

Using Public Funding to Attract Private Investment in Renewable Energy in Indonesia

Murtiani Hendriwardani, Anna Geddes,
Theresia Betty Sumarno, Laura Hohenberger¹

February 2022

Executive Summary

Indonesia faces a very important year ahead in terms of economic recovery and energy transition. In economic terms, despite regaining a positive GDP growth in 2021, Indonesia's budget deficit is still very high compared to pre-COVID-19. In terms of the energy transition, the time left to prepare to meet the country's new and renewable energy target of 23% by 2025 is shortening. In addition, in 2022 Indonesia will hold the presidency of the G20—which in its latest communiqué emphasized the importance of supporting sustainable recovery and energy transition strategies to align with the Paris Agreement, as well as the importance of mobilizing international public and private finance to support green, inclusive, and sustainable energy development (G20, 2021).

As the next G20 president, Indonesia has an important role to play in ensuring that the objectives of sustainable recovery and clean energy transition are achieved. Sustainable energy transition is a priority issue for the Indonesia G20 presidency (Bloomberg, 2021; Ministry of Communication and Informatics, 2021), and Indonesia recognizes the need for public and private financing to accelerate the development of renewable energy and the transition away from fossil fuels (26th Conference of the Parties [COP 26] to the United Nations Framework Convention on Climate Change [UNFCCC], 2021; Global Energy Alliance for People and Planet [GEAPP], 2021a). This transition is also key to Indonesia's ability to meet its renewable energy and net-zero emissions targets.

¹ The authors would like to thank the following individuals for the valuable comments and recommendations that they provided as peer reviewers: Philip Gass, Lucile Dufour, and Chris Beaton of IISD, as well as Putra Adhiguna of the Institute for Energy Economics and Financial Analysis.



By leveraging public funding in the form of fiscal incentives, budget transfers, and capital injections to attract private investment in new and renewable energy, Indonesia can also send positive signals. This brief explores several measures that have been put in place, such as the creation and promotion of public financial institutions (PFIs) dealing with specialized infrastructure, the issuance of Green Sukuk and green bonds as innovative financing mechanisms to stimulate investment in renewables, and the expanded role of state-owned enterprises (SOEs, particularly the national electricity company and the national oil and gas company) in promoting renewable energy. The brief also discusses other feasible measures, particularly international and multilateral financing, and offers some recommendations for the Government of Indonesia (GoI) to consider in further leveraging public finance to promote private investment in renewable energy.

1.0 Introduction

Indonesia's commitment to meet its renewable energy target was confirmed in the submission of the Nationally Determined Contribution (NDC) to the COP 26 in July 2021, and the release of the latest 10-Year Plan (RUPTL—Rencana Usaha Penyediaan Tenaga Listrik) of PT Perusahaan Listrik Negara (PLN) (also known as Persero), the national electricity company, in October. Indonesia's latest NDC maintained the previous target of 23% new and renewable energy in the primary energy mix by 2025 (UNFCCC, n.d.), and the country also aims to achieve its net-zero target by 2060. Meanwhile, the optimal scenario in the updated RUPTL (2021–2030) aims to achieve 24% share of renewable energy by 2030, and this optimal scenario is aligned with what has been stipulated in the updated NDC (PT PLN, 2021).

Nonetheless, renewable energy development in Indonesia has been slow and lags behind targets, and a substantial amount of both public and private investment will be needed to meet these targets. The sluggish growth of renewable energy in Indonesia can be attributed to several roadblocks, including weak pricing structure, fragmented policies and regulations, as well as various structural and institutional challenges. Rapid action is needed to incentivize private investments and reverse the current trend, considering also that supporting renewable energy development can significantly contribute to post-COVID-19 recovery and green transition. The international community plays a vital role in promoting renewable energy development in Indonesia, and in the context of post-COVID-19 recovery support, international financing from bilateral and multilateral donors can be combined or blended with public funding from the state budget (APBN) to further catalyze private investment.

Following the G20 Rome Declaration (G20, 2021), several initiatives to accelerate energy transition and renewable energy development in Indonesia have been initiated, such as the Accelerating Coal Transition Program with the Climate Investment Funds (Climate Investment Funds, 2021), an agreement with the International Renewable Energy Agency (IRENA) on an energy transition roadmap, and the facilitation of dialogues with financing partners (IRENA, 2021). These international initiatives represent a significant move forward to further accelerate renewable energy deployment in Indonesia.



This policy brief is part of the series *Achieving a Fossil-Free Recovery*, which recommends five principles² that the Indonesian government can undertake to achieve economic recovery after COVID-19 through the state budget (APBN), while at the same time realizing its NDC and net-zero target. This brief focuses on how Indonesia can utilize its state budget to leverage private investment in renewables while supporting economic recovery. It first looks at the current level of investment in renewable energy, then the status of renewable energy development and the existing support mechanisms, followed by how Indonesia can incentivize private investment in renewable energy by leveraging public finance, and finally makes conclusions and recommendations.

2.0 Current Energy Investment in Indonesia

Renewable energy deployment in Indonesia has been lagging behind the targets, and the value of investment in renewables has been insufficient. While fossil fuels still command the largest share of the overall investment in energy, investment in renewables is still directed more toward geothermal rather than other renewable sources. More investment is needed if Indonesia is to achieve the established NDC target of a 23% share of new and renewable energy by 2025. Several roadblocks also need to be addressed to unlock the investment potential of renewables, particularly for private investment (see Section 3).

Renewable energy to date represents a capacity of 10.5 GW (11.2%), which is around half of the 23% target. If Indonesia is to meet this target by 2025, a significant capacity increase is needed (Danish Energy Agency & Ministry of Energy and Mineral Resources [MEMR], 2021), requiring USD 37 billion (IDR 533 trillion) of additional investment (Pribadi, 2019).

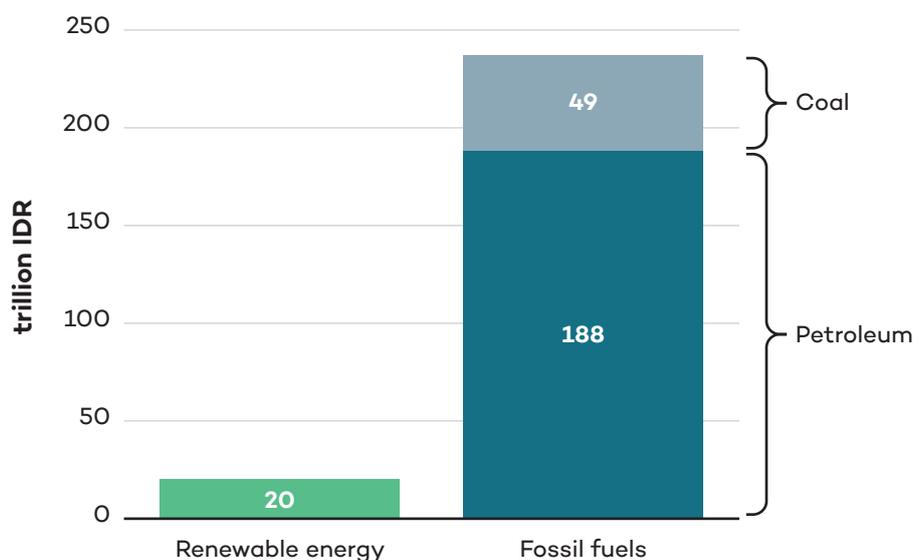
In 2020, fossil fuels still attracted the largest share of investment (around 65%) in the energy sector. The renewable energy investment in Indonesia includes investment made by PT PLN, Independent Power Producers (IPPs), and other developers. In 2020, these investors made IDR 20 trillion (USD 1.4 billion) investment in renewable power, representing 7.8% of the total investment in the energy sector, which is significantly lower compared to the investment in fossil fuels, at IDR 237 trillion (USD 16.5 billion)³ (Figure 1).

² The five principles are 1. Do not provide public money to fossil-fuel production; 2. Raise money from fossil-fuel subsidy reform and taxes; 3. Swap support from fossil fuels to clean energy; 4. Incentivize investments in clean electricity; 5. Ensure the transition is a just one (Sanchez et al., 2021). More information can be found here: <https://www.iisd.org/projects/fossil-free-recovery>.

³ The exchange rate used in this brief is IDR 14,400/USD, based on the official exchange rate in the Indonesian State Budget (APBN) 2020 (Ministry of Finance [MoF], 2021).



Figure 1. Investment in renewable power and fossil fuels in Indonesia, 2020



Notes: Renewable energy includes biomass, biofuel, geothermal, solar photovoltaics (PV), wind power, and hydropower. Petroleum includes oil and gas, both upstream and downstream activities (MEMR, 2021b).

The value for coal investment is based on the latest data for extraction activities (2019) (Central Bureau of Statistics Indonesia, n.d.) Coal represents 88% of total extraction, and this percentage is used as a proxy to estimate the investment for 2020, as per MEMR 2020 investment data (MEMR, 2021b).

Source: MEMR (2021b); authors' analysis.

The current level of investment in new and renewable energy is below target and, according to the latest estimate, insufficient to meet the 23% renewable energy target. The average annual investment target for renewables, which is set by the MEMR, is IDR 30.4 trillion or USD 2.1 billion. So far, the GoI has been investing an average of 23 IDR trillion or USD 1.6 billion annually (MEMR, 2015, 2016, 2017, 2018, 2019, 2020, 2021b). A recent estimate suggests that by the end of 2021, investment in renewables will only reach IDR 21 trillion (USD 1.44 billion) or 71% of the established annual target (Uly, 2021).

An additional investment of IDR 533 trillion (USD 37 billion) is needed to achieve the 23% target for new and renewable energy by 2025 (Pribadi, 2019), which means that the current investment target set by the MEMR needs to be significantly increased. If Indonesia were to continue at the current annual investment trajectory of USD 2 billion, in four years the country would only have achieved USD 8 billion, a difference of USD 29 billion from what is required. There is an urgent need to fill such an investment gap, and this is where the private sector can play a critical role in accelerating the development and growth of new and renewable energy in the country.

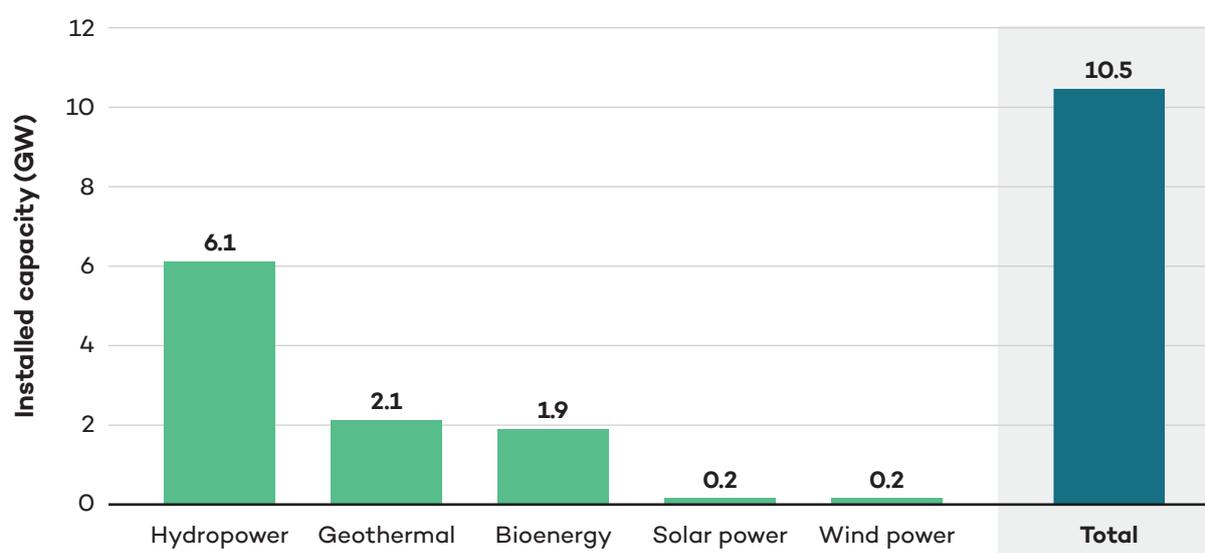
The GoI is in the position to further attract private investment in renewable energy. By increasing the current level of investment, adjusting the existing support mechanisms, and implementing a more effective set of instruments, the GoI can improve the renewable energy investment landscape, thereby incentivizing private investment. Section 4 will explore these options in further detail.



3.0 Renewable Energy Development: Status update

Several programs and initiatives have been put in place (see Section 3.1) to reach the renewable energy target of 23% of renewable energy share by 2025 (MEMR, 2021a). In spite of these initiatives, Indonesia has only achieved an 11.2% share of renewables out of the total energy mix in 2020, which is equivalent to 10.5 GW installed capacity (see Figure 2). The renewable energy growth in the past few years has been slow, growing at an increment of 1.7 GW (19.3%) since 2016, when total installed capacity was 8.8 GW (MEMR, 2021a; Warta, 2017).

Figure 2. Renewable energy installed capacity in 2020 (MW)



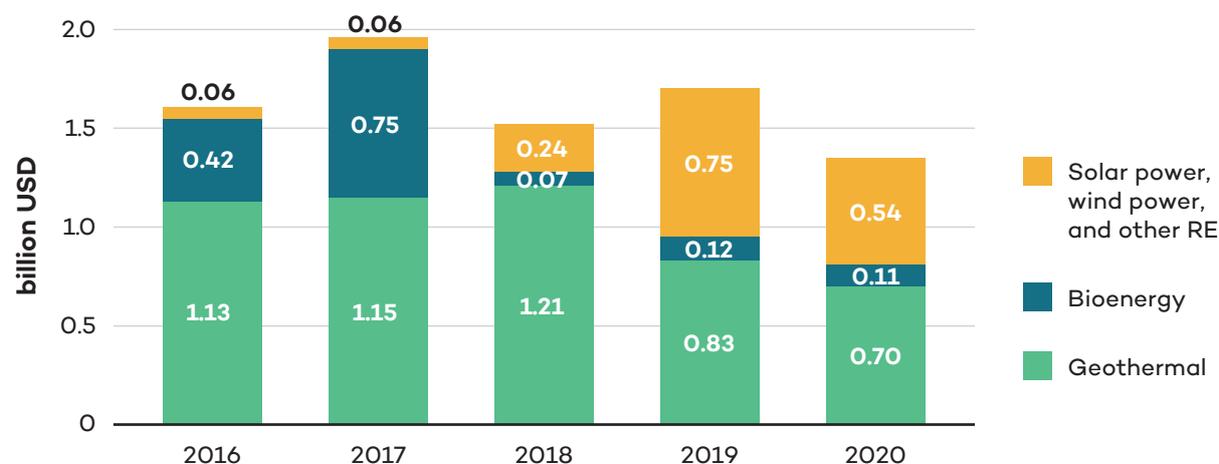
Source: MEMR (2021a); authors' assessment.

Solar and wind represent the renewable sources with the largest and third largest potential capacity, at 207.8 GW and 60.6 GW, respectively (Mulyana, 2018). Nonetheless, installed capacity for solar PV and wind sits at 0.154 GW for each, lowest amongst all renewable sources (Directorate General of New and Renewable Energy, 2021).

While geothermal energy has historically attracted the majority of the investment in renewables, the enactment of the MEMR Regulation No. 50 in 2017, as well as the strong role the Directorate General of New and Renewable Energy plays in working with stakeholders, particularly PT PLN, has contributed to increased investment in solar PV, wind, and hydropower from 2018 to 2020 (Figure 3). MEMR Regulation 50/2017 was enacted to accelerate the development of renewables by IPPs and to require PT PLN to purchase electricity from these IPPs (Draps et al., 2020). In addition to the changes in the regulatory and institutional framework for renewables, the GoI has also provided fiscal incentives to developers in the form of tax exemptions, import duty exemptions, and tax holidays (Directorate General of New and Renewable Energy, 2020).



Figure 3. Total renewable energy investment, 2016–2020



Notes: Bioenergy includes biomass (biofuel) power plants, biogas power plants, and waste power plants.⁴
Source: MEMR (2021b); authors' assessment.

The potential for renewable energy in Indonesia is enormous, including for renewable sources other than geothermal. However, due to several roadblocks that still need to be resolved, the growth of renewable energy in the country has been hindered. The major roadblocks in particular have been identified as the following:

1. Pricing and Tariff Structure

The prevailing pricing and tariff structure for electricity, regardless of energy source, is not cost-reflective and varies considerably from region to region. Although the national average price reference is set at IDR 1,334/ kWh (Al Faqir, 2021), current regulation stipulates a cap on the price that renewable energy IPPs and developers can charge, which cannot be more than 85% of local PLN's cost of generating electricity – BPP (which is mostly sourced from fossil fuels [Al Faqir, 2021]).⁵ Such a pricing structure does not reflect the real cost of renewable energy, and this is not favourable, as developers and IPPs are not able to generate a profit much less recover their investment (Indonesian Renewable Energy Society [METI-IRES], personal communication, 2021). Furthermore, the government continues to subsidize and incentivize fossil-fuel extraction and use for power generation (Setiawan, 2021). This policy is detrimental to the growth of renewables and the creation of a renewable energy industry. The GoI is now formulating a new regulation on a feed-in tariff, but at the time of this writing, little is known of the level of this tariff or when it will be enacted.

2. Regulatory Framework

The policies and regulations governing renewable energy are fragmented and changing (Bridle et al., 2018). In addition to the insufficient pricing indicated in the previous

⁴ Biofuel is considered renewable energy by the Government of Indonesia.

⁵ According to MEMR 50/2017: (i) when the local BPP is higher than the national average BPP, a maximum purchase price is set at 85% of the local BPP, except for hydro, Waste-to-Energy (WTE), and geothermal plants that allow the maximum tariff to be set up to the level of the local BPP, and (ii) when the local BPP is equal to or lower than the national BPP, the purchase price is agreed between the PLN and IPP.



section, in the past few years there has been little specificity or clarity in the rules for funding and investing in renewable energy sources, which has had a discouraging impact on investment.

3. **Investment Risk and Project “Bankability”**

Complexity and difficulty in obtaining domestic debt for renewable energy projects (Dutt et al., 2019; Lestari, 2021; MEMR, 2021b) have rendered renewable energy development in Indonesia to be high-risk. This eventually leads to a high interest rate on short-term loans, which only further deters renewables investors, developers, and IPPs (Intan, 2021). The investment risk, combined with the inconsistent policies and unfavourable pricing structure, has deterred investors because they consider renewable energy projects in Indonesia to be not financially viable (Bechauf, 2021). Hence, the upscaling of renewable energy in the country has been obstructed by the lack of bankable projects (Bechauf, 2021).

4. **Lack of Transparency**

There is a prevailing lack of transparency and data accuracy on financial flows, sources, and allocation of public funding (Lestari, 2021; MEMR, 2021b), as well as on rationales for certain initiatives (e.g., termination of DAK Small-Scale Energy—see Section 3.1) for renewable energy projects in Indonesia (National Energy Council [DEN], 2020). This is detrimental to the development of renewable energy both at the regional and national level, but also it can negatively impact investment and investor confidence (Organisation for Economic Co-operation and Development [OECD], 2021).

5. **Institutional Considerations**

There is a conflict of interest with respect to the state-owned national electricity company, PT PLN, which dominates the electricity sector in terms of asset ownership and investment. PT PLN has a de facto monopoly over the generation, transmission, sale, and distribution of electricity in the country (Draps et al., 2020), owning and operating the majority of the fossil fuel-based power generation, and has an interest in maintaining its control (Bridle et al., 2018).

Some of these challenges are being addressed, and the GoI has put in place several measures to support the development of renewable energy and stimulate its growth. Section 3.1 highlights several support measures that have been implemented.

3.1 Renewable Energy Development Support

Over the past few years, the GoI has set several policies to support and accelerate the development and growth of renewable energy in the country. The types of support given for the development of renewable energy have been in the form of fiscal incentives (see Table 1), non-fiscal incentives, and direct budget transfers to dedicated renewable energy programs, both at the national and regional levels. The GoI also directed some support to renewable energy development as part of its initial COVID-19 recovery package (see Text Box 1).

**Table 1.** Summary of tax incentives to support renewable energy in Indonesia

Tax instruments	Description
Tax holiday	100% discount on Corporate Income Tax (CIT) for up to 20 years depending on investment value (for 17 pioneer industries, including renewable energy sector)
Tax allowance	Applied to renewable energy power plants, geothermal businesses, and bioenergy industries. This allowance includes CIT reduction and suspension and elimination of VAT for various renewable energy projects.
Tax exemptions	VAT, CIT, and import tax exemption on imported goods for geothermal and other renewable energy projects
Accelerated depreciation and amortization	Accelerated depreciation and amortization on assets and goodwill for initial capital investment of renewable energy projects
Credit facilities	Various credit facilities for small to large renewable energy projects
Land tax	Land tax reduction up to 100% for geothermal exploration stage

Source: Ministry of Finance (MoF) (2021c); authors' adaptation.

Box 1. Support for renewable energy as part of COVID-19 budget

In light of COVID-19, the GoI is providing some fiscal incentives for all economic sectors, including renewable energy. Defined under the initial COVID-19 Recovery Package, these incentives include the following:

1. Suspension and elimination of VAT and Income Tax for various renewable energy projects until the end of 2021. While the rate of the VAT is 10% for most products and services, the CIT was 25% between 2010 and 2019. The CIT is reduced to 22% for 2020 and 2021, and will be further reduced to 20% starting in 2022 (MoF, 2021c).
2. Reduced interest rates for renewable energy projects. The MEMR has acknowledged the significant impact of COVID-19 by issuing a range of policies to counter these negative effects. They are now focusing on several incentives and concessions on the renewable energy business in the COVID-19 affected areas (Energy Policy Tracker, n.d.)

While the fiscal incentives provided have been mainly in the form of tax deductions and exemptions (see Table 1), the GoI has put in place several other mechanisms for accelerating renewable energy project development in the country through direct budgetary transfers or through public finance. Three of these mechanisms are of particular relevance to attracting private investment: 1) DAK Small-Scale Energy (DAK Energi Skala Kecil); 2) Green Sukuk; and 3) PFIs and SOEs for renewable energy.



DAK SMALL-SCALE ENERGY

Established in 2011, DAK Small-Scale Energy is a dedicated renewable energy fund through which the GoI allocates direct transfers from the state budget (APBN) to the regional governments to finance renewable energy projects. This small-scale energy component is part of the broader DAK–Dana Alokasi Khusus allocation.⁶ The objective of the dedicated small-scale energy portion is to improve energy access and encourage the development of renewable energy in the regions through the deployment of solar PV, hydropower, and household use of biogas/biodiesel.

Despite the relevance of the program, the amount dedicated to energy development has been small compared to the overall DAK budget. The total budget for the DAK Small-Scale Energy from 2011–2018 was IDR 3.42 trillion (USD 237 million), which was 0.9% of the total DAK, while the total DAK from 2011–2018 was IDR 373.14 trillion.

DAK Small-Scale Energy ended in 2019, and it remains unclear why it was terminated. Some regions have attributed the slow progress of regional renewables development to the termination of DAK Small-Scale Energy (National Energy Council [DEN], 2020), illustrating the need for the GoI to review the funding measures and introduce an alternative mechanism that can more effectively allocate public funds for regional small-scale renewable energy projects. One of the ways the GoI can do so is by, for example, using the special allocation fund to create a joint venture with IPPs and private sector players (Sitorus et al., 2018), thereby de-risking the investment and making the project more bankable or financially viable.

GREEN SUKUK

In March 2018, the GoI issued the world's first sovereign green Islamic bond or Green Sukuk exclusively targeted to fund climate change mitigation and adaptation. Since 2018, the MoF has made four annual issuances, the last of which was issued in June 2021 (Kristianus, 2021).

The MoF is responsible for managing the proceeds from the Green Sukuk and allocates them to eligible projects, which includes renewable energy and energy conservation. The proceeds are credited directly to the respective line ministries, such as the MEMR, Ministry of Transportation, and Ministry of Industry (MoF, 2020). Up to 2020, IDR 43.71 trillion (USD 3.24 billion) has been raised, but only 5% of it was assigned for renewable energy development projects,⁷ mainly in 2018 and in 2019 (MoF, 2021a).

These eligible projects include new and renewable energy infrastructure development, with a focus on areas that are out of the PLN electricity coverage. In other words, the projects are intended to improve the electrification ratio in off-grid areas across the country using energy generated mainly from solar and biogas (MoF, 2021b). All of the renewable energy projects funded by the Green Sukuk are owned by the MEMR, including the development of 121 renewable energy facilities and infrastructure, such as solar and micro-hydro power plants to provide off-grid electricity in the remote regions of the country (MoF, 2021a, 2021b).

⁶ The DAK–Dana Alokasi Khusus is a specific allocation fund from the national government to regional governments for the purpose of reducing inequalities in public services. DAK-recipient sectors have included the health sector, sanitation, energy efficiency, and road infrastructure.

⁷ No additional information is available at this time on the criteria for project selection and funding.



PUBLIC FINANCIAL INSTITUTIONS AND SOES FOR RENEWABLE ENERGY

To catalyze and enable renewable energy project development and project financing, the GoI has established PFIs (see Text Box 2) and government-related entities, in addition to their legacy energy SOE counterparts (see Section 4)—namely PT PLN, the national electricity company, and PT Pertamina, the national oil and gas company. Together, they represent how the GoI can use targeted instruments to further incentivize and accelerate private investment (see Section 4 for additional measures). Table 2 summarizes the characteristics of these institutions.

Box 2. The special nature of Indonesian PFIs

Because of their particular definition and classification, PFIs are quite unique in the context of Indonesia. On one hand, these entities have been created as SOEs, as defined in the respective regulations that have established them, but on the other hand, they function and operate as PFIs, providing, channelling, and managing public funding from either the state budget or capital injections (Penyertaan Modal Negara [PMN]), while also mobilizing private investment for infrastructure development projects in the country. They are also considered as PFIs because they were initiated by the GoI to fulfill specific public policy objectives (i.e., the development of and transition to new and renewable energy), and they are used as policy instruments to address the aforementioned roadblocks, stimulate investment in renewables, and bring about structural transformation for renewables (Xu et al., 2021). Furthermore, these entities do fit into the established criteria of PFIs, having the following qualifications (Xu et al., 2020):

1. Being a standalone entity with a separate legal personality, its own staff, its own financial account, and long-term objectives
2. Using “fund-reflow-seeking” instruments as main products, offering long-term financing, equity investment, refinancing, and guarantees
3. Funding sources that go beyond periodic budget transfers, receiving PMN from the GoI, grants, and concessionary loans from international and multilateral funders
4. Having a proactive public policy orientation
5. Having the national government steering their corporate strategy.

In the case of PT IIF, it is an SOE that identifies itself as a “private national company” that provides infrastructure financing and advisory services (PT Indonesia Infrastructure Finance, n.d.). At the same time, PT IIF and PT SMI have been recognized as SOEs that support infrastructure investments (Bechauf, 2021), as well as PFIs by others (Xu et al., 2021). One thing is clear, PT IIF and PT SMI, along with the other infrastructure PFIs, are not special-purpose vehicles, though they can facilitate the creation of a special-purpose vehicle. In the context of Indonesia, these entities function as fund managers, investors, and/or project developers.

By their design and function, these infrastructure PFIs and SOEs are also distinct from the legacy energy SOEs, PT PLN, and PT Pertamina (see Section 4). They all play a very important role in promoting and accelerating renewable energy in Indonesia, but unlike the infrastructure PFIs and SOEs, the legacy energy SOEs have operational and investment roles in the generation, transmission, and distribution of energy.



Formed relatively recently (post-2000), Indonesia's PFIs include 1) Indonesia Investment Authority (INA); 2) Indonesia Infrastructure Guarantee Fund (PT IIGF); 3) PT Sarana Multi Infrastruktur (PT SMI); and 4) PT Indonesia Infrastructure Finance (PT IIF).

Table 2. PFIs and SOEs for renewable energy in Indonesia

PFI/SOE	Gol ownership	Sector	Renewable energy source
Long-established legacy entities			
PT Perusahaan Listrik Negara	100%	Electricity	Hydro Geothermal Solar
PT Pertamina	100%	Oil and gas	Biogas Geothermal Solar
Recently established—post-2000 entities			
PT INA	100%	Multiple infrastructure	
PT IGF	100%	Multiple infrastructure	Hydropower Geothermal
PT SMI	100%	Multiple infrastructure	Biomass Hydro Geothermal Wind
PT IIF	30%	Multiple infrastructure	Biomass Hydro Geothermal Solar
Other entities/subsidiaries			
PT Pertamina Power & New Renewable Energy (NRE)	100%	Renewable energy	Biogas Solar
PT Pertamina Geothermal Energy	100%	Renewable energy	Geothermal
PT PLN Gas & Geothermal	100%	Renewable energy	Geothermal
PT GeoDipa	100%	Renewable energy	Geothermal

Source: PT INA, n.d.; PT IIGF, n.d.; PT SMI, n.d.; Pertamina, n.d.; PT PLN, 2020; PT Geo Dipa Energi, n.d.; Indonesian Geothermal Association, n.d.; authors' assessment.



INA

Perhaps the youngest but one of the most important PFIs in the Indonesian renewable energy sector is the recently established sovereign wealth fund, INA, which was officially launched in February 2021 to narrow the financing gap in infrastructure development projects in the country (Cabinet Secretariat of the Republic of Indonesia, 2021), and to encourage foreign investors deterred by Indonesia's legal complexity and uncertainty (Siregar, 2021). With an initial capital commitment from the GoI in the amount of IDR 77.8 trillion (USD 5.4 billion), of which USD 1 billion was allocated from the 2020 state budget (APBN) (Habir, 2021; INA, n.d.; Siregar, 2021), INA funds infrastructure projects, including new and renewable energy, and also diversifies the national investment portfolio into new asset classes (INA, n.d.; Siregar, 2021; International Forum of Sovereign Wealth Funds, n.d.). Having the authority to lend and borrow (The National, 2021), INA invests in a range of key sectors through two mechanisms: 1) Master Fund for growth and mature assets with strong development focus; and 2) Thematic Funds and Platforms in select industries of strategic national importance (INA, n.d.; International Forum of Sovereign Wealth Funds, n.d.).

In addition to loans, investments under INA's management can also come in the form of equity or shares, with the GoI targeting a maximum dividend of 30% annually, a modest return compared to standard SOE dividends that averaged between 20% and 45% pre-COVID-19 pandemic (Siregar, 2021). So far, the largest foreign investor is the United Arab Emirates (UAE) Government, with over USD 20 billion invested in INA through the Abu Dhabi Investment Authority (Siregar, 2021; The National, 2021; Velezmoro, 2021).

In 2021, the INA received another IDR 60 trillion or USD 4.18 billion, of which IDR 15 trillion (USD 1.05 billion) was a state capital injection (PMN) from the 2021 state budget, and IDR 45 trillion (USD 3.16 billion) in equity from two of Indonesia's largest banks, Bank Mandiri and Bank Rakyat Indonesia (Harsono, 2021; Pinsent Masons, 2021).

PT IIGF

Created in December 2009, the IIGF is the primary institution that provides a guarantee to all public-private partnerships (PPPs) for infrastructure projects, thereby improving their creditworthiness and quality. Since its inception, the IIGF has provided guarantees to 33 projects across six sectors, including renewable energy, which falls under the electricity sector (PT IIGF, 2021). Out of six electricity projects, only two are renewable energy projects (PT IIGF, 2021):

1. Hydropower Program to increase the electrification ratio in the remote regions of Central and Eastern Indonesia (Kalimantan, Sulawesi, and Papua). PT PLN is the guarantee debtor.
2. Geothermal Project to construct the second unit of the Dieng Geothermal Power Plant with funding from the Asian Development Bank (ADB). PT GeoDipa is the guarantee debtor. PT GeoDipa is a geothermal SOE that operates two of Indonesia's 11 geothermal power plants already in production (Darma et al., 2021; Indonesian Geothermal Association, n.d.; Richter, 2020).



The relatively small proportion of renewable energy projects vis-à-vis other electricity projects only highlights both the potential for further renewables development and the barriers that still need to be addressed.

PT SMI

PT SMI is a multi-infrastructure SOE/PFI (see Text Box 2) and non-bank financial institution formed in 2009 by the Indonesian MoF to support the development of infrastructure projects, including renewable energy and energy conservation, through PPPs and project financing mechanisms. In addition to project development, PT SMI is also responsible for managing investment and funding (grants and loans) from the GoI, international donor agencies, multilateral and bilateral development banks, as well as other private and institutional foundations, including the ADB, the International Finance Corporation (IFC), the German KfW, Bloomberg Philanthropies, and the Climate Works Foundation (PT SMI, 2021). National funding for PT SMI is allocated through the state budget in the form of state capital equity (PMN) (Deasy et al., 2020).

Although geothermal energy represents the largest portion of its financing portfolio, estimated at over USD 560 million, or 71% of a total received USD 792.4 million (RSM, 2021), since its inception, PT SMI has financed at least 10 other renewable energy projects, representing more than 500 MW of installed capacity and USD 225 million in total financing commitment (PT SMI, 2021).

In 2016, PT SMI became the first accredited Green Climate Fund entity in South-East Asia, with a funding portfolio that includes energy generation and access, and in the same year it established a dedicated Sustainable Finance Division to focus on the financing of renewable energy projects (PT SMI, 2021). As an accredited agency for the Green Climate Fund, PT SMI can mobilize international financing for sustainable infrastructure (Bechauf, 2021), and in July 2018, PT SMI issued USD 207 million worth of green bonds, becoming the first company in Indonesia to issue green bonds on the capital market in the local currency (PT SMI, n.d.; World Bank, 2018). This green bond program was created to finance green projects that include renewable energy and energy efficiency, with fossil fuel projects explicitly excluded from the eligible project categories (World Bank, 2018). PT SMI's corporate green bond was launched just after the issuance of the first Green Sukuk by the MoF in March 2018 (MoF, 2021a).

Also in 2018 PT SMI and the MoF initiated the SDG Indonesia One (SIO), a blended finance platform designed to fund projects related to sustainable development goals (SDG). The SIO Platform is managed by PT SMI, with funding contributions from international donors (e.g., AFD, KfW, and the Swiss International Development Agency); multilateral funders (e.g., the United Nations Development Programme, the World Bank), as well as private investors, such as commercial banks (e.g., Standard Chartered), institutional investors (e.g., European Investment Bank), and developers (e.g., ENGIE) (PT SMI, 2020). Since its inception, the SIO Platform has raised over IDR 47.5 trillion or USD 3.3 billion (Rahardyan, 2021), and, as of 2020, it has supported the development of nine projects and the financing of five projects, including solar rooftop and other renewable energy programs (PT SMI, 2020).



PT IIF

To help accelerate private participation and infrastructure financing in the country, PT SMI established PT IIF in January 2010 to provide privately-funded infrastructure projects with financing in local currency (IFC, n.d.). PT IIF is jointly owned by the GoI through PT SMI (30%) and several multilateral and bilateral donors, including the ADB (29%), the IFC (29%), and KfW (15%). In addition to the start-up funding from its founders, PT IIF has also received supplemental IDR 205.2 billion (USD 14.25 million) funding from the Government of Canada through the World Bank Accelerating Sustainable Public-Private Investments for Renewable Energy Infrastructure Program to strengthen the legal and regulatory framework for infrastructure projects and to establish a PPP Unit in Indonesia (Government of Canada, 2015; MoF, 2017).

In line with its Sustainable Financing Framework, PT IIF will finance and refinance (Sustainalytics, 2020) renewable energy generation and transmission infrastructure from wind (offshore and onshore), solar, tidal, and hydropower (below 25MW), and biomass/biofuel (IIF, 2020). The renewable energy projects that PT IIF has financed include the following renewable power plants (IIF, 2020):

1. USD 20 million loan facility for two 6-MW Mini Hydro power plants in North Sumatra
2. IDR 250 billion loan facility for a 12-MW biomass power plant in Aceh, North Sumatra
3. IDR 32 billion loan facility for a 2-MW solar-powered power plant in Gorontalo, Sulawesi
4. USD 17.85 million loan for two 90-MW hydro power plants in North Sumatera
5. USD 20 million guarantee facility to finance the first wind power plant with a capacity of 70MW
6. USD 38 million refinancing of a geothermal power plant with a capacity of 227 MW in West Java.

Through the creation of these specialized infrastructure PFIs, the GoI has been able to allocate direct budget transfers to mobilize investment in renewables and provide an encouraging signal to international funders and private investors.



4.0 Incentivizing Private Investment for Renewable Energy

Private investment is key to accelerating renewable energy development. To achieve the net-zero 2050 scenario globally,⁸ the International Energy Agency (IEA) estimates that investment in renewables will need to reach USD 1.1 trillion annually by 2030, and the majority of renewables financing, approximately 70%, will need to come from private investment (IEA, 2020).

In the case of Indonesia, as has been illustrated in previous sections, through direct budget transfers, equity investment, and public debt issuance, the GoI can use public finance and allocate public money in a targeted way to de-risk private finance and mobilize private investment. The creation of PT IIGF, PT SMI, and PT IIF, for instance, illustrates how the GoI can effectively leverage national and international public funding with private financing to stimulate renewable energy development in the country.

The GoI can also use well-targeted subsidies to improve the tariff and pricing structure, strengthen the regulatory framework for renewables, and improve public financing mechanisms to further prioritize and scale up solar energy and other renewable sources besides geothermal. Fossil-fuel subsidies can be reformed, and subsidy swaps from fossil fuels to renewable energy can help raise funds to support more effective promotion of renewables (see Brief 4 of this series by Christensen et al., forthcoming).

Specific approaches and additional measures that the GoI can implement and continue to support in order to accelerate private investment for renewable energy in Indonesia are discussed in the subsequent sections. These approaches and measures include renewable energy subsidies and support mechanisms, public finance and PFIs, as well as establishing related mandates to the long-established legacy energy SOEs.

RENEWABLE ENERGY SUBSIDIES AND SUPPORT MECHANISMS

Subsidies and other policies implemented by governments can be used to signal national priorities and influence investment decisions in the energy sector. In the case of fossil-fuel subsidies, by taxing and reforming subsidies of transport fuel and coal, the GoI can reallocate and use them to signal national priorities and influence investment decisions in favour of the renewable sector. This shift in public funds from fossil fuels to renewable energy can be used, for instance, to reinstate the DAK Small-Scale Energy and continue the effort of improving energy access and the national electrification ratio in rural and remote areas of the country. Furthermore, the GoI can leverage a swap to reduce the country's dependence on fossil fuels and improve the renewables investment landscape by redirecting funds to address the roadblocks identified in Section 2, particularly around the current pricing and tariff structure. This would be in the form of more adequate feed-in tariffs than the current one, discussed in Section 2.

Another option that has worked globally in various countries to address the price challenge is renewable energy auctions, as they can provide a competitive cost for renewables development

⁸ The IEA's NZE2050 scenario describes a possible route to put CO₂ emissions on a pathway to net-zero globally by 2050.



compared to traditional incentives, such as feed-in tariffs (USAID-NREL, 2020). Such auctions should be particularly used for large-scale renewable energy projects, so as to properly capture prevailing market prices and signal any policy adjustments needed (Bridle et al., 2018; Damuri & Atje, 2012). The GoI has stipulated the use of renewable energy auctions in the New and Renewable Energy Bill 2020 (Rancangan Undang-Undang Energi Baru Terbarukan—RUU EBT) that is currently under review (RUU EBT, 2021). No further details are available on how the proposed renewable energy auctions would be implemented.

Further, the GoI also provides subsidies and reduced loan interest to increase project financial viability, low- or zero-interest loans to improve project feasibility studies and to assist project construction (including solar rooftops), and grants to cover transaction fees where these fees become a barrier to develop a project (Fiscal Policy Body, 2020).

PUBLIC FINANCE AND PFIS

Public finance is the key to incentivizing private investment in renewable energy. Public finance channelled to a sector or technology can play a de-risking role, signalling that governments are prioritizing support for that sector or technology (OECD, 2017; Tucker et al., 2020). When public funding is combined or blended with private investment, this blended finance mechanism can be leveraged to catalyze many times more additional investment (Tonkonogy et al., 2018).

The GoI has made encouraging strides in using public funding to attract private investment for renewable energy. Targeted and well-defined public financing measures, particularly the creation of PT Sarana Multi Infrastruktur (PT SMI) and other infrastructure PFIs and SOEs (through the MoF), the Green Sukuk and green bonds (PT SMI and PT PLN), capital injections to PT PLN and PT Pertamina for renewables, as well as the SDG Indonesia One blended finance platform have had a positive impact for private investment (Aufa, 2020). However, with a funding gap of about USD 29 billion from the required USD 37 billion to achieve the 23% target, more can and needs to be done to leverage public funding to encourage private investment and close the investment gap.

Further blending its own budget with international funding from bilateral and multilateral banks, philanthropic investors, and private capital would be one approach the GoI could continue to pursue to optimize private investment in renewables, as this can help de-risk investment and make the projects more bankable. Reinstating budget transfers to DAK Small-Scale Energy is another approach that could potentially bring an almost immediate impact in attracting private capital for regional renewable energy development. Yet another measure that the GoI could pursue is to appropriate additional capital injections to the infrastructure SOEs and the energy SOEs, so as to enable these SOEs to make further investment in new and renewable energy.

To ensure that these public funding mechanisms can effectively and successfully achieve their targeted objectives, the GoI must strengthen the Indonesian legal and regulatory frameworks for energy and renewable sources, so as to lower the risk of renewable energy investment and thereby improve the renewables investment climate.



LEGACY ENERGY SECTOR SOES: PT PLN AND PT PERTAMINA

As discussed in Section 3.1, specialized energy and infrastructure SOEs can play a game-changing role in the development of renewable energy. Specific to the long-established legacy energy SOEs, namely PT PLN and PT Pertamina, these energy sector SOEs have a dominant position in the Indonesian energy market, and the way they operate and make investment decisions can have a considerable impact on the deployment and growth of renewable energy in the country, as well as on its clean energy transition.

With 91% ownership of all generation⁹ and 70% of total capacity (PT PLN, 2021), PT PLN dominates the Indonesian electricity sector, which is still heavily dependent on coal.¹⁰ However, there are positive signs that PT PLN is in closer alignment with the national renewable energy targets and objectives. PT PLN aims to become climate neutral (net-zero strategy from the energy sector¹¹) in three scenarios—2045, 2050, and 2060—and this will require a considerable amount of investment in renewable power plant development among others (MEMR, 2021b). One such investment is PT PLN's joint venture with the UAE's Masdar for a 145-MW PV floating solar project in West Java (Garanovic, 2021; Masdar, 2020), anticipated to be largest solar power plant in Indonesia (Harsono, 2020) and Southeast Asia (Garanovic, 2021).

Other sizable renewable energy investments that PT PLN has recently made and received include the following:

1. A green bond issuance of IDR 7.2 trillion (USD 500 million) issued in 2020 (Mudassir, 2021) as part of its Sustainable Financing Framework, a portion of which is intended to support transmission, distribution, and smart-grid development to support higher renewable energy uptake (PT PLN, 2020);
2. A collaboration with PT SMI under the direction of the MoF to develop new renewable energy projects using the SDG Indonesia One Platform (MoF, 2020);
3. A grant from the French development agency (Agence Française de Développement [AFD]) in the amount of IDR 20.6 billion (EUR 1.2 million) to support hydropower plant projects in Sumatra Barat Province (PT PLN, 2020; Rahayu & Hidayat, 2021);
4. A capital injection (PMN) of IDR 5 trillion from the GoI to support electricity infrastructure development (CNN Indonesia, 2021), although it is not clear if and how much of this investment value is intended specifically for renewables development (Priyadi, 2019);
5. An exclusive joint collaboration agreement with Singapore's Sembcorp Industries to develop 1 GW of integrated solar and energy storage projects in the regions of Batam, Bintan, and Karimun (Sembcorp, 2021; Yuan, 2021).

⁹ In 2020, 91% of all electricity generation in Indonesia was state owned, 5% was owned by Independent Power Producers (IPP), and 4% was owned by a Power Processing Unit (PPU – Licensing) (PT PLN, 2021a).

¹⁰ In 2020, coal share in the energy mix of Indonesian Electric Power Generation was 63.6% followed by gas (22.5%), water (6.7%), oil (4.8%), geothermal (2.4%), and other renewable energy sources (0.01%) (PT PLN, 2021b).

¹¹ Another strategy is the Long-Term Strategy to Low Carbon Development by the Ministry of Environment & Forestry (KLHK).



Similar investment activities have also been carried out by PT Pertamina, the national oil and gas company, with a recent announcement of IDR 174 trillion (USD 12.5 billion) investment in geothermal, solar, and biofuel (Umah, 2021). Through two of its subsidiaries, PT Pertamina has been playing an increasingly active role in renewable energy development and investment. Established in December 2006, PT Pertamina Geothermal Energy is responsible for managing all geothermal business activities (Pertamina, n.d.). In 2020, the total installed geothermal capacity was 1,877 MW (Pertamina, 2021).

At the same time, PT NRE, which was created in October 2016, also has geothermal projects, alongside new and renewable energy investment and generation, primarily in solar and biogas (Pertamina, n.d.; Pertamina, 2021). In November 2021, PT Pertamina signed a memorandum of understanding with Masdar to jointly explore floating and ground-mounted solar plants in the country (Pers, 2021). Out of the USD 32.7 billion for investments that the UAE committed to Indonesia at COP 26, about USD 18 billion is expected to be allocated to state-owned companies such as Pertamina and PLN (Worldakkam, 2021).

The GoI should continue to encourage and enable PT PLN and PT Pertamina to further invest and lead the investment in renewables, particularly in solar and other renewable sources besides geothermal. Its ownership stake allows the GoI to directly influence the overall strategy and investment decisions by mandating PT PLN and PT Pertamina to prioritize new and renewable energy. Furthermore, the GoI can also provide policy support to incentivize PT PLN and PT Pertamina to invest in renewables (Librianty, 2021; Sanchez et al., 2021), ensuring that any support given to these energy SOEs should also be accompanied by specific green conditions or requirements, as well as clearly defined mandates on the renewable energy targets for the country.

COP 26 AND INTERNATIONAL FUNDING

At COP 26, financing the energy transition in developing and emerging economies was a core issue, and to that effect several international financing initiatives were launched by various multilateral development banks, international financing institutions, bilateral funding agencies, philanthropic ventures, and other renewables financing platforms. Indonesia is a beneficiary and partner of these renewables funding initiatives.

In addition to the USD 32.7 billion committed by the UAE Government, Indonesia also received substantial support from bilateral and multilateral funders to phase out coal and transition to renewable energy. One of these support initiatives is the New Asian Renewables Fund launched by the British impact investor ThomasLloyd Energy Impact Trust, with GBP 25 million of public funding from the British government that will be used to help raise USD 340 million for investments in sustainable power infrastructure in Indonesia, the Philippines, and India (Carthew, 2021; Quinio & Oliver, 2021).

Indonesia has also entered into a partnership with the ADB to facilitate the phasing out of coal in the country and accelerate the transition to clean energy. Under the Energy Transition



Mechanism (ETM),¹² the ADB has entered into a partnership with Indonesia to retire 50% of the coal assets or at least 10 coal plants in Indonesia over the next 10 to 15 years (ADB, 2021; GEAPP, 2021a). Alongside the ADB-funded ETM, Indonesia is also one of the first beneficiaries of the Accelerating Coal Transition, a USD 2.5 billion multilateral funding facility by CIF to facilitate a Just Transition from coal to renewables in developing countries (CIF, 2021; Shalal, 2021).

The largest initiative launched at COP 26 was the GEAPP, a blended financing platform to unlock USD 100 million in public and private financing for inclusive energy transition through fossil-fuel transition,¹³ renewable energy generation, and off-grid renewable solutions (GEAPP, 2021b). Indonesia has answered the call for GEAPP's Transformational Country Partnerships, and at COP 26, President Widodo explicitly endorsed GEAPP and committed Indonesia as a country partner to co-create fast-track solutions and receive technical support and funding for energy projects in the country (Centers for Disease Control and Prevention, 2021), including the decommissioning of coal power plants (GEAPP, 2021a).

Positive signals for fossil-fuels transition were also evident in the new partnership that Indonesia has entered with IRENA and also the Global Coal to Clean Power Transition Statement signed by Minister of Energy and Mineral Resources Arifin Tasrif (UNFCCC, 2021). Under the IRENA partnership, also signed by Minister Arifin, Indonesia will work closely with IRENA and receive support through an energy transition roadmap and other joint initiatives on decarbonization and renewable energy deployment, as well as participating in dialogues with financing partners (IRENA, 2021). Meanwhile, Indonesia's endorsement of the Global Coal to Clean Power Transition Statement signals the country's commitment to reach net-zero by 2060, or earlier with international support and to consider accelerating coal phase-out into 2040, also with additional financial and technical support from the international community (UNFCCC, 2021).

5.0 Conclusion and Recommendations

If Indonesia intends to achieve net-zero emissions by 2060 and realize its target of a 23% share of new and renewable energy by 2025, investment in renewable energy must increase considerably. At the current average annual investment target of USD 2.1 billion, Indonesia is facing an investment gap of approximately USD 29 billion from what is required by 2025 (an additional USD 37 billion).

For more than 10 years Indonesia has had in place several mechanisms to support renewable energy sources, and the country's COVID-19 recovery package includes some fiscal and other incentives for project developers. However, these measures have been insufficient to address the current barriers and support clean energy at the scale needed.

¹² Ahead of COP 26, the ADB introduced the ETM as a blended finance mechanism to buy out existing coal plants in Indonesia, the Philippines, and also Vietnam (ADB, 2021; Del Bello, 2021; Wright, 2021), in order to retire and replace them with renewable energy and thereby facilitate a more expedient process of phasing out coal and transitioning to renewable energy (ADB, 2021).

¹³ GEAPP's fossil-fuel transition program in Indonesia will be implemented alongside the ADB-funded ETM program (GEAPP, 2021b).



Meanwhile, the funds allocated by the GoI to renewable energy development have been too small compared to the funding allocated for fossil-fuel energy sources. This does not align with the established NDC and net-zero targets, and the GoI should also expand its support to other renewable sources, particularly solar and wind power. Additional incentives that the GoI should consider in order to accelerate the renewable energy development and growth in Indonesia include the following recommendations:

- **Increase clarity and traceability on financial flows directed to specific projects.** Though there have been specialized infrastructure SOEs established and several green finance initiatives launched, there is still a lack of clarity in terms of observable tracing or mapping of the financial flows from the GoI to the appointed SOEs or PFIs and the targeted renewable energy projects. By increasing clarity in this aspect, the GoI would not only gain deeper trust from—and credibility with—international funders, but it could also unlock the potential to further increase private investment and boost investor confidence. It would also help to increase the traceability of the selected projects.
- **Policy certainty is key for renewables developers to mobilize investment.** Renewable energy developers have waited a very long time for the Renewable Energy Bill and President Regulation draft on the feed-in tariff to be enacted.
- **Prioritize other renewable energy sources, particularly solar and wind power.** The GoI should also increase investment targets for solar PV and wind power, in addition to its current investment on geothermal energy. Solar rooftop PV has attracted private customers and has great potential in Indonesia. Improving the incentives given to these renewable sources could accelerate the growth of renewable energy in Indonesia.
- **Enable SOEs as renewables change agents.** The GoI can mandate PT PLN, PT Pertamina, and other energy SOEs to adapt their strategies to more closely align with the established NDC targets (Sanchez et al., 2021). By requiring certain investment conditions on specific targets, the GoI can accelerate the development of renewable energy through these SOEs.



References

- Asian Development Bank. (2021). *Energy transition mechanism explainer: How ETM will support climate action in Southeast Asia*. <https://www.adb.org/news/features/energy-transition-mechanism-explainer-support-climate-action-southeast-asia>
- Bechauf, R. (2021). *How can Indonesia foster sustainable infrastructure solutions that deliver low-carbon development and bring additional benefits?* International Institute for Sustainable Development. <https://www.iisd.org/system/files/2021-07/indonesia-sustainable-infrastructure-solutions.pdf>
- Bloomberg. (2021, December 2). *President Jokowi highlights priority issues for G20 Indonesia 2022*. <https://www.bloomberg.com/press-releases/2021-12-02/president-jokowi-highlights-priority-issues-g20-indonesia-2022>
- Bridle, R., Gass, P., Halimajaya, A., Lontoh, L., Mcculloch, N., Petrofsky, E., & Sanchez, L. (2018). *Missing the 23 per cent target: Roadblocks to the development of renewable energy in Indonesia*. International Institute for Sustainable Development. <https://www.iisd.org/publications/missing-23-cent-target-roadblocks-development-renewable-energy-indonesia>
- Cabinet Secretariat of the Republic of Indonesia. (2021, February 16). *President Jokowi: Indonesian investment authority will gain domestic, foreign trust*. <https://setkab.go.id/en/president-jokowi-indonesia-investment-authority-will-gain-domestic-foreign-trust/>
- Carthew, J. (2021). *New Asian renewables fund: ThomasLloyd Energy Impact*. <https://quoteddata.com/2021/11/asian-renewables-fund-thomas-lloyd-energy-impact/>
- Centers for Disease Control and Prevention. (2021). *We are partnering with the Global Energy Alliance for People and Planet*. <https://www.cdcgroup.com/en/news-insight/news/we-are-partnering-with-the-global-energy-alliance-for-people-and-planet/>
- Central Bureau of Statistics Indonesia. (n.d.). *Coal and mining production*. <https://www.bps.go.id/indicator/10/508/1/produksi-barang-tambang-mineral.html>
- Climate Investment Funds. (2021). *Accelerating coal transition*. <https://www.climateinvestmentfunds.org/topics/accelerating-coal-transition>
- CNN Indonesia. (2021). *BUMN Dapat Suntikan Rp42,3 T, PLN dan Pertamina Dapat Aset*. CNN Indonesia. <https://www.cnnindonesia.com/ekonomi/20210208161635-532-603752/bumn-dapat-suntikan-rp423-t-pln-dan-pertamina-dapat-aset>
- Darma, S., Imani, L. I., Shidqi, M. N. A., Riyanto, T. D., & Daud, M. Y. (2021, April–October). *Country update: The fast growth of geothermal energy development in Indonesia* [Paper presentation]. World Geothermal Congress 2020+1, Reykjavik, Iceland. <https://www.geothermal-energy.org/pdf/IGAstandard/WGC/2020/01073.pdf>
- Damuri, Y. R., & Raymond Atje. (2012). *Investment incentives for renewable energy: Case study of Indonesia*. International Institute for Sustainable Development. <https://www.iisd.org/publications/incentives-renewable-energy-southeast-asia-case-study-indonesia>
- Danish Energy Agency & Ministry of Energy and Mineral Resources. (2021). *Renewable energy pipeline*. https://ens.dk/sites/ens.dk/files/Globalcooperation/renewable_energy_pipeline.pdf



- Deasy, D., Ramiayu, S. E. R., Tineke, K., Wardhani, S. E., Satrio, A., & Effendi, S. E. (2020). *Alokasi PMN kepada BUMN berdasarkan Tujuan Pemberian melalui APBN (Periode 2015–2020)*. <https://berkas.dpr.go.id/puskajianggaran/referensi-apbn/public-file/referensi-apbn-public-23.pdf>
- Del Bello, L. (2021, October 11). *Asian Development Bank plans to buy out and retire coal plants*. The Third Pole. <https://www.thethirdpole.net/en/climate/asian-development-bank-plans-buy-out-retire-coal-plants/>
- Directorate General of New and Renewable Energy. (2020). *Laporan Kinerja Tahun 2019 Direktorat Jenderal Energi Baru, Terbarukan, dan Konservasi Energi*. <https://drive.esdm.go.id/wl/?id=R0Gv1gFac4c5kCJoPOswES8EPq5Ubl3m>
- Directorate General of New and Renewable Energy. (2021). *Laporan Kinerja Tahun 2020 Direktorat Jenderal Energi Baru dan Terbarukan*. <https://www.esdm.go.id/assets/media/content/content-laporan-kinerja-ditjen-ebtke-2020.pdf>
- Draps, F., Sidabutar, E., & Yuliandhini, E. (2021). *Indonesia: Renewable energy laws and regulations 2022*. <https://iclg.com/practice-areas/renewable-energy-laws-and-regulations/indonesia>
- Dutt, A., Chawla, K., & Kuldeep, N. (2019). *Accelerating investments in renewables in Indonesia: Drivers, risks, and opportunities*. <https://www.ceew.in/publications/accelerating-investments-renewables-indonesia-drivers-risks-and-opportunities>
- Energy Policy Tracker. (n.d.). *Energy policy tracker*. <https://www.energypolicytracker.org/>
- Al Faqir, A. (2021). *Begini Cara Perhitungan Penetapan Tarif Tenaga Listrik*. Merdeka.com. <https://www.merdeka.com/uang/begini-cara-perhitungan-penetapan-tarif-tenaga-listrik.html>
- Fiscal Policy Body. (2020). *Optimalisasi BPDLH Dalam Pengembangan Energi Terbarukan Di Sektor Ketenagalistrikan*. <https://fiskal.kemenkeu.go.id/files/berita-kajian/file/kajian%20BPDLH.pdf>
- G20. (2021). *G20 Rome Leaders Declaration*. <https://www.consilium.europa.eu/media/52732/final-final-g20-rome-declaration.pdf>
- Garanovic, A. (2021, August 3). *Masdar joint venture starts construction of 145MW floating solar plant in Indonesia*. Offshore Energy. <https://www.offshore-energy.biz/masdar-joint-venture-starts-construction-of-145mw-floating-solar-plant-in-indonesia/>
- Global Energy Alliance for People and Planet. (2021a). *Let's change energy for good*. <https://www.globalenergyalliance.org/wp-content/uploads/2021/11/The-global-energy-alliance-10-31-2021-RGB-v2.pdf>
- Global Energy Alliance for People and Planet. (2021b). *Call for transformational country partnerships*. <https://www.globalenergyalliance.org/#call-for-transformational-country-partnerships>



- Government of Canada. (2015). *Prime Minister announces infrastructure funding for Indonesia*. <https://pm.gc.ca/en/news/news-releases/2015/11/15/prime-minister-announces-infrastructure-funding-indonesia>
- Habir, M. T. (2021). Indonesia's first sovereign wealth fund (INA): Opportunities and challenges. *ISEAS Perspective*, 63, 2335–6677. <https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2021-63-indonesias-first-sovereign-wealth-fund-ina-opportunities-and-challenges-by-manggi-taruna-habir/>
- Harsono, N. (2020). UAE's Masdar to support development of Indonesia's largest solar power plant. *The Jakarta Post*. <https://www.thejakartapost.com/news/2020/01/08/uaes-masdar-to-support-development-of-indonesias-largest-solar-power-plant.html>
- Harsono, N. (2021, November 9). Indonesia injects \$4.2b into sovereign wealth fund to get big projects rolling. *The Jakarta Post*. <https://www.thejakartapost.com/academia/2020/12/30/indonesias-recovery-from-covid-19-look-beyond-2021.html>
- International Finance Corporation. (n.d.). *Indonesia's infrastructure investments: Finally taking off*. https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/indonesia+infrastructure+investments
- Indonesia Investment Authority. (n.d.). *Partner for Future Prosperity. Home page*. <https://www.ina.go.id/en>
- Indonesian Geothermal Association. (n.d.). *We are Indonesian Geothermal Association. Home page*. <http://www.inaga-api.or.id/>
- Intan, N. (2021). *Bunga Pinjaman dan Agunan Tinggi Hambat Pengembangan EBT*. Republika.co.id. <https://republika.co.id/berita/qstr74383/bunga-pinjaman-dan-agunan-tinggi-hambat-pengembangan-ebt>
- International Energy Agency. (2020). *World energy outlook 2021*. www.iea.org/weo
- International Renewable Energy Agency. (2021). *Indonesia and IRENA agree partnership to decarbonise Southeast Asia's largest economy* [Press release]. <https://www.irena.org/newsroom/pressreleases/2021/Nov/Indonesia-and-IRENA-Agree-Partnership-to-Decarbonise-Southeast-Asia-Largest-Economy>
- International Forum of Sovereign Wealth Funds. (n.d.). *Indonesia Investment Authority*. <https://www.ifswf.org/members/indonesia-investment-authority>
- Kristianus, A. (2021). *2018–2021, Pemerintah Telah Terbitkan Sovereign Green Sukuk US\$ 3,5 Miliar*. Investor.id. <https://investor.id/bumee/268684/20182021-pemerintah-telah-terbitkan-sovereign-green-sukuk-us-35-miliar>
- Lestari, V. P. (2021). *Permasalahan dan Tantangan Program Peningkatan Kontribusi Energi Baru dan Terbarukan dalam Bauran Energi Nasional*. <https://berkas.dpr.go.id/puskajiakn/kajian-akuntabilitas/public-file/kajian-akuntabilitas-public-16.pdf>
- Librianty, A. (2021). *Dorong Pengembangan EBT, PLN Optimalkan Listrik Ramah Lingkungan di NTB*. Liputan6. <https://www.liputan6.com/bisnis/read/4619689/dorong-pengembangan-ebt-pln-optimalkan-listrik-ramah-lingkungan-di-ntb>



- Masdar (2020). *Masdar and PLN enter partnership to develop first floating solar power plant in Indonesia*. <https://news.masdar.ae/en/news/2020/01/19/06/56/masdar-and-pln-enter-partnership-to-develop-first-floating-solar-power-plant-in-indonesia>.
- Ministry of Communication and Informatics. (2021). *Sambut Presidensi G20 Tahun 2022, Menkominfo: Indonesia Agendakan Tiga Prioritas* [Press release]. https://www.kominfo.go.id/content/detail/36190/siaran-pers-no-270hmkominfo082021-tentang-sambut-presidensi-g20-tahun-2022-menkominfo-indonesia-agendakan-tiga-prioritas/0/siaran_pers
- Ministry of Energy and Mineral Resources. (2015). *Laporan Akuntabilitas Kinerja Instansi Pemerintah 2014: ESDM*. <https://www.esdm.go.id/assets/media/content/content-laporan-akuntabilitas-kinerja-instansi-pemerintah-kementerian-esdm-tahun-2014.pdf>
- Ministry of Energy and Mineral Resources. (2016). *Laporan Akuntabilitas Kinerja Instansi Pemerintah 2015: ESDM*. <https://www.esdm.go.id/assets/media/content/content-laporan-akuntabilitas-kinerja-instansi-pemerintah-kementerian-esdm-tahun-2015.pdf>
- Ministry of Energy and Mineral Resources. (2017). *Laporan Kinerja Kementerian 2016: ESDM*. <https://www.esdm.go.id/assets/media/content/content-laporan-akuntabilitas-kinerja-instansi-pemerintah-kementerian-esdm-tahun-2016-.pdf>
- Ministry of Energy and Mineral Resources. (2018). *Laporan Kinerja Kementerian 2017: ESDM*. <https://www.esdm.go.id/assets/media/content/content-laporan-akuntabilitas-kinerja-instansi-pemerintah-kementerian-esdm-tahun-2017.pdf>
- Ministry of Energy and Mineral Resources. (2019). *Laporan Kinerja Kementerian 2018: ESDM*. <https://www.esdm.go.id/assets/media/content/content-laporan-kinerja-kementerian-esdm-tahun-2018.pdf>
- Ministry of Energy and Mineral Resources. (2020). *Laporan Kinerja Kementerian 2019: ESDM*. <https://www.esdm.go.id/assets/media/content/content-laporan-kinerja-kementerian-esdm-2019.pdf>
- Ministry of Energy and Mineral Resources. (2021a). *Handbook of energy and economic statistics of Indonesia 2020*. <https://www.esdm.go.id/assets/media/content/content-handbook-of-energy-and-economic-statistics-of-indonesia-2020.pdf>
- Ministry of Energy and Mineral Resources. (2021b). *Laporan Kinerja Kementerian ESDM 2020*. <https://www.esdm.go.id/assets/media/content/content-laporan-kinerja-kesdm-2020.pdf>
- Ministry of Finance. (2017). *TOR finance specialist and legal specialist, 3108 ed06*. <https://123dok.com/document/yje2m26q-tor-legal-specialist-ed.html>
- Ministry of Finance. (2020). *PT PLN and PT SMI synergize to manage new and renewable energy*. <https://www.kemenkeu.go.id/en/publications/news/pt-pln-and-pt-smi-synergize-to-manage-new-and-renewable-energy/>
- Ministry of Finance. (2021a). *Green Sukuk: Allocation and Impact Report May 2021*. <https://www.djppr.kemenkeu.go.id/page/loadViewer?idViewer=10577&action=download>



- Ministry of Finance. (2021b). *Green Sukuk: Allocation and impact report, final*. <https://www.djppr.kemenkeu.go.id/page/loadViewer?idViewer=10577&action=download>
- Ministry of Finance. (2021c). *Carbon policies in Indonesia, striking the balance between carbon emission target and the 1 MMBOPD/ 12 BSCFD target* [Video]. <https://www.youtube.com/watch?v=jKg5kigqbc>
- Mudassir, R. (2021). Wow! PLN Butuh Dana Rp7,15 Kuadriliun untuk Akselerasi Proyek Dekarbonisasi. In *Ekonomi.bisnis*. Ekonomi. <https://ekonomi.bisnis.com/read/20211103/44/1461380/wow-pln-butuh-dana-rp715-kuadriliun-untuk-akselerasi-proyek-dekarbonisasi>
- Mulyana, R. (2018). *Low carbon development in the energy sector* [PowerPoint Slides]. Ministry of Energy and Mineral Resources. <http://www.iesr.or.id/wp-content/uploads/2019/04/Rida-Mulyana.pdf>
- National Energy Council [DEN]. (2020). *The Authority of the Regional Government in the Implementation of the General Provincial Energy Plan (RUED-P)*. Dewan Energi Nasional.
- Organisation for Economic Co-operation and Development. (2021). *Transparency, predictability, and accountability for investment screening mechanism*. <https://www.oecd.org/daf/inv/investment-policy/2009-Guidelines-webinar-May-2021-background-note.pdf>
- Pers, S. (2021). *Pertamina NRE and Masdar signs MoU for PLTS and clean energy development*. PT Pertamina. <https://www.pertamina.com/en/news-room/news-release/pertamina-nre-and-masdar-signs-mou-for-plts-and-clean-energy-development>
- Pertamina. (n.d.). *Home page*. <https://www.pertamina.com>
- Pertamina. (2021). *Ready for transition, Pertamina continues to grow new renewable energy*. <https://www.pertamina.com/en/news-room/news-release/ready-for-transition-pertamina-continues-to-grow-new-renewable-energy>
- Pinsent Masons. (2021, November 17). *Indonesia injects \$4.2bn into sovereign wealth fund for infrastructure*. Out-Law News. https://www.pinsentmasons.com/out-law/news/indonesia-injects-usd4_2bn-into-sovereign-wealth-fund-for-infrastructure
- PT Geo Dipa Energi. (n.d.). *PT Geo Dipa Energi*. <https://www.geodipa.co.id>
- PT Indonesia Infrastructure Finance. (n.d.). *PT Indonesia Infrastructure Finance*. <https://iif.co.id/en/>
- PT Perusahaan Listrik Negara (Persero). (2020). *Investor presentation*. <https://web.pln.co.id/statics/uploads/2020/08/Triwulan-1-2020.pdf>
- PT PLN. (2021). *Statistik PLN 2020*. <https://web.pln.co.id/statics/uploads/2021/07/Statistik-PLN-2020.pdf>
- Pribadi, A. (2019). *Kejar Target Bauran Energi 2025, Dibutuhkan Investasi EBT Hingga USD36,95 Miliar*. Press News. Ministry of Energy and Mineral Resources. <https://ebtke.esdm.go.id/post/2019/12/06/2419/kejar.target.bauran.energi.2025.dibutuhkan.investasi.ebt.hingga.usd3695.miliar>



- PT Sarana Multi Infrastructure. (n.d.). *PT SMI green bond/Green Sukuk framework*. <https://ptsmi.co.id/cfind/source/files/investor/PT-SMI-Green-Bond-dan-Green-Sukuk-Framework.pdf>
- PT Sarana Multi Infrastructure. (2021). *2020 annual report*. <https://ptsmi.co.id/wp-content/uploads/2021/04/SMI-AR-2020-28042020.pdf>
- Quinio, A., & Oliver, J. (2021). *UK government to invest in Asian renewable energy investment trust*. <https://www.ft.com/content/761cc2c3-1cc6-4a07-89b6-f13ffb52750d>
- Rahardyan, A. (2021). PT SMI Dorong Realisasi Proyek SDGs Lewat Skema Pendanaan Campuran. *Finansial*. <https://finansial.bisnis.com/read/20210929/89/1448121/pt-smi-dorong-realisisi-proyek-sdgs-lewat-skema-pendanaan-campuran>
- Rahayu, A. C., & Hidayat, K. (2021). PLN mendapat hibah € 1,2 juta dari AFD untuk bangun PLTA Masang II di Sumbar. *Kontan.co.id*. <https://industri.kontan.co.id/news/pln-mendapat-hibah-12-juta-dari-afd-untuk-bangun-plta-masang-ii-di-sumbar>
- Richter, A. (2020). *PT Geo Dipa Energi sets ambitious 1,020 MW by 2035 development target in Indonesia*. *Think Geoenergy*. <https://www.thinkgeoenergy.com/pt-geo-dipa-energi-sets-ambitious-1020-mw-by-2035-development-target-in-indonesia/>
- RSM. (2021). *Laporan Pengelolaan Dana Pembiayaan Infrastruktur Sektor Panas Bumi Tahun 2020 (Geothermal budget realisation report 2020)*. <https://ptsmi.co.id/wp-content/uploads/2021/04/Laporan-Pengelolaan-Dana-PISP-Sarana-Multi-Infrastruktur-2020.pdf>
- RUU EBT. (2021). *Testimony of MEMR. Renewable Energy Bill*. <https://pushep.or.id/wp-content/uploads/2021/04/DRAF-RUU-EBT-25-Januari-2021.pdf>
- Sanchez, L., Bridle, R., Corkal, V., Gass, P., Geddes, A., Gerasimchuk, I., Kuehl, J., Laan, T., Moerenhout, T., Muttitt, G., Muzondo, C., Pant, A., Roth, J., Sharma, S., Viswamohan, A., & Viswanathan, B. (2021). *Achieving a fossil-free recovery*. International Institute for Sustainable Development. <https://www.iisd.org/publications/achieving-fossil-free-recovery>
- Sembcorp. (2021). *Sembcorp Industries, PT PLN Batam and Suryagen to jointly develop large-scale integrated solar and energy storage project in Indonesia*. <https://www.sembcorp.com/en/media/media-releases/energy/2021/october/sembcorp-industries-pt-pln-batam-and-suryagen-to-jointly-develop-large-scale-integrated-solar-and-energy-storage-project-in-indonesia/>
- Setiawan, V. N. (2021, November 12). *Pengamat: Transisi EBT RI Terhambat Besarnya Subsidi Energi Fosil (Observer: Indonesia's NRE transition has been hampered by fossil energy subsidies)*. *Katadata*. <https://katadata.co.id/happyfajrian/ekonomi-hijau/618e12d2dcee6/pengamat-transisi-ebt-ri-terhambat-besarnya-subsidi-energi-fosil>
- Shalal, A. (2021). *COP 26: India, Indonesia and Philippines join coal transition programme*. *Reuters*. <https://www.reuters.com/business/cop/india-indonesia-philippines-join-coal-transition-programme-2021-11-04/>



- Siregar, E. (2021). *Indonesia finally has a sovereign wealth fund: Indonesia Investment Authority (INA)*. Indonesia-Investments. <https://www.indonesia-investments.com/business/business-columns/indonesia-finally-has-a-sovereign-wealth-fund-indonesia-investment-authority-ina/item9376>
- Sitorus, S., Rakhmadi, R., Haesra, A., & Wijaya, M. E. (2018). *A CPI report energizing renewables in Indonesia: Optimizing public finance levers to drive private investment*. <https://www.climatepolicyinitiative.org/wp-content/uploads/2018/11/Energizing-Renewables-in-Indonesia-Optimizing-Public-Finance-Lever.pdf>
- Sustainalytics. (2020). *Second-party opinion: Indonesia infrastructure finance sustainable financing framework*. https://iif.co.id/wp-content/uploads/2021/01/IIF-Sustainable-Financing-Framework-Second-Party-Opinion-Final_Updated-1.pdf
- The National. (2021, March 23). *UAE invests \$10 billion in Indonesia*. <https://www.thenationalnews.com/business/economy/uae-invests-10-billion-in-indonesia-1.1189460>
- Tonkonogy, B., Brown, J., Micale, V., Wang, X., & Clark, A. (2018). *A report for the business & sustainable development commission and the blended finance taskforce*. www.climatepolicyinitiative.org
- Tucker, B., DeAngelis, K., & Doukas, A. (2020). *Still digging: G20 governments continue to finance climate crisis*. <http://priceofoil.org/content/uploads/2020/05/G20-Still-Digging.pdf>
- Uly, Y. A. (2021, November 22). *Investasi energi terbarukan diproyeksi 1,44 miliar dollar AS, capai 71 persen dari target (Renewable energy investment projected at US\$1.44 billion, reaching 71% of target)*. Kompas. <https://money.kompas.com/read/2021/11/22/191707026/investasi-energi-terbarukan-diproyeksi-144-miliar-dollar-as-capai-71-persen?page=all>
- United States Agency for International Development - The National Renewable Energy Laboratory. (2020). *RE Data Explorer Use of the Tool to Support Renewable Energy Auctions Processes*. <https://nsrdb.nrel.gov>
- Umah, A. (2021). *Bangun Pembangkit EBT 10 GW, Pertamina Investasi Rp174 T*. CNBC Indonesia. <https://www.cnbcindonesia.com/news/20210701164427-4-257515/bangun-pembangkit-ebt-10-gw-pertamina-investasi-rp174-t>
- United Nations Framework on Climate Change. (n.d.). *NDC registry*. <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>
- United Nations Framework Convention on Climate Change. (2021). *Global coal to clean power transition statement*. <https://ukcop26.org/global-coal-to-clean-power-transition-statement/>
- Velezmore, S. (2021, November 10). *Indonesia investment authority seeks to grow co-investment commitments*. AsianInvestors. <https://www.asianinvestor.net/article/indonesia-investment-authority-seeks-to-grow-co-investment-commitments/473851>
- Warta, M. (2017). *BPK: Target Energi Baru Terbarukan 2025 Diperkirakan Tak Tercapai*. *Bisnis Tempo*. <https://bisnis.tempo.co/read/1043898/bpk-target-energi-baru-terbarukan-2025-diperkirakan-tak-tercapai>



- Worldakkam. (2021). *UAE investment commitment to advance Indonesian infrastructure: Thohir*. <https://worldakkam.com/uae-investment-commitment-to-advance-indonesian-infrastructure-thohir/451674/>
- Wright, C. (2021, November). *ADB mechanism will buy out coal power in southeast Asia*. Euromoney. <https://www.euromoney.com/article/299s69449g78r25m8nytc/esg/adb-mechanism-will-buy-out-coal-power-in-southeast-asia>
- World Bank. (2018). *PT SMI supports sustainable development by issuing the first corporate green bond in Indonesia*. <https://www.worldbank.org/en/news/opinion/2018/07/09/pt-smi-supports-sustainable-development-by-issuing-the-first-green-bond-in-indonesia>
- Yuan, Y. J. (2021). *Sembcorp to build integrated solar and energy storage systems with Indonesia's PLN Batam and Suryagen*. <https://www.businesstimes.com.sg/companies-markets/sembcorp-to-build-integrated-solar-and-energy-storage-systems-with-indonesias-pln>
- Xu, J., Marodon, R., Ru, X., Ren, X., & Wu, X. (2021). What are public development banks and development financing institutions?: Qualification criteria, stylized facts and development trends. *China Economic Quarterly International*, 1(4), 271–294. <https://doi.org/10.1016/j.ceqi.2021.10.001>

© 2022 The International Institute for Sustainable Development
Published by the International Institute for Sustainable Development.

This publication is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT

The International Institute for Sustainable Development (IISD) is an award-winning independent think tank working to accelerate solutions for a stable climate, sustainable resource management, and fair economies. Our work inspires better decisions and sparks meaningful action to help people and the planet thrive. We shine a light on what can be achieved when governments, businesses, non-profits, and communities come together. IISD's staff of more than 120 people, plus over 150 associates and consultants, come from across the globe and from many disciplines. With offices in Winnipeg, Geneva, Ottawa, and Toronto, our work affects lives in nearly 100 countries.

IISD is a registered charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Province of Manitoba and project funding from governments inside and outside Canada, United Nations agencies, foundations, the private sector, and individuals.

Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Tel: +1 (204) 958-7700

Website: www.iisd.org

Twitter: @IISD_news

