



GMA GARNET

REMOTE MICROGRID MINING SOLUTION

At Port Gregory in the Mid West, Advanced Energy Resources (AER) built a \$11.2 million microgrid to supply GMA Garnet's nearby mine. It aims to provide up to 70 per cent of the mine's power needs.

Balance was engaged by AER to design, supply and install a 4.4MVA / 586kWh BESS and microgrid controller which enables the system to electrically be decoupled from Western Power, thus only use renewable energy for operations.

THE GOALS

The project is to create a microgrid for the GMA Garnet mine site and remain grid-connected via a back-to-back inverter topology. The approach electrically isolates the grid from the mine power supply and allows additional renewable generation to be connected and not assessed by network utility for interconnection compliance.

The topology involves the use of two inverters in a back-to-back configuration coupled across a battery. The grid side inverter is controlled in a grid following mode, which will ensure network transients are maintained for all import and export requirements.



Location: Port Gregory, Western Australia

Project: 2 x 2.2MVA (4.4MVA) PCS with 586kWh BESS and microgrid controller.

Client: GMA Garnet Mine

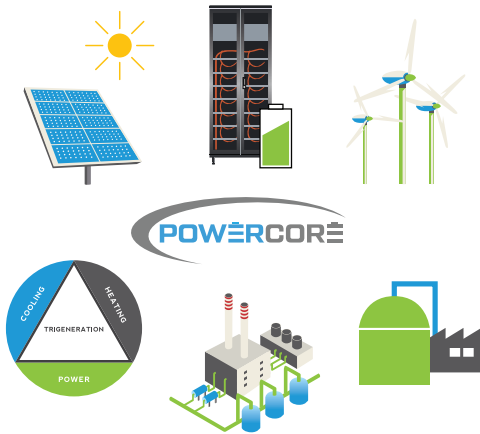
Commissioned: October 2020

THE APPROACH

Balance developed a Microgrid Controller as the “brain” of the system.

Custom programmed by Balance on Siemens S7-1500 PLC Development as per other bespoke solutions using Balance owned IP, licensed IP to client

Define Operation Philosophy
Determine State Space Machine
Develop Functional Specification
Write PLC code
Testbed PLC code
Site Implementation
Review Optimisation



HOW DOES IT WORK?

The back to back topology provides the following advantages to the utility;

- ✓ Facilitates more renewable generation to be connected at the fringes of the network
- ✓ Significantly stabilises the voltage profile on the remote feeders
- ✓ Allows controlled and smoothed renewable generation into the network
- ✓ Provides electrical isolation from the network, simplifying technical compliance issues

Advantages for the mine

- ✓ Provides a short term UPS functionality for the client
- ✓ UPS time is extended as possible by renewables
- ✓ Increase power quality (Voltage)
- ✓ Provide immunity from localised network issues

