

Country Profile

INDONESIA

GENERAL OVERVIEW

Indonesia is the largest archipelagic country in the world, comprising around 17,000 islands. Its population counts to 261 million¹, making it the fourth most populous nation in the world. Indonesia has the highest GDP in the ASEAN region with USD 1 trillion in 2017 and it is the only ASEAN member who is part of the G-20. However, in terms of its GDP per capita, in 2017 it is amounted to USD 3,871² and it takes the fifth place among the Southeast Asian countries. Indonesia is a presidential constitutional democracy, in which the political power is to a considerable extent decentralized to provincial and local governments. Jakarta is the capital city of Indonesia and the largest metropolitan area in Southeast Asia with tremendous population growth and a wide range of urban issues. Bahasa Indonesia is the official language and spoken throughout the country, while English is commonly used as the business language.

ENERGY SECTOR

ENERGY POLICIES

There are several forces that shape the energy policies of Indonesia. Foremost, the security of energy supply is crucial for the nation. Indonesia used to be an important oil exporter and a member of the Organization for Petroleum Exporting Countries (OPEC). However, with the declining domestic production and booming demand, Indonesia became a net oil importer in 2004 and subsequently suspended its OPEC membership in December 2008. Even though six years later Indonesia re-activated its OPEC membership after the election of President Joko Widodo in 2014, the oil reserve is still seen to be insufficient to cover the growing demand. For this reason, the diversification of energy supply is necessary. Secondly, Indonesia has considerable renewable energy (RE) potential, which could be utilized in order to meet the increasing energy demand, but also to ensure environmental sustainability. As an archipelagic nation, providing reliable electricity supply to some part of the country is

¹ 2016 estimation by Bank Indonesia

² ASEAN Secretariat. ASEAN Statistical Leaflet 2018

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very challenging and decentralised RE power generation can be one of solutions. Indonesia announced its commitment to greenhouse gas (GHG) emission reduction during the G-20 Leaders' summit and UNFCCC's 21st Conference of the Parties (COP-21) in 2015, which is a GHG reduction by 29% in 2030. RE and energy conservation would have a vital role in fulfilling this pledge.

Indonesia's energy sector is under the jurisdiction of Ministry of Energy and Mineral Resources (ESDM)³. The National Energy Council (DEN)⁴, that was established in accordance to the Energy Law 2007 (UU No. 40/2007), is assigned to develop the National Energy Policy (KEN). Directorate General on New, Renewable Energy and Energy Conservation (EBTKE)⁵ supports the DEN on the renewable energy and energy efficiency policies. The policy is implemented according to National Energy General Plan (RUEN).

The energy supply in Indonesia was highly subsidised by government. The fossil fuel subsidies are not new in Indonesia. These subsidies were introduced for the first time not long from the nation independence in 1949 and by the 1960s, the subsidies are accounted for nearly 20% of fiscal expenditure. The sharp devaluation of the currency during the Asian crisis of the late 1990s further ratcheted up their cost. By 2014, the economic value of fossil fuel subsidies in Indonesia amounted to \$27.7 billion.

Indonesia however has been taking some actions by gradually removing fuel subsidies started in early 2015. The energy subsidies are given to the selected customers with specific regulations. This action has been successful in reducing the nation subsidies by significant amount. According to the IEA, the country expense on fossil fuel subsidies in 2016 was projected to less than 1% of GDP.

The energy policy in Indonesia has been defined in National Energy Plan 2014 (NEP14), that was signed on 17 October 2014 as Government Regulation No. 79/2014 to replace the 2006 National Energy Plan. NEP14 sets out the ambition to transform the country energy mix by 2025 as follow: 30% coal, 22% oil, 23% renewable resources and 25% natural gas.

ENERGY MIX

Figure 1 presents the latest statistics on total primary energy supply from 2017. It is shown that fossil fuels contribute to 76% of the primary energy supply, with oil and petroleum being the dominant fuel (34%). The remaining 24% of the primary energy demand is supplied by RE sources, mostly bioenergy (20%).

³ ESDM: Kementerian Energi dan Sumber Daya Mineral

⁴ DEN: Dewan Energi Nasional

⁵ EBTKE: Direktorat Jenderal Energi Baru, Terbarukan Dan Konservasi Energi

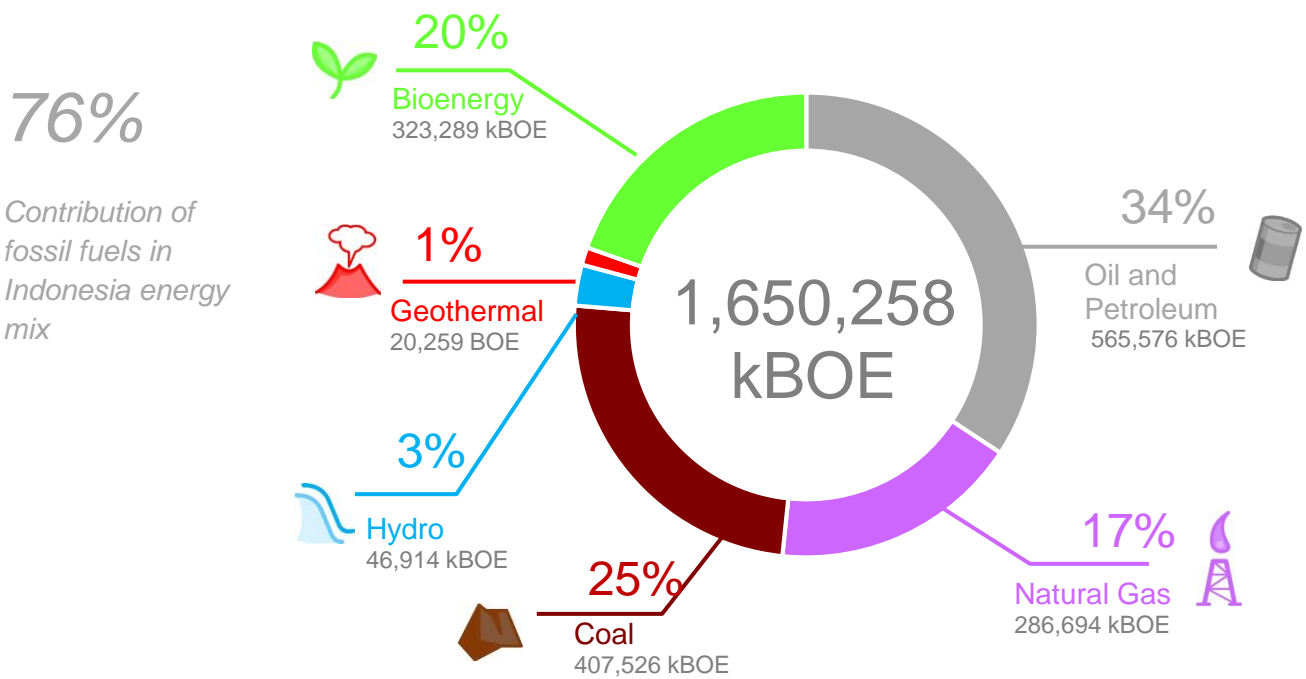


Figure 1: Primary Energy Supply (2017)

Source: Handbook of energy & economic statistics of Indonesia (2018)

Note: kBOE = Thousand Barrel of Oil Equivalent

The electricity mix is represented in **Figure 2**. Nearly 88% of electricity generation comes from conventional fuels, mostly from coal fired power plant (58%). In fact, Indonesia’s government aims to promote use of coal in the electricity sector, as it is domestically available and relatively cheap compared to other energy sources. RE contributes to only 12.6% in this sector. Large hydropower is the main RE source for electricity generation (7.4%). Biomass, which contributes significantly to the primary energy demand, does not play a major role in electricity generation. It is used mainly for thermal energy generation e.g. cooking, especially in rural area.

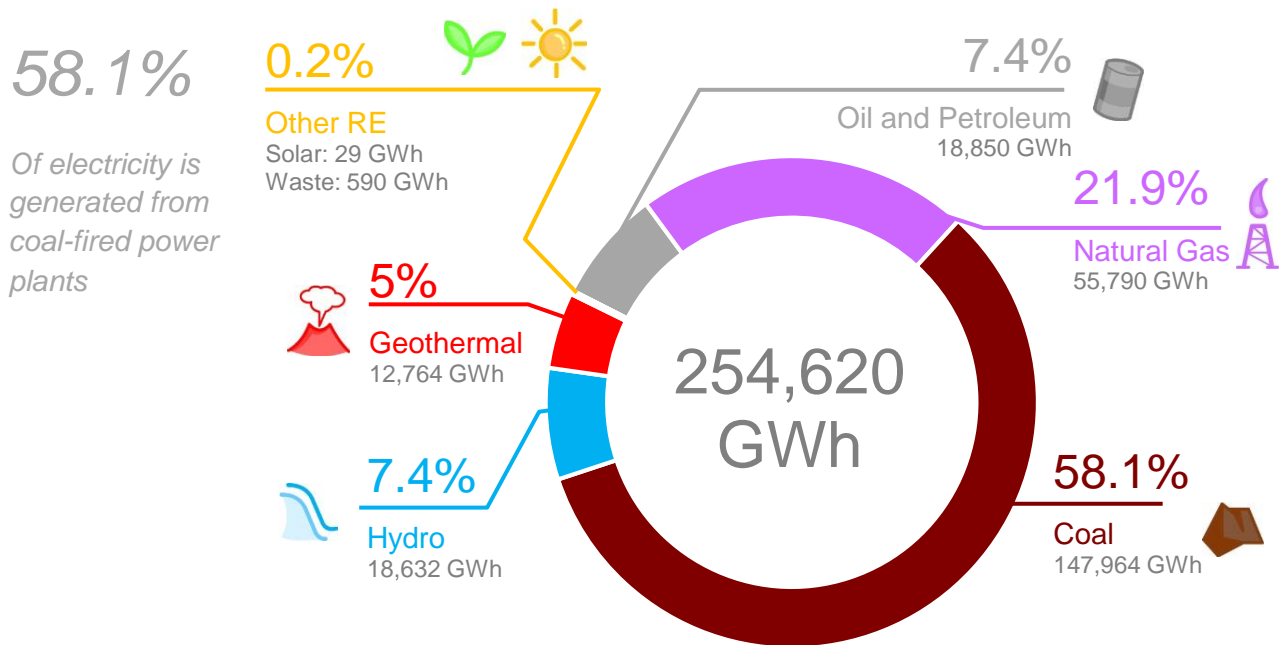


Figure 2: Electricity Mix (2017)

Source: Handbook of energy & economic statistics of Indonesia (2018)

Note: The electricity mix consists of PLN (State-owned Power Utility) self-generation – 183,809 GWh and purchase of electricity from IPP (Independent Power Producer) – 64,802 GWh.

The Indonesian government has set a target to add 35 GW of installed power capacity by 2019, which was introduced as the third Fast Track Program (FTP-III) in the Power Supply Business Plan (RUPTL) 2016-2025. In the prior FTP-I and FTP-II, around 7 GW of projects are already under construction and planned to be online by 2019.

ELECTRICITY TARIFF & ELECTRIFICATION RATE

Electricity market in Indonesia is a vertical integrated one where PLN, the state-owned utility, owns transmission and distribution assets. The private sector is allowed to generate electricity as independent power producer (IPP). However, PLN remains a single buyer.

Indonesia's electricity tariffs are regulated by the government on a quarterly basis. The latest electricity tariffs are shown in **Figure 3**. Previously, electricity in Indonesia was highly subsidized. The tariff charged to the customers was only about a half of its actual production costs, while the difference was covered by the government.

The government of Indonesia is gradually reducing subsidy on energy and then divert the state budget for financing infrastructure development. Hence, the electricity tariff needs to be readjusted in accordance with its actual production cost.

Since 1 January 2017, PLN has two different tariff categories for their customers; with and without subsidy. Households that subscribe a 450 VA power are still subject to old subsidized tariff and households with 900 VA power or more are subject to the new rate scheme.

According to the regulation PERMEN ESDM No. 28/2016 (still applies until end of 2018), the electricity tariff is as follow:

- Residential subscribers on 450 VA power are subjected to subsidized rates at Rp. 415 per kWh
- Residential subscribers on 900 VA power are subjected to non-subsidized rates, unless they are proven to be low-income, subsidized tariff may be charged at Rp. 586 per kWh
- Residential subscribers on 1,300 to 6,600 VA power are subjected to tariff without subsidy at Rp. 1,467.28 per kWh
- Business and Industry subscribers on 450 to 6,600 VA power are subjected to tariff with subsidy from Rp. 535 per kWh to Rp. 1,100 per kWh
- Business and Industry subscribers on 6,600 VA power and above are subjected to tariff without subsidy at Rp. 1,467.28 per kWh

In 2016, the electrification rate in Indonesia reached 91.16%⁶. The government is planning to increase the rate of electrification to at least 97.4% by 2019. Some remote islands have the lowest electrification rate (around 36%), while the capital city, Jakarta has reached the universal electricity access.

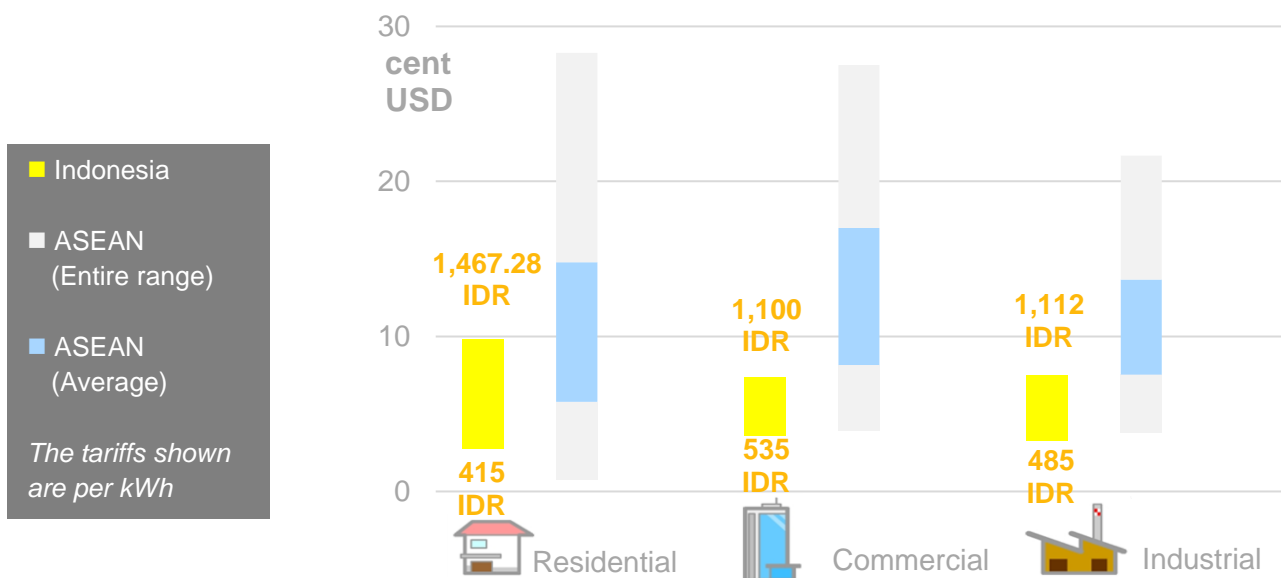


Figure 3: Electricity Tariff in Indonesia (2018)⁷

Source: PLN (2019)

Note: The conversion rate from US Dollar (USD) to Indonesian Rupiah (IDR) is 14,562 (as of December 2018).

⁶ ESDM: Kementerian Energi dan Sumber Daya Mineral

⁷ PLN: Perusahaan Listrik Negara

RENEWABLE ENERGY SECTOR

RENEWABLE ENERGY TARGETS

The Governmental Regulation (PP No. 79/2014) on National Energy Policy defines targets for RE of 23% share in total energy supply by 2025 and 31% by 2050. ESDM still have to define a detailed plan in term of installed capacity for RE power plant. However, the existing plan for 2025 is shown in **Figure 4**.

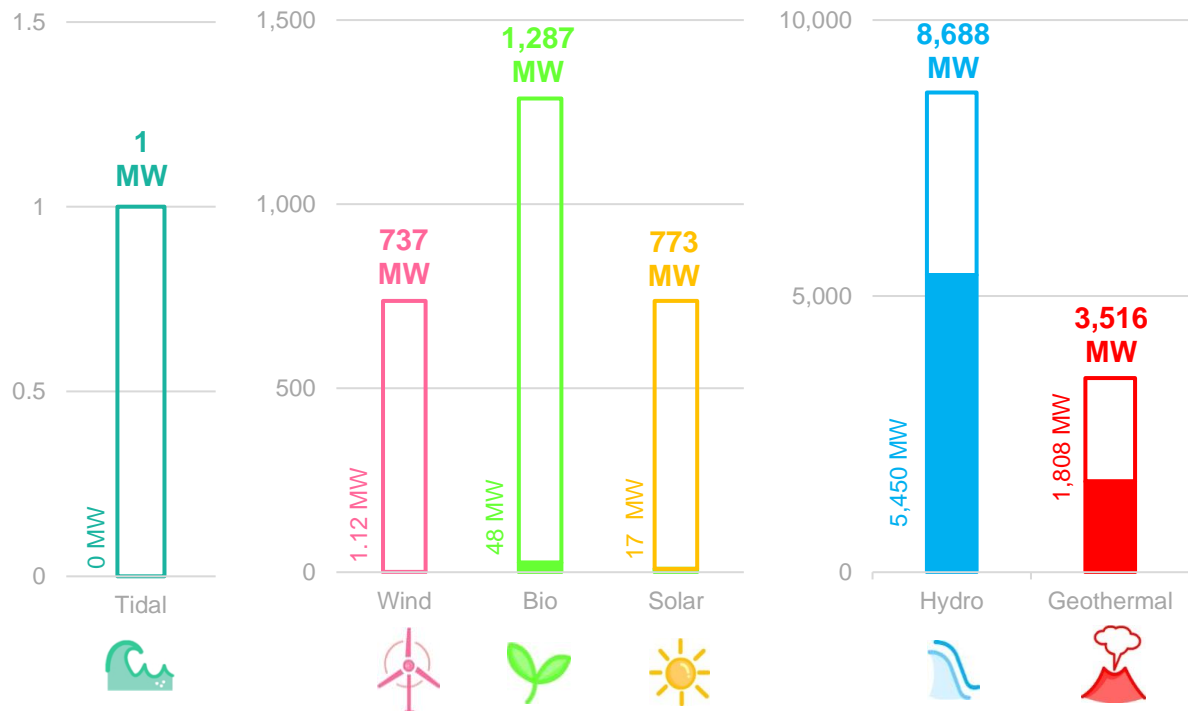


Figure 4: RE Targets by 2025 in MW, compared to existing installed capacity in 2017

Source: ESDM (for 2025 target) and Handbook of energy & economic statistics of Indonesia 2018

INSTALLED CAPACITY OF RENEWABLE ENERGY

Mini Hydropower (MHP) is considered as an important tool for rural electrification

The total installed capacity of RE in Indonesia is around 7.3 GW in 2017. It consists of two main RE sources hydro and geothermal as shown in **Figure 5**. Hydropower has the highest share (74%). Nevertheless, although Indonesia has abundant hydro resources, most of them are in remote areas, far away from the major energy demand. Around 94% of hydropower installed capacity comes from large hydropower. Mini and micro hydropower that are important means for rural electrification plays only minor role. The second largest share in installed capacity of RE is geothermal (24.7%). Considering the fact that Indonesia is the country with the largest geothermal potential in the world, yet Indonesia is still behind United States and Philippines in term of geothermal power generation. There are still significant untapped opportunities available for future geothermal exploitation.

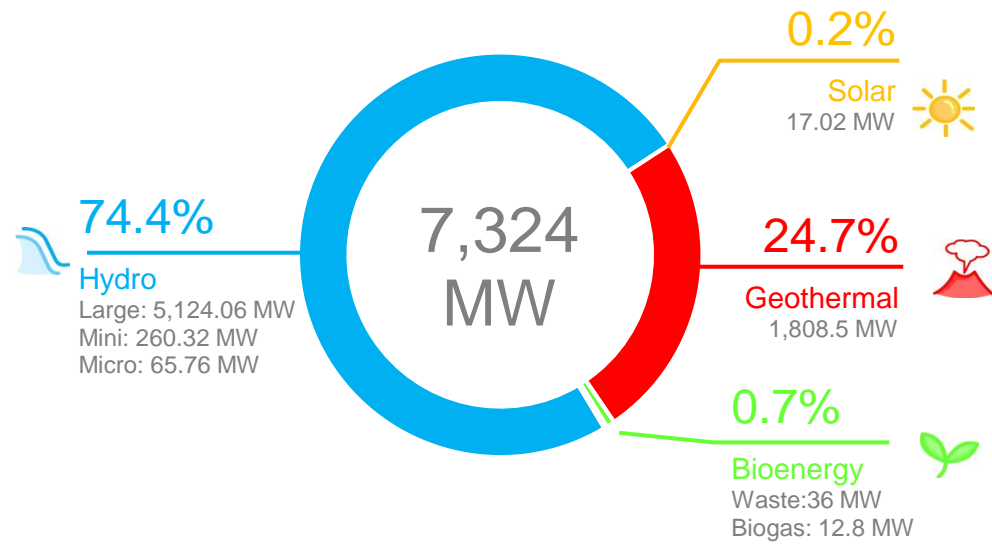


Figure 5: RE Installed Capacity (2017)

Source: Handbook of energy & economic statistics of Indonesia (2018)
 Note: The diagram only considers the PLN's power plants.

RENEWABLE ENERGY GENERATION

Figure 6 illustrates the energy generation from RE in Indonesia. Around 32 TWh of electricity comes from RE sources. Hydropower and geothermal energy account for 98% of this amount. New RE i.e. solar and wind power still plays a very small role in Indonesia.

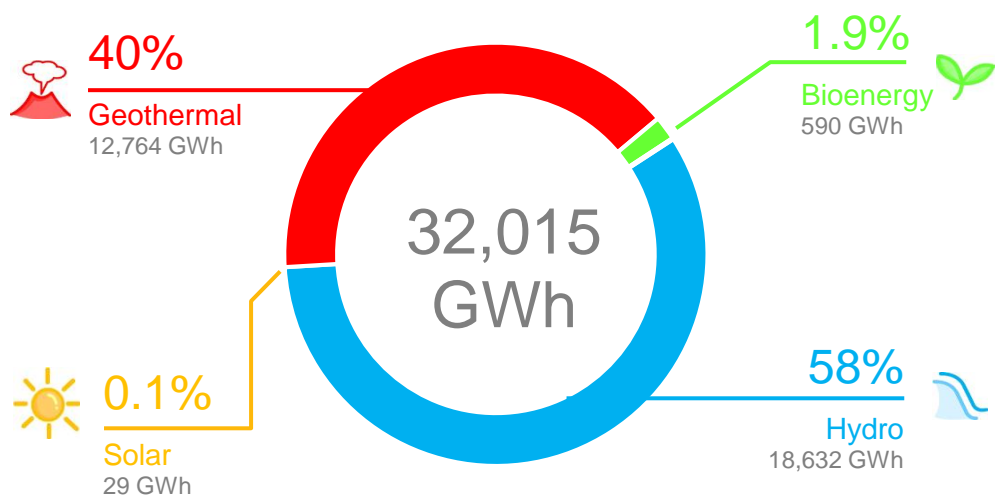


Figure 6: RE Generation (2017)

Source: Handbook of energy & economic statistics of Indonesia (2018)

RENEWABLE ENERGY MARKET

SELLING TARIFFS OF ELECTRICITY

In August 2017, the Indonesia Ministry of ESDM introduced new electricity purchase price and procurement schemes replacing Feed-in Tariff (FiT) as shown in **Figure 7** for a range of renewable energy sources. The Minister issued a new renewable energy regulation, Regulation 50/2017 on the Use of Renewable Energy for the Provision of Electricity. Regulation 50/2017 revises the previous regulation number 12/2017. According to the current regulation, the power purchase is executed through direct selection and auction with quota, as the previous regulation enabled power purchasing through auction and direct award.

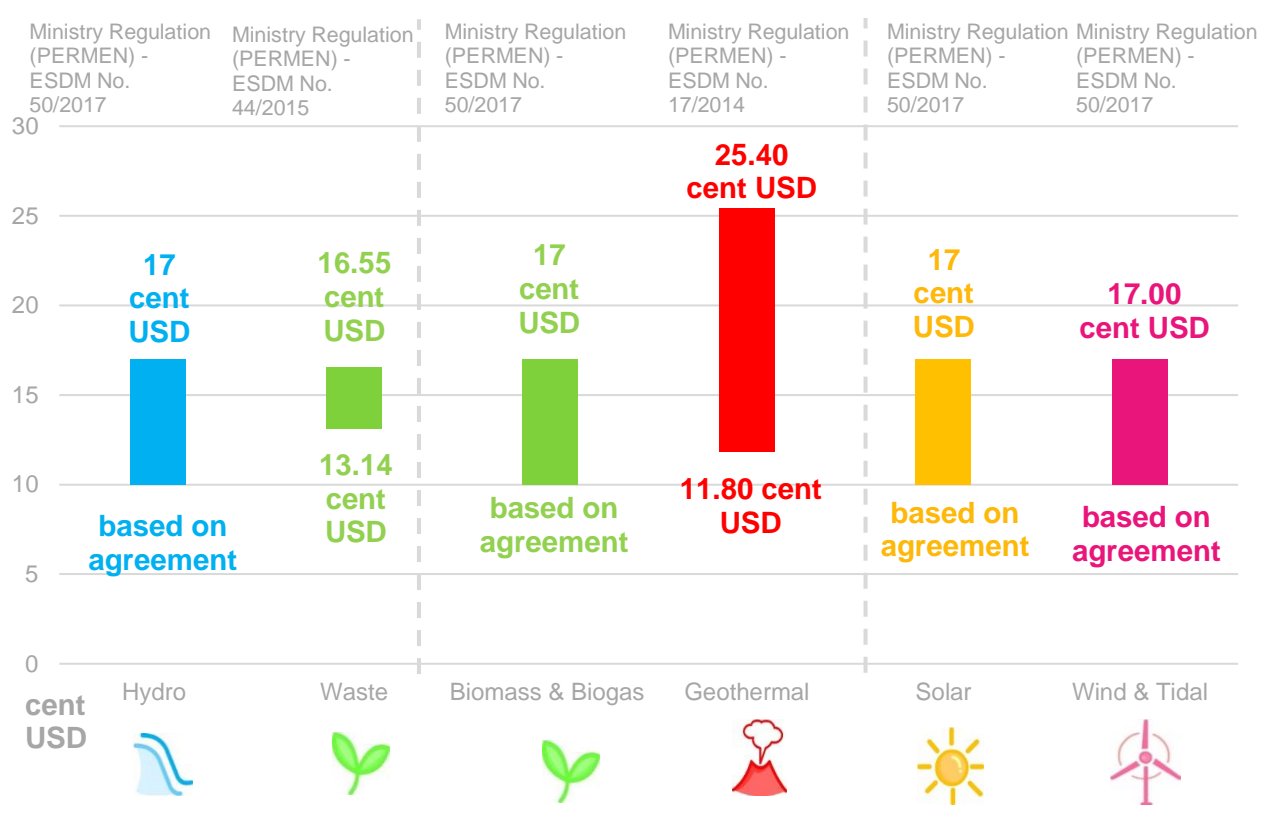


Figure 7: Indonesia Support scheme for RE

Source: Ministry Regulation (ESDM) No. 9/2018, No. 17/2014, No. 19/2016, No. 44/2015

Table 1: Indonesia Support scheme for RE

Source: Ministry Regulation (ESDM) No. 50/2017 and No. 53/2018

No.	Renewable Energy Types	Purchasing	Purchasing Price of Renewable Energy	
			BPP _{PS} > BPP _{PN}	BPP _{PS} ≤ BPP _{PN}
1	Solar Power Plant PV	Auctions based on quotas of capacity offered	Max. 85% x BPP _{PS}	Agreement of the parties
			Purchasing pattern: Build Own, Operate, and Transfer/ BOOT	

2	Wind Power Plant	Auctions based on quotas of capacity offered	Max. 85% x BPP _{PS}	Agreement of the parties
			Purchasing pattern: Build Own, Operate, and Transfer/ BOOT	
3	Biomass Power Plant	Benchmarking Price	Max. 85% x BPP _{PS}	Agreement of the parties
			Purchasing pattern: Build Own, Operate, and Transfer/ BOOT	
4	Hydro Power Plant	Benchmarking Price	Max. 85% x BPP _{PS}	Agreement of the parties
		a. Hydro Power ≤ 10 MW: <i>Capacity Factor</i> at least 65% b. Hydro Power > 10 MW: <i>Capacity Factor Depend on system requirements</i> c. Purchasing pattern: Build Own, Operate, and Transfer/ BOOT		
5	Biogas Power Plant	Benchmarking Price	Max. 85% x BPP _{PS}	Agreement of the parties
			Purchasing pattern: Build Own, Operate, and Transfer/ BOOT	
6	Waste Power Plant	Based on legislative constitution	Max. 100% BPP _{PS}	Agreement of the parties
7	Geothermal Power Plant	Based on legislative constitution	Max. 100% BPP _{PS}	Agreement of the parties
8	Tidal Power Plant	Benchmarking Price	Max. 85% x BPP _{PS}	Agreement of the parties
			Purchasing pattern: Build Own, Operate, and Transfer/ BOOT	
9	Biofuel Power Plant	Benchmarking Price	Agreement of the parties	
			Purchasing pattern: Build Own, Operate, and Transfer/ BOOT	

Under Regulation 50/2017, all tariffs (except for geothermal and waste projects as well as projects where procurement using direct selection process) will be capped at 85% of the local production cost (locally known as the BPP) if the local production cost is higher than the national average production cost. However, if the local production cost is the same or lower than the national average production cost, then the reference price will be 100% of the local production cost.

Regulation 50/2017 does not apply to power purchase agreements (PPAs) that have already been signed. In this case, the signed PPA pricing terms will remain in effect. If a PPA has not been signed but the developer has been designated as the project developer by either the Government or PLN, the pricing will follow the provisions of Regulation 50/2017. There is one exception, however, for geothermal projects. If a geothermal developer has not signed a PPA but has won the auction for the concession in accordance with the existing legislation, the tariff to be used will be the

tariff stipulated by the developer in its winning bid and the new FIT for geothermal projects will not apply.

INCENTIVES & FINANCING SUPPORT

Under Regulation 50/2017, all tariffs (except for geothermal and waste projects as well as projects where procurement using direct selection process) will be capped at 85% of the local production cost (locally known as the BPP) if the local production cost is higher than the national average production cost. However, if the local production cost is the same or lower than the national average production cost, then the reference price will be 100% of the local production cost. The tax incentives for renewable energy-based power projects under Ministry of Finance Regulation No. 21/PMK.011/2010 include:

- Income tax exemption or reduction for 5 or 10 years
- Accelerated depreciation and amortization
- Tax deduction per year of 6 years
- Exemption from VAT
- Accelerated depreciation of capital and fixed assets
- Import duty exemption for renewable energy equipment

The Ministry of Finance regulation No.139/PMK.011/201 states that the government will give financial guarantee for renewable energy plant projects through cooperation with Independent Power Producer (IPP) in the case of payment failure by PLN.

The Geothermal Fund Facility (GFF), Indonesia Infrastructure Guarantee Fund (IGFF), and loans at an interest rate lower than provided by public Banks are available to farmers, for planting palm oil for biofuel.

The Clean Technology Fund (CTF) helps to promote the energy efficiency and renewable energy development in the country and increase the electrification rate up to 90% in 2020. Followed by the US\$400 million investment from CTF, the Indonesia's geothermal power capacity is set to nearly double. In March 2015, US\$50 million was allocated for the Geothermal Energy Upstream Development Project of Indonesia.

In order to encourage the utilization of solar power plant (photovoltaic), the Ministry of Energy and Minerals has introduced new regulation (Permen ESDM No. 49/2018) concerning the power usage from PV Rooftop by power utility consumers. This aims to reduce the amount of electricity used by households with power export (to PLN) coefficient of 0.65.

ENERGY EFFICIENCY AND CONSERVATION (EE&C) SECTOR

EE&C TARGET

The 2014 National Energy Policy (Kebijakan Energi Nasional, KEN) and the 2018 National Energy Plan (Rencana Umum Energi Nasional, RUEN) outlined Indonesia's targets of reducing energy intensity by 1% per annum on average to 2025 and to achieve an energy elasticity of less than 1 in 2025 (the energy elasticity is the rate of change of total primary energy supply over the rate of change of GDP). The country targets to reduce TFEI by 17% in industrial sector, 20% in transportation, 15% in

household and 15% commercial buildings by 2025 compared to Business as Usual (BAU) Scenario (2005) according to National Energy Policy.

EE&C POLICY

Indonesia's policy on EE&C started back in the 1980s. Indonesia then introduced a Master Plan for National Energy Conservation providing a framework for EE&C actions and regulations to come in 1995. In the last 10 years, Ministry of Energy and Mineral Resources (MEMR) has issued various regulations on energy saving, electricity use, water saving, standard and labelling, electricity tariffs, and National Energy Policy. The activities of EE&C include human resource development, creating public awareness, implementing standards and labelling, reducing GHG emissions, implementing ISO 50001, developing partnerships, developing energy investments, and reducing energy intensity.

The Law No. 30/2007 on Energy, Article 25 on Energy Conservation, sets out general principles for the management of energy resources and the government's basic targets for the future development of the energy mix. The Government Regulation No.70/2009 on Energy Conservation states the obligation for large energy users (with energy consumption more than 6,000 toe per annum) to implement energy conservation measures through energy management.

The General Plan for National Energy through Presidential Regulation No. 22/2017, developed by the Ministry of Energy and Mineral Resources (MEMR), states the framework for energy efficiency and conservation. The Plan aims to promote EE through four primary activities:

1. Develop the Energy Service Company (ESCO) to implement energy efficiency projects.
2. Implement energy audit and management programmes.
3. Restructuring of industrial machinery and the issuance of incentive schemes (monetary and non-monetary) for industries that have implemented energy efficiency measures.
4. Implement socialisation and education measures via electronic and social media to increase awareness of project developers and the public regarding energy efficiency

EE&C POTENTIAL

National Energy Conservation Master Plan 2005 which amended on 2014 identified the following sectorial energy saving potentials: 15-30 percent in industry, 25 percent in commercial buildings for electricity, and 10-30 percent in the residential sector.

Ministry of Energy and Mineral Resources in accordance with the Governmental Regulation has defined for reducing energy consumption (TFEC reduction) target 2025 by 17% in industry, 20% in Transportation, 15% in household, 15% in commercial building as compared to energy consumption in Business as usual (BAU) based on 2005 levels.

The comparison on each sector between energy saving potential and target 2025 is represented by **Figure 8** below.

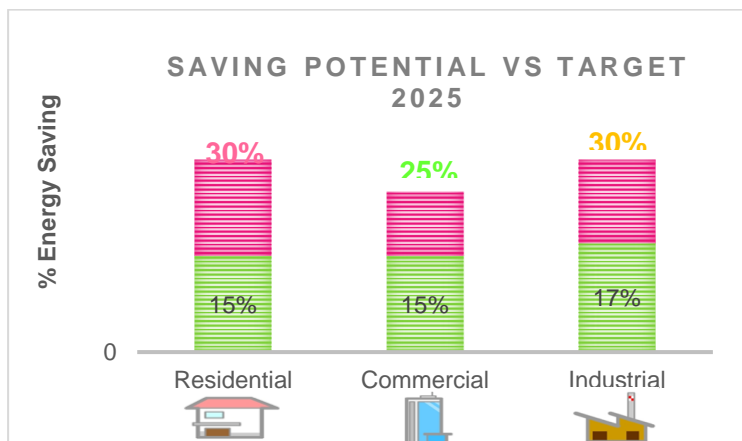


Figure 8: Indonesia’s energy saving potential vs target 2025

Source: National Energy Conservation Master Plan and the Governmental Regulation (PP No. 79/2014)

Power Generation efficiency tends to fluctuate and slightly decreased during recent years. Overall average efficiency of power plant stood approximately at 30%. The efficiency trend is even lower because the reduction of the share of hydroelectricity and the development of coal power plant. The limited development of more efficient technologies, such as gas combined cycles and cogeneration, did not permit an increase in the ratio for thermal power generation

The rate of Transmission and Distribution (T&D) losses of the Indonesian grid in 2016 is 10% of the whole distributed volumes, that is slightly higher than the world average (8.16%). Those losses tend to fluctuate significantly and have decreased slightly since 2005.

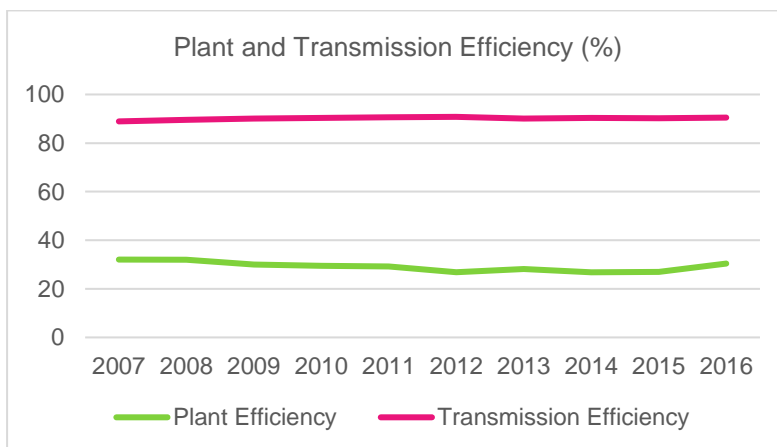


Figure 9: PLN’s Electricity System Performance

Source: Handbook of Energy & Economic Statistics of Indonesia 2017

EE&C ACTIVITIES AND INVESTMENTS

As mentioned by the Directorate of Energy Conservation in 2015 during national green chillers workshop, the estimation of investment that is needed to achieve energy saving targets in Indonesia is USD 6.02 billion. Indonesia has also developed various EE&C financing mechanisms schemes including an Infrastructure Fund and Viability

Gap Fund. Actions for energy efficiency improvement is divided into different sector, as shown in **Table 2** below:

Table 2: Support scheme on Indonesia EE&C

Source: Indonesia Chapter in IEA Energy Efficiency 2017

Objective		Overall Savings in Petajoules (PJ)
Residential Sector	National program for lighting transition, from incandescent to compact fluorescent to LEDs which started in 2007	26 PJ by year 2030 or USD 558 million
	Implementation of Minimum Energy Performance Standard (MEPS) for Air Conditioner (AC)	14.5 PJ by year 2030 or USD 313 million
Transport Sector	Switching to electric two-wheelers	97 PJ by year 2030 or USD 800 million
	Fuel efficiency standards for heavy duty vehicles	75 PJ by year 2030 or USD 630 million
	Improving and expanding public transport by developing mass rapid transport (MRT) and light rail transport (LRT) systems.	Not defined
Industry Sector	Implementation of MEPS for industrial equipment and appliances as well as appointing an energy manager for companies which consume energy more than 0.25 PJ annually as mentioned in Government Regulation 70/2009.	7.7 PJ by year 2030

Under Government Regulation. No. 70 / 2009 (Article 17, 20 and 22), three different actions for supporting energy efficiency in Indonesia has been defined such as giving facilities, incentives and disincentives. The detail is shown as **Table 3** below:

Table 3: Support scheme on Indonesia EE&C

Source: Government Regulation No.70/2009 and Minister Regulation ESDM No. 14/2012

Types	Target	Facility
Facilities	<ul style="list-style-type: none"> Energy Users Energy-efficiency equipment manufacturers 	<ul style="list-style-type: none"> Access to get information on energy-efficiency technologies and specifications Energy saving consultancy services
Incentives	Energy Users	<ul style="list-style-type: none"> Taxation facility, local tax relief and import duties for energy-efficiency appliances; Soft loan for energy conservation investment Partnership in energy audit funded by the Government
	Energy-efficiency equipment manufacturers	<ul style="list-style-type: none"> Taxation facility, local tax relief and import duties for components/parts and raw materials that produce energy-efficient appliances; Soft loan to produce energy-efficient equipment

Disincentives	Energy Users	<ul style="list-style-type: none">• Written Warning• Announcement in mass media• Penalties• Energy supply reduction
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