



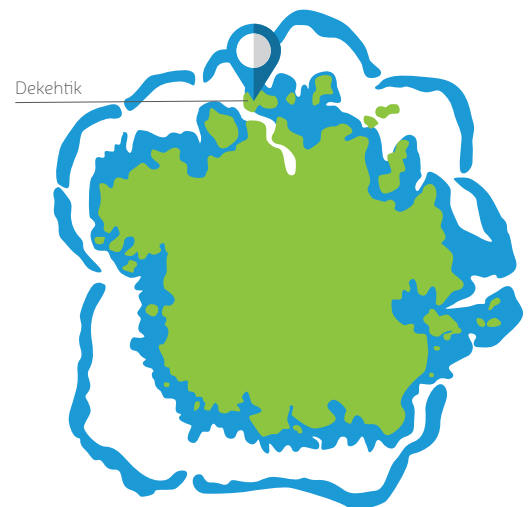
# Pohnpei Bulk Fuel Terminal

PV Battery Hybrid with Crude Nut Oil Generator

The 607 islands of the Federate States of Micronesia (FSM), located in the middle of the Pacific are pointedly remote. This creates some challenges getting resources, such as fuel and fresh food to the country's some 105,000 residents. Energy across the islands is supplied mostly from costly diesel generation and many of the islands and areas remain un-electrified. The Micronesian islands however have an abundant coconut resource, a major untapped resource which is about to be utilised at a national commercial scale for the first time.

Vital FSMPC have diversified their revenue streams by owning and operating a Crude Nut oil processing facility in Pohnpei. To better enhance this business division, completed research over the past three years identified an area of high, wild coconut plantation density which Vital has managed to secure in Chuuk on the island of Tonoas. As a conclusion of this research a new agenda emerged to consider opportunities for hybrid renewable energy solutions, which make use of crude nut oil and coconut biomass for energy production on the FSM islands.

2018 marked the commissioning and completion of the Pohnpei Terminal's 40 kW Solar Hybrid UPS System with Crude Nut Oil (CNO) Generator. A first of its kind demonstration energy project in the Pacific, which uses 100% pure crude nut oil as a substitute to diesel.



**Location:** Pohnpei, Federated States of Micronesia

**Project:** Pohnpei Bulk Terminal – PV Hybrid UPS and Warehouse Upgrades

**Solution:** Balance PowerCore Solution 60kVA Inverter with 40kWh of Battery and 40kW of PV. Inclusive 35kVA CNO Generator and Auxiliary Power Components (Filter Skid, Feeder Board and Switch Board)

**Commissioned:** June 2018

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The PowerCore for this site has two modes of operation – Grid Preference Mode and CNO Generator Preference Mode. In Grid Preference Mode, the PowerCore controls the solar input into the loads and batteries on site and minimises any consumption of energy from the grid during the day. In the evening the battery will discharge the top portion of the battery.

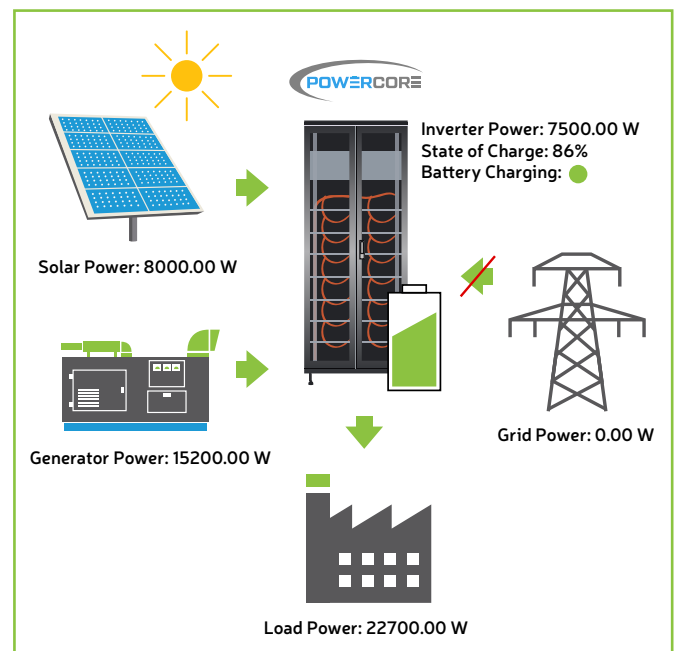
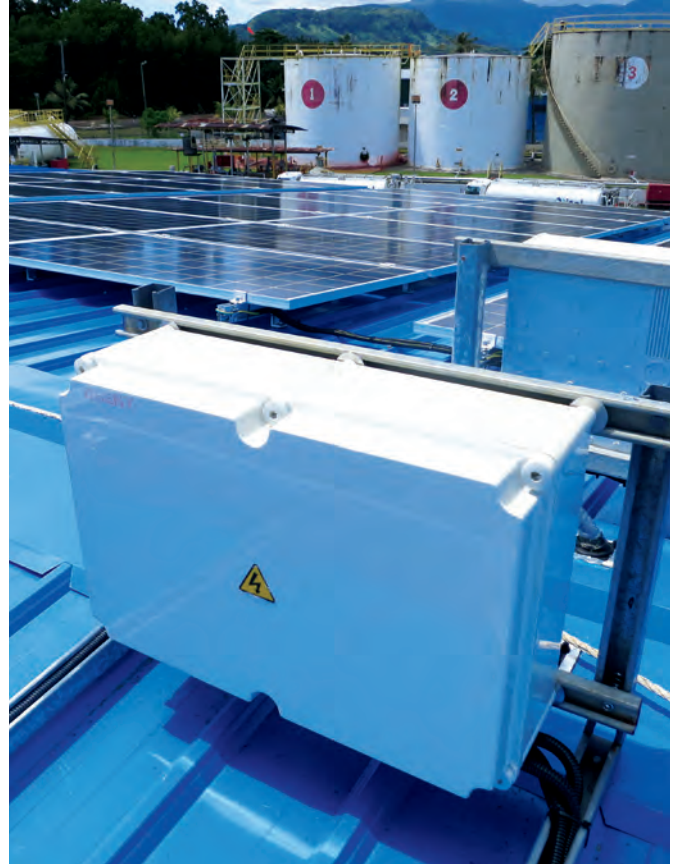
“The facility and supporting infrastructure will create economic value to the region, by providing jobs for local residents and develop new skills”

- Mr Matthias Lawrence (Vital Head of Strategy)

## BALANCE SOLUTION

Design, Procure and Commission of 40kWp of Solar, 40kWh of LiFePO4 Batteries, 32kVA Crude Coconut Oil (CNO) Generator, CNO Filter Skid and Bulk Tank. Design, Procure and Commission of New Main Switch Board with soft starters for pumping station and new Feeder Board that manages the grid connection of inverter and islanding of system when required.

- Runs in Grid Preference Mode or CNO Generator mode dependent on if operator wants to burn more CNO fuel and not rely on grid.
- Supplies the entire bulk fuel terminal as a standalone solution when required.
- Fully automated solution and back up for Island Wide Power Outages.
- Fail Safe of 3 hours UPS Backup if Generator is not available and grid is not available in an emergency.
- Automatic transition from Grid to CNO Generator by shifting the Hybrid system into UPS Mode.
- Renewable generation load shift by storing excess PV in the system and discharging when PV is not available to the UPS State of Charge (60%).
- Online monitoring system using Mango Automation which can be accessed with access to the internet via a browser.
- Automatic and configurable reporting presenting trends of solar generation, energy produced by CNO Generator and Grid usage.



## RESULTS

The key result of this project is to showcase the hybrid systems ability to achieve an autonomous standalone system that produces 100% renewable energy with the use of Solar PV, Lithium based batteries and a CNO Generator - with or without a grid.