, namely, a transition that pays attention to energy security, paradigm change, and guaranteeing public participation. A transition that pays attention to energy security is related to the energy trilemma, namely that the transition to renewable energy does not immediately eliminate the use of fossil energy sources because the direction of policy movement can give rise to an energy crisis. Until now, the need for electrical energy in Indonesia has continued to increase due to development programs. The paradigm change is that the benefits of the energy transition must be utilized for the development of EBT so that it can answer the main challenge in developing EBT, namely the very expensive costs. Guaranteeing public participation means involving the surrounding community in the development plan flow from upstream to downstream (“Fakultas Hukum Universitas Airlangga” 2022).

After Indonesia ratified the Paris Agreement, the author saw a change in behavior from the government and sub-state actors in the process of formulating, changing, and establishing the legal basis regarding the EBT sector and the electricity sector. The following is the legal basis that was formulated, amended, and established after Indonesia ratified the Paris Agreement. On March 2, 2017, Presidential Regulation Number 22 of 2017 concerning the RUEN (General National Energy Plan) was enacted. Presidential Regulation Number 22 of 2017 was ratified as the legal basis for the preparation and formulation of the RUEN. According to Article 1, paragraph 1, RUEN is the central government's policy regarding the national-level energy management plan, which is an elaboration and implementation plan for the cross-sectoral national energy policy to achieve the KEN (National Energy Policy) targets. In the attachment to Presidential Regulation Number 22 of 2017 in Chapter II, Point 9, it is stated that one of the functions of KEN is to respond to global agendas such as the Paris Agreement. So KEN has a target or aim to accelerate the development of EBT while simultaneously reducing the rate of increase in GHG emissions, which is then outlined in RUEN. Furthermore, RUEN will become a guideline for regional governments to formulate the RUED (General Regional Energy Plan). RUEN targets a renewable energy mix of 23% of the total primary energy supply in 2025 and 31% in 2050 ("PERPRES No. 22 Tahun 2017" 2017).

On May 24, 2017, Minister of Energy and Mineral Resources Regulation Number 39 of 2017 concerning the Implementation of Physical Activities for the Utilization of New and Renewable Energy and Energy Conservation was stipulated. The purpose of this regulation is to regulate the use of EBTKE or EBT. Article 1 paragraph 1 states, "Physical activities utilizing new energy and renewable energy as well as energy conservation, hereinafter referred to as Physical Activities Utilizing EBTKE, are activities in the context of utilizing energy, either directly or indirectly, from new energy sources and renewable energy for the generation of electrical and non-electrical power." and increasing the efficiency of energy utilization. According to Article 2, physical activities for utilizing EBTKE are carried out in order to support sustainable national development through increasing national energy security. The scope of physical activities utilizing EBTKE, according to Article 3, is the construction, procurement, and installation of installations providing electricity from new energy and renewable energy, installations providing non-electric bioenergy fuel, energy efficiency equipment, revitalization or rehabilitation of installations utilizing new energy, renewable energy, and energy conservation, and other physical activities utilizing EBTKE ("Permen ESDM No. 39 Tahun 2017", n.d.).

In 2018, Minister of Energy and Mineral Resources Regulation Number 39 of 2017 was updated with Minister of Energy and Mineral Resources Regulation Number 12 of 2018. Minister of Energy and Mineral Resources Regulation Number 12 of 2018 was stipulated on February 19, 2018. Changes and additions were made to accelerate the development of physical activities utilizing new energy and renewable energy as well as energy conservation, so it is necessary to re-arrange the provisions regarding the proposal and purchase of electric power for physical activities utilizing new and renewable energy as well as energy conservation ("Permen ESDM No. 12 Tahun 2018" 2018).

The government also established the legal basis for buying, selling, and supplying electricity to increase the efficiency of electricity supply businesses and strive to develop EBT-based electricity in Indonesia in 2017, namely Minister of Energy and Mineral Resources Regulation Number 12 of 2017 concerning the Utilization of New Renewable Energy Sources for the Supply of Electricity on January 27, 2017. Minister of Energy and Mineral Resources Regulation Number 12 of 2017 Article 3 paragraph 1 confirms that PT PLN Persero is obliged to purchase electricity from power plants that utilize renewable energy sources, or EBT (“Kementerian ESDM Terbitkan Aturan” 2017).

On August 7, 2017, Minister of Energy and Mineral Resources Regulation Number 50 of 2017 was stipulated. Minister of Energy and Mineral Resources Regulation Number 50 of 2017 revoked Minister of Energy and Mineral Resources Regulation Number 12 of 2017. The stipulation of Minister of Energy and Mineral Resources Regulation Number 50 of 2017 aims to accelerate the development of renewable energy for the benefit of national electricity, so it is necessary to re-arrange the provisions regarding the mechanism and price of purchasing electricity by the State Electricity Company (Persero), which utilizes renewable energy sources. PT PLN’s obligation to purchase electricity from EBT generators is still the same as in Minister of Energy and Mineral Resources Regulation Number 12 of 2017 (“Permen ESDM Nomor 50 Tahun 2017” 2017).

Then in 2020, Minister of Energy and Mineral Resources Regulation Number 50 of 2017 was amended by Minister of Energy and Mineral Resources Regulation Number 4 of 2020, which was stipulated on February 24, 2020. The aim of this change is to accelerate the development of renewable energy for electricity purposes, so it is necessary to reorganize the provisions regarding the mechanism for purchasing electricity from power plants that utilize renewable energy sources. Also to increase the economic value of the results of the construction of power plants that utilize renewable energy sources. The main changes to the second Minister of Energy and Mineral Resources Regulation Number 50 of 2017 are changes to the purchasing process, cooperation schemes, regulation of reservoir or irrigation hydroelectric power plants built by the PUPR Ministry, assignment of PLTSa, and assignment of purchasing electricity to PLN for EBT generators whose funding comes from grants. EBT power plants regulated in Minister of Energy and Mineral Resources Regulation Number 4 of 2020 are Pembangkit Listrik Tenaga Surya or solar power plant, Pembangkit Listrik Tenaga Bayu or wind power plant, Pembangkit Listrik Tenaga Panas bumi or geothermal power plant, Pembangkit Listrik Tenaga Air or water power plant, Pembangkit Listrik Tenaga Biomassa or biomass power plant, Pembangkit Listrik Tenaga Biogas or biogas power plant, Pembangkit Listrik Tenaga Bahan Bakar Nabati or biofuel power plant, Sea Hydroelectric Power Plant, Reservoir Hydroelectric Power Plant, and Pembangkit Listrik Tenaga Energi Baru Terbarukan Hibah or new renewable energy power generation grants by another country or company (“Penyempurnaan Regulasi” 2020).

In 2018, a draft law on new renewable energy (EBT) was published by the Indonesian House of Representatives. In the academic background of the draft law on EBT, it is stated that Indonesia’s dependence on fossil energy, which causes GHG emissions, sustainable development targets, meeting energy availability, and the ratification of the Paris Agreement into Law Number

16 of 2016 are some of the reasons for the government to draft the law. invite EBT to prioritize the development and optimization of new and renewable energy sources (EBT). Regulations that have been issued by the government regarding new and renewable energy often undergo changes so that they cannot yet become a strong legal basis and guarantee legal certainty because they have not been comprehensively regulated in a law. So special regulations are needed in a separate law in a comprehensive manner that will regulate new and renewable energy as a legal basis and become a reference for the statutory regulations below. The EBT law is planned to contain 61 articles that regulate the energy transition, roadmap for developing EBT, utilization and management of EBT, licensing of EBT companies, exploitation of EBT, provision of EBT, utilization of EBT, research and development, environmental management, selling prices, intensive, and EBT funding (“Pusat Perancangan Undang-Undang”, n.d.).

Second, the influence of the Paris Agreement on outcomes or results on efforts to increase capacity or efforts to develop technology, science, and funding in the EBT sector and electricity sector carried out by the government and sub-state actors. Article 11, paragraph 1, of the Paris Agreement contains the obligation of countries to increase capacity. The following is the content of Article 11, Paragraph 1. “Capacity-building under this Agreement should enhance the capacity and ability of developing country Parties, in particular countries with the least capacity, such as the least developed countries, and those that are particularly vulnerable to the adverse effects of climate change, such as small island developing States, to take effective climate change action, including, inter alia, to implement adaptation and mitigation actions, and should facilitate technology development, dissemination and deployment, access to climate finance, relevant aspects of education, training and public awareness, and the transparent, timely and accurate communication of information.”

Efforts to increase capacity in the EBT sector and electricity sector take the form of our own efforts and efforts that receive support from other countries. After the ratification of the Paris Agreement, Indonesia received benefits as part of the Paris Agreement, referred to as “Parties,” in the form of a framework for financial, technical, and capacity development support for countries in need. Article 11, paragraph 3, of the Paris Agreement states that developed countries have an obligation to provide assistance to developing countries. “All Parties should cooperate to enhance the capacity of developing country Parties to implement this Agreement. Developed country Parties should enhance support for capacity-building actions in developing country Parties.”

The following are capacity-building efforts carried out by Indonesia after ratifying the Paris Agreement. Through its own efforts at the end of 2017, IESR (Institute for Essential Service Reform) initiated the establishment of ICEF (Indonesia Clean Energy Forum). ICEF was founded based on the ratification of the Paris Agreement and the energy mix targets in RUEN. ICEF is a forum whose aim is to support the development of the EBT sub-sector and the electricity sub-sector through exchanging objective and innovative ideas on EBT and electricity issues between selected members. ICEF’s core members consist of 25 individuals from various backgrounds, namely high-state institutions, utilities, business people, think-tanks, and experts. With the existence of ICEEF, it is hoped that the implementation of the energy transition in the electricity

sector will run better. On November 15, 2018, ICEF was inaugurated by the Minister of the Ministry of Energy and Mineral Resources, Ignasius Jonan. ICEF meets regularly to discuss policy issues with Chatham House Rules and offer recommendations to policymakers. There is also an annual event as part of ICEF activities called the Indonesia Energy Transition Dialogue (IETD). IETD was held to share ideas and knowledge and build understanding of the energy transition with wider stakeholders (“Indonesia Clean Energy Forum (ICEF)”, n.d.).

Through their own efforts and with the support of other countries, the Indonesian government and sub-state actors carry out capacity-building cooperation with other countries. Collaboration between Indonesia and other countries takes the form of assistance in science, technology, and investment or funding in the energy or EBT sector and the electricity sector. Science, technology, and investment are the main elements needed in implementing the energy transition in the electricity sector, because these three elements will support the development, procurement, and installation of renewable energy power plants. The main obstacle to implementing the energy transition in the electricity sector is when constructing, procuring, and installing renewable energy power plants because not all countries have adequate knowledge, technology, and large investments.

In 2016, Indonesia and New Zealand signed the New Zealand-Indonesia Joint Commitment for Development Cooperation document. The signing was carried out in Jakarta on December 20, 2016 by Kennedy Simanjuntak as Deputy Minister of PPN BAPPENAS and Trevor Matheson as New Zealand’s representative to Indonesia. This collaboration is one of New Zealand’s aid and development programs. New Zealand has obligations under the UNFCCC and the Paris Agreement to provide financial support, capacity building, and technical transfers for developing countries to meet their climate change goals (“Aid and Development” 2022). Through the New Zealand-Indonesia Joint Commitment for Development, New Zealand provides support to Indonesia to make improvements in the EBT, agriculture, disaster risk management, and knowledge and skills sectors. This collaboration took place starting in 2017 and is planned to be completed in 2022 (“Aid partnership with Indonesia”, n.d.).

In 2017, Indonesia and Germany implemented cooperation in the EBT and electricity sectors through REEP (Renewable Energy for Electrification Program). REEP runs until 2020 under the auspices of GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit). REEP is based on the national energy mix target and the Paris Agreement goal of reducing GHG emissions. The aim of REEP is to provide support to Indonesia to increase electricity capacity in an environmentally friendly way, namely by utilizing EBT. REEP is implemented using a bottom-up approach that considers various aspects regarding technology, research, and finance while paying attention to renewable energy issues in Indonesia. The state actors involved in the project are the Ministry of Energy and Mineral Resources, the Directorate General of Electricity, the Directorate General of EBTKE, PT PLN Persero, and the Regional Government.

Furthermore, we are increasing capacity through our own efforts and by getting assistance from other countries through efforts to increase the development, procurement, and installation of EBT power plants after Indonesia ratified the Paris Agreement. PT PLN Persero, as one of

the sub-actors involved in implementing the energy transition in the electricity sector, showed support by signing a PPA (power purchase agreement) with many IPPs (independent power producers), including. PPA is an agreement between PLN and IPP regarding the sale of electrical energy generated by IPP exclusively to PLN. The PPA contains terms and conditions that bind PLN and IPP. IPP is an independent electricity generation company, or private company, that generates electricity independently and also involves foreign investors. The electricity generated by the IPP will later be purchased by PT PLN Persero to meet Indonesia’s electricity needs (“Buku IPP” 2017).

**Table 2.** Progress of the EBT Power Plant PPA Project by IPP Throughout 2017–2020

Progres Proyek PPA	Jumlah	Keterangan
Commercial Operation Date	28	- PPA 2017: 22 project - PPA 2018: 2 project - PPA 2019: 4 project
Konstruksi	26	- PPA 2017: 23 project - PPA 2018: 3 Project
FC (Financial Closing) Preparation	23	- PPA 2017: 17 project - PPA 2019: 2 project - PPA 2020: 4 project
Termination	9	- PPA 2017: 8 project - PPA 2019: 1 project

The target for the use of EBT in power plants in Indonesia’s first NDC, which is sought to be achieved by 2030, is 7.4 GW unconditionally (CM 1) and 21.65 GW conditionally (CM 2). The achievement through the PPA Project in 2020 is that 28 EBT Power Plant projects with a total capacity of 448,247 MW have been operating commercially, or COD (Commercial Operation Date). It can be said that the achievement of using EBT in power plants is still very far from the target, both unconditionally and conditionally.

Indonesia still cannot escape the use of fossil energy. In the 2018–2027 RUPTL, which revokes the 2017–2026 RUPTL, there are still plans to build, develop, and increase the capacity of fossil fuel power plants from 2017 to 2026. These power plants are coal PLTU, gas/steam gas/engine power plant gas (PLTG/GU/MG), and diesel power plants (PLTD). Development and addition plans are carried out in the Sumatra region, Java, Bali, and Nusa Tenggara regions, the Kalimantan region, the Sulawesi region, and the Maluku and Papua regions (“Rencana Usaha Penyediaan” 2018).

The outcome analysis shows that the implementation of the energy transition in Indonesian power plants is more influenced by the existence of the Paris Agreement. The existence of NDC targets and obligations for countries that have ratified the Paris Agreement to achieve GHG emission reduction targets influence Indonesia to show forms of compliant behavior, even though Indonesia’s compliant behavior is still insufficient to achieve the targets of the Paris Agreement.

### 4.3 Impact

An impact is a change in environmental quality that can be felt or seen. The advantage of using environmental changes for analysis, according to Mitchell, is that environmental changes can be evidence of forms of compliance behavior and evidence of the influence of the IEA. According to Mitchell, the drawback of using environmental change for analysis is that many factors influence environmental change, not only human activity. So it is difficult to know whether environmental changes that occur are the result of state efforts. Environmental changes that occur, whether positive or negative, could occur due to other factors and not due to the country’s non-compliance with the IEA.

Environmental changes in the implementation of the energy transition in power plants from 2016 to 2020 can be seen through changes in GHG emission levels from 2016 to 2020 in electricity generation activities. According to the Indonesia Energy Outlook 2021, GHG emissions produced by power plants from 2016 to 2019 have increased. In 2020, GHG emissions experienced a slight decrease (“Indonesia Energy Outlook 2021,” 2021). The following is a graph of the level of GHG emissions resulting from the electricity generation process:

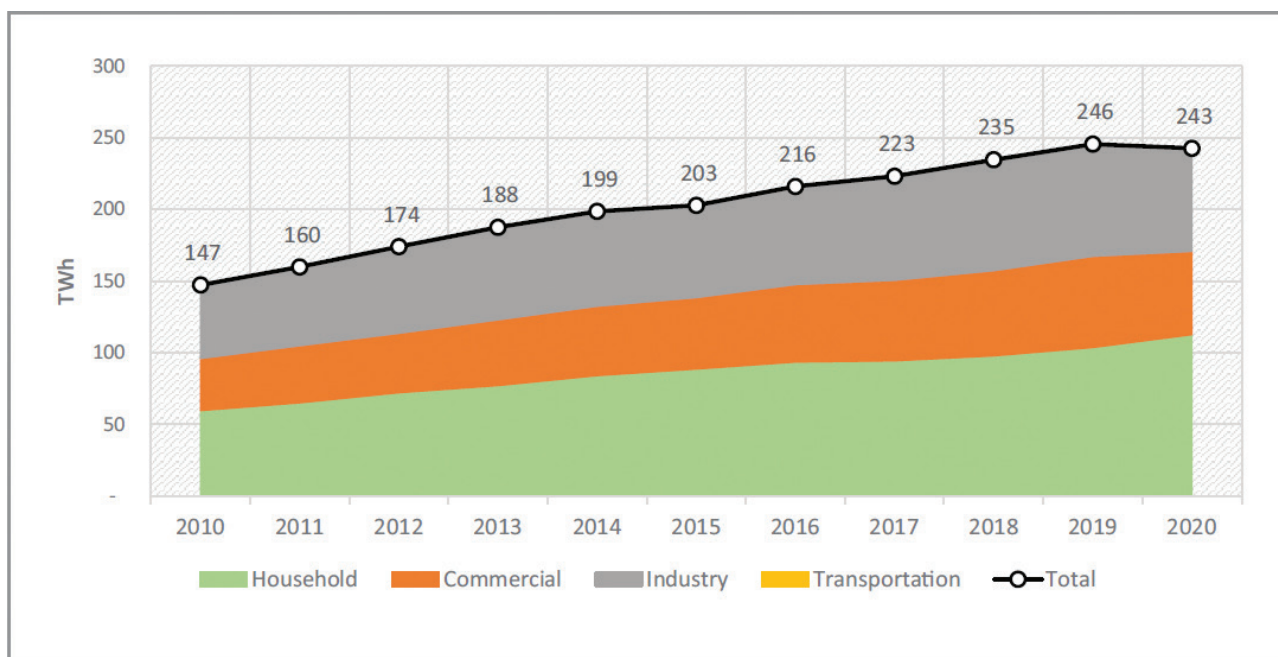


Fig. 1 Tingkat Emisi GRK Pembangkit Listrik Tahun 2015-2020

The cause of the continued increase in GHG emissions is Indonesia’s high need for electrical energy in various sectors. The largest electricity consumption is in the industrial sector, followed by the transportation sector and households. Electrical energy consumption in the transportation sector is the use of electrical energy on the MRT, LRT, and Monorail. Only in 2020 did GHG emissions decrease due to reduced electricity consumption amidst the COVID-19 pandemic (“Indonesia Energy Outlook 2021” 2021).

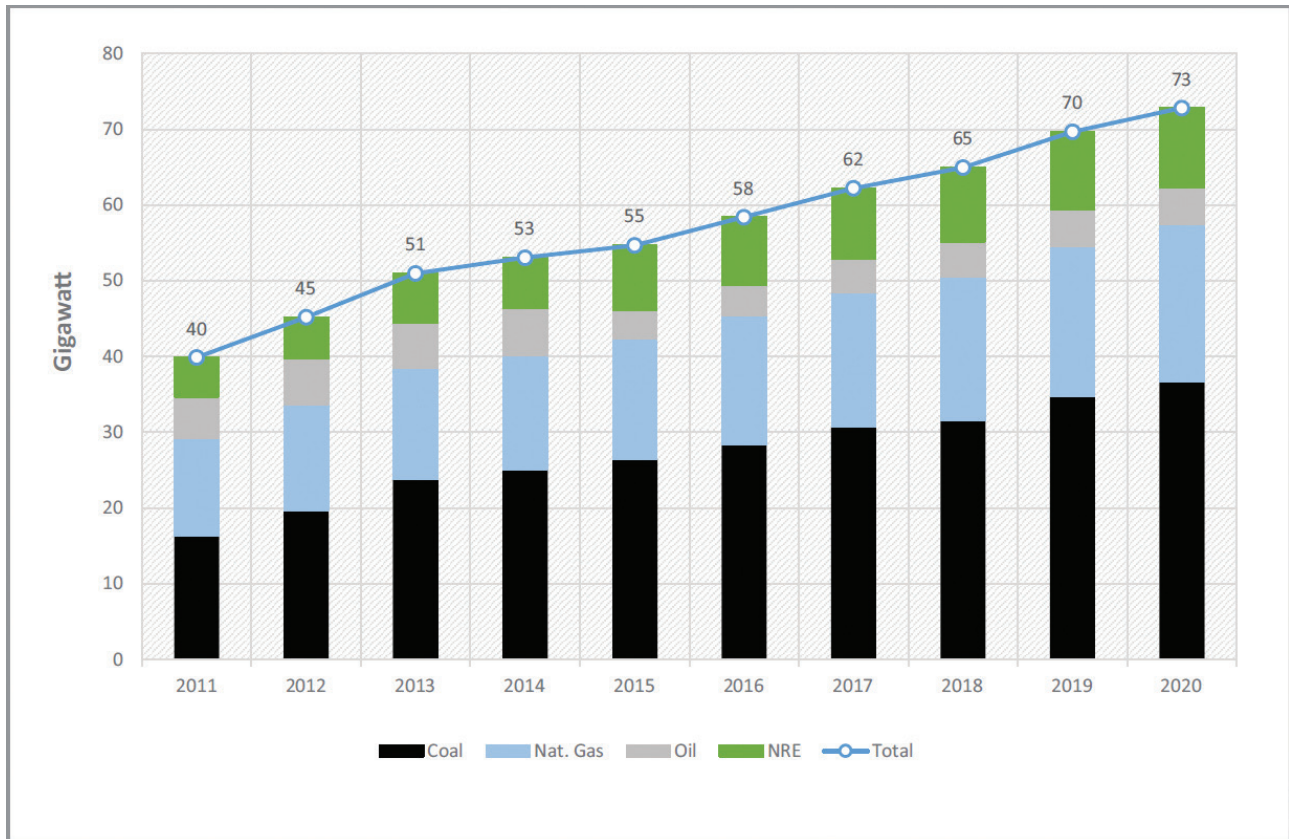
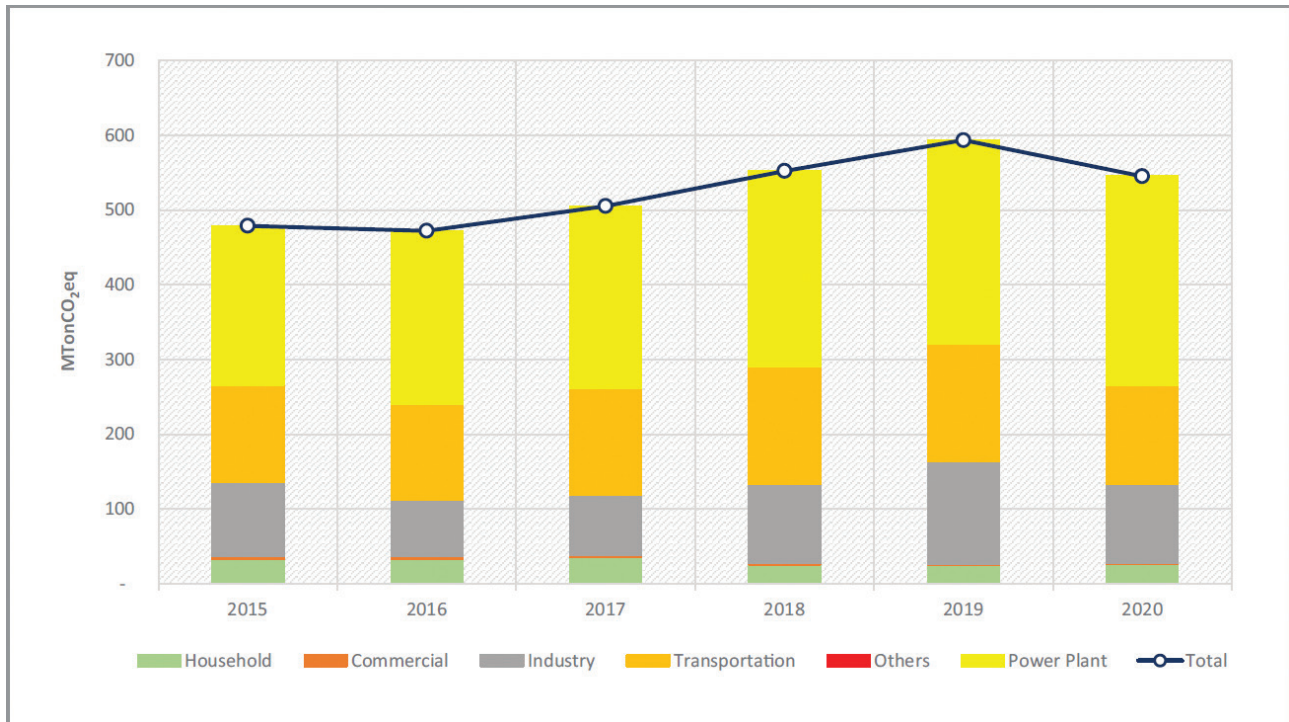


Fig. 2 Electrical Energy Consumption 2010-2020

To meet the high demand for electrical energy above, Indonesia still relies on the use of fossil energy. According to data from the Indonesia Energy Outlook 2021, Indonesia’s electricity generation will still be dominated by more than 50% of the use of coal until 2020 (“Indonesia Energy Outlook 2021” 2021). Based on a press release from the Ministry of Energy and Mineral Resources, in 2020, renewable energy power plants contributed 14.69% to the national electricity supply, with a total capacity of 10,467 MW (“Generating Capacity in Indonesia”). As also explained in the outcome, Indonesia still has plans to build, expand, and increase the capacity of fossil fuel power plants in the RUPTL, which was ratified by the Indonesian Minister of Energy and Mineral Resources. The following is a table of the energy mix in Indonesian power plants:



**Fig. 3** Energy Mix in Power Plants 2011-2020

Another cause of Indonesia's still high GHG emissions is the low level of interest from domestic and foreign investors to invest in the construction and development of renewable energy power plants compared to the level of investment interest in fossil fuel power plants, even though Indonesia has large renewable energy potential. The government has a major role in the low investor interest. Firstly, the regulations governing EBT funding or investment are still not strong and detailed enough. The government is still more focused on fossil energy sources and provides large subsidies in this sector, so the EBT electricity prices set by the government are not yet considered profitable for investors when compared with the profits from electricity tariffs originating from PLTUs ("Permasalahan Investasi Energi"2020).

## 5. Conclusions

Indonesia's steps to ratify the Paris Agreement were influenced by two things: Indonesia's own interest in reducing GHG emissions and the existence of the Paris Agreement itself. However, the influence of self-interest is still not enough to implement the energy transition in Indonesian power plants. Judging from the outcome, without the Paris Agreement, efforts to reduce GHG emissions through energy transition in power plants may not be as good as when Indonesia ratified the Paris Agreement. The obligation for each country to commit to NDC targets drives Indonesia's outcomes in implementing the energy transition in power plants. The existence of an article that requires developed countries to provide assistance to developing countries makes it easier for Indonesia to collaborate with developed countries. It can be concluded that the Paris Agreement has had a major influence on Indonesia's form of compliance.

Next, we look at the form of Indonesian compliance in Mitchell’s four compliance categories. Through output, according to Mitchell, if the IEA has been implemented into national law, then the country will have a legally compliant attitude. If there is no implementation of the IEA into national law, then the country is categorized as non-compliant. Indonesia has ratified the Paris Agreement into Law Number 16 of 2016, so Indonesia cannot be said to be disobedient. Through outcomes, the country is said to be compliant if there is a change in behavior by the government or sub-state actors. This change in behavior can occur because of the country’s interests, and these interests are in line with the IEA’s objectives, in accordance with the characteristics of the coincidental compliance category. Behavioral changes can also occur due to the influence of IEA, in accordance with the characteristics of treaty-induced compliance. Viewed through a counterfactual approach, Indonesia’s outcome corresponds to one of the characteristics of treaty-induced compliance. Through impact, the country can be said to comply if there are changes in the environment. If a country does not ratify the IEA but there are changes, the country has the characteristics of good faith non-compliance. If there is no change, then the state has the characteristics of intentional non-compliance. Indonesia ratified the Paris Agreement and has not shown any changes in the environment, so through its impact, Indonesia does not fulfill one of the four categories of compliance. This is also due to Indonesia’s lack of outcomes in implementing the energy transition, as explained in the outcomes sub-chapter. To make it easier to understand, here is an overview of Indonesia’s output, outcomes, and impact in the table:

**Table 3.** Forms of Indonesian Compliance Behavior

Influence Indicators	State Behavior
Output	There is an implementation of the IEA into national law □ Ratification of the Paris Agreement into Law Number 16 of 2016.
Outcome	There are changes in behavior or outcomes, but Indonesia’s outcomes are still insufficient to achieve the Paris agreement target □ Indonesia’s dependence on fossil energy is still large.
Impact	There is no change in the environment due to poor outcomes and investment problems.

According to the description of the four forms of compliance behavior in Table 3, Indonesia’s form of compliance tends to be close to the treaty-induced compliance category, but Indonesia still does not meet the impact.

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