



LEAD BATTERIES: ENERGY STORAGE CASE STUDY



Nuvation Energy

Solar-powered Eco-resort

Islas Secas, Panama

Harnessing abundant solar resources, an eco-resort located off the coast of Panama has chosen advanced lead batteries, paired with a battery management system (BMS), to power their island microgrid.

This unique project has installed new lead batteries to the existing battery energy storage system. Initially using East Penn's Unigy II batteries, the project seamlessly incorporated GS Yuasa batteries into the project using Nuvation Energy's BMS.

"Nuvation Energy was pleased to provide the BMS and a customized energy controller for the Islas Secas augmentation. Our configurable BMS can support batteries of different SOH, manufacturers and chemistries by simply altering configuration settings. This enables a seamless augmentation of existing energy storage systems, and greatly simplifies future battery changes."

Michael Worry, CEO, Nuvation Energy

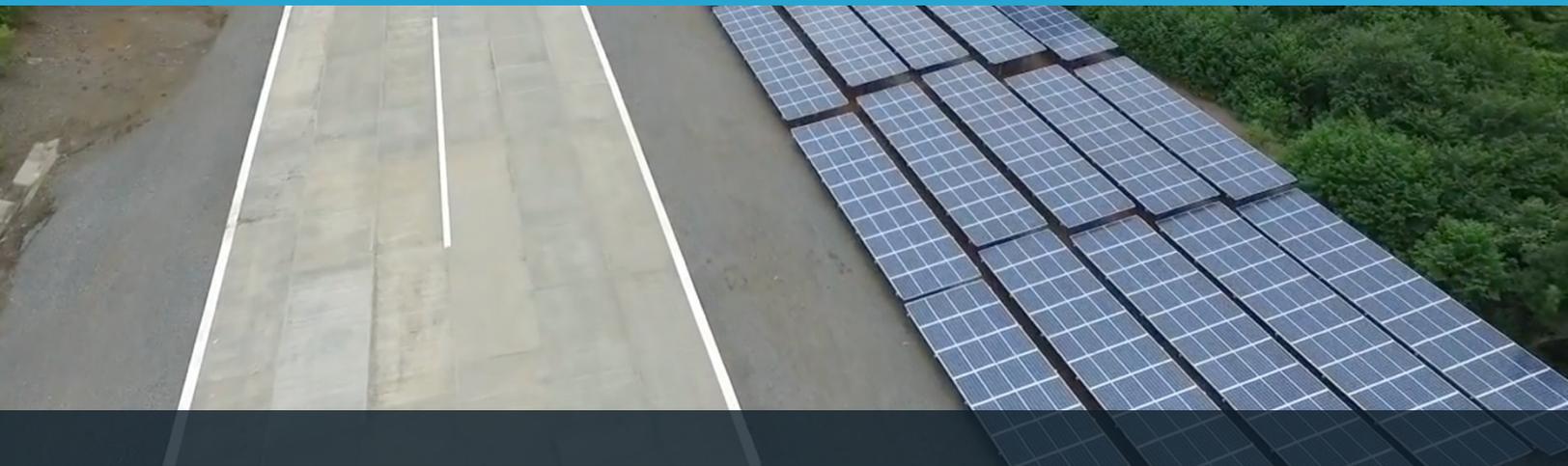
In order to enable different batteries at different states of health to be managed as a unified energy storage system, the BMS in the Unigy II batteries were replaced with the Nuvation Energy BMS, which is able to be programmed to manage cells of different capacities, chemistries and SOH as a single system.

Technical Specification

The island microgrid is powered by a 355 kW photovoltaic (PV) array, which powers all appliances and systems on the island during the day, switching off at night to utilize silent battery power.

The batteries are charged by the solar array during the day, providing a reliable and renewable 1.5 MWh energy storage solution.

The island energy storage system initially installed 18 stacks of East Penn Unigy II lead batteries. When the eco-resort wanted to expand the capacity of the



system by 500 kWh, they utilized Nuvation Energy's BMS to install new additional lead batteries.

The augmentation of the existing system with 9 stacks of GS Yuasa's batteries was a straightforward process as Nuvation's BMS is able to be used across multiple battery manufacturers.

The eco-resort utilizes an energy management system developed by Nuvation Energy to prioritize the cycling of the new and previous batteries respectively. The Nuvation Energy BMS manages both sets of batteries, which have different charge/discharge profiles, as a single unified platform.

This island project demonstrates the vital role advanced lead batteries and battery management systems are playing across the globe in facilitating the harnessing of clean, renewable energy by pairing it with battery energy storage.

Technical Summary

Battery specification	East Penn Deka Unigy II GS Yuasa SRL 1000
BMS	Nuvation Energy
Battery bank voltage	48V Nominal
Rated power in kW	162 kW
Energy in MWh	2.1 MWh
Inverter	SMA
System Integrator	Civic Solar

About Nuvation Energy

Nuvation Energy provides battery management systems (BMS) and energy storage engineering solutions to battery manufacturers and system integrators. They are headquartered in Sunnyvale, California and have a design center in Waterloo, Ontario, Canada. Nuvation's utility-grade battery management solutions are used worldwide in various types of energy storage systems.