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RESEARCH SERIES

PARIS ALIGNMENT OF POWER SECTOR FINANCE FLOWS IN INDONESIA:

Challenges, Opportunities and Innovative Solutions

MARCH 2022

SUSTAINABLE ENERGY FOR ALL

CLIMATE POLICY INITIATIVE

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PREFACE

In November 2021, a pivotal COP26 saw world leaders agreeing to the Glasgow Climate Pact in which 197 countries pledged to accelerate efforts on climate action, keeping the hope of capping global warming at 1.5 degrees alive with new and updated Nationally Determined Contributions (NDC) and net-zero commitments. The non-binding pact will set the global agenda on climate change for the next decade. While efforts to obtain consensus on ending fossil fuel subsidies and coal phase-out were unsuccessful, countries agreed that advancing clean power generation and associated energy efficiency measures should involve "the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies".

COP26 also saw the announcement of a number of significant commitments, on the sidelines of the official negotiations. Banks and financial institutions also made significant commitments to end the funding of unabated coal. These complement announcements made earlier in the year by China, Japan and South Korea to end overseas coal financing. Additionally, a group of 25 countries signed a UK-led joint statement committing to ending international public financing for the unabated fossil fuel energy sector by the end of 2022, prioritizing support for clean energy instead. This functionally ends almost all concessional or public financing of international coal power.

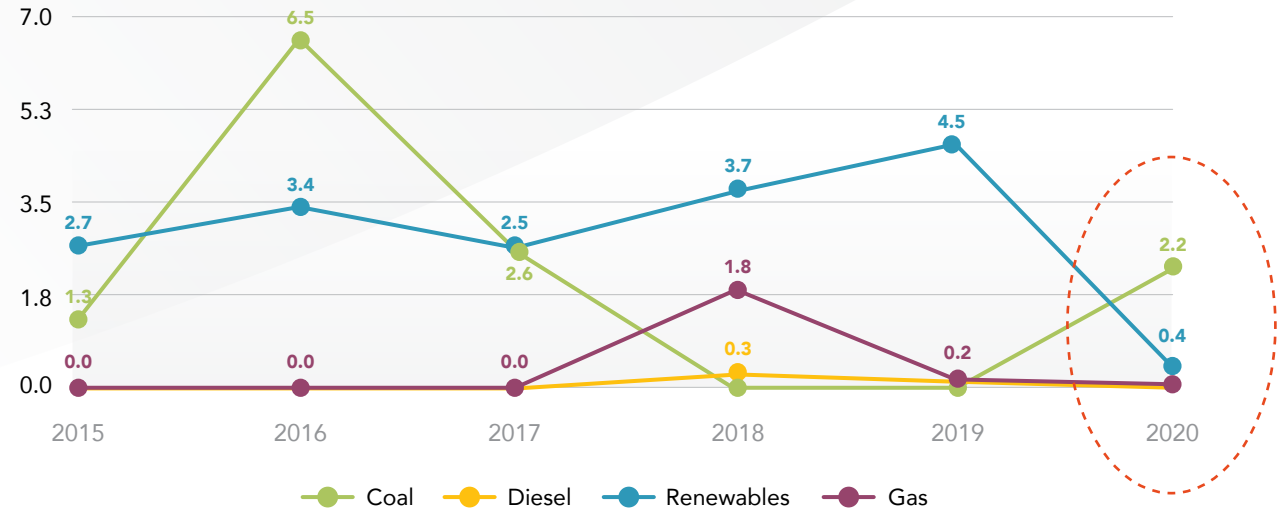
Indonesia signed on to a few key pledges on energy transition at COP26. Indonesia joined more than 40 countries in a "Global Coal to Clean Power Transition" statement to transition away from unabated coal power generation in the next few decades. The agreement's clauses included committing to phasing out coal-fired power plants by 2040, ending all investment in new coal power generation domestically and internationally. Indonesia signed on to all the clauses of this agreement except one and reserved its right to issue new permits for coal-fired power plants. Indonesia also signed an agreement with the Asian Development Bank (ADB) along with the Philippines to establish an Energy Transition Mechanism (ETM), an "ambitious plan that will upgrade Indonesia's energy infrastructure and accelerate the clean energy transition," according to Finance Minister Sri Mulyani Indrawati.

This knowledge brief was developed in the lead-up to the COP26 summit in Glasgow and therefore is primarily based on stated policies of the Government of Indonesia and its updated NDC that was submitted in July 2021.

Catalysing Indonesia's Energy Transition

Key power sector financing trends

Power Sector Financing in Indonesia (2015-2020, USD billion)



- Total tracked power sector finance commitments stood at USD 5.3 billion per annum between 2015-2020, dominated by fossil fuels, but investments to renewables increased between 2017 and 2019. However, 2020's trend signals a setback
- Fossil fuel-based power plants accounted for 46 percent (with 84 percent of total fossil fuel-based finance commitments directed toward coal-fired projects), followed by 44 percent of renewable energy projects (34 percent for grid connected renewables and 10 percent mini grid and off grids), and the remaining 9 percent for other renewable technologies and market support.
- Finance from international sources, particularly from DFIs, accounted for 65 percent of all finance commitments to the power sector. A key turnaround in 2018, when international finance to fossil fuel-based energy sources (primarily for coal), dropped by 68 percent over the period 2018-2020, driven by a shift in market preference and global policy signals to align financing with Paris Agreement objectives.

Paris Alignment of Power Sector Finance

Potential of annual underinvestment in renewables to meet MEMR's NZE 2060 Scenario (USD billion, per annum)

Renewable Power Plants	Future Annual Investment (USD billion)			How much under-investment annually? (USD billion)
	If based on stated commitment		What is needed to achieve MEMR's NZE 2060	
SOLAR	0.04	vs	4.7	4.6
WIND	1.2	vs	5.7	4.5
HYDRO	0.1	vs	2.6	2.5
GEOTHERMAL	0.7	vs	1.9	1.2
BIO-BASED	0.3	vs	1.2	0.9
ENABLING ENVIRONMENT & MULTIPLE RE TECHNOLOGY	0.4	vs	0	-0.4
	2.7	vs	16.1	13.4

- There is a need for accelerating investment in renewables and divestment from fossil fuels to align with the energy mix target of 2050 LCCP and 2060 MEMR's NZE Scenario
- However, there is potential underinvestment in renewables. Showing the widest gap, solar power financing alone needs to fill an investment gap of USD 4.6 billion annually to achieve more ambitious 2060 targets.
- While the 2060 targets estimate that Indonesia will lower its fossil fuel share to 0 percent by 2060, current trends do not match the pace of fossil fuel divestment needed to achieve that target.

Key recommendations

Shift and align	• Expeditiously phase down coal financing for fossil fuel power plants to avoid stranded asset risk, given the 2023 Indonesia deadline for no new coal-fired power plants • Support initiatives that accelerate decommissioning of coal-fired power plants whilst ensuring a just transition for coal-dependent communities.
Explore and invest	• Continue investments in renewables whilst scale lending in renewable energy infrastructure, such as deployment of smart grids, energy management systems, and transmission infrastructures. • Allocate a certain portion of investment portfolio towards low-carbon technologies and new business models (like EV, charging infrastructure, and battery exchange station, etc.) through innovative financial mechanisms, blended financing, guarantees and credit enhancement. • Accelerate investments to various customer segments like micro, small and medium enterprises, residential and industrial for rooftop solar, and ESCOs to finance energy-efficient technologies in new buildings and retrofits etc.
Assess and report	• Integrate climate risk into credit assessments; climate stress testing of own lending portfolio; measurable and transparent decarbonization targets; and report progress to regulators and investors. • Advise clients on strategies to build a climate-resilient portfolio and facilitate transition to low-carbon activities.

INTRODUCTION

Indonesia has achieved remarkable success in bringing electricity to its large population. Indonesia has achieved near-universal electrification with 100 percent of its population electrified in urban areas, but remote rural areas continue to face stark energy inequalities with rural electrification rates standing at 98 percent (IEA et al. 2021). Covid-19 has laid bare these gaps as limited energy access hampers healthcare provision and economic productivity, especially in remote areas of the Indonesian archipelago. To maintain reliable access to power during the pandemic, the government has allocated additional subsidies to provide reliable and affordable electricity to its population.

A swift energy transition in Indonesia is essential to ensure compatibility with Paris Agreement commitments. Indonesia, which is projected to be the world's fourth largest economy by 2045,[1] will require a fundamental transformation to achieve its renewable energy targets. Indonesia has committed in its Nationally Determined Contributions (NDCs) to reduce at least 11 percent of its greenhouse gas (GHG) emissions from the energy sector from 2010 levels by 2030. To address its growing energy needs, Indonesia's National Energy Policy aims to increase renewable energy capacity to 23 percent of the energy mix by 2025. Coal (30 percent) and oil and gas (47 percent) would make up the balance.

However, progress has been slow as renewables accounted for only 14 percent of the energy mix in 2020. Indonesia still relies heavily on fossil fuels for its current energy supplies, and although Indonesia has announced a moratorium on new coal power plant permits by 2025, a large number of coal-fired power plants are already in the pipeline (IEA 2021). The government's 2021–2030 national electricity supply plan (RUPTL 2021–2030), has set a coal capacity target of 44.7 GW by 2030; representing a 40 percent increase from 2020 levels (Ministry of Energy and Mineral Resources (MEMR) 2020 and PT Perusahaan Listrik Negara (PT PLN) 2021).

In addition, there remain fossil fuel subsidies at an annual average of USD 135 million since 2015,[2] uncompetitive feed-in tariffs for renewables, and locked-in coal investments.

There is a need to mobilize investments at an accelerated rate to narrow the investment gap and ensure a clean energy transition. To achieve net-zero emissions in the energy sector, the government has announced a number of possible scenarios, one that targets a renewable energy mix of 43 percent by 2050 (Long Term Strategy 2050 Low Carbon Compatible with Paris Agreement scenario, 2021), and another that targets a renewable energy mix of 87 percent by 2060 (MEMR 2021). To achieve the MEMR target of 87 percent of renewables by 2060, Indonesia needs on average USD 16.1 billion in annual investments to renewable energy.[3] However, tracked annual investments on average only reached USD 2.7 billion for the period 2015–2020, which clearly falls short of finance requirements.

[1] Indonesia Vision 2045 (Bappenas 2019). https://www.bappenas.go.id/files/Visi%20Indonesia%202045/Ringkasan%20Eksekutif%20Visi%20Indonesia%202045_Final.pdf

[2] Fossil fuel subsidies have remained 9 percent of the total state budget on average since 2015 (Mafira 2021). https://www.climatepolicyinitiative.org/blog-indonesia-wants-a-carbon-tax-but-with-subsidies/

[3] MEMR presentation on Roadmap to Reach NZE, 2021.

Public finance is also critical to build the right environment for renewables investment to accelerate and enhance the electricity investment proposition. Indonesia's fiscal capacity to increase support to the power sector can be effectively mobilized by making targeted interventions through innovative financing schemes, as well as setting clear policies for energy transition and broader sustainable development. Public investments are also needed to expand and update Indonesia's transmission and distribution infrastructure to overcome the challenges of renewable energy integration and attract private investment in the space.

Overall domestic public spending on renewable electrification is still smaller than domestic public spending to support fossil fuels. In addition, limited investments have been deployed to install smart grids and upgrade transmission and distribution infrastructure. Plans to allocate an initial investment of USD 700 million to 1.7 billion for smart grids are scheduled to begin in 2021.[4]

This brief, by examining the current financing landscape of the Indonesian electricity generation sector, and its alignment with Indonesia's Ministry of Energy and Mineral Resources's Net Zero Emission 2060 Scenario (MEMR's NZE 2060),[5] aims to identify the challenges and opportunities in financing Indonesia's ambitious targets on renewable energy towards an energy transition. Analysing the key trends in electricity sector financing, such as the sub-sector, source, and financing instrument, is a key starting point to identifying opportunities to scale up finance, as discussed in the following section. A subsequent section provides an approach to assessing the alignment of investments with Indonesia's net-zero targets and the Paris Agreement. This is followed by a section on innovative financing mechanisms to mobilize private investments and recommendations for financial actors to support Indonesia's energy transition in the coming years.

[4] Republika. 2021. PLN Investasikan Rp 25 triliun untuk Kembangakan Smart Grids. https://www.republika.co.id/berita/qp856p370/pln-investasikan-rp-25-triliun-untuk-kembangkan-smart-grid

[5] In October 2021, the Ministry of Energy and Mineral Resources (MEMR) announced it is preparing to launch a Roadmap to Net Zero Emission by 2060. Although yet to be officially launched in its entirety, the principal 5-year milestones and investment plans have already been announced, and MEMR officials have provided detailed presentations that lay out targets for renewable generation capacity additions, fossil fuel decrease, and quantitative projection of investment needs to meet the 2060 goal. It is expected to form the basis for adjustment to the National Energy Policy (KEN) and National Electrification Master Plan (RUEN). See MEMR's press release at https://www.esdm.go.id/en/media-center/news-archives/ini-prinsip-dan-peta-jalan-pemerintah-capai-net-zero-emission

UNDERSTANDING THE LANDSCAPE OF POWER SECTOR FINANCING IN INDONESIA

This section analyses financing trends, identifying which sector, source of capital, and financing instruments dominate electricity-sector investment in Indonesia, as well as the financial drivers of Indonesia's energy transition. The trends assessment is based on tracked finance commitments, i.e. transactions that reached financial close, or were backed by the necessary funds, flowing to Indonesia's electricity sector between 2015 and 2020 (utilizing the methodology of SEforALL's *Energizing Finance: Understanding the Landscape* series). It then assesses the gap between these tracked commitments (both renewable and fossil fuel[6]) and actual disbursement,[7] and finance needs to meet the 2050 target of Indonesia's LCCP scenario.[8]

Key Findings

Finance commitments to fossil fuel-based energy projects levelled off while finance commitments to renewable energy projects increased between 2017 and 2019, but financing trends in 2020 signal a setback.

84 percent of total fossil fuel-based finance commitments were directed toward coal-fired projects between 2015 and 2020. Financing to coal alone averaged USD 2.5 billion a year between 2015 and 2020, but peaked in 2016 and went into a continuous decline afterwards, levelling off at an average of USD 1.6 billion per year between 2017 and 2019. Meanwhile, financing for renewable energy averaged USD 2.7 billion per year over the period 2015–2020.

However, these trends reversed in 2020. Fossil fuel finance increased sharply in 2020 (Figure 1), while finance commitments for renewables declined significantly. The decline in renewable energy finance is primarily attributed to lower energy demand during the Covid-19 pandemic, making new investments in renewable energy less attractive. In addition, the renewable energy sector gained only minor support in the country's economic stimulus – Indonesia directed only 4 percent of its total economic recovery stimulus towards dedicated green outcomes primarily in the energy sector (Vivid Economics and CPI 2021).

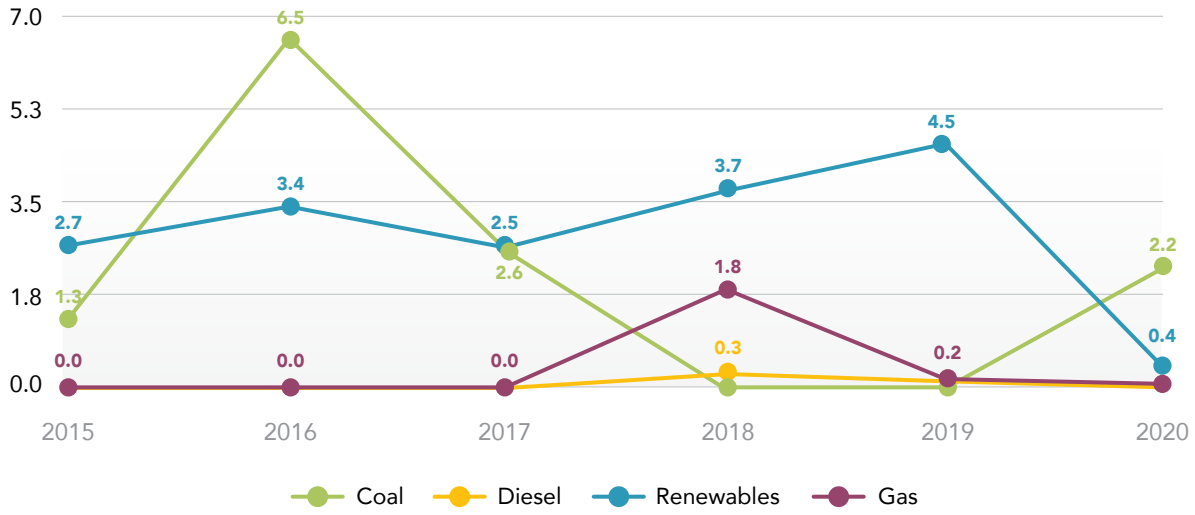
The 2020 increase in fossil fuel finance has correlation with several factors. First, Indonesia's 35 GW power generation programme unveiled in 2015, of which 46.9 percent is to be coal-powered, continued to be accelerated during the pandemic and continued to receive new finance in 2020 (Figure 2 – By Sector). This is why Indonesia has seen coal-fired power plant capacity continue to increase, reaching 31.9 GW in 2020 from projects already underway (PLN 2021). Second, Indonesia's recent Omnibus Law (2020) eased the approval process for coal mining permit extension and removed royalty obligations for downstream coal mining companies, sending a positive signal for coal investment.

Despite the 2020 spike in finance for fossil fuels and decline in finance for renewables, the government's energy transition policies suggest that the 2020 situation may be a short-lived trend that will not continue beyond

[6] Fossil fuel energy comprises energy generated from coal, gas and oil.
[7] Indonesia investment realization data are sourced from the Ministry of Energy and Mineral Resources (MEMR) performance report for the period 2015–2020.
[8] Finance need estimate is sourced from Ministry of Energy and Mineral Resources (MEMR) on how much investment is needed (every five years) for each kind of renewable and fossil fuel power generation to meet LCCP 2050 scenario. However, these estimates only include power generation (without off-grid and on-grid breakdowns). They exclude transmission and distribution investment.

2030. The coal capacity target has been revised downward from 57 GW to 44.7 GW by 2030 (RUPTL 2021–2030), and the state-owned electricity company, PT PLN, has stated that Indonesia will not commission new coal-fired power plants after 2025 and will gradually retire old ones. This is in line with MEMR's roadmap showing that no new coal-powered plants licenses will be issued after 2025, and by 2030 there will be no more construction of new plants. The government has also announced intent to explore early retirement of coal-fired power plants by 2040 (this is further discussed in Box 2 on the "Energy Transition Mechanism" below).

FIGURE 1
Power Sector Financing in Indonesia (2015-2020, USD billion)



Finance from international sources represented around 65 percent of total tracked finance to Indonesia's electricity sector (both fossil fuel and renewables) between 2015 and 2020. Prior to 2018, a large portion of finance was committed to coal-fired power plants, with average commitments from international sources representing 65 percent of all finance to the sum of USD 3.7 billion between 2015 and 2017 (USD 2.4 billion from international public sources and USD 1.3 billion from international private sources) (Figure 2 – By Provider). A key shift was identified in 2018, when international finance to fossil fuel-based energy sources primarily for coal, dropped by 68 percent to USD 0.5 billion on average over the period 2018–2020. However, while no new finance was committed to coal-fired power plants between 2018 and 2020, international sources continued to finance gas and/or diesel power plants. By contrast, domestic finance represented only 31 percent of all finance commitments in the electricity sector, to the tune of USD 1.6 billion per year (USD 0.2 billion from public sources and USD 1.4 billion from private sources) mainly financing fossil fuel energy generation.

Only a small portion (USD 0.1 billion per year) of domestic electricity finance went to renewable energy projects, i.e. four large-scale[9] and several small-scale hydropower plants over the period 2015–2020. This shows substantial effort is needed to attract investment from domestic financial institutions and investors.

Loans are the preferred financing instrument, comprising 78 percent of total finance commitments to electricity generation in Indonesia between 2015 and 2020, averaging USD 2.5 billion per annum (Figure 2 – By Instrument). 52 percent of debt finance (USD 1 billion per year, on average) went to fossil fuel power plants between 2015 and 2017, with no increase

[9] Four large hydropower plants that were being financed in 2018: Poso II Hydro Power Plant 515 MW, Malea Hydro Power Plant 90 MW, Asahan 1 hydro power plant 180 MW, North Sumatera, and PLTA Buttu Batu 200 MW. The flow mainly came from commercial financial institutions.

since then. Out of 52 percent of debt finance, 86 percent (USD 0.8 billion per year, on average) of finance went to coal power plants. The remaining 48 percent (USD 0.9 billion per year, on average) of debt finance commitments were made to renewable energy, which has been on an increasing trend since 2018, except for the decline in 2020. Debt instruments comprised 59 percent balance sheet debt and 19 percent project-level debt, which mainly came from commercial and public financial institutions, as well as corporate actors. Commercial financial institutions provided the highest proportion of debt finance commitments (29 percent of total finance, all in debt instruments) in the period 2015–2020 (Figure 2 – By Actor).

Commercial loans to fossil fuels are decreasing as a result of a shift in market preferences (i.e. global shift in energy supply) and regulatory signals, primarily in the financial sector, such as OJK regulation No. 51/2017 on the Implementation of Sustainable Finance for Financial Services Companies, Issuers, and Public Companies, and OJK regulation No.60/2017 on green bonds. Furthermore, the recent PLN's announcement on a moratorium of coal-fired power starting in 2023 impacts the market's risk appetite.

Reciprocating the trend of commercial loans, DFIs are increasingly starting to phase out financing to fossil fuels to align with Paris Agreement objectives. Many DFIs are reconsidering their investment and portfolio decisions to meet ambitious climate goals in achieving universal energy access, while curbing global carbon emissions. For instance, EU Investment Bank released a statement that it will align all financing activities with the Paris Agreement goals, and will no longer consider new financing for unabated, fossil fuel projects (including gas) after 2020; KfW Development Bank included coal in its financing exclusion; and Agence Française de Développement (AFD) indicated that it will not finance any coal, oil, or diesel-fueled plants in its low-carbon plan.

Equity finance made up 18 percent of total tracked commitments over the period 2015–2020 and originated from various sources, mainly project developers and corporations. Grants contributed only 1 percent of the total tracked finance, but have shown an incremental increase over the past five years. Most grants (89 percent) were provided by multilateral donors for enabling activities for renewable energy generation, i.e. technical assistance, policy, and administrative management.

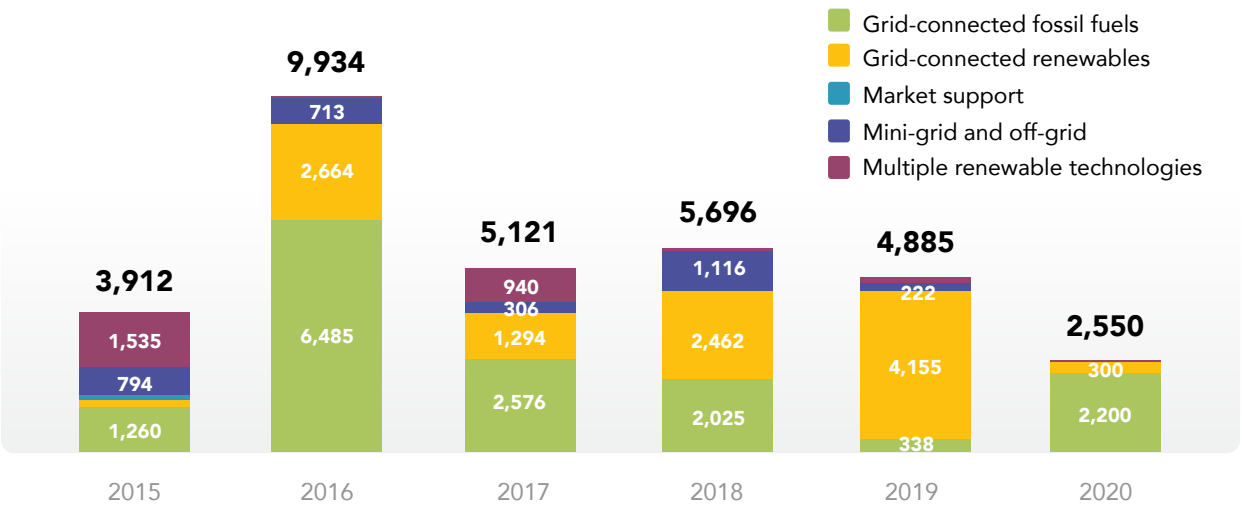
Hydropower and geothermal projects together accounted for almost two-thirds of the total renewable energy finance commitments between 2015 and 2020, while solar and wind accounted for only 1.4 percent and 5.7 percent of total renewable energy finance, respectively. Hydro and geothermal secured 57 percent of total debt finance, followed by fossil fuels at 28 percent, and renewable energy (i.e. solar, wind, and bio energy) at 15 percent (Figure 2 – By Energy Source). High levels of finance commitments for hydropower projects are driven by the relative maturity of the technology in Indonesia, having been developed together with several irrigation systems and flood-management dams, making investments relatively cost-effective. Geothermal projects have consistently received around USD 1 billion in finance commitments per annum, except in 2020, mostly due to having higher initial capital as well as operating and maintenance costs requirements. Another trait of hydropower and geothermal is that they are both stable, non-intermittent energy sources. Apart from focusing on the mature application of these technologies, more diverse investment in smart transmission and distribution is also necessary in view of anticipated growth in intermittent generation sources, i.e. solar and wind.

The low volume of commercial debt finance to solar based energy technologies is surprising given the compelling value proposition of solar panels. These panels are modular and able to provide an effective renewable source of electricity quickly across Indonesia's expansive geography with multiple deployment options (mini-grid, utility grid, off-grid). Furthermore, solar technology is now more cost-effective, with prices for solar panels having dropped globally by 82 percent over the last decade (IRENA 2020). Encouragingly, Indonesia ranks solar energy as a priority in its energy transition programme (MEMR 2021).

FIGURE 2

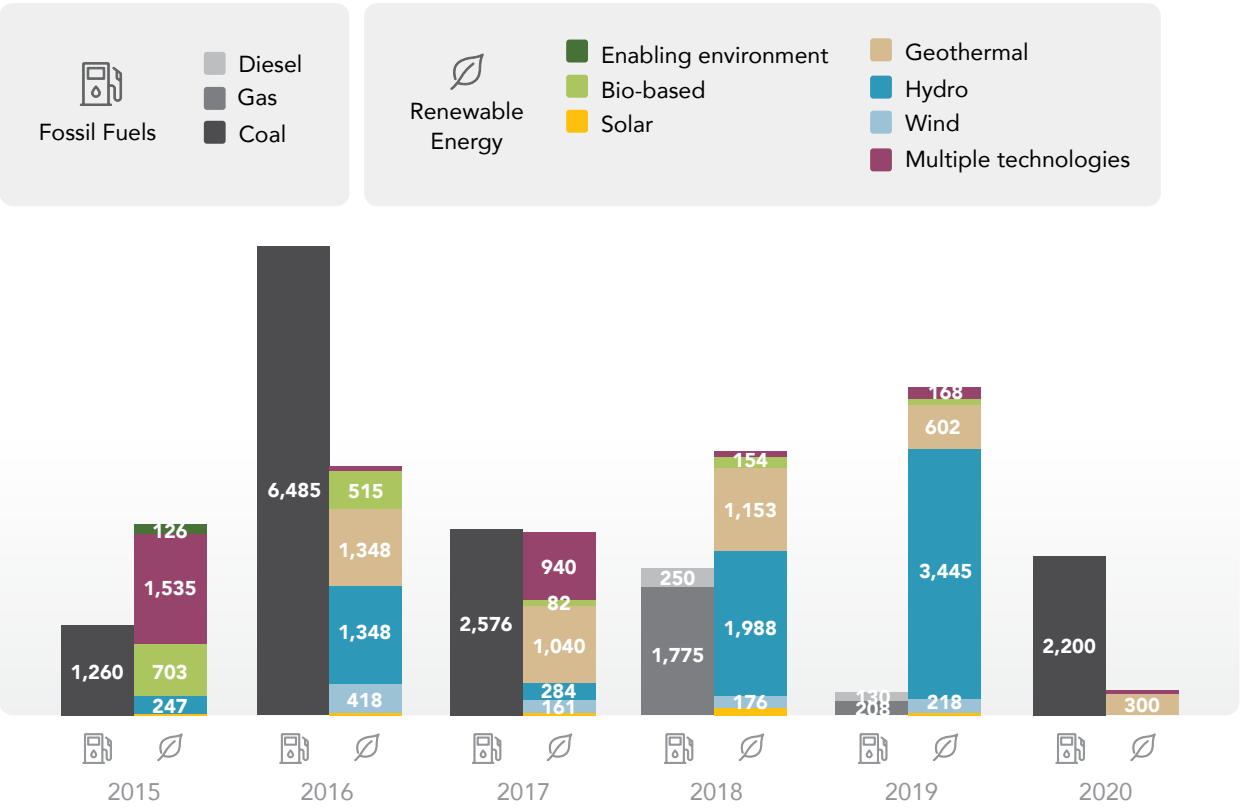
Snapshot of power sector financing in Indonesia (2015–2020, USD million)

By Sector



Note: Market support includes feasibility studies, policy and administrative management, R&D, and other similar activities.

By Energy Source



Note: Multiple technologies include an electricity grid development programme, sustainable and inclusive energy programme design, system design and assessment, facility installment, and a pilot programme on renewable energy access.

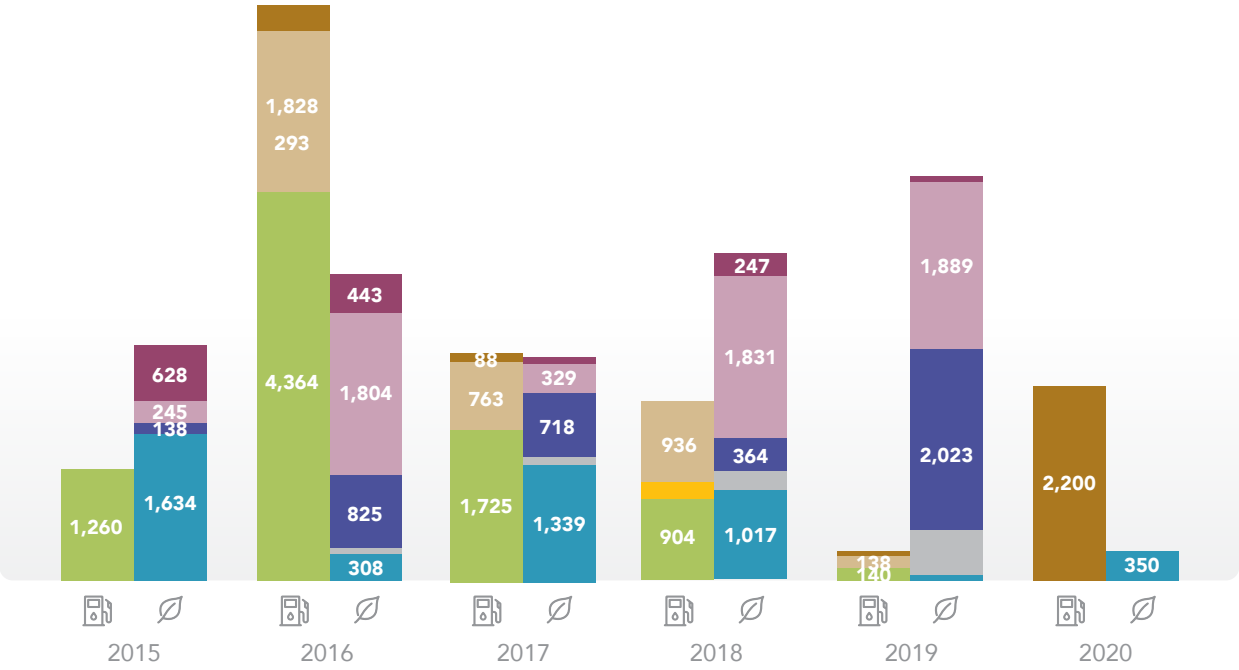
By Provider

Fossil Fuels

- Public - International
- Public - Domestic
- Private - International
- Private - Domestic

Renewable Energy

- Public - International
- Public - Domestic
- Private - International
- Private - Domestic
- Private - Others



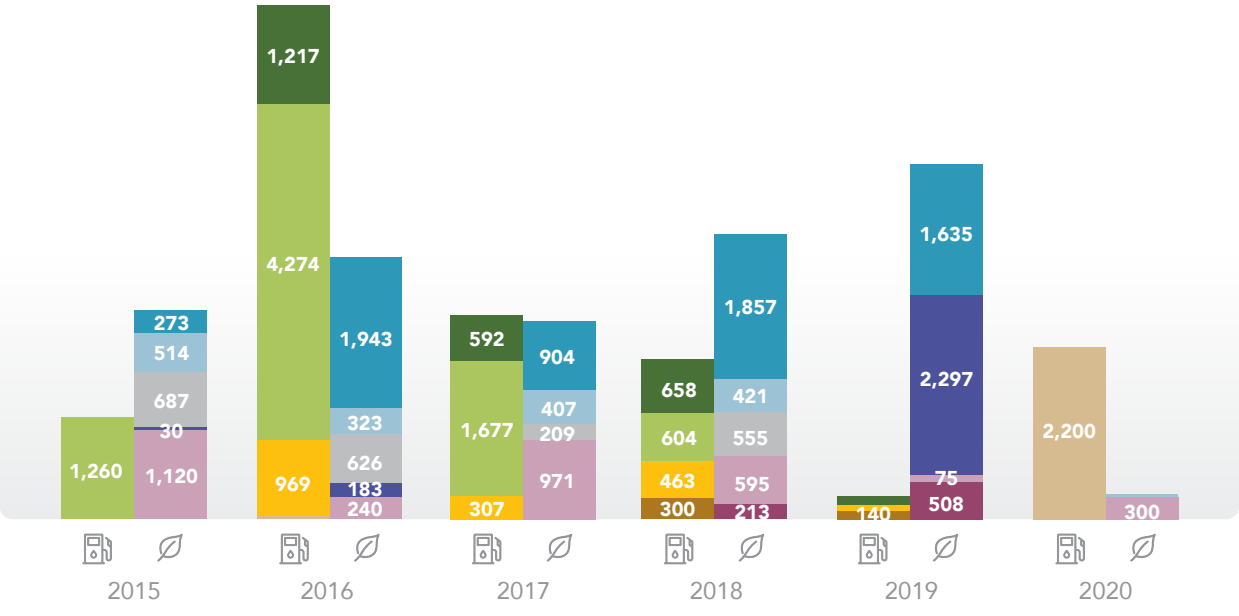
By Actor

Fossil Fuels

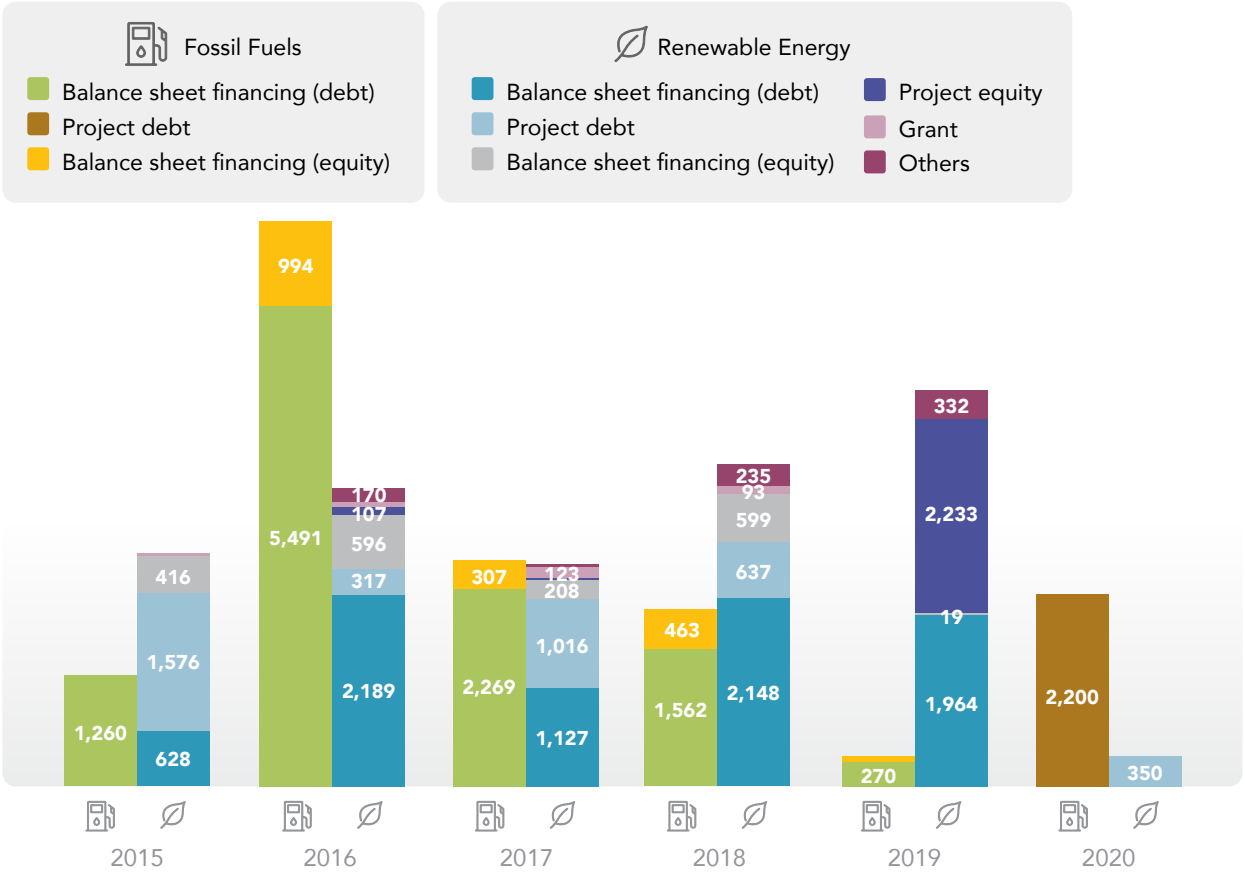
- Commercial financiers
- Bilateral DFI
- Project developers
- Corporates
- Multilateral DFI

Renewable Energy

- Commercial financiers
- Bilateral DFI
- Project developers
- Corporates
- Multilateral DFI
- Goverment (domestic)



By Instrument



Note: There were limits in accessing 2020 data, particularly private finance data.

Total disbursements[10] for fossil fuel-based energy projects were 37 percent higher than finance commitments between 2015 and 2020. By contrast, disbursements for renewable energy projects were 65 percent lower than finance commitments in the same period. Between 2015 and 2020, around USD 4.26 billion was disbursed annually for coal-fired, gas and diesel power plants in Indonesia, compared to only USD 1.73 billion per annum for renewable energy projects – only a third of fossil fuel power plant investment. In 2020, installed capacity of renewable power plants in Indonesia reached only 10.5 GW (or 14 percent of total installed capacity), which is much lower than the installed fossil fuel-based generating capacity (Figure 4).

Certain policies employed in 2015-2020 may help explain the discrepancy between finance commitments and disbursements. The commitments and disbursements relating to renewables showed a noticeable dip in 2017, coinciding with a regulation that revised renewable feed-in tariffs to cover only 85 percent of electricity generation costs. This was widely considered a setback to renewables, at the time.[11] In contrast, disbursement of committed finance for fossil fuel projects increased significantly following the unveiling of the government's 2015 programme to build 35 GW of new power generating capacity, of which 46.9 percent is planned to be coal-powered.

[10] Indonesia investment realization data are sourced from the MEMR performance report for the period 2015–2020.
[11] MEMR, Ministerial Decree No 50/2017.

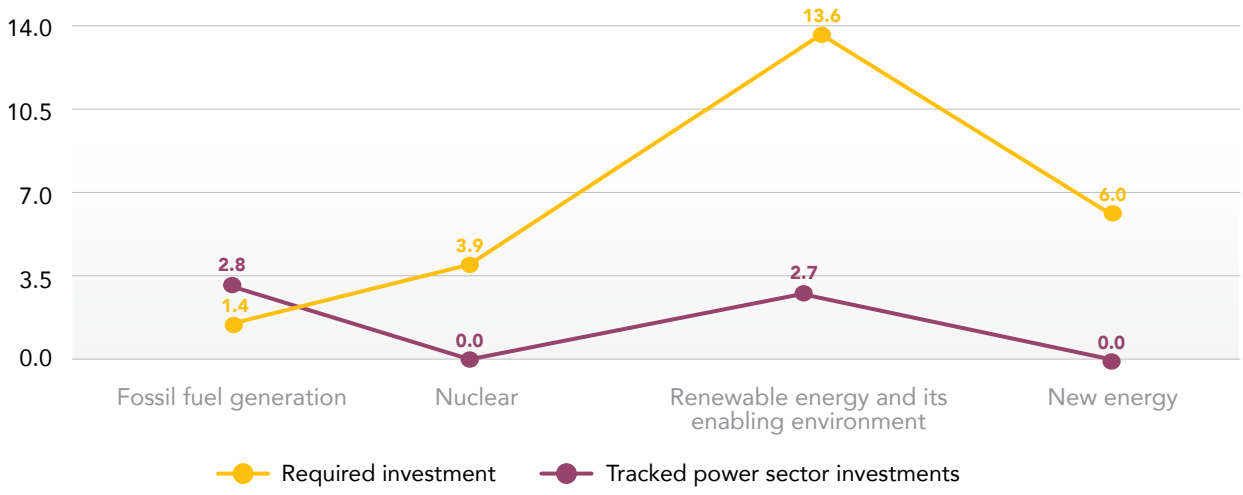
PARIS ALIGNMENT OF POWER SECTOR FINANCING - CHALLENGES

Indonesia will require an exponential increase in finance to the renewable energy sector to achieve its renewable energy targets by 2050 and 2060. Indonesia recently launched its Long-Term Strategy for 2050 (LTS 2050) consisting of three decarbonization scenarios, the third and most ambitious of which is the Low Carbon Compatible with Paris Agreement (LCCP) scenario. The LCCP states that if Indonesia is to be aligned with the Paris Agreement goal and scale up efforts to reduce emissions, then renewables should constitute 23 percent by 2025, based on National Energy Policy, and 43 percent by 2050 based on the LCCP scenario of its power sector capacity. A different scenario modelled by the MEMR shows a net-zero emissions roadmap for Indonesia to achieve a 86 percent renewable energy mix by 2050 (98 percent if including new energy), and 87 percent by 2060 (100 percent if including new energy), where new energy means tidal, pump storage, hydrogen, BESS (battery energy storage system), and nuclear. All of these scenarios are a big jump from current levels of 14 percent renewable energy in 2020 (Figure 4).

There is an estimated investment need of USD 16.1 billion per year for electricity generated from renewable sources for Indonesia to achieve an 87 percent renewable energy mix by 2060 (Figure 3).[12] The huge finance need and recent policy shifts provide an opportunity for accelerated investments in renewables (For an indicative list of policies and regulations supporting renewable energy see Appendix IV).

FIGURE 3

Required investments based on MEMR Net Zero Emissions Long-Term Strategy for 2060 (MEMR's NZE 2060 Scenario) compared to tracked investments to the electricity sector (USD billion, per annum)



Source; MEMR presentation on Long-Term Strategy Energy Sector towards Net-Zero Emission August 2021 for required investment; CPI and SEforALL Analysis for tracked investment 2015–2020.

Note: MEMR estimates the required investments for capacity addition to electricity generation from 2021–2050 to reach LCCP 2050 scenario energy mix. These include both fossil fuel energy generators (e.g. coal, gas, oil), nuclear, and renewable energy generators (e.g. hydropower, geothermal, solar, bio-based energy, wind), and other new energy (tidal, hydrogen, and battery energy storage systems (BESS)).

[12] MEMR presentation on Long Term Strategy Energy Sector towards Net-Zero Emissions August 2021 for required investment.

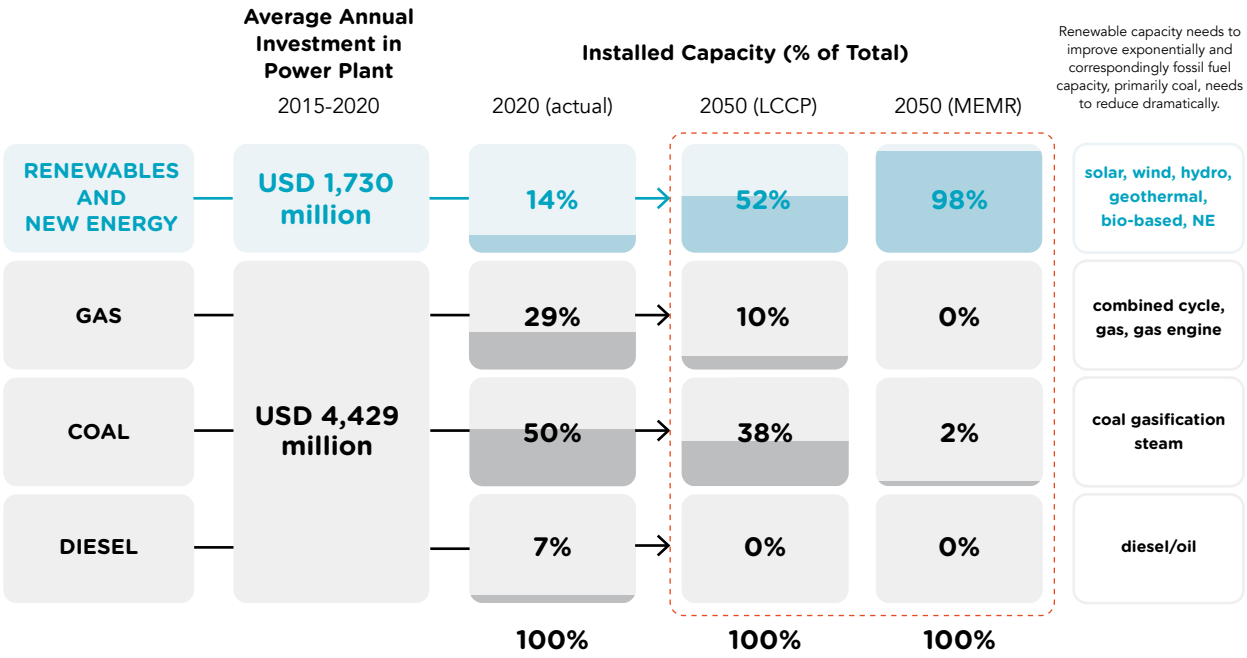
Fossil fuel corporations and project developers must actively contribute to the transition to renewable energy, and the government can accelerate this by providing consistent signals to move away from fossil fuels-based energy. Having policy targets alone are not sufficient to ensure a smooth energy transition away from fossil fuels. There are two indications of obstacles hampering the renewable energy mix and coal reduction targets from being met. First, policies in support of existing coal mining and coal-fired power plants still exist, such as subsidies to the tune of USD 135 million a year, fiscal stimulus, and coal mining permit extensions as mentioned in the above sections. Second, the current tracked finance data indicate that corporates and project developers are largely still contributing to financing coal (Figure 2 – by Actor). Both of these factors are locking in ample coal supply for decades to come. Granted, there are indications this trend may change. Some of the big players in the coal industry, like Indika Group, are already starting to develop renewable energy projects for the future. But it remains to be seen whether or not all the big energy players make a significant pivot to renewables.

More ambitious investment in grid maintenance and expansion could lead to 100 percent electricity access. The MEMR has predicted an average annual increment of 6 percent in national energy demand. To keep pace with the increased demand, PT PLN, the sole operator of transmission and distribution in Indonesia, needs to ensure a well-integrated electrical system throughout all geographical areas. However, based on historical investment in transmission and distribution infrastructure by PT PLN, the average annual investment in electricity networks in Indonesia levelled off in 2019 and stood at USD 1.4 billion[13] (based on MEMR periodical performance reports). Given the importance of energy for the provision of efficient lighting, heating, cooking, clean water, transport and telecommunications service, more finance will be needed to ensure reliable and affordable access in achieving universal electricity access. While the state has a legal monopoly on transmission and distribution[14], the private sector can participate in investment in smart grids to integrate renewables and to transmit power from the new 35 GW programme. Investment in mini- and micro-grids can also be considered to increase access, reliability and optimize the energy generation mix in remote rural areas. Tax concessions and an attractive power purchase agreement with PT PLN could fast-track this.

[13] These are investment realization data in transmission and distribution, sourced from the MEMR performance report for the period 2015–2020.
[14] Law No. 30 of 2007 on Energy (the Energy Law) and Law No. 30 of 2009 on Electricity (the Electricity Law) are the main laws that govern the electricity sector in Indonesia. Their implementation is regulated under Government Regulation No. 14 of 2012 on Electricity Supply Business Activity, as amended by Government Regulation No. 23 of 2014 (GR 14/2012). As electricity is deemed vital and strategic, the business of electricity is controlled by the state and held by state-owned and region-owned enterprises, the main such company being PT Perusahaan Listrik Negara (Persero) (PLN). To increase the electricity supply, the private sector is also given the opportunity to participate in the sector.

FIGURE 4

Past investment until 2020, the resulting 2020 capacity mix, and the stated 2050 capacity mix



Note: BECCS is Biomass Energy with CCS.

Source: MEMR performance report for the period 2015–2020, Handbook of Energy & Economic Stats of Indonesia (2020), LTS Document (2021).

The need for investment in renewables and divestment from fossil fuels

Renewable energy capacity in Indonesia needs to grow annually at an accelerated pace to reach the MEMR's more ambitious target of an 87 percent share by 2060. The contribution of renewable energy to installed generating capacity in Indonesia has historically been low. From 2010 to 2020, the installed capacity of renewables only grew around 559 MW per year. Wind- and solar-based installed capacity only grew by 15 MW and 19 MW annually from 2010 to 2020, while the largest improvement was seen in hydropower capacity, which grew by 241 MW annually, followed by bioenergy (191 MW) and geothermal sources (94 MW), for the same period. Under all scenarios, solar energy is projected to make up the largest source of renewable energy. The MEMR has a target of 398 GW solar power installed capacity by 2060. For Indonesia to achieve its renewable energy targets and meet its commitments under the Paris Agreement by 2060, solar power capacity must grow by 9945 MW annually (Figure 5).

The development of solar power capacity must accelerate by 523 times over current levels to fill the renewable energy capacity gap by 2060. However current volumes of finance for solar energy projects fall far short of those required. Indonesia missed its solar energy capacity target in 2020 under the national energy plan (RUEN), which envisaged up to 900 MW of installed solar capacity by 2020, while the actual installed capacity was only 185 MW (Figure 5). According to the MEMR's performance report (2015–2020), Indonesia only added 28.8 MW of solar PV installation in 2020, which was well below the 46.2 MW installed in 2019.

FIGURE 5

Renewables' capacity additions since 2010 vs. ideal capacity additions to meet MEMR's NZE 2060 scenario

Installed Capacity (MW)	2010 (actual)		2020 (actual)		2060 (MEMR's NZE)	Rate of capacity addition needed to meet LCCP scenario
SOLAR	0.19	+19 MW/year →	185	+3,760 MW/year →	398,000	523 X
WIND	0.34	+15 MW/year →	154	+562 MW/year →	41,000	68 X
HYDRO	3,734	+241 MW/year →	6,141	+2,062 MW/year →	82,000	7 X
GEOTHERMAL	1,189	+94 MW/year →	2,131	+696 MW/year →	18,000	4 X
BIO-BASED	0	+191 MW/year →	1,907	+836 MW/year →	43,000	5 X

Source: Handbook of Energy & Economic Stats of Indonesia (2020), Ministry of Energy and Mineral Resources's presentation (2021), CPI analysis.

Commercial financiers play a key role in increasing renewable energy capacity, having provided 38 percent of finance in renewables between 2015 and 2020. Finance flows from financiers to renewable energy projects have been increasing for the past five years with the exception of 2020, representing a significant portion (38 percent) of total financing to renewables. This is close to global trends that show commercial finance contributing 41 percent of total financing for renewables (CPI 2021), and this financing trajectory is positive for the decade ahead (Mazzucato and Semieniuk 2018). However, in Indonesia most of this financing has gone into geothermal and hydropower projects, with less than 2 percent going into solar power.

The opportunity for solar PV financing is projected to be immense in the future for various reasons. First, the government's net-zero emissions scenarios project solar energy as the dominant source of energy in 2060. Second, solar PV prices have consistently dropped globally over the past decade. Third, solar PV has a comparatively more varied market than other renewable energy technologies, given that it can be installed at stand-alone, mini-grid and utility-grid scale. The composition of investment portfolios varies considerably among financial actors, creating directions towards particular technologies that may result in a skewed distribution of renewable investment. The increasing maturity of solar PV technology, increasing familiarity of financiers with solar PV financing approaches, and large potential market should be seen as an opportunity for financial institutions to allocate more finance to the sector.

Underinvestment in renewables stands at USD 13.4 billion annually. Showing the widest gap, solar power financing alone needs to fill an investment gap of USD 4.6 billion annually to achieve 2060 targets. There is a substantial underinvestment in renewables of USD 13.4 billion annually, because the annual investment in renewable power plants should be around USD 16.1

billion to achieve 2060 targets (MEMR 2021) and yet current financing only provides USD 2.7 billion per year (Figure 6). Solar PV plants have the widest investment gap, being USD 4.6 billion short of the USD 4.7 billion investment needed per year. This reflects the current trend of underdevelopment in renewables that is mainly attributable to an uncertain regulatory environment and investment framework. For instance, issues on procurement and tariff pricing have yet to be addressed, though an anticipated presidential decree to be published later this year will address this issue. The decree is expected to set a higher feed-in tariff for renewable projects below a certain capacity and competitive auctions for larger capacity projects, including solar PV, wind, hydropower, biomass and biogas.[15] In narrowing the gap, attracting such investment is likely to become more challenging given the global economic crisis, reinforcing the importance of reforms to improve Indonesia's power sector investment framework, and creating an enabling environment (IEA 2020).

FIGURE 6

Potential of annual underinvestment in renewables – Required investment to reach the MEMR's NZE 2060 Scenario and 2015–2020 tracked investment in renewables (USD billion, per annum)

Renewable Power Plants	Future Annual Investment (USD billion)			How much under-investment annually? (USD billion)
	If based on stated commitment		What is needed to achieve MEMR's NZE 2060	
SOLAR	0.04	vs	4.7	4.6
WIND	1.2	vs	5.7	4.5
HYDRO	0.1	vs	2.6	2.5
GEOTHERMAL	0.7	vs	1.9	1.2
BIO-BASED	0.3	vs	1.2	0.9
ENABLING ENVIRONMENT & MULTIPLE RE TECHNOLOGY	0.4	vs	0	-0.4
	2.7	vs	**16.1**	**13.4**

Note: Committed investment in the future is assumed to follow what has been stated/announced by investors in the past (average 2015-2020)

Source: CPI Electricity Generation Finance Tracking, Ministry of Energy's presentation on LTS 2050 (presented in April 2021)

[15] References for feed-in tariff for renewable projects, based on drafted presidential decree on renewable energy:
The Jakarta Post. 2021. Government to issue green energy regulation this year as goals remain elusive. https://www.thejakartapost.com/news/2020/10/26/govt-to-issue-green-energy-regulation-this-year-as-goals-remain-elusive.html
IEA. 2020. Attracting private investment to fund sustainable recoveries: The case of Indonesia's power sector. https://www.iea.org/reports/attracting-private-investment-to-fund-sustainable-recoveries-the-case-of-indonesias-power-sector

There is also an overinvestment in fossil fuels to the tune of USD 0.2 billion annually. While the 2060 targets estimate that Indonesia will lower its fossil fuel share to 0 percent by 2060, current trends do not match the pace of fossil fuel divestment needed to achieve that target. The MEMR (2021) stated that the annual investment in fossil fuel power plants must go down to around USD 4.1 billion to achieve the 2060 target. However, based on current trends of committed finance, going forward Indonesia may expect to still see around USD 4.3 billion of annual investment in fossil fuel power plants, setting the country on a path for a USD 0.2 billion overinvestment in fossil fuels annually (Figure 7).

FIGURE 7
Financing gap – 2015–2020 tracked commitment vs. LCCP 2050 financing need

	FUTURE ANNUAL INVESTMENT (USD BILLION)			OVER VS UNDER	ACTION NEEDED
	Based on Commitment		What is needed to achieve LCCP 2050		
RENEWABLE	2.7	vs.	16.1	Under-investment by USD~13.4 billion annually	Incentivize renewable investment
COAL, GAS, DIESEL	4.3	vs.	4.1	Over-investment by USD~0.2 billion annually	Disincentivize fossil fuel investment

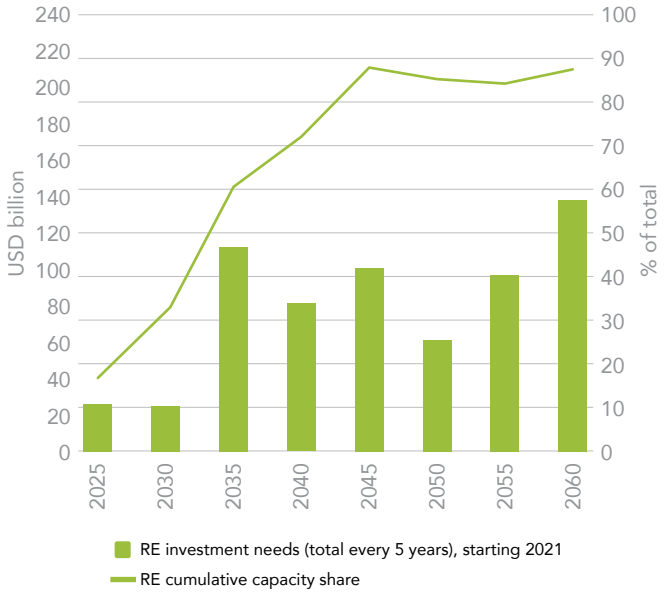
Note: Committed investment in the future is assumed to follow what has been stated/announced by investors in the past (average 2015-2020)

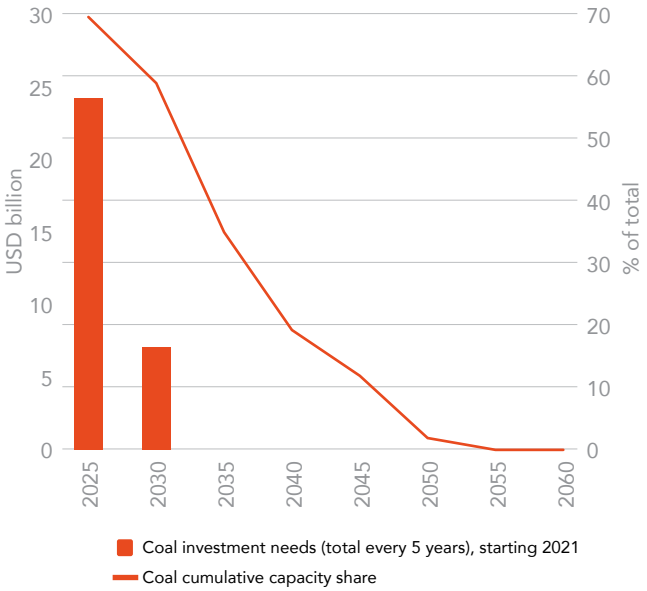
Source: CPI Electricity Generation Finance Tracking, Ministry of Energy's presentation on LTS 2050 (presented in April 2021)

Of all the fossil fuel sources, coal power plants are planned to be gradually phased-out, with five-year milestones for coal decrease corresponding to five-year milestones for renewable energy increase between 2025 and 2060 (Figure 8). According to this scenario, Indonesia will only need USD 3.11 billion of coal investment per year until 2030, after which no financing is needed as there should be no more construction of new coal power plants. However, current investment trends following announced finance commitments are putting Indonesia on a path towards USD 3.13 billion in coal financing per year, which is slightly higher than is needed.

FIGURE 8

Renewable energy investment vs coal investment following MEMR energy transition milestones





On average, Indonesia would need USD 16.1 billion of investments into renewables annually (until 2060).

However, current trends signal an underinvestment in renewables with only USD 2.7 billion projected to be committed to the sector annually.

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Current policies and incentives to accelerate renewables

On balance, the financing trends captured between 2015 and 2019 indicate that renewable energy continues to gain traction from investors, and the government's policy targets indicate that there will be a demand for increased renewable energy investment well into 2060. This can be attributed to existing policies and some promising new ones (Appendix IV). Investment levels are still far behind what is needed due to continued policy or pricing support for fossil fuels that enhance investment risks for renewables, whether real or perceived.

An improved policy and regulatory framework can help reduce some of the perceived risks and improve the bankability of renewable energy projects. The government has recently issued Presidential Regulation No. 98/2021 on Carbon Pricing, which will kick off by implementing a cap and tax for coal-fired power plants beginning in April 2022, likely making it costlier to produce coal-based electricity. Bankability for renewable energy projects is affected by MEMR Regulation No. 10/2017 on the Principles of Power Purchase Agreement, which require all power purchase agreements (PPAs) to be entered into on a "build, own, operate, transfer" (BOOT) basis that prevents sponsors from seeking to negotiate an extension to their initial PPA term. The government released a decree in early 2020 (Regulation 4/2020) that included changes such as removing the requirement to develop "build, operate, own transfer" projects, which had caused difficulties for developers in terms of land ownership and their ability to obtain finance. The new decree allows projects on a "build, own, operate" (BOO) basis. The decree also requires PT PLN to take renewable generation on a "must run" basis, which means that it must prioritize the dispatch of such plants against available capacity from conventional/fossil fuel power plants. Other issues such as the remuneration mechanism and tariff level for renewables are also expected to be addressed in the forthcoming Presidential decree.

Other key considerations, such as simplified permit and licensing processes, the ability of the grid to integrate increasing amounts of renewables through a build-out of smart grid infrastructure, and the credibility of the government's renewable energy targets discussed above are part of the overall investment framework and enablers that investors and financiers could consider. A strengthened investment environment for renewables could heighten investor confidence in the power sector. A clear and transparent presidential decree would create enabling conditions for renewable energy and send a positive signal to the market, especially as investors are currently extra cautious given overall global economic uncertainty.

BOX 1

Potential of electric vehicles for Indonesia's net-zero aspiration

Electric vehicles (EVs) help ease air pollution from diesel and petrol fumes, and reduce costly oil imports. If the electricity that powers the vehicles is from renewable sources, they can also help meet emissions reduction targets to limit climate change.

The national energy plan (RUEN) includes a roadmap for electric vehicle adoption commitments and targets. The government has set as a target the production of 4.2 million electric cars and 13.3 million electric motorcycles by 2050. The number of electric cars is expected to increase in 2021 due to the availability of local fiscal incentives, such as the vehicle title transfer fee discount/exemption in Java and Bali and luxury vehicle tax exemptions, as well as non-fiscal incentives, such as free and/or dedicated parking and odd/even lane access. The government also launched public EV battery exchange stations in November 2020 to accelerate the development of the EV ecosystem. To speed up this development, state-owned enterprises (SOEs) have created several partnerships with the private sector to promote EVs and build charging infrastructure. These include a commercial pilot project between Pertamina and Gojek and collaboration between PT PLN, Grab, and other private actors.

Investment opportunity across EV supply chain

A move towards EVs also supports Indonesia's ambitious plans of becoming a global hub for production, as the country ramps up processing of its rich supplies of nickel laterite ore used in lithium batteries. Current investments are still concentrated in raw materials and more are needed throughout the entire EV supply chain, such as for EV domestic production/manufacturing (IESR 2021). Local production of electric bicycles remains limited and no domestic facility exists to produce electric cars. Some investment plans have been made by foreign car companies; for example, Toyota and Hyundai are investing in building factories in Indonesia.

To tap the EV investment opportunity, the government could provide targeted support, for instance tax exemptions for VAT and import duties, subsidies and low-interest loans to the private sector to develop charging infrastructure, and projects to increase public awareness of the benefits of EVs.

INNOVATIVE FINANCING SOLUTIONS

The following text boxes showcase examples of financial innovation in Indonesia that are helping mobilize private investments to the renewable energy sector.

CASE STUDY: SDG INDONESIA ONE PLATFORM

Implementor

PT Sarana Multi Infrastruktur (PT SMI) is an Indonesian governmental development finance institution (DFI) whose primary role is to finance infrastructure. Together with the Ministry of Finance, it established the blended finance platform SDG Indonesia One (SIO) in October 2018 as a one-stop shop to develop and finance infrastructure projects that are key to Indonesia's Sustainable Development Goal (SDG) priorities.

Facility Size

USD 3.03 billion in finance commitments from 32 stakeholders. This is made up of: USD 2.4 billion for development; USD 10 million for de-risking; USD 490 for project finance; and USD 191 million for an equity fund.

Key funders for development include bilateral and multilateral financial institutions such as Agence Française de Développement (AFD), USAID, World Bank, Asian Infrastructure Investment Bank, Asian Development Bank, Islamic Development Bank and others. De-risking is funded by AFD and Global Affairs Canada. Project finance is funded by private-sector financiers such as Standard Chartered Bank, United Overseas Bank, Bank Central Asia and European Investment Bank. The equity fund is financed by Engie, China Communications Construction Company and WanaArtha Life, an Indonesian insurance major.

Mechanism

SIO incorporates public and private finance from sovereign donors, philanthropies, commercial financial institutions (including banks) and multilateral DFIs to finance infrastructure projects in Indonesia. Projects are funded across multiple sectors including health, education, renewable energy and urban infrastructure. To date, almost 70 percent of SIO's investments have been in renewable energy projects. The facility operates as an integrated platform that enables it to offer end-to-end financing to project developers. Its scope of operations can be broken down into four distinct pillars: i) a development facility to fund project preparation; ii) a de-risking facility to increase bankability through interest rate subsidies, first-loss mechanisms and cost overrun insurance, iii) a project finance facility, and iv) an equity fund that provides opportunities for private investors to invest in infrastructure projects and strengthen capital capacity for greenfield projects. A special purpose vehicle for capitalizing infrastructure projects is to be set up for equity investments.

Key Takeaways

- **Innovation:** SIO's innovation lies in blending finance from public and private sources to offer end-to-end support to project developers, integrating multiple funding windows under one platform. The development facility is the largest under the SIO platform and is primarily funded through concessional debt and grants. This allows PT SMI to identify projects and deploy capital to prepare a pipeline of projects for investment readiness. This catalytic use of capital together with the de-risking facility helps decrease early-stage project risk, thereby crowding in private-sector investment. For example, during

the development of a mini-hydroelectric power plant, SIO created a first-loss mechanism with France's AFD to cover up to 15 percent of the project loan value, reducing the risk exposure to commercial investors in the early project stages. Beyond addressing principal repayment risk, the platform provides resources earmarked for early-stage, bankable and mature projects, helping leverage public finance to attract commercial capital.

- **Impact:** SIO has supported 15 projects addressing multiple SDGs such as increasing renewable energy capacity through rooftop solar, disaster rehabilitation, waste and water management. As of 2020, SIO-funded energy projects had reduced 5,867 tons of CO2 emissions per year and the facility had financed more than 8 MW of additional renewable energy capacity. SIO's current project pipeline would add at least 700 MW of additional renewable power capacity to Indonesia's grid, leading to a potential emissions reduction of 2.5 million tons of CO2 per year.
- **Scalability:** By supporting Indonesia's renewable energy sector in its relative infancy, SIO is creating an environment in which the private sector, especially commercial banks, can view the sector as an investment opportunity. SIO's support to develop a bankable renewable energy project pipeline through funding and technical assistance, and blending finance to de-risk projects, makes the renewable energy sector more attractive to private capital.

CASE STUDY: GREEN SUKUK

Implementor

Ministry of Finance, Indonesia

Cumulative Issuance Value

USD 3.24 billion

Mechanism

Green sukuk is a financial instrument used to channel funding from investors towards green and sustainable infrastructure projects. A sukuk is an interest-free bond that generates returns through underlying assets that are partially owned by investors. The interest-free nature of the bond makes it compliant with the principles of Islamic law. The Government of Indonesia issued the world's first green sukuk in February 2018 to raise USD 1.25 billion for renewable energy and other environmental projects including water and sanitation. Following subsequent issuances in 2019 and 2020, Indonesia has so far raised a total of USD 3.2 billion through green sukuk issuances, of which USD 2.6 billion was raised globally and USD 490 million in domestic retail markets. Indonesia is currently the fourth largest sukuk market in the world. Under its Green Bond and Green Sukuk Framework — developed in 2017 with the support of HSBC and UNDP — nine economic sectors are eligible to receive the proceeds of a green sukuk bond issue. These include renewable energy, energy efficiency and sustainable transport. The framework has received a positive second opinion review by CICERO, an independent reviewer of green bonds that determines environmental robustness. Each green sukuk issue comprises a near equal split between refinancing existing projects and financing new ones. Renewable energy and energy efficiency projects received a combined 14 percent (~USD 175 million) and 26 percent (~ USD 244 million) of the proceeds from green sukuk issuances in 2018 and 2019, respectively.

Key Takeaways

- **Innovation:** Apart from being a leader in the green sukuk market, Indonesia's issuances demonstrate the appetite for Islamic law-compliant green bonds among institutional and retail investors. For example, in 2019, Indonesia issued a retail green sukuk that was sold to retail investors in the domestic market. It was made available through an online platform, specifically to increase its accessibility to Indonesian youth, who made up more than half of the investor profile of the 2019 retail green sukuk issuance. The green sukuk has therefore enabled diversification of the investor base to include climate-conscious youth and crowded in private finance for sustainable infrastructure projects, including renewable energy, in a manner that is tailored to the Indonesian market.
- **Impact:** With the support of the Indonesian government and DFIs, green sukuk bonds have reduced GHG emissions, electrified homes with renewable energy, and contributed towards Indonesia's SDG targets. According to the Green Sukuk: Allocation and Impact Report 2020, green sukuk proceeds contributed towards building an additional 7.35 GW of renewable energy generation capacity and avoided approximately 2 million tons of GHG emissions.
- **Scalability:** The rapid development of the green sukuk market has offered a sustainable financing model for clean energy project developers to raise long-term debt from a diversified investor base drawn from over 13 countries. The size of Indonesia's green sukuk issuances demonstrate their ability and potential to crowd in private sources of capital to fund Indonesia's sustainable development targets. However, compared to the traditional market, the green bond market is still immature and while green sukuk issuances have raised substantial amounts of capital, there are still critical barriers that must be overcome to support Indonesia's energy transition, including a lack of investor knowledge about the potential benefits of investing in sukuks and a robust, bankable project pipeline.

WAY FORWARD

The following actions by financial institutions can support Indonesia's energy transition:

1

As the 2023 deadline for no new coal-fired power plants approaches, there is a need to expeditiously phase down financing for fossil fuel power plants to avoid stranded asset risk. Both public- and private-sector signals are showing a shift in demand away from fossil fuels. The Indonesian government has announced lowering its coal capacity target to 44.7 GW by 2030. PT PLN has announced that it will not commission new coal-fired power plants after 2023, retire its coal-fired power plants of 1.1 GW by 2030 and replace them with renewable energy-based generation plants. According to the MEMR's net zero by 2060 roadmap, the Ministry will continue retirement of older generation power plants (i.e. subcritical , critical, and partly super-critical coal-fired power plants) in phases between 2031 and 2040. Multiple financial institutions have also pledged to halt coal financing. However, due to current policy support for coal (e.g. license extensions, subsidies, and continued pursuit of coal to achieve the government's 35 GW plan), finance for coal projects remains steady with no decline.

Based on current trends of committed investments, Indonesia is on a path for huge overinvestment in fossil fuels. If fossil fuel energy demand continues to fall in accordance with current trends and estimates, coal-fired power plants are likely to become stranded assets adversely impacting the financial institutions that are financing these projects. Therefore, there is a clear need for commercial financiers to support, invest and lend to initiatives targeting phasing out and/or pulling back from financing new power plants to meet climate targets, as well as re-align their financing activities, lending policies and practices with the goals of the Paris Agreement (see Box 2).

BOX 2

Post COP26 highlights: the Energy Transition Mechanism

At COP26, the Asian Development Bank announced the 'Energy Transition Mechanism (ETM)' initiative to help lower the stranded assets risk in coal power projects in Indonesia and the Phillipines. This initiative aims to connect these countries with global climate change-focused funds and partner with energy and government stakeholders in conducting feasibility studies for various business cases that can help accelerate the energy transition (ADB, 2021). Two funding mechanisms under the initiative are:

- Fund for early retirement or repurposing of 5-7 coal-fired power plants in the two countries on an accelerated timeline; and
- Replace these plants with new clean energy investments in generation, storage, and grid upgrades.

At full scale, the initiative aims to retire 50 percent of existing coal-fired power plants in countries such as Indonesia, the Philippines, Pakistan and Vietnam during the next 10-15 years. In Indonesia, the ETM scheme targets to retire 5.5 GW of coal-fired power plants by 2040, and the Minister of Finance has stated this will require USD 25-30 billion in funding support.

2

Commercial financial institutions should prioritize and increase financing to the renewable energy sector leveraging various financial mechanisms. As renewable energy projects become increasingly viable on a market basis coupled with decreasing demand for fossil fuels, commercial financial institutions - the biggest provider of debt instruments - should aggressively expand their renewable energy portfolios. These approaches include, but are not limited to:

- **Facilitate increased co-financing via syndication among commercial financial institutions to finance large-scale projects.**[16] Particularly, providing syndicated loans for national strategic projects should be guaranteed by the Indonesian government, thus reducing the cost of funds. In addition, this guarantee will increase the ability of national banks to finance renewable energy infrastructure development because this financing is not included in the calculation of the maximum legal lending limit[17]. This, coupled with improved policy and regulatory frameworks, will reduce some of the perceived risks and improve the bankability of renewable energy projects. Also, there is a need for a concerted effort at increasing awareness of domestic commercial banks on new and existing opportunities in the renewable energy sector.
- **Leverage de-risking facilities to lessen project risk and increase private sector participation in renewable projects.** As illustrated in the case study on the SDG Indonesia One Platform, public capital can be critical in unlocking commercial capital. For Indonesia, expanding the role of public financial institutions such as SMI to bridge financing gaps can help lower risk and crowd-in more private investment into the renewable energy sector.
- **Green bonds and sustainability-linked bonds can act as a potential instrument to channel significant volumes of capital into renewable energy.** Green and sustainability-linked bonds have enormous potential to attract additional finance to the sector (as evidenced by the success of Green Sukuk and the recent addition of sustainability-linked bonds issued by local commercial banks), because they: (i) bridge the gap between capital providers and green assets to help raise finance for projects to meet climate targets; (ii) enable investors to achieve sustainability objectives; and (iii) offer the ability to scale up renewable energy projects, as they make greater amounts of finance available, hence making projects more bankable, reducing risk to investors, and boosting confidence.
- Scaling up project preparation facilities to provide visibility on investable projects. Renewable energy projects continue to be perceived as high risk by some local commercial financiers due to inadequate policy frameworks especially relating to the pricing of renewables, and the capacity of project developers to structure bankable projects. Such project preparation facilities can provide technical assistance to project developers, and improve their ability to catalyse long-term debt financing.

3

Commercial financiers should expand their portfolio to include investments in low-carbon infrastructure and emerging technologies to support Indonesia's clean energy transition. A few emerging sectors that could spur a clean energy transition in Indonesia could include increasing investments in the following low-carbon sectors:

- **Renewable energy infrastructure:** To enhance commercialization and attract private capital to develop and scale-up smart grid technology, the government has recently introduced several regulations and initiatives to foster infrastructure investments. This includes developing energy management systems, power reliability through automation, and integration of renewable energy. The 35-GW progamme ("The 35,000 Mega Watt Electricity for Indonesia") presents an opportunity for investments in smart grids from the private sector to improve reliability and create reliability and efficiency at power plants, transmission, and distribution, as well as help to accelerate the electrification process. As demanded by the

[16] Syndication of three international banks, Sumitomo Mitsui Banking Corporation (SMBC), Societe Generale, dan Standard Chartered Bank, to co-finance the development of the biggest floating solar power plant in Southeast Asia, "PLTS Terapung" Cirata, reached financial close in August 2021. Source: See References

[17] As regulated by OJK regulation No. 32/POJK.03/2018 and its amendment by OJK Regulation No. 38/POJK.03/2019, the provision of funds is excluded from the calculation of the legal lending limit if the investment/ projects issued and/or guaranteed by the Government of Indonesia or guaranteed by Central Bank of Indonesia

Indonesia 2020-2024 National Medium-Term Development Plan (RPJMN), the government has included smart grid development in PT PLN's Electricity Supply Business Plan (RUPTL) with a target of developing five smart grids annually until the end of 2024 (MEMR 2021). Investment in mini- and micro-grids can also be considered to increase access, reliability and optimize the energy generation mix in remote rural areas. Tax concessions and an attractive power purchase agreement (PPA) with PT PLN could fast-track infrastructure investment. The government provides a number of tax incentives that can be enjoyed by investors in the renewable energy sector, such as exemption from import duties for renewable energy and reduction of property tax up to 100 percent at the exploration stage for geothermal facilities (MoF 2020). Furthermore, a government decree in 2020 (Regulation 4/2020) is now allowing renewable energy infrastructure projects to be on a "build, own, operate" (BOO) basis, removing difficulties for developers in terms of land ownership and securing project financing.

- **Electric vehicle (EV) and charging infrastructure:** The EV industry is expected to rise significantly due to the introduction of fiscal and non-fiscal incentives, such as the tax exemption, fee discount, and free and/or dedicated parking. This is complemented by PLN's target to build more Public Electric Vehicle Charging Stations (SPKLU) and the introduction of public EV battery exchange stations in November 2020. Government is encouraging private sector participation to accelerate EVs adoption and build charging infrastructure. Given the current investments are still concentrated in raw materials, there are more opportunities for the private sector to invest throughout the entire EV supply chain, such as for EV domestic production/manufacturing. From a financing perspective, Bank Indonesia eased lending rules for the purchase of EVs and on business loans linked to their manufacturing in a bid to boost investment in the sector[18]. Moreover, loans related to the development of infrastructure, such as charging stations, could also be exempted from limits set by OJK[19].
- **Rooftop solar:** The increasing maturity of solar PV technology, familiarity of financiers with solar PV-financing approaches, and large market potential should be seen as an opportunity by financial institutions. In fact, Indonesia's Roadmap towards Net Zero Emissions identified solar PV as having the biggest potential to provide energy generation, with the national energy plan (RUEN) targeting a 23 percent share of solar energy generators in the 2025 energy mix. Further, the government regulation to revise the feed-in tariffs from 85 percent to 100 percent is anticipated to increase demand for residential solar[20] and to support the government's intention to accelerate solar development by targeting a solar capacity of 17.6 GW by 2035. Currently, a few local commercial banks have demonstrated readiness to finance residential rooftop solar by offering a 0 percent loan rate or non-collateral loans with a tenor of up to 12 months, and a three-year loan for rooftop solar installations of up to 5 kWp.[21] Not only individual and residential, adoption of rooftop solar panels on a large scale for industrial uses is also encouraged as it will potentially reduce the weight of government subsidies. The use of rooftop solar power plants in industry will substitute for electricity demand from PLN so that the load of subsidizing industrial customers will also be reduced. Responding to strong industrial market demand, some global commercial banks with presence in Indonesia have introduced solar rooftop financing programmes for business[22]. This could potentially be scaled up nationwide, as more banks are expected to join the trend. In addition, opportunities for the commercial and industrial sectors to adopt solar PV are getting wider with the availability of various solar PV investment schemes such as installments and leases.

[18] Bank Indonesia Regulation No. 23/2/PBI/2021 on relaxation of LTV/FTV and down payment for environmentally-friendly properties and vehicles
[19] OJK Regulation No. 32/POJK.03/2018 on Maximum Limit on Credit Lending and Provision of Large Funds for Commercial Banks as amended by OJK Regulation No. 38/POJK.03/2019
[20] MEMR, Revision to Ministerial Decree No 49/2018 on solar rooftop energy, July 2021
[21] Terms & Conditions of solar rooftop PV lending scheme for residential housing by local commercial banks:
PT Bank Central Asia Tbk: https://www.bca.co.id/en/promo-bca/2021/08/03/01/55/sunterra
PT Bank Mandiri Tbk: https://www.sunterra.id/promo/kartukreditMANDIRI/
[22] U-Solar programme for business by UOB Bank: https://www.uobgroup.com/u-solar-id-en/business.page

4

Financial institutions to assess and report on the impact of climate-related risk on their operations and financing portfolios, and advise their clients on building climate-resilient portfolios. Since the launch of the OJK's Sustainable Finance Roadmap (SFR) Phase I in 2015, much progress has been made on accelerating sustainable finance implementation. In 2018, Indonesia Sustainable Finance Initiative (ISFI) was started with eight banks to channel loans based on the principle of sustainable financing. In 2020, ISFI grew significantly to comprise of 13 commercial banks and one Infrastructure Financing Institution, represent 60 percent of market share. SFR Phase I is followed by the launch of SFR Phase II in 2021 and the first version of Indonesia green taxonomy in January 2022. Financial institutions show a high level of awareness in their role for transitioning to a low-carbon economy, thus climate change is starting to be embedded in their business strategies. However, they put a lot less focus on integrating climate risk into credit assessments, setting specific, measurable and transparent decarbonization targets, and reporting progress to regulators and investors, hence they will increasingly face claims related to disclosures for green financial products, breach-of-contract and fiduciary duties if they continue to finance high-carbon projects (CPI 2021; Deloitte 2021).

The Task Force on Climate-related Financial Disclosures (TCFD) recommends financial institutions to conduct climate stress testing to understand the transition, physical, underwriting, reputational and liability risk of their lending portfolio as well the institutions to which they are exposed. OJK initially responded to this requirement by prioritizing implementation of ESG integration aspects into risk management as basis in planning macro- and micro-prudential policies to manage the climate-related risks to financial stability, as well as to improve the quality of climate-related financial disclosures, in line with the TCFD recommendation (OJK 2021). Particularly, transition risks of fossil fuel financing have the potential to impact borrowers' capacity to generate sufficient income and repay their debt, as well as capital and collateral that back loans, leading to higher probabilities of default and losses given default in the event that financial markets are not able to enact an orderly transition. Climate stress testing can help financial institutions understand the extent of exposure of the risk of stranded assets and reflect on actions that need to be taken to strengthen resilience. Integrating climate-related transition risks, including policy and legal, technology, markets and reputational risks, and mapping opportunities (resource and energy efficiency, new products/services, markets) into credit assessments of their clients, would help them to adequately price carbon risk when lending, advise their clients on strategies to build a climate-resilient portfolio, report to stakeholders on climate-related risks and opportunities based on forward-looking and scenario-based assessments, and enhance reporting transparency (voluntarily or mandatory) for climate-related disclosures. At present, OJK and Central Bank of Indonesia do not cover the mandatory reporting of climate-related risks[23]. Also, there is limited publicly available information on the magnitude of climate risk on the Indonesian financial system to develop appropriate mitigation strategies - an area of potential research for subsequent studies.

[23] Adopting the Basel II Standard, Bank Indonesia identified 8 types of risk profile assessments that must be managed and mandatory reported, namely credit risk, market risk, operational risk, liquidity risk, legal risk, strategic risk, reputation risk and compliance risk.

APPENDIX I:
Methodology for Power Sector Financing

Building on the methodology developed by SEforALL, CPI and the World Bank in the first edition of Energizing Finance: Understanding the Landscape and CPI's Global Landscape of Climate Finance 2019 methodology, the report begins by tracking public and private finance commitments , to any project that enhances energy access to electricity. These commitments include support for capacity-building measures as well as for the development and implementation of policies.

The report considers only collected information that was available at the project level, disregarding aggregate (regional or global), unverifiable figures, and top-down estimates, which may lead to underreporting of total finance. The report tracks commitments according to the following dimensions:

A. TECHNOLOGIES

Electricity technologies tracked in the report include electricity generation technologies and the transmission and distribution network. Specifically, the following technologies are included, as either electricity generating or facilitating the final consumption of electricity:

- Grid-connected electricity-generating assets, including renewable energy (solar PV, wind, small and large hydro, biomass and waste, biofuels, geothermal), and fossil fuels (coal, oil, gas).
- Transmission and distribution networks (including grid extensions and connections).
- Mini-grids including renewable energy assets, fossil fuel assets and hybrid solutions (a mix of renewable and fossil fuel energy).
- Off-grid assets including solar (solar home systems, solar lanterns) and non-solar technologies.
- Energy-efficiency investments that support energy conservation and demand reduction, including building and industry upgrades, smart grids, metering, tariffs, improvements in lighting, appliances and equipment that increase the quality of electricity grids and infrastructure.
- Market support activities, including capacity building, technical assistance and institutional support for energy reforms.

B. SOURCES

Public sector institutions include:

- Multilateral development finance institutions (DFIs) including climate funds and EU institutions, where the institution has multiple shareholder countries.
- Bilateral DFIs, where a single country owns the institution
- National DFIs, including public banks and local public sector providers of debt instruments
- Export credit/promotion agencies
- Government international, refers to bilateral Official Development Assistance (ODA) and Other Official Flows (OOF)
- Government domestic, domestic financing through public budgets carried out by central, state or local governments and their agencies

Private sector institutions include:

- Corporate actors and project developers designing, commissioning, operating and maintaining energy projects, such as private sector utilities and energy companies, independent power producers
- Commercial financial institutions providing private debt capital, such as commercial and investment banks and micro-financial institutions
- Commercial finance, including asset managers and early-stage investors (private equity, impact investors, venture capital and infrastructure funds
- Philanthropic foundations
- Households, i.e. family-level economic entities, high-net-worth individuals and their intermediaries (for example, family offices investing on their behalf)

C. FINANCIAL INSTRUMENTS

The report tracks:

- Grants
- Project-level debt (both concessional and commercial), where debt relies on a project's cash flow for repayment
- Project-level equity, equity investment relying on the project's cash flow for repayment
- Balance sheet financing (i.e. a direct debt or equity investment by a company or finance institution)
- Other instruments like crowdfunding

The report does not track disbursements and policy-induced revenue support mechanisms such as feed-in tariffs, secondary market transactions, or other public subsidies (except in the case studies). Feed-in tariffs, for example, pay back investment costs, so including them would constitute double counting. Similarly, guarantees are only exercised in particular circumstances, and there might never be any outflow from the guarantor. Secondary-market transactions, such as the reselling of stakes, are only tracked if they do not constitute double counting with other areas of the data collection.

APPENDIX II:
List of Data Sources Used to Track Financial Commitments

Source name	Description	Sector relevance	International /Domestic	Additional comments
Organisation for Economic Co-Operation and Development (OECD)	Data on international aid for project and market support from bilateral and multilateral donors, publicly available from the OECD DAC Creditor Reporting System (CRS)	Electricity	International	As information was not directly available, a "key words" search was performed to identify and separate off-grid, smart grid etc.
Bloomberg New Energy Finance (BNEF)	Asset finance database for grid-connected renewable energy Contains data on finance raised by solar companies	Electricity – grid- connected renewable generation (excluding large hydro) and off-grid solar	International and domestic	Main reference for finance for grid connected renewable energy
Climate Policy Initiative	Project-level data from DFIs (MDBs and IDFC members) collected during the Global Landscape of Climate Finance	Electricity	International	Additional data for bilateral and multilateral DFIs that include guarantees, risk mitigation instruments and non-concessional finance not reported in OECD DAC CRS
Climate Funds Update	Additional data on national and multilateral Climate Funds' commitments	Electricity – grid- connected and off-grid renewable generation	International	Complements data on international and domestic public finance for electricity projects
IJGlobal	Energy and infrastructure finance database	Electricity – grid- connected generation (fossil fuel, nuclear and large hydro) and transmission and distribution	International and domestic	Main reference for grid-connected fossil fuel and LNG distribution projects
S&P Global Market Intelligence	Tracks private equity investments in Asia-Pacific and Africa in the Energy and Utilities sectors	Electricity – mini-grids and grid- connected renewable generation	International	Complements mini-grid and grid- connected renewable finance data
Foundation Grant Self-Reporting	Tracks grant funding from philanthropies to energy access	Electricity – mini-grids, off-grid, market support and energy efficiency	International	Complements CPI tracking of foundation finance flows

APPENDIX III:
Methodology for Analysis of Paris Alignment

This brief considers whether Indonesia is on track to meet the goals of the Paris Agreement. The International Energy Agency (IEA) has some country scenarios for the electricity sector. The IEA's first scenario is an estimation of the future level of emissions produced by a country (after estimating the future capacity of various kinds of power plants in the country based on its running policies and expected demand growth, among other things). The second scenario is an assessment of the corresponding temperature that results from that emissions level. However, the IEA has only produced such scenarios for a few key high-impact countries, and Indonesia is not one of them.

As an alternative, this report relies on other references. The Paris Agreement itself implies that the world needs to achieve climate neutrality by mid-century. There have been several scenarios in Indonesia that pertain to a net-zero emission (NZE) pledge. The first one is the Long-Term Strategy for 2050 (LTS 2050), from the Indonesian Ministry of Environment. The strategy includes the Low Carbon Compatible with Paris Agreement (LCCP) target, in which, by considering future power demand growth, the Ministry has envisioned the ideal capacity of various kinds of power plants in Indonesia in 2050 for emissions from Indonesia's future power sector to meet Paris Agreement goals. The second one is the NZE 2060 scenario from the Ministry of Energy and Mineral Resources (MEMR). In general, the MEMR's scenario is more ambitious and the estimates are available in greater granularity (in terms of sectoral and temporal breakdown, plus detailed financing needs) and longer time horizon. Due to this, this brief chooses to focus on the MEMR scenario, where comparison to LTS is made only occasionally.

This brief compares the (current) business-as-usual (BAU) trend of renewable generation capacity additions (and their investment), as recorded in the historical data, versus the (future) ideal trend of renewable generation capacity additions (and their investment) to meet the Paris Agreement goals, as stipulated in the MEMR scenario.

There follows a three-step analysis:

1. **Analysis using tracked finance data and current installed capacity trends.** A linear conservative assumption is used to make projections based on historical data, where the future trend mimics the historical trend. For instance, how much the solar power capacity in Indonesia will grow annually in the future is assumed to be the same as how much it did annually in the past. Additionally, how much annual investment in solar power plants in Indonesia there will be in the future is assumed to be the same as how much it averaged annually in the past.
2. **Analysis of the MEMR's NZE 2060 scenario.** By comparing the current installed capacity of every renewable form of energy with its ideal capacity in 2060, this brief derives the ideal capacity addition annually. The MEMR also already estimates the cumulative financing needs until 2060 for every power plant type (including fossil ones), from which this brief derives their ideal annual investment.
3. **Comparing the above two analyses, the brief then derives how significant the gap is (both technically and financially) and reflects on how (mis)aligned Indonesia is with Paris Agreement goals.** Generally, there is minimum estimate on the ideal investment on transmission and distribution. There is also minimum estimate on the future ideal proportion of on-grid versus off-grid power plants. Commonly, any reference would only qualitatively remark on the aspiration to create a "smarter" grid for renewable energy integration and more off-grid power plants. This brief would benefit from the IEA widening the scope of its country scenarios to other countries, including Indonesia.

APPENDIX IV:
Key supporting policies and regulation for renewable energy finance

Policies/ Regulation	Incentives
Law no.11/2020 on Job Creation	The key terms that provide a positive impact on green investment include: • Simplification of investment requirements; risk-based approach to business licensing • Mandatory local content requirements for power generation businesses; supporting local environment-friendly innovation capacity • No requirement on geothermal production royalty; this will also support the government's roadmap of geothermal power development to increase geothermal capacity from 2.1 GW in 2019 to 7.9 GW in 2030

Draft of the Presidential Regulation on new and renewable energy bill	Part of the government's effort to drive renewable energy generation includes fiscal and non-fiscal incentives for renewable energy generators
	The key terms that provide a positive impact on green investment, include:
	• Local content requirements; centralization of authority for procurement; state-owned electricity company requirement to purchase the power generated
	• Renewable energy feed-in tariff, subsidy/compensation, fiscal/non-fiscal incentives, blended biofuel pricing, renewable energy fund
	  • Renewable energy tariffs, including solar energy, are set as below:
	  • the feed-in tariff is used for small utility-scale solar with the capacity of ≤ 5 MW, and
	  • competitive bidding is designated for medium-to-large utility-scale solar (> 5 MW)

Ministry of Energy and Mineral Resources Regulation 4/2020 on renewable power generation	Provide better terms for renewable power generation, with the aim of enhancing project bankability and boosting renewable penetration in Indonesia • the replacement of the build, own, transfer (BOT) scheme, with a build, own, operate (BOO) scheme that is more attractive for project developers • the possibility for the state-owned electricity company to procure electricity from all renewable energy power plants regardless of their capacity through direct appointment • a mandate for the state-owned electricity company to buy electricity produced from irrigation canals-type hydropower plants • a mandatory purchase of waste-to-energy power plants in certain cities

Ministry of Energy and Resources Decree No 50/2017 on Utilization of Renewable Energy Resources for Electricity Supply	If the project is located in an area where the regional PLN's generation production cost (BPP) is greater than the national average BPP, then the maximum negotiated price (the feed-in tariff) is 85% of the regional BPP, depending on the technology.
Revision to Ministry of Energy and Resources Decree No 49/2018 on solar rooftop energy, July 2021	The updated regulation has revised the feed-in tariffs from 65% to 100% and will provide a better restart period which was previously every 3 to 6 months This supports the Government's intention to accelerate solar development by targeting solar capacity of 17.6 GW by 2035
Presidential Regulation No. 55/2019 on the umbrella regulation for electric vehicles	Introduction of incentive scheme: exemptions of luxury tax and vehicle title transfer fee in some cities
Ministry of Home Affairs Regulation No.8/ 2020 on EV tax	This set basic calculations and caps for an EV Vehicle Tax and Vehicle Transfer Fee in 2020
Ministry of Energy and Mineral Resources Regulation No. 13/2020 on EV incentive and tariff	The key terms include: • business and incentives schemes • electricity tariff policy for charging and public transport operators • standardization of charging plugs
Governor of Jakarta Regulation No 3/ 2020 on EV title transfer fee	Exemption of vehicle title transfer fee for battery EVs until 31 December 2024 in Jakarta
Government Regulation no.70/ 2009 on Energy Conservation	Mandatory energy management implementation for energy users up to 6,000 TOE (ton oil equivalent) and above per year

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