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# Systems Monitoring

## Our Services

- Training personnel in communications protocols and technologies
- Data acquisition, analysis and presentation over secure Web sites
- Advanced algorithm development from raw data such as event analysis
- Data acquisition device specification and development support
- Requirements definition for product development, application, and support
- Database configuration and data correlation
- Embedded software development
- Development and support of software for data downloading and analysis
- Communication network development/configuration support for data acquisition
- Monitoring project management
- Testing equipment against industry standards
- Training on industry standards and communication protocols

## Staff Involvement in Industry Groups

- IEC Technical Committee 57 Working Groups
- TC 88 IEC 61400 Part 25 Working Group on Wind Power Plant Communications
- IEEE Power Engineering, Computer, Instrumentation and Measurement Societies and Standards Association
- OpenAMI and UtilityAMI

## Expertise in Related Standards

IEEE P1159.3/Power Quality Data Interchange Format // IEEE 519 harmonics standard  
 IEEE 1459 metering in nonsinusoidal situations // IEC 61850 utility communications standard  
 IEC 61000-4-15 flicker standard // IEC 61400-21 wind power quality standard //  
 IEC 61400-25 wind communications standard // IEC 61400-21 wind power quality standard  
 IEC 61400-25 wind communications standard // Protocol design and interoperability

## Representative Clients

U.S. Dept of Energy – Energy Storage Program // Utility Wind Integration Group // AREVA/Alstom/Bitronis

*Our staff has extensive experience in utility communications applications, including:*

Supervisory Control and Data Acquisition (SCADA), Energy Management Systems (EMS) and Distribution Management Systems (DMS) // Power system equipment and power quality monitoring  
 Advanced metering infrastructure // Demand response infrastructure  
 Substation automation and control // Data acquisition from generation assets





## Systems Monitoring

There is a tremendous amount of interest in the electric power industry in data acquisition, analysis and application. Energy providers as well as end-use customers are installing monitoring equipment not only for measuring traditional factors such as voltage and current, but also for other parameters such as temperature, oil pressure, etc. Current topics such as phasor measurement, monitoring for condition-based maintenance and performance measurement of renewable generation and energy storage applications are drawing significant interest throughout the electric power industry.

EnerNex personnel have been working in monitoring of electric power systems for many years. Our staff has experience in a number of areas including product specification, software development, system applications and enterprise-level data acquisition and management. We have provided support in systems monitoring for electric utilities, end-use customers, instrument manufacturers and government and private-sector research programs.

EnerNex is the pre-eminent consulting firm for **Systems Monitoring and Analysis**.

## Our Services

*EnerNex is a research, engineering, and consulting firm specializing in the development and application of new electric power technologies. Our focus is to aid in the understanding and solution of electric power related issues, as well as the development of technology and expertise that will ultimately improve the operation and reliability of electric power systems. We offer services organized around these areas of emphasis:*

- ▶ Power Systems Analysis
- ▶ Wind Integration
- ▶ Information Security
- ▶ Systems Monitoring & Analysis
- ▶ Testing and Research & Development
- ▶ Smart Grid Development
- ▶ Advanced Metering Infrastructure
- ▶ Utility Communication Architecture & Implementation
- ▶ Utility Automation
- ▶ Demand Response & Energy Efficiency

EnerNex