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## The Condition of Electricity Oversupply in Indonesia

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### Abstract

The purpose of this study is to determine the condition of electricity supply in Indonesia, which experienced a shortage in 2015 but is currently experiencing an oversupply. Starting from the existence of a 35,000 MW mega project which turned out to be in line with the Covid-19 pandemic, the use of electrical energy was stagnant, even though the addition of electrical energy supply continued to grow. This is also coupled with the problem of the proportion of fossil energy use which is still more than that of new and renewable energy. So that makes PLN have to spend a large amount of money and has not been balanced with the results obtained. The solution is to increase electricity demand, namely by adding new market niches to increase productive electricity demand. As well as through various bundling and promos to increase customer comfort, for example, promos to increase power, discount home charging for electric vehicle owners, the use of electric stoves and so on.

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### INTRODUCTION

In 2015 as many as 11 of the 22 major electricity systems in Indonesia, experienced a deficit (Marwan a, 2015). The electricity deficit means that the growth of electricity consumption is not offset by the development of power generation capabilities, as a result, at that time there were often rotating power outages, because the available power was still lower than customer needs (Citarsa et al, 2018). This causes economic activity to be hampered and many requests for additional power cannot be met, so the economy is also underdeveloped.

Then a 35,000-Megawatt Program was created, which is to add Indonesia's electricity supply for five years. The ambition of the 35,000 MW project is the beginning of the problem of oversupply of electricity from the State Electricity Company. This happened because of the construction of a new coal-fired power plant, which at the same time the economy slowed down due to the Covid-19 pandemic. The continuous increase in the number of coal-fired power plants is an agenda to fulfill the 35,000 MW mega project initiated by President Jokowi during the 2014 Presidential Election. The new plant continues to be built in accordance with PLN's General Plan for Electricity Supply (RUPTL) 2021-2030. It turns out that the 35,000-megawatt (MW) program, which makes PLN's electricity supply now in excess condition compared to customer load or consumption. In addition, the 35,000-megawatt (MW) program turns out to make PLN's electricity supply currently overloaded compared to customer load or consumption. Moreover, the 35,000-megawatt program is actually not evenly distributed throughout Indonesia. As a result, starting in 2020 there will be an increase in excess power or excess supply of generating capacity due to decreased demand due to the Covid-19 pandemic. The oversupply of electricity in Indonesia is above 40% on average (Muliawati, 2023). Meanwhile, electrification in West Kalimantan, East Nusa Tenggara, and eastern Indonesia has not reached 100 percent.

The program to add 35,000 Mega Watts of electricity is included in the five development agendas of the Ministry of Energy and Mineral Resources, especially agendas 1 and 5, namely, the Strategy of the Ministry of Energy and Mineral Resources in order to support the policy direction of the ESDM sector which includes in 5 (five) development agendas are as follows:

#### **Development Agenda 1: Strengthening Economic Resilience for Quality Growth**

Management of economic resources

A solid macroeconomic foundation by strengthening the quality of investment and domestic innovation is the direction of Indonesia's economic development plan. The policy direction related to the ESDM sector is the management of economic resources and the increase in economic added value. While the implementation strategy is as follows:

- a. Fulfilling energy needs by prioritizing the increase in NRE which will be implemented with the strategy: Additional NRE generation capacity of 9.1 GW in the 2020-2024 period, so that the portion of additional installed capacity of NRE plants to total generation increases from 2020 by 15% to 20% in 2024; Acceleration of BBN development through domestic biofuel utilization of 17.4 million kL; Improving the implementation of energy conservation and efficiency with a target of primary energy intensity reaching 133.8 SBM / Rp Billion (constant 2010) and a decrease in final energy intensity by an average of 0.9 SBM / Rp Billion per year; and Developing NRE supporting industries through the utilization of domestic component levels in the NRE generation sector, with details of targets for 40% solar power plants, 40% PLTB, 70% hydropower, 40% bioenergy and 35% geothermal.
- b. The utilization of natural gas and coal resources for industry and electricity will be focused on: Natural gas resources are implemented by considering the entire potential of natural gas supply and paying attention to the methodology on demand. Natural gas production in 2024 is targeted at 1,314 thousand BOEPD and 68% is used for domestic allocations. Coal utilization must prioritize domestic energy needs by gradually reducing coal exports, and still pay attention to optimizing state revenues. To ensure the security of domestic coal supply, the Government has established the obligation of coal mining companies to allocate part of their production for coal needs for domestic users/DMO with a target of 187 million tons by 2024.

#### **Development Agenda 5: Strengthening Infrastructure to Support Economic Development and Basic Services**

The five policy directions and strategies in order to fulfill access, energy supply and electricity are equitable, reliable, efficient, and sustainable are:

Diversification of energy and electricity to meet needs, pursued through:

- a. Increased NRE such as geothermal, water, solar, biomass, and marine energy as well as other NRE.
- b. Development of clean energy-based mini/microgrids.
- c. Development and utilization of energy storage system including batteries.
- d. Utilization of rooftop solar energy and floating solar power plants along with the development of the domestic solar cell industry.

Improved efficiency of energy and electric power utilization, through:

- a. Development of Energy Service Company (ESCO).
- b. Expanding, rehabilitating, and increasing the capacity of transmission and distribution systems.
- c. Development of information management and data control systems.
- d. Development and utilization of smart grid technology.
- e. Utilization of more efficient and low emission (HELE) technology.

Strengthening and expanding energy supply and electric power services, pursued through:

- a. Fulfillment of electricity in priority areas.
- b. Provision of new electrical installation assistance to underprivileged households.
- c. Support for the provision of primary energy (gas and coal) for electricity.
- d. Increased capacity of domestic oil refineries.
- e. Improvement of natural gas infrastructure, especially such as gas transmission pipelines and non-pipeline distribution, especially LNG receiving terminals.
- f. Development of fuel and LPG buffer/operational reserves.
- g. Construction of urban jargas, LPG, and electricity-based clean stoves.

- h. Improving national engineering capabilities for energy and electricity supported by domestic industries.
- i. Expansion of one-price fuel distribution.
- j. Development of supporting infrastructure for electric motor vehicles.

Improved energy and electricity governance, through:

- a. Improvement of institutional duties and functions in the electricity sector.
- b. Strengthening the independence of the transmission system operator.
- c. Encourage energy price/tariff policy and its implementation so as to gradually achieve economic prices.

Development of funding and financing policies, through:

- a. Development of targeted subsidies through direct subsidies and reallocation of spending.
- b. Application of adjustments to electricity tariffs and energy prices.
- c. Utilize financing with light and reasonable terms, alternative instruments, and asset leverage.
- d. Development of appropriate and sustainable funding schemes.

In addition, the problem of the scheme that has been in effect for the past few years is known as take or pay. Payment of electricity results by IPP based on a contract that has been made, although the amount of need is smaller. Therefore, it is hoped that PLN can renegotiate the electricity production payment scheme carried out by private Independent Power Producers (IPP). Thus, reducing the cost of fees that must be paid.

Data from the Ministry of Energy and Mineral Resources (ESDM) noted that as many as 10,469 MW of the target of 35,000 MW had entered the commercial operation date (COD) stage in August 2021. The large number of power plants that have only been operating since 2017 has resulted in a larger supply, where the power reserve to date has reached 30% (Fajrian et al, 2022). In other words, the power supply owned by PLN has a capacity of 130% of the needs. This makes PLN ready to become the driving force of the economy. The amount of electricity reserves owned by PLN can be maximized by customers to develop their business activities. However, the Covid-19 pandemic has slowed down the economy, while electricity supply has increased, and costs continue to be incurred. Thus, it is necessary to know what solutions must be done to balance Indonesia's electricity oversupply with its use.

## LITERATURE REVIEW

### Excess Electricity Supply

Excess power is excess electrical energy that must be discarded (or reduced) because it cannot be used to power loads or charge batteries. Excess power occurs when excess power is generated (by renewable sources or generators whose minimum output exceeds the load) and the battery cannot absorb all the power (Home energy, 2023). In economics, oversupply, economic surplus, market surplus, or short-term surplus refers to a situation in which the quantity of goods or services supplied is greater than the quantity demanded (Arthur, 2003). In other words, a power oversupply is a situation in which there is too much power in a region and too little power is being consumed. In other words, supply exceeds demand.

Electricity supply must match demand. But demand changes throughout the day. When demand is high, suppliers need to produce more electrical energy. And when demand is low, we need to reduce production. Shortages occur when suppliers do not produce enough electricity. It may lead to troubles such as blackouts and blackouts. Oversupply occurs when suppliers generate excess power. In some cases, you can even sell that extra energy. Otherwise, it will be wasted. This is because electricity cannot be stored. It can only be converted into other forms of energy. And it can be converted into electrical energy as needed. For example, a giant battery can convert electricity into chemical energy or convert it into chemical energy (Iesttalkscience,2023).

### Covid-19 Pandemic and the Effect on Electricity Supply in Countries

The Ministry of Energy and Natural Resources (ESDM) announced that Indonesia's electricity reserves are safe. The country's electricity reserves are 4.79 gigawatts (GW), or 12.58% of the country's electricity capacity (home, 2021). The reserve margin alias power reserve in 2019 was recorded at 32%. Meanwhile, starting in 2020 there was an increase in excess power or excess supply of power generation capacity due to a decrease in demand due to the Covid-19 pandemic. The reserve margin in 2020 was recorded at 39.9%, then in 2021 it will drop to 37% and in 2022 it is expected to increase again to 56% (Setiawan, 2023).

This excess electricity also occurs in America. The United States has 63 GW of generating capacity, exceeding the NERC (North American Electric Reliability Council) reserve target. Over-target capacity levels vary by region. Some regions have large excess capacity, while others have more limited capacity. The electrical industry has the headroom to maintain reliability. Today's large-scale electricity storage is uneconomical, so power systems need sufficient resources to meet electricity demand and to accommodate unplanned outages. Each NERC region has a reserve margin target. This is the amount of shipping capacity required for reliability to exceed the estimated annual peak hour demand for the region. Reserve targets for the NERC region are usually around 14-17% with a total supply capacity of 117 GW (EIA, 2013).

In Southeast Asia, electricity demand is increasing rapidly. Over the past two decades, demand has grown at an average annual rate of over 6%. This is driven by increased ownership of home appliances and air conditioners, and increased consumption of goods and services. Of the 10 countries in the region, the four largest consumers of electricity – Indonesia (26%), Vietnam (22%), Thailand (19%) and Malaysia (15%) – account for 80% of total global demand. We supply more than 100% region.

The economic impact of the COVID-19 pandemic in ASEAN countries has been reflected in reduced electricity demand, which is expected to decline by around 1% this year. Demand in Indonesia is expected to stagnate over the course of the year after falling about 11% in May. Vietnam's demand in the first 10 months of this year is expected to be 3.2% higher than the same period in 2019, after averaging around 10% growth over the past decade. Compared to each period in 2019, demand in Thailand fell by 3.7% in the first eight months, while demand in Malaysia fell by 5% in the first ten months.

Southeast Asia is one of the few regions in the world where coal-fired power generation is expanding. Nearly 20 GW of new coal-fired power plants are under construction, mostly in Indonesia (a major coal producer), Vietnam and the Philippines. Although the pre-construction phase has seen a significant increase in production capacity, some plans have been reviewed and will focus more on expanding natural gas and renewable energy (Iea, 2020).

### **Renewable Energy**

Energy is the ability to do work. In all aspects of life, energy is a facility to increase human ability to do work and humans use it for economically constructive purposes in carrying out activities that were not possible for humans before the existence of energy technology. Meanwhile, alternative energy refers to energy sources that are not based on burning fossil fuels. Interest in the field of energy studies initially stemmed from the unwanted effects of pollution (as it is today) both from the burning of fossil fuels and from the by-products of nuclear waste.

There are several alternatives to be used as an energy source which is expected not to have too big an impact on the environment. New energy is often associated with alternative energy. The alternative energy segment in the energy industry includes various sources from a number of technologies that are considered quite potential, such as nuclear energy and hydroelectric power, wind energy, solar energy, and biofuel.

Based on the definition of the United Nations' Brundtland Commission in 1987, the definition of sustainability (sustainability) is the ability of a system to meet the current needs of society without affecting the ability of future generations to meet their needs. Sustainable energy is that part of the planetary structure which implies that it is continuously replenished through natural means. In other words, sustainable energy will not run out. Sustainable energy is often referred to as "alternative energy" because it is a better choice compared to fossil fuels. It is important to understand that the term sustainable energy should not be construed as 100% safe for the environment. That's why sustainable energy is the global ticket to a cleaner and less polluted earth.

The International Energy Agency (IEA) defines renewable energy as that 'derived from natural processes' and 'replenished at a faster rate than it is consumed' (IEA 2002, OECD, IEA and Eurostat, 2005). The IEA definition of renewable energy includes the following sources: 'electricity and heat derived from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources' (IEA 2002). The International Renewable Energy Agency (IRENA) has a definition ratified by 108 members (107 countries and the European Union) as of February 2013: "renewable energy includes all forms of energy produced from renewable sources in a sustainable manner, including bioenergy, geothermal energy, hydropower, ocean energy, solar energy, and wind energy (Nazarudin,2021). Renewable energy sources become the solution for energy development in Indonesia due to the increasingly depleted use of fossil-based energy, due to an increase in the population that increases energy consumption and waste in fuel consumption (Jaelani et al, 2017).

Excess electricity is not such a big problem if more is produced from renewable energy. But in Indonesia, most of the excess electricity is generated from fossil energy.

Indonesia's production of renewable electricity is still relatively small among the G20 countries. This can be seen from the latest data from the energy consulting company, Ener data. It is recorded that Indonesia's renewable electricity production is only 18.7% in 2021. This figure places Indonesia in the fourth lowest rank among the G20 countries. Brazil occupies the top position as the country that produces the highest renewable electricity among the countries in the G20. The percentage reaches 78.4%, ranking the third highest in the world. Canada, Germany and Italy are also among the highest producers of renewable electrical energy in this group of countries with respective percentages of 68%, 41.5% and 41.4%. Under Indonesia, there are South Africa and South Korea with respective percentages of 9.2% and 8.6%. Meanwhile, Saudi Arabia was ranked lowest with renewable electricity production of only 0.1% last year (Annur,2022).

## METHOD

This research used a qualitative methodology with a description of the results and discussion. Qualitative methodology is a research procedure that generates descriptive data in the form of written or spoken words of people and observed behaviors. In addition, qualitative research is research that intends to understand the phenomena experienced by the subject of research holistically, and by utilizing descriptions in the form of words and languages, in a specific natural context, and by utilizing various scientific methods (Moleong, 2007). Descriptive research is research that seeks to answer existing problem solving based on data. Descriptive research guides researchers to explore and or photograph social situations that will be studied comprehensively, broadly, and deeply (Sugiyono, 2014). Then, the purpose of this qualitative descriptive research was to describe the phenomena experienced by the current research subject thoroughly. In this research, activities were carried out describing, recording, analyzing, and interpreting conditions that were occurring or existing (Barusman and Redaputri, 2018). In other words, this qualitative descriptive research aimed to obtain information about the existing circumstances. The data used was secondary data based on data owned by PT. PLN (Persero). The following is the research flow:

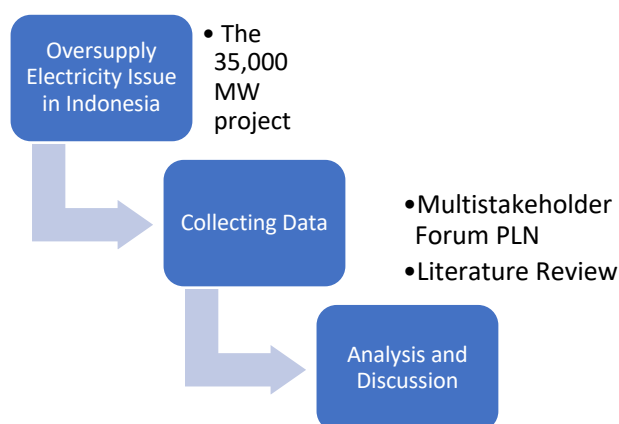


Figure 1. The Research Flow

## RESULTS AND DISCUSSION

### Excess Electricity Condition

The condition of PT PLN (Persero) electricity oversupply will still continue to occur. This is due to the continuation of mega projects to increase electricity capacity in the country. Based on data from the Directorate General of Electricity of the Ministry of Energy and Mineral Resources as of April 2021, the completion of the plant has reached 10,069 megawatts (MW) or has increased by 107 MW compared to the end of 2022 of 9,931 MW. In that period, it was recorded that as many as 418 units of pltu had been contracted or had signed electricity purchase agreements (PPA). A total of 218 units of coal-fired power plants with a capacity of 10,069 MW or equivalent to 28 percent have been operating, 91 units with a capacity of 17,964 MW or equivalent to 50 percent have been contracted and are entering the construction stage, while 43 units with a capacity of 6,228 MW or equivalent to 18 percent have been contracted but have not yet been constructed.

Meanwhile, as many as 54 units with a capacity of 1,563 MW or 4.4 percent are still uncontracted. Meanwhile, the details are that 29 units of coal-fired power plants with a capacity of 724 MW are still in the planning stage, while 25 units with a capacity of 839 MW are still in the procurement stage. In the latest development, the number of coal-fired power plants included in the 35 GW program operating until the second quarter of 2022 has reached 39 percent. The government plans to limit the granting of business licenses for electricity supply and the use of captive power due to an oversupply of electricity from PT PLN (Persero).

This electricity oversupply is related to the Covid-19 pandemic that occurred. In the conditions of the Covid-19 pandemic, the company's electricity performance and service to customers are well maintained. In fact, PLN experiences an excess or reserves throughout the system. Therefore, PLN is in a state of readiness to supply customers' electricity needs, including companies that have been providing electricity from their own plants (captive power).

Business actors must carefully review this because it is related to the availability of infrastructure and also reliable electricity supply in the long term. This condition is a challenge for companies that have invested in building their own power plants and have entered the operational stage because the costs in building are not cheap.

### The Use of Energy Types

The condition of oversupply of PLN electrical energy coupled with the problem of the type of energy used. PLN is still more inclined to use fossil energy even though the use of renewable energy has also increased.

- **The Use of Fossil Energy**

#### Ratio of Coal Imports to Coal Needs

The sub parameter of the ratio of coal imports to coal needs is a comparison between the number of coal commodity imports to coal needs. By comparing the two indicators, it can be calculated how much dependence the Energy Supply Source Independence parameter has on the energy supply sourced from imports.

Until 2021 Indonesia has never imported coal. Coal needs are targeted at 137.5 million tons, while the realization of coal needs is 133 million tons. Compared to the realization in 2020, coal demand increased by 1.13 tons. The small increase in coal demand is due to the decrease in coal consumption due to the impact of the COVID-19 pandemic that is still hitting Indonesia, in addition to that there are efforts to divert primary energy to produce electrical energy from what was originally produced from coal-fired power plants to renewable power plants and natural gas.

The government has succeeded in maintaining the fulfillment of domestic coal needs independently, so that no coal imports from abroad are needed, this results in the realization of a ratio of 0% so that the ratio of energy independence to coal fulfillment is 100%.

Table 1. Ratio of Coal Imports to Coal Needs

No	Indicators	Realization	Ratio Realization	Independence Ratio
1	Coal Import	0 Tons	0%	100%
2	Domestic Coal Needs	133.000.000 Tons		

- **The Use of Renewable Energy**

#### Domestic Component Level (TKDN) of New and Renewable Energy (NRE) Subsector

The TKDN of the NRE subsector is calculated from the comparison between the investment expenditure used and the purchase of local products of the NRE subsector. TKDN EBT consists of TKDN PLTA/M, TKDN PLT Bayu, TKDN PLTS, TKDN PLT Geothermal, and TKDN PLT Bioenergy. The achievement of TKDN values from hydropower plants/m, geothermal power plants and bioenergy power plants was 76.71%, 38.98%, and 57.75%, respectively. Meanwhile, the TKDN value of PLT Bayu in 2021 is based on the realization value of TKDN in the previous year, which is 40%, because in 2021 there is no PLTB development and no COD. Similar to the TKDN PLT Bayu, the realization of the achievement of the PLTS TKDN in 2021 is based on the value of the TKDN achievement in 2020, which is 47.08%, because this year there is no progress in the construction of commercial-scale solar power plants. The target of TKDN EBT in 2021 is 55.45%, while the achievement is 56.05%, this achievement is a recapitulation of the average TKDN of the TKDN achievements of each generation cluster.

One of the advantages obtained in the development of technology in the energy sector is that Indonesia does not depend on other countries' technology in Indonesia's energy production activities. If the energy sector technology that has been developed by the Government has competitiveness and can be applied to conditions abroad, then the Government can export ESDM sector technology abroad. One of the keys to being able to develop technology in the ESDM sector is to collaborate with R&D institutes or universities that have a focus on developing ESDM sector technology.

Indonesia needs an additional \$8 billion per year in investment in new and renewable energy (NRE) development if it is to achieve Indonesia's ambitious net zero emissions target by 2060, according to the International Energy Agency. Ironically, the development of national NRE investment has been relatively stagnant in the last five years, with an injection of development funds that is less than 2 billion US dollars per year. IEA Executive Director Fatih Birol also assessed that the ambitious target of Indonesia's green energy roadmap would be difficult to achieve without serious policy reforms and international support.

To achieve the net zero target and get all these benefits, an additional 8 billion US dollars (investment) is needed every year. Therefore, in addition to internal efforts, international collaboration is essential. Furthermore, Indonesia will also find it difficult to achieve other economic targets, namely becoming a developed country by 2045. As for the end of this year, the proportion of NRE in Indonesia's energy mix is expected to fall to 12.7 percent.

Although the capacity continues to grow, the composition of green energy in national mixed energy in the last five years has tended to statically get only a 12-14 percent "ration". In fact, the government only has three more years to pursue the national green energy target of 23 percent according to the Paris Agreement commitment, which was also agreed upon in the 2021-2030 PLN RUPTL.

Oversupply with coal energy occurs due to a decrease in the proportion of NRE due to the influx of additional power from the new power plant part of the 35,000-megawatt (MW) project, whose contract with the IPP is "take or pay" (TOP). NRE capacity will continue to increase, but the energy mix will decrease because many coal-fired power plants have to be operated. Some come from IPPs, some of which are TOP (contract take or pay), the electricity must be purchased so PLN must turn on these coal-fired power plants, which in the end will be urgent from (proportion) of the NRE itself.

According to a report by the Ministry of Energy and Mineral Resources until the end of 2022, the additional supply from the 35 GW project, whose progress is expected to reach 65.8 percent, will increase the dominance of coal energy in the national energy mix by 68.7 percent. As of July 2022, the Java Madura and Bali systems have a capable power of 38,652 MW with a peak load of 28,552 MW, or there is an excess power of up to 10,100 MW.

The impact of Covid-19 has an effect on economic growth which also has an impact on the growth (consumption) of electricity. This has led to several large systems such as the Java-Bali electricity system and the Sumatran system potentially oversupply. Therefore, to open up a large enough space for renewable energy in the electricity plan, the government and PLN as business entities will stop the construction of new coal-fired power plants, except those that are already in the construction stage. The government through the Ministry of Energy and Mineral Resources also encourages the construction of solar power plants to be greater than the previous RUPTL, considering the cheaper and faster development prices for achieving the target of 23 percent of the NRE mix by 2025.

The achievement of the NRE mix target will also continue to be met by co-firing coal-fired power plants with biomass, while still paying attention to the environment for the availability of feedstock. The effect of oversupply on NRE investment has an impact on renewable energy investment because it automatically leaves no room for its development. In this oversupply condition, the government will inevitably calculate more business calculations, and it will definitely prioritize coal-fired power plants that have to take or pay contracts because the unused energy produced still has to be paid.

The problem is that in recent years, the growth in national electricity demand has been minimal along with low or even negative economic growth. Whereas since 2014 the government has set a very ambitious economic growth target with a huge electricity supply project. The government also chose the use of biomass, which is still technically controversial in its production cycle, because it is feared that it will not be "green" upstream because of the risk of clearing land for raw materials. Therefore, the development of NRE from biomass is not appropriate in the context of the energy transition. Renewable energy ends up being very difficult to get in because the opponent is not worth it.

To be able to develop in Indonesia, NRE needs to be protected with regulations so that it can compete with fossil energy that has dominated the national electricity system so far. For this reason, the balancing point must be known between how the new NRE industry can enter, how the developer (NRE) can develop its resources, and how PLN can get a reasonable share or ration for them to also survive.

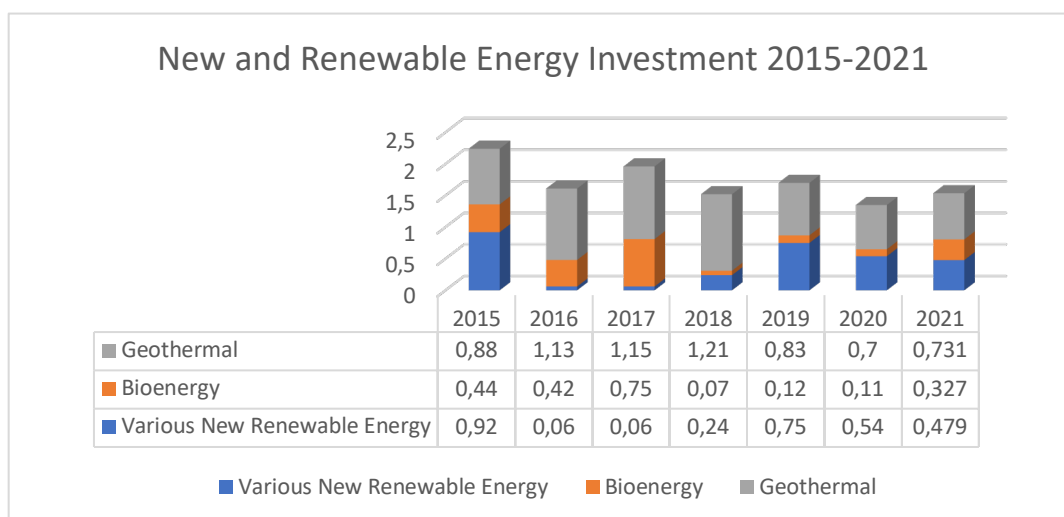


Figure 2. New and Renewable Energy Investment 2015-2021 (Source: Ministry of Energy and Mineral Resources Performance Report 2021)

## DISCUSSION

### Solutions and Future Plans

The trend of excess power tripled from 2016 to 2017 to reach 10,813 MW. The average growth of the national electricity excess in 2017-2021 then reached 18.2 percent per year, with coal still dominating the national energy mix of 58-63 percent. Even so, the oversupply of electrical energy should be better utilized.

To overcome the problem of oversupply of PLN electricity, PLN also seeks to increase electricity demand, namely by adding new market niches to increase productive electricity demand, the development of the electric battery industry ecosystem is expected to increase PLN's electricity absorption. As well as through various bundling and promos to increase customer comfort, for example, promos to increase power, discount home charging for electric vehicle owners, the use of electric stoves and so on. With the use of various electrical devices with PLN electricity, there are several benefits obtained by customers. First, the ease of access to electricity, specifically for electric vehicles, reduces the use of relatively expensive fuel and produces air and sound pollution or reduces the impact of environmental pollution (green energy) and increases the use of clean energy with electricity. In more detail with electric vehicles, in addition to being able to charge energy at home, customers are also facilitated by the existence of charging stations from PLN, namely Public Electric Vehicle Charging Stations which are available spread across various cities and make it easier for electric vehicle users to charge their vehicles' electric energy. This is part of the transformation and transition of electrical energy.

In more detail, not only continuing the energy transformation and transition, the first strategy, by integrating electric vehicles and improving electrifying lifestyles. In addition to being able to increase national electricity consumption, it can also increase people's efficiency in terms of energy cost expenditure. With 1 kWh of electricity for Rp. 1,444.7 it can travel 10 km. When compared to fuel for 1 litre of gasoline for Rp. 9,000 with the same mileage. This is much more economical for the community. Also, on the one hand, this step will also have an impact on Indonesia's trade balance by reducing the burden of crude oil imports.

Second, PLN is also increasingly focusing on promoting electrifying agriculture programs by targeting farmers. With this program, PLN replaces agricultural operational tools and fish farmers that were previously diesel-based to be electricity-based. Farmers and farmers become more efficient, and equipment is much less noisy and can increase the productivity of farmers and farmers.

Third, PLN targets the captive market. So far, there are still many industries that use their own power plants. PLN offers for the industry to switch to PLN electricity to be more efficient on the operational side. By handing over the electricity supply to PLN, the industry can focus more on optimizing its production and utilities. Of course, PLN must cooperate and collaborate with stakeholders so that this program can run smoothly. Moreover, the move will be coordinated and harmonized with the Ministry's policies, so that the positive impact can be felt by industry and society.

### CONCLUSION

Indonesia's electricity consumption has decreased due to the COVID-19 pandemic. However, the Ministry of Energy and Mineral Resources is optimistic that the condition of the electricity excess will not have a



long-term impact because electricity demand will continue to grow. The condition of excess electricity, especially in Java, is not only due to the Covid-19 pandemic. Several plants of the 35,000-megawatt (MW) program started operating. With this condition, there are still many potential regions in Indonesia that can still be developed. If the power supply in the entire PLN electrical system is in sufficient condition and ready to become an economic wheel drive. As a state-owned company in the field of electricity, the company is committed to meeting every electricity need for customers. PLN also ensures that it will make it easier for industry and business players to run their business operations in Indonesia.

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