PLN's New 2021 - 2030 Business Plan: High hopes and 'greener' projects

In brief

The Minister of Energy and Mineral Resources has finally approved PLN's 2021-2030 Electricity Supply Business Plan (***RUPTL***). A copy of the RUPTL can be downloaded from PLN's website here.

This long-anticipated RUPTL marks a pivotal milestone for PLN. For the first time, the majority of power generation projects to be developed are renewable energy projects, accounting for 51.6% of 40,575 MW of power generation projects. The RUPTL also allocates a bigger share to Independent Power Producers (**IPP**) in developing power generation projects.

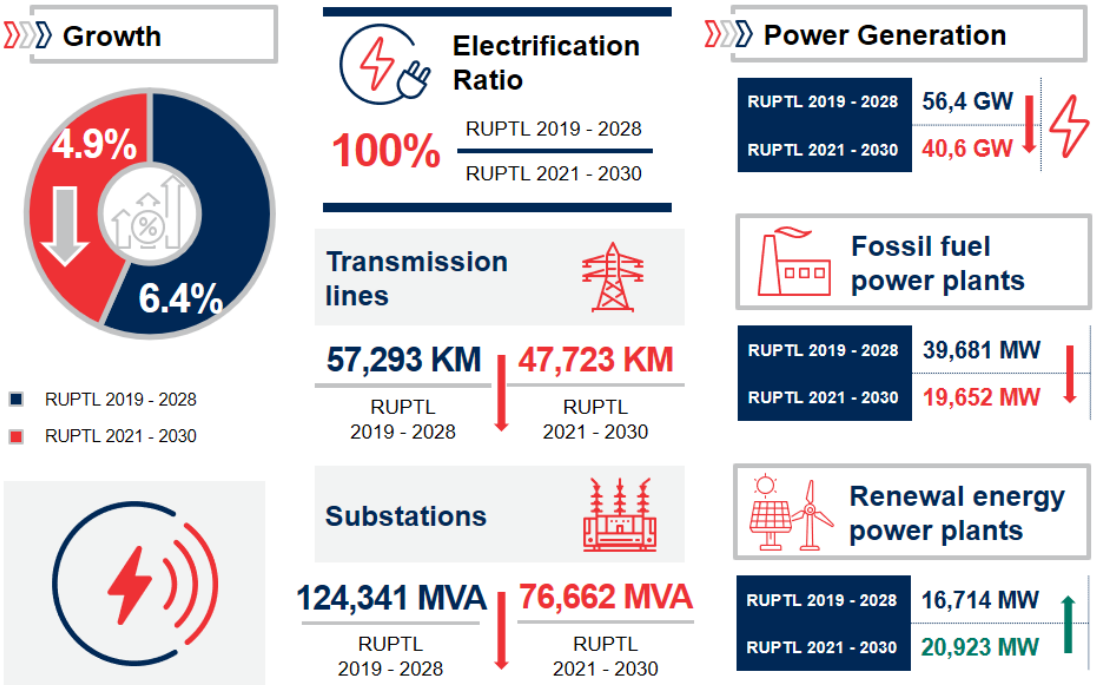
The new RUPTL also lays down, among other things, PLN's strategies to reduce the effects of greenhouse gases, and its target to achieve net zero emission by 2060, which is the policy adopted by the current administration in line with the UNFCCC's Paris Agreement.

What is an RUPTL

An RUPTL is PLN's 10-year business plan for the development of power projects, including power generation, distribution and transmission projects development. The RUPTL determines projects to be developed by PLN and IPPs respectively. Particularly for power generation, the RUPTL also provides the targeted commercial operation dates for the projects which are being developed and provides a basis for new projects procurement by PLN.

The RUPTL is usually updated annually to address changes that may be needed during the course of the plan. Due to the Covid-19 pandemic, there have been no updates to the last RUPTL in 2019, which covered the period until 2028.

What is changing



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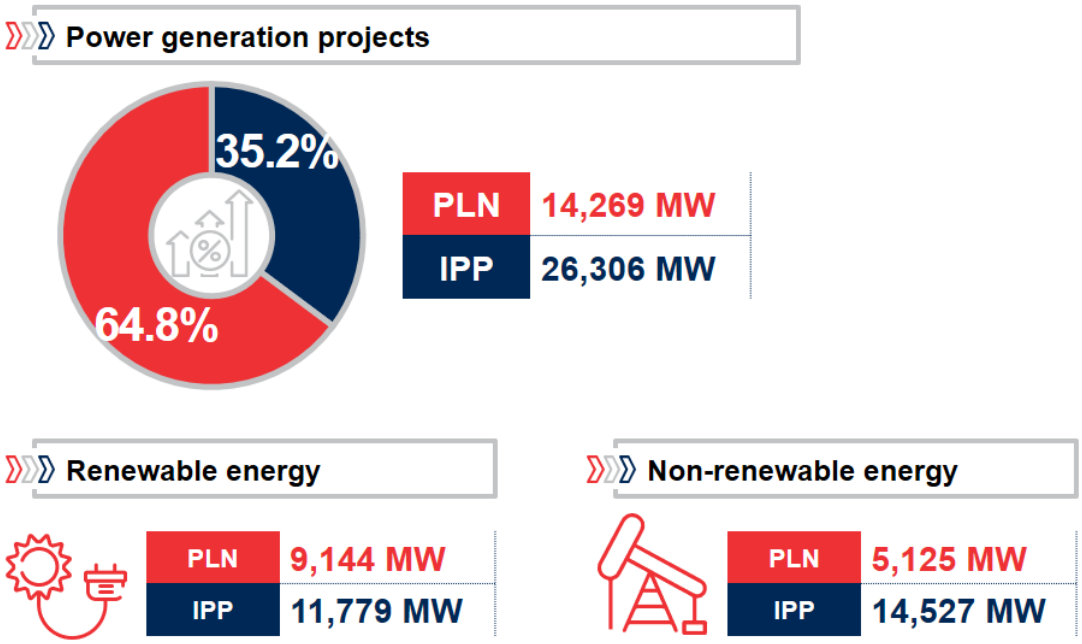
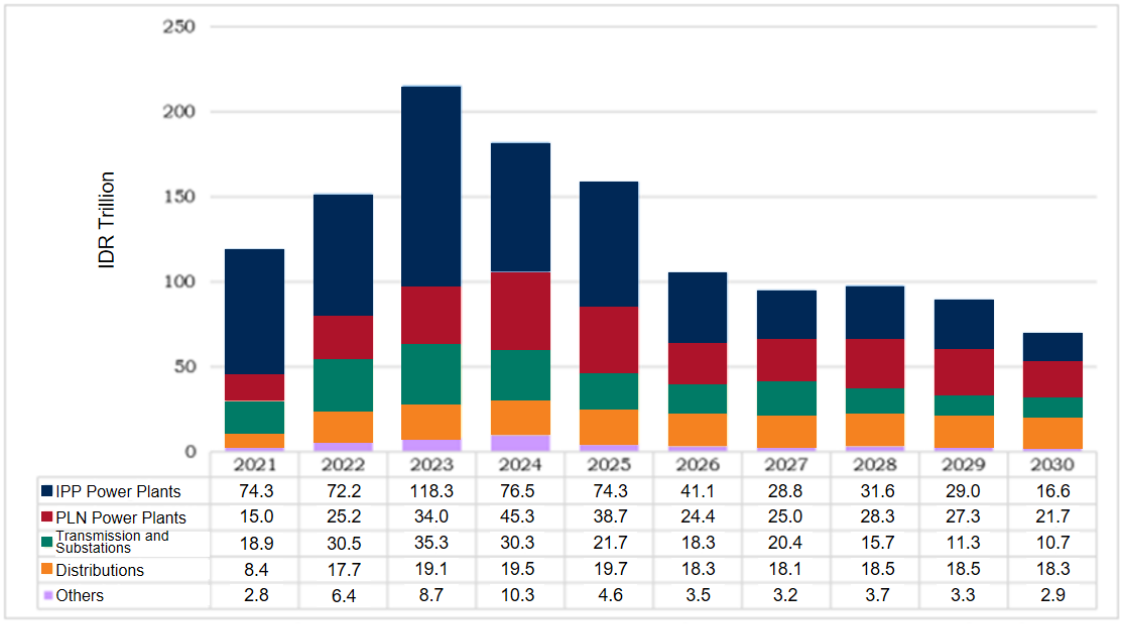
The matrix above sets out a summary of the changes from the previous RUPTL. The new RUPTL indicates that the Covid-19 pandemic has caused substantial decreases in energy demand and affected growth. It revises the demand growth projection to 4.9% and this has consequent knock-on effects on the overall development of power projects under the new RUPTL.

Despite the overall decrease in generation capacity compared to the 2019 - 2028 RUPTL, under the new RUPTL renewable energy will take up an increasing share of power generation projects, and IPPs will play a bigger role in the development of power generation projects.



PLN's presentation material on the new RUPTL indicates that 26,306 MW (64.8 % of the total 40,575 MW power generation projects under the new RUPTL) is allocated to IPPs, comprising 11,779 MW renewable energy power projects and 14,527 MW non-renewable power projects.

The new RUPTL also sets out an estimate by PLN of the investment to be made by PLN (for power generation, transmission, distribution and others) as well as by IPPs (for power generation) over the next ten years. The average figure indicated by the new RUPTL is IDR 128.7 trillion per annum (IDR 72.4 trillion by PLN, and IDR 56.3 trillion by IPPs) for new infrastructure, excluding investment requirements for maintenance.



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
IPP Power Plants	74.3	72.2	118.3	76.5	74.3	41.1	28.8	31.6	29.0	16.6
PLN Power Plants	15.0	25.2	34.0	45.3	38.7	24.4	25.0	28.3	27.3	21.7
Transmission and Substations	18.9	30.5	35.3	30.3	21.7	18.3	20.4	15.7	11.3	10.7
Distributions	8.4	17.7	19.1	19.5	19.7	18.3	18.1	18.5	18.5	18.3
Others	2.8	6.4	8.7	10.3	4.6	3.5	3.2	3.7	3.3	2.9

Estimated Investment Needs for Electricity Projects Year 2021 - 2030

Source: PLN's RUPTL 2021-2030.

A 'greener' RUPTL

Significantly, the new RUPTL allocates 20,923 MW of generation capacity (more than half of the planned 40,575 MW power generation projects) for renewable energy projects. This is a 25% capacity increase (4,209 MW) from the 2019-2028 RUPTL. On the other hand, there is an almost 50% decrease in the capacity of planned fossil fuel power generation projects.

The 20,923 MW of renewable energy power projects under the new RUPTL comprise approx. 49.65% hydro power projects (including mini/micro hydro power projects), 22.36% solar power projects, and 16.04% geothermal power projects. The remaining renewable energy capacity comprise wind, biomass and a new variant of '*EBT base*' projects. EBT base projects are base load renewable energy power projects that are intended to replace coal fired power projects still in planning by 2025; which will be combined with gas in order to provide base load power generation. It is not clear whether the reference to replacing coal power plants still at the planning stage refers to coal-fired power plants which have not yet been procured by PLN by 2025. PLN's presentation slides on the new RUPTL refers to these as 'not yet committed' plans for coal fired power projects. The new RUPTL also indicates the EBT base power plants are being planned for 2026 onwards.

The anticipated growth in renewable energy generation capacity is set out below:

No	Renewable energy power plants	Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
1	Geothermal power plants	MW	136	108	190	141	870	290	123	450	240	808	3,355
2	Hydro power plants	MW	400	53	132	87	2,478	327	456	1,611	1,778	1,950	9,272
3	Mini/micro hydro power plants	MW	144	154	277	289	189	43	-	2	13	6	1,118
4	Solar power plants	MWp	60	287	1,308	624	1,631	127	148	165	172	157	4,680
5	Wind power plants	MW	-	2	33	337	155	70	-	-	-	-	597
7	Biomass/waste power plants	MW	12	43	88	191	221	20	-	15	-	-	590
7	EBT base power plants	MW	-	-	-	-	-	100	265	215	280	150	1,010
8	Renewable energy peaker power plants	MW	-	-	-	-	-	-	-	-	-	300	300
TOTAL		MW	752	648	2,028	1,670	5,544	978	991	2,458	2,484	3,370	20,923

Source: PLN's RUPTL 2021-2030.

The intention of this planned growth is to achieve:

1. a mixed energy target for renewable energy of 23% by 2025 (which, in fact, is the same target as the 2019 - 2028 RUPTL)
2. Indonesia's goal of reducing greenhouse gas emissions by 29% by 2030
3. net zero emission by 2060

PLN uses two scenarios in the new RUPTL, i.e., the optimum and a low carbon scenarios. Under the optimum scenario, the energy mix target for renewable energy of 23% will be achieved by 2025, and by 2030, the energy mix composition will be coal 64%, natural gas (including LNG) 11.5%, renewable energy 23%, and fuel oil 0.4%. Under the low carbon scenario, PLN plans to reduce its reliance on coal even further, and to increase biomass co-firing and gas, such that the target energy mix composition by 2030 is expected to be coal 59.6%, natural gas (including LNG) 15.6%, renewable energy 24.2%, and fuel oil 0.4%.

Each scenario presents its own challenges. However, the statement in the last paragraph of section 5.6.1.1 of the new RUPTL (which sets out that "... the scenario used in this RUPTL is a low carbon scenario."), seems to suggest that PLN is targeting low carbon.

The path to carbon neutral

Under the new RUPTL, PLN acknowledges that energy supply until 2029 will still be dominated by fossil fuel power plants, particularly coal-fired ones. The new RUPTL explains what PLN's efforts have been to date to reduce emissions from coal-fired power plants, and how it intends to do so even further. Past efforts include the use of electrostatic precipitators to catch dust, ash or particulates, the installing of flue gas desulphurization technology in coal-fired power plants and the use of low Nitrogen oxide (NOx) burners. For the future, PLN intends to continue to implement fuel switching (from oil to gas, diesel to mixed biofuel, diesel to gas) and to roll out the use of more efficient and low carbon technology (e.g., using supercritical and ultra-supercritical boilers for coal fired power plants in Java and Sumatra).

Significantly, unlike the 2019 - 2028 RUPTL, the new RUPTL includes PLN's plans to use biomass for co-firing and to retire aging coal fired power plants.

1. **Biomass co-firing**

   The new RUPTL includes PLN's plan to mix coal with biomass for coal fired power plants.

   The co-firing plan is aimed at certain coal-fired power plants using Circulated Fluidized Beds (CFB), Pulverized Coal (PC) and stocker technology. The new RUPTL identifies 18,895 MW capacity of coal-fired power plants located in 52 locations that have the potential for co-firing, and if all were in commercial operation, this would generate 2.7 Gw of electricity from renewable energy and require up to 14 million tons of biomass fuel per annum.

   PLN's RUPTL presentation reveals that it has implemented co-firing pilot projects at 32 existing coal-fired power plants using 5% biomass fuel. To achieve the target for 23% renewable energy by 2025, co-firing is planned by way of mixing coal with 10% - 20% biomass fuel, and the design of new coal-fired power plants that are planned to operate after 2025 must enable them to use a minimum of 30% biomass fuel.

   This new plan is not without challenge, as it requires security of biomass supply, stable biomass prices, and additional investment costs. PLN seems to be looking for regulatory and policy support from the Government to maintain such biomass fuel supply and competitive tariffs to make the plan work. It remains to be seen to what degree this support will be forthcoming.

   If these requirements are passed onto coal-fired power plants developed by IPPs, the PPAs will need to be adjusted to address, among other things, the procurement of biomass fuel supply and heat rate differences between coal and biomass fuel. This is because, in a typical coal fired PPA, fuel costs are passed through to PLN, but are subject to a specific heat rate guarantee, such that the fuel cost paid by PLN as component C is reduced if there are heat rate inefficiencies.

2. **Retiring aging coal-fired power plants starting from 2030**

   In July 2021, PLN stated that it would phase out all its coal-fired power plants by 2056 in order to achieve net zero emission by 2060. PLN said it would start lowering coal-fired power plant capacity portion in 2021, retiring coal fired power plants by 2030, developing nuclear power plants by 2040, and finally retiring all coal-fired power plants by 2056. There was also a discussion on an alternative scenario where coal-fired power plants would remain in operation, but would use enhanced carbon capture technology.

   The new RUPTL includes a short description of PLN's plan for retiring aging coal-fired power plants. However, it does not set a target for the retirement of all coal-fired power plants by 2056 nor does it include nuclear power development by 2040 (although it does mention small modular reactor nuclear power projects as an option and identifies several locations that have potential for nuclear power projects).It does mention that the retirement of aging coal-fired power plants will be done in stages, starting from 2030. However, this will be subject to a number of factors, including the term of the PPA and the economic life of the relevant power plants. This will be implemented by monetizing the coal-fired power plants.

   The new RUPTL provides an example of what monetization might mean. This includes the sale of PLN's coal-fired power plants to the private sector in order to free up PLN's revenues to develop renewable energy power plants. There is no further explanation of whether the power plants will be sold on the basis that they are still capable of running so that the purchaser will still be able to use the power plants for its own power generation. However, if that is the case then, while this would seem to support PLN's plan to achieve its net zero emissions target, this will still make it challenging for Indonesia to achieve its target, unless the power plants are sold to the purchasers on the condition that they will cease to operate by 2060.

   More significantly, it will be interesting to see what the market's appetite will be for aging coal-fired power plants, particularly given increasingly tightening market conditions for coal financing.

Other matters

- Conversion of diesel power plants

  One of the programs that PLN will carry out to achieve the 23% renewable energy mix target by 2025 is to convert its existing 5,200 units of small-scale diesel power plants (scattered in 2,130 locations) into renewable energy based and gas-fired power plants. This program was initially launched in November 2020 and is now included in the RUPTL.

The program will be carried out in three phases from 2021 to 2026. The first phase is to convert approximately 225 MW capacity of diesel power plants that have been operating for more than 15 years, located in 200 isolated locations, into solar and battery storage power plants with a total size of around 660 MW. The second phase is to convert diesel power plants with a total capacity of around 2,000 MW to gas fired power plants or renewable energy power plants. The third phase is to connect isolated or off-grid systems to the grid.

- Transmission

  Similar to the previous RUPTL, the new RUPTL opens opportunities for private developers to develop transmission projects under a build lease transfer (BLT), build own operate (BOT) or power wheeling scheme.

  Under a BOT or BLT scenario, transmission lines are developed and funded by private developers, including for the land acquisition and the right of way, and PLN will pay for the lease of the transmission assets, and after a certain period the transmission assets will be transferred to PLN.

  In a power wheeling scheme, the context remains that private developers will develop, fund, operate and own the transmission lines, and PLN will pay a fee to the developer to deliver electricity from PLN's power plants to PLN's customers.

  Although the option of utilizing PLN's transmission lines by entering into power wheeling schemes has theoretically been open for some time now, unfortunately, the new RUPTL does not discuss this in detail. This needs further clarification. As the market understands it, power wheeling using PLN's transmission systems could potentially accelerate the growth of renewable energy based corporate PPAs by the private sector, which would help Indonesia to achieve its emissions reduction target.

- Smart grid and electric vehicle and rooftop solar

  The new RUPTL includes PLN's plans in respect of smart grid, electric vehicle and rooftop solar projects.

  A smart grid is a power grid system equipped with advanced technology to enable the more efficient control of energy in the grid system and to provide predictive information and real-time availability conditions for power plants connected to the grid. PLN's smart grid roadmap for 2021 - 2025 includes the digitalization of power plants, automation of transmission and distribution substations and implementation of advanced metering infrastructure technology in stages. For 2016 and beyond, PLN plans to, among other things, upgrade the SCADA system to Wide Area Monitoring system and implement dynamic line rating.

  With respect to electric vehicles, PLN's main role, in addition to providing electricity, is to provide the infrastructure needed for charging stations for cars (SPKLU) and motorcycles (SPLU). By 2019, 7,194 SPLU units had been built in 3,348 locations. PLN estimates that the electric vehicle population will increase to 38,491 units in 2024 and the average energy needed will be around 99.3 GWh. Unfortunately, the new RUPTL does not provide further detail on how many SPKLUs will be built and the proposed target locations. It does however, emphasize the need for a road map for charging stations infrastructure and to strengthen the grid to cater for charging electric vehicles at home.

  The development of rooftop solar photovoltaic projects continues to be part of PLN's business plan. As with the 2019 - 2028 RUPTL, PLN provides support to rooftop solar photovoltaic projects such as providing parallel operation facilities, creating billing systems to accommodate export and import of electricity and by providing reserve margin to balance solar photovoltaic intermittency. Nevertheless, in the new RUPTL PLN identifies several challenges to rooftop solar development. These include the lack of readiness of a number of PLN systems to accept renewable energy (due to oversupply and decreased demands), and increased PLN operating costs as it now has to prepare buffer power plants and invest in automatic generation control and dispatch.

Closing

The new RUPTL opens up significant new opportunities for investors, financiers, suppliers, service providers and other stakeholders to participate in Indonesian green power projects in the next 10 years; hopefully, this will speed up Indonesia's energy transition towards net zero.

In order to ensure the success of the goals set out in the RUPTL, it will be important to have an ecosystem of regulations and policies that facilitates investment, bankable power purchase agreements, and continuous support from domestic and overseas financial institutions.