



Perenjori

Battery Energy Storage in the Australian Outback

The small Western Australian town of Perenjori sits at the end of a long stretch of power-lines which are exposed to a range of environmental factors. A problem anywhere along this long line could cut power to the town and blackouts have been all too common.

Fast forward to 2017 and Perenjori is the first town to trial a backup battery supply on the Western Power network, thanks to a 1MWh network battery that has been installed on the outskirts of town.

Network batteries can be used as a backup power supply to improve reliability when there is a fault on the main electricity network, or as part of an independent microgrid when connected with other generation sources such as solar panels and diesel generators.

With better technology and growing interest from the public, the level of investment in energy storage is helping bring the cost of batteries down. The project's main goal will be to remove the question of reliability for customers who are half way through preparing a meal for the family, or watching the footy with friends at the town's local watering hole.

The 1MWh network battery will act as a backup power supply for the town and will eliminate up to 80% of outages, based on the town's power outage history.



Location: 350km North of Perth

Project: Western Power Perenjori Energy Storage

Capacity: Turnkey EPC 1MW, 1MWh Battery Energy Storage connected to the 22kV rural network

Commissioned: July 2018

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BALANCE SOLUTION

Balance in Joint Venture with Decmil were the principal Engineer Procure Commission Contractor for the turnkey 1MWh Containerized BESS, connected to the 22kV rural network at Perenjori WA. The system is comprised of lithium-ion batteries with an inverter. It kicks into gear instantaneously if the town loses supply from the main electricity network. Our Balance Solution included;

- 0.7MW continuous power (2.4MW peak) / 1.2MWh Li-Ion battery capacity.
- BESS: HV Grid connected and off-grid, grid forming, multi- functional operation
- Able to maintain power supply to the town of Perenjori for 2 hours off grid
- Fully automated BESS transition from grid and back to grid without interruption.
- Can provide full 4 quadrant dynamic network support.
- BESS Fault level sufficient to provide full protection grading while islanded.
- PLC based remote supervision and control including settings reconfiguration.
- BESS installed in 6m HC container with air conditioning and fire system.
- Inverter, step up tx and 22kV switchgear installed together in 12m enclosure.
- Extensive Dig SILENT steady state and dynamic modeling to confirm validity of design, control and protection.

Since commissioning in July 2018 the system has achieved no outages.

- ✓ Perenjori town was supported on 12 different occasions by the energy in the battery, demonstrating successful operation during system disturbances.
- ✓ Customers connected to the battery's energy supply experienced any voltage depression for fractions of the time compared to those not connected. Overall the BESS solution Balance provided has improved power quality for Perenjori's residents and businesses.
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