CASE for Southeast Asia

On behalf of

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

of the Federal Republic of Germany

Final Report

De-risking Facilities for the Development of Renewable Power Sector in Indonesia

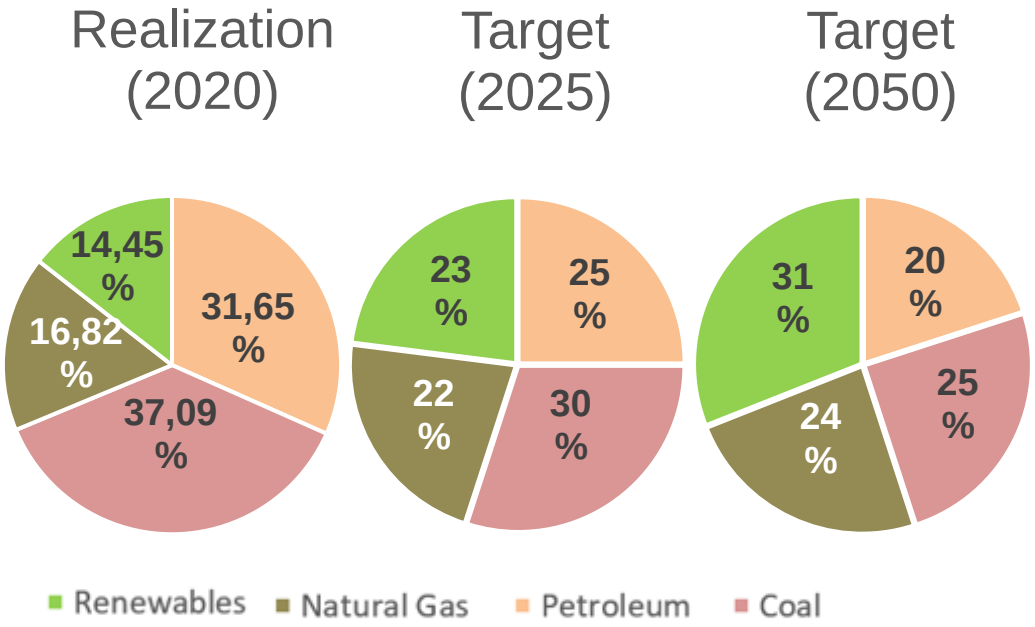
on behalf of Clean, Affordable and Secure Energy (CASE) for Southeast Asia

Background

Introduction to Indonesia’s Renewable Power Sector

Indonesia's Renewable Energy Target

Energy Realization and National Energy Supply Target According to the National Energy Policy (KEN)



Source: Ministry of Energy and Natural Resources (2017 and 2020)

Summary of Indonesia's Renewable Energy Policies:

1. Indonesia's **Nationally Determined Contributions**, first issued in 2017 targeted renewable energy contribution of 23% by 2025 and 31% by 2050 to total energy supply, which was adopted to **National Energy Policy (KEN)**. **Recent update** to **NDC** in 2021 added improvements to the strategies of achieving the RE targets.
2. **National Energy General Plan (RUEN)**, issued through Presidential Regulation No. 22/2017, outlining energy management plan for 2017-2050.
3. RUEN serves as the document reference for **General Plan of National Electricity (RUKN)**, **the Electricity and Supply Business Plan (RUPTL)**, and national and local government planning documents. Recent release **of 2021 – 2013 RUPTL** in 2021 aims to increase renewable power proportion to at least 48%, increasing from 30% in the 2019 – 2028 RUPTL.
4. The Long-term Strategy on **Low Carbon and Climate Resilience (LTS-LCCR 2050)** sets adaptation pathway goals by increasing resilience in 4 basic necessities (water, food, environmental health, and energy).
5. Ministry of Development Planning has established the **Low Carbon Development Indonesia (LCDI)** which outlines climate-resilient development policy between 2020 – 2025.

Indonesia's Lagging Renewable Power Sector

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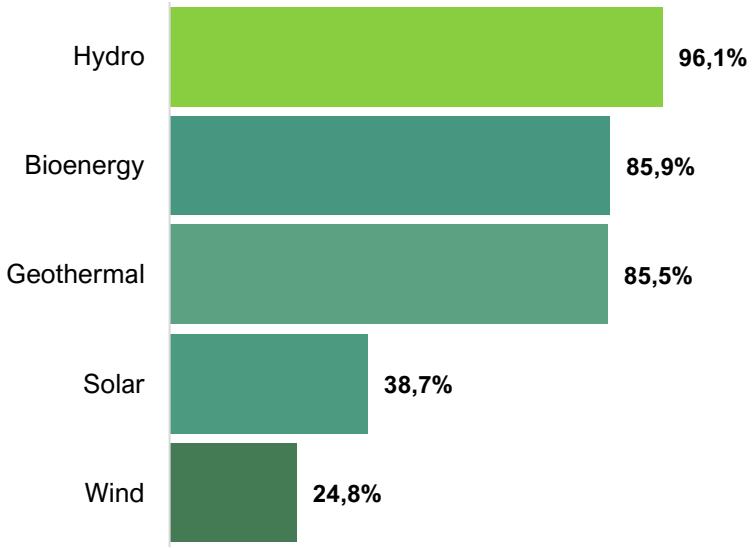
Despite the increasing push for renewable policies, Indonesia's renewable power potential is still underutilized and behind conventional energies in production.

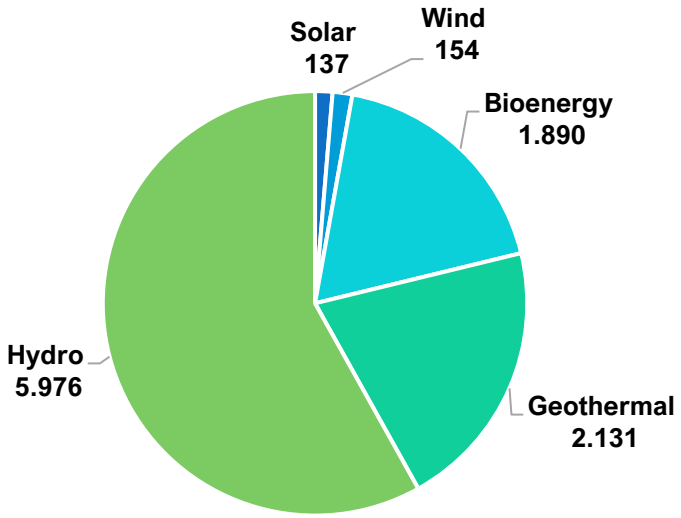
RE Potential (in GW), Installed Capacity (in MW), and Utilization Rate

Energy	Potential*	2020 Capacity**	Utilization (%)
Hydro	94.3	5 176.29	5.49%
Geothermal	28.5	2 130.7	7.48%
Bioenergy	32.6	169.12	0.52%
Solar	207.8	123.84	0.06%
Wind	60.6	153.83	0.25%
Ocean	17.9	0.0	0%
Total	441.7	7 753.78	1.76%

Realization of Renewable Power Generation (% of Target)***



Realization of Renewable Power Generation (MW), 2019***



- Overall, renewable energy are utilized at only 1.76% rate, with the highest being hydropower (7.48%) and geothermal (7.48%). Despite being the highest potential (207.8 GW), solar energy is among the least utilized at only 0.06%.
- In 2019, Hydro power generator has the highest level of progress from realization (around 96% of target), with the amount of power generated are up to 5,976 MW.
- Meanwhile, solar and wind generator are among the types of renewable energy with the lowest realization-to-target progress. Solar and Wind also have the lowest contribution in terms of energy generated in 2019.

*Source: *National Energy Council (2019), **Ministry of Energy and Mineral Resources (2019), ***Ministry of Energy and Mineral Resources (2020)*

Background

Barriers to Indonesia’s Renewable Power Sector Development

The Relatively Higher Cost of Renewable Power

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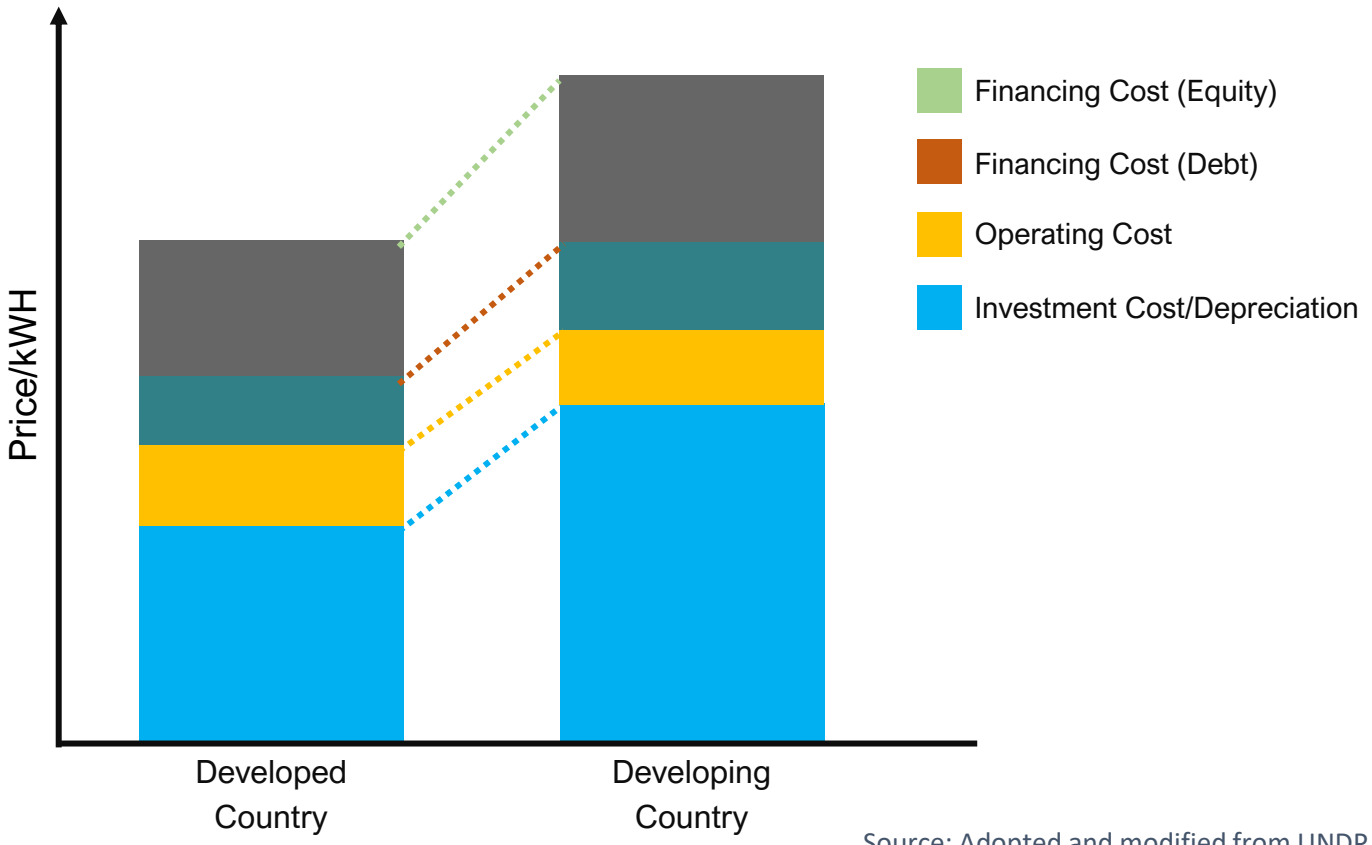
While prices are in decline globally, renewable power in developing countries still lacks cost competitiveness in comparison to conventional energy

Factors contributing to the higher cost of renewable power in developing countries:

1. The lack of infrastructures needed to establish renewable power generator sites
2. The higher cost of providing or procuring technology that otherwise would have been more available and easily accessible in developed countries
3. Financial instruments tailored to address the risk specific to renewable power projects are relatively less available and less developed
4. Transaction costs to finance small renewable power projects

Energy Cost Structure Illustration



Source: Adopted and modified from UNDP (2013)

Renewable Project Risks Across Phases

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Explanation on Development Phase Risk Level

- While the amount of capital required to invest in the development phase is lower, the risk is generally higher as the failure of development phase may turn invested capital into sunk cost immediately

Explanation on Construction Phase Risk Level

- The phase with the highest amount of capital requirement
- Affected by how good risks in development phase are addressed- risks may continue to construction phase if not managed properly during development phase

Risk Bearer	Development Phase (Medium to High Risk Level)	Construction Phase (High to Medium Risk Level)	Operational Phase (Low Risk Level)
Developer	▪ Unfavorable findings of energy resource assessments, inappropriate site locations, and failure in project design & technology development ▪ Lengthy and uncertainty in bureaucratic process for permits and legal administration ▪ Changes in rules related to the off-take agreement (incl. pricing policy) & grid connections ▪ Resistance & disputes related to land acquisition process & societal issues	▪ Unsuitable actual site conditions & equipment ▪ Change in natural conditions, including disasters ▪ Resistance and disputes related to land acquisition process & societal issues ▪ Construction accidents ▪ Unreliable engineering, procurement, & construction (EPC) partners ▪ Changes, uncertainty, length, and complexity regulatory process	▪ Changes in economic & energy policies affecting the marketability of renewables ▪ The high uncertainty and the complex structure of regulatory frameworks and bodies in Indonesia ▪ Technical failures & its hazards ▪ Disruptive industrial & market trends
Financiers	▪ Asymmetric information in the understanding of project risk profile, such as - The unassured quality of outsourced consultants' project assessment - Unanticipated land acquisition issues - Unanticipated societal resistance	▪ Asset loss due to the materialization of risks faced by developers ▪ Asset illiquidity	▪ Repayment failures of developer

Source: Halimatussadiah et. al. (2019), Authors' Analysis (2021)

Project Risks According to Renewable Power Types

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Renewable Power Type	Development Phase	Construction Phase	Operational Phase
Solar	▪ Extensive installation areas ▪ Problems in land acquisition and obtaining location permit ▪ Specific location requirement– areas with high sunlight intensity	▪ Resistance from local communities	▪ Expensive energy storage (if apply) ▪ Inconsistent weather reliability ▪ Waste toxicity
Wind	▪ Problems in land acquisition and obtaining location permit ▪ Specific location requirement– areas with high wind intensity	▪ Safety hazard & nuisance to local wildlife & nearby populations ▪ Resistance from local communities	▪ Expensive energy storage ▪ Inconsistent weather reliability ▪ Hazards to local wildlife (birds) and nearby populations
Hydropower	▪ High upfront capital investment ▪ Complicated processes to undergo to ensure minimum environmental impacts ▪ Possible problems in land acquisition and obtaining location permit	▪ Structural failures ▪ Local community resistance ▪ High interconnection cost ▪ Construction delay and cost overrun	▪ High interconnection cost ▪ Structural failures ▪ Susceptibility to droughts
Geothermal	▪ High upfront capital investment ▪ High project development costs	▪ Surface instability effects ▪ Harmful gas hazards ▪ High interconnection cost ▪ Construction delay and cost overrun	▪ High interconnection cost ▪ Safety hazards – harmful gas leaks, earthquakes
Bioenergy	▪ Feedstock distance to grids ▪ Landuse expansion risk from virgin feedstock use		▪ Disruption in the availability of bioenergy feedstocks

Source: Authors' Analysis (2021)

Background

Potential De-risking Instruments for Indonesia’s Renewable Power Sector Development

Understanding De-risking Instruments

De-risking instruments address the existence of risks particularly related to renewable energy, increasing its investment attractiveness and enabling more funding sources to develop the sector.

Policy De-risking Instruments

- Address sectoral risks by seeking to **remove** the underlying barriers that are the root causes of the risks
- Utilize policy and programmatic interventions to mitigate risks.

Financial De-risking Instruments

- **Transfer** the financial risks of renewable power projects from financing institutions to other actors, such as public institutions & development banks
- Usually in the form of financial products and/or arrangements

Source: UNDP (2013)

Policy De-risking Instruments

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1. Improving Renewable Energy Target Clarity & Policy Coherence
2. Reforming Pricing & Subsidy Policies
3. Creating Effective and Efficient Permit & Procurement Process
4. Increasing Project Risk Management Quality by Providing Ratings & Technical Support
5. Increasing Project Feasibility & Credibility by Facilitating Research, Project Development, and Capacity Building

Improving Renewable Energy Target Clarity & Policy Coherence

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Policy adjustment to improve clarity, consistency, coherence, and credibility is needed to address the inconsistency and the obscurity of Indonesia's renewable energy policy.

Summary of Key Risk Issues

- Policies have different approaches, as RUEN (which serves as the reference document for RUKN) uses top-down approach while RUPTL are set in bottom-up approach, employing different modellings & assumptions.
- As a result, plans are inconsistent with **different targets** & energy mix trajectories (RUKN & RUPTL)
- Plans with top-down approach also often involve overoptimistic on economic growth, demands, and capacity additions.
- Unclarity still exists in defining **the role, the responsibility,** and the involvement of different stakeholders (government bodies, developers, financiers) to achieve renewable energy targets.

De-risking Policies

- Investigating whether current renewable energy policies are **aligned**, given recent development (update on new NDC, LTS-LCCR) and the changing nature of some policies (RUPTL, which is updated annually)
- Undertaking adjustments to ensure the **clarity, the consistency, the coherence, and the credibility** of national renewable energy policies.
- Outlining clear & detailed **implementation plan** in national energy policies, which should include all relevant information such as **stakeholder engagement, specific geographical mapping of potential projects,** and its **risks**.

Source: IESR (2018), Authors' Analysis (2021)

Reforming Pricing & Subsidy Policies

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Transitioning towards a more renewable-friendly pricing and subsidy policy can further lowers the barriers of renewable power development.

Summary of Key Risk Issues

- **Unattractive and persistent changes in pricing policy**
- PERMEN ESDM 50/2017, as amended through 53/2018, determines a price ceiling policy for renewable power in areas where regional cost of electricity production (BPP) is more than the national average, preventing developers from entering the renewable power market.
- Ceiling on consumer power prices and the domestic market obligation (DMO) on coal incentivizes The State Electricity Company (PLN) to lower its cost by procuring power from fossil-fuel sources with lower costs to renewable sources.
- There is a lack of incentives for renewables relative to brown energies, as fossil fuels have been subsidized for years and the government applies DMO on coal, which also creates contribute to BPP being biasedly lower than the cost of renewable powers

De-risking Policies

- Shifting pricing policies from not favoring the transition to renewables (price ceiling for renewable power, consumer power price ceiling, and price ceiling in coal DMO).
- Creating a more appropriate subsidy policy by reducing subsidy from brown energy and adding subsidy to renewable power. Carbon tax instruments may also serve as a catalyst to transition from brown energy.

Source: IESR (2019), MoEMR & MoF (2019), ADB (2020b), Authors' Analysis (2021)

Creating Effective and Efficient Permit & Procurement Process

Streamlining permit process & improving the certainty of key procurement aspects are important to overcome the barriers of renewable power development in Indonesia.

Summary of Key Risk Issues

- Permit process can be unclear, lengthy, & hard to acquire (especially for projects that require large land acquisition and extensive impact studies), causing time uncertainty which leads to increasing costs and financing obstacles.
- There is an uncertainty for procuring opportunity in alignment with the plans and the targets of RUPTL
- Procurement assessment can be time-consuming, cumbersome, and less reliable for Independent Power Producers (IPPs), incurring high administration costs. PPA contract arrangement is based on negotiation, putting small-scale developers with lower bargaining power at a disadvantage
- Impartial resolution of conflicts between IPPs and PLN is uncertain

De-risking Policies

- Streamlining renewable energy permit process and enforce transparent practices, fraud avoidance mechanisms, & corruption control
- Providing more procuring opportunity for IPPs as outlined in the plans and the targets of RUPTL, with most developers are expecting more tender bid opportunity and the implementation of feed-in-tariff contracts
- Improving consistency in PPA contracts by providing contract standards to enhance efficiency and equity.
- Improving the certainty of impartial dispute resolution between IPPs and PLN
- Ensuring the objective role of institutions to reduce potential rent-seeking behavior to create a more efficient market mechanism (i.e. reconsideration of the roles of institutions such as serving both as energy buyer and provider)

Source: ADB (2019), Authors' Analysis (2021)

Increasing Project Risk Management Quality by Providing Standards, Ratings, & Technical Support

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The provision of standards, ratings, & technical support may help to address the asymmetric information and unanticipated risk problem in Indonesia's renewable power sector.

Summary of Key Risk Issues

- With the niche market nature of renewable powers, there is no formal standard for project development, resulting in asymmetric information problem in the sector
- Financiers are often unable to fully understand and verify the assessment results of outsourced consultants in the evaluation of the risk level of renewable power projects
- Not all developers, especially the small ones, are able to inform potential financiers their risk profile due to the inaccessibility of hiring outsourced consultants
- Renewable projects often experience the materialization of unanticipated risks, such as land acquisition, social & political resistance, and natural disaster events, that requires the assistance of relevant government agencies

De-risking Policies

- Establishing a formal project assessment standard as a best-practice reference for risk evaluation.
- Providing a rating on renewable projects and a rating or other forms of evaluation on the credibility of assessment consultants.
- Ensuring the availability of relevant public institutions in providing technical support during risk assessment and mitigation, and strong & coherent coordination across institutions at national and sub-national levels
- Developing pilot models for the mitigation of common project risks.

Source: Authors' Analysis, 2021

Enhancing Project Feasibility & Credibility by Facilitating Research, Project Development, and Capacity Building

Research, project development, and capacity building can reduce the risks during development phase, prevent possible decrease in competitiveness, and enhance the credibility of local developers

Summary of Key Risk Issues

- Developers often face the highest level of risk during development phase when an unsuccessful development attempt may immediately turn into a sunk cost.
- Additionally, project development research is important but often too costly for private developers to conduct on their own.
- Concerns are often raised on the credibility of local small-scale developers in conducting renewable power projects.

De-risking Policies

- Providing project development facilities, which mainly include development financing and technical assistance.
- Research and development (R&D) facilities by providing fiscal incentives through increase in public funding for renewable energy (R&D) and technical supports including access to public research equipment, instruments, & personnel.
- Project development research may also include government-supported exploration projects and dissemination of national research findings.
- Capacity building includes industry training, apprenticeship programs, industry conferences, and university programs to build skills in renewable energy sector (planning, construction, and operations & marketing)

Source: Authors' Analysis, 2021

Financial De-risking Instruments

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Guarantee Provision	Performance-based Lending	Asset Securitization
Green Bonds	Seed Capital	Convertible Grants
Asset Aggregation	Mezzanine Financing	Concessional Debt

Guarantee Provision

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Entities can provide guarantee for the project of renewable energy or even for the financing in case of default.

- Guarantee plays an important role in financing the renewable projects as most projects have underlying risks from the project itself to the financial and regulatory risks (EIU, 2011).
- Guarantee provision can manifest in the form of project guarantee and financial guarantee.
- Government and non-government entities can be the guarantee providers for the renewable energy projects.

Types of Guarantee Provision

		Guarantee Providers	
		Government	Non-Govt. Guarantors
Object of Guarantee	Project	V	V
	Financial	X	V

Source: Authors' Analysis (2021)

Performance-based Lending

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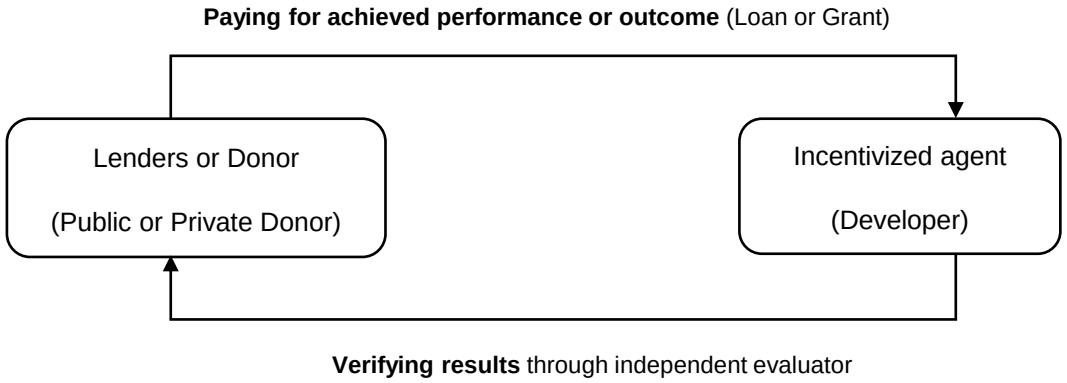
Disbursements of the lending are linked to certain agreed criteria, such as results, rather than to upfront expenditure.

- The aims of PBL are to increase project developer's accountability and give incentive to them to deliver good and sustained outcome of the projects.
- The key players of the instrument are lenders (usually private donors) and incentivized agent (developers).

Performance-based Lending Scheme



Source: World Bank (2018)

Asset Securitization

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Asset Securitization transforms an illiquid asset or a group of assets and aggregates them through financial engineering into liquid assets in the form of security.

- Asset securitization can lower the liquidity risk of renewable energy and increase investors' appetite in investing to such projects.
- One of the asset securitization in Indonesia has been deployed by PT Sarana Multigriya Financial to finance infrastructure projects.
- However, financing through asset securitization has not been used for renewable energy projects in Indonesia.

Green Bonds

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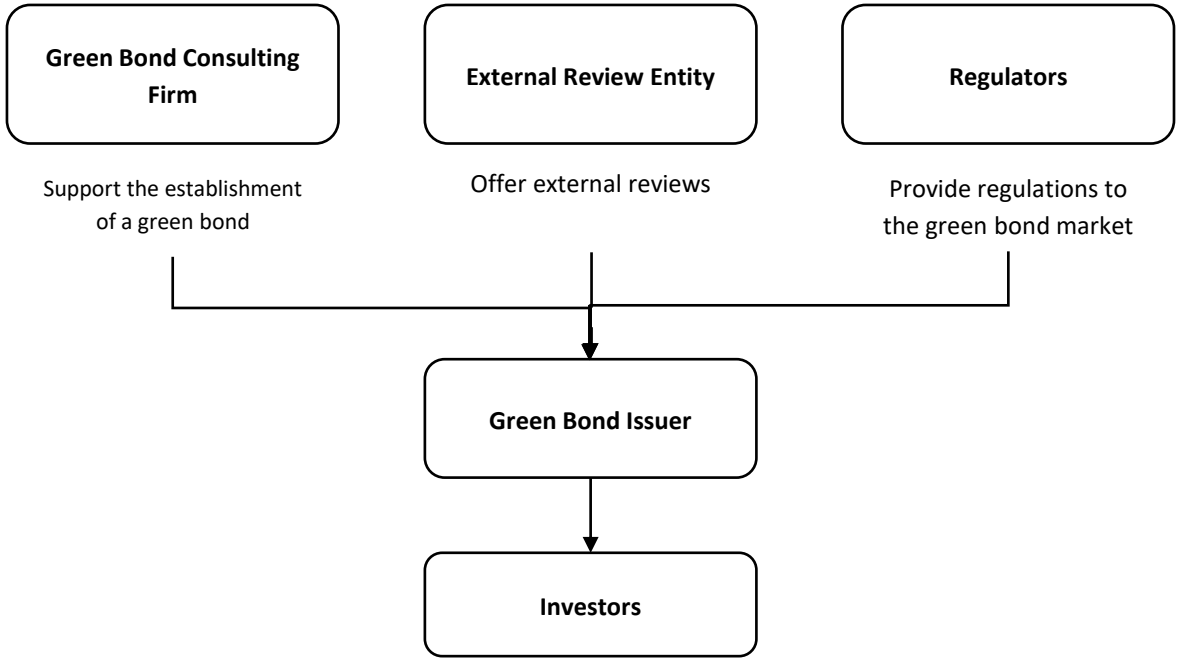
Green Bonds serve as an alternative instrument that can facilitate and bridge the capital on the financial market to renewable energy projects.

- One of the issues of green bonds development is that the green bonds market is still relatively small compared to conventional bonds.
- The development of the green bonds market can increase the accessibility of renewable energy projectors to a bigger pool of funds.
- The key players in green bonds financing scheme are the green bonds issuers, investors, and also the green bonds issuance supports.

Green Bonds Scheme



Source: World Bank (2018)

Seed Capital

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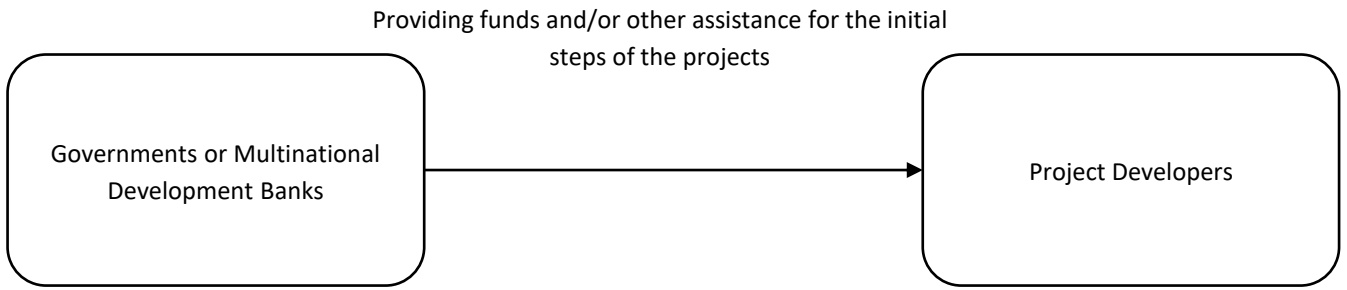
Provision of a certain amount of initial investment in a renewable energy project to spur private investment and capital raising.

- Seed capital is money used for the initial investment in a project or start-up company, for proof-of-concept, market research, or initial product development (ADB, 2007).
- Seed capital is usually provided by the governments or Multinational Development Banks (MDBs).

Seed Capital Scheme



Source: Authors' Illustration (2021)

Convertible Grants

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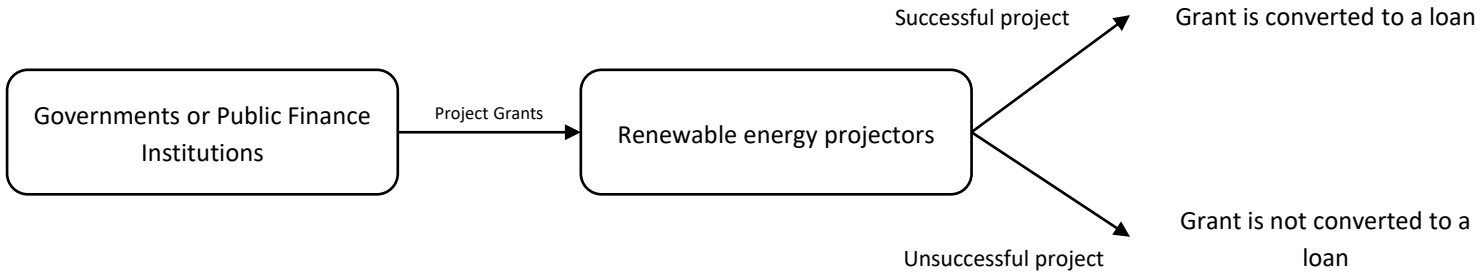
A grant that is usually provided by the government or public finance institutions that can be converted into a loan.

- Convertible grants specifically targets the high risk of exploration drilling, providing a safety cushion for projects to buffer against unsuccessful drills (GGGI, 2019).
- If exploratory drilling turns out to be successful, the grant is converted to a loan and the project has to repay 80% of the funds received.
- However, if it is unsuccessful, there is no financial commitment to repayment and the grants are not converted to loans.

Convertible Grants Scheme



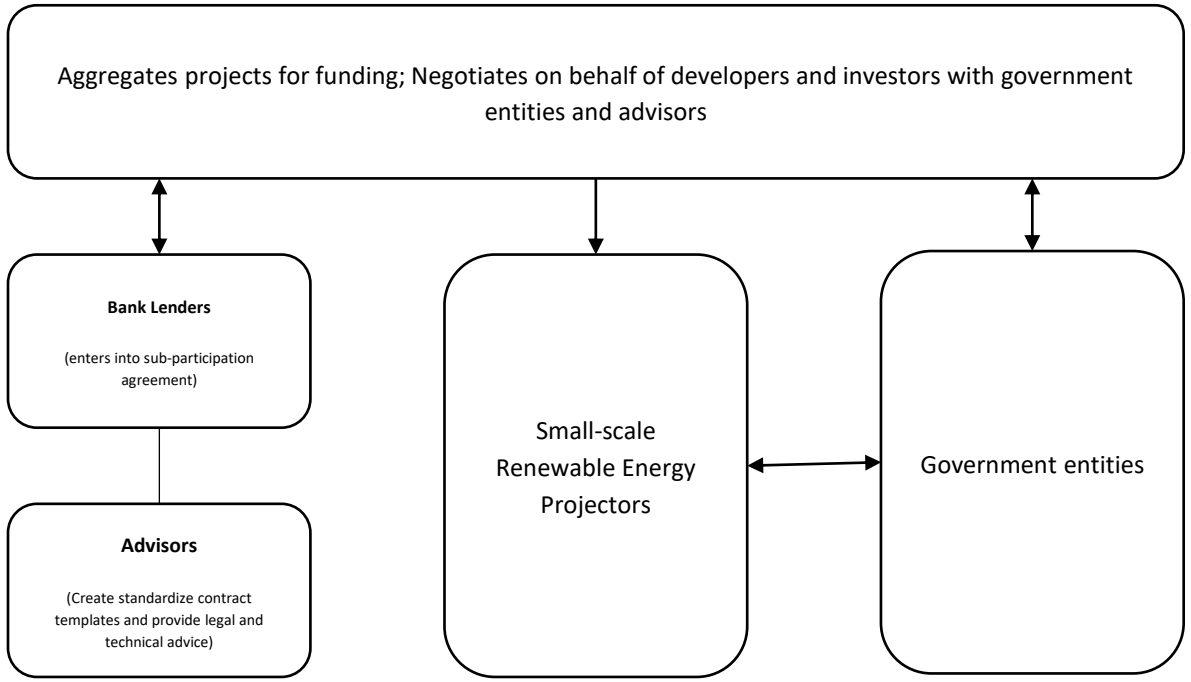
Source: Authors' Illustration (2021)

Asset Aggregation

Aggregating smaller-scale renewable energy assets can help scale up the investment volume and reduce due diligence costs per project for institutional investors.

- Renewable energy tends to vary in terms of size, while the transaction and due diligence cost tend to be similar for all project sizes, creating a disadvantage to smaller-scale projects.
- Aggregation in the renewable energy sector is not limited to financial aggregation, but also demand aggregation, projects aggregation, and information aggregation.

Asset Aggregation Scheme



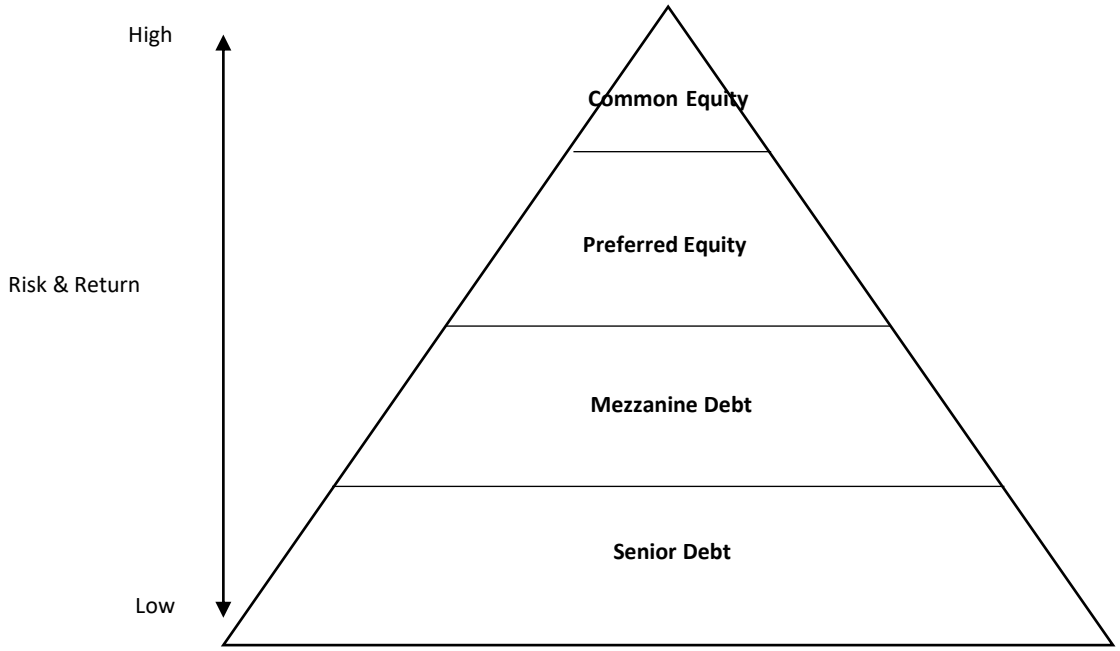
Source: GGGI (2019)

Mezzanine Financing

Lender can convert the hybrid of debt and equity financing to an equity interest in the company in case of default, usually happens after venture capital companies and other senior lenders are paid.

- Mezzanine financing is frequently associated with acquisitions and buyouts, for which it may be used to prioritize new owners ahead of existing owners in case of bankruptcy.
- Renewable energy projectors usually seek mezzanine financing when bank debt is insufficient to finance the whole project.

Mezzanine Financing Scheme



Source: Authors' Illustration (2021)

Concessional Debt

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Debt instrument which provides borrowers with upfront funding in exchange for repayment based on predetermined timeframes and interest rate terms.

- The concessional debt includes special features like no or low interest rates, extended repayment schedules, and interest rate modifications during the life of the loan.
- Institutions who provide the concessional debt usually are Development Finance Institutions, like ADB.
- The concessional loan or debt can motivate renewable energy developers to complete their projects and fill the financing gaps of the projects.

Financial De-risking Instruments Availability

No	Financial De-risking Instruments	Availability in Indonesia	Potential
1	Guarantee Provision	Currently **limited available** in Indonesia	Highly potential to provide guarantee to investors. Could be in the form similar to PPP (KPBU)
2	Performance-based Lending	Currently **available** in Indonesia ADB PBL proposed USD600 million result-based loan programs to support the development of electricity distribution for sustainability in Eastern Indonesia.	Highly potential and can expand the loan to private-owned renewable energy projects
3	Asset Securitization	Currently **not available** in Indonesia	Highly potential for RE projects
4	Green Bonds	Currently **available** in Indonesia The market is still small and lacks participation of private and foreign players. The bonds are still dominated by the government (70% of total green bonds issued)	Highly potential and need to increase private and foreign investors participation to have deeper green bonds market

Financial De-risking Instruments Availability

No	Financial De-risking Instruments	Availability in Indonesia	Potential
5	Seed Capital	Currently **not available** in Indonesia	Highly potential, especially for small-scale project developers
6	Convertible Grants	Currently **available** in Indonesia	Potential to be applied in RE projects
7	Asset Aggregation	Currently **not available** in Indonesia	Highly potential for small-scale RE projectors and HH
8	Mezzanine Financing	Currently **not available** in Indonesia	Potential to be applied in RE projects especially when bank loan is insufficient
9	Concessional Debt	Currently **available** in Indonesia From MDBs like ADB who provides financial assistance for Indonesia's geothermal project power project at Muara Laboh.	Potential to increase motivation of RE developers to complete their projects and fill the financing gaps of the projects

De-risking Instruments to Support Indonesia’s Clean Energy Sector Development

Implementation of Potential De-risking Instruments

- Indonesia is still in the earlier stage of development of renewable energy sector.
- This study suggests that compared to financial de-risking instruments, policy de-risking is more critical and urgent to be solved as most of policy and regulation challenge are still considered as the main bottleneck of renewable energy development in Indonesia.
- One of the main impediments hampering the growth of renewable energy projects in Indonesia is the permit process. Thus, permit process needs major improvement to be clearer in terms of its mechanism, enforcement, key government institutions involved, and needs to constitute well-defined property rights.
- Procurement process in the renewable energy sector in Indonesia is still considered relatively unfair for the developers and needs to be more competitive. Government need to support for research and development in the sectors.
- However, the financial de-risking instruments needs also to be developed in parallel to create a momentum in which once the policy de-risking instruments reach a stage of adequate “enabling environment”, the financial instruments can serve to channel the funds to finance the growth of renewable energy sectors from potential investors.

Conclusion and Recommendation

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- Two instruments that serves as pertinent tools to address the issue of renewable energy development: policy de-risking instruments and financial de-risking instruments.

- Currently, Indonesia needs to prioritize policy de-risking instruments over financial de-risking instruments due to the regulatory aspects issues in the renewable energy sector.

- **Policy de-risking options**: (1) improving renewable energy target and policy coherence; (2) reforming incentives and pricing policies; (3) creating effective and efficient permit and procurement process; (4) increasing project risk management quality; and (5) enhancing project feasibility & credibility.

- Development of financial de-risking instrument should not wait until the policy and regulatory framework achieve its optimum shape.

- **Financial de-risking options**: (1) guarantee provision; (2) performance-based lending; (3) asset securitization; (4) green bonds; (5) seed capital; (6) convertible grants; (7) asset aggregation; (8) mezzanine financing; and (9) concessional debt.

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Acknowledgement

This presentation was developed for CASE Programme Indonesia.

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Full-text version available.

October 2021