Institute for Energy Economics and Financial Analysis

Briefing Note

June 2025

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Realizing Indonesia's Ambitious Renewable Energy Goals Calls for a New Approach

- *Indonesia aims to install 42.6 gigawatts (GW) of renewable energy by 2034, driven primarily by solar power additions. Over the past decade, the country has only added 717 megawatts (MW) of solar capacity. To meet its 75GW renewable energy goal by 2040, Indonesia needs to install 5GW annually for the next 15 years.*
- *Indonesia's current approach to renewable energy development through the state utility PT Perusahaan Listrik Negara (PLN) – based on individual proposals and bespoke contractual terms – has resulted in significant delays and few projects realized. A new approach is needed to manage the volume of projects required to meet national renewable capacity targets.*
- *Successful large-scale renewable deployment requires facilitating investment by creating de-risked project sites with pre-planned connections to the national transmission grid, technically sound project preparation with transparent tender management, and centralized project contracting through a financially credible public authority.*
- *Indonesia needs a new renewable project procurement infrastructure that, like a production line, can manage dozens of projects simultaneously, supported by external skilled professionals, standardized processes, and cross-organizational coordination with consistent results.*

On 26 May 2025, Indonesia launched its latest Electricity Supply Business Plan (RUPTL) for the period 2025 to 2034. Under the RUPTL, Indonesia aims to add 42.6 gigawatts (GW) of renewable energy by the end of 2034. The plan contributes to the broader national long-term strategy, Golden Indonesia Vision 2045, which seeks to have 75GW of renewable energy operating by 2040. Solar generation is expected to constitute most of the envisioned renewable energy capacity.

Solar energy is the cheapest form of electricity globally. Indonesia's strong solar irradiation and equatorial positioning makes it suitable for establishing fixed-axis mount solar panels. These are the easiest and quickest to install, allowing entire utility-scale solar farms (larger than 100 megawatts [MW]) to be implemented within months.

Yet, the development of Indonesian renewable energy projects has been chronically delayed. A marginal 0.2% of the country's energy is sourced from solar. To achieve the vision for 2040, the pace of capacity additions needs to ramp up quickly from nearly zero now to around 5GW yearly. That is equivalent to establishing 26 of Indonesia's largest solar farms, the 192MW Cirata

floating solar project, every year for the next 15 years.

Despite solar being the cheapest solution to meet demand, these developments will still require billions of dollars in investment annually. As outlined in the RUPTL, the government expects most of these funds to come from the private sector, ideally through competitive processes coordinated by the public sector.

How Can the Government Implement Renewable Energy Projects Rapidly?

There are successful examples of large, utility-scale deployment from countries worldwide. The key features of a rapid, large-scale, national procurement program include:

- **Solar parks:** Facilitating investment by creating de-risked project sites with pre-planned connections to the national transmission grid, ready for bidding
- **Project preparation:** Engaging in technically sound project preparation, commercially oriented bidding, and contracting, supported by consistent, transparent tender management
- **Credible public contracting:** Centralizing project contracting with a financially credible public authority charged with delivering results and value over long periods

This briefing note will provide examples of these program attributes.

Public Sector Facilitated Large-Scale, Multi-Investor Solar Parks

Government- or utility-organized solar parks, supported by investment from the private sector, can accelerate capacity additions in a planned manner and at reduced cost. India has been a trailblazer in the publicly facilitated solar park model. Aided by proactive public-private partnerships (PPPs), these solar parks were initiated in 2010 by developing the 4,900-acre (2,000-hectare) Charanka solar park in Gujarat. There are currently over 50 solar parks in India with more than 13GW of aggregate capacity. These include some of the world's largest single-site solar developments, such as the 2,500MW (and growing) Badhla park in Rajasthan. Many sub-national, state government entities have now adopted the model initiated by the central government.

How Does the Public-Led Solar Farm Model Work?

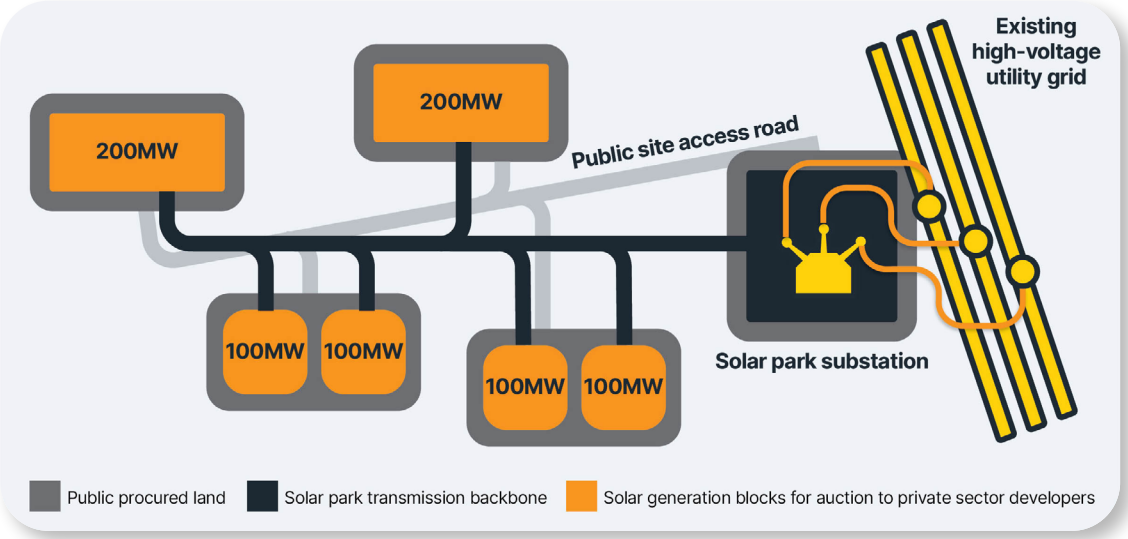
The government takes the lead in identifying, studying, and preparing solar farm sites, dividing them into developable blocks. This could be done through the actions of a state-owned utility or by a specially designated entity responsible for renewable energy development. The main components of this public leadership include:

- **Identifying sites**: Find sites for large-scale farms near major transmission lines, secure land rights, undertake preliminary permitting studies, and guarantee the locations' environmental and social stability
- **Confirming resources**: Commission industry-class data gathering on solar insolation intensity over at least a year
- **Preparing transmission interconnection**: Design, specify, and build a backbone transmission system that connects all solar development blocks to the main grid through the public-sector utility or transmission company
- **Bidding out development sites**: Auction of solar farm blocks to private sector developers in grid-appropriate, scalable increments, ranging from 50MW to over 300MW each

This public-led "bulk development" approach to solar farms reduces the risks of utility-scale projects for the private sector. Challenges related to land, permits, data, and grid interconnections are the most significant risks that developers face.

Providing that information to all bidders upfront allows interested parties to focus on project economics. By minimizing or eliminating those risks, developers can prioritize achieving the lowest possible costs for the solar farm itself. Figure 1 summarizes the solar park concept.

Figure 1: Solar Park Schematic Concept

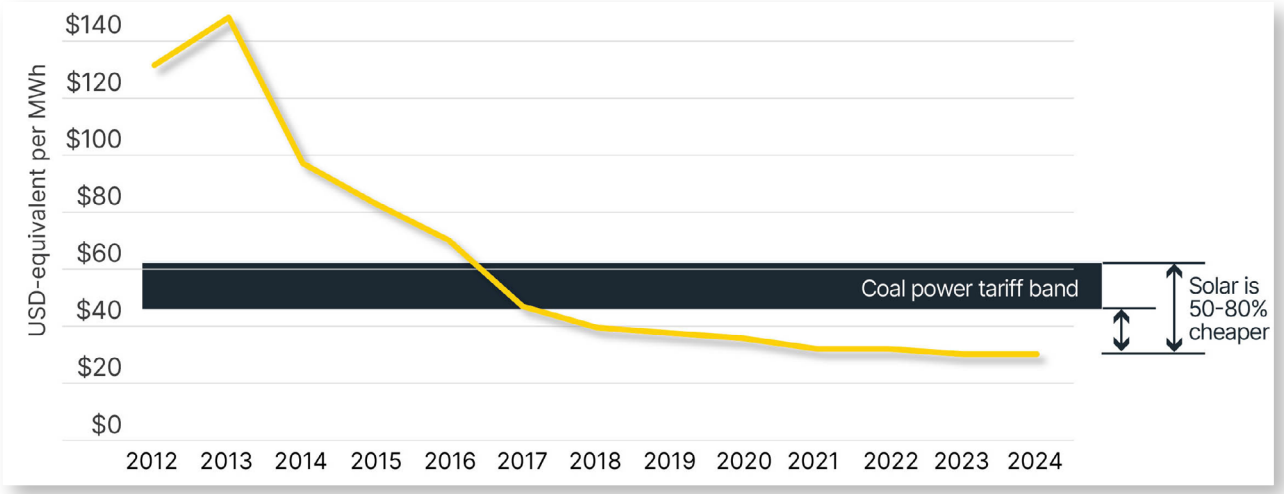


Source: IEEFA

With implementation risks minimized, the time from bid award to project commissioning is streamlined and predictable, and financing costs can be reduced. The utility and the consumers benefit from having the lowest possible tariff from bidding delivered quickly. As more blocks of the solar park are constructed, there is higher certainty regarding on-site performance, and subsequent auctioned blocks could yield even lower costs and tariffs.

This model has been successful in India. From 2010 to 2020, the winning bid tariffs dropped from a high of USD148.50 per megawatt-hour (MWh) in 2013 to USD30 in 2024, an 80% decrease (Figure 2). Additionally, despite India being a coal-mining country where more than 70% of electricity is coal-generated, the price of solar was one-third lower.

Figure 2: Solar Park Block Auction Tariff Results in India



Source: IEA. India PV auction results 2012-2020. 2020; Mercom. Five Lowest Solar Tariffs in 2021. 24 December 2021;

Renewable Watch. Tariff Trends: review of renewable energy tender auctions. 17 December 2024.

As of January 2025, India installed over 100GW of solar capacity, implemented over 15 years. This is nearly the same as Indonesia's current goal. Under its 14th National Electricity Plan, India aims to more than triple that achievement to 365GW by 2032 using a competitively bid solar park model.

Project Preparation: Standardization and Consistency are Critical

Project preparation by the public sector is a key factor in consistent, successful tendering and closing on renewable energy projects at individual sites and multi-phase, multi-investor solar farms. The groundwork for such projects includes the physical development of a project site, as described in the India solar park model, and the legal, technical, financial, and commercial terms in bid documents and contracts.

This concept is well-developed in infrastructure PPPs across Asia. Since the revival of PPPs in the 2010s, a comprehensive approach to project selection, preparation, and management has been developed. This has enabled the delivery of hundreds of billions of dollars in investment across thousands of critical regional public service projects.

Successful PPPs follow a standardized formula of well-selected and prioritized projects supported by strong preparation, clear and balanced commercial contracts, and transparent and objective bidding and evaluation. The goal is to create a long-term, stable arrangement that benefits the government and private investors.

Strong fundamentals are essential, including a demonstrated need for a given project and a realistic prospect of it delivering economic benefit. A balanced commercial structure that allows for private sector innovation without government interference and allows the investor to earn a fair return on investment is required. Simultaneously, the project should yield a reasonable service cost to society. These PPP principles apply equally to energy sector projects.

PPP projects typically use a project development and tendering system controlled by the public sector. In many cases, a centralized PPP authority, overlooking individual government ministries or departments, provides the services and expertise needed to deliver government-approved investment programs. A government-PPP advisory entity manages tenders according to a transparent national framework and oversees external legal, technical, and financial consultants who develop detailed specifications for each project tender.

Project development facilities (PDFs) are finances used to prepare projects for tendering and guide those bid-out projects through the negotiation process. These funds are used to hire the various professional services needed, including engineers, lawyers, bankers, accountants, and environmental professionals, as well as to undertake land surveys, subsurface geotechnical studies, and other data-gathering exercises. PDF funds can be used to assess wind or solar resources and hire independent professional service providers to deliver industry-class data that bidders can use to formulate engineering designs and financial proposals. These professional services are also subject to standard tendering and procurement procedures. For example, the Philippines PPP Center has a separate e-procurement portal for consultant services as part of its Project Development and Monitoring Facility.

Indonesia's PPP regulations similarly provide guidelines for many of these procedures. Despite this, the country's electric power sector rarely receives extensive external advisory and project development support to assist the national utility, PT Perusahaan Listrik Negara (PLN). Further,

PLN usually acts as its own bidding and contracting authority. Under PLN's model, typically, development support is limited to bidding and contractual documents rather than broader preparatory activities like physical site selection, data gathering, and preliminary engineering works that would be privately financed. These omissions may have impacted the pace and nature of Indonesia's renewable energy development. At the end of 2024, Indonesia delivered only an aggregate of around 717MW of utility-scale solar projects, which only happened after extended negotiation periods. Contrastingly, China added over 750MW of solar capacity *per day* in 2024 alone. A different approach is needed if Indonesia is to accomplish the renewable energy goals outlined in national plans.

Financial Obligations: Considering a Centralized Power Purchasing Authority

A fiscally sound government counterpart is required to support contracts and finance agreements if a country is to implement a sustained, large-scale renewable energy procurement program.

Saudi Arabia offers an example of what is needed to achieve an exceptionally rapid and large-scale rollout of renewables. The country aims to supply 50% of its electricity demand with renewables – primarily solar – by 2030. Announced in March 2021 as part of the Saudi Green Initiative, the task was challenging, requiring progress from effectively zero to 50% of electricity supplied from renewables in just over eight years. As of the end of 2024, 3.5GW of solar projects have been commissioned, bringing the total operating capacity to 5.7GW. 5GW of solar is under construction for 2025, and another 10GW is planned for 2026. Overall, the target for 2030 is to have tendered projects exceeding 100GW of renewable generation capacity.

The crucial element for achieving this target has been the establishment of two important entities: the Renewable Energy Project Development Office (REPDO) within the Ministry of Energy, which fulfills the project preparation and tendering role, and the Saudi Power Purchasing Company (SPPC), which serves as the "principal buyer." The SPPC was created as a separate entity from the state-owned electric power utility, the Saudi Electric Company (SEC). The SPPC is a credible central contracting counterparty supported by the Ministry of Finance.

The SPPC established an online tendering portal to provide a single window for information disclosure and bidder information delivery for all projects under the Saudi National Renewable Energy Program. Meanwhile, the national utility SEC has been relieved of tendering duties, allowing it to focus on managing the grid's rapid development, expansion, and operation to ensure it can accommodate the large-scale addition of renewables that the Saudi Green Initiative will generate.

The SPPC has run six rounds of bidding for wind projects and five rounds for solar projects. Each round has secured multiple projects from multiple developer-investors. Depending on the available site and transmission interconnection capacity, each bid-out project ranges from 90MW to as much as 2,500MW.

The Saudi government recognizes that these signings, in significant quantities over a short period, will result in mounting public sector contractual liabilities. This requires government support for these projects, overseen by the Ministry of Finance, to ensure tight fiscal compliance. This carefully considered approach has led to the country's solar procurements achieving record lows for 2024. The 2,000MW Haden Solar Photovoltaic (PV) project in Makkah Province achieved a levelized cost of electricity of USD1.58762 cents per kilowatt-hour (kWh) over its 20-year agreement.

Despite the cost optimizations achieved through tendering, these contracts remain long-term contingent liabilities that must be actively managed to prevent burdening the national budget. Centralizing management under the Ministry of Finance can reduce risk and enforce performance. Therefore, a centralized, top-down public fiscal risk management approach can be advantageous.

The Saudi SPPC arrangement provides power purchase agreement (PPA) buffering and protection during economic or fiscal difficulties. A central power purchasing authority can be risk-wrapped by the Ministry of Finance and aided by other guarantees or liquidity support from multilateral development banks. The risk is pooled and does not have to be handled on a project basis, making intervention expedient and less likely to lead to default.

Many new projects will be needed in a short period. Consequently, the highly standardized, government risk-wrapped, single-buyer model is an effective tool.

Figure 3: Saudi Principal Buyer Scope of Responsibilities

Source: Saudi Principal Buyer

The Saudi sovereign wealth fund, Public Investment Fund (PIF), announced its intention to promote the country's 2030 agenda through supportive financing. Accordingly, it formalized a national green financing framework, backed by an independent Second Party Opinion, to help raise sustainability-oriented finance and deploy those funds to achieve sustainability-aligned goals. PIF has undertaken to provide green finance to support up to 70% of the renewable

energy investments targeted under the national strategy. The Fund has undertaken two green bond issues totaling USD8.5 billion to date.

The government of Saudi Arabia is taking a comprehensive approach to the energy transition. It combines the developmental leadership of REPDO to create projects for tender, allowing the SEC to focus on improving grid operations. This approach is backed by the Principal Buyer, who provides credible financial support for renewable energy PPAs with private developers. It also facilitates investment by making PIF funding available to co-finance these projects.

Indonesia's Current Challenges in Renewable Energy Development

Indonesia's 192MW Cirata floating solar project is a significant milestone in the country's solar development. It is a successful example of floating solar, a unique subset of solar farm development. However, the project faced several challenges. PLN subsidiary PT PLN Nusantara Power partnered with United Arab Emirates-based Masdar and took over three years to negotiate the project and financing agreements for the plant. It took a further three years from contract signing to construct and commission. While some of this extended timeline can be attributed to the unique floating nature of the project and the COVID-19 pandemic, there were also fundamental difficulties in reaching a commercial agreement.

Challenges arose in two areas: local content requirements and the commercial terms that PLN demanded from Masdar. Cirata was a first-of-its-kind project in Indonesia, and many floating components were not manufactured in the country. Further, during negotiations, the strict provisions for local content in solar PV panels faced a similar issue. The key parts of solar cells and panel components were not manufactured by any Indonesia-based entity and, like most nations, were imported from China to be assembled in-country. On the commercial side, there were reported to be onerous demands on equity shareholding and profit sharing, in addition to other challenging contractual terms that led to extended negotiation periods.

The Need to Significantly Scale Up Procurement and Delivery

Given the scale of Indonesia's renewable energy development plans, project timelines need to be streamlined. The most effective way is by simplifying and standardizing the overall project procurement process. This requires using global standard contract agreements that are fair and balanced between the public and private sectors and neutral toward whether investors are domestic or foreign. This is an area where Indonesia could improve. As the Institute for Energy Economics and Financial Analysis (IEEFA) has previously highlighted, imbalanced risk allocations, reflected in contract terms and unrealistic financial investment frameworks, have impeded the private sector's ability and willingness to participate in renewable energy development. This has contributed to extended delays in negotiations and few project completions.

There will need to be multiple ongoing projects in various stages of development, bidding, and implementation each year over the next 15 years if Indonesia is to meet its proposed renewable energy buildout. This effort is complicated by the wide geographic distribution of opportunities, the varied project sizes, and the need for integration into the national grid. The country's electric power sector will need a smooth project preparation and tendering system to manage multiple proposals simultaneously. To succeed, this should work in parallel with PLN's intended transmission and distribution grid planning and improvements, as detailed in the RUPTL 2025-2034.

Unfulfilled Demand for Renewable Energy from Indonesia's Private Sector

The Indonesian government should anticipate numerous unsolicited proposals from the private sector and have plans to avail these opportunities. Business entities are likely to have access to sites that may be unknown to PLN or have near-to-site end uses for renewable energy. These may include clean energy use for their company's facilities or industrial parks.

There is substantial unfulfilled demand for renewable energy supply amongst corporate entities in Indonesia. For example, more than 130 members of RE100 operating in Indonesia are committed to achieving 100% renewable energy supply by 2040. Collectively, these companies represent several gigawatts of potential energy demand, and many are willing to invest their own capital to meet their individual renewable energy goals on accelerated timelines.

To date, PLN has been unable to fulfill RE100 company renewable energy goals due to a lack of new project realization. PLN may face challenges in balancing its own development of renewable supply projects with private sector demands to increase its own renewable energy access. However, this creates the potential to add significant new renewable capacity without using public sector budgets. Managed appropriately, this could be a win-win for the utility, corporates, and the country's decarbonization plans.

A new approach to project tendering is needed to meet Indonesia's renewable energy targets. For the past few years, PLN has struggled to sign its relatively limited pipeline of projects under tender. The proposed Golden Indonesia 2045 plan and the national decarbonization strategy will require the state utility to manage a significantly higher volume of projects than it currently does and to deliver those projects efficiently and consistently. PLN could benefit from the support of a national project development and negotiating task force that is robustly staffed with the full range of experts required.

How Can Indonesia Accelerate Renewable Energy Deployment?

Indonesia's 75GW renewables program needs to deliver multiple gigawatts annually for the next 15 years and beyond. Dozens of tenders will need to be issued, bid, and signed consistently every year. However, PLN has struggled to work with a far smaller number of projects. Taking bespoke approaches to each project, leading to complex terms and challenging negotiations, has led to sluggish progress. These projects are complex undertakings, requiring the integration of engineering, legal, financial, and commercial considerations to form a balanced deal. Formats should be simplified, standardized, and streamlined in a balanced and advantageous manner for both PLN and investors.

Establishing a New Renewable Procurement Infrastructure

Indonesia would benefit from increasing the human and financial resources allocated toward identifying, structuring, and delivering renewable energy projects. A new renewable energy tendering infrastructure is needed to produce approved, bid-ready projects for implementation using a scaled-up, standardized, replicable, and reliable process.

Simply stated, renewable energy procurement needs to look more like a manufacturer's assembly line to achieve national goals — one that repeatedly produces project after project in a high-quality, standardized, reliable manner. Such a production line requires templates, inventory, and highly skilled labor for synchronized output. Therefore, Indonesia needs a renewable project procurement infrastructure to deliver its targeted 5GW of investment annually.

The country needs dozens of projects in various stages of development at any given point for years to achieve its renewables targets. This is because of the varied nature of projects, ranging

from straightforward and predictable to challenging and with unexpected hurdles. Additionally, not all projects that are considered will progress to completion. Preparatory activities will inevitably lead to certain proposals not meeting selection criteria. Therefore, there needs to be sufficient redundancy in project volumes under processing.

Scores of skilled personnel, including engineers, lawyers, accountants, procurement professionals, team managers, and clerical staff, are required to support the government with project development. Since all these human resources are unlikely to be available in-house, the government would need to procure external professional support to augment their teams.

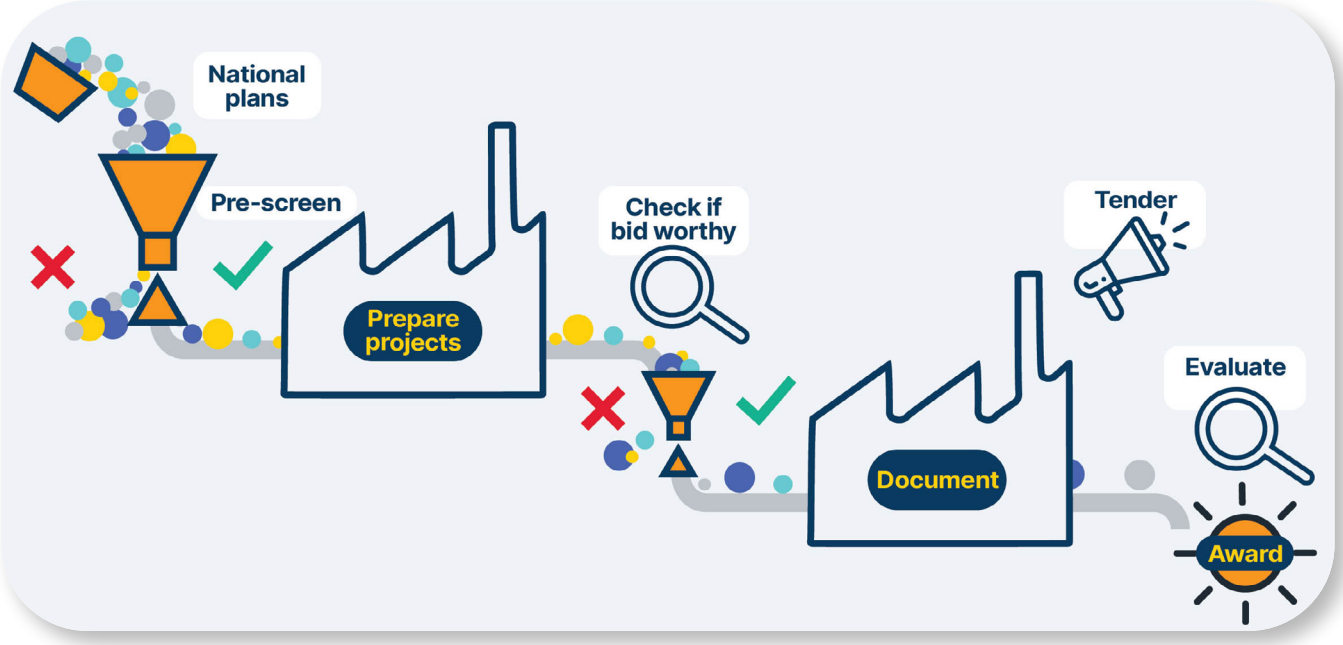
Currently, Indonesia does not have the scale of procurement activity or the comprehensive managerial infrastructure to implement such a plan in one place. The skills and resources of many entities will be required to build up the scale to achieve these goals.

Rumah Paten May Provide the Tender Infrastructure's Foundations

Indonesia has taken the inaugural step towards creating this infrastructure by launching the National Energy Transition Action Design House, or Rumah Paten, in January 2024, created to support work under the Just Energy Transition Partnership (JETP). This is a physical site where government ministerial and institutional partners can meet to coordinate actions to implement the national energy transition plan. Rumah Paten brings together the Coordinating Ministry for Maritime Affairs and Investment, Coordinating Ministry for Economic Affairs, Ministry of Energy and Mineral Resources (MEMR), Ministry of Finance (MOF), Ministry of State-Owned Enterprises, Ministry of Environment and Forestry, PT Sarana Multi Infrastruktur (SMI), and PLN. This forms a coordinating secretariat that can work together to identify, debate, and solve problems, providing direction for those undertaking implementation activities.

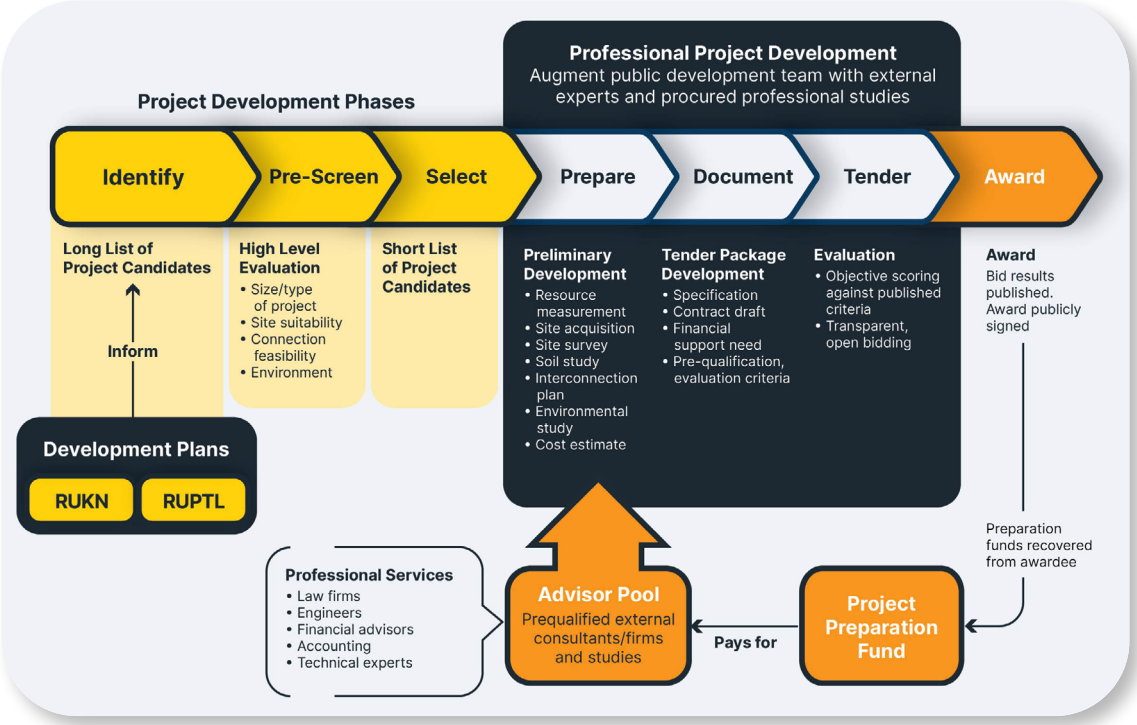
Rumah Paten's cross-organizational coordination could help clear hurdles through direct consultations among key stakeholders, allowing quicker decisions. Acute challenges that arise on a project or across multiple projects that impact aspects like grid access could be addressed swiftly.

Figure 4: The National Tender Infrastructure Production Line



Source: IEEFA

Figure 5: Elements of a Tender Production Line



Source: IEEFA

PT Sarana Multi-Infrastrukur (SMI) – PPP support services

SMI could assist PLN as a supporting partner in initiating project development and tendering. The entity was established in 2009 to coordinate and deliver preparatory work for the country's wider infrastructure PPP program. SMI has delivered more than 400 infrastructure projects worth over USD69 billion.

Through its project development and advisory services arm, SMI can help arrange project development funds and services. The entity often manages the procurement of professional services that PDFs support and oversees and coordinates delivery. This could be useful in supporting the national tender infrastructure's development work.

SMI's role has expanded to include financing, covering expenses needed for project preparation and development facilities, and long-term capital co-financing for tendered projects. Combining SMI's experience and resources with PLN's technical expertise could increase the flow of projects and achieve sustainable outcomes.

Pre-bid project preparatory services can deliver value for both the government and participating private parties. Defining critical elements upfront helps all parties understand the project's parameters and potential risks. It also creates a level playing field among interested bidders. Upfront public sector development services assist in lowering risk. Bidders appreciate the

certainty this approach provides for their proposed investment.

Additionally, the public sector's initial investment in project preparation reduces bidders' initial expenditures. Thus, government contracting entities involved with these PPP bids often include a PDF cost-recovery payment as part of the bidding terms. The winning bidder pays the government back for the preparatory investment, and the government can recycle that PDF money into the fund to help prepare for future projects.

Tapping Investment Resources, Driving Financial Efficiency

Since PLN is now a member company under the national state-owned enterprise (SOE) holding company Danantara, the parent company can reasonably demand stronger financial performance. Renewable energy projects, especially solar power, are far more cost-efficient than any other form of energy. Enhancing renewable energy deployment could alleviate financial performance pressures created by other investments. As part of a larger holding company, PLN could benefit from access to additional financial resources to improve the selection, preparation, and closing of projects with the private sector. Furthermore, co-financing resources from Danantara or Indonesia's sovereign wealth fund, Indonesia Investment Authority (INA), could co-finance private sector investment, similar to PIF in Saudi Arabia.

Partnering with Global Financiers for the Energy Transition

There is broad interest in seeing the Indonesian government successfully implement energy transition investments from the countries, private sector banks, and philanthropic organizations supporting the USD20 billion Just Energy Transition Partnership (JETP). JETP comprises support from eight governments, private sector financiers from the Glasgow Financial Alliance for Net Zero (GFANZ), and philanthropy.

The program has spurred the government to create the Comprehensive Investment and Policy Plan, with over 400 projects totaling about USD100 billion. The multilateral development banks have missions to maximize their support for sustainable energy and climate-resilient investments, and Indonesia is a primary focus. Over 130 private industrial and commercial entities in Indonesia have renewable energy mandates to fulfill and a willingness to invest. However, as IEEFA has previously highlighted, access to JETP support will require prioritization, processes, and transparency. The elements covered in this paper – solar farms, project preparation, and centralized contracting – are strategies that can significantly help to achieve these goals.

Conclusion

Countries around Asia have demonstrated that adding gigawatts of renewable capacity over short periods is possible. A viable pipeline of prospective projects that can be rapidly, reliably, and repeatedly realized over many years is needed to achieve this goal. The government should have a skilled and experienced project development team supported by adequate funds to cover project preparation costs. A public counterparty that provides financially credible and commercially resilient contracting capabilities can be beneficial.

These aspects are possible in Indonesia through entities like SMI, sovereign funds such as INA, state bodies like PLN, MEMR, and MOF, and overall corporate leadership from the newly formed Danantara. Proposals and interest from groups supporting JETP and the GFANZ demonstrate an offshore interest in funding these efforts, and domestic banks can also finance

many renewable projects. The achievement of the 75GW renewable energy program requires strong organization, urgent action, and rigorous discipline.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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Grant's experience spans over 30 years in 30 different countries, covering energy markets and infrastructure public-private partnerships (PPP). Across Asia, he has garnered expertise as a project developer in both renewable and conventional electricity, a project finance investment banker, and energy asset strategist. More recently, he served as a Principal at the Asian Development Bank in Manila, spearheading creation of the bank's PPP Operational Plan and advising governments across South and Southeast Asia how to integrate PPP principles into their public investment planning.

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