



# Pathways to Financial Sustainability for PLN through Renewable Energy Development

*Massive expansion of coal-fired power plants and lack of development in renewable energy have led to PLN's financial woes*

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## Key Findings

**The development of renewable energy in Indonesia has been underwhelming, and the renewable energy mix in 2023 only reached 13.1% due to the dominance of coal-fired power plants.**

**The massive expansion of coal-fired power plants in fulfilling the mandate from the government of Indonesia created financial problems for PLN.**

**Indonesia was burdened with US\$8 billion of electricity subsidy and compensation in 2022 due to PLN's heavy reliance on coal-fired power plants.**

**The retirement of coal-fired power plants gradually and the acceleration of the renewable energy development, especially solar and wind, can be a win-win solution to achieve PLN's financial sustainability and Indonesia's Paris Agreement commitment.**



## Economic Miracle or Unsustainable Business Model?

Indonesia's state-owned power utility PLN has posted record profits, all without raising tariffs in the face of escalating operating costs while maintaining subsidies for the low socioeconomic household customers, as well as small business and industrial customers up to 5,500 VA power. Look beneath the surface and a far more complex and concerning picture emerges. The GOI's decision to massively expand coal-fire power generation has locked PLN into paying for excess power it cannot sell, placing a huge strain on its finances and ability to service debt. If, as has been the case, it is unfeasible for PLN to pay its subsidies, the GOI must meet the shortfall plus pay PLN's mandated profit margin as "compensation". Thus PLN's "record profits" are propped up by the GOI's subsidies and compensation payments. In fact, the GOI's total financial support dwarfs PLN's profits by a factor of almost four to one, placing a huge, unnecessary drain on the budget. The GOI has sought to insulate PLN from volatile global coal prices by capping the price well below market value. This intervention is not only a business constraint on domestic coal producers, but it also limits the tax revenue they pay the GOI. As a result, PLN and, by extension, the GOI, due to its political aversion to raising tariffs, are locked in a vicious cycle of ever-escalating costs and compensation payments that are unsustainable. Meanwhile, Indonesia's vast and abundant resources of renewable energy, particularly solar and wind power, remain largely untapped, despite the increasingly compelling economic and environmental case for their deployment.

## Executive Summary

In 2023, average global temperatures hit the highest level in the 174-year observational record, reaching 1.45°C ( $\pm 0.12^\circ\text{C}$ ) above pre-industrial levels. As climate change becomes increasingly worrying, renewable energy has surged to the forefront of climate action.

As a signatory to the Paris Agreement, Indonesia committed to a 29% reduction in greenhouse gas (GHG) emissions by 2030 through its own efforts – or to 41% with international support. In the long term, it pledged to reach net-zero emissions (NZE) in 2060 or earlier.<sup>1</sup> Despite introducing regulations to support these targets, progress seems to be slow.

Indonesia still depends heavily on fossil-based energy, as shown in the latest data from Ministry of Energy and Mineral Resources (MEMR). In 2023, coal contributed 40.5% of the energy mix whereas renewable energy only accounted for 13.1%.<sup>2</sup> Instead of developing renewable energy power plants

<sup>1</sup> Government of Indonesia (GOI). [Law no 16 on the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change](#). October 2016.

<sup>2</sup> Ministry of Energy and Mineral Resources (MEMR). [Capaian Kinerja Sektor ESDM Tahun 2023](#). Page 16.

to fulfill its electricity needs, Indonesia's dependence on electricity from coal generation has increased from year to year.

National electricity utility, PT Perusahaan Listrik Negara (PLN), as the primary actor in implementing the renewable energy policies, has an important role in decarbonizing Indonesia's energy sector and developing renewable energy projects in Indonesia. However, the data shows that historically PLN has not achieved renewable energy targets. A contributing factor has been PLN's financial instability, which makes it heavily reliant on Government of Indonesia (GOI) subsidies to support its operation and maintenance expenses. The GOI's establishment of the Fast Track Program (FTP)-1 (2006), FTP-2 (2010) and FTP-3/35,000-megawatt (MW) Program (2015) drove a massive expansion of coal-fired power plant capacity. The contractual obligations imposed by power purchase agreements (PPAs) for those projects made the situation worse by increasing the financial burdens on PLN. As a state-owned company supposed to generate profit for the government, PLN is still reliant on financial support from the GOI. In 2022 alone, the subsidy and compensation income from the GOI reached about IDR123 trillion (US\$8 billion).

Indonesia only has seven years to fulfill its Paris Agreement commitment. The development and utilization of renewable energy is vital to fulfilling these commitments. This report takes a deep dive into the renewable energy challenges in Indonesia by focusing on:

- The failure of Indonesia to achieve its renewable energy targets and the reasons behind it.
- PLN, as Indonesia's agency to implement energy policies, struggles to maintain its financial position.
- How renewable energy, especially solar and wind, can be a win-win solution to achieve both PLN's financial sustainability and meet Indonesia's Paris Agreement commitment.

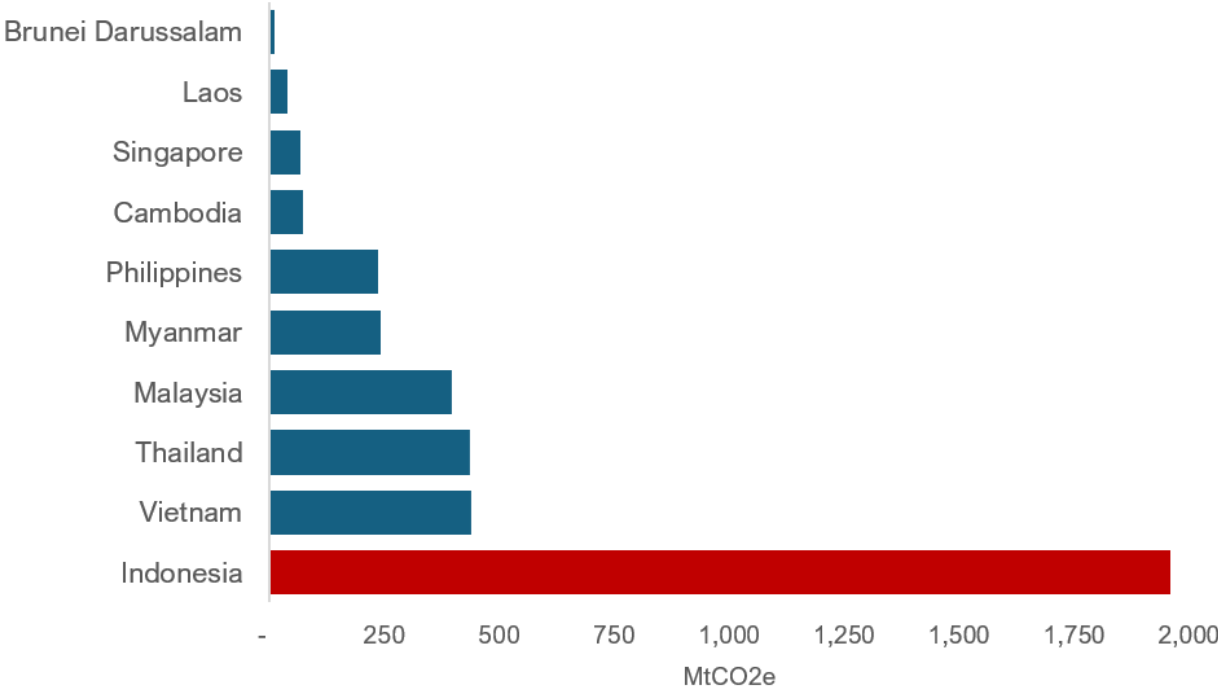
# Introduction

## Indonesia and its Climate Change Commitments

The World Meteorological Organization has confirmed 2023 as the hottest year in recorded history, with the average temperatures hitting the highest level in 174 years of record-keeping by a clear margin, reaching 1.45°C (±0.12°C) above the pre-industrial average.<sup>3</sup> Many experts assert that climate change is becoming increasingly concerning and poses a threat to the planet's sustainability. Under these conditions, renewable energy generation has surged to the forefront of climate discourse and action for its potential to achieve decarbonization targets.

As the most populous country in Southeast Asia, Indonesia contributes about half of the region's Greenhouse Gas (GHG) emissions.<sup>4</sup>

**Figure 1: Southeast Asia's GHG Emissions (MtCO2e)**



Source: Bain & Company

As a signatory to the Paris Agreement, Indonesia is committed to a 29% reduction in GHG emissions by 2030 through its own efforts – or to 41% with international support. In the long term, it has

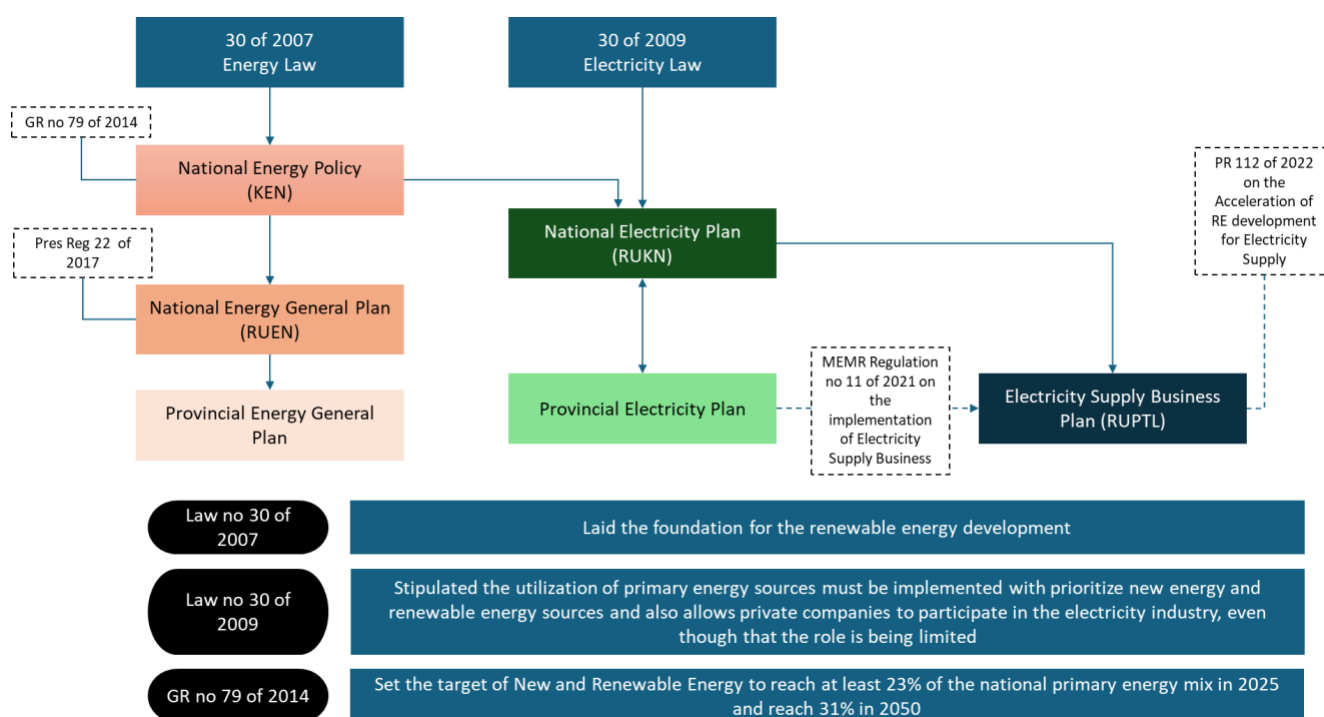
<sup>3</sup> World Meteorological Organization. [State of the Global Climate 2023](#). Page 3.

<sup>4</sup> Bain & Company. [Southeast Asia's Green Economy 2023 Report](#). Page 34.

pledged to reach net-zero emissions (NZE) in 2060 or earlier. Indonesia's commitments to energy transition are embodied in its ratification of the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) through Law No. 16 of 2016.<sup>5</sup> In September 2022, Indonesia submitted its enhanced Nationally Determined Contribution (NDC), and committed to a higher GHG reduction target of 31.9% (unconditional) and 43.2% (conditional).<sup>6</sup>

To support the energy transition and to achieve NZE target, the Government of Indonesia (GOI), issued several regulations as a foundation to boost the development and implementation of renewable energy (Figure 2).

**Figure 2: Indonesia's Regulations on the Energy and Electricity Sector**



Source: UK Mentari, 2022; Comprehensive Investment and Policy Plan PP JETP, 2023; IEEFA

To support Indonesia's effort, international organizations provide assistance through the establishment of a renewable energy fund to accelerate the energy transition throughout the country. The latest support offered to Indonesia is through the launching of Just Energy Transition Partnership for Indonesia (JETP Indonesia) on 16 November 2022, in collaboration with the International Partners Group (IPG).<sup>7</sup> JETP Indonesia aims to achieve peaking power sector emissions

<sup>5</sup> GOI. [Law no 16 on the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change](#). October 2016.

<sup>6</sup> UNFCCC. [Enhanced Nationally National Contribution](#). Page 12.

<sup>7</sup> International Partners Group (IPG). [Joint Statement](#). Page 1. Note: The IPG comprises the governments of Indonesia, Canada, Denmark, the European Union, France, Italy, Norway and the United Kingdom, and co-chairs Japan and the United States.



by 2030 of no more than 250 million tons of carbon dioxide equivalent (MtCO<sub>2</sub>) in 2030, renewable energy generation share of 44% by 2030; and achievement of NZE in the power sector by 2050, with initial commitment of US\$20 billion.<sup>8</sup>

Despite its best efforts and the support from internal and external organizations, the development of renewable energy has been underwhelming, partly due to the dominance of coal-fired power plants. As a country with the highest energy consumption among the member States of Association of Southeast Asian Nations (ASEAN),<sup>9</sup> Indonesia is uniquely placed to lead the energy transition in the region and, to a further extent, the world. However, the GOI has been hampered by its heavy dependence on fossil fuel-based energy, mainly coal.



**The GOI has been hampered by its heavy dependence on fossil fuel-based energy, mainly coal.**

According to the latest 2023 MEMR data, coal accounted for 40.46% of the energy mix, while all types of renewable energy contributed only 13.1%.<sup>10</sup> Instead of developing renewable energy power plants to fulfill its electricity needs, Indonesia's dependence on electricity from coal generation has increased from year to year.

The clock is ticking for the GOI to fulfill its commitment to achieve the 29% reduction in GHG emissions by 2030. PLN, as the primary actor in implementing the renewable energy policies, has an important role to help Indonesia to achieve this target. Therefore, the reasons behind this slow progress in renewable energy development needs to be addressed immediately.

<sup>8</sup> JETP Indonesia. [Comprehensive Investment and Policy Plan 2023](#). Page 2. November 2023.

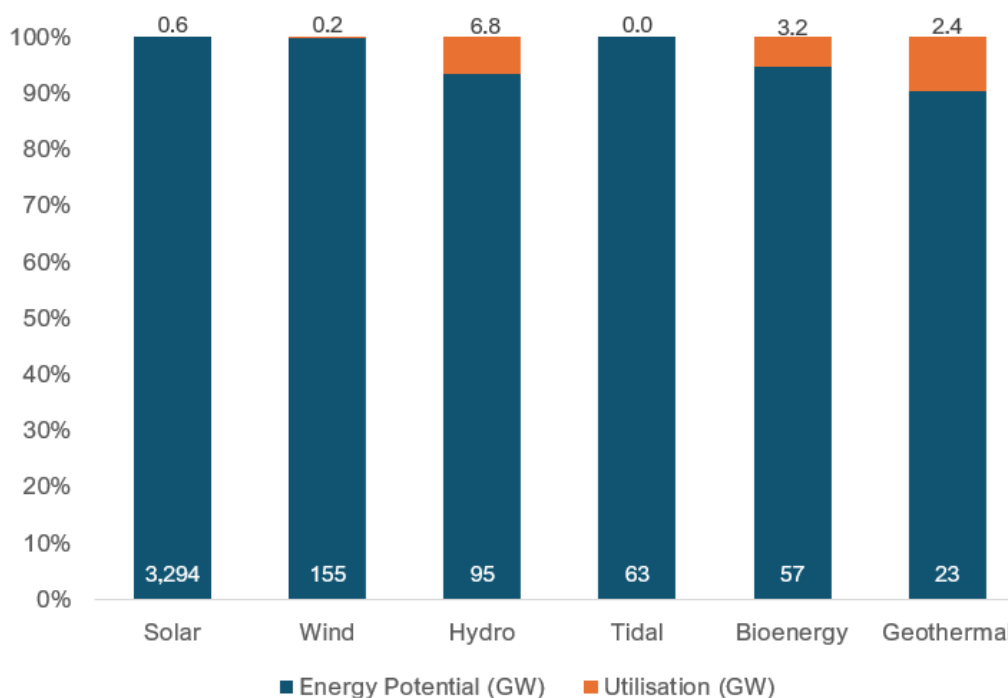
<sup>9</sup> International Energy Agency (IEA). [Electricity 2024](#). Page 101.

<sup>10</sup> MEMR. [Capaian Kinerja Sektor ESDM Tahun 2023](#). Page 16.

## Indonesia Off Track to Reach Paris Agreement Target

Indonesia, with its abundant natural resources, holds immense potential for renewable energy. Considering its location, it has favorable natural resources for the development of hydro, geothermal, solar PV power plants, and even wind power resources offshore.<sup>11</sup> Unfortunately, the development of renewable energy has been subpar, partly due to the dominance of coal-fired power plants, and through December 2023, the GOI has only been able to utilize 0.4% of its renewable energy potential.

**Figure 3: Indonesia's Renewable Energy Utilisation**



Source: National Energy Council (DEN), MEMR, IEEFA

## An Untapped Abundance of Sunshine and Wind

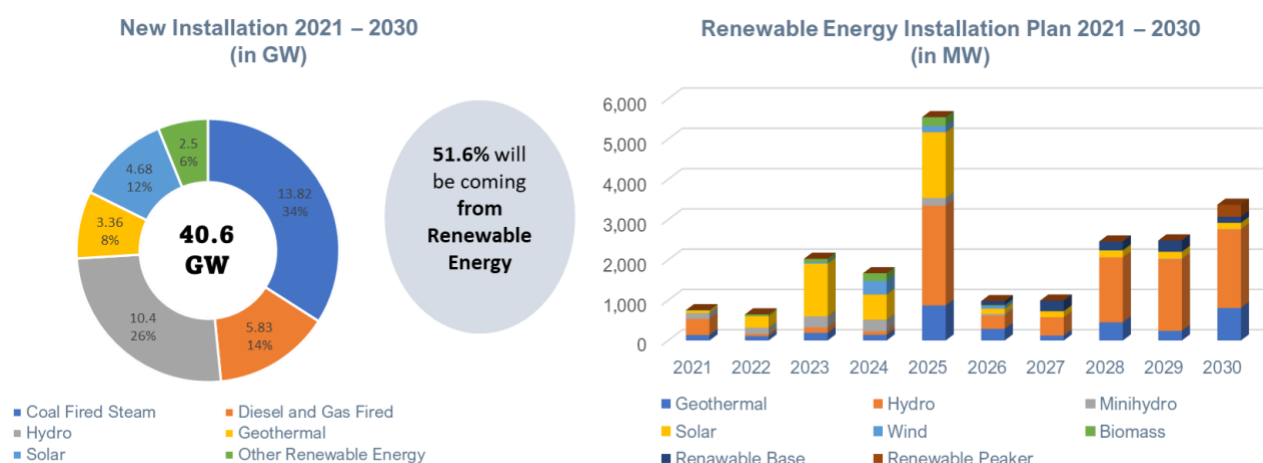
As an equatorial archipelago of more than 17,000 islands, Indonesia should be able to utilize the country's vast resources of solar and wind for electricity, especially in remote areas. However, Indonesia has added only 574 megawatts (MW) of solar power out of a possible 3,293 gigawatts (GW), which is just 0.017% of its potential. This is one of the lowest rates in the Asia-Pacific region.

<sup>11</sup> World Bank. [Offshore Wind Technical Potential in Indonesia](#). Page 1.

Additionally, Indonesia has only developed 154 MW of wind power from a potential of 155 GW, or 0.001%.<sup>12</sup>

Indonesia has set an ambitious target of 23% renewable energy by 2025, reaching 31% in 2050.<sup>13</sup> This target was also stipulated in the Electricity Supply Business Plan (RUPTL 2021 – 2030), PLN's 10-year development plan for electricity generation, transmission, and distribution assets nationwide. It was hailed as the greenest RUPTL, as it featured 21GW of renewable energy capacity, with half to be achieved in 2025. The 21GW of new capacity includes Hydro – 44%, Solar PV – 22.4%, Wind – 2.9%, Biomass – 2.8% and Geothermal – 16%.<sup>14</sup>

**Figure 4: New Capacity and Renewable Energy Installation Plan 2021-2030**



Source: RUPTL 2021-2030

Under the RUPTL, PLN will add a further 4.7GW coal-fired power plant (CFPP) capacity, of which 1.3GW has since been canceled, plus 5.8GW of diesel and gas power generation to the grid. However, 1.1GW of CFPP capacity will be retired by 2030, to be replaced by about 3.6GW of diesel and gas generation.<sup>15</sup> To support this, in 2022, outgoing President Joko Widodo issued a regulation to ban the development of new CFPPs, and committed to reducing the number of CFPPs by giving the MEMR authority to accelerate the closure of CFPPs operated by PLN and/or independent power producers (IPPs). This regulation also replaces renewable energy tariffs from the average basic cost of generating electricity (BPP) to the highest price based on the type of energy source and location. In addition, it streamlines the procurement process for renewable energy projects and provides a time limit for their completion.<sup>16</sup>

<sup>12</sup> National Energy Council. [Outlook Energi Indonesia 2023](#). Pages 12 and 15-16.

<sup>13</sup> GOI. [Government Regulation Number 79 of 2014 regarding National Energy Policy](#). Page 8.

<sup>14</sup> PLN. [RUPTL 2021 – 2030](#). Section III. Page 14. Table 3.1. September 2021.

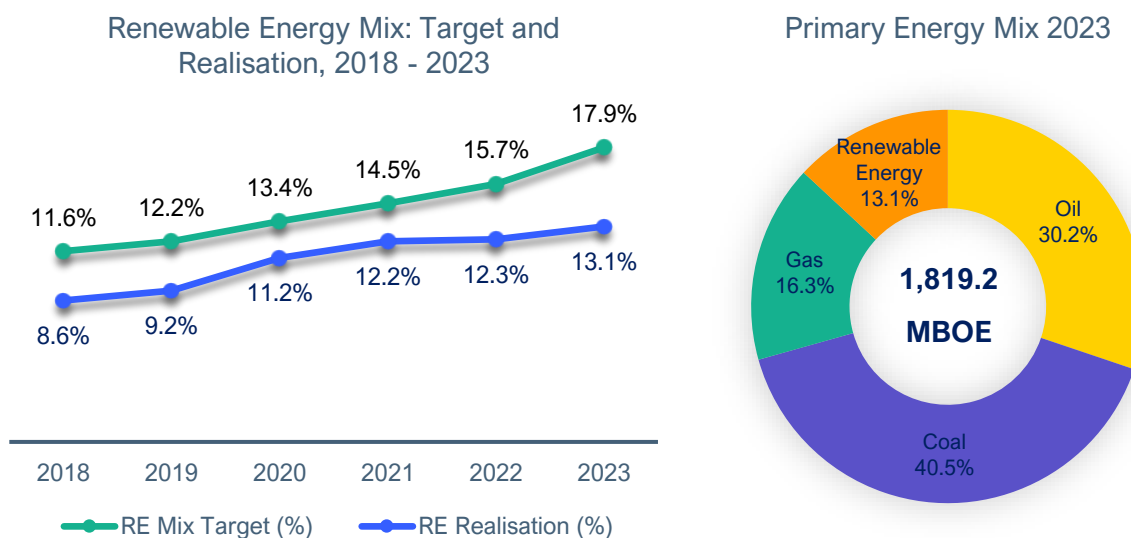
<sup>15</sup> Ibid. Section V. Page 53.

<sup>16</sup> GOI. [Presidential Regulation Number 112. Acceleration of Renewable Energy Development](#). September 2022.

Although the regulatory support has been excellent, very few of these measures have actually been implemented. In 2023, one year after the regulation was issued, the GOI has added only 540MW of renewable energy, of which the Cirata Floating Solar Project with a total capacity of 192-Megawatt peak (MWp) was the one shining light. It came to fruition as a joint venture between PLN and Masdar, a renewable energy investor from United Arab Emirates.<sup>17</sup> This capacity addition, in perspective, remains modest compared with the new South Sumatra Mine-Mouth Coal-Fired Power Plant 8, also launched in 2023, with a capacity of 1,320MW.<sup>18</sup>

In the past seven years, Indonesia’s incremental renewable energy contributions to the primary energy and electricity generation mix increased only 1% to 2% a year, falling short of the initial target of 3%. As of December 2023, renewable energy only amounted to 13.1% with total capacity of 13.2GW, mainly from hydroelectric, biomass and geothermal (12.4GW), still well below the initial target of 17.9%. From 2018 to 2022, the GOI was only able to add 2.78GW of renewable energy generating capacity. As a result, Indonesia is still heavily dependent on coal-based energy, comprising 40.5% of the energy mix.<sup>19</sup>

**Figure 5: Primary Energy Mix and Renewable Energy Mix Target versus Realisation**



Source: MEMR, 2024

Presumably due to the slow progress in renewable energy development, Indonesia now plans to reduce its renewable energy target. National Energy Council (DEN) is working on updating Indonesia’s National Energy Policy and lowered its renewable energy target to a less ambitious target from 23% to 17-19%. The draft, which is being debated in the House of Representatives,

<sup>17</sup> MEMR. [Capaian Kinerja Sektor ESDM Tahun 2023](#). Page 15.

<sup>18</sup> CNBC Indonesia. [Legitimate! Giant PLTU Sumsel 8 Finally Operates](#). 2 November 2023.

<sup>19</sup> MEMR. [Capaian Kinerja Sektor ESDM Tahun 2023](#). Page 16.

would also reduce the national renewable energy target for 2030 from 26% to 19%-21%.<sup>20</sup> Such movement signals a low commitment from the GOI to the energy transition.

Furthermore, MEMR has also issued a new rooftop solar regulation, relinquishing PLN's obligation to purchase excess power generated from privately owned solar rooftop panels, which it claims could further strain PLN's budget.<sup>21</sup> This move has been perceived as an effort to tilt the playing field to PLN's advantage.<sup>22</sup> It has also raised questions about the GOI's commitment to achieving its renewable energy targets and PLN's financial sustainability.

Instead of focusing on proven renewable energy technologies such as solar and wind, the GOI has followed the trend in developed countries by focusing instead on new and "hyped" technologies, such as carbon capture and storage (CCS) and hydrogen as a quick solution to reduce GHG emissions. On 9 September 2023, the MEMR, together with the PLN, opened a green hydrogen plant (GHP) in the Muara Karang Gas Power Plant area in Jakarta, the first of its kind in Indonesia.<sup>23</sup> Three months later, PLN opened 21 GHP pilot units throughout Indonesia.<sup>24</sup>

CCS has also gained attention as a purported solution to reduce GHG emissions. The GOI has initiated policies and partnerships to encourage the development and application of CCS technology.<sup>25</sup> In January 2024, the GOI approved carbon capture, transportation and storage activities in Indonesia.<sup>26</sup> However, despite its hype as a solution to reduce CO<sub>2</sub> emissions, this technology remains unproven. The drawbacks of CCS include its high costs, low CO<sub>2</sub> capture rates, and susceptibility to leaks and failure.<sup>27</sup>

Aside from hydrogen and CCS, Indonesia is also considering nuclear power. In 2021, the MEMR announced it would form a Nuclear Energy Program Implementing Organization (NEPIO) in an effort to fulfill the requirements of the International Atomic Energy Agency (IAEA) to build a nuclear power plant.<sup>28</sup> The NEPIO is still in the draft phase.<sup>29</sup> The risks and liabilities associated with the development of nuclear power plants should be considered. With its location on the Pacific Ring of Fire, a natural disaster could have a catastrophic impact on Indonesia.<sup>30</sup>

<sup>20</sup> IEEFA. [Dark Cloud Over Indonesia's Pledge Achieve Net Zero Emissions](#). February 2024.

<sup>21</sup> MEMR. [MEMR Regulation Number 02 of 2024](#). Rooftop Solar Power Plant Connected to the Electric Power Network Business License Holder for Providing Electric Power for Public Use. January 2024.

<sup>22</sup> PV Magazine. [Indonesian Government Abolishes Net Metering](#). February 2024.

<sup>23</sup> Jakarta Post. [PLN starts green hydrogen production](#). 10 October 2023.

<sup>24</sup> Indonesia Business Post. [PLN inaugurates 21 green hydrogen plants across Indonesia aiming to lead in Southeast Asia](#). 21 November 2023.

<sup>25</sup> GOI. [Presidential Regulation Number 98](#). Implementation of the Economic Value of Carbon. 2021.

<sup>26</sup> GOI. [Presidential Regulation Number 14](#). Implementation of CCS activities allowing the foreign entities to store their carbon emission in the Indonesia's CCS facilities. January 2024.

<sup>27</sup> IEEFA. [Norway's Sleipner and Snøhvit CCS: Industry Models or Cautionary Tales?](#) June 2023.

<sup>28</sup> MEMR. [Ministerial Decree Number 250](#). Nuclear Energy Program Implementing Organization. December 2021.

<sup>29</sup> MEMR. [Secretary General of DEN: Construction of Nuclear Plants to Balance the Energy Mix](#). 2 November 2023.

<sup>30</sup> IEEFA. [Tackling Indonesia's Nuclear Power Euphoria](#). June 2021.

In light of Indonesia’s reliance on the fossil fuels, especially coal, and focus on new technologies, this report examines PLN’s financial position and potential pathways to a more secure, sustainable and economically viable energy future.

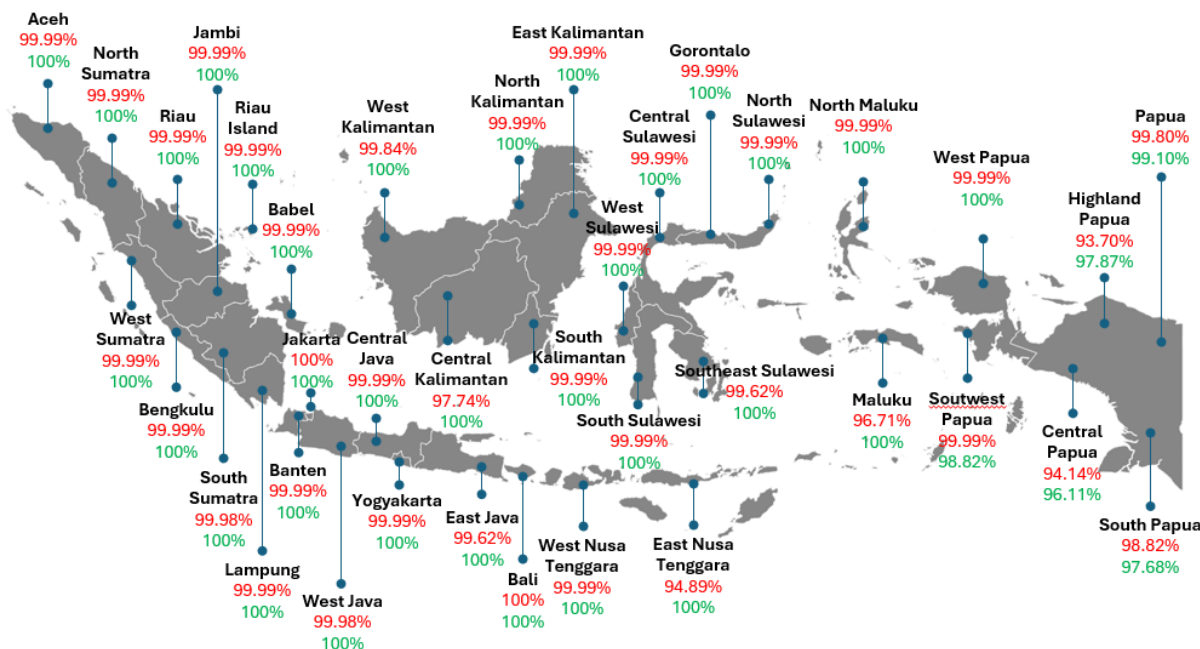
## PLN’s Role in Transition Beset by Financial Burdens

PLN is the state-owned enterprise in charge of the Indonesian electricity sector, and by law is granted a priority to provide electricity for public interests. The company holds a monopoly on the transmission, sale and distribution of electricity to end consumers, and is the second-largest state company by assets.

As a state-owned company, PLN has been given several mandates by the GOI, from distributing electric power to diversifying electricity resources with renewable energy and accelerating the development of new power capacity across the Indonesian archipelago.<sup>31</sup>

Through its efforts, the scale of Indonesia’s electrification ratio is among the highest in the world, increasing from 84.1% in 2015 to 99.78% in 2023.<sup>32</sup>

Figure 6: Map of Electrification Ratio Indonesia



<sup>31</sup> GOI. Presidential Regulation Number 48. Assignment to PLN to Accelerate the Development of Electric Power Plants. 2011

<sup>32</sup> MEMR. Capaian Kinerja Sektor ESDM Tahun 2023. Page 14. January 2024.

Source: MEMR, 2024

Despite achieving its electrification ratio targets, PLN faces significant challenges, including:

- An oversupply of electricity and substantial debt burdens.
- Obligations under the take-or-pay scheme, which compel PLN to purchase excess electricity from IPPs.
- High operating and maintenance costs due to continued reliance on coal-fired power plants.

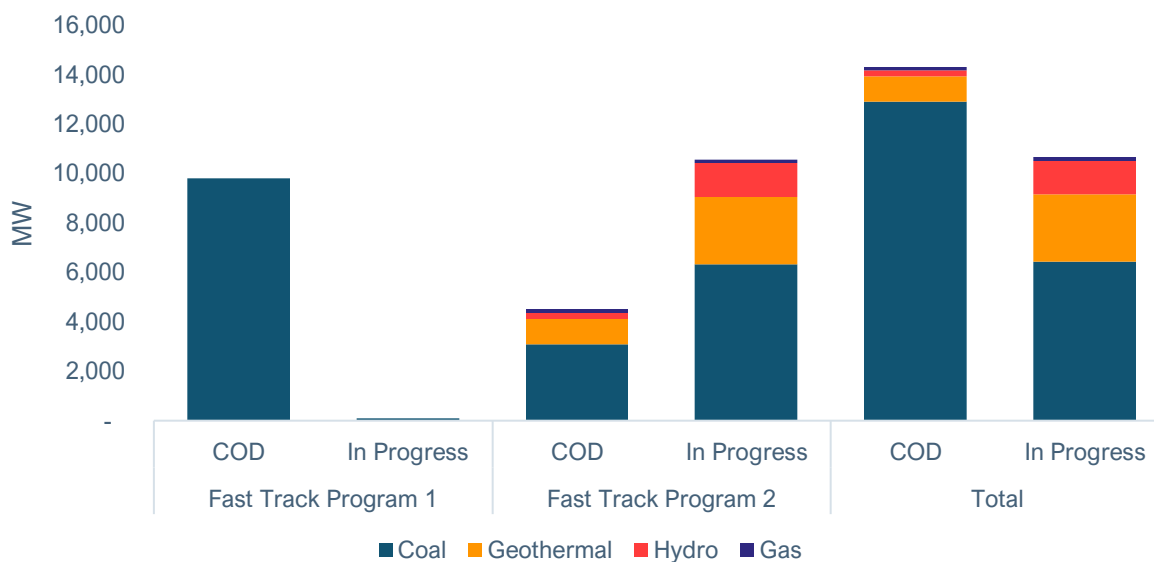
## Massive Expansion Creates Problems for PLN

In an effort to fulfill domestic electricity demand, the GOI launched the first Fast Track Program (FTP-1) in 2005, during the reign of President Susilo Bambang Yudhoyono. PLN was mandated to add 10,000MW in capacity by developing coal power plants.<sup>33</sup> To achieve this target, PLN had to take on massive debts, which created financial instability. As of December 2022, the outstanding debt to fulfill this program was about IDR1,924 billion.<sup>34</sup> Despite this financial burden, PLN achieved its main goal of fulfilling the Indonesian market's demand for electricity, successfully adding 9.8GW of its 10GW target of 10GW.

Reflecting on FTP-1's successful outcome, and realizing the continuously growing electricity demand, in 2010 the GOI launched a sequel to the project, Fast Track Program 2 (FTP-2), which added a further 7,500MW of capacity. At the time, the GOI tried to diversify its energy source away from coal, and PLN started to explore renewable energy options such as geothermal, gas and hydropower.

<sup>33</sup> World Bank. Implementation Completion and Results Report. [Indonesia-Geothermal-Clean-Energy-Investment-Project](#). June 2019.

<sup>34</sup> PLN. [Annual Report 2022](#).

**Figure 7: Progress of Fast Track Program 1 and 2, 2023**

Source: PLN, RUPTL, IEEFA

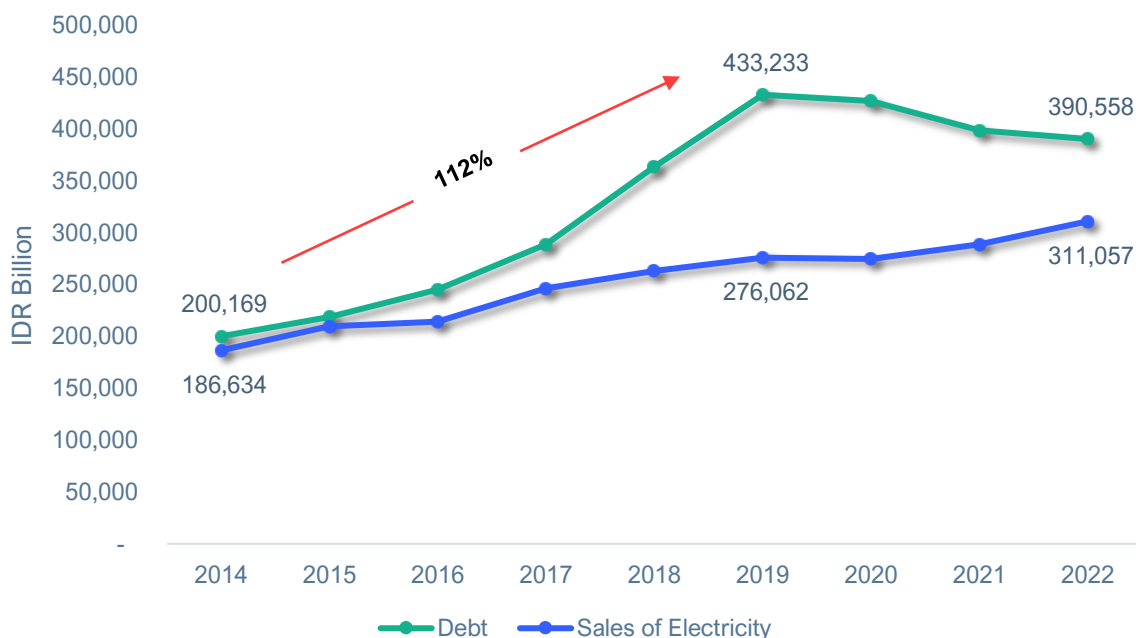
Equipped with a good track record based on the previous two major projects in FTP-1 and FTP-2, and foreseeing the electricity demand in the height of economic rise, in 2015 the GOI launched FTP-3, better known as the 35,000MW project. This project aimed to double the capacity from the two previous projects, which stands at about 17,500MW. The additional 35,000MW was based on a rosy economic growth projection of 6-7% a year. From 2015-2019, the average additional annual capacity required was calculated at 7,000MW to meet rising demand.<sup>35</sup> This turned out to be an overestimate, as the Indonesian economy could only maintain about 5% growth, except during the COVID-19 pandemic. As a result, PLN wound up with a reserve margin of more than 40%, compared with PLN's reserve margin standard of 20%-40%.<sup>36</sup>

Then-President Jokowi Widodo's grand vision to build 35,000MW of new capacity in four years, spearheaded by Public-Private Partnerships (PPPs) that would attract billions of dollars in foreign investment, also went sideways. At the end, this lofty goal put an even greater strain on PLN's overstretched finances. To the new capacity target, PLN's debt more than doubled from 2014 to 2019. In addition to paying back the loan from the FTP-1 project and obligatory power purchases from the FTP-2, PLN must also fund the FTP-3 project.

<sup>35</sup> MEMR. [Launch of 35,000 MW Power Plant Development Program](#). 4 May 2015.

<sup>36</sup> Kontan. [Java-Bali Electricity Reserve Margin Reaches 44% As of June 2023](#). 5 July 2023.



**Figure 8: PLN's Debt and Sales of Electricity Growth, Year-on-Year**

Source: PLN

PLN's efforts to proactively transform financial management over the last few years, through accelerating debt payments and loan conversions, need to be appreciated. This step was able to reduce the debt balance by IDR43 trillion from 2019 to 2022. But nevertheless, PLN requires a multifaceted approach to achieve financial stability and sustainability.

## Take or Pay Scheme a Lose-Lose Situation for PLN

Although PLN maintains a strict monopoly on the transmission and distribution of power, since the 1990s it has increasingly sourced power from IPPs, entering into purchase agreements (typically for 20-30 years) with private companies to buy power at fixed rates.<sup>37</sup> By the time FTP-2 was launched, the GOI assumed that 59% of the capacity would be built by IPPs. For FTP-3, it expected the private sector to contribute about 24,500MW or 70% of the total capacity through PPP schemes. To attract the investment from the IPPs, PLN implemented the take-or-pay scheme. While having some merit, this scheme has a downside especially for PLN, which is obligated to purchase the power generated by the private sector regardless of demand.

In the absence of any coal power plants being retired, this operating capacity stands at 72,976MW while the demand growth has stagnated at 5% a year.<sup>38</sup> The high supply and low demand has

<sup>37</sup> Jakarta Post. [Massive power projects: Is PLN up to the task?](#) 27 March 2018.

<sup>38</sup> PLN. [PLN Statistics 2023 \(Unaudited\)](#). Page 1.

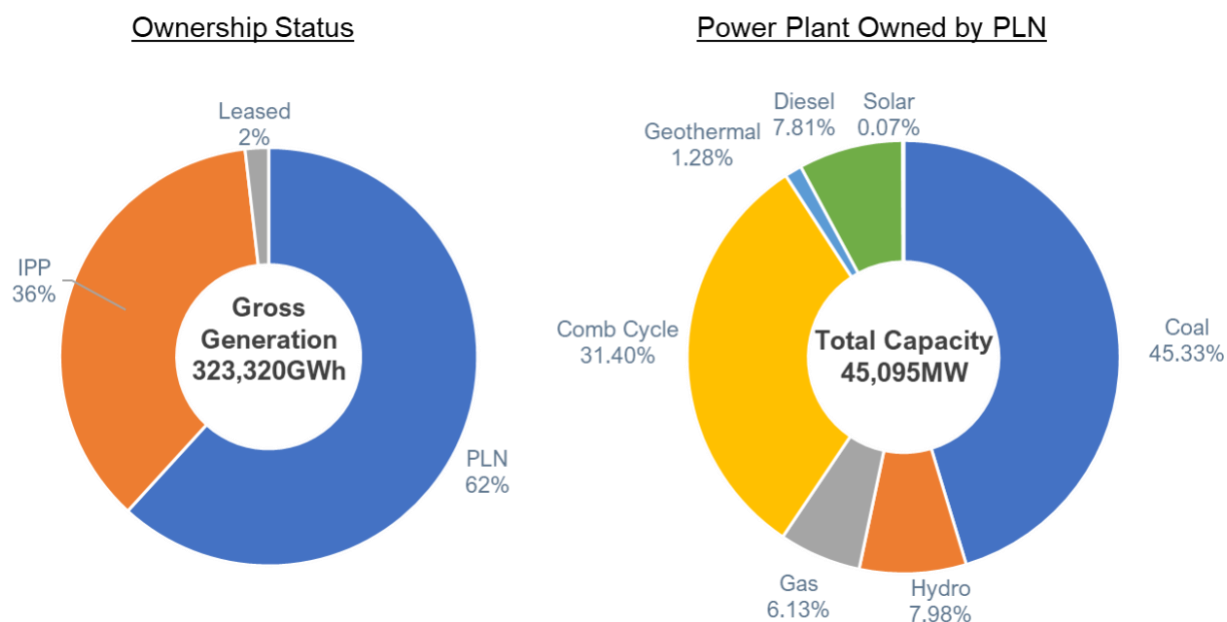
resulted in electricity oversupply. With the take-or-pay scheme, PLN has been burdened for years, and continues to cover the excess supply of electricity generated from IPPs.

PLN is in the difficult position of having abundant electricity but is unable to sell it. This is compounded by the fact it must repay its debts to lenders while having to purchase the unutilized electricity through the take-or-pay scheme.

## Fast-tracking Coal Backfires on PLN

Coal has become a central part of Indonesia's power generation. However prioritizing coal-fired power plants to fulfill the Fast Track Program also backfired for PLN. Due to the massive expansion of coal-fired power plants to fulfill the program, coal plays an important yet burdensome role in Indonesia's power generation. Although private power plant development by IPPs is permitted, PLN is still the majority owner of power plants in the country. As of December 2023, it controls more than 62% of total generating capacity, or about 45,095MW, of which 45.3% is from coal-fired steam power plants.<sup>39</sup>

**Figure 9: Indonesia's Power Generation 2023**



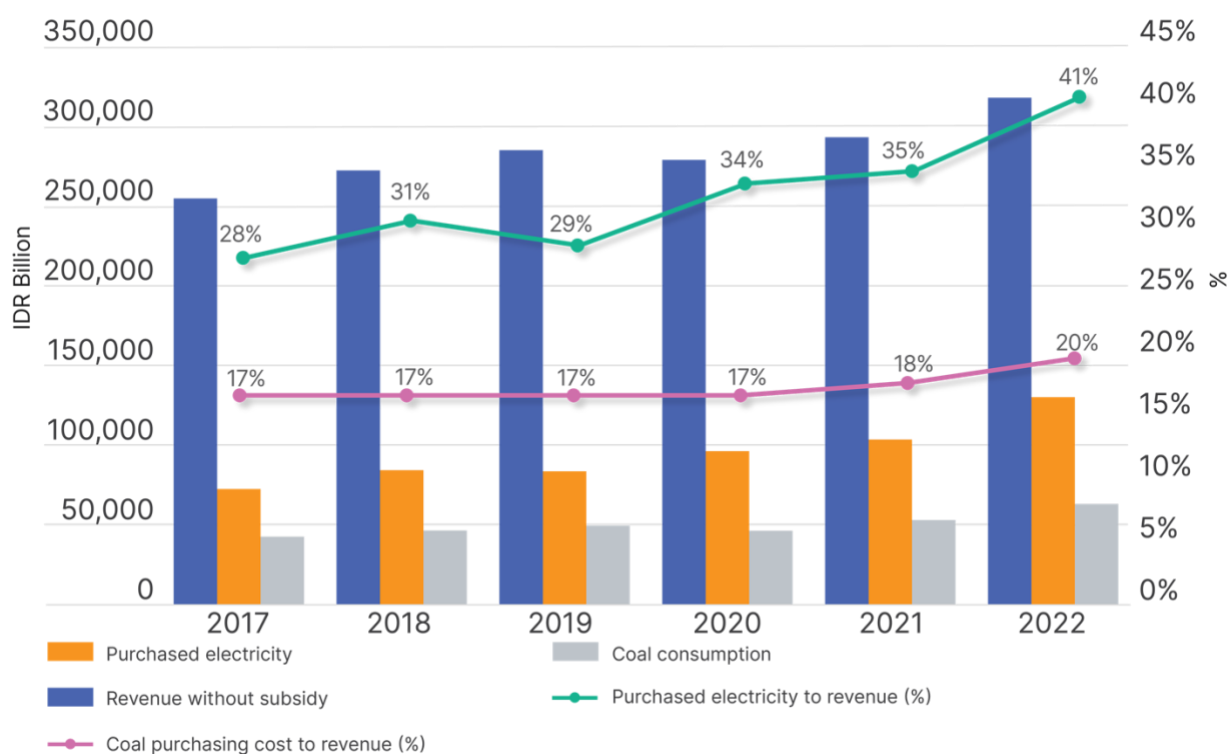
Source: PLN

<sup>39</sup> Ibid. Page 23.

According to PLN's financial statements from 2017 to 2022, there are two main contributors to its ever-soaring operation expenses: electricity purchase from IPPs and coal purchasing for its 20GW coal-fired power plants.

PLN's operating expenses rose by 20% in 2022, from IDR323 trillion in 2021 to IDR386 trillion in 2022, led by the electricity payments to IPPs, followed by coal purchasing costs. As the owner of about 20GW of coal-fired power capacity, PLN's operating expenses have increased throughout the years mainly due to its ever-increasing coal consumption, which is expected to continue for the next few years. In 2022 alone, coal purchases accounted for 16% of total operating expenses. This cost increased by 49% in five years, from IDR42,416 billion in 2017 to IDR63,061 billion in 2022. The combination of purchased electricity and coal purchase costs alone consumed 61% of PLN's revenue in that period.

**Figure 10: PLN Revenue, Coal Purchasing Cost and Purchased Electricity, 2017-2022**



Source: PLN

In conclusion, massive expansion to fulfill the GOI's mandates has led to the high electricity purchase and coal consumption costs, which need to be managed by PLN to improve its financial performance.

## Record Profits Propped up by the GOI's Subsidies

In 2022, PLN recorded IDR14.4 trillion profit, up 124% compared with the GOI's IDR6.4 trillion target. Year-on-year, its profit increased about 9.4% from IDR13.17 trillion. PLN's revenue also rose by 20% in 2022, from IDR366 trillion in 2021 to IDR441 trillion in 2022.

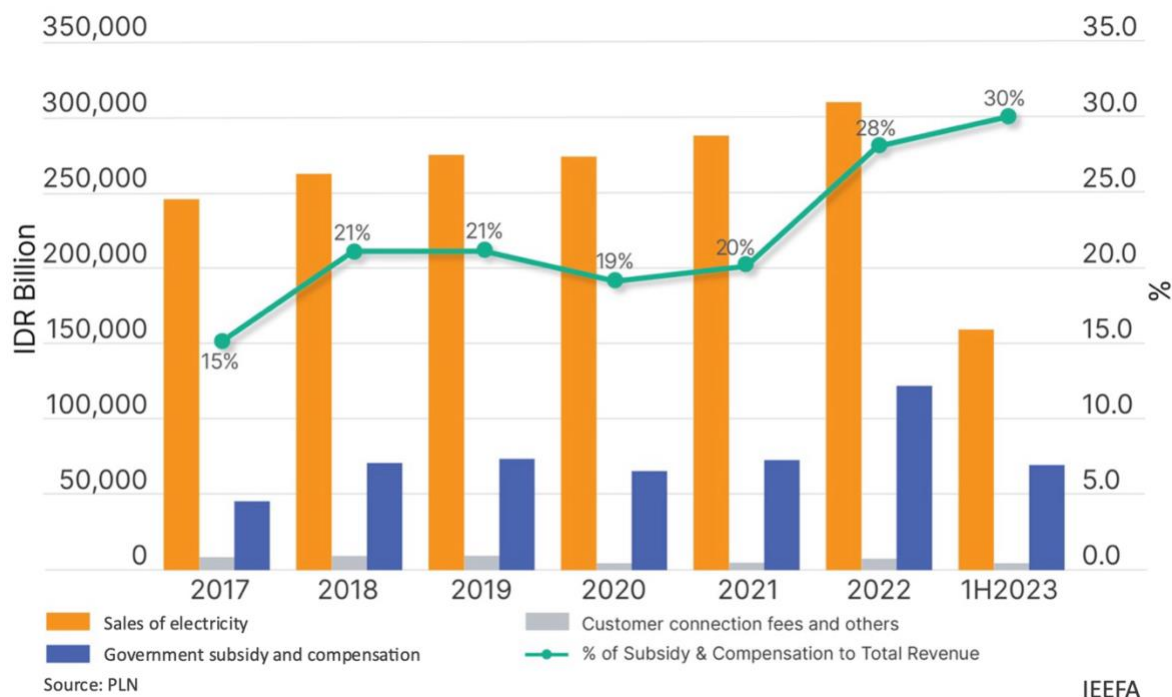
However, the revenue breakdown tells a different story. The two major contributors to PLN's record net profit were the GOI's subsidies and compensation payments. Removing them from the equation, PLN would struggle to manage its ever-growing operational and maintenance costs, finance costs and electricity purchase obligations. Without the GOI's support, PLN would book a significant net loss.

**Figure 11: PLN Income Statement 2017-2022, With and Without Subsidy (IDR billion)**

Principle	2017	2018	2019	2020	2021	2022
<b>With Subsidy</b>						
Revenue	255,295	272,898	285,641	279,523	293,783	318,650
Government electricity subsidy and compensation	45,738	71,275	73,965	65,893	73,189	122,482
Operating Expense	(275,474)	(308,189)	(315,441)	(301,008)	(323,119)	(386,194)
Other Income (Expense)	(17,015)	(16,083)	(18,046)	(32,116)	(20,632)	(33,396)
Income Tax Expense	(4,116)	(8,325)	(21,797)	(6,298)	(10,046)	(7,127)
<b>Net Profit</b>	<b>4,428</b>	<b>11,576</b>	<b>4,322</b>	<b>5,993</b>	<b>13,175</b>	<b>14,415</b>
<b>Without Subsidy</b>						
Revenue	255,295	272,898	285,641	279,523	293,783	318,650
Operating Expense	(275,474)	(308,189)	(315,441)	(301,008)	(323,119)	(386,194)
Other Income (Expense)	(17,015)	(16,083)	(18,046)	(32,116)	(20,632)	(33,396)
Income Tax Expense	(4,116)	(8,325)	(21,797)	(6,298)	(10,046)	(7,127)
<b>Net Profit</b>	<b>(41,310)</b>	<b>(59,699)</b>	<b>(69,643)</b>	<b>(59,899)</b>	<b>(60,014)</b>	<b>(108,067)</b>

Source: PLN

In 2022 alone, the GOI paid close to IDR123 trillion to PLN in subsidies and compensation, a 70% increase on the previous year's IDR73 trillion. Compared with revenue from electricity sales, the subsidy and compensation from government contribution to PLN revenue rose to almost 28% that year. In 2023, PLN's combined subsidies and compensation income are estimated to reach about IDR130 trillion, against an EBITDA of IDR94 trillion (unaudited). Instead of being a source of income for the government, PLN has become a budgetary burden.

**Figure 12: Subsidy and Compensation's Contribution to PLN's Revenue**

As of 2024, the electricity subsidy budget for PLN alone is IDR75.83 trillion. Compensation income for 2024 has not yet been reported.

As a state-owned enterprise, PLN's stated goal when it was formed in 1965 was "to help develop the national economy, by prioritizing the needs of the people towards a just and prosperous society materially and spiritually".<sup>40</sup> PLN also plays a critical role in distributing subsidies accurately, targeting small businesses and underprivileged communities. As a business entity, PLN's founding principles also include an obligation to generate income, to be financially sustainable and ensure that its revenue is sufficient to cover its operational and maintenance costs without relying heavily on external funding.<sup>41</sup> PT PLN (Persero) is also committed to contributing to the state through dividend payments and corporate taxes.

Despite this, the GOI's contribution outstrips PLN's dividend and tax payments. In June 2023, PLN reported it had paid dividends of IDR2.2 trillion,<sup>42</sup> an increase of 191.7% on 2022, which was IDR750 billion. PLN also made tax payments of IDR35.3 trillion in 2022, making a total contribution

<sup>40</sup> GOI. Government Regulation Number 19. [Dissolution of the General Leadership Body of the State Electricity Company and Establishment of the State Electricity Company \(PLN\)](#). May 1965.

<sup>41</sup> GOI. Government Regulation Number 19. [Protection of Businesses, Companies, Business Entities, Trade](#). April 1960.

<sup>42</sup> PLN. [Summary of Minutes of the Annual General Meeting of Shareholders \(AGMS\) PT PLN \(Persero\) regarding the Approval of the Financial Year 2022 Annual Report and the Ratification of the Financial Year 2022 Financial Report](#). Page 2.

to the GOI of about IDR36 trillion in 2023. PLN's tax and dividend contribution only accounted for about 28% of the total cash paid to it by the GOI.

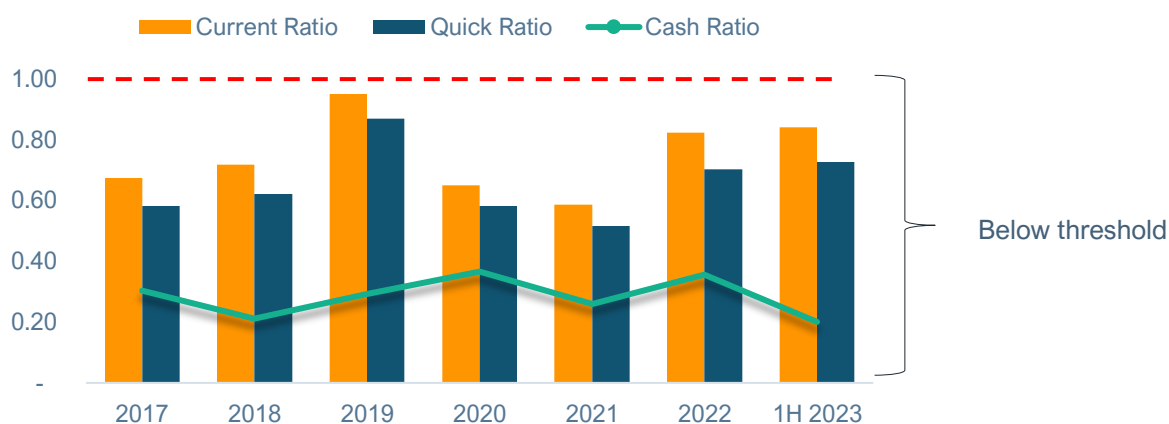
**Figure 13: The GOI's Cash Flow from PLN (IDR billion)**

	2017	2018	2019	2020	2021	2022
<b>Cash-in from PLN</b>						
Tax obligation	27,150	27,400	34,640	25,477	31,198	35,275
Dividend	2,153	310	4,000	17	400	750
<b>Total Cash-in</b>	<b>29,303</b>	<b>27,710</b>	<b>38,640</b>	<b>25,494</b>	<b>31,598</b>	<b>36,025</b>
<b>Cash-out to PLN</b>						
Electricity subsidy	(50,595)	(56,508)	(51,289)	(48,700)	(46,155)	(56,129)
Compensation income	-	-	-	(45,427)	(17,905)	(72,127)
<b>Total Cash-out</b>	<b>(50,595)</b>	<b>(56,508)</b>	<b>(51,289)</b>	<b>(94,127)</b>	<b>(64,060)</b>	<b>(128,256)</b>
<b>GOI Surplus/(Deficit)</b>	<b>(21,292)</b>	<b>(28,798)</b>	<b>(12,649)</b>	<b>(68,633)</b>	<b>(32,462)</b>	<b>(92,231)</b>

Source: PLN

Despite the GOI's financial support, PLN's cash position remains a concern, when one looks beneath the surface. The three main liquidity ratios – current, quick and cash ratio – are below 1, which indicates PLN's debt maturing within a year exceeds its cash and current assets.

**Figure 14: PLN's Liquidity Ratio (2017-H1 2023)**



Source: PLN

Liquidity management is a key indicator of a company's financial health. With a liquidity ratio below 1, PLN has a cashflow problem that must be closely monitored by its management.

## Energy Subsidy and Compensation a Burden on the GOI

Subsidies and compensation for PLN have become a significant burden for the GOI's budget and will remain so for the foreseeable future. As such, it is important to understand the subsidy and compensation formula to find a solution for PLN's financial issues.

By law, the GOI is obliged to provide energy subsidies for low socioeconomic households through PLN by special assignment as part of its role as state electricity provider.<sup>43</sup> If the assignment is not feasible, the GOI must compensate PLN for all costs incurred, including its expected profit margin. The electricity subsidy value is the difference between the basic cost of providing electricity (BPP) and PLN's tariff (Figure 15). The BPP and tariff for the electricity subsidy calculation only applies to customers in the subsidy tariff category (volume).

**Figure 15: Electricity Subsidy Formula**

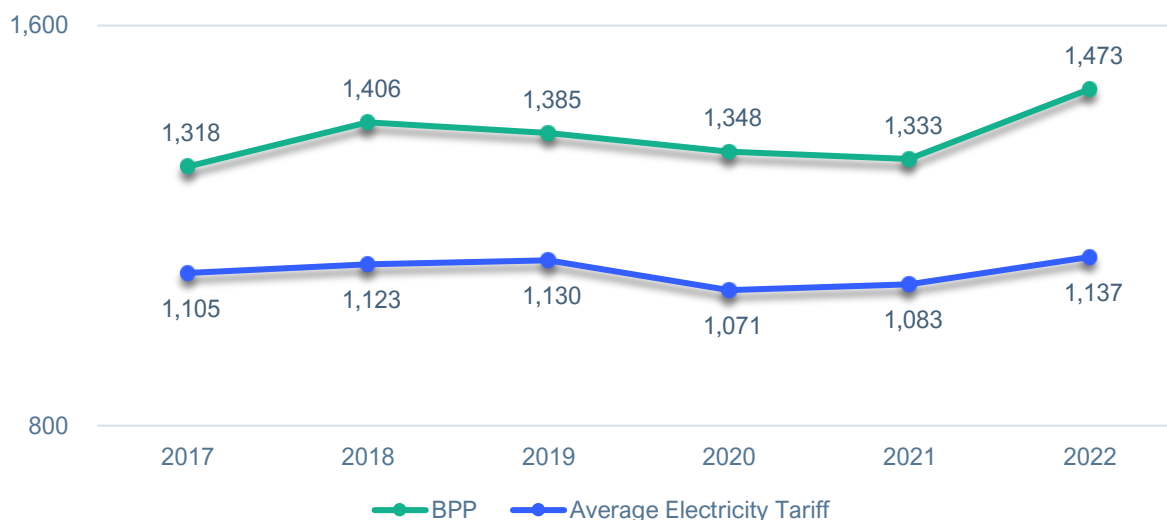


Source: MOF, IEEFA

According to the Ministry of Finance (MOF), the BPP includes electricity purchase costs, fuel and lubricant costs (**including coal purchasing cost**), maintenance costs, personnel costs, administration costs, depreciation costs and interest costs. The gap between BPP and electricity tariff will determine the subsidy provided by the GOI.<sup>44</sup>

<sup>43</sup> GOI. [Law Number 30. on Energy](#). Page 14. 2007.

<sup>44</sup> MOF. [Regulation Number 178. Changes to Procedures for Provision, Calculation and Accountability of Electricity Subsidy](#). Page 12. February 2021.

**Figure 16: BPP versus Average Electricity Tariff (in IDR/kWh)**

Source: PLN

**Other than subsidies, the GOI must also pay compensation to PLN.** This is income from the GOI for non-subsidized tariffs, which have not increased since 2017. According to the MEMR, four factors that can affect non-subsidized tariffs are: the exchange rate of the US dollar against the rupiah, the Indonesian Crude Price (ICP), inflation and the coal benchmark price.<sup>45</sup>

Any increase in these four factors will result in a tariff adjustment by PLN. Periodically, PLN can submit adjustments to the old tariff to the GOI for approval. If the adjustment is not approved and there is a difference between the set tariff and the actual tariff, the GOI must pay compensation to PLN for the full amount of the difference in sales value.

The increasing cost of purchasing coal due to the rising coal benchmark price means the subsidies and compensation paid to PLN by the GOI also increase every year.

It is important to note that electricity prices in Indonesia are set by the GOI and can vary based on consumer groups and subgroups. The GOI has been reluctant to increase electricity tariffs as it will be politically unpopular, trigger a negative response from the people, increase prices for goods and services, and add to inflation. In light of this, the GOI's reluctance to increase electricity tariffs is understandable. Thus, it is important for PLN to find a solution to lower the BPP.

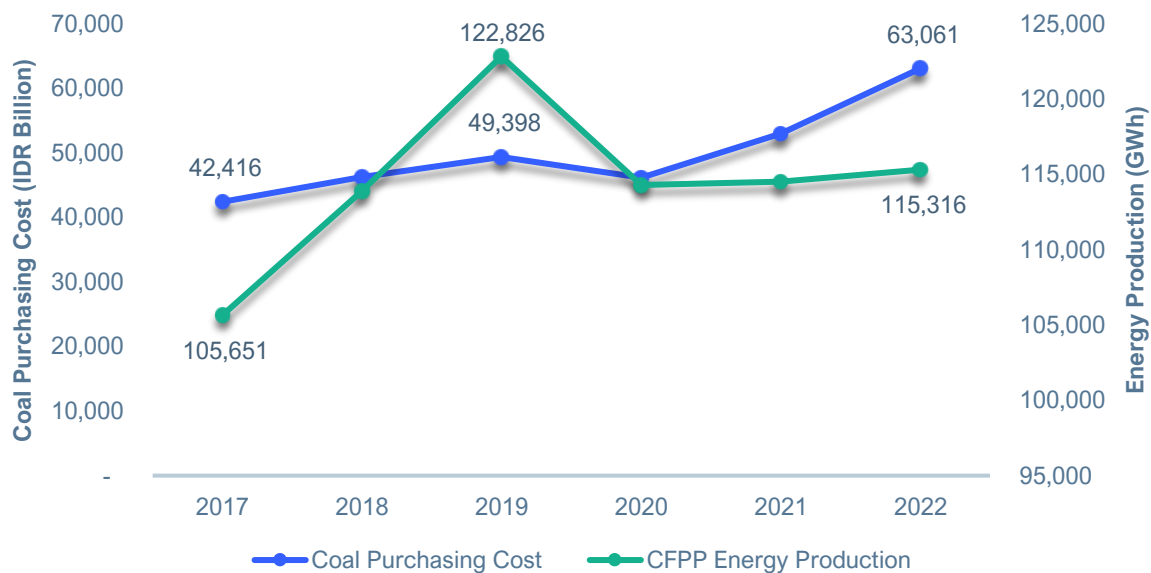
<sup>45</sup> MEMR. [Regulation Number 8. Electricity Tariffs Provided by PLN](#). Page 5. July 2023.



## Retiring CFPPs Can Ease PLN’s Burden

Reviewing PLN’s financial statements, coal purchasing costs have increased significantly from 2020 but the data shows that this incremental cost increase did not translate to electricity generated by the CFPP, which could indicate the energy production inefficiency within the CFPP itself.

**Figure 17: CFPP Energy Production and Coal Purchasing Cost**

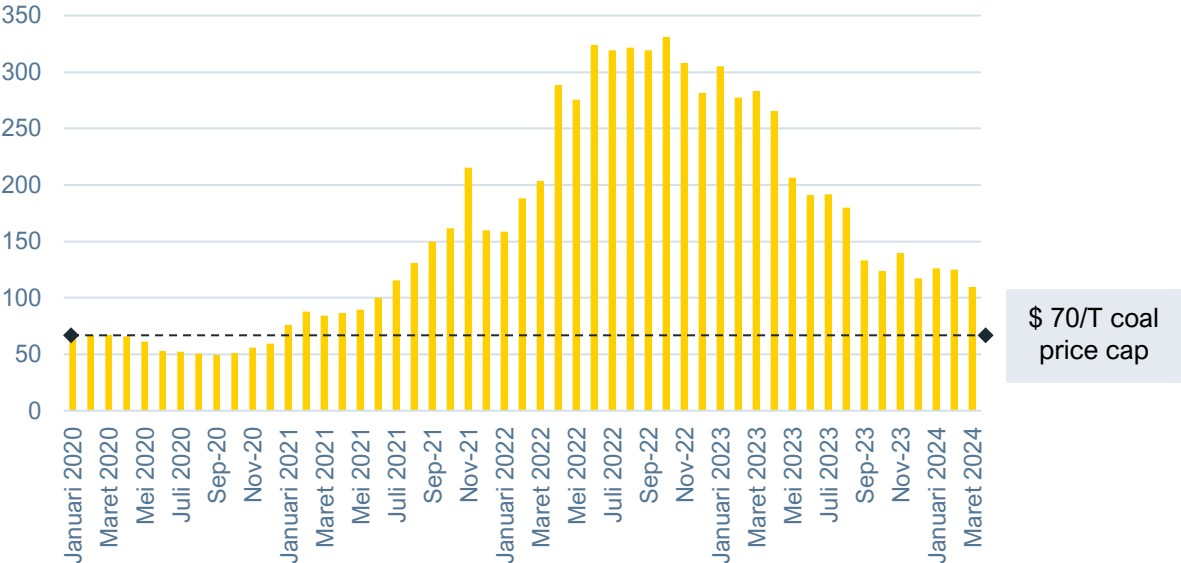


Source: PLN

In addition to the aforementioned benefits provided by the GOI, PLN is also the beneficiary of coal price capping. Coal purchased by PLN is capped at US\$70/ton, well below the market price of US\$110/ton as of March 2024.<sup>46</sup> However, this policy also limits the GOI’s revenue from coal companies through lower taxes paid on capped-price sales well below the open market price.

<sup>46</sup> MEMR. [Ministerial Decree Number 267. Meeting Domestic Coal Needs.](#) November 2022. Page 9.

Figure 18: Indonesia’s Benchmark Coal Price



Source: MEMR

Despite the GOI’s price cap, PLN still struggles to deal with coal price fluctuations due to exchange rate movements between the US dollar and the rupiah. This is because the coal price is indexed in US\$, and PLN must bear the cost of exchange rate variations. In summary, PLN’s exposure to US\$-denominated coal prices necessitates careful management, considering both market dynamics and currency fluctuations.

As of December 2023, PLN had about 20.4GW<sup>47</sup> of coal-fired power plant capacity, and 23% of these plants have been operating for more than 20 years.<sup>48</sup> As the operating costs of coal-fired power plants will continue to increase in the future, it makes sense to gradually retire them.

<sup>47</sup> PLN. [PLN Statistics 2023 \(Unaudited\)](#). Page 1.  
<sup>48</sup> Global Energy Monitor. [Global Coal Plant Tracker](#). January 2024.

Figure 19: PLN's CFPP with Operating Age &gt;20 years

PLANT	UNIT	CAPACITY (MW)	PROVINCE/STATE	START YEAR
Banten Suralaya power station	Phase I Unit 1	400	Banten	1984
Banten Suralaya power station	Phase I Unit 2	400	Banten	1985
Bukit Asam Muara Enim power station	Unit 1	65	South Sumatra	1987
Bukit Asam Muara Enim power station	Unit 2	65	South Sumatra	1987
Banten Suralaya power station	Phase I Unit 3	400	Banten	1988
Banten Suralaya power station	Phase I Unit 4	400	Banten	1989
PLN Paiton power station	Unit 2	400	East Java	1993
Bukit Asam Muara Enim power station	Unit 3	65	South Sumatra	1994
Bukit Asam Muara Enim power station	Unit 4	65	South Sumatra	1994
PLN Paiton power station	Unit 1	400	East Java	1994
Banten Suralaya power station	Phase II Unit 1	600	Banten	1996
Ombilin power station	Unit 1	100	West Sumatra	1996
Banten Suralaya power station	Phase II Unit 2	600	Banten	1997
Banten Suralaya power station	Phase II Unit 3	600	Banten	1997
Ombilin power station	Unit 2	100	West Sumatra	1997
Asam-Asam power station	Unit B-3	65	South Kalimantan	2000
Asam-Asam power station	Unit B-4	65	South Kalimantan	2000

Source: Global Energy Monitor

The gradual retirement of these CFPPs offers benefits to decrease PLN's exposure to coal price volatility and reduce the significant maintenance costs as the economic benefits of old CFPPs decrease with age.

## The Timing is Right for PLN to Develop Renewable Energy

Up to this point, electricity development has been based on conventional concepts where power generation development is generally focused on two pillars: affordability (lowest cost) and security of supply. By contrast, PLN has promoted the narrative that renewable energy is too expensive to build on a large scale while coal is seen as the cheapest source of electricity, hence its reluctance to switch away from coal.<sup>49</sup> This point of view might be outdated considering the technological

<sup>49</sup> Kontan. [PLN Reveals that the Basic Cost of Providing EBT Electricity \(BPP\) is Still Expensive](#). 17 December 2023.

advances in renewable energy, which have resulted in more efficient energy production, lower capital, operational and maintenance costs, and environmentally friendly infrastructure.

There are several renewable energy technologies available in the market suitable for deployment. The Levelized Cost of Electricity (LCOE) is a crucial metric used for investment planning and comparing different technologies of electricity generation. LCOE is seen as one of the main indicators that could help determine which technology is affordable while producing maximum electricity output.

Globally, renewable energy, especially solar and wind power, has become more affordable compared with fossil fuels, and the cost of solar energy is expected to decrease further. Following the same trajectory, the LCOE of solar and wind have become more affordable, despite remaining higher compared with the global standards. This is particularly due to the Local Content Requirement (LCR) regulations set by the GOI to use the domestic inputs in industrial production. Apart from providing benefits to domestic industry, the LCR policy also increases investment costs, which ultimately increases financing costs.

However, even with the LCR, the LCOE of renewable energy remains competitive compared with coal and is expected to become cheaper by 2030.

**Figure 20: Levelized Cost of Energy Comparison**



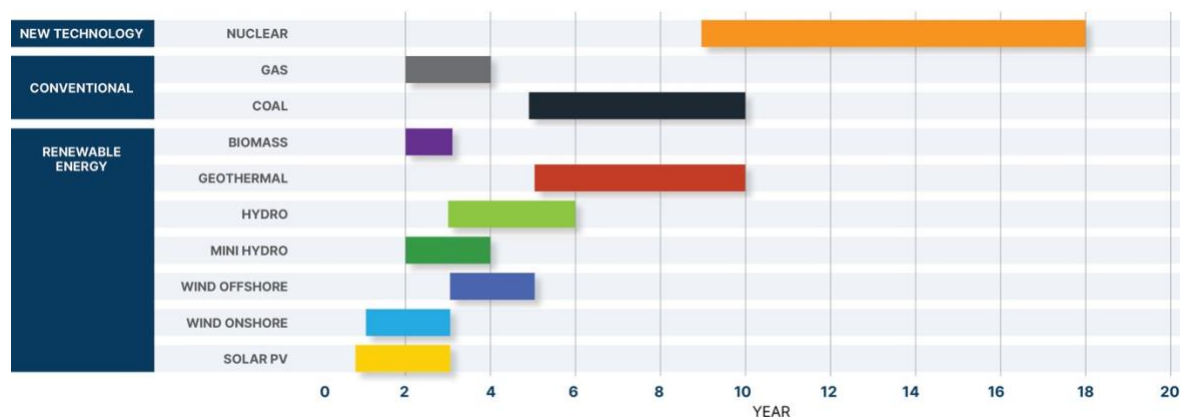
Source: IEEFA<sup>50</sup>

Another advantage of renewable energy power plants is that projects can be built significantly faster than fossil fuel power plants. Of the renewable energy technologies, solar and wind are the quickest to construct and deploy. It only takes about nine months to build a 10MW solar PV project. For wind, it takes an average of 18 months. Hydro projects can take more than three years to complete due

<sup>50</sup> The formula to calculate the LCOE is (Present Value of Total Cost Over the Lifetime) / (Present Value of Electricity Generated Over the Lifetime).

to the complicated process to secure environmental consents, and the substantial amount of engineering design work required, including the long lead-time to design and build the hydro turbine. Solar and wind's short construction time offers the potential to reduce costs and minimize the interest accrued during construction, saving time, and accelerating revenue generation.

**Figure 21: Power Generation Construction Time**



Source: IEEFA

PLN need not look far for concrete proof that solar is the quickest solution. Its own 10MW solar PV project in Indonesia's new capital city, Ibu Kota Nusantara, only took about nine months to complete.<sup>51</sup>

## Solar and Wind Opportunities for PLN

The key to PLN's financial sustainability is the ability to improve power production through timely and affordable investment. Due to its financial underperformance, PLN should focus on implementing cost-cutting and efficiency strategies.

Renewable energy already offers the fulfillment of three main pillars of electricity generation development: affordability (lowest cost), security of supply and acceptability (environmental consideration). In addition, renewable energy offers a fourth pillar, being the quickest technology available on the market.

<sup>51</sup> Solar Quarter. [PLN Nusantara Power Connects 10 MW Solar Power Plant to IKN Transmission Network in Indonesia](#). 6 March 2024.

**Figure 22: Four Pillars of Renewable Energy**

Source: IEEFA

Transitioning from fossil fuel-based energy to renewable energy can be the solution for PLN as renewable energy, especially solar and wind, have been proven globally as the cheaper and quicker solution to provide electricity compared with coal or any other technologies. Solar and wind power plants do not produce greenhouse gases (GHG), which helps to reduce pollution. Solar and wind also have minimal impact on the environment compared with the other renewable energy sources such as hydro and biomass.

Switching from fossil fuels, especially coal, can help PLN minimize the harmful effects of pollution on the environment and public health, and show that it also considers social and environmental concerns for a better Indonesia, as stated in its charter almost 60 years ago.

The major challenge for solar and wind has always been their intermittent nature. This is due to the fact that variable renewable energy is not dispatchable, and only produces energy when the sun is shining, or wind is blowing. An IEEFA report in 2020 found that the combination of solar and wind could produce more consistent power because solar power is produced during the day while wind power is typically strongest at night. The report also found that the inherent complementary nature of wind and solar power made hybrid systems well suited to meet energy demand. The combination of solar, wind and other renewable energy technologies, such as hydro and geothermal, can help to mitigate this issue. The rapidly decreasing cost of battery storage systems holds the potential

to make blended renewable energy storage systems that are both grid-stable and cost-competitive with their fossil fuel equivalents.<sup>52</sup>

With only seven years remaining and the addition of 21GW of renewable energy already included in the RUPTL of 2021-2030, the momentum is needed for PLN to start the process of renewable energy procurement, especially solar and wind, and retire the old CFPPs gradually so Indonesia can meet its Paris Agreement target and PLN can achieve financial sustainability.

In addition to solar and wind, PLN should accelerate the procurement of hydro and geothermal projects to mitigate the intermittent nature of solar and wind, as both technologies take longer to plan and build due to resource identification and the environmental and social aspects of the technologies.

Figure 23: Roadmap of Coal Power Plant Replacement



Source: IEEFA

Indonesia can get back on track to achieve financial sustainability and fulfill its Paris Agreement commitments by gradually retiring the old CFPPs and focusing on solar and wind energy deployment. This would also bring the country in line with the COP28 commitment to triple installed renewable energy generation capacity by 2030.

<sup>52</sup> IEEFA. [Wind-Solar Hybrid: India's Next Wave of Renewable Energy Growth](#). October 2020.

## Conclusion

PLN, as the primary actor in implementing the GOI's renewable energy regulations, struggles to meet its energy production targets while remaining financially viable due to the ambitious planning and the massive expansion of CFPPs to fulfill the Fast Track Programs.

The dependence on coal adds a heavier burden to PLN finances through increased operating and maintenance costs as well as declining energy production efficiency of existing old CFPPs. This burden is evident in the large and persistent subsidies and compensation payments PLN needs to remain solvent. PLN must formulate a comprehensive strategy to phase out the existing CFPPs, starting with those already in operation for more than 20 years, and simultaneously start to prepare for, and encourage, the development of renewable energy power plants.

PLN must take advantage of recent technological advances in renewable energy, which could produce electricity in more efficient, cheaper, and quicker ways. As the price of developing renewable energy continues to decline, the relatively low operating costs of these power plants relative to their ageing coal-fired equivalents will only continue to increase. Therefore, it makes sense to gradually retire coal-fired power plants and kick-start the development of more financially sustainable renewable energy projects, especially solar and wind power plants.

The resultant improvement in PLN's financial performance will reduce the burden on the GOI having to pay subsidies and compensation, which is a significant and increasing drain on the budget. Other than that, the gradual retirement of coal-fired power plants and the development of renewable energy projects will be a giant leap for Indonesia to significantly reduce its GHG emissions and meet its Paris Agreement commitment.

### Key Recommendations

- Focus on cost-reduction strategies within PLN to improve profitability.
- Reduce PLN's reliance on fossil fuels, especially coal, by gradually retiring old coal-fired power plants.
- As renewable energy becomes much cheaper than coal, PLN needs to accelerate the renewable energy procurement process to achieve Indonesia's 2030 Paris Agreement target by focusing on solar and wind power.



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