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Trials of a Large Battery Energy Storage System in a Micro Grid

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The electricity industry is going through a revolution that is not only challenging technical paradigms, but also traditional planning frameworks and business models. The customer is transferring from the edges of the grid to the center of the disruptive forces and the business model.

The proliferation of small-scale systems (micro grids) using solar or wind combined with battery storage is moving the industry from a centralized to a distributed model, and requiring networks to adapt by providing multiflow paths and respond to increasing intermittency of generation.

This technology disruption is occurring as utilities face the additional challenges of aging assets, tighter capital and operating expenditure, and greater expectations on safety and, continuity and quality of supply.

Traditional planning methods such as N-1, investment criteria and asset management strategies that have served us well in the past are too broad in their application to prevent us creating increasing quantities of stranded and underutilized assets, and experiencing unacceptable levels of network safety and performance.

Storage of energy, both large and small scale, has been seen as the key to responding to some of these challenges. This paper describes how Horizon Power, a leader in the operation of microgrids has deployed a large scale battery energy storage system into an isolated grid in Carnarvon, Western Australia.

A 2MW/2MWh battery has been installed at the diesel and gas-fired power station. The large scale energy storage system is connected to the main substation bus bar for the purposes of carrying out trials to determine its technical capabilities for different power system applications.

The trials will examine the ability to use battery storage for providing spinning reserve support, peak load shifting, renewable energy smoothing as well as various other tests. The intent of the trial period is to develop an understanding of battery system integration and control requirements for optimal performance. It's envisaged that these learnings could be applied to other microgrids and assist with the establishment of business issues for this type of technology, as well as provide confidence in the operational aspects.



Trial battery on site at Mungullah Power Station, Carnarvon WA