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# Micro-Grid Solution, Rural Electrification Energies PH

**PESTECH**



# Rural Electrification Distributed Energy Resources

## Key Requirements of Rural communities

The Blueprint : **"ADVANTAGES OF A DER COMPACT SOLUTION"**

- *Replacement of diesel genset and fuel consumption*
- *Singular, integrated, software and hardware platform*
- *Quick installation and commissioning*
- *Stable and reliable power quality*
- *Modular - capacity can be increased with demand growth*
- *No maintenance, or opex cost*
- *Long lifetime*



# Rural Electrification Distributed Energy Resources

Micro-Grid Storage Functionality



## What it means for Rural Electrification Projects

### LOWER CAPEX

- Reduced oversizing to compensate for DOD, C-rate, ambient temperature, round-trip efficiency
- Reduced safety infrastructure requirement
- Reduced disposal cost and environmental impact

### LOWER OPEX

- Lower energy consumption during cycle life
- Lower energy consumption due to reduced parasitic loads (e.g., HVAC)
- Reduced diesel consumption & DG maintenance costs in diesel + storage deployments

# System Functionality

The Blueprint : **"DER CS ATTRIBUTES"**

EFFICIENCY	High DC to DC round-trip efficiency <sup>1</sup>
	Nameplate capacity = usable capacity <sup>2</sup>
SAFETY AND DURABILITY	No risk of thermal runaway
	No heat generation during cycling
LONGEVITY	Long cycle and calendar life
	No memory effect <sup>4</sup>
	Self-discharge, when in sleep mode, of 2% or less, per month
VERSATILITY	Wide ambient operating temperature range
	High C-rate capability without affecting cycle life or capacity
	Commercially acceptable form factor for low, medium or high voltage applications
	Modular and scalable. Economical manufacturing plant.

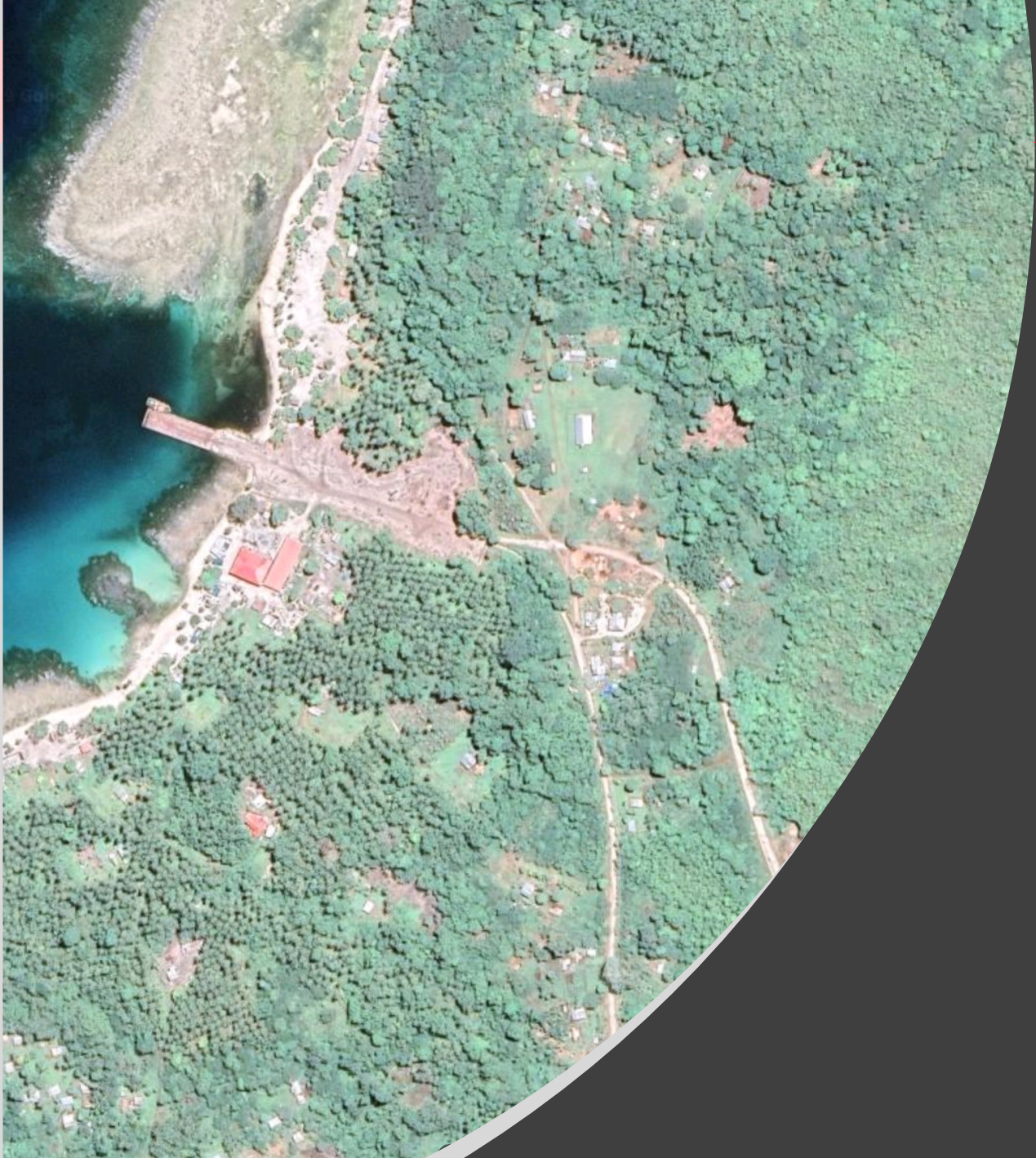
<sup>1</sup> at the supercap cell level

<sup>2</sup> under normal operating conditions, no derating necessary for DOD, C-rate, temperature, capacity loss due to cycling

<sup>3</sup> warranty for 10 years

<sup>4</sup> If left idle for an extended period and recharged, no effect on capacity or cycle life



An aerial photograph showing a dense green forest covering a hillside. A small settlement with several buildings, including one with a prominent red roof, is situated near a body of water on the left. A dirt road or path winds through the forest. The image is partially obscured by a dark grey curved shape on the right side of the slide.

## Key benefits in providing a modular and Environmentally friendly solution.

- Savings: thanks to its high efficiency the **OPEX are reduced** and the TCO lower compared to legacy technologies (No Diesel Gen).
- No fuel logistic: the system Self generates the fuel from renewables. **All the other fuel cell systems depend on fuel logistics** whether it is expensive pure H<sub>2</sub> delivered in cylinders or methanol for reforming.
- No fuel theft: H<sub>2</sub> cannot be used for traditional uses such as powering/ heating houses or running cars.
- OPEX independent from volatility: the main energy source is renewable energy, whose cost is fixed and therefore less volatile than the cost of diesel/oil/gas.
- Easy and low-cost maintenance: the system is fully remotely managed, there is **NO NEED for on-site checks**. A Self test procedure verifies the status of all the components while a pressure meter monitors H<sub>2</sub> storage.
- Funding : PESTECH focuses on environmentally friendly solution which are fully funded by state governments as part of their Rural electrification budget



# Rural Electrification Distributed Energy Resources

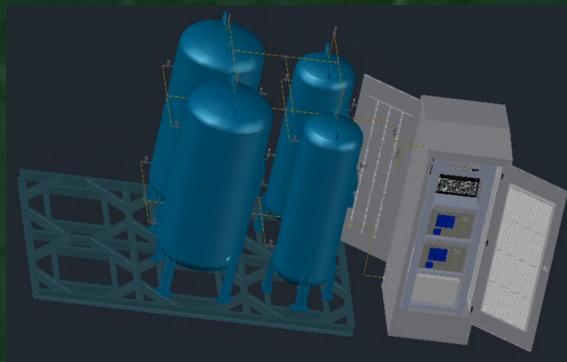
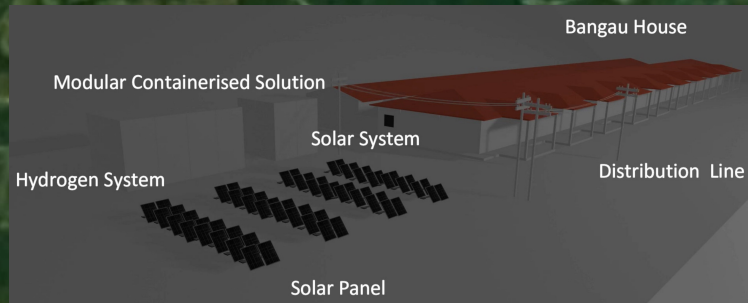
PESTECH Installed Base in the Southeast Asia region



# Sarawak Rh. Bangau ; Centralised Super-Capacitor Storage with back-up Self Recharging Fuel Cells (Hydrogen) : Application : Village

Rh. Bangau	
PV Solar	20kWp
Storage	40kWh
Server	20kW
H2 Fuel Cells	2.5kW

Business Model : State Government funded Project.  
20 Homes, 1kW/2kWh per Home  
Three phase 415 V, 50 Hz,  
1. Centralized Solar PV with Super-cap Storage  
2. Self Recharging Fuel Cells (Hydrogen)



Rh Bangau

# Self Recharging Autonomous Energy Solution

*No Batteries, No Fuel*

**PESTECH™**

**Energies PH**