Print Post Approved 100008807

ADM

AUSTRALIAN DEFENCE MAGAZINE

SERVING THE BUSINESS OF DEFENCE

SEPTEMBER 2017 VOL.25 NO.9 WWW.AUSTRALIANDEFENCE.COM.AU

ADM EXCLUSIVE

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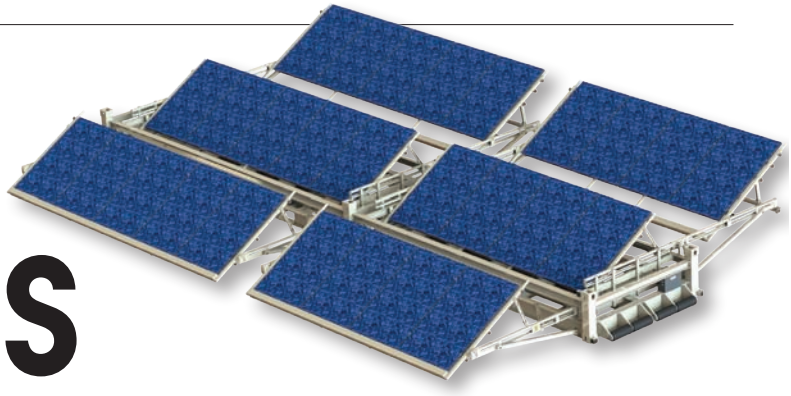

Microgrids have big advantages

KATHERINE ZIESING | CANBERRA

In recent years, one growth problem within the military specifically, but also in remote and rural areas, has been the supply of reliable electricity. There is an increasing requirement for relocatable and reliable green power solutions for Defence and resource sectors, and for remote area power users requiring self-sufficiency. Enter the deployable microgrid.

HISTORICALLY, the requirement for permanent infrastructure and high costs have been an obstacle in the path for wide scale take up of renewable power solutions, and not every deployed site across various industries has a life of 25 or more years. This is similar for Defence and Humanitarian missions, where deployed forces often need to bring all its own infrastructure and take it with them when they leave.

Power generation is the leading consumer of diesel fuel in deployed military operations thanks to a heavy reliance on diesel hungry generators. For a long time, there was only one choice when it came to deployable power; the ubiquitous generator. While reliable and scalable, these systems require large quantities of fuel and even the 'greenest' give off disproportionate environmental emissions.

Moreover, most systems are oversized to deal with surges and peak loads and as such rarely operate at their most efficient settings. In locations like remote Australia, the sheer cost of diesel freight is staggering and natural events like flood often impact on the reliability of supply. In the contested military environment this issue is further complicated by the need to provide force protection to fuel convoys, often over highly contested terrain.

A microgrid solution importantly addresses two critical factors associated with military operations. Firstly, and most importantly, the reduction in fuel usage reduces the frequency of fuel replenishment tasks, decreasing risk exposure to deployed forces from vehicle accidents and other threats associated with operating in said contested environment. Secondly, deployed hybrid power infrastructure improves self-sufficiency of geographically dispersed operating bases.

The traditional means of delivering fuel across long lines of communication in austere environments is enormously expensive, so hybrid power solutions can save significant operating costs associated with

ABB

Microgrids offer a viable power alternative to generators on deployed operations.

The ABB power management system inside a Sea Box container.

> "For a long time, **there was only one choice when it came to deployable power;** the ubiquitous generator."

deployed or remote operations. The use of a system that integrates renewables, battery storage, and smaller traditional generators plus a smart control systems has achieved some acceptance, but it has a number of inherit weakness that make it unsuitable for Military or Humanitarian Assistance Disaster Relief (HADR) applications.

Solar

A key technical challenge often overlooked in the provision of hybrid microgrids is dealing with the rapid changes to power generation from photo voltaic (PV or solar panel) modules.

Patchy cloud cover can result in power generation dropping and surging within seconds, which can be quicker than the time it takes to automatically start a standby generator, or even transfer power from a running generator operating as a spinning reserve.

ABB's experience over 125 years in power and automation technologies has helped create the Microgrid Plus control system that effectively deals with these changes. The Microgrid Plus control system monitors the microgrid and effectively predicts when to engage various spinning reserve power sources. Batteries in the PowerStore solution can also act as a spinning reserve, supporting the microgrid during the constantly changing conditions from PV generation and power draw from the deployed infrastructure.

Traditional diesel generators can also be connected to the microgrid to deal with high demand periods, or provide additional standby power. The PowerStore solution and Microgrid Plus control system ensures diesel generators are primarily used to charge batteries, meaning they run at optimum load, increasing the life of the generator.

In response to the increasing demand for reliable, relocatable hybrid microgrids, ABB, in collaboration with its partner, Sea Box International (SBI), have developed ruggedized and containerise relocatable hybrid microgrids that can be moved and setup quickly using standard materials handling equipment.

This system is based around the global standard 20 or 40 foot ISO container (seen above) and as such readily integrates with extisting materials handling, shipping or land transport equipment.

An ABB microgrid, based on ABB's PowerStore product and the Microgrid Plus control system, is a plug-and-play relocatable microgrid solution that makes maximum use of renewable power generation. It can be matched to deployable solar power solutions such as SBI's CROWS-PV, which is a containerised roll out PV array that is delivered fully assembled from factory and operationally ready.

ABB and SBI have taken this concept to the next level by the Development of the world's first truly military grade redeployable microgrid.

This system brings together ABBs Powerstore System with robust generation and the Seabox knowledge around robust packaging and transportation to deliver a scalable and truly redeployable system.

Designed from the outset to be redeployable this system requires minimal site preparation, limited skilled tradesmen and can be producing power within hours of arrival at site.

Equally it can rapidly be packed away and moved when the need requires. Its rugged construction also allows it to be cyclone rated and its scalability allows it to grow or contract as the needs of the application evolve.

While primarily designed with Defence and HADR applications in mind this type of system is also applicable or remote exploration mine sites that might only have a few months or years life or longer term installations like the remote JORN stations in the outback of Australia.