



## LEAD BATTERIES: ENERGY STORAGE CASE STUDY



### Nuvation Energy / HOPPECKE Remote Island Grid Energy Storage

#### Lifuka, Kingdom of Tonga

Lifuka is a 4.4 square mile island in the Kingdom of Tonga. Previously receiving power exclusively from diesel generators, the Kingdom contracted CBS Power Solutions to deliver a renewable energy storage system that meets the government's mandate to obtain 50% of grid power from clean energy. CBS installed a solar + storage microgrid in Lifuka to reduce the island's dependence on diesel generators.



The project began in 2016 and was completed in 2017. Nuvation Energy installed a NuvationBMS™ High-Voltage Battery Management System that would provide precise State of Charge (SOC) information to the Siemens power conversion systems (PCS) to help manage the charge and discharge process. The BMS also provides remote access to battery performance data.

#### Technical Specification

The project features a solar array and 480 kW / 990kWh of battery storage. The lead batteries used for the project are 2V valve regulated HOPPECKE cells. The installation of this microgrid reduced the island's dependence on diesel generators as a primary power source by 50%.

The Nuvation Energy BMS communicates with a pair of 300 kW Siemens inverters and an energy management system that

work together to charge the battery cells from the PV array during the day and provide power to the utility grid at night.

Lead batteries minimized project costs by eliminating the need for the complex fire suppression and thermal management systems often required by more volatile battery chemistries. They provided a cost-effective solution and are recycled at end of life.

While lead batteries are very resilient, continual overcharging and/or over-discharging will significantly shorten their life. A BMS provides battery module level SOC information to the PCS, enabling the PCS to precisely manage the charge and discharge process.

This granular sharing of data between the BMS and PCS can double or triple the life of the lead batteries. Nuvation BMS is also able to disconnect contactors if a fault condition develops that could damage the cells.

In an ESS that contains dozens or hundreds of battery modules, the communications and safety features added by the BMS extend the life of the lead batteries to a degree that recovers the BMS cost many times over during the life of the ESS. Additionally, maintenance personnel are provided with remote access to battery State of Health data, reducing the need for costly “check-up” service calls. The SOH data also includes the granularity needed to identify cells and other components that may need replacement, often before an emerging issue visibly impacts the performance of the ESS.

### About Nuvation Energy

Nuvation Energy provides battery management systems (BMS) and energy

“The granular sharing of data between the BMS and PCS can double or even triple the life of lead batteries.”

Joseph Xavier, Director of Marketing, Nuvation 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.

### About HOPPECKE

HOPPECKE Batteries is the largest producer of industry battery systems in European ownership.

Since 1927, the family company has been developing and producing lead acid batteries in Germany, and thanks to their own recycling plant, 99% of the used battery material can be recycled.

With the development of marketable, forward-looking energy storage solutions, HOPPECKE makes an important contribution to solve the societal challenges that result from the implementation of global climate protection goals.