

S&C Electric Company

Grid-Connected Large-Scale Products and Services Overview

1. Overview of Products and Services

The S&C Electric Company's Power Quality Products Division (PQPD) and Power System Services (PSS) Division have become leaders for products and services used in distributed power systems that provide grid-connected power conversion. This leadership has been recognized at the national level in helping to develop the future energy policies needed to modernize the U S electrical grid.

PQPD's Engineering team has in aggregate more than 150 years of experience in the design and manufacture of large-scale power conversion systems (PCS) products, both medium and low voltage. These large inverter systems serve as platforms for a variety of energy storage, VAR compensation, and voltage support systems now in service world-wide.

Coupled with these products are in-depth analytical services and turn-key construction services offered by the S&C PSS Division. This unique combination of capabilities, coupled with S&C's 97 year tradition of unmatched commitment to customer service in the power industry has created this leadership position. The following is a summary of products and services provided by S&C in support of these new markets.

Large Scale Energy Storage

PQPD's SmartGrid Storage Management Systems have been selected for the majority of the distributed storage projects conducted in the last few years in the US. Working with American Electric Power (AEP) on its major storage projects, S&C has provided turn-key product and services solutions on four Sodium Sulfur (NaS) battery projects totaling 7.0 MW (43 MW-hour) through the end of 2008. In addition, S&C completed installation of a 1.0 MW (6 MW-hour) system with XCEL Energy for its "Wind to Battery" demonstration project in Minnesota. An additional 4 MW (24 MW-hour) project for AEP is underway for 2009. The projects completed in 2008 are designed to expand the use of distributed energy storage in the grid to incorporate system reliability improvements, islanding and ancillary service support. A summary of each project currently in service is contained in Section 2 of this summary.

VAR Compensation and Voltage Support Systems

Sharing a common inverter platform with the SmartGrid Storage Management System is PQPD's current DSTATCOM offering. Its market success in providing VAR compensation and voltage support is growing both in the US and abroad. In Dec. 2008 PQPD will ship its 5th windfarm DSTATCOM system of this year. Two of these DSTATCOM systems have shipped to the United Kingdom, two have

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shipped to a single windfarm in Kansas, and one shipped to Wisconsin. To date, S&C's inverter-based DSTATCOMs in the field total more than 110 MVA in support of more than 1,300 MW of wind generation, with additional projects in the pipeline.

NAS Battery Best Practices Report

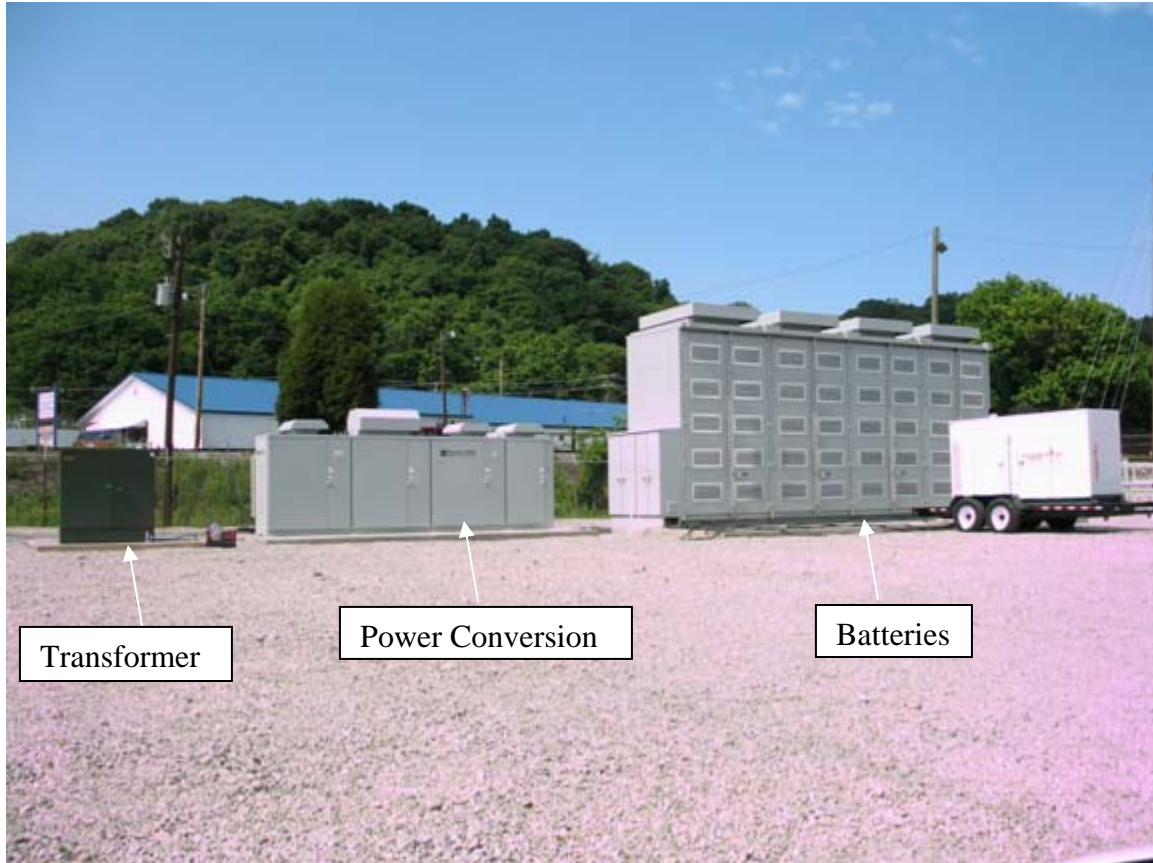
Based on the project experience S&C has with NaS battery systems, the Electric Power Research Institute (EPRI) contracted in June 2008 with S&C to provide a "Best Practice Guideline for Deploying NAS Energy Storage Systems". This report was completed in November 2008 and should be available to EPRI utility members in January 2009. The report is intended to provide guidance to utilities planning NAS battery deployments in their networks.

DOE Advisory Committee Participation

In May 2008 the U S Department of Energy (DOE) announced the formation of a 30-member Electricity Advisory Committee to advise the Department on actions needed to modernize the nation's electrical grid. One of the key areas of the committee's activities was to provide guidance in development in deployment of energy storage to support the grid. Based on the experience with energy storage with S&C, Brad Roberts, PQPD's Power Quality Systems Director was chosen as a member of this committee and asked to head the group's Energy Storage Subcommittee. This subcommittee is completing a report to the U S Congress on an action plan to help meet the goals of the Energy Independence and Security Act of 2007. The actions of this committee have been vital to the growing awareness of the need for energy storage in the grid. Membership in this committee includes senior management from the California Independent System Operator (CALISO), the California Public Utilities Commons, New Jersey Board of Public Utilities, Bonneville Power Administration and the Public Utility Commission of Texas. More details on the committee's activities and copies of the Energy Storage Subcommittee Report can be found on the committee website www.oe.energy.gov/enc.htm.

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2. S&C Energy Storage Project Summary



Customer: American Electric Power (AEP)

Project Location: Chemical Substation, Charleston, West Virginia

In-service Date: June, 2006

Project Description:

This turnkey installation of a 1.0 MW, 7.2 MW-hour NAS battery was the first megawatt scale NAS battery system installed outside of Japan. The system was designed to provide peak-shaving for a 20 MVA station transformer and defer station upgrade for two-to-three peak load seasons. The system successfully met these objectives for three summer peak seasons and will continue in-service at this location for an additional two-to-three years, deferring construction of a new substation.

A detailed report on this project was produced by Sandia National Laboratories in 2007.

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Customer: American Electric Power (AEP)

Project Location: Balls Gap (future substation), Milton, West Virginia

In-service Date: November, 2008

Project Description:

This turnkey installation of a 2 MW, 12 MW-hour NAS battery-based storage system provides similar peak-shaving capability as the Chemical Station project with the addition of islanding functionality. The islanding capability is provided by integration of S&C's power conversion SmartGrid Storage Management System™ with S&C's IntelliTEAM II® Automatic Restoration System controls to improve customer service minutes by providing back-up power to an area which experiences frequent and long outages.

The system is installed on a 30-mile-long, 34.5-kV rural feeder. Several S&C Scada-Mate® Switches, equipped with the S&C IntelliTEAM II® Automatic Restoration System, create an area that can be locally served with stored energy if power to the feeder should be interrupted. If an upstream fault occurs, the system is "islanded" from the utility grid, and serves as many downstream customers as its capacity will allow.

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Customer: American Electric Power (AEP)

Project Location: Citizens Substation, Bluffton, Ohio

In-service Date: October, 2008

Project Description:

This turnkey installation of a 2 MW, 12 MW-hour NAS battery-based storage system provides similar peak-shaving capability as the Chemical Station project with the addition of islanding functionality. The islanding capability is provided by integration of S&C's power conversion SmartGrid Storage Management System™ with S&C's IntelliTEAM II® Automatic Restoration System controls,

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Customer: American Electric Power (AEP)

Project Location: East Busco Substation, Churubusco, Indiana

In-service Date: December 2008

Project Description:

This turnkey installation of a 2 MW, 12 MW-hour NAS battery-based storage system provides similar peak-shaving capability as the Chemical Station project with the addition of islanding functionality. The islanding capability is provided by integration of S&C's power conversion SmartGrid Storage Management System™ with S&C's IntelliTEAM II® Automatic Restoration System controls,

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Customer: XCEL Energy

Project Location: Rock County Substation, Beaver Creek, Minnesota

In-service Date: November 2008

Project Description:

This turnkey installation of a 1 MW, 6 MW-hour NAS battery-based storage system presently provides peak-shaving capability. It is installed at the point of interconnection of the Minwind 12 MW wind farm. Functionality enhancements in 2009 will provide demonstrations of wind farm output smoothing, dispatched wind power, and energy arbitrage.