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# Developing West Java's Enabling Environment and Banking Needs Assessment to Drive Green Finance

July 2021

## Acknowledgements

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## Descriptors

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Region	Indonesia	
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Contact	Tiza Mafira	Tiza.Mafira@cpiglobal.org

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## Executive Summary

The Government of West Java is among municipalities with the highest commitments towards SDGs and climate change issues. It is currently implementing a 2018-2023 subnational action plan on SDGs (RAD TPB) and aims for West Java to be a “green province” by 2025. The province has listed potential projects on mitigation, adaptation, particularly in the sector of Sustainable Infrastructure, Sustainable Transportation, Renewable Energy, and Resilience to Climate Change (waste and water system).

These identified potential projects in the pipeline generally have high investment requirements and have specific challenges at the project-level. Challenges vary from technical to institutional, but all of them converge to the difficulty of obtaining adequate and sustainable financing. Hence, there is a need to develop a set of enabling policies to push the banking sector's involvement and optimize the use blended finance, by addressing investment barriers for climate resilience related programs.

The scope of study aims to assess the following questions:

- (i) Considering West Java's project pipelines in need of financing and West Java's limited fiscal capacity, which projects can be prioritized based on value for money?
- (ii) Given current banking sector appetite towards financing green projects, what kind of enabling conditions and financial schemes can be adopted to finance priority projects?

To assess the two main issues above, this study utilized the following approaches:

1. Identified a list of green project pipelines by filtering a list of planned development projects in West Java based on its potential to yield environmental benefits, specifically emissions reductions, in line with Bappenas' Low Carbon Development Indonesia (LCDI) framework.
2. Assessed West Java's fiscal capacity by analyzing its budget revenue and spending structures.
3. Applied a “value for money” assessment to prioritize projects based on (i) which projects are more likely to yield returns attractive to private sector financing and (ii) provides emissions reductions with relatively low fiscal burden and potential replicability.
4. Conducted research and interviews with the banking sector and industry players to identify their needs and barriers to financing green municipal projects, as well as identify concessional financing schemes more likely to be utilized by banks towards priority projects in West Java.
5. Recommended innovative banking finance and non-bank financing schemes for the selected priority green projects of West Java, including identification of stakeholders to be involved.

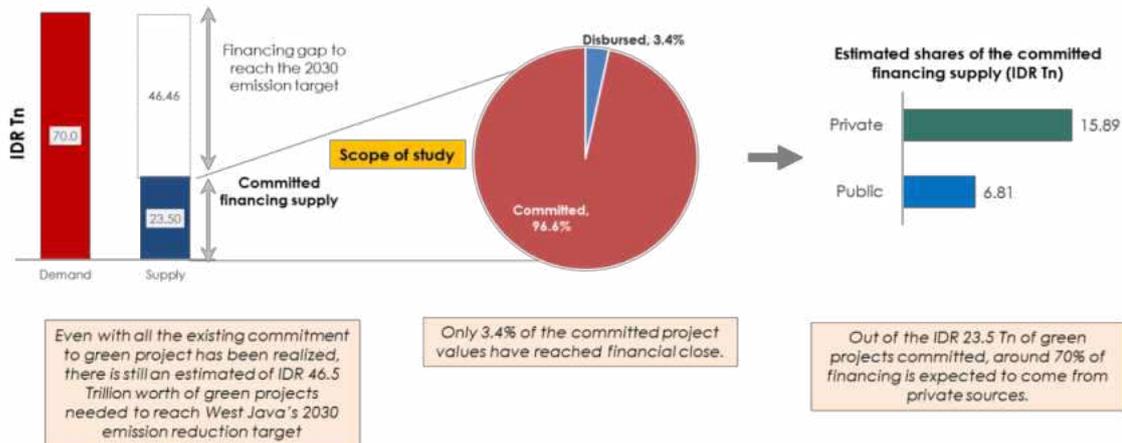
## Key Findings

- 1. Of the 30 green project pipelines identified in West Java, priority for stronger financing efforts could be given to medium-scale rooftop Solar PV installation and medium-scale intermediate waste management projects**

Of the projects currently being considered for development in West Java, 30 have been identified as green projects by virtue of having a potentially positive environmental impact. The 30 green projects span five sectors, ranging from small-medium to large scale. They have

received IDR 23.5 trillion in committed financing supply, and only IDR 800 billion has been disbursed.

Meanwhile, West Java estimated the financing needs to achieve their Low Carbon Development Plans (PPRK) is approximately IDR 7 trillion per year, or up to IDR 70 trillion from 2021-2030 (RAD-GRK of West Java). To close the financing gap, West Java needs to secure IDR 6.8 trillion of public finance, and the remaining portion of IDR 15.9 trillion is expected to be covered by private investment.



Source: Simpul KPBU Jawa Barat, data from multiple agencies, CPI analysis  
 ES1. West Java's Green Financing Gap Analysis

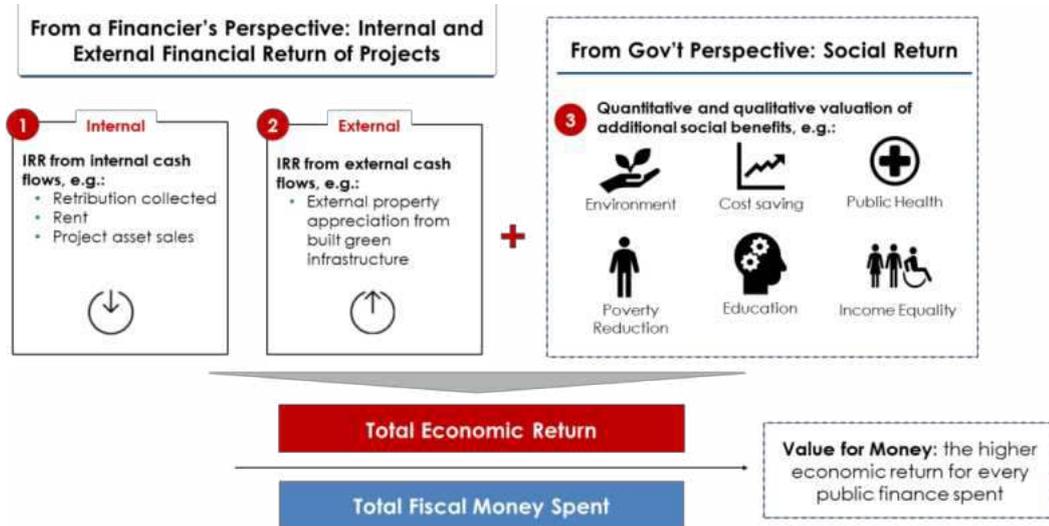
West Java's average fiscal capacity is IDR 9.6 trillion in 2020, which is enough to cover the public portion of finance needs of IDR 6.8 trillion. West Java is also eligible to receive regional loans of up to IDR 12.7 trillion. However, spending flexibility is decreasing due to COVID-19, and policymakers may not have support to allocate budget for investments. Indeed, consultations with West Java Bappeda and Investment Bureau throughout the study reveals a preference for small to medium scale projects, as it has relatively lower fiscal burden, shorter timeframe to implement, and higher potential for replicability.



Source: West Java Regional Budget Report, CPI Analysis  
 ES2. West Java Estimated Fiscal Capacity for Green Projects

Applying a “value for money” filter further narrows down the list to a few green projects to be prioritized. This study qualitatively measures Value for Money as total economic return relative to fiscal spending. The higher the economic return for every public finance spent, the better value for money. In this case, because the aim is to ultimately attract private financing, the economic returns are measured from both the financier's perspective and government's perspective. If the project can generate revenue, it will

yield financial returns for the financier. If the project contributes to reduced emissions, it will generate social returns for the government. When these combined economic returns can be achieved with relatively low fiscal spending and has potential replicability, it is considered value for money.



Source: Interview with Bappeda and Related West Java Institutions & Agencies (2020), OECD (2019), CPI Analysis

ES3. Value for Money approach

Based on this Value for Money assessment, only four out of the 30 projects fulfill all criteria. The first is a Solar PV installation project for 173 public schools. The second, third, and fourth are intermediary solid waste management facilities located across 3 cities in West Java (Cimahi, Purwakarta, Bandung). See Appendix 8.6 for Priority Project Analysis.

		Rooftop Solar PV at 173 high schools	Solid Waste Processing Site (TPS3R - 3 cities)	Water management installation	AFOLU	
#1	Public capacity to support	Relatively low fiscal burden	223 bn ✓	3 bn ✓	42 - 400 ✓	37 bn ✓
		Quick wins/ Replication Potential	High ✓	High ✓	Low-Medium ✓	Low-Medium ✓
#2	Private sector appetite	Financial Return	IRR 6-9%, PBP 8-12 Year ✓	Yes, unspecified ✓	Yes, unspecified ✓	Generally, low to negative IRR ✗
		Finance enablers available	Medium ✓	Medium ✓	Low ✗	Low ✗
#3	Social benefit	LCDI Priority Sector	Yes ✓	Yes ✓	No ✗	Yes ✓
		Emission Reduction	Yes ✓	Yes ✓	No ✗	Yes ✓
		Social Return	Medium - High ✓	High ✓	High ✓	High ✓

\*Bundling: Grouping of several rooftop solar PV installation projects in high schools in West Java  
 Source: List of Green Projects in the West Java Pipeline. Pre-Feasibility Study of Solar Roofs in 173 Public Schools in West Java. West Java RAD-GIRK Review Documents, Various West Java Project Data, CPI Analysis

ES4. Sample of "Value for Money" consideration to prioritize Solar PV and solid waste management projects

**2. Co-financing, syndicated loans, and leasing models have been identified as the most promising financing schemes for priority projects, after considering the range of financial mechanisms and business models with potential to enable green finance**

To cover the private sector portion of financing gaps of IDR 15.9 trillion, green finance needs to be accelerated. Public finance can be leveraged to enable private sector engagement to cover private financing gap. In improving banks' appetite, green banking policy instruments could act as risk management tool and market signaling.

Interviews conducted with the banking sector during this study reveals that certain policy instruments have potential to unlock green finance, such as global banking standards on stress testing, internal financial institution policies on disclosure and reporting requirements, government policies on interest rate subsidies, government-provided or government-backed guarantees, and certain policy signals favoring green projects such as regulation on carbon economic instruments. These findings need to be taken into consideration by central government, particularly the Financial Services Authority, in ensuring a robust market to finance municipal green projects.

Policy Area	Instrument Type	How the instruments work
<b>Macro-prudential</b> Best-practice rules for global FIs – mitigate financial risks caused by climate change.	<ol style="list-style-type: none"> <li><b>Stress testing</b></li> <li>Differentiated capital requirements</li> <li>Loan-to-value, loan-to-income caps, and loan exposure restriction</li> <li>Sectoral leverage ratio</li> <li>Liquidity restrictions – BASEL III post-crisis reforms (2018)</li> </ol>	<ol style="list-style-type: none"> <li>Impact assessment of climate related financial risks on the financial system</li> <li>Higher risk weighting to carbon-intensive assets when evaluating the capital to risk assets ratio of banks</li> <li>Limit the lending/ financing source and credit exposure to high carbon emission sectors</li> <li>Limit leveraged position to carbon-intensive assets and/ or collateral</li> <li>Introduce an incentive mechanism for Net Stable Funding Ratio (NSFR) requirements (ASF/RSF &gt;100%) to link the climate targets and the liquidity/maturity mismatch requirements</li> </ol>
<b>Micro-prudential</b> FIs' internal policies and operations to account E&S safeguards	<ol style="list-style-type: none"> <li><b>Disclosure and reporting requirements</b></li> <li>E&amp;S risk management</li> <li>Reserve requirements</li> </ol>	<ol style="list-style-type: none"> <li>Information disclosure of climate-related financial risks by banks, following TCFD and NGFS recommendation and disclosure and sustainability reporting guidelines of POJK 51</li> <li>Develop E&amp;S risk management framework and standards and implement, as guided by POJK 51</li> <li>Lower reserve requirements for bank's green portfolio to encourage green investment</li> </ol>
<b>Market making</b> Green investment guidelines by regulators	<ol style="list-style-type: none"> <li>Sustainable finance guidelines, including green taxonomy</li> <li>Green bond guidelines</li> <li><b>Interest rate subsidy re-allocation</b></li> </ol>	<ol style="list-style-type: none"> <li>OJK's Sustainable Finance roadmap Phase I and II. <b>Phase II covers national green taxonomy development</b></li> <li>Green bond guidelines to encourage the issuance of green bonds (POJK 60/2017)</li> <li>Reallocate interest rate subsidy from brown to green sectors</li> </ol>
<b>Credit allocation</b> Lending & investment for low carbon economy – imposed by regulators & Central Bank	<ol style="list-style-type: none"> <li>Green lending allocation</li> <li>Green refinancing windows</li> <li><b>Guarantee</b></li> <li>Concessional loans for priority sectors</li> </ol>	<ol style="list-style-type: none"> <li>A minimum proportion of bank lending to climate and environment-related sectors → similar like MSME lending quotas, but for green project</li> <li>Refinancing windows to encourage green finance initiatives</li> <li>Provide guarantee for green sectors to mitigate political, public sector performance, and commercial risks e.g. provided by IIGF, PT SMI</li> <li>Provide concessional loans to banks that lend to climate-sensitive sectors</li> </ol>
<b>Policy indirectly impacting FI</b> imposed by regulators	<ol style="list-style-type: none"> <li><b>Carbon economic instruments</b> (new Presidential Decree)</li> <li>Carbon neutrality commitment</li> </ol>	<ol style="list-style-type: none"> <li><b>Non-fiscal measure:</b> (i) Development priority to put pricing on emission to achieve NDC target, (ii) Carbon Emission Inventory to centralize inventory of carbon emission, including monitoring and evaluation</li> <li><b>Fiscal measure:</b> (i) Carbon trading: monetization of certified carbon emission reduction, (ii) Carbon pricing: state collection on carbon emission, (iii) public finance budgeting for climate actions that follow the rule set by the carbon economic instrument</li> </ol>

Source: CPI Analysis, OJK regulation, BASEL standard, Park and Kim (2020)

*ES5. Green banking policy instruments*

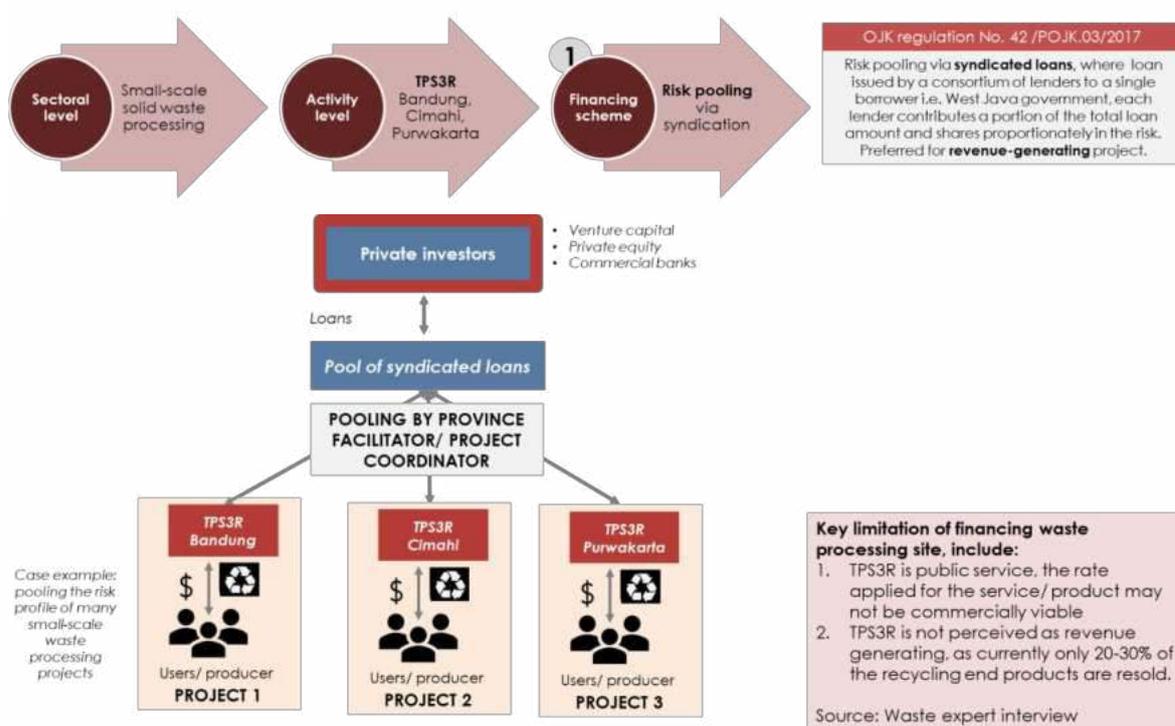
Interviews with the banking sector also show that certain financial instruments and business models are more favorable to banks when applied to certain projects, depending on the size of the project, and depending on whether other forms of technical assistance is available. For example, risk-pooling has been identified as a promising model to finance small-medium scale projects, but less appropriate for large-scale projects. Following from this finding, we have identified two risk pooling models that would fit for the purpose of financing the two identified priority green projects in West Java: risk pooling via syndicated loans, and risk pooling via co-financing.

Interviews with industry players reveal another financing mechanism which does not involve banks, which is leasing models. A rooftop solar PV leasing model is increasingly being provided by solar PV project developers and can drive down upfront costs for the

project owner. This model has potential to be utilized for West Java's School Rooftop Solar PV project.

As preferred by banks and industry players for the two priority green projects, this study has narrowed down to three potential financing schemes proposed for the priority projects, with the potential for replicability to other West Java/ national non-PPP green projects:

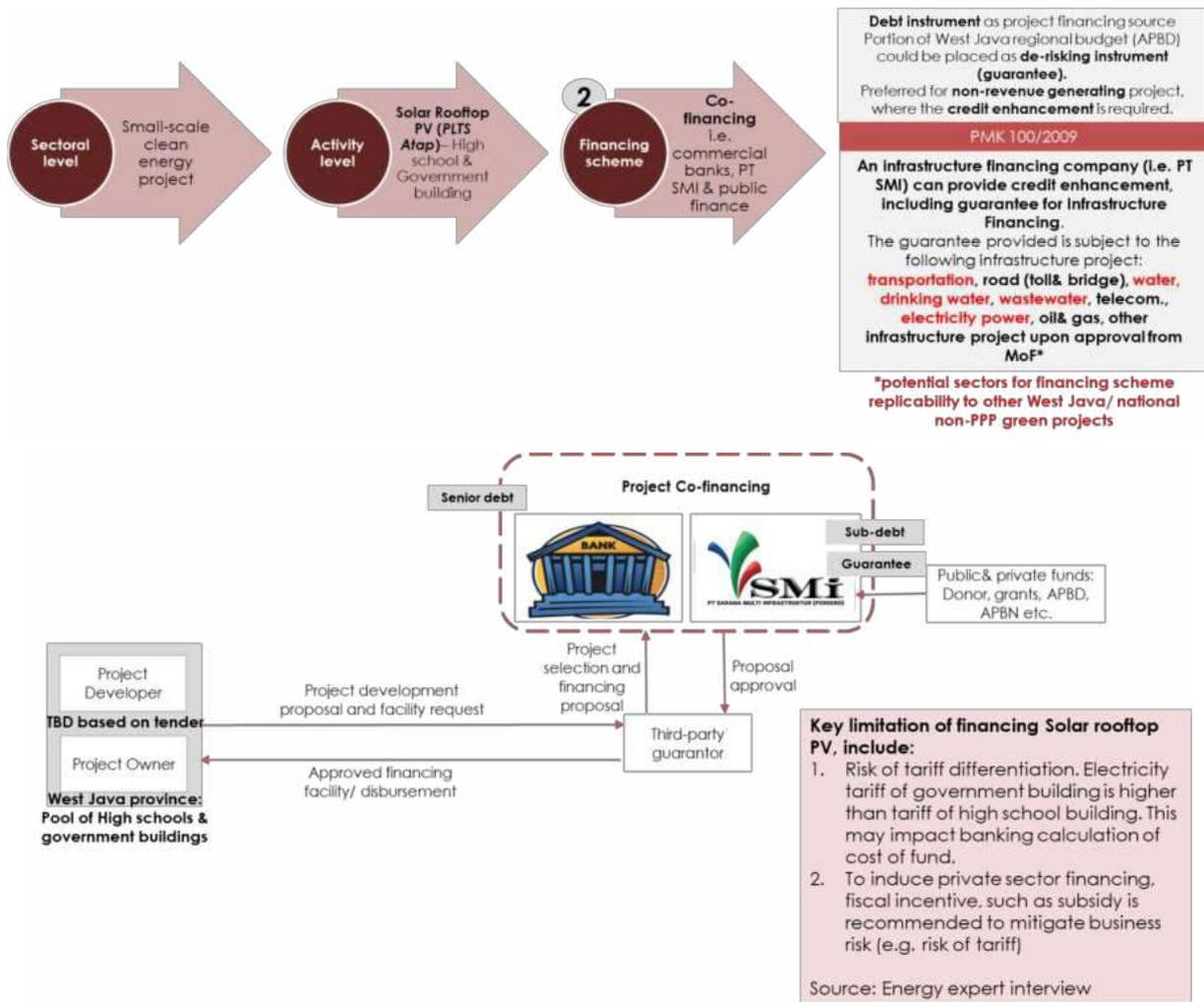
1. **Risk pooling via syndicated loans**, to mitigate a portion of financial risks from multiple small-to-medium scale waste projects, in this case solid waste-processing sites (or "TPS3R" – Temporary 3R Solid Waste Disposal Site). The uniqueness of this scheme is the institutional arrangement that requires a Public Service Agency (BLU) as project owner, so they are legally viable to access loans from commercial banks. This scheme could be replicated to West Java waste projects in the pipeline e.g. waste and wastewater management, SPALD. Future work on this recommendation must focus on business models that defines the role of the third party that could finance its operationalizations such as co-op or community groups. The business models should also define the legal basis on incentive structures between the state and the small-medium-enterprises.



Source: CPI analysis, waste expert interview

ES6. Proposed financing scheme for small-scale waste management site

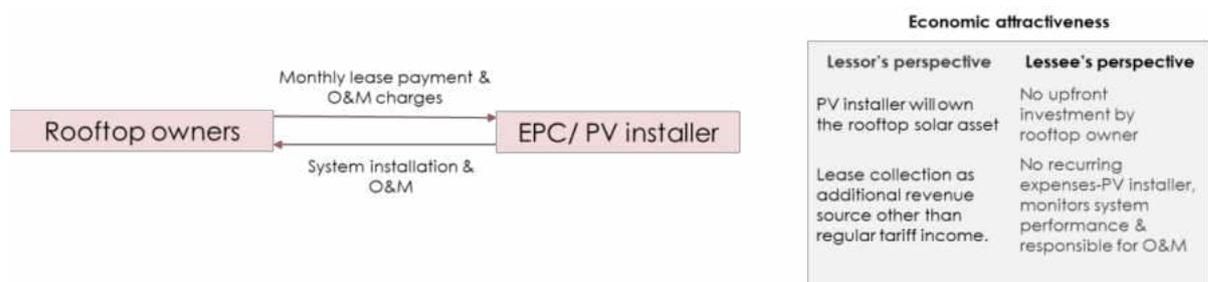
2. **Risk pooling via co-financing with commercial banks, PT SMI, and public finance** on solar PV projects at schools, to create more efficient market and lower the cost of fund.



Source: CPI analysis, energy expert interview

ES7. Proposed financing scheme for small-scale solar PV

3. **Leasing model** whereby the PV installer acts as a lessor and rooftop owners lease the solar panels from the lessor. The leasing agreement involves performance-based renting, meaning that the PV installer earns revenues from the rooftop owner's electricity savings, as well as from lease fees.



ES8. Proposed leasing scheme for small-scale solar PV

## POLICY RECOMMENDATION

This study formulates key recommendations for West Java in enhancing green investment to close its financing gap and to meet its RAD-GRK commitment in 2030, by focusing on quick win priority projects. These recommendations have the potential to be replicated across other provinces in Indonesia that have similar attributes, to encourage green finance and use of financing scheme, business model and technical assistance.

The recommendations are:

1. Optimize existing public finance instruments as leverage to non-government financing sources, to increase private sector engagement in financing green projects. Proposed financing schemes should be tailored to characteristics – revenue generating and environmental impact, economic returns and fiscal capacity, small-medium vs. large scale, and sectors of the projects.

For West Java, a value for money assessment reveals that small-medium scale waste and solar PV projects should be prioritized and could be developed further as pilot projects.

2. Improve the private investment appetite by leveraging green finance enabling regulations (e.g. green banking policy) and providing technical assistance tailored to key stakeholders such as regional government units as project owners and operators and financiers.
3. Explore the use of innovative financing models to attract banking finance by pooling risks and thereby mitigating investment risks. This can be done through syndicated loans and co-financing.
4. To expand the coverage of potential solutions, seek alternative business models that do not require private bank participation, such as leasing models which are becoming increasingly applicable for Solar PV installation.

Further assessment is required to determine the project and business model for pilot projects. UNDP/ IFL will cover the next stage of the study to build pilot project for West Java.

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## 1. Introduction

Despite their important roles, subnational governments face challenges in mobilizing investment for climate goals. Several factors affect the current investment gap, with the lack of pipelines of investment-ready green projects is a key factor. The provision of enabling environment for private investment can help to address this challenge by lowering investment risks and increasing the appetite of private investors in financing green projects, so that green projects at the local level can secure financing.

The Government of West Java Province, Indonesia, is among the subnational governments committed towards SDGs and ambitious climate goals. It is currently implementing a 2018-2023 subnational action plan on SDGs (*Rencana Aksi Daerah Tujuan Pembangunan Berkelanjutan—RAD TPB*) and aims for West Java to be a “green province” by 2025. The province has listed several green projects on mitigation, adaptation, and cross benefit – particularly in the sector of Sustainable Infrastructure, Sustainable Transportation, Renewable Energy, and Resilience to Climate Change (waste and water system).

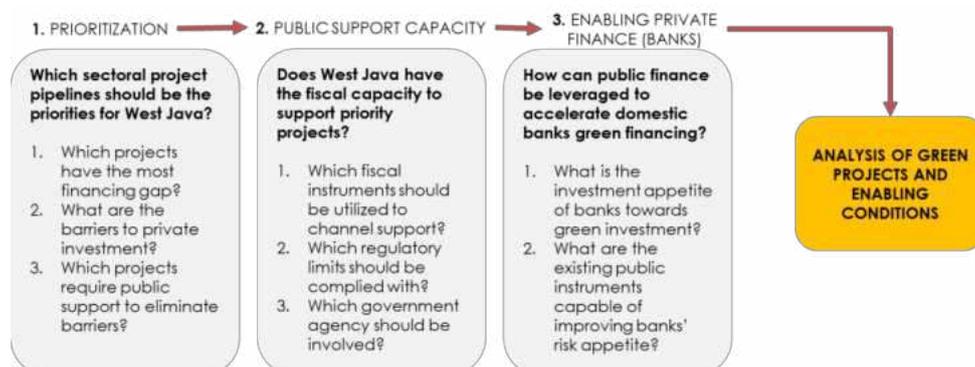
However, these green projects generally have high investment requirements and have specific challenges at the project-level. Challenges vary from technical to institutional, but all of them converge to the difficulty of obtaining adequate and sustainable financing. Hence, West Java needs to develop a set of enabling policies to optimize the use blended finance, addressing investment barriers for climate resilience related programs.

**The aim of this report is to map the enabling environment and identify gaps in West Java’s efforts to mobilize private investment for green projects, while focusing on banks as potential financiers in the region.** The scope of study is limited to narrow the gap of the green commitment by West Java from the perspective of: (i) Bappenas Low Carbon Development Indonesia (LCDI) framework, (ii) “Value for Money” (i.e. which projects provide financial and social return, with the highest environmental impact), and (iii) potential replicability of financing scheme/ business model.

This report focuses on two main part:

1. **Enabling environment analysis:** map the landscape of green finance in West Java (demand/needs, supply), analyze West Java’s green financing gap, examine West Java’s fiscal capacity, and identify potential enablers to close the financing gap
2. **Banking needs assessment:** identify banks’ risk appetite to finance green projects in West Java and identify potential public instruments capable of improving their risk appetite.

The approach used in this study is outlined below.



## 2. West Java's Financing Gaps for Green Projects

### 2.1 Financing demand

#### 2.1.1 3.85% EMISSION REDUCTION ACHIVED, FORESTRY AND WASTE DOMINATED THE HISTORICAL EMISSION PROFILE

West Java aims to reduce its emission to 9.94% from the Business-As-Usual (BAU) scenario in 2010-2030. The total emission reduction achieved in 2010-2019 is 3.85%, with 6.09% yet remain to be achieved in 2021-2030. Forestry and waste both dominated the emission profile (~64%). Forestry has become the major sector capable of reducing emission in the region, given that 23% of West Java is categorized as Forest Area (INCAS, 2021) followed by waste, where West Java is the most populous province in Indonesia, hosting 48.2 million people—larger than the total population of Malaysia (BPS, 2021).

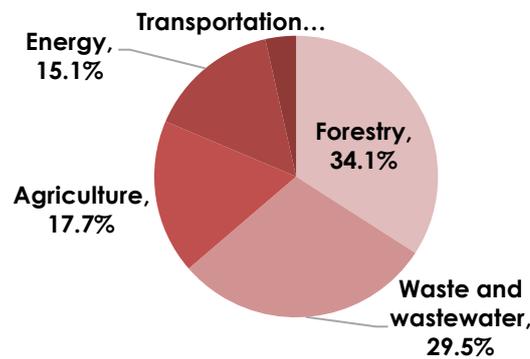


Figure 1. West Java's sectoral emission reduction profile (2010-2019)

#### 2.1.2 FINANCING NEED OF IDR 70 TRILLION TO ACHIEVE 2021-2030'S EMISSION REDUCTION GOALS

We use three literatures (Mckinsey, 2009; Shrestha, et al; and BAPPEDA, 2020) for estimating the financing needs of green projects in West Java to achieve its 2021-2030 emission reduction goals. These literatures represent various abatement cost from global, regional, and local scales. The total estimated financing needs are ranging, but local estimation from West Java's BAPPEDA is significantly larger than the other two sources, averaging the financing needs at IDR 70 Trillion, compared with the two others at IDR 20-25 Trillion. This is due to the incorporation of indirect project activities (i.e., technical assistance, community capacity building, etc.) in the project cost estimation in West Java's planning document.

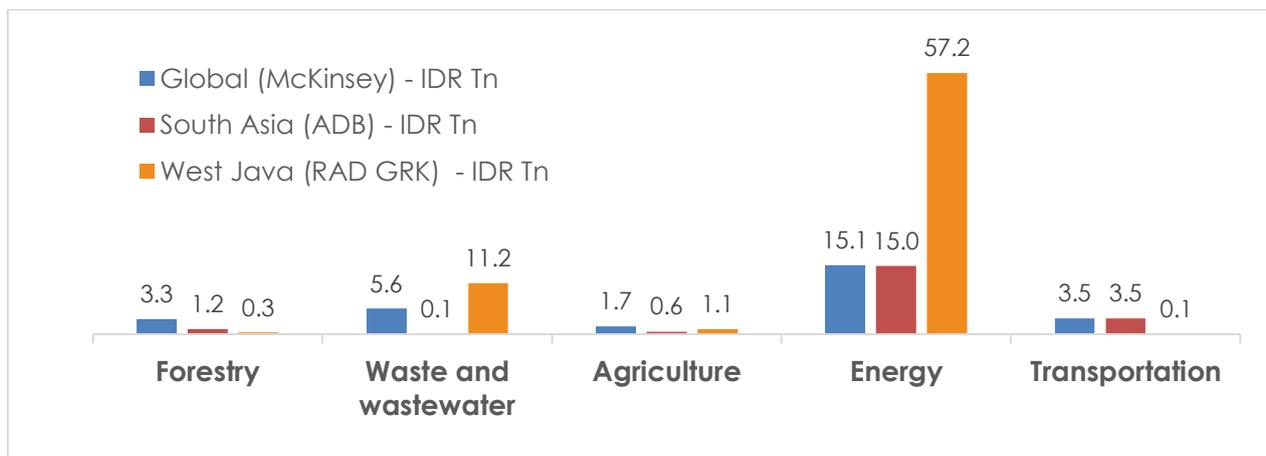


Figure 2. Total West Java Financing Needs in 2021-2030, by Sector (IDR Tn)

**Box 1. Abatement cost per ton from various literatures**

Source:	McKinsey (2007)	ADB (2013)			RAD GRK (2018)	
Sector	Global (\$/ton)	South Asia (\$/ton)			Sector	West Java, Indonesia (\$/ton)
		\$/ton	Country	Note		
1. Energy, incl. Transport	554.79	~500	South Asia (excl. India)	If they aim to reduce energy emission by around 23.5% from BAU	1. Energy	3,272.34
2. Industries	246.83	154.96	Bangladesh, Sri Lanka	This number is around the average of Global and Indonesia	2. Transport	19.57
3. Waste	104.50	2.37	South Asia (excl. India)	Activity: Recycling & composting Municipal Solid Waste	3. Waste	327.98
4. Forestry	53.23	17.24	Bangladesh, Sri Lanka	Activity: Expanding the amount of carbon stored (stocks)	4. Forestry	8.34
5. Agriculture		16.51	Bangladesh, Sri Lanka	Activity: Flood regulation, draining fields, and UMMB	5. Agriculture	54.44

Average abatement cost per ton	<b>\$ 245/ton (IDR 3.5 million/ton)</b>	<b>\$ 201/ton (IDR 2.8 million/ton)</b>	The average abatement cost of RAD GRK is more expensive than the other literatures, particularly in energy and waste sector. The abatement cost in RAD-GRK includes other activities that support the main activities of reducing emissions, for example, training, capacity building	<b>\$ 737/ton (IDR 10.5 million/ton)</b>
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**2.2 Financing supply**

2.2.1 GREEN PROJECTS PRIORITIZATION BASED ON “VALUE FOR MONEY” (VFM) AND LCDI

Green projects in the pipeline are prioritized based on the total economic return, measured relative to fiscal spending. High financial return of green projects corresponds to fiscal and institutional capacity, while social return focuses on low carbon development goals.

		Rooftop Solar PV at 173 high schools	Solid Waste Processing Site (TPS3R - 3 cities)	Water management installation	AFOLU
#1 Public capacity to support	Relatively low fiscal burden	223 bn ✓	3 bn ✓	42 - 400 ✓	37 bn ✓
	Quick wins/ Replication Potential	High ✓	High ✓	Low-Medium ✓	Low-Medium ✓
#2 Private sector appetite	Financial Return	IRR 6-9%, PBP 8-12 Year ✓	Yes, unspecified ✓	Yes, unspecified ✓	Generally, low to negative IRR ✗
	Finance enablers available	Medium ✓	Medium ✓	Low ✗	Low ✗
#3 Social benefit	LCDI Priority Sector	Yes ✓	Yes ✓	No ✗	Yes ✓
	Emission Reduction	Yes ✓	Yes ✓	No ✗	Yes ✓
	Social Return	Medium-High ✓	High ✓	High ✓	High ✓

\*Bundling: Grouping of several rooftop solar PV mini-grid projects in high schools in West Java  
Source: List of Green Projects in the West Java Pipeline, Pre-Feasibility Study of Solar Roofs in 173 Public Schools in West Java, West Java RAD-GRK Review Documents, Various West Java Project Data, CPI Analysis

Source: Interview with Bappeda and Related West Java Institutions & Agencies (2020), OECD (2019), CPI Analysis

Figure 3. VfM assessment for West Java's project pipeline

We used the Low Carbon Development Initiative (LCDI) framework provided by the National Planning Agency (BAPPENAS) as the reference taxonomy to categorize “green projects” in West Java into 5 sectors (Energy, Agriculture Forestry and Land Use (AFOLU), Transportation,

Waste, and Water (Adaptation). From this taxonomy, we identified 30 green project pipelines in West Java categorized based on its sector and scale (Large scale valued at >IDR 100 B, small-medium scale at <IDR 100B).

**Box 2.** Which projects in West Java get categorized as “green projects”?

30 identified green projects in the pipeline

Sector categorization based on pipeline and financing gap

Scale categorization (Small-Medium vs. Large)

Encompass **economic, social, and environmental benefits** (Reference to LCDI).  
West Java received IDR 23.5 tn commitment, but only **IDR 800 tn (3.4%)** has been disbursed.

**Commitment of West Java Green Project in the Pipeline**

**15 Large scale projects:** > IDR 100 MM\*, PPP as preferred funding scheme  
**15 Small-medium scale:** < IDR 100MM, non-PPP preferred funding scheme

\*\* West Java SPAM's projects and Bendungan Sadawarna are indicated as National Strategic Project – based on Perpres No.58/2017

\* Referring to KPPIP's criteria in selecting a national strategic project - Perpres No.58 / 2017, confirmed through interviews with Bappeda & related West Java Services

Source: Interview with Bappeda and Related West Java Institutions & Agencies

### 2.2.2 WEST JAVA'S GREEN PROJECT PIPELINES: IDR 23.5TN COMMITTED WITH ONLY 3% DISBURSEMENT

Furthermore, we broke down the existing green project pipelines to obtain the private financing requirements. The result indicates that the majority of committed green projects in West Java have not been implemented—with total commitment for green projects in West Java reached IDR 23.5 Trillion, but real disbursement only reached 0.8 Trillion. See the complete list of projects in **Appendix 8.2**

Table 1. Private finance requirements for green projects in West Java (IDR Tn)

Project Sectors	Project Sub-sectors	Financing status (IDR Tn)			Private/ public ratio <sup>(2)</sup>	Public finance requirements (IDR Tn)	Private finance requirements (IDR Tn)
		Investment Value	Financial close <sup>(1)</sup>	Gap			
Transport	Light Rapid Transit	4.8	0.0	4.8	70 : 30	1.44	3.36
	Railway	5.7	0.0	5.7	70 : 30	1.71	3.99
Energy	Solar rooftop	0.23	0.0	0.23	70 : 30	0.07	0.16
	Street lighting	0.0	0.0	0.0	70 : 30	0.00	0.00
AFOLU	Mangrove conservation	0.04	0.0	0.04	70 : 30	0.01	0.03
Waste and wastewater	Waste processing	5.2	0.8 <sup>(3)</sup>	4.4	70 : 30	1.32	3.08
	Urban sewerage	0.23	0.0	0.23	70 : 30	0.07	0.16
Water (Adaptation) <sup>(4)</sup>	Flood retention facility	1.3	0.0	1.3	70 : 30	0.39	0.91
	Water treatment plant	6.0	0.0	6.0	70 : 30	1.80	4.21

TOTAL	23.5	0.8	22.7		6.81	15.9
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- (1) Whether the project is on the implementation stage
- (2) Based on best-practice loan : equity 30:70 which translates to public : private finance proportion. This is also based on benchmarking to TPPAS Nambo public : private finance proportion (Dinas Lingkungan Hidup Jawa Barat, 2020)
- (3) TPPAS Nambo
- (4) National Strategic Project – based on Perpres No.58/2017

### 2.2.3 SCREENING GREEN PROJECTS THAT WEST JAVA SHOULD FOCUS ON

This screening of 30 green project pipeline in West Java recommends two most viable priority projects, namely (1) installation of rooftop solar PV on 7 government buildings and 173 schools, as well as (2) solid waste processing in Bandung, Cimahi, Purwakarta. The screening of these two projects are based on three main key factors (See Appendix 8.6 for Priority Project Analysis) :

- **Public finance capacity:** we selected those with the lowest fiscal needs, where small-to-medium scale projects may pass but large-scale projects do not, and project replication potentials
- **Private sector appetite:** we selected those with clear, positive Internal Rate of Return and where alternative financial instruments are available
- **Social benefit:** we screened social benefit based on the alignment of projects with LCDI priority sectors, emission reduction potential, and overall social return. **The alignment with LCDI priority sectors is found to be pivotal, as clear definitions of green project must be made to screen projects (i.e. waste processing site that does not contribute to emission reduction may be excluded)**

## 2.3 Financing gap of IDR 22.7 trillion identified based on West Java's commitment

With only 3.4% of the committed green project values have reached the implementation stage, out of the total commitment of IDR 23.5 trillion green projects in West Java, about 70% of financing (IDR 15.89 Trillion) should come from private sources.

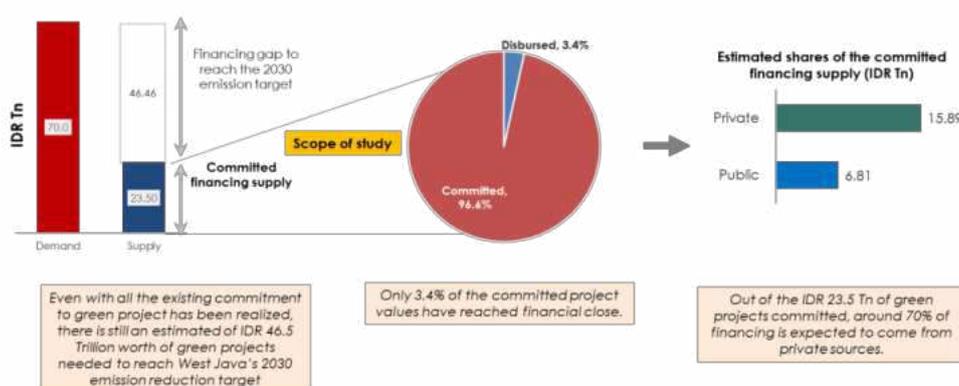


Figure 3. West Java's Green Financing Gap Analysis

It is also important to note that even the existing commitment falls short from what is needed. Even if the IDR 23.5 Trillion of green project commitments were fully mobilized, there would still be an estimated of IDR 46.5 trillion worth of green projects needed to reach West Java's 2030 emission reduction target. However, **the focus of this study would be on the committed financing supply only**. This study analyzes the enabling environment and banking assessment to mobilize the existing committed green financing.

## 2.4 IDR 15.9 trillion of private finance requirement to narrow financing gap

**Clean water, waste processing, and rail-based transportation projects are among the top 3 sectoral green projects with the highest private finance needs.** These projects tend to have high public benefits, rarely financially attractive for private investors unless they are large-scale and offer financing enhancements. The climate-benefits of these projects include: (i) adaptation benefits, such as clean water supply (*Sistem Pengadaan Air Minum—SPAM*), (ii) mitigation benefits such as Light Rail Transit (Urban Light Rail Transit—LRT), and (iii) dual-benefit projects such as waste processing sites.

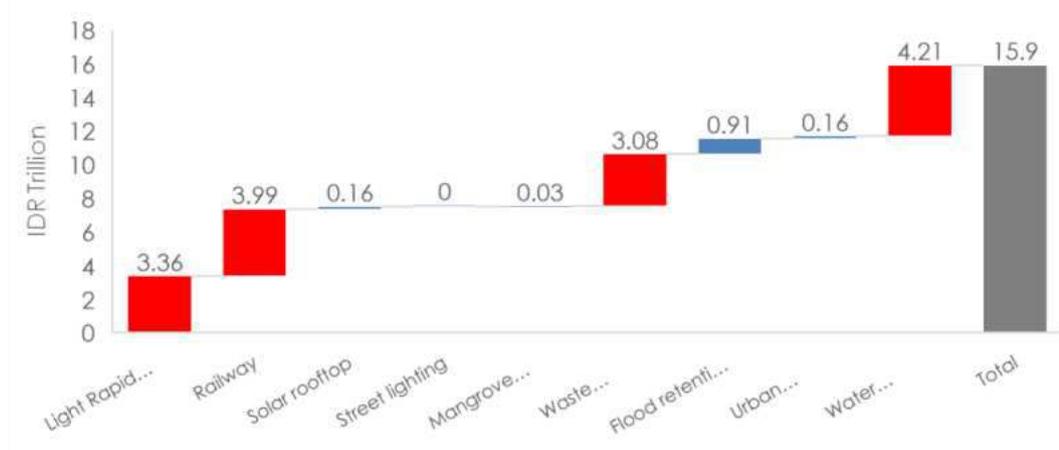


Figure 4. Total Private Investment Needs by Sector (IDR Tn)

### 3. West Java's Fiscal Capacity to Support Projects

West Java has high fiscal capacity, proven by the region's strong economic growth in the last 5 years, and placing it on par with other high-performance regions such as the capital city of Jakarta. There is space in the West Java annual budget that can be utilized to finance capital projects in green sectors. However, despite constantly positive revenue growth, West Java government investments have not followed. This conservative trend is also apparent in other regions in Indonesia with Very High fiscal capacity, such as Central Java, East Java, and DKI Jakarta; **the more revenue, the more expenses, but not necessarily more investment spent**. The regional budget (APBD) policy lies within the autonomy of local government, where it should allocate certain portion to government priority programs. However, budgets still need to be approved by the local parliament, which may adopt a conservative stance.

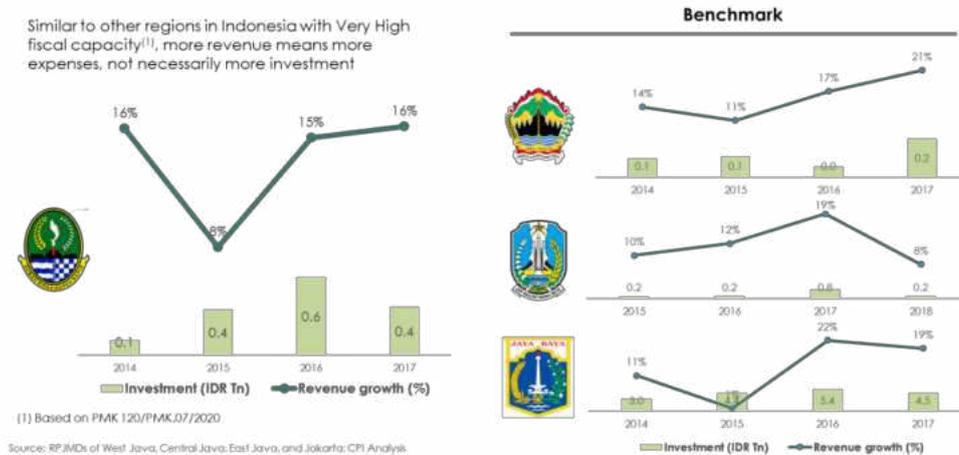


Figure 5. Subnational governments budget benchmark

#### 3.1 Public finance capacity

Despite COVID-19 has deflated West Java's fiscal capacity to -24%, it is still capable to cover the estimated public proportion for green projects especially if it was leveraged to obtain lending. This means that West Java is able to: (i) leverage regional lending from non-government and private sources to increase the existing fiscal capacity and (ii) to use of alternative business model and innovative financing instruments to create vibrant investment prospects.

FISCAL CAPACITY FOR THE PAST 3 FY			
	2018	2019	2020
<b>A</b> Revenue (IDR Tn)	33.9	36	34.5
<b>B</b> Earmarked revenue (IDR Tn)	10.9	11.8	13.2
<b>C</b> Expenditure (IDR Tn)	13.2	13.5	13.1
<b>Fiscal Capacity (A - (B+C)) (IDR Tn)</b>	<b>9.81</b>	<b>10.8</b>	<b>8.24</b>
<b>Fiscal capacity to revenue ratio</b>	0.29	0.3	0.24
<b>Fiscal capacity growth rate (%)</b>	-	10%	-24%
<b>Fiscal capacity index</b>	3.15	3.17	4.68
<b>Index category</b>	Very High	Very High	Very High

- The average of West Java's fiscal capacity is **IDR 9.6 Tn per year**, down from IDR 10.3 Tn per year before the pandemic
- West Java's fiscal capacity for revenue ratio averages at 0.28; illustrating the province's ability to spare its revenue for capital expenditure is relatively moderate

CAPEX FOR THE PAST 3 FY			
	2018	2019	2020
CAPEX (IDR Tn)	3.15	2.53	1.56
LCDI-related CAPEX (IDR Tn)	1.02	1.34	0.82
CAPEX ratio to fiscal capacity	0.32	0.23	0.18
LCDI-related CAPEX to fiscal capacity ratio	0.1	0.12	0.1

- Records shows that the province's capital expenditure (CAPEX) to fiscal capacity ratio averages at 0.25, while LCDI-related capex at 0.1 meaning that **the province has been allocating relatively little of its fiscal space for CAPEX in green projects**

Based on PMK 120/PMK.07/2020 Article 4, BPKAD West Java, CPI Analysis

Figure 6. Fiscal capacity for capital expenditure

### 3.1.1 WIDENING WEST JAVA'S FISCAL CAPACITY THROUGH LENDING

West Java can potentially raise new loans up to IDR 12.7 trillion in total for 5 years tenor, given certain conditions. The conditions are explicit in the regulations, but our calculation shows that West Java can leverage up to IDR 12.7 trillion of new loans to finance its public proportion for green projects. There are several loan instruments options that West Java can investigate, such as municipal bonds, trust funds, concessional loans, and commercial loans including syndicated loans.



Figure 7. Identifying potential lending instruments

The new loan can be obtained from non-government sources, including banks, by keeping the DSCR > 2.5

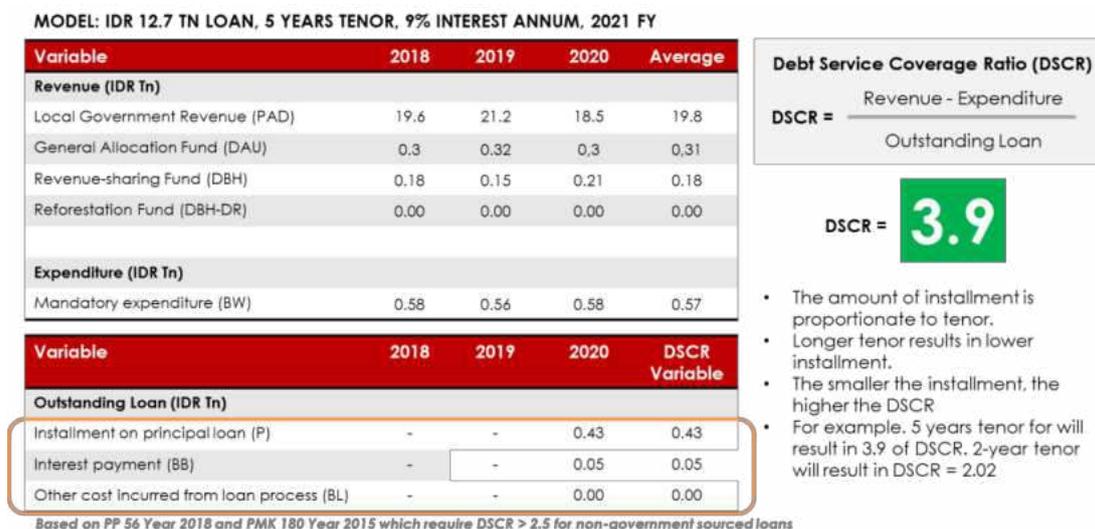


Figure 8. Modeling of DSCR

### 3.1.2 THE NEEDS TO REFOCUS BUDGET FLEXIBILITY TO GREEN PROJECTS

West Java's fiscal capacity is larger than the estimated public proportion needs for green projects, but its budget flexibility is decreasing due to COVID-19. Hence, West Java governments needs to focus on actively reallocate its fiscal space for green projects; or obtaining new lending that helps it finance its committed green projects.

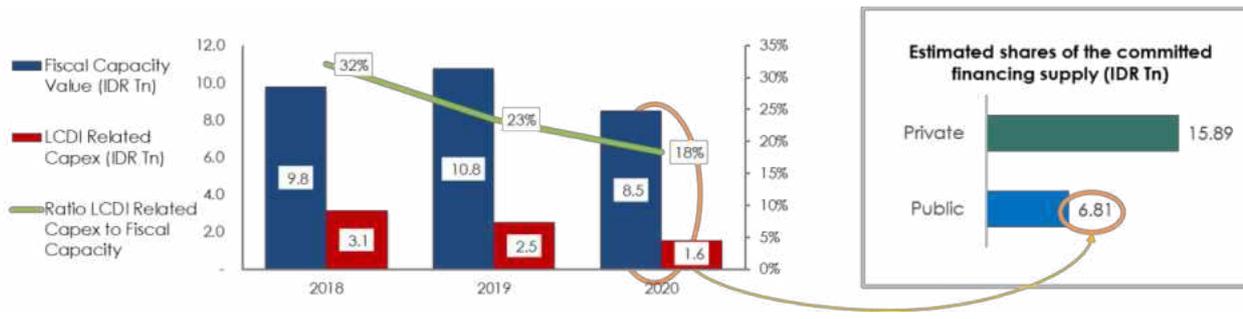


Figure 9. Fiscal capacity trends for the past 3 fiscal years

### 3.2 Investment barriers

#### 3.2.1 COMMON INVESTMENT BARRIERS BASED ON PROJECT SCALE

The investment barriers for West Java to mobilize finance for green projects are categorized based on project scales below.

Table 2. Common barriers to mobilize finance for green projects

PROJECT SCALE	BARRIERS TO INVESTMENT	IMPACT LEVEL	ENABLERS (FROM PUBLIC)	
<b>Small and Medium*</b>	Private sector appetite limited to B2B model, with clear revenue streams and high ROI	Low-Med	<b>Business Model</b>	Capital injection to BUMD/BUMDES, private shareholders/operators
	Unknown legal basis on mandates, such as equity injection and asset ownership	Med		Asset transfer to BUMD/BUMDES, private operators
	Sub-optimal capacity to conduct risk management	Med-High	<b>Technical Assistance</b>	Technical assistance on project preparation from donors
	High cost of debts/unavailable credit enhancement due to economics of scale	High	<b>Business Model + Financial instrument</b>	Risk-pooling investments, Public-Private Joint Venture
<b>Large**</b>	Lengthy process until financial close >4 years, particularly on solicited government projects	High	<b>Business Model</b>	PPP institutional arrangement
	Significant risk (especially project specific risk) which requires risk enhancement facilities	High	<b>Business Model + Financial instrument</b>	PPP, Guarantee instrument, finance intermediation
	Lengthy and bureaucratic process to obtain financing from non-government sources	Low-Med		PPP, VGF, Guarantee, Fiscal Incentives, Availability Payment
	Strict legal lending limit from non-government sources	Med-High		PPP, Availability Payment for OnM

#### 3.2.2 PRIORITY SECTOR'S BARRIERS

Meanwhile, each priority sector (see chapter 2.4) also has specific barriers outlined below.

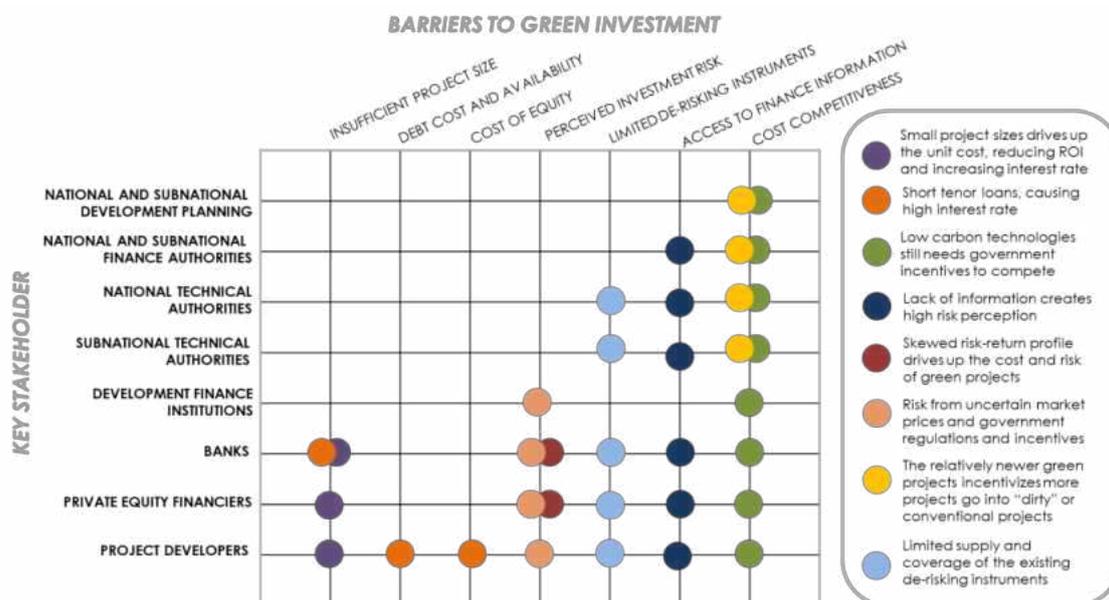
Table 3. Investment barriers in the priority sectors

PRIORITY SECTOR	BARRIERS TO INVESTMENT	IMPACT LEVEL	ENABLERS (FROM PUBLIC)	
<b>Water and wastewater</b>	Preference on accelerating many on small and medium scale projects (faster delivery)	Low-Med	<b>Business Model</b>	Capital injection to BUMD/BUMDES, Private-Public Joint Venture

	Prioritized as public projects rather than B2B	Med		
	B2B appetite exists on small-scale drinking water sales, but there is a lack of capacity to build business plan	Med-High	<b>Technical Assistance</b>	Technical assistance on project preparation from donors
<b>Transport</b>	Preference to large scale projects due to high-investment cost	High	<b>Business Model + Financial instrument</b>	PPP, Guarantee instrument, finance intermediation
	Low Willingness-to-Pay; subsidies are needed to make the project financially attractive	High		PPP, Availability Payment for OnM
<b>Waste</b>	Preference on accelerating numerous small-medium scale projects	Med	<b>Business Model + Technical Assistance</b>	Technical assistance from donors, public-private joint venture
	For large-scale projects, problems on off-taker contracts & unperformed private sponsors	High	<b>Business Model + Financial instrument</b>	PPP, Institutional Arrangement, VGF, Guarantee, Fiscal Incentives, Availability Payment
	Changing institutional mandates	Low-Med		
	Strictly regulated revenue stream, only from retribution fees	Med-High	<b>Financial Instrument</b>	Availability Payment, Tariff Adjustment

### 3.2.3 KEY STAKEHOLDER'S BARRIERS

It is pivotal to involve all relevant stakeholders in the financial sectors to address barriers and enabling the green investments. Figure 10. maps the barriers to green investment from the perspective of key stakeholders – regulators/ authorities, development finance institutions, banks, private financiers, and project developers.



Source: CPI Analysis

Figure 10. Barriers to green investment from the perspective of key stakeholders

## 4. Understanding banks' needs to support green finance

Climate finance has been dominated by public sources and development funds. In the face of Covid and the need of economic recovery, public finance capacity must be allocated in the most effective and efficient way, while role of private sector in mobilizing private climate finance became significant and will need to collaborate with banks as the core part of the domestic financial system. Identification of banks' risk appetite and their readiness to finance green project are mapped to unlock potential in boosting private sector engagement in West Java.

### 4.1 Commercial banks dominate private green finance in the form of debt instrument, targeting energy and transport projects

Commercial financial institution remains the biggest source of private green finance in Indonesia for the period of 2015-2019 with an average of 55.8%, with the hike of green financing in 2019 was identified, driven by enforcement of Sustainability Reporting for BUKU 3<sup>1</sup> and BUKU 4<sup>2</sup>(CPI Analysis, 2019). CPI analysis also indicated that privately sourced financing for green projects is limited and dominated by debt instrument and renewable energy and urban transport remain the key sectors that attracts financing, makes up to 53.3% of total private climate finance inflow in Indonesia of USD 21.3 billion in the last 5 years.



Figure 11. Private climate finance landscape mapping by actors and by instruments, for the period of 2015-2019

### 4.2 Despite of adequate green finance understanding, banks need public finance intervention and streamlined policies

Banks and the banking system are exposed to climate change that arise from climate risk drivers, as well as traditional financial risks. The mapping of climate-related banking risks are summarized in Table 3, below.

<sup>1</sup> BUKU 3 is a bank that has a core capital of between 5 trillion rupiah and 30 trillion rupiah.

<sup>2</sup> BUKU 4 is a bank that has a core capital of 30 trillion rupiah or more.

Table 3. Climate-related financial risks in banking sector

FINANCIAL RISK / CLIMATE RISK	REGULATORY	CREDIT	MARKET	OPERATIONAL	COMPETITIVENESS
<b>Transition risk</b> e.g. policy changes, reputational impacts, and shifts in market preferences, norms, and technology.	<ul style="list-style-type: none"> <li>To include climate change related and climate risks into the test. <b>Currently no regulation nor guidance</b> on internalizing climate risk into risk assessment yet.</li> <li>Banks are mandated to perform <b>stress testing annually and risk self-assessment (8 risk profiling for Risk Based Bank Rating) semi-annually</b>, required by Bank of Indonesia regulation PBI No. 15/12/PBI/ 2013, No. 14/18/PBI/2012, and No. 13/1/PBI/2011 and Financial Services Authority (OJK) regulation No.4/POJK.03/2016</li> </ul>	<ul style="list-style-type: none"> <li><b>Lower valuation</b> of asset and collateral (balance sheet effect)</li> <li><b>Impaired</b> loan portfolio due to stranded assets e.g. coal</li> <li><b>Higher expected default</b> by carbon-intensive sectors</li> </ul>	<ul style="list-style-type: none"> <li><b>Higher energy and commodity prices</b> e.g. Potential re-pricing of stranded -fossil fuel assets</li> <li>Higher transaction costs due to changes in macroeconomics conditions e.g. changes in real estate valuation due to stricter energy efficiency standards</li> </ul>	<ul style="list-style-type: none"> <li>Higher <b>reputational risks by investing</b> in carbon-intensive sectors</li> <li><b>Climate risk disclosure: IFRS 7</b></li> </ul>	<ul style="list-style-type: none"> <li>The need of ESG advisory for product innovation</li> <li>The need of research and development expenditures in new and alternative technologies</li> <li>The risk of shifting investor' perception &amp; appetite in net zero target setting</li> </ul>
<b>Physical risk</b> impact of climate and environmental incidents.		<ul style="list-style-type: none"> <li><b>Lower valuation</b> of properties in coastal areas/ vulnerable areas, e.g. increased risk of flooding</li> <li><b>Higher expected default</b> by climate-vulnerable sectors e.g. agriculture</li> </ul>	<ul style="list-style-type: none"> <li><b>Downgrade of credit ratings</b> of borrowers, due to extreme weather</li> </ul>	<ul style="list-style-type: none"> <li><b>The risk of relocation</b> of headquarters and data centers due to climate physical risk</li> </ul>	
<b>Liability risk</b> vulnerability that can cause a party to be held responsible for certain types of losses	<ul style="list-style-type: none"> <li><b>Currently no liability risk imposed yet</b>, as it is still voluntary to include climate risk into stress testing based on regulation of Bank of Indonesia and Financial Service Authority.</li> <li>No obligatory disclosure requirement on climate risk yet</li> </ul>	<ul style="list-style-type: none"> <li><b>Supply chain disruptions</b> by losses to property and assets</li> </ul>	<ul style="list-style-type: none"> <li><b>Increased cost of insurance premium</b>, as investors revise their assessment of uncertainty on future payoffs.</li> </ul>	<ul style="list-style-type: none"> <li>Higher reputational risks due to <b>potential breach of fiduciary duty</b></li> <li><b>Climate risk impairment test: IFRS 9/IAS 36</b> assets impairment test</li> </ul>	<ul style="list-style-type: none"> <li><b>Higher product compliance cost:</b> costs to adopt and deploy new practices and process</li> <li><b>Higher risk of losing investment</b> from carbon-heavy sectors</li> </ul>

A set of comprehensive survey is developed to identify the market perception on sustainable and green finance as well as climate-related risks within and surrounding their organizations. The survey captures key constraints and financial institutions readiness in factoring climate risks into their vision, internal policies, human resource, product and services, portfolio management, process, and operations. The survey is distributed the 10 members of Indonesia Sustainable Finance Initiative (ISFI/IKBI), comprising SOE banks, private commercial banks, and infrastructure finance institution.

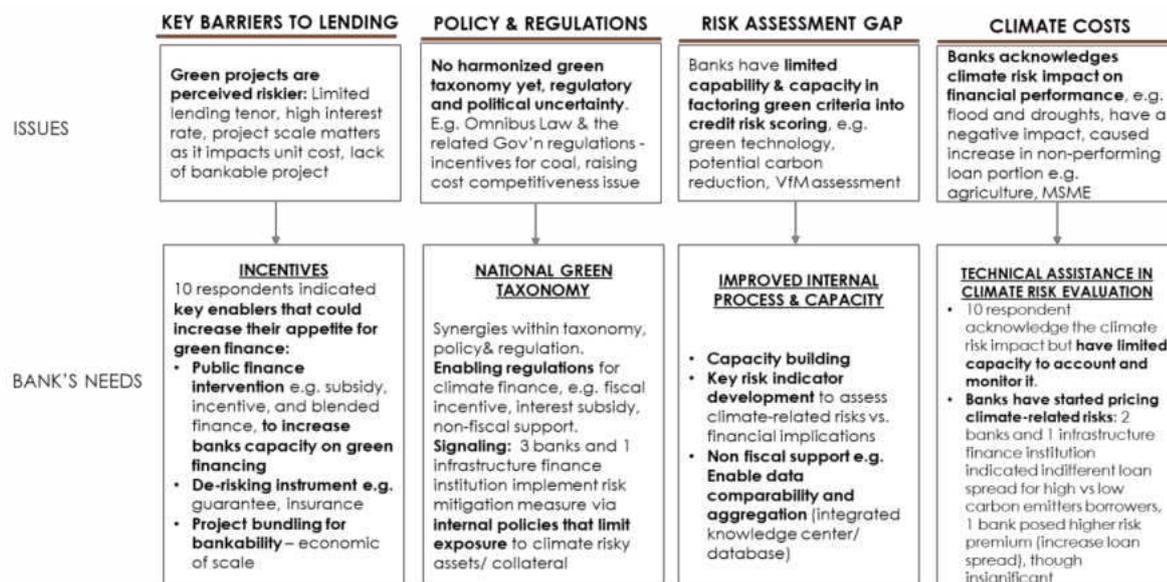
**Survey result: Sustainability is factored into strategy and policies, with some extent to banking product and process. With adequate knowledge, awareness, and enabling environment, banks in ISFI/IKBI are ready to mobilize green financing.**

The result of seven respondents (6 commercial banks and 1 infrastructure financing institution) are collected and indicate that they have sustainability strategy and policies in

place with reference to national guidelines i.e. POJK 50 and POJK 61 and international guidelines i.e. ICMA Green Bond Standards, ASEAN SUS, as well as have adequate knowledge and awareness in sustainable and green finance, hence ready to mobilize green financing. Specific findings include:

**1. All respondents indicated the need of key enablers in implementing green initiatives, prioritized as follow:**

- Public finance aid to compromise high real and perceived risks of green projects, i.e. **incentives**, that can be in the form of: (i) **tax incentive** including deduction, exemption, a credit, (ii) **interest subsidy** as a form of financial aid to green lending
- **A national green taxonomy**, for streamlined criteria of investment activities and standards for technical guidelines and definitions for low emitting sectors. One of the respondents, raised that **the taxonomy could signal and potentially addressed main issues of green finance**, such as low awareness from industry players and client readiness and acceptance amid a very limited supply of green or sustainable companies and projects. OJK is taking extensive measure in setting up Indonesia green taxonomy in 2021-2022, as stipulated in Indonesia Sustainable Finance Roadmap Phase II.
- Since there are limited green standard benchmark ratings and framework, **improved internal process and capacity** is needed to self-assess climate related financial risk and to factor specific criteria into banks' credit risk scoring.
- **Technical assistance in climate risk evaluation**. Banks acknowledges climate risk impact on financial performance but faces unclarity in internalizing climate cost into facility pricing. Hence, there is a potential of mispricing the facility and misperception of risks.



Source: CPI Interview and analysis

Figure 12. Survey key takeaways: Banking needs and readiness of green financing

2. **One infrastructure financing institution is mandated by MoF to be the promoter of Sustainable Finance** in Indonesia, with an established ESS framework to account for environmental and social aspects. Furthermore, it has extensive experience in mobilizing green facilities, that covers guarantee/ de-risking instruments for renewable energy projects.
3. Two respondents from **SOE banks are refining their sustainable finance policies, products, and processes, by starting the initial implementation of green finance policies to specific sectors (e.g. sustainable palm oil & CPO, energy, construction)**. One of them

is currently in the preparation phase of formulating Sustainable / Green / Social Bonds Frameworks following POJK 60 and ICMA GBS Principles. The banks confirmed that they follow POJK 51 as reference for sustainability and ESG financing, with majority of financing are allocated to MSME. The bank suggested that introduction of incentives, enabling regulations (including harmonized green taxonomy and policy), and information of available bankable and ready-to-finance projects could drive their appetite in considering green financing.

4. Two respondents from **private commercial banks with presence in Indonesia and ASEAN, are implementing more defined policies in green finance, as compared to SOE banks**. Both banks allocated about 10 - 25% of green credit disbursement and internally developed Exclusion List of Investments to limit the exposure to high carbon emitters sector, aligning with international benchmarks, e.g. exclude new coal power production, following ASEAN SUS. Both banks performed enhanced due diligence to assess debtors' ESG criteria and declared that their portfolio are 100% ESG compliant in 2020. One of the bank internally expands the facility disbursement process procedure to include a guideline to complete an ESG Risk Assessment Template that will standardize the process business units use to assess the general and sector-specific ESG risks of debtors.
5. Two respondents from **local private commercial banks, are in the process of molding their policies, products, and processes, to align with national guidelines of sustainable finance**. One of them is recently joining Indonesia Sustainable Finance Initiative in 2020 and another one is an Islamic bank with additional Sharia supervisory board. Both banks are starting to monitor and allocate small portion of credit disbursement to sustainable finance portfolio.
6. Three respondents are in **the initial stages of translating climate risks into robust, quantifiable financial risks**. Two banks performed initial scenario analyses and stress tests have focused on selected portfolios or exposures for transition risks, and selected hazards for physical risks. Moreover, the monitoring and evaluation tools are required to assess banks' greenness performance overtime.

### **4.3 Green finance barriers: Scale & sector selection influence bank's appetite due to its limited financing capacity**

Commercial banks face many barriers to accelerate credits for green projects, and these are summarized as below:

Barriers to lending	Description	Risk Level
1 Banks are constrained in providing long-term lending	<ul style="list-style-type: none"> <li>Banks dominate the holdings of financial assets in Indonesia</li> <li>Banks are constrained to provide long-term debt financing due to reliance on short-term deposits.</li> </ul>	Low
2 Small local capital markets are unable to provide long-term debt financing	<ul style="list-style-type: none"> <li>~70% of bonds were issued with a tenor of 3 or 5 years.</li> <li>8%&lt; of the bonds issued had a tenor of 10 years or more.</li> </ul>	Low
3 High interest lending rate compared to the other ASEAN countries + India	<ul style="list-style-type: none"> <li>Indonesia has high interest lending rate compared to the other developing countries in ASEAN and India</li> <li>This discourages private actors to borrow money from banks</li> </ul>	Low
4 Financiers are only interested in large-scale green projects, not small-medium	<ul style="list-style-type: none"> <li>Small-scale projects tend to attract developers with small balance sheet</li> <li>In general, the ROI of small green projects &lt; large projects</li> </ul>	Low
5 Cost competitiveness: there are policy incentives for non-green products and projects, making green less competitive	<ul style="list-style-type: none"> <li>Projects with low-carbon technologies tend to be newer and costlier than their high-carbon counterparts, so cost competitiveness is frequently a major issue</li> </ul>	Low
6 Risk aversion towards investing in the early stage of a project	<ul style="list-style-type: none"> <li>High risk in early-stage development discourages financial institutions to provide lending due to uncertainties that could lead to project default.</li> </ul>	Low
7 Insufficient information to feel comfortable investing in	<ul style="list-style-type: none"> <li>Unfamiliarity with the technology and the technical data impacts the risk appetite of the banks in providing loans.</li> </ul>	Low

**Legend**

Perceived risks (dashed box)    Regulatory (orange box)    Capacity (blue box)

Low High

Risk Level

Source: Expert interviews, CPI Analysis

Figure 13. Financial institution barriers in providing green financing.

For case of West Java, banks indicated that they are **constrained to provide long-term debt financing due to reliance on short-term deposits**, while green projects i.e. renewable energy and urban transport, are mainly required multi-year financing. Furthermore, **the scale of the project affects their investment appetite, the smaller the scale, the higher cost per unit**. Small-scale projects tend to attract developers with small balance sheet, whereas clean energy projects are characterized by high capital costs. This is also similar to the other type of green infrastructure project, such as waste management facilities in West Java i.e. TPS3R Plus. As financiers, banks follow the dynamics of policies and regulations surrounding the sectors. Government Regulation No.25/2021 provided fiscal incentives for coal royalty; policy incentives for non-green products and projects, making green projects less competitive. Moreover, banks still **perceived green project as high risk, especially in early-stage development because of the new technology** (e.g. solar, waste-to-energy, etc.). Unfamiliarity with specific technology and lack of capacity to process technical data can impact the risk appetite of banks in providing loans.

Despite of the barriers, respondents eager to have more involvement in green investment, since they are aware of their critical role for the transition to the low carbon economy. The survey result indicated banks' need to gradually divest the portfolio from carbon-intensive industry to low carbon and energy efficient technologies because **the transition risks of policy changes may cause more immediate impact from a credit risk perspective** e.g. possibility of downgraded collateral valuation due to new regulation. Thus, enabling regulation, including policy coordination, is required to tackle barriers of green finance.

#### 4.4 Opportunities: Improving bank's appetite through green financing scheme and policy instruments

**Depending on project characteristics, banks are willing to involve in green financing scheme.**

Small-scale project is preferred to reach the stage of project piloting due to smaller capital requirement and shorter process (See section 3.2.1) (Bappeda of West Java, 2020). Survey result concluded that **five respondents are willing to contribute to risk pooling scheme** (using

syndicated loans), **if the green projects are assessed as bankable and are expected to provide future revenue.** Bankability shall be supported by feasibility study or similar document to enable banks estimate the facility pricing, tenor, and rate of return. Moreover, bundling of green project with the same characters/ asset class may enhance bankability of small-scale projects e.g. TPS3R Plus in Cimahi, Bandung, Purwakarta. **While for the non-revenue generating projects, such as Solar rooftop on the high schools and government building, banks identified that public finance support is required,** such as co-financing with public and private actors.

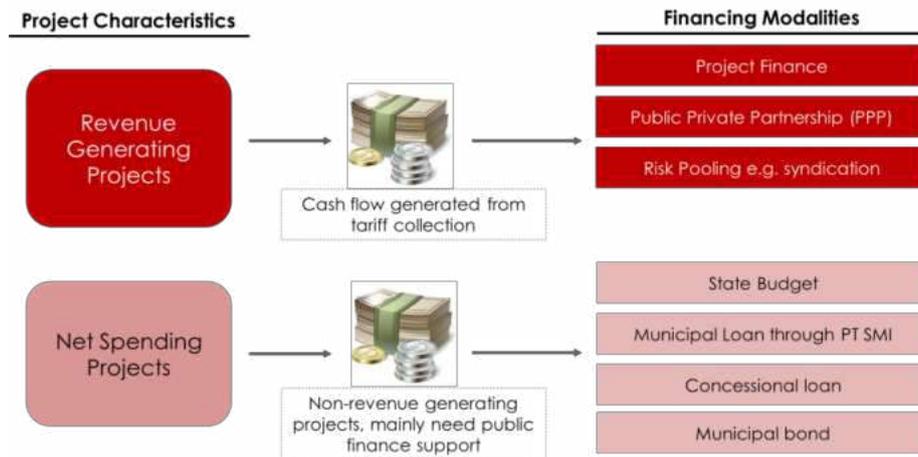


Figure 14. Financing modalities recommendation for small-scale projects.

**Green banking policy, a combination of voluntary guideline and enforced regulation for risk management tool and market signaling, to induce banks’ appetite**

Banks are started to assess the risks associated with exposure to their portfolio by adopting available risk management frameworks, such as Capital Adequacy Ratio Monitoring and Self-Assessment Risk Profiling for Risk-Based Bank Rating reporting to Financial Services Authority (OJK). However, assessment of climate risks is voluntary and demonstrated inherent limitations including limited scope, inadequate monitoring, and lack of implementation and enforcement.

Green banking policy instrument could sharpen up risk management and give the strong signal to market players. OJK is the member of Network for Greening the Financial System (NGFS) and already provided several **sustainable finance guidelines including, the roadmap, disclosure, and reporting requirements to provide the signals to the banks that they are expected to start analyzing potential climate risk exposure.** Green banking policy areas and instruments are summarized in Figure 15 below.

Policy Area	Instrument Type	How the instruments work
<b>Macro-prudential</b> Best-practice rules for global Fis – mitigate financial risks caused by climate change	<ol style="list-style-type: none"> <li>1. <b>Stress testing</b></li> <li>2. Differentiated capital requirements</li> <li>3. Loan-to-value, loan-to-income caps, and loan exposure restriction</li> <li>4. Sectoral leverage ratio</li> <li>5. Liquidity restrictions – BASEL III post-crisis reforms (2018)</li> </ol>	<ol style="list-style-type: none"> <li>1. Impact assessment of climate related financial risks on the financial system</li> <li>2. Higher risk weighting to carbon-intensive assets when evaluating the capital to risk assets ratio of banks</li> <li>3. Limit the lending/ financing source and credit exposure to high carbon emission sectors</li> <li>4. Limit leveraged position to carbon-intensive assets and/ or collateral</li> <li>5. Introduce an incentive mechanism for Net Stable Funding Ratio (NSFR) requirements (ASF/RSF &gt;100%) to link the climate targets and the liquidity/maturity mismatch requirements</li> </ol>
<b>Micro-prudential</b> Fis' internal policies and operations to account E&S safeguards	<ol style="list-style-type: none"> <li>1. <b>Disclosure and reporting requirements</b></li> <li>2. E&amp;S risk management</li> <li>3. Reserve requirements</li> </ol>	<ol style="list-style-type: none"> <li>1. Information disclosure of climate-related financial risks by banks, following ICFD and NGFS recommendation and disclosure and sustainability reporting guidelines of POJK 51</li> <li>2. Develop E&amp;S risk management framework and standards and implement, as guided by POJK 51</li> <li>3. Lower reserve requirements for bank's green portfolio to encourage green investment</li> </ol>
<b>Market making</b> Green investment guidelines by regulators	<ol style="list-style-type: none"> <li>1. Sustainable finance guidelines, including green taxonomy</li> <li>2. Green bond guidelines</li> <li>3. <b>Interest rate subsidy re-allocation</b></li> </ol>	<ol style="list-style-type: none"> <li>1. OJK's Sustainable Finance roadmap Phase I and II. <b>Phase II covers national green taxonomy development</b></li> <li>2. Green bond guidelines to encourage the issuance of green bonds (POJK 60/2017)</li> <li>3. Reallocate interest rate subsidy from brown to green sectors.</li> </ol>
<b>Credit allocation</b> Lending & investment for low carbon economy – imposed by regulators & Central Bank	<ol style="list-style-type: none"> <li>1. Green lending allocation</li> <li>2. Green refinancing windows</li> <li>3. <b>Guarantee</b></li> <li>4. Concessional loans for priority sectors</li> </ol>	<ol style="list-style-type: none"> <li>1. A minimum proportion of bank lending to climate and environment-related sectors → similar like MSME lending quotas, but for green project</li> <li>2. Refinancing windows to encourage green finance initiatives.</li> <li>3. Provide guarantee for green sectors to mitigate political, public sector performance, and commercial risks e.g. provided by IIGF, PT SMI</li> <li>4. Provide concessional loans to banks that lend to climate-sensitive sectors</li> </ol>
<b>Policy indirectly impacting FI</b> imposed by regulators	<ol style="list-style-type: none"> <li>1. <b>Carbon economic instruments</b> (new Presidential Decree)</li> <li>2. Carbon neutrality commitment</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Non-fiscal measure:</b> (i) Development priority to put pricing on emission to achieve NDC target, (ii) Carbon Emission Inventory to centralize inventory of carbon emission, including monitoring and evaluation</li> <li>2. <b>Fiscal measure:</b> (i) Carbon trading: monetization of certified carbon emission reduction, (ii) Carbon pricing: state collection on carbon emission, (iii) public finance budgeting for climate actions that follow the rule set by the carbon economic instrument</li> </ol>

Source: CPI Analysis, OJK regulation, BASEL standard, Park and Kim (2020)

Figure 15. Green banking policy instruments

The survey confirms that each policy area has its potential instrument that could help banks to better assess the climate related risk, hence induce their appetite for green projects.

1. **Stress testing** assesses the impact of climate related financial risk (See Table 3) to determine bank's ability to deal with climate crisis. OJK recently launched Sustainable Finance Roadmap Phase II, where the ESG risk integration is one of the key focus. Given this messaging, it is likely that climate-related risk stress testing will be among the first requirements within the wider realm of climate related risk management. It will be important for banks to leverage their current financial stress testing framework and embed a climate-related risk component into it. Current POJK 18/ 2016 regarding Risk Management for Banks has not included climate and environmental risks into the framework. Based on leading approach, inclusion of climate risk is essential to identify the risk level for environmental impact that could damage the ability of the borrower to repay the loans.

Two private commercial banks are in development stage of integrating climate risk into their ESG risk frameworks and are starting to follow the established risk processes of identification, assessment, management, and reporting to address climate risk. These banks are in the process of building scenario analysis, as a tool to assess the impact of climate risk, to anticipate climate transition risk (i.e. change in regulation) and to follow global best practice.

2. **Disclosure and reporting requirements** are currently imposed by POJK 50 on the annual mandatory sustainability report. Internal initiative of enhanced disclosure and reporting has potential to influence the market players and ecosystem. PT SMI, a mandated promoter of sustainable finance, implements comprehensive initiatives to link climate risk into performance by implementing ESS framework to assess greenness criteria of the portfolio and implementing SDG tagging on existing portfolio to assess GHG footprint and

carbon emission, thus following TCFD requirement to disclose climate-related financial risks and opportunities, while POJK 50 currently does not require these, yet.

3. **National green taxonomy** is the key policy enabler that could provide the market players clearer guideline in directing their investment strategy. Survey found that this could be complemented by **introducing and/ or re-allocating interest subsidy to incentivize** private sector, making green sector more attractive, therefore signal the market to gradually phase down their brown investment.
4. **Guarantee** mitigates various risks of green sectors, such as political, public sector performance, and commercial risks. Detailed discussion of this instrument is presented in Section 5.2.
5. Though indirectly impacting banks, **carbon economic instrument could provide economic signal** to emitters and encourage them transform to greener activities and lower the emissions, as continue emitting will impact their financial performance.

In addition, Figure 16 below lists the key enabling regulations that could tackle some financing limitation from the perspective of financiers and projects.

Regulations				Financing relevance	Opportunities
<b>OJK Regulation No. 38/POJK.03/2019 on Legal Lending Limit (Batas Maksimum Pemberian Kredit)</b>	<b>Topic</b> • Legal Lending Limit for banks • DSCR	<b>Article 38B</b> • Max loan given to 1 borrower/ 1 group of borrowers other than related parties is 25% of bank's capital	✓ Bank's capability to provide lending  ✓ Bank's guaranteed financing	• Provision of loan to Regional Government through Regional Owned enterprise  • GoJ/ Central Government support in providing guarantees for priority project financing	
		<b>Article 39</b> • Loan for SOEs/ Regional Owned enterprise is set at max of 30% of bank's capital			
		<b>Article 43</b> • BMPK is excluded for loan that is guaranteed by GoJ, only for national priority projects			
<b>Law 11 Year 2020 on Job Creation</b>	<b>Topic</b> • Municipal bond issuance	<b>Article 251 – Revision to UU No.23 2014 Article 300</b> • Central government has the authority to strike down any municipal regulation that runs counter to the higher laws and regulations • For regional heads who wish to issue bonds, it is sufficient to obtain a recommendation and approval from the Minister of Finance	✓ Simplification of Business Licensing and Investment Requirements	• MoF support could be used to obtain DRPD's approval • Possibility of streamlining administration process	
<b>OJK 30/POJK.04/2019 and IDX regulation No. I-B</b>	<b>Topic</b> • Listing of Debt Securities	• Non-IPO municipal bond issuance is permitted by OJK since June 2020 • 50% discount on listing fees for implementing municipal bonds in the next 5 years	✓ Lower listing fee for Regional Government	• Finalizing municipal bond to finance green project	

Source: Law 11 Year 2020, OJK Regulations, CPI Analysis

Figure 16. Key enabling regulation for green finance

## 5. Enabling green finance

This study maps business model, alternative financing, and technical assistance for key stakeholders in enabling green finance. Detailed mapping of their applicability to West Java's case is presented in Appendix 9.3.

### 5.1 Business model to mitigate investment risk

**PPP is suitable to attract private finance for large scale projects, while JV is more feasible for small-medium scale project**

We have developed business model options based on the project pipeline to address associated risks of the projects. 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. Proposed business models are below:

		Small and Medium Scale Projects	Large Scale Projects	Non-government Finance (Banks)
Business Model	BUMD JV	✓	✓	
	DAK JV	✓		
	PPP		✓	✓
	PPP + AP	✓	✓	✓

Mapping of business model applicability to West Java's green project pipeline is presented in Appendix 9.3 and mechanics of the below identified business model are presented in Appendix 9.4.

### 5.2 Alternative finance as leverage to private finance source

In addition to implementing innovative business models, pioneering financial instruments would be crucial in addressing some of the investment gaps in green 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 as mentioned earlier, thereby addressing the challenges. Proposed financing scheme are below:

		Small and Medium Scale Projects	Large Scale Projects	Non-government Finance (Banks)
Financial Instrument	Muni bonds	✓	✓	✓
	Intermediation		✓	✓
	Lending		✓	✓
	Guarantee	✓	✓	✓
	Risk-pooling	✓		✓
	ABS	✓	✓	

The report identifies **six financing scheme** that could be applicable to West Java, depending on project characteristics, scale, and sector. The financing scheme includes:

1. **Risk pooling via syndication** pools the financial risks from multiple small-to-medium scale projects by collection and management of similar projects so that project risk become more predictable and are distributed among all investments of the pool. For West Java's case, this could be deployed for the small-scale waste projects, such as TPS3R.

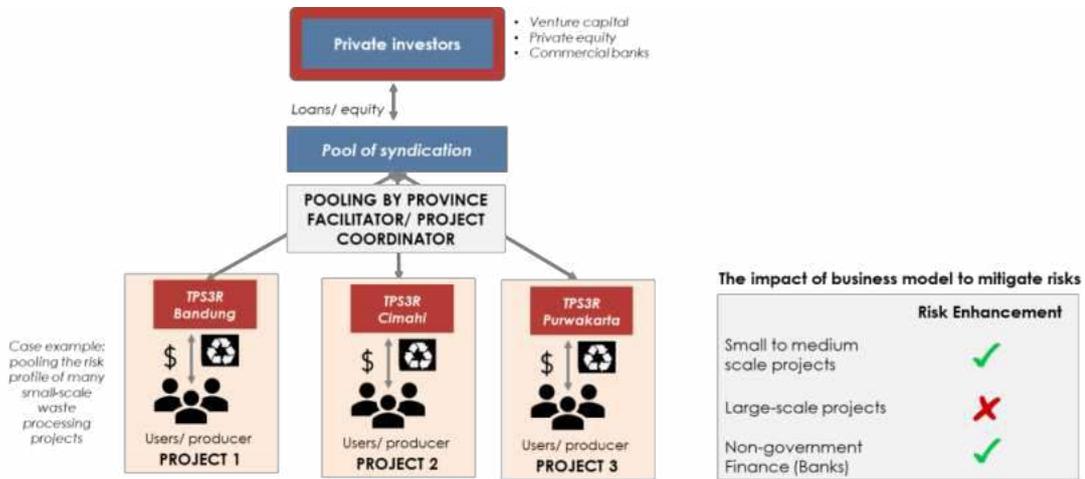


Figure 17. Illustration of risk pooling scheme via syndication

The uniqueness of this scheme is the institutional arrangement that requires a Public Service Agency (BLU) as project owner, so they are legally viable to access loans from commercial banks. This scheme could be replicated to West Java waste projects in the pipeline e.g. waste and wastewater management, SPALD. Future work on this recommendation must focus on business models that defines the role of the third party that could finance its operationalizations, such as co-op or community groups. The business models should also define the legal basis on incentive structures between the state and the small-medium-enterprises.

2. **Finance intermediation through project co-financing** with commercial banks, PT. SMI, and public finance, creates more efficient market to lower risk and cost. Other de-risking instrument, such as guarantee could also be blended in structuring the transaction – see the point number 3. This scheme is relevant for projects with cost-saving character, such as solar PV that seek financing from commercial banks.

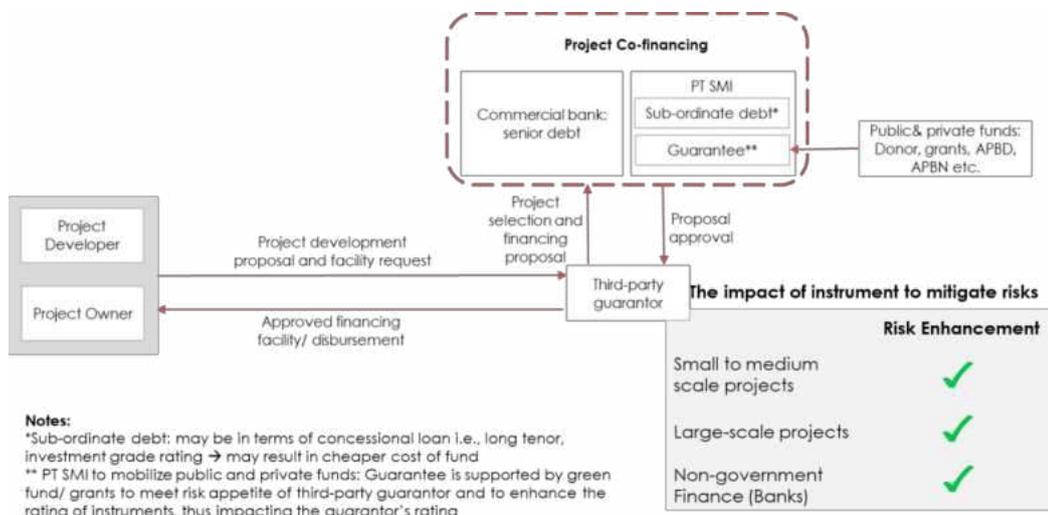


Figure 18. Illustration of project co-financing scheme

Future work on this solution must be complemented with alternative business models that do not require participation from banks, such as leasing agreement with private provider that involves performance-based renting. **Leasing model**, is potential financing scheme for clean energy project, which are becoming increasingly applicable for Solar PV installation. The PV installer acts as a lessor and rooftop owners lease the solar panels from the lessor. The leasing agreement involves performance-based renting, meaning that the PV installer earns revenues from the rooftop owner's electricity savings, as well as from lease fees.

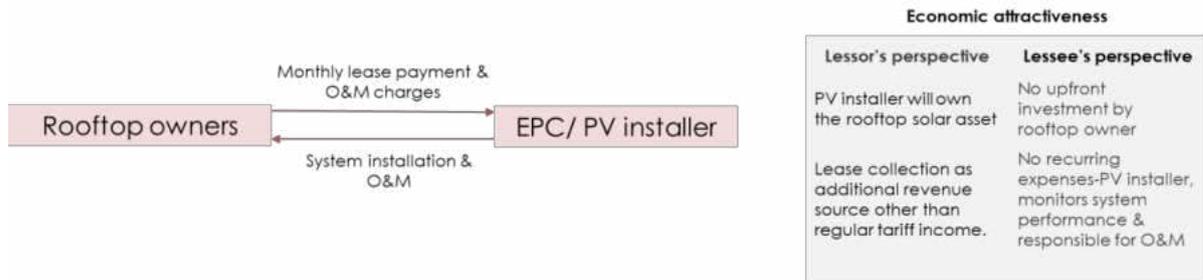


Figure 19. Leasing model for Solar rooftop PV

3. **Guarantee instrument** can reduce project risks, enhance lending appetite for green projects. Current guarantee products include political risk guarantee, public sector performance guarantee, and commercial risk guarantee. The penetration of guarantee instruments in Indonesia is relatively low and they tend to focus on large-scale transactions and currently only IIGF and PT SMI have a focus on the Indonesian market. See Appendix 9.5 for detailed risk coverage by each type of guarantee.

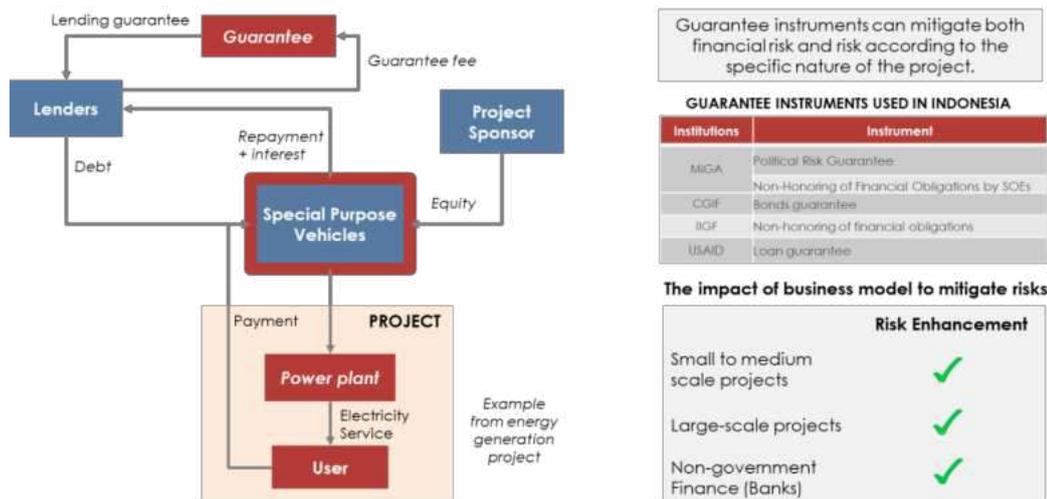


Figure 20. Illustration of guarantee scheme

4. **Long term lending** may address banks' barrier in providing multi-year financing for green projects. The lending instruments include bank-issued green bonds and municipal bonds – see point number 5, infrastructure investment fund (*Dana Investasi Infrastruktur/DINFRA*), real estate investment fund (*Dana Investasi Real Estate/DIRE*),

and Asset Backed Securities (ABS) – see point number 6. Each instrument has its own characteristics, potential, and the set of enabling regulation to finance green projects.

Existing instruments	
<b>Long-term Lending</b>	<b>Municipal Bonds (OBDA)</b>
	<p><b>Long-term loans from the community to finance public green projects, which generates revenue for the APBD and / or provides benefits to society</b></p> <p><b>Bond type:</b></p> <ol style="list-style-type: none"> <li>1. General: guaranteed by the Regional Gov'n</li> <li>2. Revenue: guaranteed by the project return</li> <li>3. Double barreled: guaranteed by both Regional government and project return</li> </ol> <p>✓ PP No. 30 Tahun 2011 and PMK No.180/PMK.07/2016</p> <p>✓ If the project has not yet revenue-generated, the Local Government is obliged to cover financing needs for the interest payment on the bond.</p>
	<b>Dana Investasi Infrastruktur (DINFRA)</b>
	<p><b>Infrastructure Investment Fund</b></p> <p>✓ POJK No. 52/POJK.04/2017</p> <p>✓ Provider: PT SMI</p> <p>✓ Investment with DINFRA can be conducted (i) directly through the purchase of Infrastructure Assets or (ii) indirectly through debt and/or equity investment in companies that utilizes Infrastructure Assets</p>
	<b>Kontrak Investasi Kolektif-Efek Beragun Aset (KIK-EBA)</b>
	<p><b>Collective Investment Contract of Asset Backed Securities</b></p> <p>✓ POJK No. 65/POJK.04/2017 and BEI No. KEP-00011/BEI/02-2009</p> <p>✓ Alternative long-term funding, for a period of 3-10 years</p> <p>✓ The financial asset in KIK-EBA investment portfolio must:</p> <ol style="list-style-type: none"> <li>(i) have or generate cash flow,</li> <li>(ii) are legally owned, or in the control of original creditor,</li> <li>(iii) can be freely transferred to KIK-EBA.</li> </ol>
	<b>Dana Investasi Real Estate (DIRE)</b>
	<p><b>Real Estate Investment Fund, in the form of collective investment contract</b></p> <p>✓ POJK No. 64/POJK.04/2017</p> <p>✓ Required to invest a minimum of 80% of the funds they manage in the property sector; 20% can be invested in assets related to real estate, i.e. money market instruments and securities portfolios.</p>

Figure 21. Existing instrument of long-term lending with potential to finance green project

- Municipal bonds:** This is suitable for localities with high fiscal capacity (e.g. West Java, DKI Jakarta) to finance revenue-generating project pipelines.

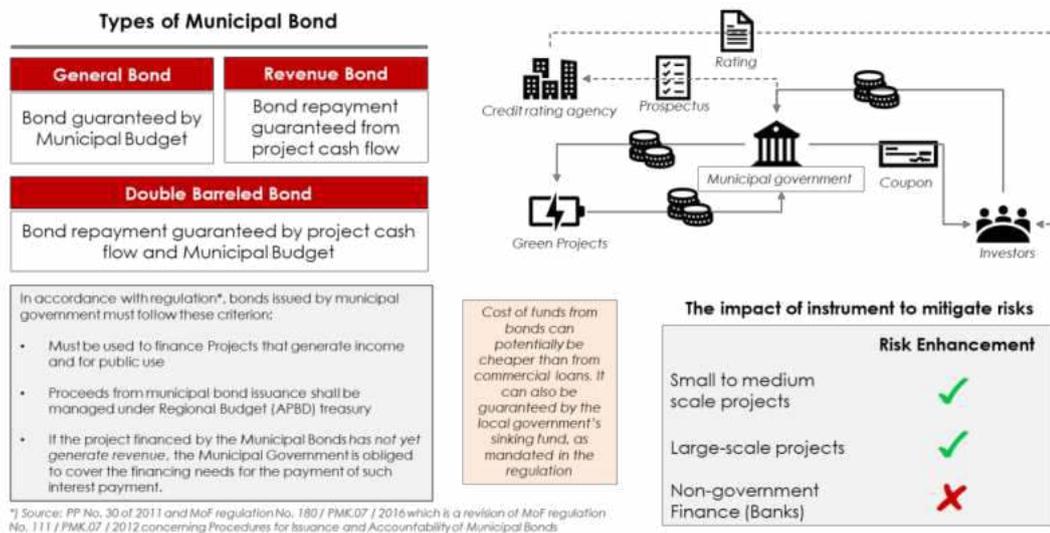


Figure 22. Illustration of municipal bonds scheme

- Asset-backed securities (ABS),** can finance green project expansion as long as the future revenue is securitized. This scheme is potentially deployed for the energy sectors or projects with the stable future revenue.

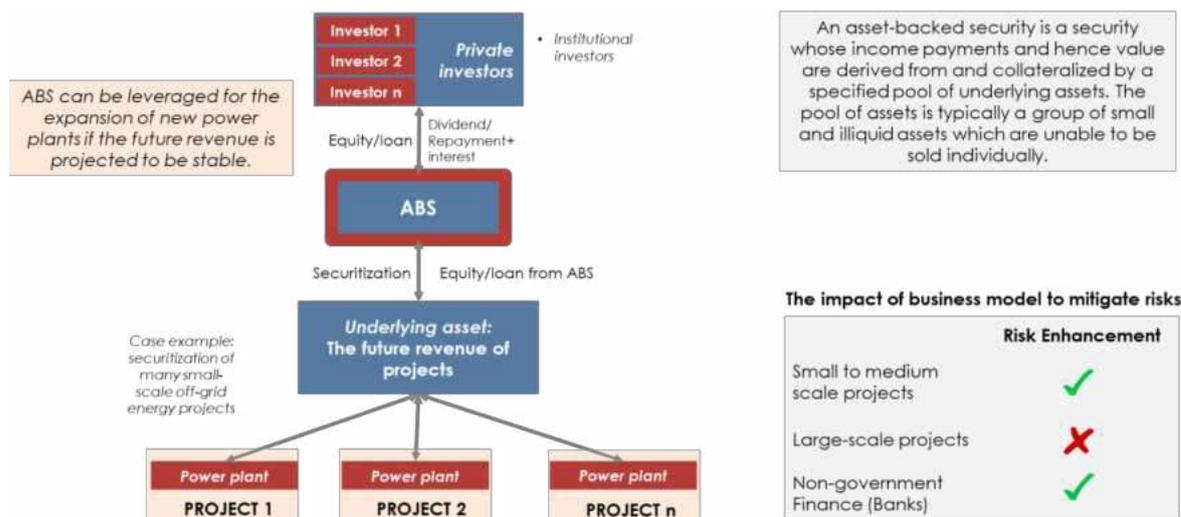


Figure 23. Illustration of ABS scheme

Complete mapping of alternative finance applicability to West Java's green project pipeline is presented in Appendix 8.2.

### 5.3 Technical assistance to improve efficacy of financing scheme recommendation

Our recommendation for the TA programs is aiming to address current issues faced by key stakeholders, such as Bappeda/ Regional government, Government related institutions and agencies and Financiers i.e. Banks. The main issues are related to increase integration of low carbon development in the regional planning of West Java Province i.e. RAD-GRK, as well as bank's long term sustainability strategy. These are the theme of technical assistance programs that could be targeted to improve efficiency and effectiveness of financing scheme recommendation:

#### I. Green project identification and policy formulation

TA topic	Target recipient
Green sectoral policy formulation	<ul style="list-style-type: none"> <li>Regional government</li> <li>Financiers, e.g. banks</li> </ul>
<b>Value for Money</b> for green project identification - the most advantageous combination of cost, quality, and sustainability to meet customer requirements	<ul style="list-style-type: none"> <li>Regional government</li> <li>Other related government institutions and agencies</li> <li>Financiers</li> </ul>
Grouping small-scale regional/ village green projects for pilot preparation → potentially <b>replicable to other regions and scalable nationally</b>	<ul style="list-style-type: none"> <li>Other related government institutions and agencies</li> <li>Financiers, especially officers that perform credit scoring</li> </ul>

#### II. Regional planning and budgeting

TA topic	Target recipient
Institutional strengthening and low carbon financing structure formulation	<ul style="list-style-type: none"> <li>Regional government</li> <li>Other related government institutions and agencies</li> </ul>
Alternative funding from non-government and non-PPP, especially for smaller scale project	<ul style="list-style-type: none"> <li>Regional government</li> <li>Other related government institutions and agencies</li> <li>Financiers</li> </ul>

### III. *Setting up universal “Green” taxonomy*

TA topic	Target recipient
Definition of LCDI (Bappenas, 2018)	<ul style="list-style-type: none"> <li>Regional government</li> <li>Other related government institutions and agencies</li> </ul>
Capacity building for green project	<ul style="list-style-type: none"> <li>Financiers, especially officers that perform credit scoring</li> </ul>

## 6. Conclusion and Recommendation

The study focusing in narrowing the financing gap in West Java from the perspective of: (i) Bappenas Low Carbon Development Indonesia (LCDI) framework, (ii) “Value for Money” (i.e. which projects provide financial and social return, with the highest environmental impact), and (iii) potential replicability of financing scheme/ business model.

**West Java needs to reduce 6.09% of its emission in 2021 – 2030, with the estimated cost of up to IDR 7 trillion per year (or total up to IDR 70 Trillion); with the highest financing needs goes to the energy and waste sector.** In other words, climate finance disbursement needs to speed up through the creation of an enabling environment.

West Java committed a total of IDR 23.5 Tn on green finance projects, with only 3.4% of that has moved to the implementation stage—leaving a 96.6% financing gap. From that IDR 23.5 Tn committed financing, IDR 15.9 Tn is expected to be financed by private sector. Based on West Java green project pipeline, **clean water, waste processing, and mass transport are among the top 3 sub-sector projects with the highest private finance needs.** These projects have high public benefits, rarely financially attractive to involve private investors unless they are large-scale, and several credit enhancements are met.

**The average West Java’s fiscal capacity decreased by 24% to IDR 9.6 Tn in 2020 due to COVID-19, but still able to cover public finance portion of IDR 6.8 Tn in financing green project pipeline.** Regardless, West Java still has the capacity to obtain loans up to IDR 12.7 Tn if the requirements are met (i.e., loan size < 75% previous year’s revenue, DSCR > 2.5).

In general, there are **more barriers in setting up large-scale than small-medium scale projects, despite credit enhancement facilities usually more applicable to large-scale projects. In some cases of clean energy and waste management, small-medium scale projects is preferred** particularly for this practicality reason. Each sectoral project also has specific challenges to overcome. In the priority sectors (determined based on the largest financing needs), key stakeholders in clean energy and waste management prefer community-based, small-to-medium scale projects with alternative financing mechanism to drive the pilot project. Meanwhile, low-emission transportation sector is only relevant with large-scale financing, which requires credit enhancement at substantial amount.

In the **banking needs assessment, data shows that Indonesian banks dominate the financial holding in Indonesia and financing through debt instrument.** Particularly in financing green sectors, **renewable energy and sustainable transportation are sectors** that attract most of private finance as they offered forecasted stable revenue in the future.

**Banks face several barriers** in providing lending for green projects in Indonesia, mostly owed to the combination of the existing financing structure that prohibits long-term lending, risk appetite, and information asymmetry. Furthermore the scale and sector selection of green project influence bank’s appetite to invest.

There are several **enablers identified to mobilize green finance at project level, which is divided to business model, financing scheme, and technical assistance.** Each of this enabler can reduce the risk exposure to certain level. A combination of all, tailored to project-level, should be able to enhance overall project attractiveness. These enablers must be complementary to rigorous technical assistance. In the case of West Java, technical assistance is necessary on improving the knowledge on green taxonomy, green project identification, as well as planning and budgeting.

This study identifies key recommendations for West Java in enhancing green investment vibrant to close financing gap and to meet its RAD-GRK commitment in 2030. These recommendations have the potential to be replicated across other provinces in Indonesia that have similar attributes, to encourage green finance and use of financing scheme, business model and technical assistance. The recommendations are:

1. To optimize the existing public finance instruments as leverage to non-government financing sources, to increase private sector engagement in financing green projects. Propose financing schemes should be tailored to characteristics, scale, and sectors of the projects.
  - Explore intermediation (co-financing) and guarantee use with PT SMI and the other project lending mechanism for the net spending projects, such as small-scale solar PV
  - Pool the risk of small projects with potential revenue generation, via syndicated loans e.g. small-scale waste management projects
  - For large scale project, re-assess the use of muni bonds after the Omnibus Law mandate on DPRD approval is in effect

For West Java, small-medium scale waste and clean energy are preferred since these are assessed as priority sectors (i.e. these projects need more financing source to close financing gap) that could be developed as pilot projects.

2. To improve the private investment appetite by leveraging green finance enabling regulations (e.g. green banking policy) and providing technical assistance tailored to key stakeholders such as regional government units as project owners and operators and financiers.
3. To explore the use of innovative financing models to attract banking finance by pooling risks and thereby mitigating investment risks. This can be done through syndicated loans and co-financing.
4. To expand the coverage of potential solutions, seek alternative business models that do not require private bank participation, such as leasing models which are becoming increasingly applicable for Solar PV installation.

Further assessment is required to determine project and scheme selection for pilot project. UNDP/ IFL will cover the next stage of the study to build pilot project for West Java.

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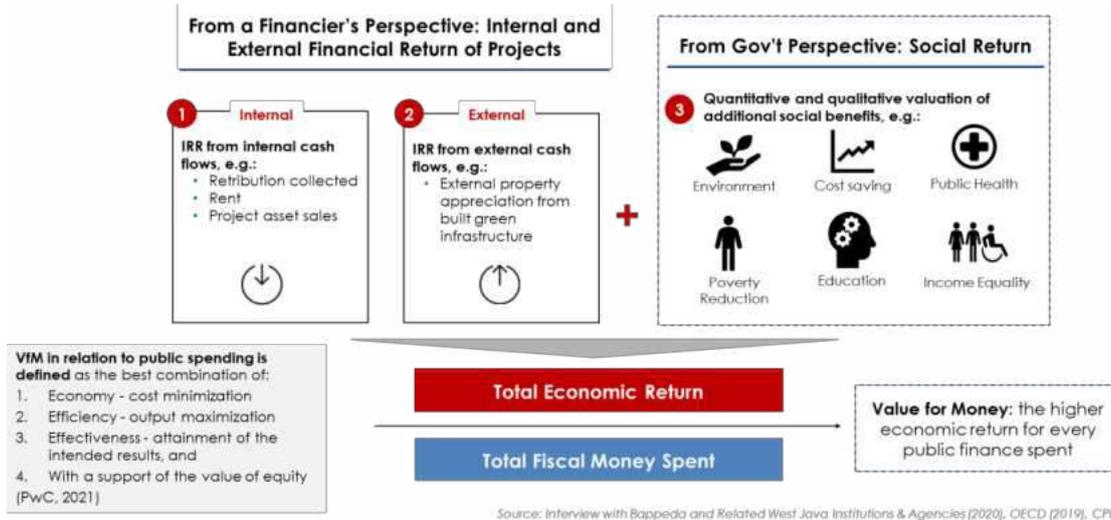
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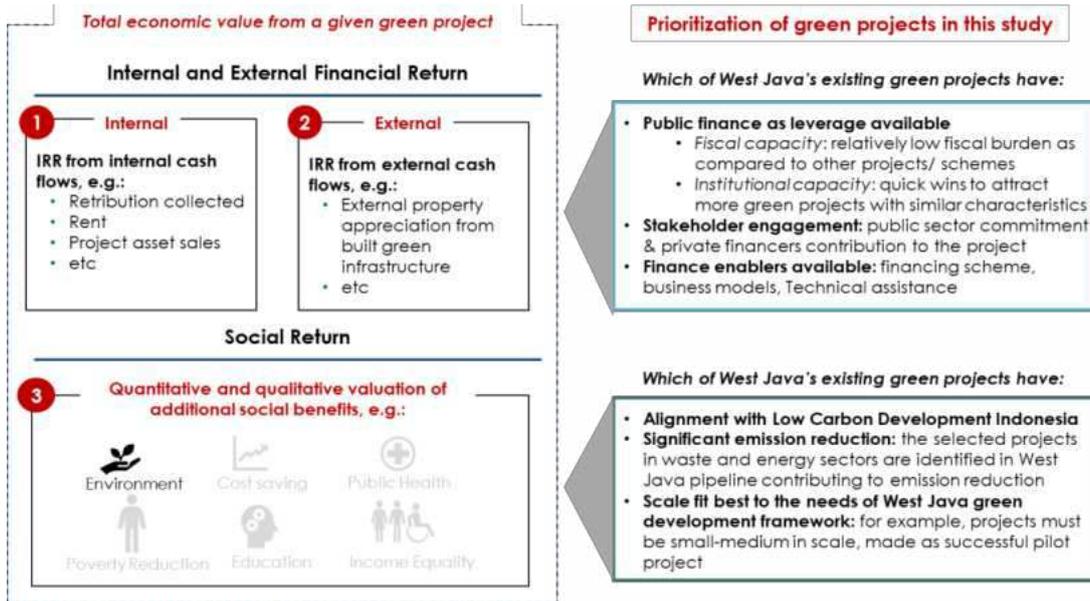
## 8. Appendix

### 8.1 Value for Money Assessment Criteria

The prioritization of green projects focuses on the total economic return, measured by Value for Money (VfM) relative to fiscal spending



High financial return of green projects corresponds to fiscal and institutional capacity, while social return focuses on low carbon development goals



### 8.2 West Java's Green Project Pipelines

#### Large-scale projects

Project Sectors	Project Sub-sectors	Project name	Financing status (IDR Tn)		
			Investment Value	Financial close	Gap
Transport	Light Rapid Transit	LRT Bandung Raya	4.8	0.0	4.8

	Railway	Pengembangan akses KA ke Patimban	1.1	0.0	1.1
		Pengembangan akses KA ke Kertajati	2.7	0.0	2.7
		KA Cibungur-Tanjung Rasa	1.9	0.0	1.9
Energy	Solar rooftop	Pembangunan PLT Surya Atap di Gedung-gedung Pemerintah Provinsi	TBD	0.0	TBD
	Street lighting	PJU di Jalan Provinsi	TBD	0.0	TBD
Waste	Waste processing and management	TPPAS Lulut Nambo	0.8	0.8	0.0
		TPPAS Legok Nangka	4.0	0.0	4.0
		TPPAS Ciayumajakuning	0.4	0.0	0.4
		TPPAS Bekarpur – Feasibility Study	0.001	0.0	0.001
		TPAS Bersama Sukabumi – Feasibility Study	0.001	0.0	0.001
Climate adaptation	Water Treatment Plan	SPAM Jatigede (Regional Metropolitan Cirebon Raya)*	2.3	0.0	2.3
		SPAM Sinumbra (Regional Metropolitan Bandung Wilayah Barat I)	2.9	0.0	2.9
	Flood retention facility	Bendungan Sadawarna*	1.3	0.0	1.3
<b>TOTAL</b>			<b>22.2</b>	<b>0.8</b>	<b>21.4</b>

### Small-Medium scale projects

Project Sectors	Project Sub-sectors	Project name	Financing status (IDR Tn)		
			Investment Value	Financial close	Gap
Energy	Solar rooftop	PLTS Rooftop SMA/SMK Negeri di Jawa Barat (173 Unit)	0.22	0.0	0.22
		PLTS Rooftop di Pondok Pesantren (7 Lokasi)	0.006	0.0	0.006
		PLTS Rooftop di Gedung Pemerintahan (7 Lokasi)	0.006	0.0	0.006
Waste	Waste processing & management (solid)	Rencana Teknis Fasilitas Peralihan Sampah Antara	0.001	0.0	0.001
		Pekerjaan Pengadaan Sarana dan Prasarana Pilot Project Kawasan Tuntas Sampah Kabupaten Purwakarta (TPS 3R Plus)	0.001	0.0	0.001
		Pekerjaan Pengadaan Sarana dan Prasarana Pilot Project Kawasan Tuntas Sampah Kota Cimahi (TPS 3R Plus)	0.001	0.0	0.001
		Pekerjaan Sarana dan Prasarana Pilot Project Kawasan Tuntas Sampah Kota Bandung (TPS 3R Plus)	0.001	0.0	0.001
		Pekerjaan Alat Pengolah Sampah Residu	0.001	0.0	0.001
		Urban sewerage system	SPALD Regional di Metropolitan Bandung Raya	0.115	0.0
		SPALD Regional di Metropolitan Cirebon Raya	0.117	0.0	0.117
	Waste-to-energy	Biogas di Pondok Pesantren (6 Lokasi)	0.004	0.0	0.004

<b>AFOLU</b>	Mangrove conservation	Hutan Bakau Sinar Laut	0.037	0.0	0.037
<b>Climate adaptation</b>	Water	SPAM Kertasari	0.37	0.0	0.37
		SPAM Cikeruh/Cigondong (SPAM Regional Timur 2)	0.042	0.0	0.042
		SPAM Cikalong	0.40	0.0	0.40
	Flood retention facility	Kolam Retensi Kab. Bandung	TBD	0.0	TBD
<b>TOTAL</b>			<b>1.36</b>	<b>0.0</b>	<b>1.36</b>

### 8.3 Mapping of applicable business model, alternative finance, and technical assistance to West Java's Green Project Pipelines – based of project scale

#### Large scale projects

Projects	Muni Bonds	Intermediation	Lending	Guarantee	Risk Pooling	ABS	BUMD JV	DAK JV	PPP	PPP+AP	Capacity Building
<b>Transportation</b>											
LRT Bandung Raya		●	●	●					●	●	●
Akses KA ke Patimban		●	●	●					●	●	●
Akses KA ke Kertajati		●	●	●					●	●	●
KA Cibungur-Tanjung Rasa		●	●	●					●	●	●
<b>Energy</b>											
PLT Surya Atap di Gedung Pemerintah Provinsi	●	●					●	●	●	●	●
PLTS Rooftop SMA/SMK (173 Unit)	●	●					●	●	●	●	●
PJU di Jalan Provinsi	●	●					●	●	●	●	●
<b>Waste</b>											
TPPAS Lulut Nambo		●	●	●					●	●	●
TPPAS Legok Nangka		●	●	●					●	●	●
TPPAS Ciayumajakuning		●	●	●					●	●	●
TPPAS Bekarpur		●	●	●					●	●	●
Kajian TPAS Bersama Sukabumi		●	●	●					●	●	●
<b>Water (Adaptation)</b>											
SPAM Jatigede (Regional Metropolitan Cirebon Raya)*		●	●	●			●		●	●	●
SPAM Sinumbra (Regional Metropolitan Bandung Wilayah Barat I)		●	●	●			●		●	●	●
Bendungan Sadawama*		●	●	●			●		●	●	●

\* National Strategic Project – based on Perpres No.58/2017

Legend

Business model	Technical Assistance	Financial Instrument
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#### Small-medium scale projects

Projects	Muni Bonds	Intermediation	Lending	Guarantee	Risk Pooling	ABS	BUMD JV	DAK JV	PPP	PPP+AP	Capacity Building
<b>Energy</b>											
PLTS Rooftop di Pondok Pesantren (7 Lokasi)	●	●				●					●
PLTS Rooftop di Gedung Pemerintahan (7 Lokasi)	●	●				●					●
<b>Waste</b>											
Rencana Teknis Fasilitas Peralihan Sampah Antara			●								●
TPS 3R Plus Kab. Purwakarta					●		●	●		●	●
TPS 3R Plus Kota Cimahi					●		●	●		●	●
TPS 3R Plus Kota Bandung					●		●	●		●	●
Alat Pengolah Sampah Residu							●	●		●	●
SPALD Regional Bandung Raya							●	●		●	●
SPALD Regional Cirebon Raya							●	●		●	●
Biogas Pesantren (6 Lokasi)							●	●		●	●
<b>AFOLU</b>											
Hutan Bakau Sinar Laut			●				●				
<b>Water (Adaptation)</b>											
SPAM Kertasari					●	●	●	●		●	●
SPAM Cikuh/Cigondong (SPAM Regional Timur 2)					●	●	●	●		●	●
SPAM Cikalong					●	●	●	●		●	●
Kolam Retensi Kab. Bandung							●	●		●	●

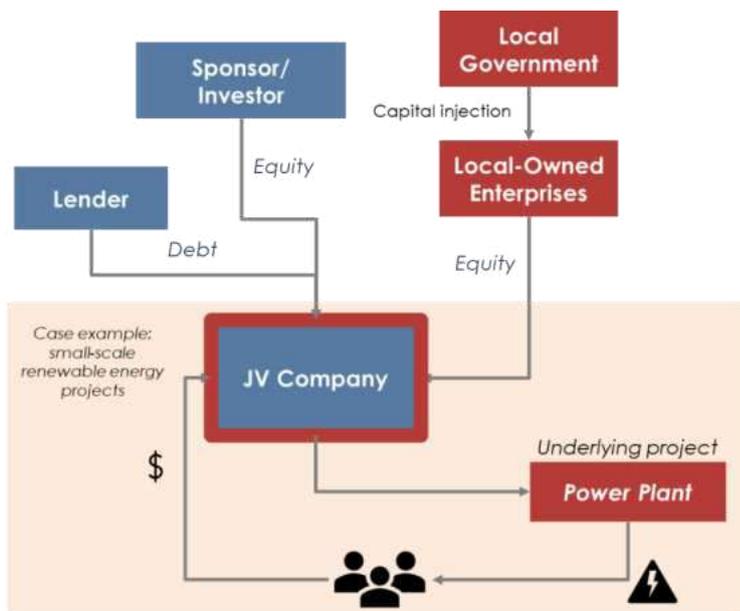
Legend



### 8.4 Proposed business model to finance green projects

#### 1. BUMD JV (Badan Usaha Milik Daerah/ Regional Owned Enterprise Joint Venture)

- **Joint Venture: Locally-Owned Enterprises (LOEs) and Private Sponsors**

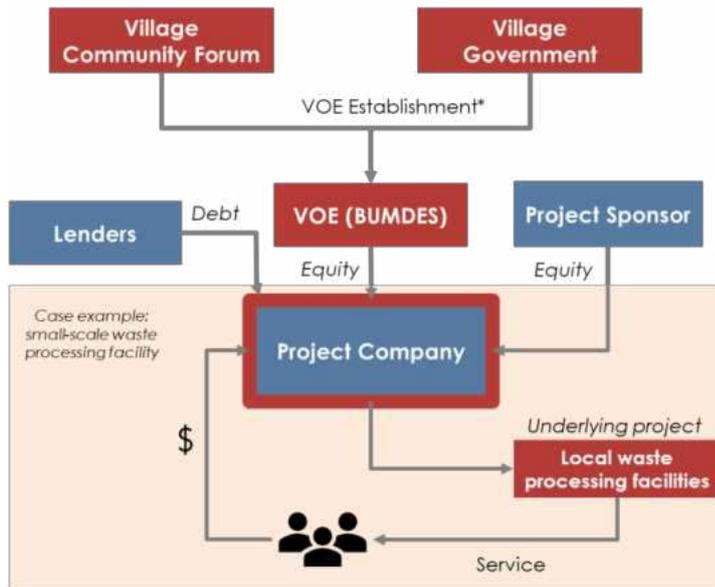


- Local government's direct appointing to Local-owned Enterprises for renewable energy development and provide capital injection to the company
- Local-owned Enterprises can cooperate with private sector in the plant operation through creating a JV Company to leverage its capital

**The impact of business model to mitigate risks**

	Risk Enhancement
Small to medium scale projects	✓
Large-scale projects	✗
Non-government Finance (Banks)	✓

• **Joint Venture: Village-Owned Enterprises (VOEs) and Private Sponsors**



Strategic JV between village owned enterprises and private sponsor can be the solution for small scale projects. Managing a range of small-scale projects could attract private sector given adequate return and the economies of scale. The source of capital for VOE can be optimized from village fund.

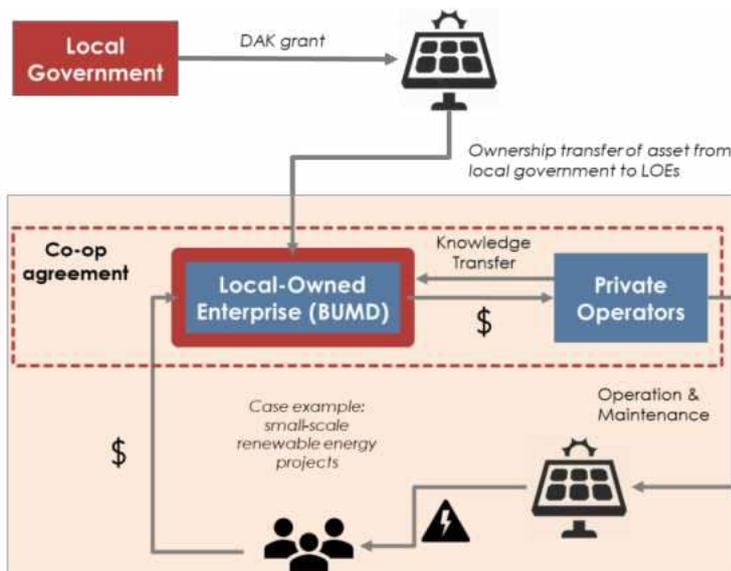
! Technical assistance to VOEs staff might be necessary

**The impact of business model to mitigate risks**

	Risk Enhancement
Small to medium scale projects	✓
Large-scale projects	✗
Non-government Finance (Banks)	✓

2. **DAK JV (Dana Alokasi Khusus/ Special Allocation Fund Joint Venture)**

**Joint Venture: Special Allocation Fund and Private Operators**



- Infrastructure development using Special Allocation Fund on Small-Scale Energy projects based on the technical manual made by the Ministry of Energy
- Asset transfer in a form of asset capital injection to local-owned enterprise (BUMD) is in line with the existing regulation

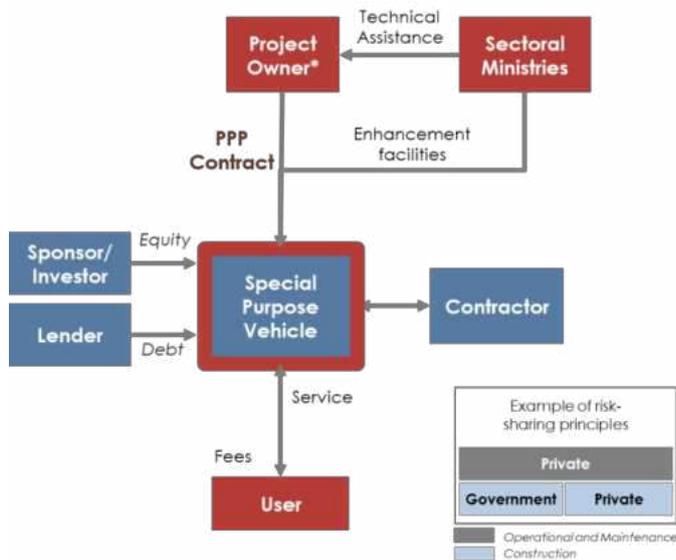
**The impact of business model to mitigate risks**

	Risk Enhancement
Small to medium scale projects	✓
Large-scale projects	✗
Non-government Finance (Banks)	✓

Based on the Ministry of Energy 36 (2018) Regulation on Special Allocation Fund on Small-Scale Energy Operational Manual

3. **PPP**

Public Private Partnership (PPP) scheme reduces investment risks, but the extent depends on enhancement facilities



Source: Permen Bappenas 4 Year 2015; Permen Bappenas 2 Year 2020; CFI Analysis

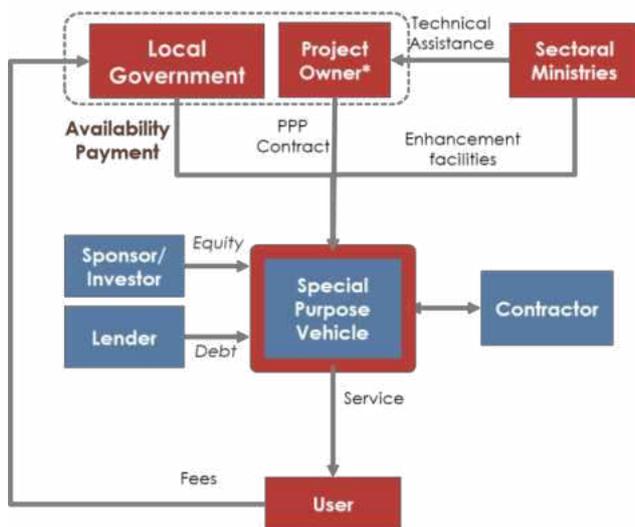
- ✓ **Risk sharing principle:** PPP shares investment risks between the government and private
- ✓ Risk-bearing principles is applicable using **Enhancement Facilities**
- ✓ **Usually applicable to large-scale projects**, but no regulatory constraint on other project scales
- ✓ Project Owner (**Penanggung Jawab Proyek Kerjasama--PJPK**)\* position can be filled by local governments or Local-owned Enterprises (BUMD)

**The impact of business model to mitigate risks**

	Risk Enhancement
Small to medium scale projects	✗
Large-scale projects	✓
Non-government Finance (Banks)	✓

**4. PPP + AP**

**Regional PPP (KPBU Daerah) using Availability Payment (PPP)**



- Project Owner (*Penanggung Jawab Proyek Kerjasama--PJPK*)\* position can be filled by local governments or Local-owned Enterprise.
- The selection of the private partner shall follow the procedures in PPP regulations
- Financial support is in form of *availability payment* in accordance with Ministry of Home Affairs Regulation 96/2016

**The impact of business model to mitigate risks**

	Risk Enhancement
Small to medium scale projects	✗
Large-scale projects	✓
Non-government Finance (Banks)	✓

## 8.5 Guarantee products currently available in the market

Type of Guarantee	Risks Coverage	Definitions
Political Risk Guarantee	• Currency inconvertibility and transfer restriction cover	• Losses arising from an investor's inability to convert local currency into hard currency due to government action
	• Breach of contract/ contract disputes	• Losses arising from the utility's breach or repudiation of a contract (e.g., breach of a PPA by a government entity).
	• Expropriation cover	• Losses arising from government action including nationalization, deprivation, confiscation, which reduce investors' ownership or control over an asset.
	• War, terrorism, and civil disturbance cover	• Destruction of business due to political violence, including revolution, insurrection, coups d'état, sabotage, and terrorism.
Public Sector Performance Risk	• Non-honoring of financial obligations	• Losses resulting when a sovereign or state-owned enterprise defaults on financial payment obligations
	• Other risks	• Delay in permits and licenses • Not honoring financial closure • Change in regulations
Commercial Risk	• Nonpayment by the borrower/ issuer	• Debt service default by the borrower regardless of the cause of default on the guaranteed portion of the principal and interest due
	• Credit enhancement	• Enhance credit rating for debt instruments (loans and bonds)

## 8.6 Priority projects analysis

### 8.6.1 PROJECT SCREENING

#### Value for Money Assessment leads to priority project options

		Rooftop Solar PV at 173 high schools	Solid Waste Processing Site (TPS3R - 3 cities)	Water management installation	AFOLU
#1 Public capacity to support	Relatively low fiscal burden	223 bn ✓	3 bn ✓	42 - 400 ✓	37 bn ✓
	Quick wins/ Replication Potential	High ✓	High ✓	Low-Medium ✓	Low-Medium ✓
#2 Private sector appetite	Financial Return	IRR 6-9%, PBP 8-12 Year ✓	Yes, unspecified ✓	Yes, unspecified ✓	Generally, low to negative IRR ✗
	Finance enablers available	Medium ✓	Medium ✓	Low ✗	Low ✗
	LCDI Priority Sector	Yes ✓	Yes ✓	No ✗	Yes ✓
#3 Social benefit	Emission Reduction	Yes ✓	Yes ✓	No ✗	Yes ✓
	Social Return	Medium-High ✓	High ✓	High ✓	High ✓

\*Bundling: Grouping of several rooftop solar PV mini-grid projects in high schools in West Java  
 Source: List of Green Projects in the West Java Pipeline, Pre-Feasibility Study of Solar Roofs in 173 Public Schools in West Java, West Java RAD-GRK Review Documents, Various West Java Project Data, CPI Analysis

### 8.6.2 SWOT ANALYSIS

Priority green projects for West Java		Financing gap	Fiscal allocation need	Private finance need*	Institutional capacity	Financiers' readiness	Supporting document for financing
<p>TPS 3R in Bandung, Cimahi, dan Purwakarta</p>		IDR 1.6 billion	IDR 0.48 billion	IDR 1.12 billion	<p><b>Medium</b></p> <ul style="list-style-type: none"> <li>It is necessary to establish a legal entity, for example BLU/BUMD in the management of TPS3R to facilitate access to finance</li> <li>TPS3R Project Stages in 3 cities: <b>Preparation stage</b></li> </ul>	<p><b>Medium</b></p> <ul style="list-style-type: none"> <li>Pengalaman pemodal terhadap TPS3R: <b>rendah</b></li> <li><b>Sindikasi dapat memilligasi risiko investasi</b>, dalam menarik apetit bank</li> </ul>	<p><b>N/A</b></p> <ul style="list-style-type: none"> <li><b>Additional documents are required</b> to verify financial and social returns, and emission reductions</li> </ul>
<p>Rooftop solar PV di 173 sekolah</p>		IDR 223 billion**	IDR 66.9 billion	IDR 156.1 billion	<p><b>High</b></p> <ul style="list-style-type: none"> <li><b>Previous experience in rooftop PV mini-grid installations</b> by the West Java provincial government.</li> <li><b>Can replicate the role of regional institutions in the portion of roof PV mini-grid financing</b> referenced from other regions, for example Central Java.</li> <li>Stages of the Rooftop PV mini-grid Project in 173 schools: <b>Pre-Feasibility Study</b></li> </ul>	<p><b>Medium</b></p> <ul style="list-style-type: none"> <li><b>Experience of financiers with rooftop PV mini-grid: medium</b></li> <li>When complemented by <b>the portion of public finance and financing instruments</b>, cost-saving projects increase bank's appetite</li> </ul>	<p><b>Partially available</b></p> <ul style="list-style-type: none"> <li><b>Pre-feasibility study for 173 schools:</b> verified estimates of financial and social returns, and emission reductions</li> <li>Further documents are required for implementation, eg. Final feasibility study</li> </ul>

\*Based on best-practice loan : equity 30:70 which translates into proportion of public finance : private. This is also based on benchmarking to the public TPPAS Nambo: the proportion of private finance (West Java Environmental Service, 2020)

\*\* Bundling: Grouping of several rooftop solar PV mini-grid projects in high schools in West Java

## TPS3R financing: SWOT analysis

### STRENGTHS

- Economic impact:** the financing gap is IDR 1.6 billion, with **IDR 1.12 billion expected from private financial contributions**
- The cost of reducing emissions is lower when compared to the cost in the energy sector (See calculation of abatement costs)
- Social impact:** Bigger social impact if compared to rooftop solar PV projects

### WEAKNESSES

- TPS3R is a public service, the rate applied for the service/ product may not be commercially viable.
- Insufficient infrastructure, regulation, and policy, particularly for TPS3R
- Environmental impact:** The waste sector contributes to West Java's emission reduction profile. **TPS3R Bandung, Cimahi & Purwakarta contribute to reduce 0.02% of West Java's total emissions for the period 2021-2030**

### OPPORTUNITIES TO FINANCE

- Public incentives to environmental initiative e.g. subsidy to financiers
- National and provincial level policies to support waste management
- Funding from central government
- Institutionalization of TPS3R:** If TPS3R is in the form of BLU, there is wider opportunities on accessing finance source

### TREATS TO FINANCE

- Hard to predict revenue stream** as not all waste has value
- Potential higher operational cost:**
  - Lack of control over operation of disposal sites i.e. TPS3R
  - Poor cooperation from residents e.g. unwillingness to separate waste at source, waste management fee
  - Technology selection for waste processing

Source: CFI Analysis, Interview with banks and West Java agencies

## Solar rooftop PV financing: SWOT analysis

### STRENGTHS

- **Economic impact:** less fiscal burden, institutional capacity & readiness to deliver the projects
- **Foreseeable replication** for similar projects
- **Environmental impact:** Energy sector contributes to the emission reduction profile & energy mix target (RUED of West Java). **Solar PV installation in 173 high schools contributed to estimated total emission reduction of 103,610 tons CO2 up to 2030**
- **West Java familiarity with solar rooftop PV installation** i.e. SMAN 3 Bandung

### WEAKNESSES

- **Economic impact:** financing gap of IDR 223 billion, with **IDR 156 billion expected from private finance contribution.**
- **High investment costs** for emission reduction need to be budgeted (See abatement cost calculation)
- Unclear business model
- Lack of industrial partners

### OPPORTUNITIES TO FINANCE

- Public incentives to environmental initiative e.g. subsidy and tax policies to mitigate risk of tariff differentiation
- Funding from central government
- **Medium familiarity** of solar rooftop PV financing from the banks as financier. This could be enhanced via capacity building.

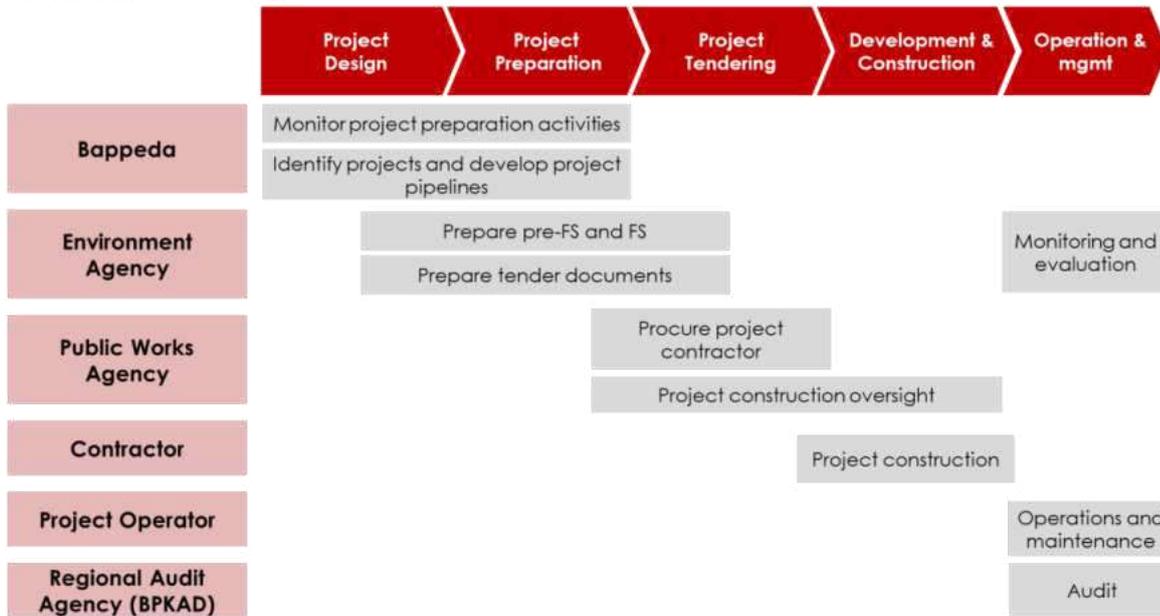
### THREATS TO FINANCE

- **Risk of tariff differentiation**, impacting banking cost of fund calculation e.g. NPV variability
- Renewable energy incentive (i.e. Solar) program has been intermittent as compared to those of fossil fuel industry

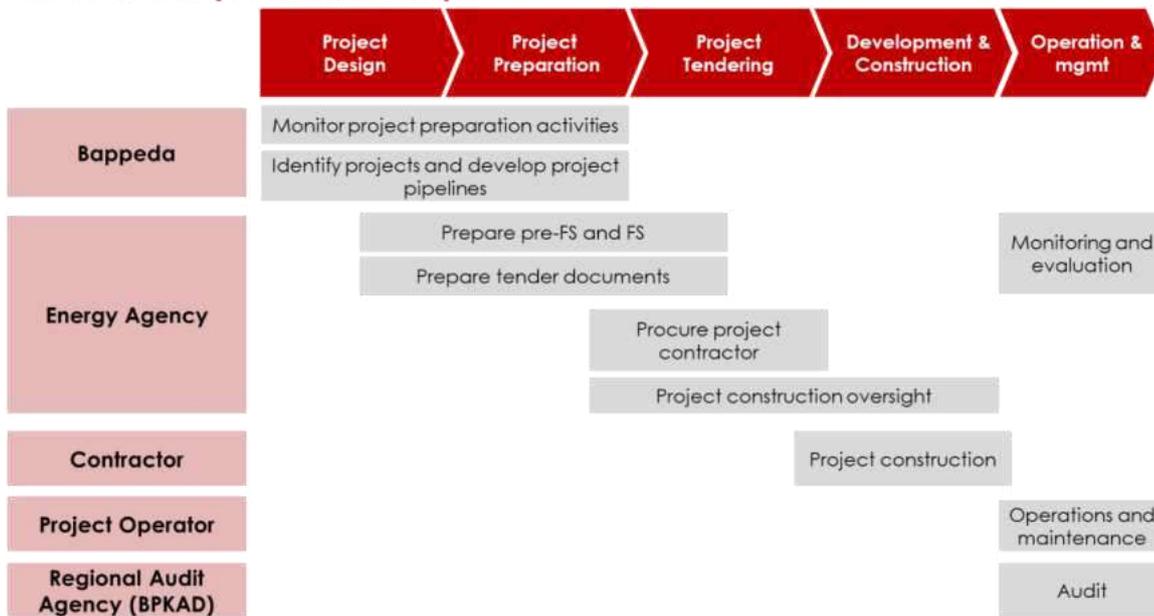
Source: CPI Analysis. Interview with banks and West Java agencies

## 8.6.3 PROJECT COORDINATION

### TPS3R: Next steps



## Solar rooftop PV: Next steps



### 8.6.4 EMISSION REDUCTION POTENTIAL

## TPS3R: Total estimated emission reduction from 3 cities is 27,491 ton CO2eq for period 2021-2030

Year	Waste generation in Bandung, Cimahi, Purwakarta (ton/year)	Waste generation (ton/day)	Emission from total waste generation (ton CO2eq)	(Ton/Day Organic)*	Emission from organic waste (ton CO2eq)	BAU emission	% Emission reduction
2021	914,000	2,504	3,876	1,593	2,465	5,138,700	0.048%
2022	936,000	2,564	3,969	1,631	2,524	5,327,600	0.047%
2023	959,000	2,627	4,067	1,671	2,586	5,509,800	0.047%
2024	982,000	2,690	4,164	1,711	2,648	5,687,300	0.047%
2025	1,005,000	2,753	4,262	1,751	2,711	5,861,900	0.046%
2026	1,029,000	2,819	4,364	1,793	2,775	6,034,600	0.046%
2027	1,054,000	2,888	4,470	1,837	2,843	6,206,700	0.046%
2028	1,079,000	2,956	4,576	1,880	2,910	6,378,900	0.046%
2029	1,105,000	3,027	4,686	1,925	2,980	6,533,200	0.046%
2030	1,130,000	3,096	4,792	1,969	3,048	6,728,400	0.045%
<b>Total</b>	<b>10,193,000</b>		<b>43,224</b>		<b>27,491</b>	<b>59,407,100</b>	<b>0.046%</b>
Contribution to the total emission reduction target of West Java 2021-2030 (BAU) from waste sector		0.05%					
Contribution to the total emission reduction target of West Java 2021-2030 (BAU) of 135,212.47 thousand tons of CO2 eq.		0.02%					

**Notes:**

- Estimated emission reduction for 2021-2030, vary from 2,465 tons CO2eq to 3,048 tons CO2eq, with an average reduction of CO2 emissions of 2,749 tons CO2eq. This is with the assumption that **ONLY the main composting activity is accounted** into calculation, i.e. \*Only accounts organic waste of 63.6% from total waste generation (Source: Kaji ulang Jawa Barat, Page 93-94 Table 2.54)
- The estimation is based on the existing LCDI methodology in calculating real emission reduction from main composting activity, and has not yet account:
  - the emission arise from other/ supporting composting and recycling activities.
  - the potential emission reduction from activities that could be prevented such as, waste transportation to landfill, waste piling, virgin plastic production

**The next stage:**

- Document to support TPS3R project e.g. pre-FS, FS, or equivalent to access financing from private sectors
- Adjustment to emission reduction calculation to account all TPS3R activities, e.g. composting, recycling, waste management (prevention activities)

## Solar rooftop PV: high schools contributes to estimated total emission reduction of 103,610 tons CO<sub>2</sub> up to 2030

Source: Pre-Feasibility Study of Solar rooftop PV for 173 highschools in West Java	Installed panel capacity (kWp)	Number of panels	First year energy production (kWh)	Estimated emission reduction up to 2030 (Tons CO <sub>2</sub> )	Notes:
117 Vocational schools (SMKN)	6343	20795	10331522	68448	
56 High schools (SMAN)	3272	10728	5307371	35162	
<b>Total of 173 high schools in West Java</b>	<b>9615</b>	<b>31523</b>	<b>15638893</b>	<b>103611</b>	<b>Assumption: project starts in 2022</b>
<b>Average of 173 high schools in West Java</b>	<b>55,6</b>	<b>182,2</b>	<b>90398,2</b>	<b>598,9</b>	
<b>Contribution to the total emission reduction target of West Java 2021-2030 (BAU) from energy sector 54,923.30 thousand tons of CO<sub>2</sub> eq.</b>				<b>0,2%</b>	
<b>Contribution to the total emission reduction target of West Java 2021-2030 (BAU) of 135,212.47 thousand tons of CO<sub>2</sub> eq.</b>				<b>0,1%</b>	

### Notes:

1. The **capacity of the rooftop PLTS to be installed varies from 2.14 kWp to 166.20 kWp**, with an **average rooftop PLTS capacity of 55.58 kWp**. The analysis of the projected capacity of the school roof uses a Helioscope with the upper limit of the PLN power installed on each school.
2. Rooftop **solar power production in the first year varied from 3,481.68 kWh to 277,208.07 kWh**, with an **average production in the first year of 90,398.23 kWh**. The calculation is carried out by considering the capacity of the installed rooftop solar PV, the peak sun hour value for each school location, and the efficiency of the system during the first year of installation
3. **Estimated emission reduction until 2030 vary from 23.07 tons of CO<sub>2</sub> to 1,836.55 tons of CO<sub>2</sub>, with an average reduction of CO<sub>2</sub> emissions of 598.90 tons of CO<sub>2</sub>.**
4. The estimation above only covers the installation of rooftop solar PV at 173 schools, and does not include 7 government buildings. Adjustments is required.

### The next stage:

- Pre-FS document can be used to access financing as initial indication of RoI and payback period
- Final Feasibility study and more detailed analysis in Detailed Engineering Design (DED) through direct visits to each school