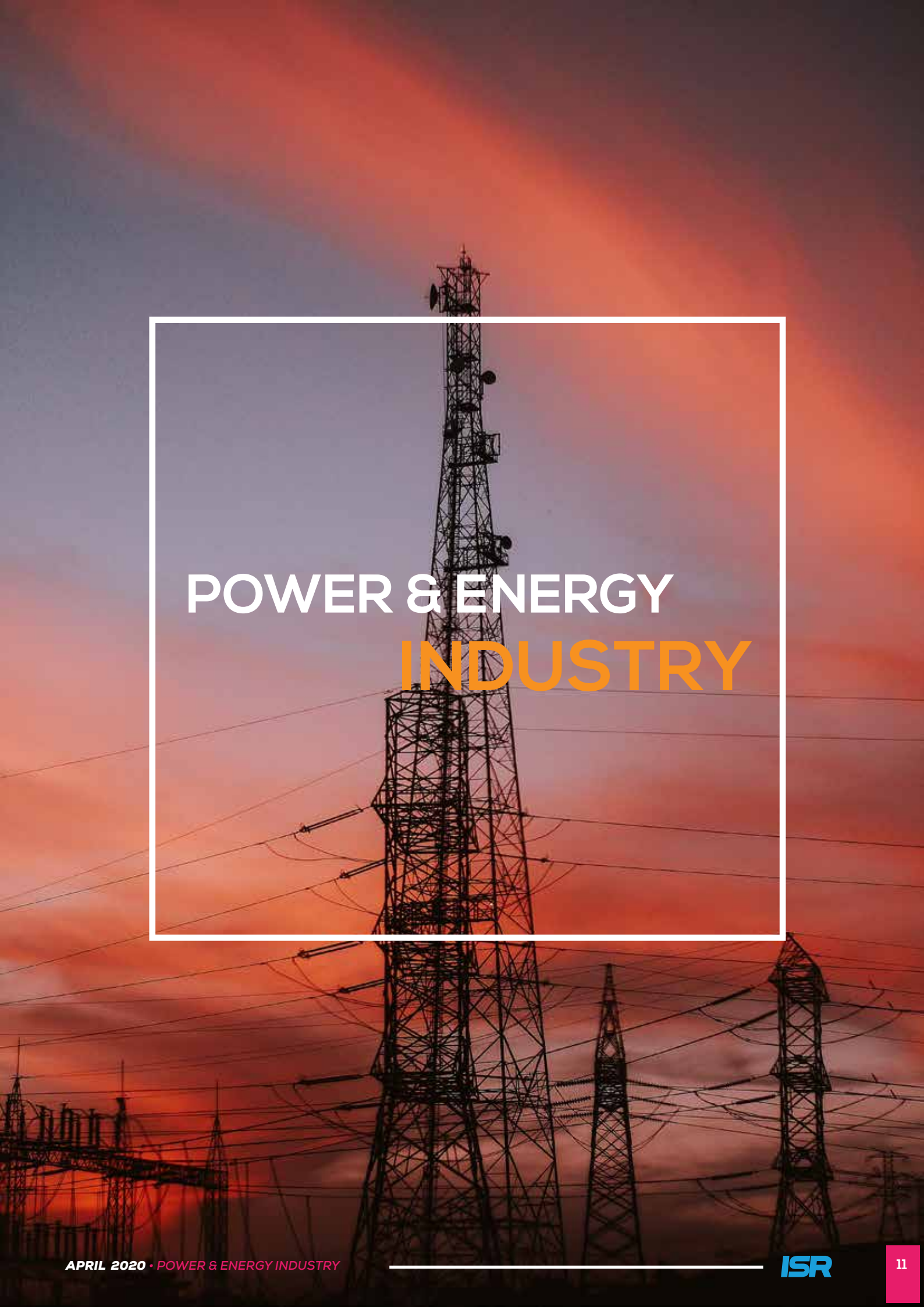


POWER & ENERGY INDUSTRY

POWER AND ENERGY IN INDONESIA

PEFINDO is of the view that long-term energy demand in Indonesia is correlated with the growing population and economic growth. The Ministry of Energy and Mineral Resources (ESDM) predicted electricity needs in the country will grow by 7% every year until 2027, driven by domestic household consumption. This affects the trade deficit, especially in relation to crude oil (including oil fuel) and the gas sector. To mitigate the energy imbalance, the government is committed to achieving 23% renewable energy in the national energy mix by 2025, in alignment with its commitment to mitigate climate change.

OVERVIEW OF INDONESIAN ELECTRICITY AND ENERGY SECTOR

Indonesia's GDP is largely driven by domestic household consumption, and the need for electricity and energy demand increased sharply in the last decade. According to a British Petroleum (BP) statistical review, primary energy demand in Indonesia grew by 8.3% in 2019, higher than 4.0% growth in 2018 and its average annual growth rate of 1.5% in 2008-2018. This is quite different from the growth of the global energy market, which slowed in 2019 to 1.3%, from 2.8% growth in 2018.

TABLE 1. INDONESIA'S PRIMARY ENERGY CONSUMPTION

Energy Sources	Consumption (Exajoules)	Annual Change (%, YoY)	Shares of Primary Energy (%)
Oil	3.38	0.16	37.98
Natural Gas	1.58	-1.60	17.70
Coal	3.41	20.00	38.22
Hydro electric	0.15	0.61	1.70
Nuclear energy	0.00	0.00	0.00
Renewables	0.39	54.21	4.39
Total	**8.91**	**8.34**	**100.00**

Source : BP statistical review (2020)

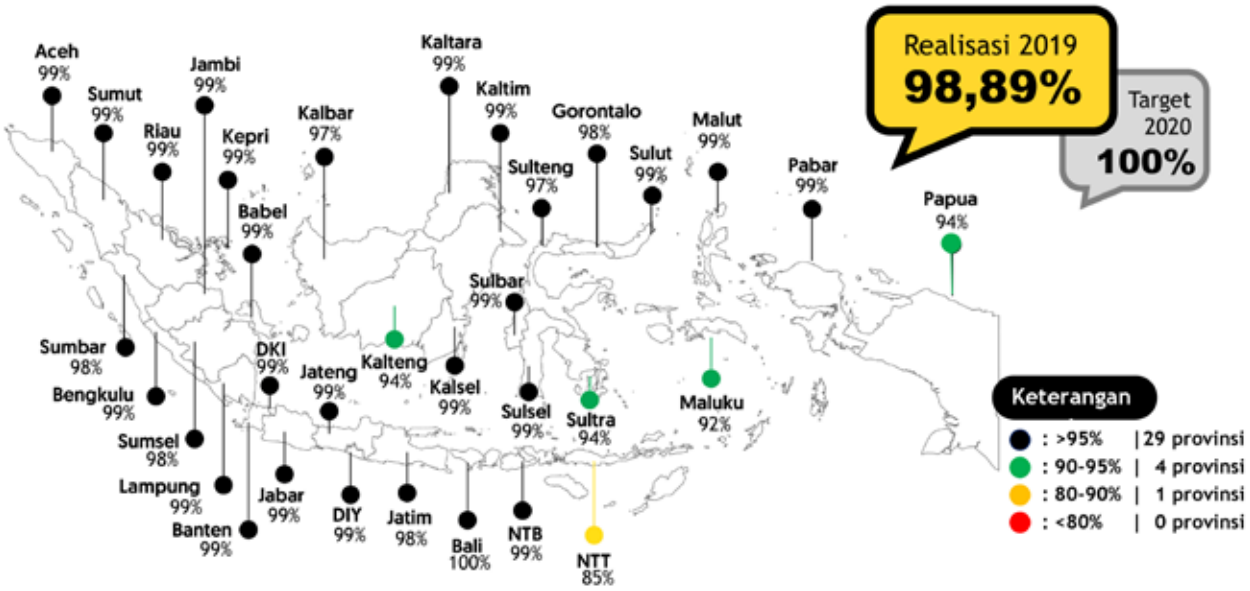
ESDM has predicted the country's electricity needs will grow by 7% every year until 2027. To accelerate demand, the government has also raised the investment target every year. In 2019 it was USD33.4 billion, with realization in the energy sector only reaching USD31.9 billion. On January 9, 2020, Energy Minister, Arifin Tasrif said: "The complicated regulation (permits) of land supply is the biggest challenge for the industry".

In 2019, there were issues over the government reducing subsidies (including fuel and electricity). However, until the end of 2019, the Government maintained stable fuel and electricity prices to maintain people's purchasing power. Traditionally, Indonesia's inflation performance is highly vulnerable to the government's price adjustments - especially fuel and electricity subsidies.

In 2020, the government raised investment targets in the energy sector to USD35.9 billion. For the mineral and oil and gas sectors, the target is USD7.8 billion and USD13.8 billion, respectively. New renewable energy and energy conservation are targeted to rise to USD2.3 billion. Investment in the electricity sector is expected to remain at USD12 billion.

Hopefully, the huge investment will see energy sector growth above economic growth. In comparison, energy sector (classified in the electricity and gas sector) growth was 6.01% year-on-year (YoY) at the end of 2019, higher than the average GDP growth of 2,97% (YoY). In first quarter of 2020, growth was 3.85% (YoY), above the average GDP of only 2.97% (YoY) in the same period.

FIGURE 1. ELECTRIFICATION RATES IN INDONESIAN PROVINCES



Source : Directorate General of Electricity – Kementerian ESDM (2020)

The electrification rate (ER) in Indonesia reached 98.89% at the end of 2019. Almost all provinces in Indonesia have an ER greater than 95%, according to the minutes of the 2019 electrification ratio and village electricity ratio setting meeting. The lowest ER was in East Nusa Tenggara, increasing from 62% in 2018 to 85% in 2019.

CONVENTIONAL ENERGY
DEFICIT IN OIL AND GAS, BUT SURPLUS IN COAL

At the end of 2015 the government revised Government Regulation (GR) No. 79 of 2010 to GR No. 27 of 2017 on Cost Recovery and Taxation in Upstream Business through tax deductions in exploration and exploitation periods, such as no customs duty, VAT, and import tax in order to promote and create a more interesting oil and gas upstream business sector for investors.

The government also issued Government Regulation No. 8 of 2017 on Gross Split Production Sharing Contract (PSC) as a new scheme for oil and gas upstream contracts. As a result, there were 45 new contracts with the gross split scheme up to December 2019. Under the gross split scheme, the share for the government is 52% for gas output and 57% for oil, with the rest going to the contractor. Under the previous system, the government received 70% for gas and 85% for oil. Most oil companies have criticized the scheme as they claim the new arrangement places much greater risk on investors, being especially unattractive for new oil blocks because the costs and split are fixed up front.

Both regulations aim to boost domestic production. While demand is still growing, production is in reverse, with Indonesia experiencing a crude oil (including oil fuel) and gas deficit.

FIGURE 2. OIL PRODUCTION AND CONSUMPTION PER DAY

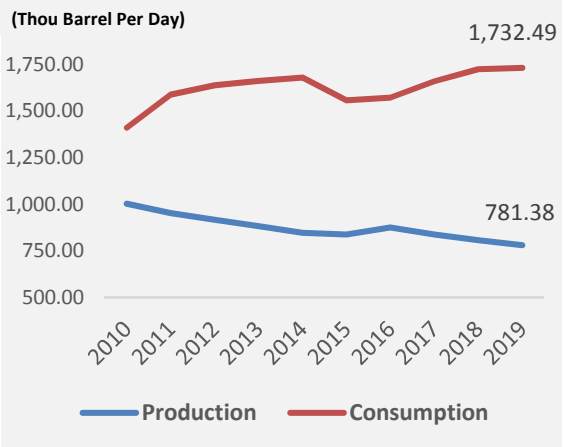
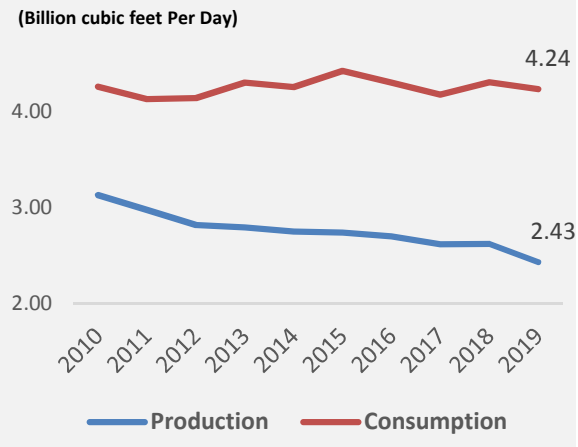


FIGURE 3. GAS PRODUCTION AND CONSUMPTION PER DAY

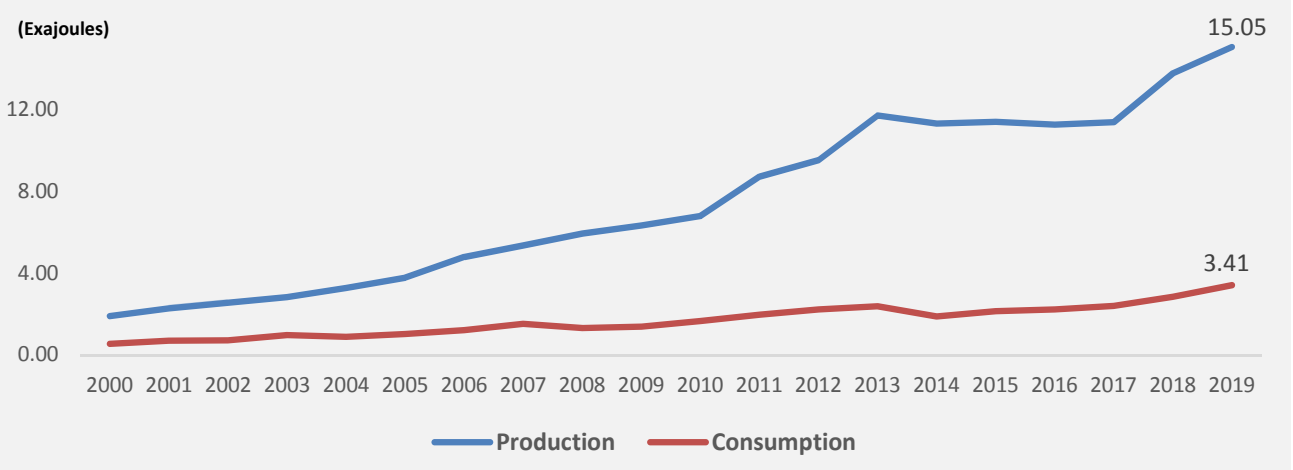


Source : BP statistical review (2020)

There is a surplus in the coal sector (especially thermal coal), with Indonesia one of the world's largest producers and exporters of coal. A significant portion of its exported thermal coal consists of medium-quality (between 5,100 and 6,100 cal/gram) and low-quality (below 5,100 cal/gram), with large demand from China and India, with the production moratorium on the creation of new coal mines since 2016 in China (with plans to close 4,300 small and inefficient coal mines) and increased demand from India.

The replacement of coal by natural gas and renewables energy globally, particularly in the power sector, pressured coal prices in 2019. Northwest Europe and Chinese markets prices declined by 34% and 14%, respectively, to USD60.86 per ton and USD85.89 per ton. Global demand from Europe, Japan and South Korea also outweighed the price in 2019.

FIGURE 4. COAL PRODUCTION AND CONSUMPTION PER DAY



Source : BP statistical review (2020)

In Indonesia, coal is still in high demand as state-owned electricity firm (PT Perusahaan Listrik Negara (Persero)/PLN) allocated 63.8% of its energy mix in 2019 to coal-fired power, natural gas at 25.7%, hydro (5.3%), fuel oil (2.5%), and geothermal (2.2%).

Coal mining companies in Indonesia cannot expect much from the domestic market as the government set the coal price for domestic market obligation (DMO) at USD70 per ton starting January 1, 2020. The government also pegged 25% of miner production distribution for DMO, and it was proposed the government set special DMO prices for PLN. The proposed price is the production cost plus a 15% - 25% margin, which is expected to make the price more efficient as it will eliminate price fluctuations.

The government also changed the sanctions mechanism for companies that fail to fulfill DMO obligations. Companies unable to meet the DMO quota will be subject to sanctions in the form of reduced production. Those that surpass the DMO can increase production.

RENEWABLE ENERGY – **RISING STAR**

The government has taken appropriate steps to reduce the trade balance deficit and strengthen national energy security by increasing the utilization of renewable energy resources. It targets renewables energy contributing 23% of power production by 2025, but regulatory headwinds are setting the country back from achieving this goal. Regulations stipulate Indonesia should have reached a 17.5% renewable power mix by 2019, but it was only 12.36% at the end of 2019. The increased use of renewable energy is expected to reduce imported commodities which currently dominate the fulfillment of domestic energy demand.

The Lowy Institute says Indonesia has the potential to generate 788,000 megawatts (MW) of power from renewable energy sources such as wind, solar, tidal, and geothermal. This is more than 14 times the country's current electricity consumption. Thanks to magma, hot rocks, and hot water beneath its surface, Indonesia has 40% of the world's geothermal energy stores, enough for 29,000 MW of energy. Its huge maritime area could provide 75,760 MW of power through projects such as the Larantuka Straits Tidal Bridge, a USD550 million project that will power 250,000 homes in East Flores. It will be the world's largest tidal power plant upon its completion.

TABLE 2. INDONESIA'S RENEWABLE ENERGY TARGET

	Capacity	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Geothermal	MW	190	151	147	455	245	415	2.759	45	145	55	4.607
Hydro	MW	154	326	755	-	182	1.484	3.047	129	466	1.467	8.009
Mini Hydro	MW	140	238	479	200	168	232	27	20	20	10	1.534
Solar	MW	63	78	219	129	160	4	250	-	2	2	908
Wind	MW	-	-	30	360	260	50	150	-	-	5	855
Biomass	MW	12	139	60	357	50	103	19	5	15	35	794
Ocean Wave	MW	-	-	7	-	-	-	-	-	-	-	7
Total	MW	560	933	1.697	1.501	1.065	1.065	6.251	199	648	1.574	16.714

Source : IIF (2019)

Indonesia's first wind farm was built in 2018 in Sidrap, South Sulawesi. Its 30 turbines provide 75 MW of energy to 70,000 households, and cover 100 hectares of land, making it Southeast Asia's largest wind farm. According to the International Renewable Energy Agency (IRENA), Indonesia has an estimated total potential for onshore wind energy of 9.3 GW, and nearly 85% of wind power potential is in Java-Bali, Sulawesi and Nusa Tenggara regions.

There are also recent developments in rooftop solar power. ESDM regulation No. 13 of 2019 (ESDM 13/2019) amended ESDM regulation No. 49 of 2018 on the use of rooftop power systems by PLN customers, which was issued subsequent to the promulgation of ESDM regulation No. 12 of 2019 on electric power generation capacity for own use pursuant to operating license (ESDM 12/2019). The 12/2019 and 13/2019 regulations read in conjunction aim to simplify the licensing and worthiness certification requirements for own use power generation. The amendment of ESDM regulation No. 16 of 2019 provides for a reduction of capacity charges by PLN industrial customers and the elimination of emergency energy charges, as was previously provided under 49/2018, and will result in more viability economically in providing solar PV electricity. Capacity charges were previously one of the main hindrances for industrial customers to adopt and install solar power for their operations.

The biggest challenge to the renewable energy sector is cost. The cost of developing off-shore wind turbines is USD3.0 to USD4.0 million per MW, for geothermal power plants it is USD2.0 to USD3.0 million per MP, while coal-powered plants have an average capital cost of less than USD1 million per MW. Policy still requires private investors to transfer their projects to PLN at the end of the agreement periods, which, combined with the fact that the energy minister sets the consumer price of energy, has led to concern about return on investment.

Financing is another problem. To achieve the 23% target for renewable energy by 2025, Indonesia needs investment of USD154 billion, but with a narrow fiscal policy as a result of COVID-19, the government is expected to reduce its investment, meaning that private financing is necessary - which is hard to achieve.

Indonesia has the potential to become a leading nation in renewable energy. Despite all the challenges, the growing middle class and society's greater concern about climate change are increasing demand for electricity to come from renewable sources.