



LEAD BATTERIES: ENERGY STORAGE CASE STUDY



Crown Battery

Off-Grid Renewable Energy For Mountainous Region

Bamyan, Afghanistan

One of the largest off-grid solar systems in the world, producing 1 MW of power, this vast PV array coupled with advanced lead battery energy storage, is located in the mountains of Bamyan, Afghanistan, famously known for its Giant Buddha statues.

Part of the Renewable Energy Program funded by New Zealand's government, the project provides 24-hour power to 25,000 homes, businesses, hospitals and government officers for this central mountainous region.

"An entire community depends on Crown batteries – to power their homes, businesses, schools, and more. Bamyan's extreme conditions and remote location ruled out most battery options, and this system's components had to be engineered to last."

John Connell, Vice President, SLI Products Group

Technical Specification

Involving a mix of solar, lead battery storage and diesel backup, the renewable energy project provides sustainable and cost-effective electricity to local people. Prior to installation, residents relied on small diesel generators, domestic solar panels or no power at all.

The PV array generates solar energy and is powered in times of bad weather by the advanced lead battery storage system.

The project uses Crown Battery's flooded lead batteries with a capacity of 38 strings at 4,500 Ah 48 V DC.

The system uses Sunny Island inverters:

- Amount: SI5048 x 114 units
- Type: STPI7000 x 50 units
- SIC50 charge controller: 72 units



Solar module:

- Amount: 4,176 x LG 250 Wp
- Producer: LSIS
- Type: Mono

Diesel back-up generator:

- Capacity: 750 kVA (3 x 275 kVA units derated for altitude)
- Type: FG Wilson Diesel

Power ratio:

- 750 kVA = 600 kW
- 1050 kWp of PV results in 57% ratio

Due to its mountainous location, subject to extreme temperatures as low as -25°C in the winter, advanced lead batteries were chosen for their reliability and robustness.

Employees of the local utility supplier in Bamyan were trained to continue to operate the system after installation.

About the Company

Crown Battery has corporate and manufacturing operations in Fremont, Ohio.

Crown has 12 sales and distribution offices throughout North America, 600 employees and a network of authorized business partners, distributors and dealers throughout the Americas, Europe, Africa, Asian-Pacific, Australia and New Zealand.

Crown's operating principle – "The Power Behind Performance" – represents Crown Battery's commitment to providing power to millions of people around the world – power that makes life easier, and raises standards of living, health and safety for the communities we serve.

CONTACT

Dr. Alistair Davidson
Director

alistair.davidson@batteryinnovation.org
BatteryInnovation.org