

Archipelago Isolated Grid Hybrid Solution

Indonesia

Context

The project envisages developing a pipeline of **hybrid solar-battery installations in aggregate of 200MW PV + 120MW battery of capacity**. This relatively new hybrid configuration has not yet been pursued in these island provinces. Currently, such provinces rely on high-cost diesel-based generators.

Stand-alone solar installations disrupt the stability of relatively weak island grids due to the intermittent nature of solar energy production, which is not reliable. As a result, stand-alone solar installations do not provide a comprehensive solution for reliable power in many island provinces in Indonesia.

Infunde Development, will lead the project, contributing to the development of a hybrid PPA template, implementation of a proof of concept and developing a pipeline of additional opportunities, thus making it a bankable and repeatable opportunity for further private sector investment.

Project Highlight

200MW PV
+ 120MW
Battery
Multiple sites

379M
US\$ of total
project cost

Q4 2022
Expected
COD
(of 3 selected
projects)



Country and Sectoral Background

Indonesia is one of the fastest growing countries with strong economic development and population growth, giving this country a growing demand for electricity.

The electrification ratio in Indonesia **has been increasing rapidly at 89% by end of 2019** according to PLN publications, as a result of the Government of Indonesia's successful efforts in increasing generation capacity. However, there is a wide variance in the electrification ratios from one province to another.

Indonesia has an ambitious target to have 23% of energy produced from renewable energy sources by 2025. As of 2019 **only 12.2% of energy is generated from renewable sources** while a series of ministerial and presidential directives have been issued. The new Ministerial Decree No. 20 (2020) by Ministry of Energy and Mineral Resources has been received with mixed support from the private sector.

Project Overview

Company:	Infunde Development Pte., Ltd.
Country:	Indonesia
Location:	Several locations across Indonesia
Sector:	Hybrid solar-battery
Status:	In development
Timeline:	Expected financial close: Q1 2022
Supplier:	Indonesia and Philippines power company

Development Impact



Lowering and utilize the cost of energy by pairing solar PV and battery.

Electricity access to isolated areas within several islands in Indonesia will be improved.



Approximately 6.5M tons of CO2 emissions are expected to be avoided.

The project also reduce fossil-fuel consumption, greenhouse gas to create cleaner environment.



1M+ people estimated for having the improved infrastructure services.

By building the Transmission and Distribution line, extending grid access to remote and isolated area which help to increase the use of electricity with cheaper cost.



Provide 200+ jobs for the short and long term during the construction and operation.

More than 200 short-term jobs and more than 144 long-term jobs will be created after the project completion of all sites.

Environment and Community



The Archipelago Hybrid Solution (AHS) project will develop a pipeline of hybrid (solar PV-storage) projects that consist of both expansions of existing projects and establishment of new ones.

The development of the hybrid platform would improve access to reliable cost-efficient generation, decrease/displace diesel consumption and potentially provide power to some non-electrified communities.

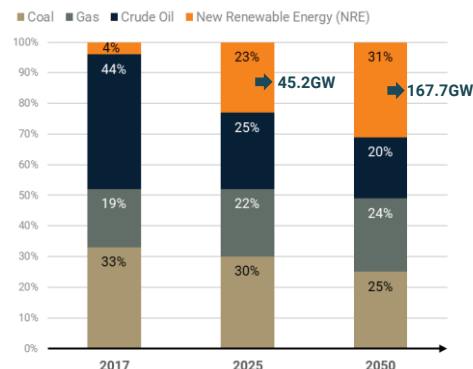
The project will be guided and comply with **IFC Performance Standards**. Land needed for the project is expected to be acquired through a negotiated acquisition with identified landowners or land-users will be thoroughly documented and will put in place mitigation measures for identified social and environmental impacts.

Key Investment Strengths	Power Market Overview
<p>Up to 200MW PV + 120MW battery total project pipeline located in more than 10 islands in Indonesia with a shortlist of 3 sites of Hybrid PV + Battery projects with 6MW PV + 2 MW battery in West Indonesia and 9MW PV +4 MW battery and 10MW PV +2MW battery in Maluku.</p>	<p>Demand Driven by rapid economic development, electricity demand in Indonesia has experienced strong growth rates during the past decade.</p>
<p>Supportive regulatory The Ministry of Energy and Minerals (ESDM) has recently released the MEMR ministerial decree No.4 of 2020 that is more investor friendly with the removal of Transfer of Land at the end of the PPA as an example. There is also a circulation of renewable energy presidential decree draft that will help boost renewables in Indonesia even further.</p>	<p>Supply According to the RUPTL (2019-2028)</p> <ul style="list-style-type: none"> Renewable energy targets by 2028 Hydro/mini-hydro power plants are allocated the largest portion with 9.7GW, followed by geothermal power plants, projected at 4.6GW. The use of rooftop solar photovoltaic is projected at 3.2GW. Energy supply priorities: IPPs are allocated power projects to deliver a total of 33,666 MW, while state-owned PLN is slated to build power plants delivering approximately 16,243 MW.
<p>Replicability of projects Due to the ease of acceptance of PLN after a successful project, replicability of projects through the pipeline is easier.</p>	<p>Solar energy Indonesia committed to reach 23% of renewable energy in its national energy mix by 2025 and Indonesia's solar energy potential is estimated at 500,000MW, of which less than 50MW are currently in operation.</p>

Renewable Energy in Indonesia Outlook

"Indonesia, under Paris Agreement, has pledged to lower its greenhouse gas emissions by 26% by 2020 or 41% with international support. To lower emissions in its power sector, the government of Indonesia stipulated the National Energy Policy (KEN) in 2014, setting out targets to increase the New and Renewable Energy (NRE) share in the primary energy mix to 23% by 2025 and 31% by 2050"

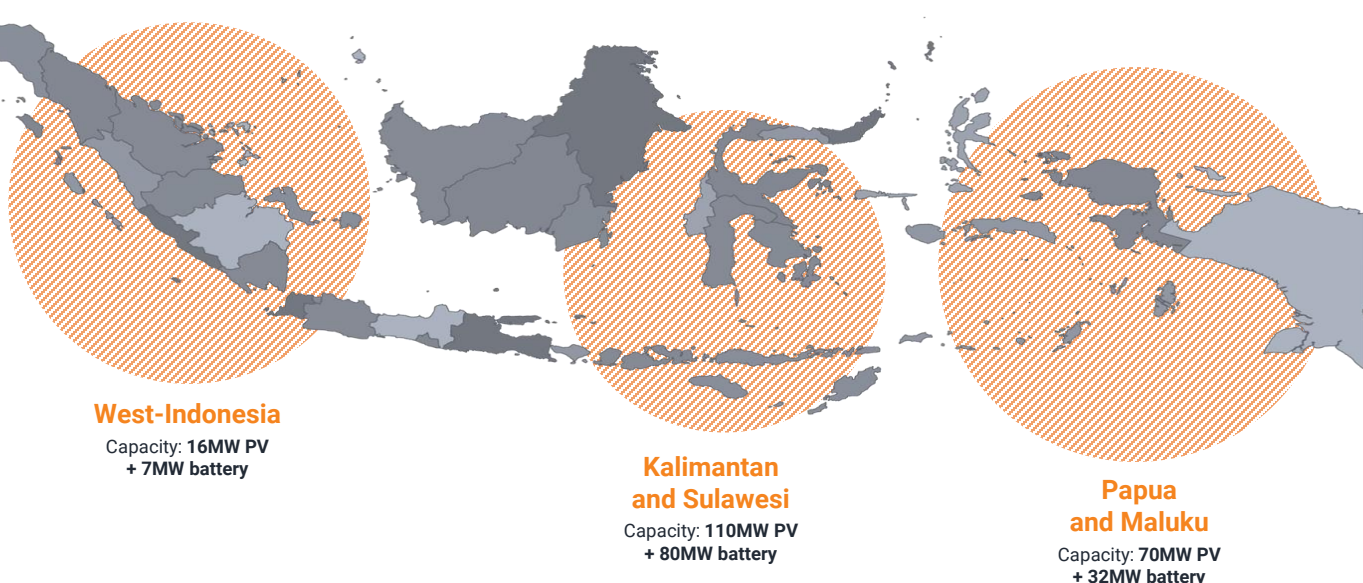
Indonesia Electricity Generation Percentage
(Indonesia's Primary Energy Mix by 2025 and 2050 as set in KEN, Gov. Reg. No. 79/2014)



Source: BP Statistical Review of World Energy 2018 and Handbook Energy Indonesia, MEMR

Projects Information

Geographic Location



Project Scope

Archipelago Hybrid Power project offers a solution for electrification in rural areas within Indonesia and supports the government in increasing renewable energy utilization.

The project entails the development and construction of medium size. The proof-of-concept hybrid plants and adding solar hybrid technology that will yield savings to PLN, the national power corporation of Indonesia, and the sole buyer for electrical energy in the country.

From the project pipeline that has been reviewed in detail by the consortium, there are three projects selected for construction.

West Indonesia:

- 6MW PV + 2MW battery; COD of Q3 2022

Two sites in Maluku:

- 9MW PV + 4 MW battery; COD of Q4 2022
- 10MW PV + 2MW battery; COD of Q1 2023

In addition, the project scope includes completion of development activities for other project sites amounting to a potential portfolio of 200MW PV + 120MW battery generation capacity (including the pilot plant) developed to reduce the risk of the project by having technical and environmental studies, and local permits.

Hybrid Solar and Battery Power Features



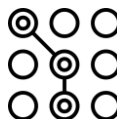
Independent storage system



Can be integrated with all types of PV inverters



Modular design



Seamless transition from PV to Battery and rest of the Grid



Various battery integration support via BMS

Infunde's Role

Infunde Development is leading overall project management, negotiations with strategic partners, installers, and financing activities. It will also help the local building the business plan and investment case, obtaining the necessary licenses, project and partnership structuring, overseeing feasibility studies, management of design work, EPC procurement and contracting and arranging the necessary debt facilities. Infunde will also lead for financial modeling, structuring, environmental and social safeguards, permits and approvals, EPC procurement and tendering, grid interconnection and feasibility, overall coordination and project management.

INFRACoASIA

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