Market Segment: Utility

POWER PROFILE

American Samoa Power Authority (ASPA)

POWER NEED

In September 2009, a tsunami hit the island of American Samoa, destroying the Satala power plant, one of the main power generation facilities on the island, and leaving the isolated, Pacific community with an 18 MW power shortfall. Emergency relief efforts were supported by the United States Federal Emergency Management Agency (FEMA), and a temporary system was deployed. About one year later, the American Samoa Power Authority (ASPA) issued a Request for Proposal (RFP) for a temporary power generation system to provide 18 MW of continuous, reliable electric power to operate for approximately two to three years until the Satala power plant could be rebuilt.

The RFP requested a flexible, modular system that could be redeployed after the Satala plant was completed. It specified using ISO certified containers for component packaging to allow for maximum flexibility, and ease with handling, installation and relocation. In addition, it required a flexible configuration with the ability to operate as two sites with up to eight generator sets, as an independent system, as one large combined system and with or without being in parallel with the existing utility grid.

The power plant needed to meet the demands of a tropical location, and include a comprehensive Supervisory Control and Data Acquisition (SCADA) system to provide local and remote monitoring and control capabilities. Finally, the entire power plant had to be fully functional within eight months, or risk significant financial penalties for missing the deadline.

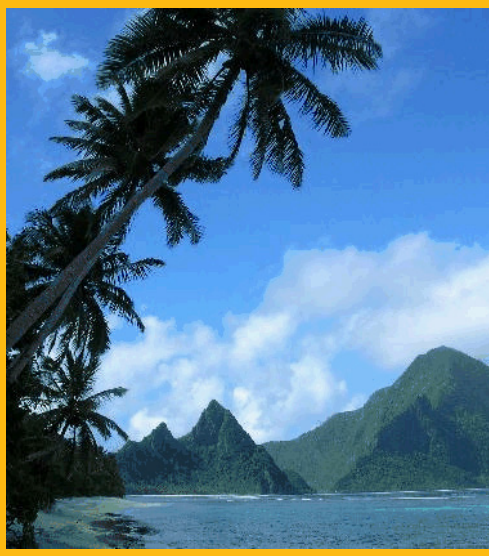
SOLUTION

Cat® Dealer Hawthorne Power Systems partnered with Enercon Engineering to provide a detailed bid that included design and engineering information, system configuration and optimization, and site implementation and planning. Hawthorne was the primary contractor, providing the generator sets, project management, logistics, and site installation labor and coordination. Enercon Engineering served as a subcontractor, providing the custom container fabrication, packaging, switchgear and controls, fuel tanks, SCADA system and testing at Enercon's Phoenix, Arizona, facility.

The system design called for 11 Cat 3516C diesel generator sets rated at 1,650 kW each at 13.2 kV and 60 Hz. The 3516C generator sets are EPA Tier 2 compliant and run on ultra low sulfur diesel fuel to minimize emissions. Each features a 16 cylinder vee-type engine with an air-to-air aftercooler, a 6.69 inch (17 centimeter) bore, 7.48 inch (19 centimeter) stroke, 69.0 liter displacement and individual cylinder temperature thermocouples.

To meet the specifications of the RFP, each generator set is housed in a custom-built, fully stainless steel container. Built by Enercon Engineering, each 40-foot cube container meets ISO and CSC specifications, and is fabricated from specialized, selected grades of stainless steel to provide for superior corrosion resistance.

The design of the containerized generator sets is based on a traditional, rental-fleet power modular concept, and includes local switchgear and paralleling controls



American Samoa is relying on 11 Cat® 3516C generator sets for temporary power after a tsunami destroyed one of the island's main power generation plants.

CUSTOMER
American Samoa Power Authority (ASPA)

LOCATION
American Samoa

CUSTOMER BUSINESS ISSUE
Temporary power while a new, permanent power plant was constructed

SOLUTION
Eleven Cat® 3516C generator sets

CAT DEALER
Hawthorne Power Systems

in each unit to provide the ability to operate individually or as a group, depending on the application.

The two lineups of main switchgear – one for each site – are also housed in custom-built, stainless steel, 40-foot, ISO-certified cube containers, and are configured so that each can easily be relocated to meet application needs.

Each generator set is connected to one of the two main lineups of switchgear through a disconnect switch in the switchgear and the individual local paralleling circuit breaker. These main lineups also each feature a utility tie breaker, several feeder breakers and a bus tie breaker. The main switchgear lineups also each feature a PLC system to gather and process system information through communications and input/output modules. This control system is fully compatible with the existing monitoring system and capable of remote controlling the generator sets.

The SCADA system, designed and implemented by Enercon Engineering, compiles information from all system components and creates a seamless interface for monitoring and control.

Once all equipment was fabricated and shipped to American Samoa, Hawthorne sent a team to work with ASPA on installation of the plant. Hawthorne was responsible for all aspects of the installation, including site erection, fuel system piping, control and low voltage interconnect wiring, and final commissioning of the system. ASPA performed all site preparatory work and all medium voltage cabling.

Once the plant was installed and startup completed, a 14-day continuous run acceptance test was completed prior to turning plant operations over to ASPA. Turnkey installation and commissioning were completed in less than two months.

RESULTS

From the original RFP phase to the final commissioning process completed in late June 2011, this project allowed ASPA to partner with the Hawthorne and Enercon Engineering teams to design, construct and implement a fully integrated system for a tropical marine environment on a remote island in the Pacific. The team approach by Hawthorne and Enercon Engineering was essential to provide the comprehensive system delivered on time according to the demanding schedule.

Innovations and ideas produced and implemented on this project can confidently be utilized by other Pacific island power authorities to help them provide reliable, efficient power generation solutions to their residents. The modular approach combined with highly reliable and efficient operating generator sets can provide temporary power solutions with rapid mobilization for small systems less than 2 MW, up to large systems greater than 100 MW and include flexible operating options.

For more information, please visit www.catelectricpowerinfo.com/pp.

POWER PROFILE

American Samoa Power Authority (ASPA)

The customized, modular temporary power generation plant at Satala, American Samoa, can be completely redeployed once the permanent facility is rebuilt.

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