

# POWERLOGIC®

## Advanced Power Reliability Solutions

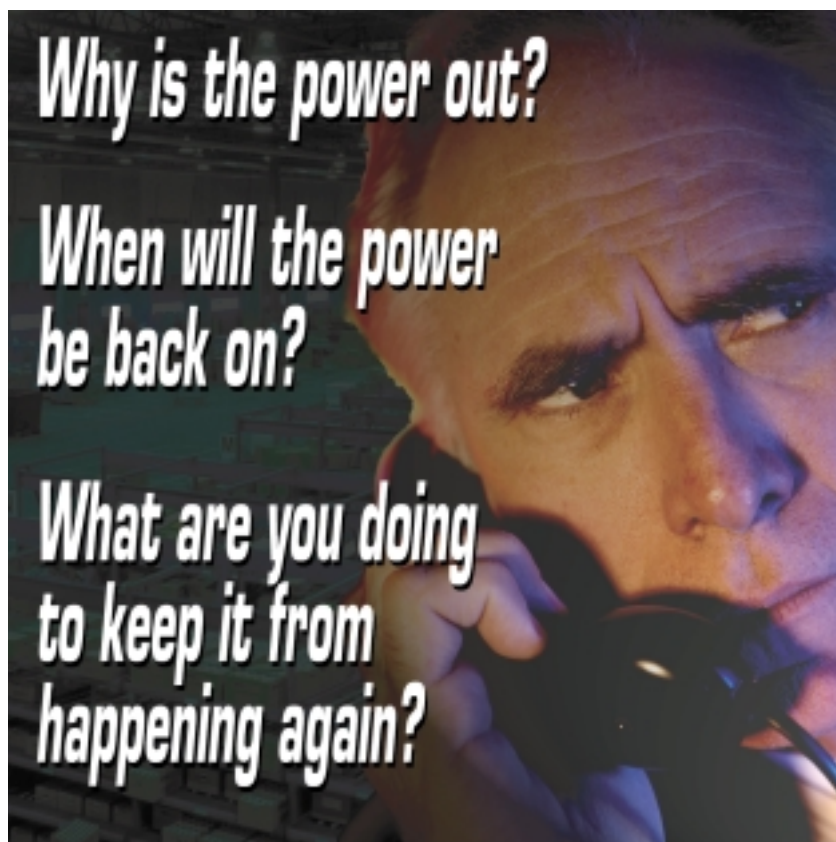
*How seriously does a power outage affect your facility—safety, restart time, lost production, lower yields, scrap, etc.*

*Are you concerned about how utility deregulation will affect the reliability of your power supply?*

*When will you need to generate your own electricity, or increase your capacity?*

*How would you benefit from a system that clearly showed you the specific events and root cause that led to a power outage?*

*Would you like to improve your power system reliability and operational effectiveness?*



### **Are these the questions you never want to hear your boss ask?**

Our Power Management Engineering Services team has years of power reliability and integration experience. We can help you solve an assortment of power system reliability issues with proven solutions:

- **Load Preservation** – prevent and minimize costly outages.
- **Sequence of Events** – analyze cause to quickly restore power.
- **GPS Time Accuracy** – synchronize system control.
- **Generator Interface** – manage emergency power supply.
- **Automatic Transfer Schemes** – avoid power interruptions.

**If you want to have peace of mind knowing that your facility is going to keep running, be able to understand your power problems, and be able to take action to prevent future incidents . . .**

we have all levels of engineering expertise to help you:

- **Engineered Solutions** – integrate, design, build, and control your power system with our experienced engineers.
- **Professional Analysts** – identify power quality and energy management strategies for system reliability and savings.

 [www.powerlogic.com](http://www.powerlogic.com)

Power Management Operation  
295 Tech Park Dr., Suite 100  
LaVergne, TN 37086

Phone: 615-287-3400  
Fax: 615-287-3404  
E-mail: [pmosupt@squared.com](mailto:pmosupt@squared.com)



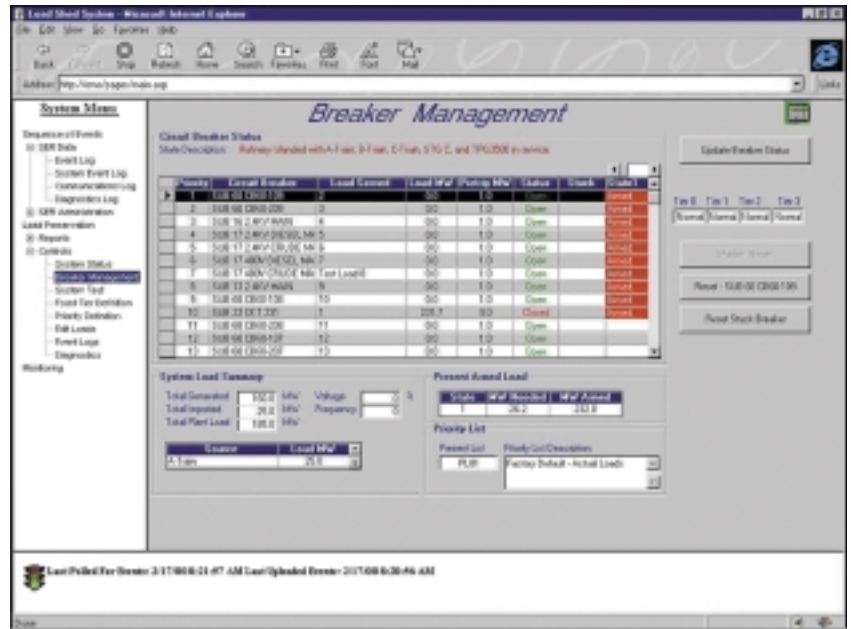
**SQUARE D**  
Schneider Electric

# Some people dream of power . . .

## Load Preservation System

### What does a load preservation system do?

- **Monitoring loading** – total generation versus total circuit load to dynamically determine the prioritized loads for trip sequence.
- **Detects and minimizes losses** when a utility or cogeneration source is not operable.
- **Responds by switching power flow** to the higher priority loads and shedding lower priority non-critical loads.
- **Avoids overloads** and keeps remaining on-site power generation sources from tripping.
- **Provides displays** with 1 ms event log time stamp accuracy, up-to-date breaker position, alarms, power flow and communication status.
- **Stabilizes power system** to greatest extent possible—electrical interlocking prevents load addition greater than capacity available.
- **Enhances system reliability** – reducing downtime in the critical process area.

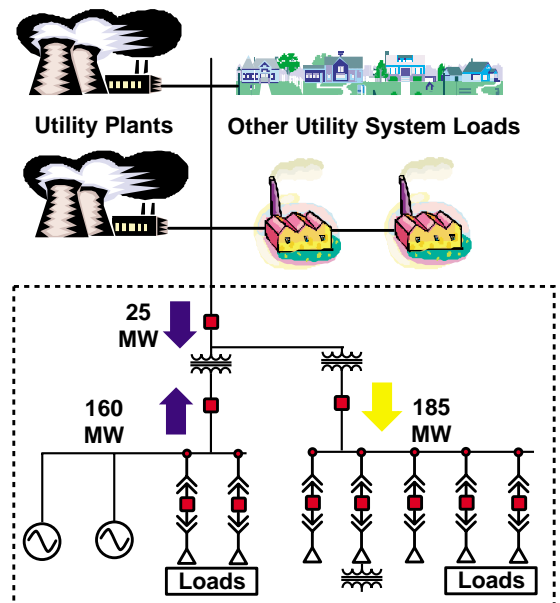


### Requirements for Load Preservation System

- Dynamic system study
- Generator governor and excitation models
- Inertias of large motor equipment
- Define how the load decays with frequency
- Utility frequency decay rates
- Utility load shed schedules
- Identify and prioritize circuit breakers that can be shed

Extremely fast control from the load preservation system allows you to view, prioritize and trip individual breakers—pre-programmed or on the fly—ensuring only necessary amount of load is shed.

System Features	Benefits
Master and localized industrial rugged controllers	Provides redundancy and high performance
	Redundant DC power supply
	Ensure reliable installation in even the most difficult plant environments
	Can use available DC control power to avoid installation of AC power
	IEEE rated to trip DC breaker coils, I/O available with DC common, and fast current output to switch 30A
	0–1 mV analog input
10 pre-configured load priority lists	Standard sequence of events modules with 1ms time stamp accuracy
	Optimization to minimize (or maximize): a) the number of loads tripped b) the total kW shed c) the adherence to the priority list
Localized frequency-based backup	Load preservation scheme redundancy at local level—performs even if communication network down
Generator control interface	Configurable signals sent to generator controls upon power disruption
Data validation techniques	Limit checking, consistency, and averaging to determine accuracy of measured data
Diagnostic parameter recording	For event reconstruction and troubleshooting purposes 1ms event stamping allows root cause analysis to minimize downtime
TEST mode scenarios	Allow simulation and recording without the actual tripping of circuit breakers
Manual control	Capability for manual closing and tripping of circuit breakers
Demand control	Limits imported kW demand in case of loss of one or more generators
	Reduce utility charges by negotiating for interruptible rates



# Others are destined to control it . . .

## Sequence of Events Recording & Global Positioning System Synchronization

### How is global time synchronization used with power monitoring systems?

In a properly coordinated power system, protective equipment time settings are the key to power system reliability. Likewise, when automatically controlling power systems, control actions must be synchronized and performed at precisely the correct instance in time. By ensuring global time positioning across the power monitoring system, control actions are not susceptible to typical communication network latency. The synchronized monitoring devices are then enabled to record events within 1 ms providing the exact sequence of events when an incident occurs.

### Why is sequence of events recording important?

Sequence of Events Recording (SER) systems aid to quickly pinpoint the cause of an outage even in very large, complex power systems. This means it is possible to restore a power system much more rapidly. With detailed time accurate event sequence information, you will be able to quickly pinpoint the cause of an outage, clear up persistent problems, properly restore your power system, and take corrective action to prevent the problem from happening again.

### Typical millisecond time-stamped SER inputs:

#### Point of Utility Coupling

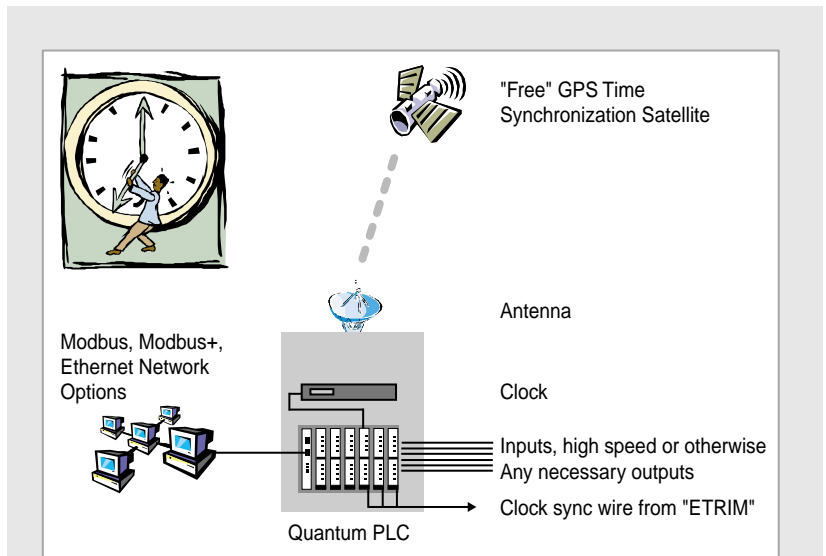
- Circuit breaker status
- Frequency relays
- Reverse power relays
- Other important relays

#### Motors

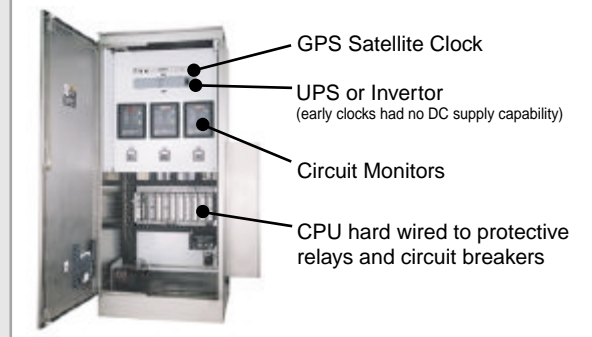
- Status (aux. contact)
- Protective relays
- Lockout relays 86

#### Cogeneration Bus

- Generator differential relay 87
- Circuit breaker status 52
- Lockout relay 86
- Voltage phase balance 47
- Negative sequence 40
- Ground fault 50/51G
- Reverse power 32
- DC bus voltage relay
- Battery charger alarms



### Typical Substation Enclosure with SER and GPS clock



Date/Time	Area	I/O	SER ID	PS Description	Status	Action Type	Remarks
2008-08-08 10:00:00	REC	OS	08 11	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 12	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 13	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 14	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 15	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 16	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 17	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 18	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 19	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 20	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 21	SWP	Open/Close	SWP	SWP
2008-08-08 10:00:00	REC	OS	08 22	SWP	Open/Close	SWP	SWP

Find root cause of problems by tracing sequence of events using time-stamped event log accurate to within 1 ms. Used with POWERLOGIC waveform capture will aid investigation of fault characteristics and fault duration.

# Which are you?

## Generator Control Interface & Automatic Transfer Schemes

### Realizing the Power Control Dream

Square D Power Management Engineering Services provides engineered solutions including properly designed transfer schemes that automatically transfer load to another source with minimal power interruption. Typical large project integration and power system monitoring consists of:

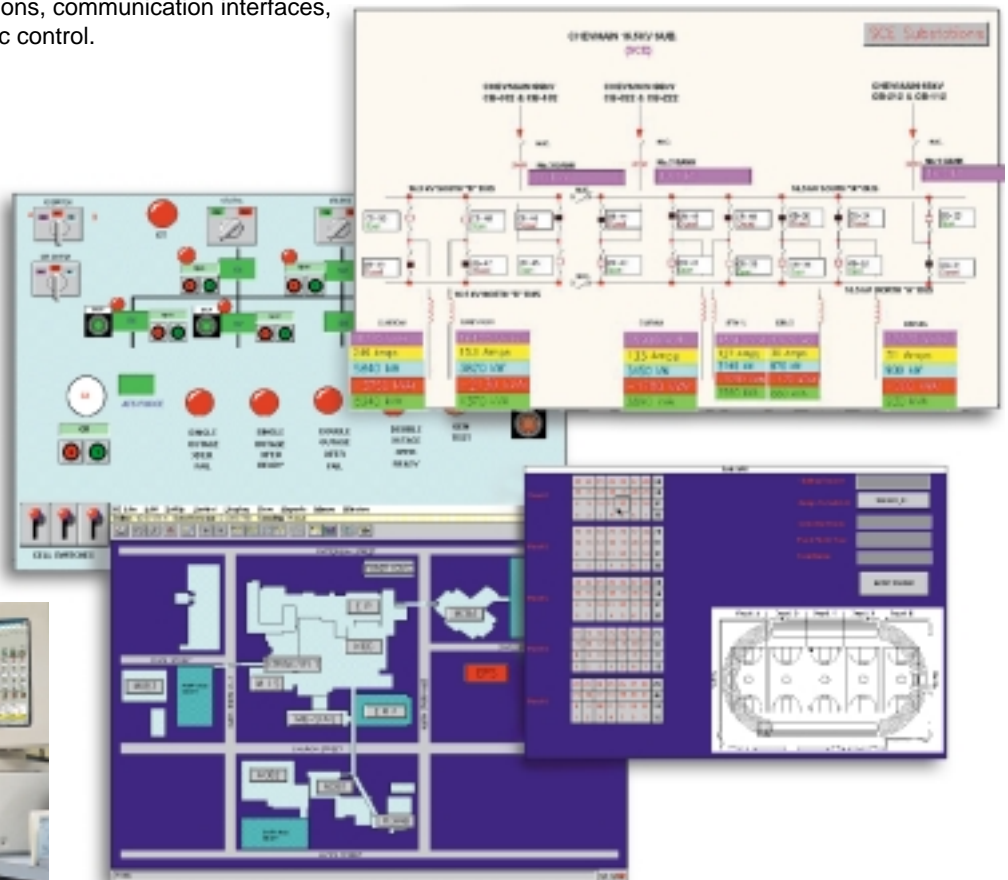
- **Paralleling and synchronizing** multiple generators.
- **Controlling transfer switches**—to supply additional capacity for peak avoidance, cost savings and/or shedding during outage phenomena.
- **Consolidating utility feeds** into central main-tie-main switchgear with automatic transfer scheme controller designed for the specific application.
- **Rapid indication of potential problem** conditions 24 hours a day, 7 days a week, via remote alarm paging to minimize downtime, avoid peak setting and increase system reliability.
- **Total engineering and design/build services under single contract**—enclosures, PC workstations, communication interfaces, automatic control.

### Streamline Regulatory Documents for Generator Exercising

In critical care facilities, it is required by law to maintain reliable continuous electrical power to life support and other important systems. Therefore, on-site generation capabilities with adequate documentation showing weekly no-load generator and monthly loaded generator test results.

Square D Power Management Engineering Services are industry specialists experienced in providing graphical user interfaces to exercise generators and record testing results.

- Generator start time
- Record proper load transfer
- Monitor generator performance and operating temperature
- Load readings and frequency at regular intervals
- Generator shutdown



## *Have experienced leaders at your service.*

Over the past decade, Square D Power Management Services has helped hundreds and hundreds of critical power facilities solve their power reliability concerns—dozens of hospitals, some of the largest US refineries, many strategic data centers and several hundred industrial facilities.

Although the needs of each location differ, there are also similarities and common experiences that we have mastered and incorporated into our product and service offering.

Give us the opportunity to help you solve your power reliability and energy monitoring challenges.



### **Hospitals:**

- JCAHO automatic reports
- Load control
- Power quality evaluations
- PLC programming



### **Data centers:**

- UPS
- Emergency generation
- Turn-key projects
- Lighting control



### **Petrochemical:**

- Co-generation
- Utility interruptible rates
- Load preservation
- Incident root cause analysis



### **Industrials:**

- Total utility monitoring
- Power factor improvement
- Energy management interface
- Power system troubleshooting

## **Optional System Enhancements**

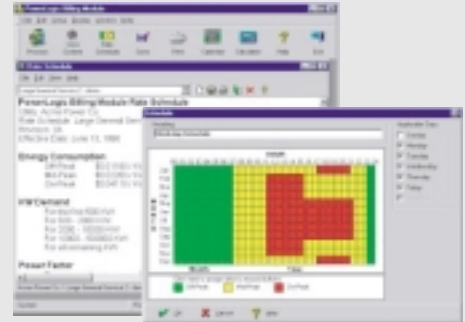
### **Remote Alarm Notification**



**Proactively respond to potential incidents by receiving remote alarm message to your alphanumeric pager!**

Our Engineered Solutions include an Active Pager Module, flexible remote controller applications and monitoring devices that notify you directly. Real time data is continuously monitored notifying operations on over-loaded feeders, voltage out of tolerance, current imbalance, breaker operation, and other important system events.

### **Energy Cost Management**



**Calculate your facilities total utility costs by analyzing data from POWERLOGIC circuit monitors, power meters, other manufacturers' meters, or non-electrical metered data—gas, water, steam, etc.**

Our Engineered Solutions include modules and/or services that expedite the data analysis process, provide at-a-glance reports to identify usage over different periods, and give you coincident utility peak power demand, energy, and power factor. We also have standard enterprise solutions to aggregate loads for multiple facilities regardless of geographical location.

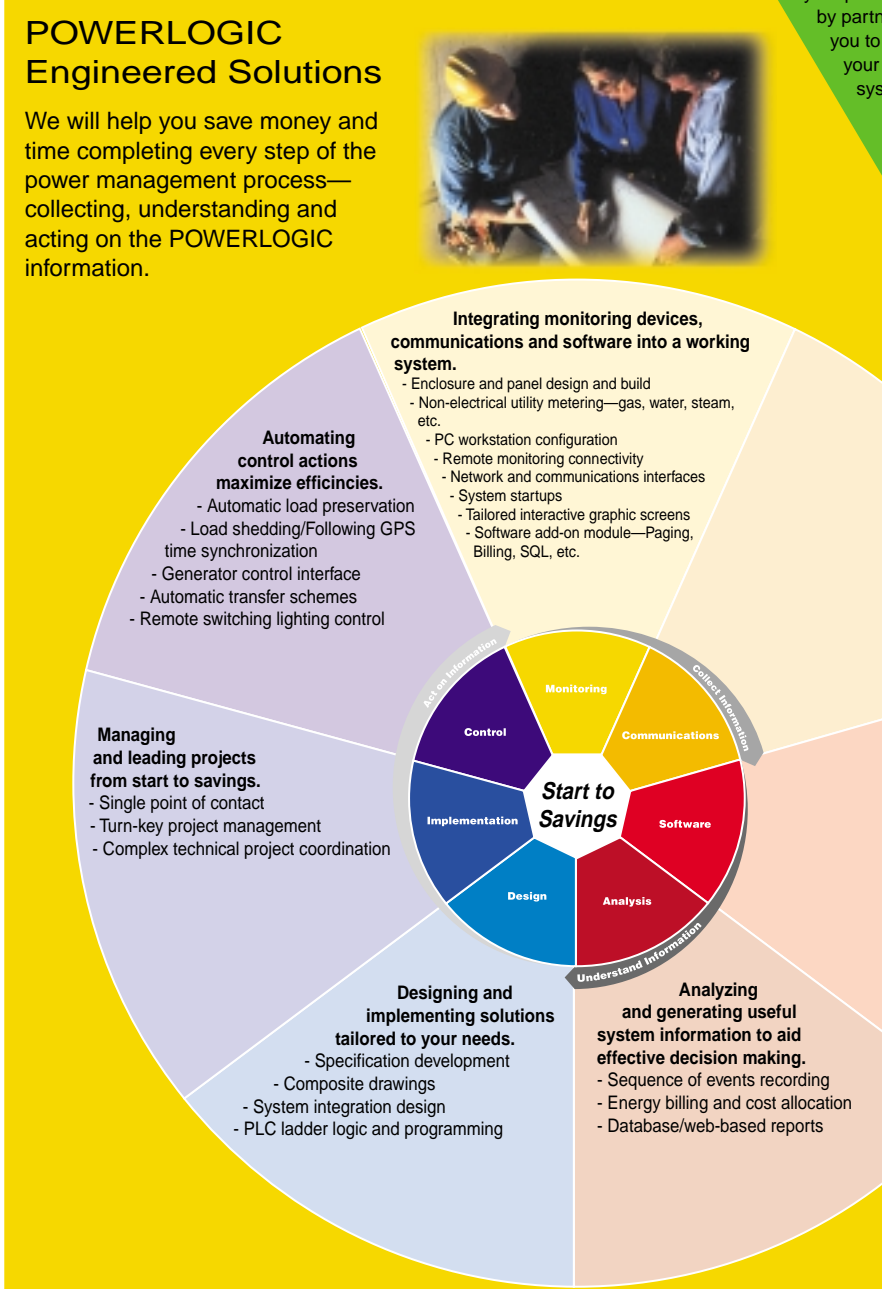
# Power Management from Start to Savings

What will you do with your power equipment investment?

- Nothing
- Reactively maintain
- Perform limited preventative maintenance
- Proactively maintain
- Regularly assess and improve

What will it cost your business for an unexpected, preventable outage?

If you do not have time . . . or if power management is out of your area of expertise . . . we would like to restore your peace of mind by partnering with you to manage your power system.



**POWERLOGIC Power Quality & Energy Management Services**

Our professional engineers are on the leading edge of electrical equipment and power management knowledge. We are proud to say they are nationally recognized experts and hold leadership positions on several IEEE power quality standard committees.

We offer a full range of services that can be performed at your site or remotely—recommending improvement strategies for savings and system reliability:

**Energy Savings:**

- Bill and tariff analysis
- Power Factor improvement
- Mechanical equipment optimization

**Power Quality Evaluation:**

- IEEE-519 harmonic compliance
- Circuit and transformer loading
- Harmonic mitigation
- Power system simulation
- IEEE 1346 voltage sag analysis
- Transient analysis and simulation

**Power System Troubleshooting:**

- Equipment problems—overcurrent conditions, motors, drives, etc.
- Wiring and grounding evaluation