



LEAD BATTERIES: ENERGY STORAGE CASE STUDY



Rolls Battery Engineering / Surrette Battery Company

Reliable Power For Remote Scottish Island

Isle of Muck, Scotland, UK

The Isle of Muck, a 2-mile long island lying off the west coast of Scotland is home to 38 people.

With no mainland grid connection, the existing wind turbine and diesel generator system dating from 2000 was upgraded in 2013 with new solar panels, wind turbines and a lead battery energy storage system.

The system was designed to allow the island to support 24-hour power despite variable output from renewable energy sources. Providing 150 kWh a day, the system now supports 20 domestic properties, a school, community hall and three small workshops.

“The Isle of Muck system has offered residents dependable uninterrupted power for several years. We’re pleased that our Rolls deep cycle batteries have been chosen for this and other island microgrid systems in the region.”

Jeff Myles, Marketing Manager, Rolls Battery Engineering

Technical Specification

Switched on in March 2013, the new system consists of three 3-phase clusters each with 3 x Sunny Island 5 kW inverters each with a 53 kWh Rolls 48 VDC deep cycle battery bank.

The entire installation comprises three battery banks provided by Rolls Battery Engineering, each consisting of 24 x 4KS25P Rolls deep cycle batteries. Each battery bank is connected to a Multicluster Box 12.

The batteries give 48 V DC with a capacity of 2242 Ah. This is approximately total for the whole system of 150 kWh useable capacity to 50% depth of discharge.

The inverter system uses one of two back-up diesel generators, 40 kW or 25 kW, if the batteries require charging.

Six 5 kW wind turbines and a PV array with an output of 33 kWp complete the system.



Installation

The new system was designed and installed by Wind and Sun (www.windandsun.co.uk) along with the battery store, PV array and wind turbines. Evance Wind Turbines were responsible for the turbine installation.

The renewable energy sources are connected using Sunny Island inverters which control battery charging when energy is generated from wind or solar. It also manages frequency and voltage.

About the Company

Rolls Battery Engineering is a long-established Canadian manufacturer of industrial lead batteries and is the brand name of Surrrette Battery Company. They supply flooded and valve-regulated lead batteries for many applications and specialize in renewable energy storage.

Technical Summary

Battery specification	24 x 4KS25P Rolls deep cycle batteries
Capacity	2242 Ah
Inverters	Wind: 6 x SMA WB-5000A PV: 6 x SMA SMC-5000A 9 x SMA Sunny Island SI-5048 inverter/chargers
Wind Turbines	6 Evance R9000 5 kW wind turbines
PV array	132 REC Solar 250PE 250 W photovoltaic modules (33kWp in total)
Diesel Generators	SEE Contracting installed 2 new diesel generators
Overall Power Output	15 kW
Available Stored Energy	150 kWh to 50% DoD