



Enhancing Decentralized Renewable Energy Investment to Achieve Indonesia's Nationally Determined Contribution

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Descriptors

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Hivos is an international organization that seeks new solutions to persistent global issues. With smart projects in the right places, we oppose discrimination, inequality, abuse of power, and the unsustainable use of our planet's resources. Our primary focus is achieving structural change. This is why we cooperate with innovative businesses, citizens and their organizations. We share a dream with them of sustainable economies and inclusive societies.



Executive Summary

Indonesia's economy has seen significant growth in recent years, yet wealth remains concentrated and a large part of the population is low income. Access to electricity is part of the solution for bridging this inequality and improving livelihoods. The government of Indonesia has planned for 100% electrification by 2020, but geographic conditions and uneven demand distribution restricts this plan severely, leaving thousands of islands with limited or no access to electricity. This is especially true in the eastern parts of the country.

Decentralized renewable energy (DRE) can increase energy access to Indonesia's underserved regions and contributes to its National Energy Policy targets. However, existing DRE business models fail to address prevailing barriers in the sector, ranging from policy barriers, limited access to finance, and high investment risks, discouraging private investments.

Decentralized renewable energy (DRE) is a possible solution to accelerate electrification in underdeveloped areas. It is also in line with Indonesia's National Energy Policy target to achieve a contribution of 23% of renewable energy towards the energy mix by 2025 and the National Determined Contribution (NDC). However, there is a 98% gap in investment per year towards improving Indonesia's energy system through government funding (CPI, 2018). Therefore,

it is a requisite for the Government of Indonesia to attract other sources of finance, particularly from private players, to meet the national clean energy and electrification targets.

However, there are multiple barriers that make the sector unattractive to private investors, including:

- 1. Regulatory constraints that hinder new projects:** Complicated procedures to apply and obtain the business area (*Wilayah Usaha*) for distribution and sale of electricity, discourage new projects.
- 2. Unattractive small-scale and decentralized renewable energy projects for private investment:** Many of the available renewable energy projects are small-scale. Therefore, they are likely to impose a higher unit cost and bring a lower return on investment. In addition, uncertainty on off-taker capabilities is a significant challenge for project developers to secure their revenue.
- 3. Lack of access to innovative financing:** Lack of appetite from local banks to invest in renewable energy development and high interest rates on loan services create challenges for developers looking for debt financing. This makes projects financially unfeasible.
- 4. Lack of financial instruments for project or financial risk mitigation:** Financial instruments for renewable energy projects are dominated by loans and do not provide the necessary long-term debt financing. Moreover, financial institutions perceive developing clean energy as a relatively high-risk undertaking. To add to this, there are not many financial de-risking instruments available in the market.

Table ES1: Risk level of each barrier faced by private investors in DRE

Barriers	Proposed Business Model			
	Low	Low-Med	Med-High	High
I. Regulatory constraints hinder new project	Low	Low-Med	Med-High	High
II. Unattractive small-scale and decentralized renewable energy projects for private investment	Low	Low-Med	Med-High	High
III. Lack of access to innovative financing	Low	Low-Med	Med-High	High
IV. Lack of financial instruments for financial/project risk mitigation	Low	Low-Med	Med-High	High

This report, produced in collaboration with Hivos, aims to improve the overall financial feasibility of the decentralized renewable energy sector in Indonesia. It identifies innovative business models that address the key barriers for private investments by optimizing the existing regulations. The study uses Sumba Island, in East Nusa Tenggara, as an example case.

In order to scale private investment in distributed renewable energy to its potential, policymakers and regulators need to address the sector risks. Policy reform, adopting sustainable business models, and establishing tailored financial instruments, together, can overcome most of these barriers.

Through our analysis we found that catalyzing private investments for DRE in Sumba and similar islands would require strong commitment and active participation from the government, particularly to enhance its regionally owned enterprises. Capital injections or asset transfers to commission partnerships with the private sector would be key.

Further, we found that the first barrier on the regulatory process to obtain a business area (*Wilayah Usaha*) is the only barrier that the following business models

cannot address.

Village-Owned Enterprises (VOEs) and Private Sector Joint Venture Scheme: This scheme can help address the barrier of off-taker uncertainties since village governments have an inherent understanding of electricity users from their areas. Additionally, the use of capital injection from village funds can potentially reduce the reliability on debt-financing instruments.

Public Private Partnership (PPP) using Availability Payment Scheme: The use of availability payment schemes can help encourage investments because the regular nature of disbursement from this financial instrument helps maintain the level of public service. Availability payment also ensures return on investment and helps reduce the risk perception of local banks and other financial institutions as these instruments are supported by a long-term government commitment.

Locally Owned Enterprises (LOEs) and Private Sector Joint Venture Scheme: Direct capital injection into LOEs reduces the need for upfront investment and return on investment. It also reduces the reliance on high-interest loans from local banks and other financial institutions. Moreover, it can potentially address off-taker uncertainties as the renewable energy project will be managed by on-the-ground LOEs.

Special Allocation Fund and Private Sector Joint Venture Scheme through Joint Operation Mechanism: The special allocation fund is a grant that covers the capital expenses and helps improve the return on investment. The asset will then be transferred to an LOE and be operated by the private sector through a joint operation mechanism to ensure its sustainability.

Table ES2: Maps the aforementioned sector barriers to the business models that can serve as solutions

Barriers	Proposed Business Model
I. Regulatory constraints hindering new project	The government of Indonesia needs to revisit its policy on its procedure to apply and obtain business area (<i>Wilayah Usaha</i>) for new projects
II. Unattractive small-scale and decentralized renewable energy projects for private investment	<ul style="list-style-type: none"> Village-Owned Enterprises (VOEs) and Private Sectors Joint Venture Scheme Public Private Partnership (PPP) using Availability Payment Scheme Locally Owned Enterprises and Private Sectors Joint Venture (JV) Scheme Scheme Special Allocation Fund and Private Sector Joint Venture Scheme
III. Lack of access to innovative financing	<ul style="list-style-type: none"> Public Private Partnership (PPP) using Availability Payment Scheme Locally Owned Enterprises and Private Sectors Joint Venture (JV) Scheme
IV. Lack of financial instruments for financial/project risk mitigation	<ul style="list-style-type: none"> Village-Owned Enterprises (VOEs) and Private Sectors Joint Venture Public Private Partnership (PPP) using Availability Payment Scheme Scheme Special Allocation Fund and Private Sector Joint Venture Scheme

In addition to implementing innovative business models, pioneering financial instruments would be crucial in addressing some of the investment gaps in the sector. If given adequate business scale, as well as risk and return on private investment, the following innovative financial instruments can complement the business model of each DRE project, thereby addressing the challenges.

Risk Pooling Investment Schemes: By pooling investments into DRE projects, the scale of the investment value and returns increase proportionately to match the risk appetite of private investors. It can also attract funding from financial institutions as it offers a diverse risk and return profile.

Asset-Backed Securities (ABS): An asset-backed security increases the investment scale for DRE by pooling the loan portfolios of multiple projects. It is then sold as a security product to the investors. It can also work as an alternative financial instrument.

Guarantee Instrument: In small projects, a guarantee can address the security gap because of the tendency to attract small developers with insufficient balance sheets. A guarantee can improve the risk-return profile

of a renewable energy project and increase access to long-term funding from financial institutions due to the improved risk profile.

This paper highlights the DRE opportunity in Indonesia, several key barriers for private investment, and the potential paths to address these barriers, but further research is required. Particularly to identify suitable locations to pilot the suggested business models supported by the tailored financial instruments, understand the region-specific barriers to implementation, proof-test the feasibility and replicability of the models, and conduct impact analysis of these solutions. CPI, through its future work, intends to continue to work and delve deeper to actualize these potential solutions.

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1. Introduction

Indonesia has experienced solid economic growth despite turbulent times when compared with peer countries. The GDP increased by 5.2% in 2018 and continued its positive trend with 5.1% (yoy) increase in Q1 2019¹. Despite its growth, Indonesia is still facing economic inequality and wealth concentration, particularly in the Eastern regions of the country. GDP contribution from the region only accounted for 3.2% and the figure has not increased since 2010. The average percentage of people below the poverty line in Eastern Indonesia is 19.1%, which is higher than the national average of 9.7%². Shortage of energy supply remains the main reason for the low economic development in Eastern Indonesia.

To overcome the inequality of economic growth, the government has set the Indonesian electrification ratio target at 100% in 2020. However, geographic conditions and uneven demand distribution create significant challenges in providing electricity to thousands of islands and remote areas. Sumba Island in the East Nusa Tenggara province is a prime example of how those challenges impede the electrification ratio growth (Table 1.1). In 2018, the average electrification ratio provided by the State-owned electricity company (PLN) was under 40%. The number increased to 68% with support from the private and communal power plants in the island.

Table 1.1: Electrification rate in Sumba Island³

District	Household	Electrification Ratio by PLN (%)	Total Electrification Ratio (%)
Sumba Timur	52.8	49.9	68.5
Sumba Barat	24.5	36.1	55.4
Sumba Tengah	14.1	34.5	86.0
Sumba Barat Daya	59.8	29.3	62.9

These challenges make electricity inaccessible through on-grid network systems. Therefore, an off-grid or decentralized electricity generation model is the best choice to electrify these underdeveloped areas. A decentralized renewable energy (DRE) system offers greater advantages to accelerate the electrification rate as it uses locally available energy sources. The DRE program is in line with Indonesia's unconditional commitment in the National Determined Contribution (NDC) under the Paris Agreement to reduce greenhouse gases (GHG) emissions by 29% with domestic support, and 41% with international support by 2030 from the projected "business-as-usual" scenario. Indonesia's NDC recognizes the increasing importance of energy sector to climate change mitigation targets considering this sector ranked second largest emitter after land-based sector in 2030. From 29-41% (834-1,081 MT CO₂e) of emission reduction target from BAU scenario, about 11-14% (314-650 MT CO₂e) of it will come from the energy sector. The implementation of DRE helps to avoid GHG emissions by reducing dependency on diesel-fueled power plant used in remote areas in Indonesia. DRE program is also in line with the National Energy Policy targets to achieve 23% contribution of renewable energy in the energy mix by 2025.

Between 2012 and 2016, the tracked government funding to support clean energy development amounted to at least IDR (Indonesian Rupiah) 12.4 trillion or IDR 2.5 trillion per year on average⁴. Only IDR 2.5 trillion of IDR 12.4 trillion flows through the special allocation fund for small-scale energy (DAK Energi Skala Kecil). This amounts to an annual average finance flow of IDR 0.5 trillion per year. Overall, this number was far below the reasonable amount forecast by PLN, which estimated that the investment needed to reach the RE power generation target by 2025 was IDR 1,400 trillion, or equivalent to an average of IDR 140 trillion per year. In other words, a gap of 98% in investment per year remains to be filled to improve Indonesia's energy system. This also reflects the investment gap to improve the electrification rate or access to electricity in remote areas. It is therefore clear that the government does not have the financial capacity to deploy its own funding to

1 Bank Indonesia (2019). Investor Relations Unit

2 Data presented for 4 provinces (East Nusa Tenggara, Maluku, North Maluku, Papua and West Papua). Source: www.bps.go.id . Accessed in August 15th 2019.

3 PLN's RUPTL Pulau Sumba 2019-2028

4 Climate Policy Initiative (2019): *Developing a Guarantee Instrument to Catalyze Renewable Energy Investment in Indonesia*

meet clean energy targets, including the DRE system, and will require other sources of funding, particularly private investment.

However, private investment interest has been absent so far because private actors perceive several barriers and risks to support DRE projects in remote areas. Innovative business models and suitable financing mechanisms and instruments will be instrumental to unlock private investments in the DRE system.

This report aims to improve the overall financial feasibility of the decentralized renewable energy sector in Indonesia. It identifies innovative business models that address the key barriers for private investments by optimizing the existing regulations.

It intentionally uses Sumba island as an example case because its electrification rate is significantly lower than the national average, and has political support from both the local and central government to accelerate its electrification ratio using the DRE system. The results of this study will help identify appropriate business models and financial instruments for areas with low electrification ratios across Indonesia.

This report presents:

- (i) Key barriers that prevent the private sector from taking part in the DRE business in Indonesia
- (ii) Existing business models for DRE investment in Indonesia
- (iii) Innovative business models to overcome key barriers through existing regulations
- (iv) The most suitable financial instruments to leverage private sector investments in the DRE business in Indonesia.

The data for this study was collected from interviews with the Ministry of Energy and Mineral Resources (MEMR), local governments in Sumba Island, project developers, and financial institutions. With support from Hivos, CPI Indonesia's analysts presented early findings from this study to several key stakeholders from governments and the private sector to confirm and clarify any concerns regarding the collected data and findings.

2. Barriers and Investment Risks in Decentralized Renewable Energy Investment

This chapter delves into the barriers and investment risks faced by the private sector while investing in Decentralized Renewable Energy projects.

We have identified four main barriers (Table 1): policy constraints, unattractive returns, access to financing, and the lack of financial instruments for risk mitigation. Of which, policy constraints and unattractive returns are the two main reasons private investors are hesitant to invest in DRE.

2.1 Regulatory constraints hindering the commencement of new projects

In order to do business related to electricity generation in Indonesia, any business entity must first apply for the business area (Wilayah Usaha) or the area of distribution and sales of electricity with the MEMR⁵ (Ministry of Energy and Mineral Resources Regulation). The current Indonesian law bestows all business areas to the PLN. Therefore, in the eyes of the law, if a non-PLN entity wants to start an electricity generation business, it must first make a proposal to the MEMR to release a part of the PLN's business area. Figure 2.1 illustrates the process of releasing a PLN business area and how to extend the period of release after the expiration date.

This regulatory process, however, exhibits several problems that prevent the acceleration of new small-scale electricity projects:

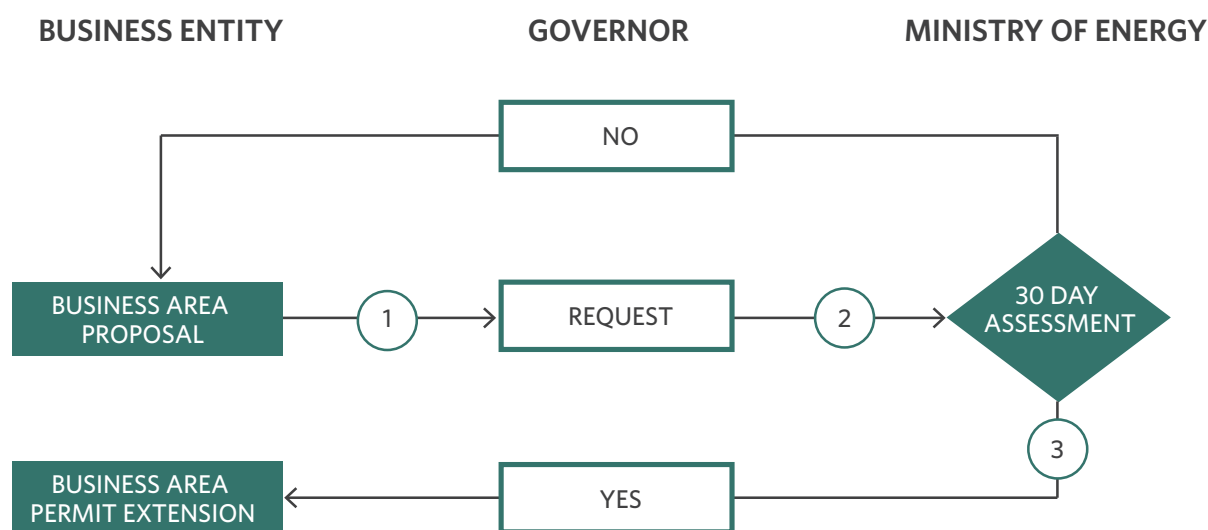
- **Problem 1:** Technical manuals (*Petunjuk teknis—Juknis*) are not available to guide business entities through the process of identifying the appropriate local government agency or office under the governor that has the authority to verify the project proposal.
- **Problem 2:** The minimum administrative level for the release of the PLN business area is one district. This is problematic because in several locations in Indonesia, one district can cover an extensive area— it can even comprise several islands. This is especially problematic for the economic calculation of small-scale energy projects.
- **Problem 3:** The lifetime of renewable energy technologies must be adjusted with the duration of the business area lease. In the case of Sumba, where solar cell is the focus of technology, the average infrastructure lifetime is 20 years. The lifetime must be synchronized with the duration of the business area lease, to prevent breaking the lease before the technology lifetime comes to an end.

Table 1: Risk level of each barrier faced by private investors in DRE

Barriers	Risk Level			
	Low	Low-Med	Med-High	High
I. Regulatory constraints hinder new project	Low	Low-Med	Med-High	High
II. Unattractive small-scale and decentralized renewable energy projects for private investment	Low	Low-Med	Med-High	High
III. Lack of access to innovative financing	Low	Low-Med	Med-High	High
IV. Lack of financial instruments for financial/project risk mitigation	Low	Low-Med	Med-High	High

5 See Article (1) point (3) on Ministry of Energy and Mineral Resources Regulation 38/2016 on Accelerating the Electrification Efforts in Underdeveloped, Secluded, and Borderline Villages through Small-scale Electricity Generation

Figure 2.1: Business area based on the Ministry of Energy Regulation 38/2016.



2.2 Unattractive small-scale and decentralized renewable energy projects for private investment

2.2.1 THE COURSE OF RENEWABLE ENERGY DEVELOPMENT IN SMALL-SCALE POWER PLANTS

In Indonesia, the renewable energy market has promising prospects considering the increasing demand for energy and overarching political will for sustainable energy supplies. However, many of the currently available renewable energy projects operate on a small scale. According to the rule of economics of

scale, smaller projects will impose a higher unit cost and bring a lower return on investment. Therefore, small-scale energy projects tend to be unattractive for private investment.

Table 2.1 illustrates the case of the renewable energy development plan in Sumba. Points 10-15 highlight potential projects for private investment, with the scale of projects ranging from 1.6 to 5 MW. Projects below 5 MW are considered small-scale.

Table 2.1: List of renewable energy development plans in Sumba

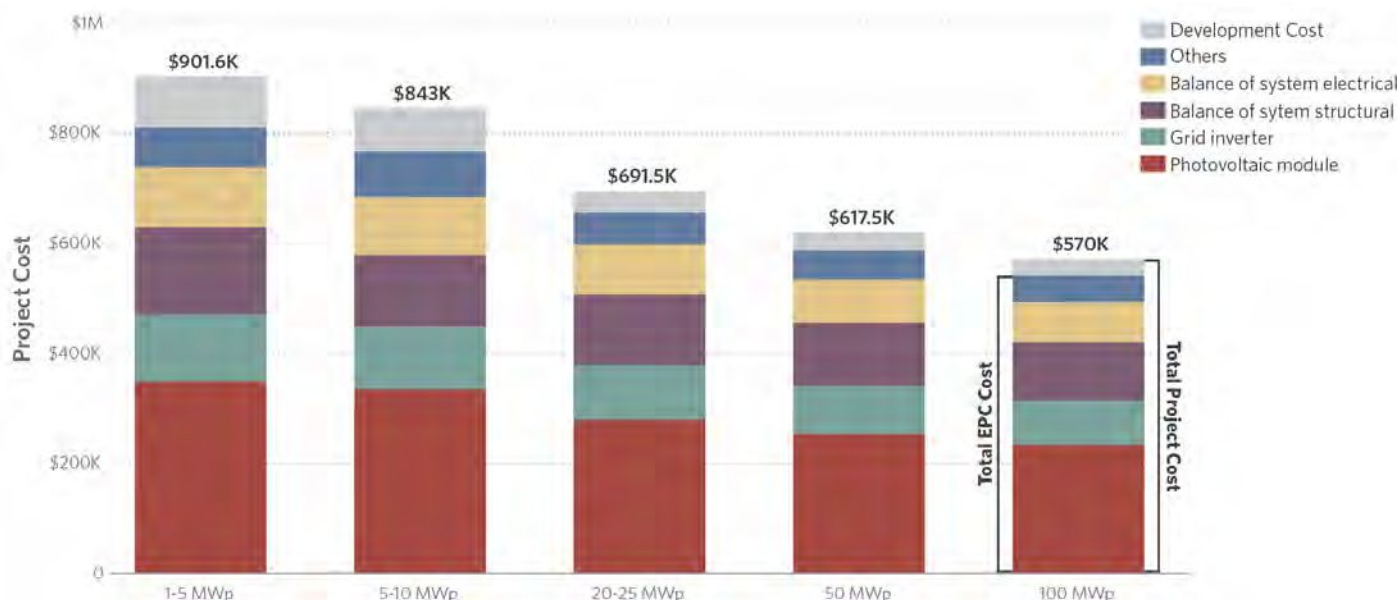
No	Technology	Location	Capacity	Project Developer
1	Micro Hydro	Scattered	5 MW	PLN
2	Solar	West Sumba	10 MW	PLN
4	Solar	East Sumba	10.1 MW	PLN
5	Solar - Hybrid	West Sumba	2 MW	PLN
6	Wind	East Sumba	3 MW	PLN
7	Wind	Scattered	3 MW	PLN
8	Solar	Scattered	5 MW	PLN
9	Biomass	West Sumba	1 MW	PLN
10	Micro Hydro	East Sumba	2 MW	IPP
11	Micro Hydro	West Sumba	1.6 MW	IPP
12	PLTS	Scattered	3.8 MW	Unallocated
13	PLTBm	Scattered	5 MW	Unallocated
14	PLTBm	Scattered	5 MW	Unallocated
15	PLTM	Scattered	5 MW	Unallocated

2.2.2 HIGH UPFRONT CAPITAL FOR SMALL SCALE RENEWABLES

Unlike fossil fuel powered projects, renewable energy projects including Solar PV-based technologies are characterized by high upfront costs, and low operation and maintenance costs. In other words, project developers must utilize or raise more equity and have a large enough balance sheet to invest upfront in small-scale Solar PV. However, following the rule of economies of scale, a larger project size would result in a lower upfront investment.

Figure 2.2 illustrates how the overall cost of Solar PV is actually lower for large-scale projects when compared with small-scale projects. The most distinct difference is in the cost structure of photovoltaic modules. On average, a 1 MWp increase in project size equals a reduction of USD 1.121 in the cost of photovoltaics module.

Figure 2.2: Upfront investment cost comparison for Solar PV/MW for various project sizes



2.2.3 LOW RETURN ON INVESTMENT (ACCORDING TO FINANCIAL MODELLING ON MINISTERIAL REGULATION 38/2016)

Decentralized renewable energy systems have typically experienced a low return on investment curbing the appetite for new investments from the private sector. One of the reasons behind this is regulation, where the use of subsidies from the state for a certain business area requires a fixed electricity tariff and a consumption ceiling that is eligible for a subsidy.

We developed a model for small-scale Solar PV projects using the case of Sumba island based on regulations that require a minimum of one district for the business area (See Table 2.2). We used an integrated

Table 2.2: Integrated off-grid solar plant using a subsidy scenario in Sumba Island

Parameter	Unit	Amount
Investment (full equity)	IDR	3.86 Billion
Off-taker	Household	200
Electricity consumption	kWh/month	84
Electricity tariff/house	IDR/month	34,860
Subsidy by the state	IDR/month	226,565
Payback Period (PBP)	Year	7.1

off-grid model considering Sumba's renewable energy development plan and its geographical requirements. We also assumed the subsidized model with a consumption ceiling of 84 kWh per month per household (the maximum allocated consumption under the government subsidy).

Using an upfront investment of IDR 3.86 Billion (USD 278K), the project can electrify 200 households using the state's subsidy mechanism with a Payback Period (PBP) of 7.10 years. A PBP that is longer than 5 years is considered to be a low return on investment and unattractive for commercial loans. Therefore, this illustration from Sumba exhibits that in a general sense, small-scale decentralized solar-PV investment is

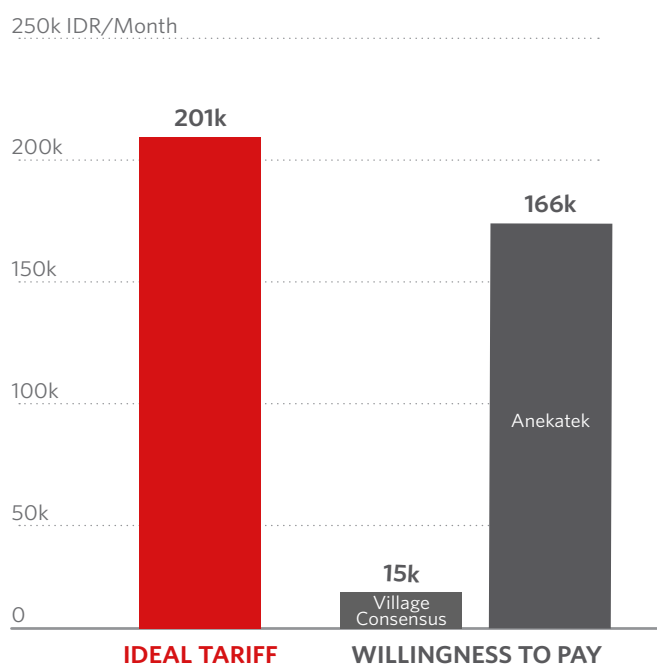
unattractive for private investment.

2.2.4 OFF-TAKER UNCERTAINTIES

The uncertainty in off-taker capabilities in decentralized renewable energy projects, compared to the conventional centralized (on-grid) projects, is another reason why private sectors are reluctant to invest in this business. The comparison between our business model in subchapter 2.2.3 and on-ground observation in Sumba explains how off-taker uncertainty has become another barrier to investment.

Figure 2.3 highlights the gap between the ideal electricity tariff for off-grid PV investment and the Willingness to Pay (WTPs). The problem is not only the range of diverse WTPs in different districts in Sumba, but also because these WTPs are still lower than the ideal tariff for a decentralized renewable energy project. Therefore, private sectors face uncertainties regarding the financial capabilities of electricity off-takers, be it in Sumba or in the context of small, outer, and unelectrified islands similar to Sumba.

Figure 2.3: Comparison between ideal tariffs and willingness to pay



6 National Finance Authority/OJK (2018): Indonesia Banking Statistics
 7 National Finance Authority/OJK (2018): Indonesia Banking Statistics and World Bank Data Indicators (2019)

2.3 The lack of access to innovative financing from financial institutions

2.3.1 THE LACK OF APPETITE FROM LOCAL BANKS TO INVEST IN RENEWABLE ENERGY DEVELOPMENT

The total value of renewable energy financing from local banks in Indonesia was USD 4.9 billion in 2018. This figure is far below the other utilities such as electricity, gas, and water combined.⁶ In other words, renewable energy financing makes up only 11% of total loans in the utilities sector. This illustrates the lack of appetite from local banks to invest in renewable energy projects compared to other types of utilities due to perceived risks in the low return on investment. Figure 2.4 illustrates the gap between renewable energy financing and other utilities sectors, using publicly available banking data.

2.3.2 HIGH INTEREST RATE FOR LOAN SERVICES IN INDONESIA

The interest rate on commercial loan services in Indonesia is still comparatively high by comparison with other Southeast Asian Countries (ASEAN) and India.⁷ From 2015 to 2018, Indonesia's average interest rate decreased but never dropped below 10% per annum. Meanwhile, Thailand's interest rate has been relatively more stable at 4-5% per annum. Figure 2.5 presents a comparison of interest rates in the region. There are many factors that influence a country's interest rate such as inflation forecasts, capital flows, and currency exchange rates. These factors create barriers for private sectors to invest in renewable energy projects and, especially when the project requires a high debt to equity ratio. In other words, a high interest rate presents a barrier to private sectors to access finance.

Figure 2.4: Comparison between renewable energy financing and other utilities combined (in billion USD)

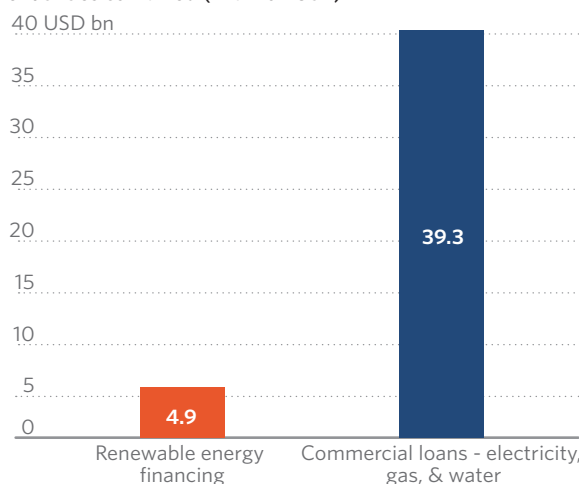
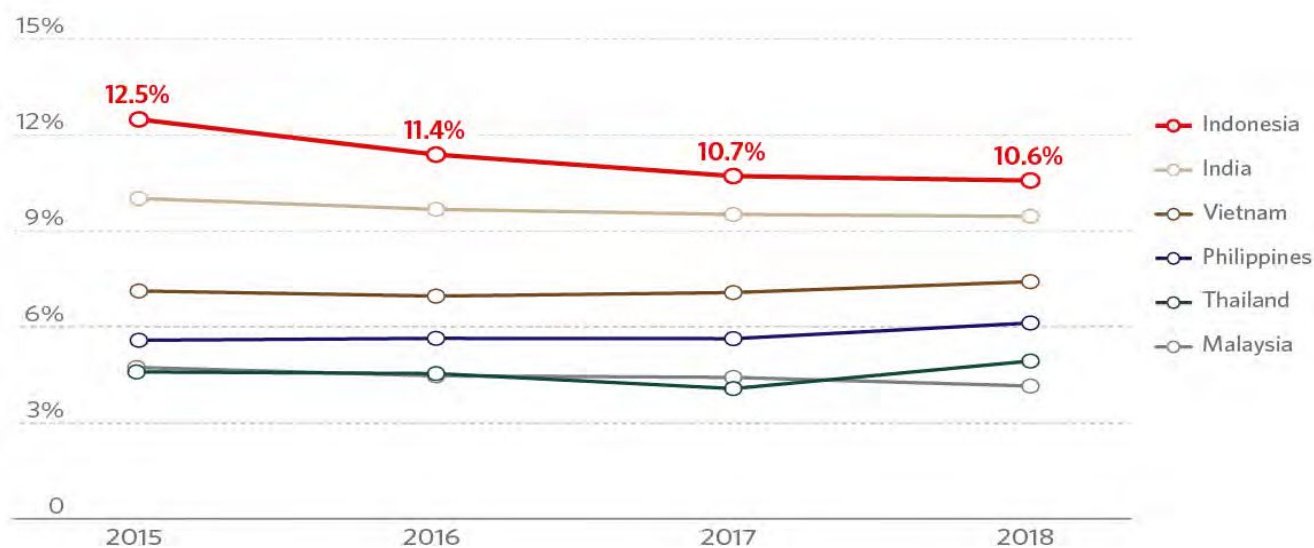


Figure 2.5: Indonesia's interest rates in comparison with other countries



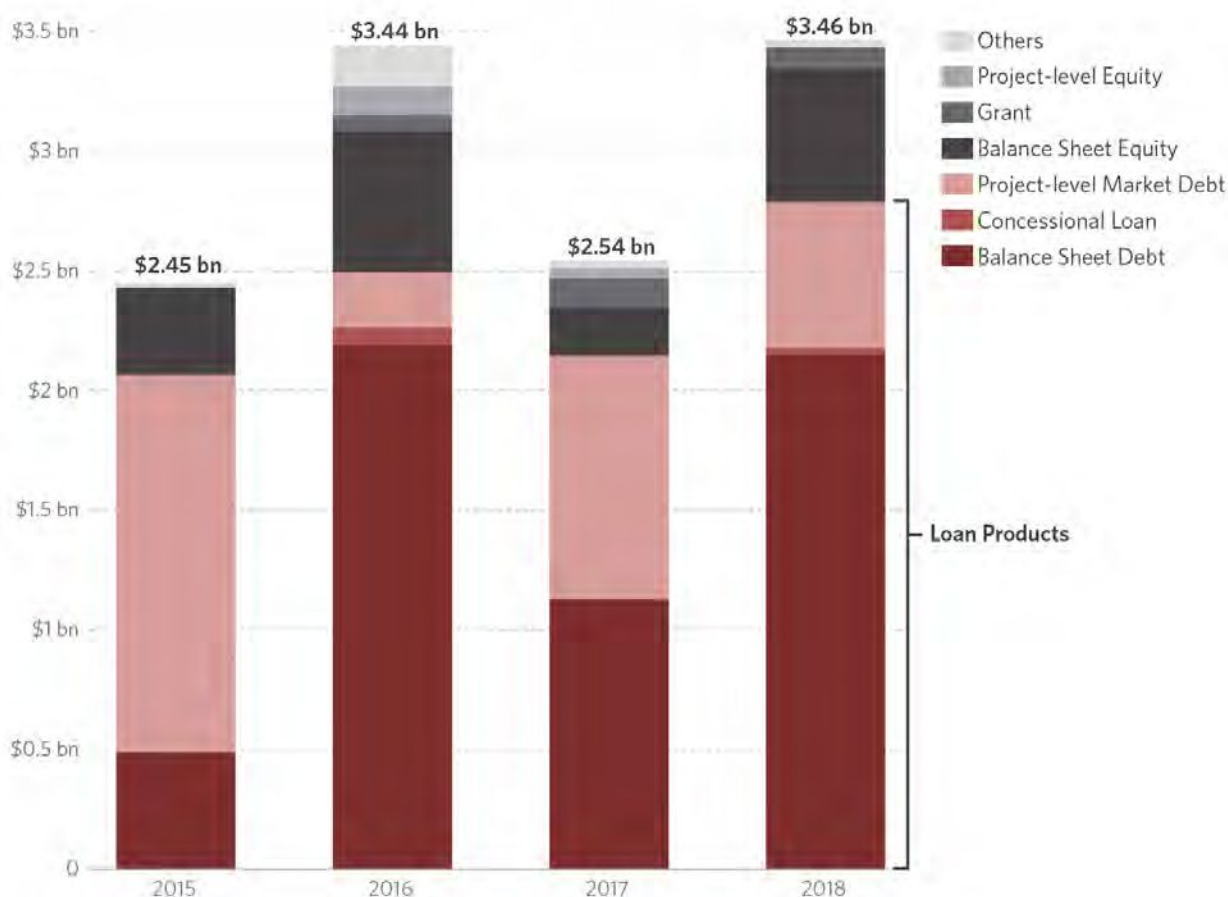
2.4 The lack of financial instruments for financial and project risk mitigation

2.4.1 LIMITED NUMBER OF FINANCIAL INSTRUMENTS TO FUND RENEWABLE ENERGY

Financial instruments for renewable energy projects are dominated by loans, while other instruments

such as equity and grants are still relatively limited. In total, commercial loans comprise 49% of financial instruments for renewable energy financing (valued at USD 5.9 billion). Figure 2.6 illustrates the trend of financial instruments used for renewable energy development in Indonesia.

Figure 2.6: Financial instruments used for renewable energy projects in Indonesia



Therefore, it is necessary to enable financial instruments to scale down barriers to decentralized renewable energy investments in Indonesia.

Loans as financial instruments are not adequate to address investment barriers such as a long-term return on investment. Indonesian local banks that dominate financial asset holdings and disburse loans are constrained in their ability to provide long-term debt financing due to reliance on short-term deposits. Corporate bonds are predominantly issued with a tenor of 3 or 5 years.⁸ Meanwhile, our model shows that the payback period for decentralized renewable energy projects is 7.1 years. Therefore, innovative financial instruments are necessary to address investment barriers in Indonesia.

2.4.2 RENEWABLE ENERGY GUARANTEE INSTRUMENTS FOCUS ON LARGE-SCALE PROJECTS

To date, there are several ready-to-use guarantee instruments for renewable energy projects in Indonesia. The function of these guarantees is to absorb or mitigate risks for renewable energy projects. They include local government loans, bilateral loans, geothermal loans, and business feasibility guarantee letters (see Table 2.3 below). The issuers of these instruments range from the Ministry of Finance, PT. Sarana Multi Infrastruktur (a state-owned company), and the World Bank.

However, these guarantees focus mostly on large-scale energy projects. This is due to a higher expectation of return on investment for large-scale projects in comparison with smaller ones. This is problematic in the context of renewable energy projects, particularly in remote islands, where in most situations the demands are better suited for small-scale renewable energy plants. Therefore, the lack of guarantee instruments for small-scale renewable energy projects acts as a barrier for private investments in this sector.

Table 2.3 Comparison of different guarantee instruments

	LOCAL GOVERNMENT LOAN	BILATERAL LOAN	GEOHERMAL GUARANTEE	BUSINESS FEASIBILITY GUARANTEE LETTER
GUARANTOR	Ministry of Finance	PT SMI through bilateral grant	World Bank	Ministry of Finance
RISK COVERED	Local government's risk of default to PT. SMI's loans	Risk of loss of the loan given by PT. SMI to debtors	Risk of failure in geothermal exploration activities	Guarantee on PLN's capability as off-taker
ELIGIBLE PROJECT	A cut to the General Allocation Fund (DAU)/ Revenue Sharing Fund to pay for the guarantee	Quasi Equity Facility grant whose liquidity is contingent on project loss	Payment for exploration costs in the form of a grant if project loss occurs	Payment of loss by MoF if PLN fails to fulfil its obligation as off-taker
RISK MITIGATION MECHANISM	Infrastructure projects funded by local budget (APBD) including renewable energy projects	Renewable energy projects with maximum investment value of USD 10 million	Geothermal projects in accordance with the PLN's General Expansion Plan (RUPTL)	Renewable energy projects based on President's Regulation 4/2016 on accelerating electrification

8 Climate Policy Initiative (2019): Developing a Guarantee Instrument to Catalyze Renewable Energy Investment in Indonesia

3. Understanding Existing Business Processes and Models of Decentralized Renewable Energy

This chapter explains the business process and existing business models in line with the current regulations in Indonesia. The first section on business process explains the steps for private actors to invest in DRE projects and the second section illustrates how the current regulation of DRE project would be if translated into business models.

3.1 Business Process

3.1.1 SMALL SCALE, OFF-GRID RENEWABLE ENERGY BUSINESS PROCESS USING SUBSIDIES

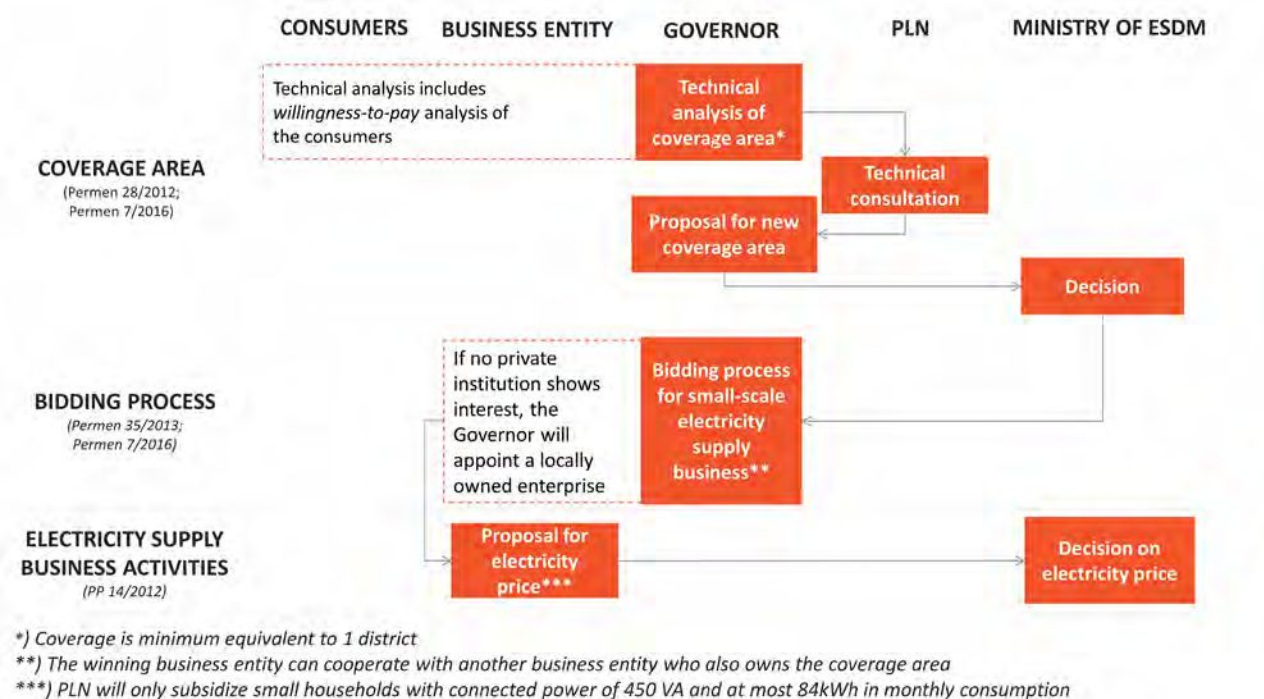
According to MEMR Regulation No. 38/2016,⁹ a small scale, off-grid business model can be designed:

- (i) Using a subsidy from the State Electricity Company (PLN)
- (ii) Without using a subsidy but using PLN's electricity tariff scheme
- (iii) Without subsidy but using a market-based tariff scheme, where the tariff is pre-approved by the government

The subsidy-based business model benefits only small household consumers as off-takers¹⁰. Regardless of the use of subsidy, all small-scale, off-grid renewable energy businesses, require a release of business area from the PLN and MEMR. Figure 3.1 describes the regulatory flow to acquire the business area if the proposed business plan uses a subsidy.

Under this regulation, there are several issues related to the business area (*Wilayah Usaha*). While the provincial governor is supposed to be the first actor who proposes a release of the business area to the MEMR, the proposal must be thoroughly analyzed and include a willingness to pay analysis. It is difficult to make a robust technical analysis without adequate resources in the provincial government (in this case the Energy Agency or *Dinas Energi dan Pertambangan Provinsi--Distamben*) and prior collaboration with a professional business entity. In addition, since the Ministry of Energy is the only entity that can grant the business area, complications can arise if the proposed release of business area was already granted to the PLN.

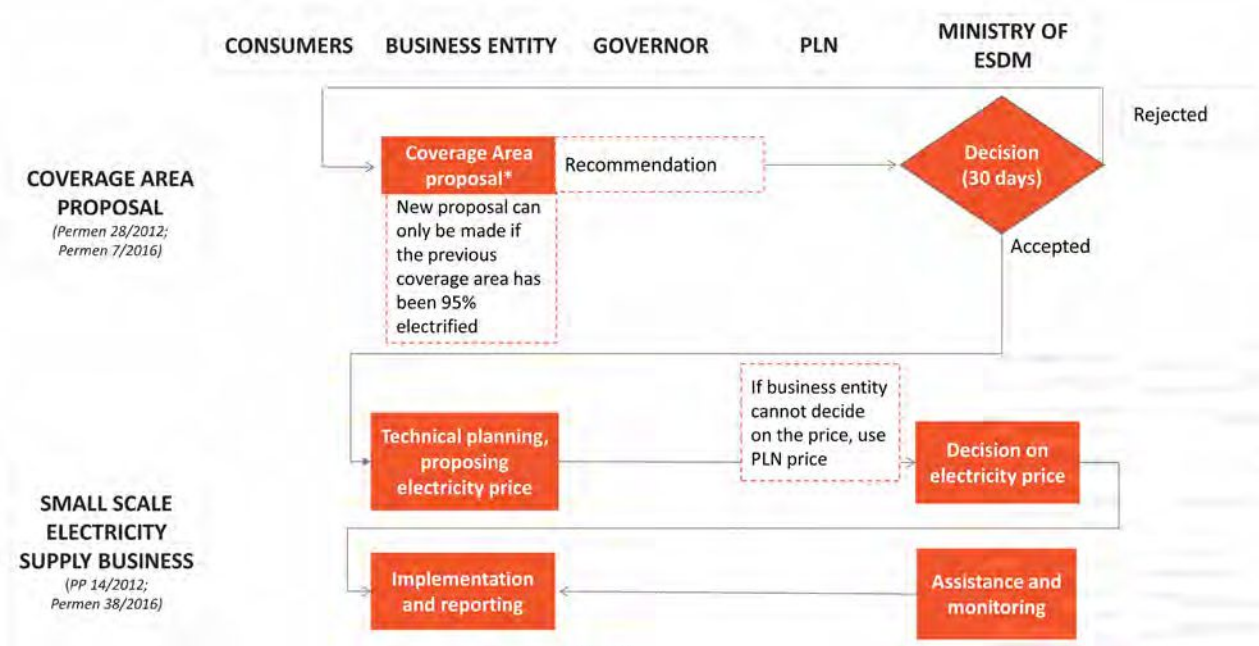
Figure 3.1: Off-grid business regulatory flow in a rural or small island using a subsidy



9 PERMEN ESDM No. 38/2016 on Accelerating Electrification in Underdeveloped, Remote, and Borderline Villages and Inhabited Small Islands using Small Scale Electricity Generation Business Model

10 PLN will only subsidize small households with connected power of 450 VA and at most 84kWh for monthly consumption

Figure 3.2: Off-grid business regulatory flow in a rural or small island without subsidy



*) Coverage area minimum equivalent to 1 district. The proposal must include the analysis of renewable energy sources, demand analysis, household social and economic analysis, willingness-to-pay, Capital Expenditure (CAPEX), and Operational Expenditure (OPEX)

3.1.2 SMALL SCALE, OFF-GRID RENEWABLE ENERGY BUSINESS PROCESS WITHOUT SUBSIDY

If the proposed off-grid business model does not utilize subsidies, any business entity can assume an active role and propose a new business area directly to the MEMR.

However, the business entity must satisfy specific requirements.

- (i) They must adhere to the minimum local content requirements, i.e., locally made components must be prioritized. This requirement can be burdensome for renewable technologies that are not locally produced, for example, solar.
- (ii) The entity must achieve 95% of the electrification ratio in their business area before they can expand their business.
- (iii) They must complete all construction processes within a year after receiving the business area permit from the MEMR. Figure 3.2 describes the regulatory flow to acquire the business area if the proposed business plan does not use the subsidy.

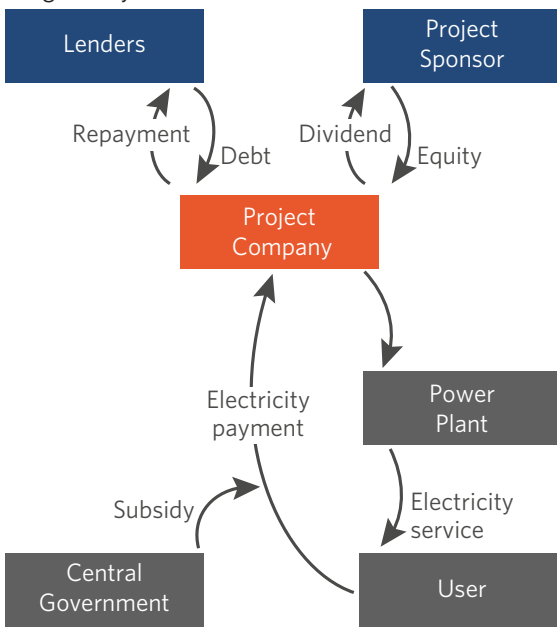
3.2 Existing Business Model

3.2.1 SMALL SCALE, OFF-GRID RENEWABLE ENERGY BUSINESS MODEL USING SUBSIDY

The electricity tariff can receive a subsidy up to a certain threshold (84 kWh/month) under the business model based on MEMR Regulation No 38/2016. Moreover, the project company responsible for day-to-day business activities must be chosen after it undergoes a tendering process by the local government (province level). If no private business entity is interested in participating, the local government will directly appoint a locally owned enterprise (LOE).

This business model, however, does not scale down the barriers mentioned in chapter 2. First, it does not reduce the regulatory constraints on the business area. Second, it does not affect the appetite for private investment. This is because it does not increase the scale of renewable energy projects, increase the return on investment or provide off-taker certainties. Third, it does not exempt the need to use high-interest loans. Finally, it does not support the use of innovative financial instruments

Figure 3.3: Small scale, decentralized renewable energy business model using subsidy



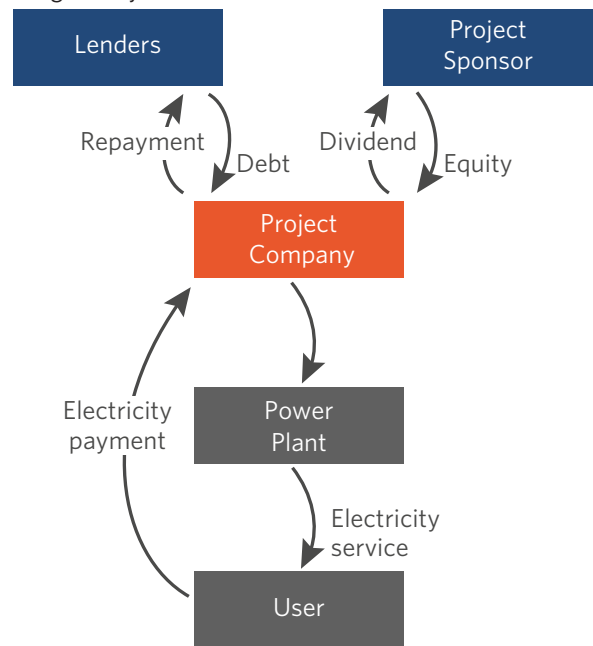
3.2.2 SMALL SCALE, OFF-GRID RENEWABLE ENERGY BUSINESS MODEL WITHOUT SUBSIDY

The difference between this business model and the model depicted in Figure 3.3 is the absence of a subsidy from the central government. The business entity may also propose that the electricity tariff be approved by the Ministry of Energy.

Just like the subsidized business model, this model does not address the perceived risks and barriers mentioned earlier. The absence of subsidy and the self-proposed electricity tariff create uncertainty regarding the Ministry of Energy's approval of the tariff. Therefore, it does not address the barriers of low return on investment and off-taker uncertainties. Additionally, this business model does not help improve the investment appetite from local banks and consequently does not affect the high interest rate of debt-financing. Also, as in the case of the subsidized business model, this business model does not incentivize the use of innovative financial instruments.

THE BUSINESS MODEL'S EFFICACY IN MITIGATING RISKS	
Regulatory constraints that hinder new projects	✗
Small-scale and decentralized renewable energy projects are unattractive for private investment	✗
The lack of access to innovative financial instruments	✗
The lack of financial instruments for financial or project risk mitigation	✗

Figure 3.4: Small scale, decentralized renewable energy business model using subsidy



THE BUSINESS MODEL'S EFFICACY IN MITIGATING RISKS	
Regulatory constraints that hinder new projects	✗
Small-scale and decentralized renewable energy projects are unattractive for private investment	✗
The lack of access to innovative financial instruments	✗
The lack of financial instruments for financial or project risk mitigation	✗

4. Innovative Business Models to Unlock Private Investment

This chapter explores four innovative business models to address existing barriers in DRE investment as previously explained in Chapter 2. Each business model pays attention to the business process it is required to follow, for example, Special Allocation Fund (*Dana Alokasi Khusus—DAK*) from the state budget requires the local government to follow a specific bureaucratic process. Further, each business model takes existing regulations into account to ensure that it is legally feasible to implement.

4.1 Village-Owned Enterprises (VOEs) and Private Sector Joint Venture Scheme

In this business scheme, a Village-Owned Enterprise (VOE) is established by the village government and village-level community forum, followed by a capital injection into the VOE¹¹. The VOE and project sponsor can then reinject their equity capital into the project company, while the project company can procure debt services from lenders. The blended public-private capital in the project company can then be made available to renewable energy projects.

VOE-Private Sponsors Shareholdings in the Project Company

The purpose of split-ownerships in the Project Company between VOE and Private Sponsor is to share the investment risks between VOE (public institutions) and Private Sponsors (e.g. private investors such as commercial banks, financial institution, etc). This risk-sharing scheme can potentially attract the involvement of private funding in renewable energy projects.

In terms of grants injection to VOE¹², the source of capital for VOE is legally possible to come from public grants or cooperation agreement with the village. However, it does not include direct capital injection from the private sector. In other words, private sectors cannot have an ownership share in the VOE. Private investors' involvement is only possible if the funds from private investors are treated as the asset of the village, so then the village government could hand over the asset into the VOE as a capital injection. Therefore, the creation of a Project Company is meant to smooth the process of

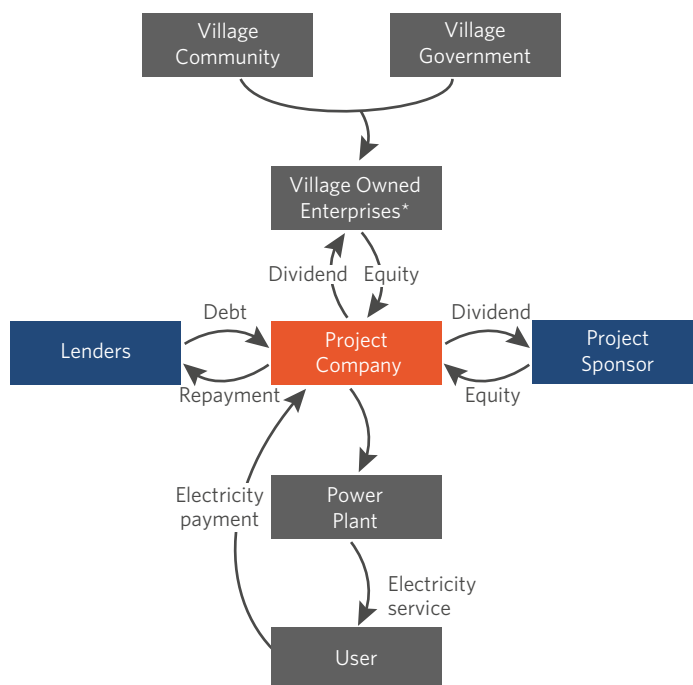
capital blending from public institution such as VOE and private investors, beyond the conventional public-grant scheme.

Project Company Establishment

Establishing a JV or a Project Company would not be an obstacle for the VOE, since the Government has launched the Online Single Submission (OSS). OSS is a web-based business licensing system to simplify the process of obtaining business permits, as part of the government's effort in accelerating private investment. The OSS system is also an integrated system between the central government and regional government, with the electricity sector is included in the system.

In terms of operational arrangement, electricity users receive the electricity service managed by the Project Company, and they also pay the Project Company for this service. Since Project Company is likely to be a private business entity, it is expected that the establishment of Project Company would be associated with an improved delivery of electricity services to the users.

Figure 4.1: Village-owned enterprises (VOEs) and private sector joint venture scheme (*VOE Establishment is followed by capital injection)



*The establishment includes direct capital injection to Village Owned Enterprises

11 For reference, see Ministry of Village, Development of Disadvantaged Regions and Transmigration Regulation 11 (2019) that allows the use of village funds for renewable energy development

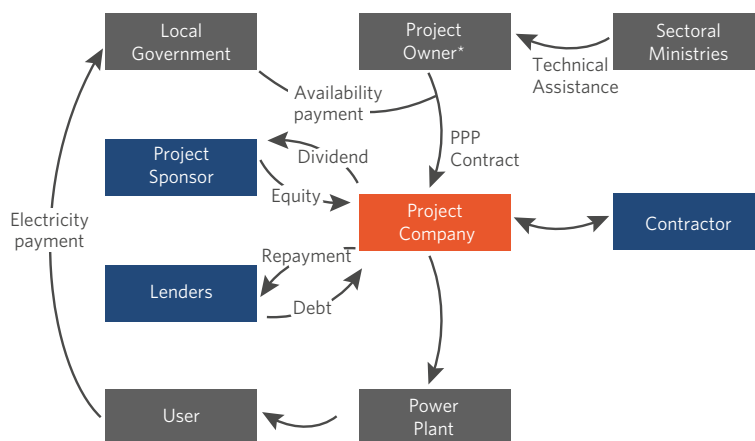
12 See Minister of Village Regulation No.4/ 2015

This scheme does not address the barriers to business area release, meaning that the project company must undergo the process of obtaining the business area (see Chapter 2.1.1) from the PLN through MEMR. It is also unable to improve the risk-appetite from local banks and financial institutions as the extent of capital from village-level governments is likely to be small.

However, this business model can potentially address the barrier of off-taker uncertainties since village governments have the necessary knowledge about their electricity users. Therefore, this business model can partially address the second investment barrier, i.e. the unattractiveness of decentralized renewable energy projects for private investment. Additionally, the use of capital injection from the village government and village community forum (most likely via the use of village funds or *Dana Desa*) can reduce the reliability on debt-financing instruments. Therefore, the use of innovative financial instruments (fourth investment barrier) may not be necessary as some of the upfront capital is covered by capital injection from the village-level government and the village community forum.

and availability payment¹³ from the local government. Availability payment is a periodic payment from the local government budget to enterprises which provide infrastructure services that conform to the criteria specified in the PPP agreement.

Figure 4.2: Public private partnership (PPP) using the availability payment scheme



*Project owner can also be a local government agency or a locally owned enterprise

THE BUSINESS MODEL'S EFFICACY IN MITIGATING RISKS	
Regulatory constraints that hinder new projects	✗
Small-scale and decentralized renewable energy projects are unattractive for private investment	✓
The lack of access to innovative financial instruments	✗
The lack of financial instruments for financial or project risk mitigation	✓

4.2 Public Private Partnership (PPP) Using the Availability Payment Scheme

In this business model, the local government (e.g. provincial-level, regency-level, or locally-owned enterprise/LOE) assumes the role of a contracting agency (*Penanggung Jawab Pemegang Kerjasama--PJK*) in the public private partnership scheme. The local government also injects equity capital into the project company. This enables the project company to benefit from capital inflows through equity capital from the local government as well as the sponsor or investor, debt-financing from lending institutions,

As in the case of the VOEs and private sector joint venture scheme, this business model does not address the barrier of business area regulation. However, availability payments can help address the problem of off-taker uncertainty because of the regular nature of disbursement from this financial instrument to maintain the level of public service. Another implication of the use of availability payment is its ability to improve the return on investment as it partially covers the capital and operational requirements. Therefore, this business model can address the second investment barrier, i.e., small-scale and renewable energy projects are not attractive to private investors.

In addition to this, the use of availability payment can help improve the risk perception of local banks and other financial institutions because it is an instrument that has the support of a long-term government commitment. In other words, this business model also addresses the third investment barrier, which is the lack of access to innovative financial instruments. Lastly, the use of availability payment acts as a risk-mitigation instrument that helps maintain the delivery of electricity services thus addressing the fourth investment barrier i.e. the lack of financial instruments for risk mitigation.

13 See Ministry of Home Affairs Regulation 96/2016 on Availability Payment on Public Private Partnership between Local Government and Business Entity in Infrastructure Development

THE BUSINESS MODEL'S EFFICACY IN MITIGATING RISKS	
Regulatory constraints that hinder new projects	✗
Small-scale and decentralized renewable energy projects are unattractive for private investment	✓
The lack of access to innovative financial instruments	✓
The lack of financial instruments for financial or project risk mitigation	✓

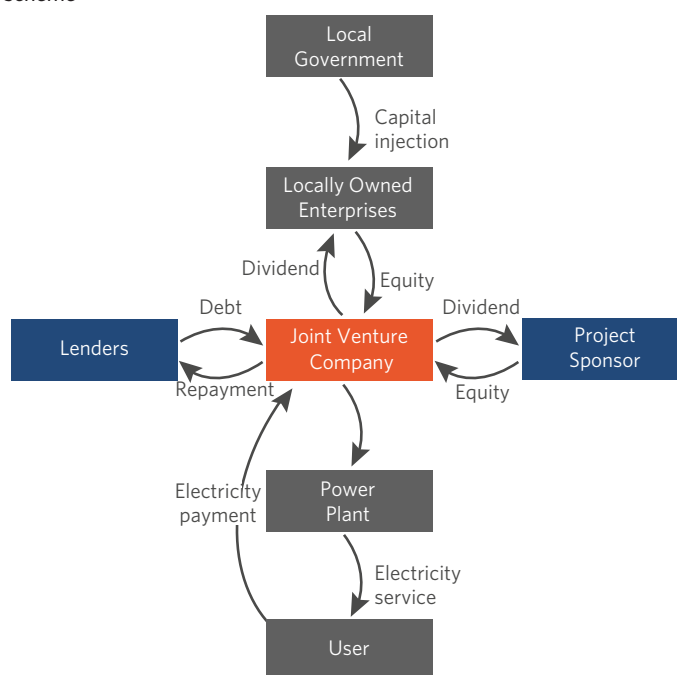
4.3 Locally Owned Enterprises and Private Sector Joint Venture Scheme

In a joint venture (JV) between a locally owned enterprise and the private sector, the local government (at the provincial and/or regency-level) appoints a specific LOE responsible for renewable energy projects and injects capital from the local budget into it¹⁴. The LOE then collaborates with the private business entity or entities by co-injecting capital in the form of equity into the joint venture company. The company also procures loans from lending institutions to reach the required equity debt ratio as well as the amount of capital needed for the renewable energy project.

As in the case of the other business models, this scheme fails to address the barrier of business area regulation. It is also unable to address the fourth investment barrier i.e. the lack of financial instruments for financial or project risk mitigation. This is because direct capital injection into the LOE does not necessarily reduce the reliance on innovative financial instruments other than loans.

However, this business model does address the second investment barrier and makes it possible to attract private investment because direct capital injection into LOEs reduces the need for upfront investment and return on investment. Additionally, it can potentially address off-taker uncertainties because the renewable energy project will be managed by on-the-ground LOEs. Lastly, it addresses the third investment barrier i.e. the lack of access to innovative financial instruments. This is because capital injection from the local government can reduce the reliance on high-interest loans from local banks and other financial institutions.

Figure 4.3: Locally owned enterprise and private sector joint venture scheme



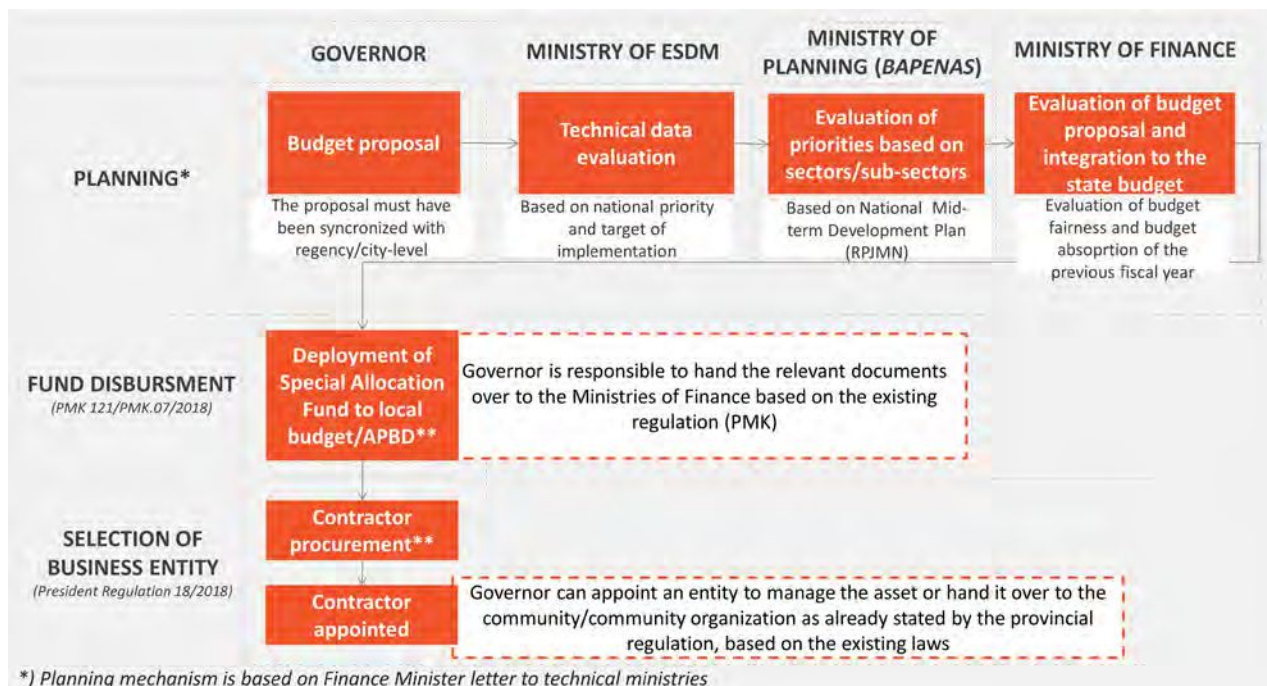
THE BUSINESS MODEL'S EFFICACY IN MITIGATING RISKS	
Regulatory constraints that hinder new projects	✗
Small-scale and decentralized renewable energy projects are unattractive for private investment	✓
The lack of access to innovative financial instruments	✓
The lack of financial instruments for financial or project risk mitigation	✗

4.4 Special Allocation Fund and Private Sector Joint Venture Scheme through a Joint Operation Mechanism

This model uses the special allocation fund (*Dana Alokasi Khusus—DAK*) as a financial instrument for small-scale renewable energy projects. The respective governor must first make a budget proposal to different line ministries to request this fund. The Ministry of Energy will then assess the technical plan, while the National Planning Agency will assess its urgency based on national development priorities. The Ministry of Finance will evaluate its budgetary feasibility and measure it against the state budget's capacity at the same time. The fund will be earmarked and transferred

14 For reference, see *Government Regulation 54 (2017) on Locally Owned Enterprises*

Figure 4.4: Regulatory flow for small-scale renewable energy projects using special allocation fund



to the local budget if it is deemed feasible, and the governor will conduct a tendering process to select contractors. Figure 4.4 illustrates the process.

In the Special Allocation Fund and Private Sector Joint Venture business model, the Special Allocation Fund from the state budget will be used to cover the construction costs for renewable energy infrastructure. After that, the ownership of the renewable energy infrastructure will be transferred to a Local-Owned Enterprises (LOE), after which the LOE will issue a Joint Operation (*Kerjasama Operasional--KSO*) contract with relevant private operators whom will be responsible for handling day-to-day operations.¹⁵ KSO is a cooperation agreement between two or more parties to reduce the risk from the use of a particular asset. In this sense, because the physical asset (power plant) belongs to LOE, then LOE must cooperate with another party to engage in a KSO scheme.

In KSO, private operators will be responsible to deliver electricity services to users. The term “private operators” can vary where in the context of Sumba, the role of private operator can be assumed by existing local private entities, such as PT. RESCO Sumba Terang or cooperations, as long as these institutions have the capabilities to conduct operational & maintenance in renewable energy electricity services. In the context of on-grid electricity services, PLN as a State-Owned Company can assume the role of private

operators. Furthermore, LOE will pay the operation and maintenance cost to private operators, while energy users will pay the electricity tariff to LOE.

Knowledge Transfer Process

The aim of knowledge transfer process is to equip the local public institutions with the necessary technical skills normally owned by private operators. By undergoing this process, LOE/VOE who owns the power plant can benefit from the capacity building by the presence of private operators, so they would be able to be self-sufficient after the KSO contract has expired.

In the KSO contract or co-op agreement, private operators must transfer their operational knowledge to LOE/VOE in a specific time. For example, for the 15 years of the project life cycle, private operators must undergo an operational knowledge transfer to LOE/VOE in the last 5 years of the project cycle. The timing for the knowledge transfer can vary depends on the agreement between both parties.

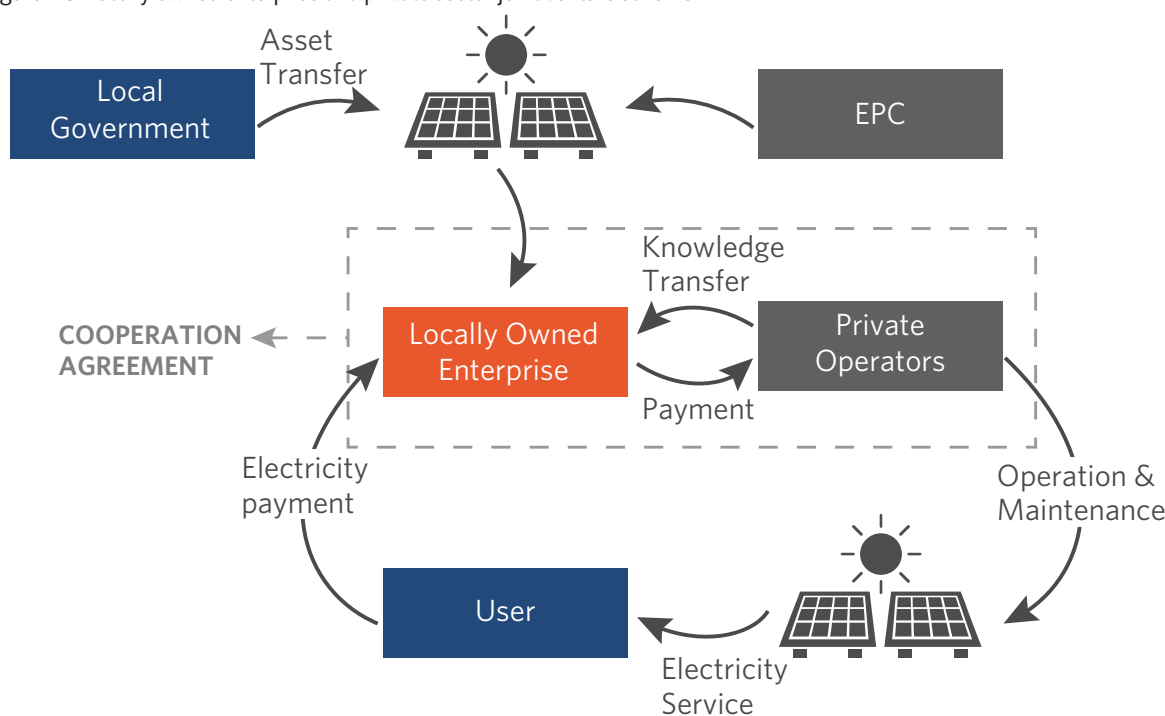
15 For reference, see *Government Regulation 54 (2017) on Local-Owned Enterprises*

Figure 4.5 illustrates this business model.

As with the other business models, this business model does not circumvent or reduce the policy barrier on business area regulations. It also does not address the need for a loan instrument because this scheme does not cover the operational expenses necessary to keep the renewable energy plants running. Therefore, this scheme does not address the third investment barrier i.e. inability to access innovative financial instruments other than loans.

However, this business model can still attract private investment because the use of the special allocation fund covers the capital expenses which can improve the return on investment. Therefore, this scheme can partially address the second investment barrier. Lastly, the special allocation fund is a grant, which is a financial instrument that mitigates construction risks in the early phase. Therefore, this business model addresses the fourth investment barrier.

Figure 4.5: Locally owned enterprise and private sector joint venture scheme



THE BUSINESS MODEL'S EFFICACY IN MITIGATING RISKS	
Regulatory constraints that hinder new projects	✗
Small-scale and decentralized renewable energy projects are unattractive for private investment	✓
The lack of access to innovative financial instruments	✓
The lack of financial instruments for financial or project risk mitigation	✗

5. Innovative Financial Instruments to Support Private Investment

Certain financial instruments can support the business models described earlier. We have identified three innovative instruments based on the investment characteristics of DRE, particularly in Sumba. Risk pooling investment and asset-backed securities (ABS) are two instruments that could specifically catalyze private investment in DRE given adequate business scale, risk and return on the private investment.

Here is a summary of these financial instruments:

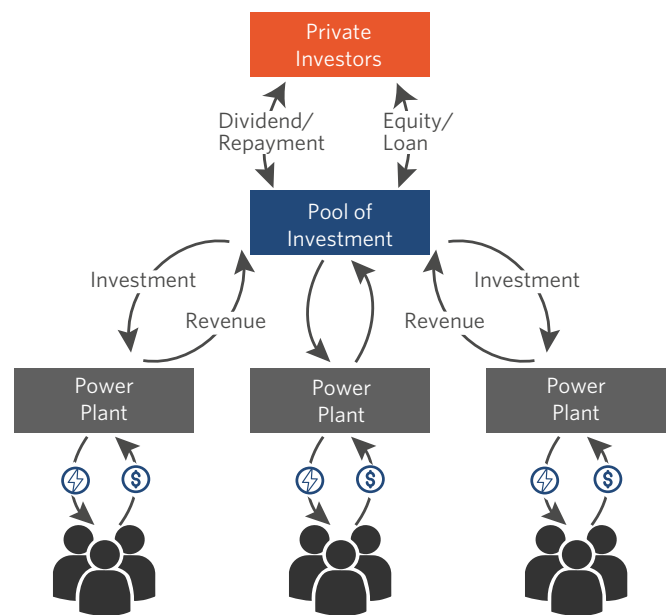
Instrument	Risk Coverage	Instrument Mechanics	Source of Funds
Risk pooling investment	Financial risk	Investment pooling of selected power plant assets to increase economies of scale and to attract private investment	<ul style="list-style-type: none"> • Venture capital • Private equity • Commercial banks
Asset-backed securities (ABS)	Financial risk	Securitization of RE assets as the offering instrument from risk pooling investment to the investors. This instrument presents diversified risk profiles for the investors.	<ul style="list-style-type: none"> • Institutional investor
Credit guarantee	Financial and project risk	A credit guarantee mitigates risks that may affect the loss of investment throughout the project cycle. There are many forms of guarantee mechanisms depending on the project's risk characteristics.	<ul style="list-style-type: none"> • State budget • Bilateral/ multilateral financial institutions • Infrastructure guarantee company

5.1 Risk Pooling Investment Scheme

Risk pooling investments consist of a pool of DRE projects that are offered to investors in the form of an investment program. This instrument works when an SPV has the financial capacity and technical capabilities to manage multiple DRE assets. With typically <500 kw capacity per site, scaling up the investment through a risk pooling instrument is essential to attract investors due to the appetite for a good return on investment from diverse allocated risks. The investors or lenders will take the credit worthiness of the SPV company into consideration, with regards to its project portfolio management of underlying assets.

This instrument addresses the following investment barriers:

Figure 5.1: Risk pooling investment scheme



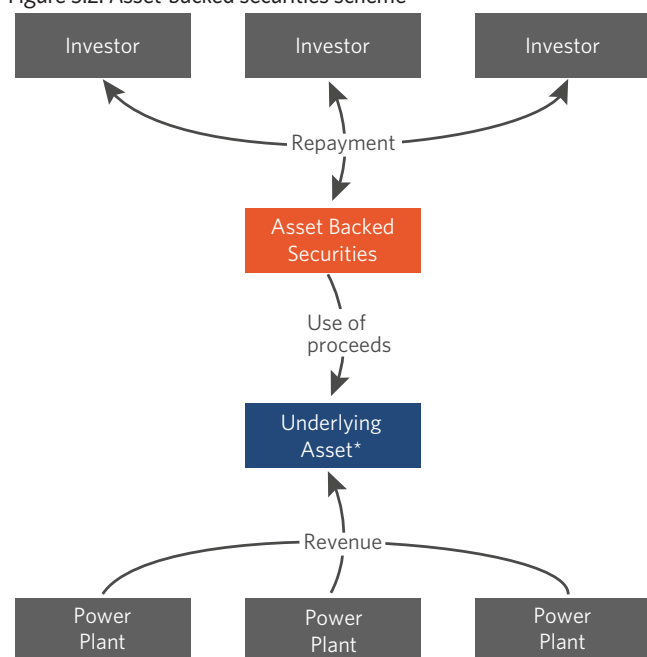
- Small-scale and decentralized renewable energy projects are unattractive for private investment: By pooling all investments into DRE projects, the scale of the investment value and return is proportionately increased to match the risk appetite of private investors.
- The lack of access to innovative financial instruments: Risk pooling investment is an innovative financial instrument that can help attract funding from financial institutions as it goes beyond traditional project financing schemes with a diverse risk and return profile.

5.2 Asset-Backed Securities (ABS)

Asset-backed securities pool the loan portfolios of multiple projects and this is then sold as a security product to the investors, as in the case of bond issuance. This instrument is compatible with the investment characteristics of DRE in Sumba due to its scale. As in the case of the risk pooling investment, asset-backed securities highlight the importance of scaling up investments to meet the investor's risk appetite and expected return.

However, the instrument mechanics of ABS are more complicated than common securitization initiatives and may result in challenges to structuring and underwriting. To increase the bankability of ABS, the instrument mechanics should provide assurances with

Figure 5.2: Asset-backed securities scheme



*Future income of the power plant

regards to the technical aspects such as standardized contracts and product warranties. It should also provide a credit enhancement mechanism on the initial offerings, which can help mitigate the risk associated with this complexity. As loans become more standardized resulting in a loan performance track-record, the underwriting complexity, pricing, and need for credit enhancement will decrease.

This instrument addresses the following investment barriers:

- **Small-scale and decentralized renewable energy projects are unattractive for private investment:** As with the risk pooling investment, ABS enables the pooling of loan portfolios, which can increase the investment scale for DRE. However, the role of loans as underlying assets should be maintained.
- **The lack of access to innovative financial instruments:** ABS can provide an alternative instrument to bond issuance as it offers investors securitization based on underlying loan portfolios that can be used to refinance or renew

5.3 Guarantee Instrument

A guarantee instrument is one of the many potential de-risking instruments that can help accelerate renewable energy development in Indonesia. Although a guarantee is not the only available solution that can address the range of investment barriers that renewable energy projects face, it can partially address some of these barriers.

1. **Security gap:** In small projects, a guarantee can address the security gap because it helps attract small developers with insufficient balance sheets.
2. **Risk-return profile of a renewable energy project:** A guarantee can improve the risk-return profile of a renewable energy project in a situation where the guarantor assigns a lower risk profile to a project than the risk profile of the potential lender (and where the cost of guarantee is lower than the cost of debt).
3. **Access to long-term funding:** A guarantee can enhance access to long-term funding from local banks resulting from an improved risk profile.

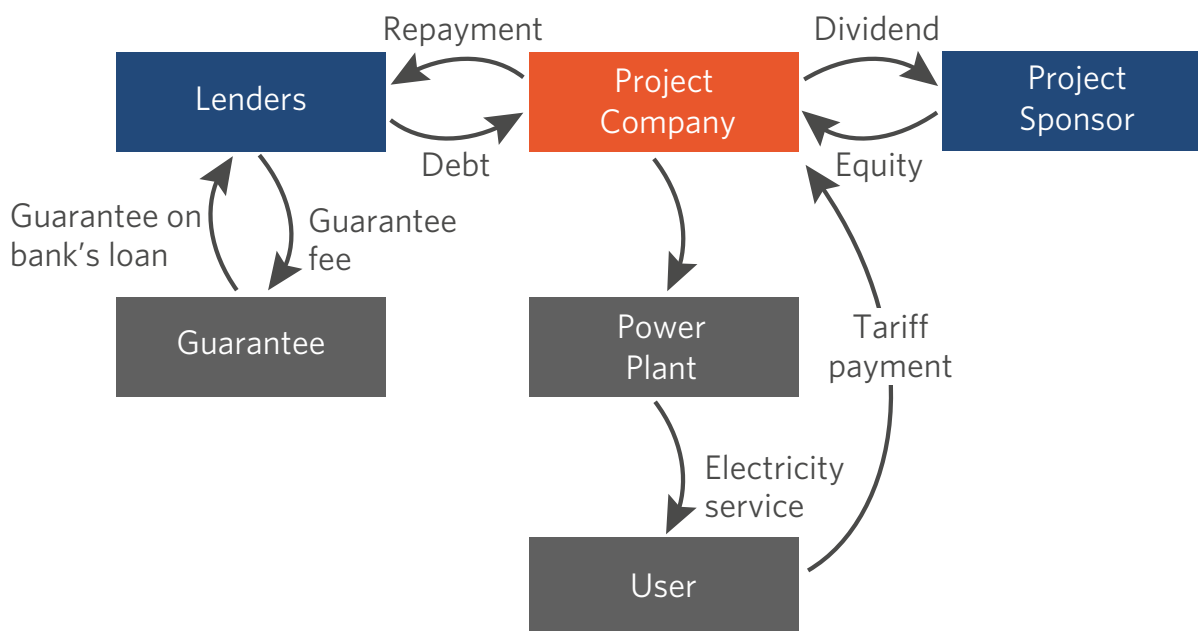
Guarantee providers for DRE investment for small scale energy projects may be scarce in Indonesia. Therefore, it is necessary to identify an alternative source of funding that provides a guarantee to attract private investment and capital from financial institutions, with specific instrument mechanics to mitigate risks in DRE.

This instrument addresses the following investment barriers:

- **Small-scale and decentralized renewable energy projects are unattractive for private investment:** Guarantee instruments should provide an assurance to the investors if small scale developers have an insufficient balance sheet to access financing.

- **The lack of access to innovative financial instruments:** A guarantee is an innovative instrument that can attract investment from financial institutions due to an improved risk profile.
- **The lack of financial instruments for financial or project risk mitigation:** It addresses risk mitigation issues with a guaranteed scheme of perceived risk according to the investment analysis.

Figure 5.3: Guarantee instrument scheme



6. Conclusion

Most off-grid power plants in Sumba receive funding from the state budget as well as grants from CSOs. This creates a pressing challenge to achieve the Sumba Iconic Island (SII) target and reach 95% of renewable energy generation by 2025. An adequate source of finance is necessary to match the investment characteristics of decentralized renewable energy in Sumba and increase the scale of implementation. Therefore, the biggest challenge to financing SII is the ability to attract private investors, including financial institutions, and have them invest in DRE in Sumba. It is also imperative to address investment barriers that could hamper the interests of private investors in DRE.

To attract private investors, it is necessary to identify an innovative business model and the appropriate financing instrument besides the current business scheme. We have identified four business models that can address investment barriers and potentially scale up DRE investment in Sumba:

1. Joint venture business model between a village enterprise and a private company
2. Public private partnership (PPP) using availability payment from the regional government budget
3. Joint venture business model between a regionally-owned enterprise and a private company
4. Joint venture business model using the special allocation fund between a regionally-owned enterprise and a private company

Catalyzing private investment for DRE in Sumba requires strong commitment and active participation from the government, particularly to enhance its regionally-owned enterprises through capital injection or asset transfer and commission partnerships with the private sector.

Our analysis concerning investment barriers also concluded that regulations regarding the business area (Wilayah Usaha) is the only barrier that remains unaddressed by the proposed business models.

7. References

Bank Indonesia (2019). Investor Relations Unit. (available online: <https://www.bi.go.id/en/iru/default.aspx>)

Climate Policy Initiative (CPI), 2018, Energizing Renewables in Indonesia: Optimizing Public Finance Levers to Drive Private Investment.

Climate Policy Initiative (CPI), 2019, Developing a Guarantee Instrument to Catalyze Renewable Energy Investment in Indonesia.

HIVOS, 2018. Monitoring & Evaluation of Sumba Iconic Island Program 2018.

HIVOS, 2019, Financing Decentralized Renewable Energy for the Last Mile - what funding sources and instruments can be applied?

HIVOS, 2019, Assessment Toward Sustainable Decentralized Renewable Energy through the RESCO Model in Indonesia.

Otoritas Jasa Keuangan (OJK), 2018, Indonesia Banking Statistics.

Perusahaan Listrik Negara (PLN), 2018, RUPTL Pulau Sumba 2019 - 2028.

World Bank (WB), 2019, World Bank Data Indicators (available online: <https://data.worldbank.org/indicator>)