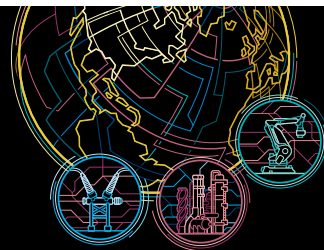


# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Best practices for utilities

### Asset management

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601001 **Is an oil change the best solution for aging transformer oil degradation?**

The oil in a transformer degrades when subjected to heat and dielectric stresses during normal operation. In cars, oil is replaced at the end of life. In a transformer, contaminated oil is captured in the cellulose insulation system. The existing oil can be cleaned with the transformer off-line through a state-of-the-art oil reclamation system. Oil can also be refreshed while the transformer is online carrying load. This session reviews a basic oil analysis that determines when action is required, to minimize costs and maximize transformer life.

##### 2:30 p.m. - 3:30 p.m.

###### 601002 **Transformer bushing replacement: what are the options and is it as simple as “plug and play”?**

A power transformer likely has a life that exceeds that of its original bushings. The decision to replace a bushing may seem simple, but selecting the right bushing type and successfully installing it is complicated. Critical considerations range from selecting the proper technology to matching the dimensions of the original bushings as closely as possible and dealing with the internal insulation and structural members of the transformer.

##### 4:00 p.m. - 5:00 p.m.

###### 601003 **On-load tap changer maintenance and retrofitting to keep transformers humming**

On-load tap changers are the only moving parts in the power transformer. Maintenance is essential to keep the transformer system operating reliably. There are solutions for the replacement of worn contacts and insulation with factory equal-or-better components for many models. Some older designs have questionable reliability, and these tap changer types can be replaced with modern load tap changers (LTCs) that offer state-of-the-art smart-grid-ready performance while using the remaining life in the transformer core and coils.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601004 **Optimal solutions for aging substations based upon reliability and economics**

Expanding or extending the life of aging substations often involves a variety of options. This session presents several examples of risk assessments based upon an analysis of configuration, component reliability and how failures affect system reliability. The results provide quantified alternatives comparing the reliability and economics of each for capital planning.

##### 2:30 p.m. - 3:30 p.m.

###### 601005 **Operating issues with aging equipment**

The California Department of Water Resources (DWR) replaced the pneumatically operated generator circuit breaker (GCB) and disconnecting switch in a dam with an SF6-type GCB and motor-operated disconnect switch. Hear about the operating issues involved with aging equipment and how the difficulties with maintenance were overcome. A collaborative effort by DWR and ABB enabled repair and replacement of the old equipment.

##### 4:00 p.m. - 5:00 p.m.

###### 601006 **Power electronics gas turbine starting solutions 101**

Static frequency converters (SFC) can start large gas turbine-generator sets if the generator is operated as a synchronous motor; this approach eliminates the need for a separate starting device, such as an electric motor, diesel engine, torque converter and associated auxiliary equipment. Static starters also require less maintenance and less mounting space. This session examines static frequency converters and generator excitation systems and how recent advances in technology can be applied in an upgrade project.

# Best practices for utilities

## Asset management

### Wednesday, March 4, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601007 **Improve asset lifecycle and lower costs through predictive analytics and asset health management**

Asset management strategies leveraging predictive analytics are critical for optimizing the asset lifecycle. Retiring experts, aging assets and shrinking budgets are increasing the demand on utilities to get the most out of their systems. Traditional approaches to maintenance and replacement planning are unable to meet these growing demands. This session explores the challenges utilities face in managing their asset fleet and how they can use advanced performance algorithms and predictive analytics to increase reliability and efficiency and save millions in operating and capital expenses.

#### 2:30 p.m. - 3:30 p.m.

##### 601008 **Using other fluids in a transformer originally designed and tested with mineral oil**

Other fluids may be considered for refilling a transformer when properties of the alternative fluid are desired due to safety or environmental concerns and the original design details are known. This session considers the dependency of the insulation and cooling system on the liquid used in the original transformer design. Key items that must be evaluated include bushings and tap-changers. A design evaluation is also necessary to determine the nameplate rating of the refilled transformer.

#### 4:00 p.m. - 5:00 p.m.

##### 601009 **Driving value and efficiency with an operational focus: linking the enterprise and mobile workforce**

Utilities can improve enterprise asset utilization and mobile field service operational efficiency. Integrated and complementary solutions for work and asset management create many benefits by linking the back-office enterprise to the supply chain and customer service and to the field through mobile applications. An operational focus helps automate cross-functional work processes to safely and efficiently plan and perform inspections, maintenance and repairs; and leads to savings from efficiency and reduced operating and capital expenses.

### Thursday, March 5, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601010 **Performing repairs of power transformers on site, including winding replacement and full testing**

Traditionally, when a large power transformer reaches end of life and the organic material is exhausted, it is either replaced or sent to a remanufacturing facility. With the aid of significant mobile processing and test systems, ABB has developed a process that allows rebuilding of the transformer at or near the installation site. Windings are built at an ABB factory and then carefully installed in a temporary or permanent clean room near the station. This session provides examples of the hundreds of transformers that have been successfully returned to begin a new life of service.

#### 2:30 p.m. - 3:30 p.m.

##### 601011 **New technology to improve arc flash safety for switchgear**

The REA arc flash relay and the ultra fast earthing switch (UFES) provide 24x7 arc flash mitigation for switchgear by lowering incident energy levels to workable levels. Protective relay maintenance modes need to be manually applied every time the switchgear is serviced or tested and don't protect the switchgear when not engaged. However, the REA and UFES solutions provide protection to quickly isolate the feeder bus when a problem occurs.

#### 4:00 p.m. - 5:00 p.m.

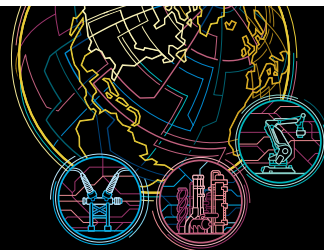
##### 601012 **Modern monitoring tools keep an eye on your power transformer without frequent visits**

Failures of power transformers can be costly and disruptive. Many monitoring options are available for owners of power transformers, giving detailed operational insight into the condition of the transformers. The session reviews the modes of failure, the drivers of those events and the monitoring options that are available to detect problems as they emerge.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Best practices for utilities

### Distributed energy resources and renewables

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601101 **Collecting renewable power, from source to substation**

Renewable energy is nothing new, but today's technologies for capturing that power and converting it to usable electricity have evolved dramatically. Specialized applications and expertise are often required to ensure renewable plants capture power as efficiently, safely and cost-effectively as possible.

##### 2:30 p.m. - 3:30 p.m.

###### 601102 **Energy storage 101**

Energy storage is a grid game-changer, going through a significant technical and commercial evolution. Improvements in storage mediums and innovations in power electronics, advanced controls and algorithms have greatly increased performance and reliability in complex applications. This session presents energy storage system basics and applications that manage power fluctuations while improving network performance. It also addresses the impact of regulatory change and distributed generation and uses case studies to illustrate gains made in operational efficiencies and standardization.

##### 4:00 p.m. - 5:00 p.m.

###### 601103 **Own some sun: the high growth of residential solar power**

Residential solar is growing quickly and homeowners across North America are moving towards solar-powered homes. Among key factors to consider for residential solar are climate, utility policies and regulatory and environment incentives.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601104 **Connecting renewable power, from conversion to the grid**

Connecting renewables to the grid requires more than specialized hardware. Wind and solar developers need to understand grid codes and utility practices to minimize project implementation delays and maximize project profitability. An expert panel sheds light on the key issues developers and utilities are facing. Bring your questions and get them answered.

##### 2:30 p.m. - 3:30 p.m.

###### 601105 **Islanded hybrid-diesel grids: Alaska's Power Systems Integration Laboratory**

The Alaska Center for Energy and Power (ACEP) at the University of Alaska Fairbanks operates a 500 kW Power Systems Integration Laboratory that emulates the islanded hybrid-diesel microgrids found in remote regions of Alaska and around the world. Recently, ACEP acquired a 313 kVA ABB power conversion system (PCS) to demonstrate the integration of various energy storage devices into these grids. This session examines the general laboratory design and capabilities, the integration of the PCS with a flywheel and valve-regulated lead-acid (VRLA) batteries and performance testing of the systems.

##### 4:00 p.m. - 5:00 p.m.

###### 601106 **The Kodiak Island grid stabilization microgrid project**

Kodiak Energy Authority (KEA) is responsible for generating and delivering power to Kodiak Island in Alaska. KEA currently generates power through hydro generators, wind turbines and diesel gensets and intends to go to 100% renewables by the end of 2014. Two battery systems are in place to mitigate the renewable intermittency. The Kodiak Island PowerStores grid stabilization project will mitigate the effect of a new crane at the port facility that is being introduced into the existing network, as well as intermittency of the 9 MW wind farm output.

# Best practices for utilities

## Distributed energy resources and renewables

### Wednesday, March 4, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601107 **Operating, maintaining and planning ahead with renewables to ensure bankability**

Every renewable plant owner wants to see their project perform with maximum productivity and minimal risks. After a renewable project is built, maintenance and control systems are needed to make real-time operational decisions that ensure bankability. A well-prepared plan is essential. An expert panel shares the hardware and software considerations for managing renewable power, from plan to portfolio.

#### 2:30 p.m. - 3:30 p.m.

##### 601108 **Hybrid energy storage system transforms drilling operations**

Drilling operations face challenges when venturing into isolated locations with rugged terrain and harsh environmental conditions. Off-grid rigs are more susceptible to transients and faults, yet power quality performance remains essential for safe and efficient operations. This session describes an integrated mobile battery energy storage solution for a gas rig that quickly responds to changes in power demand and operating conditions, providing many benefits that reduce the need for added capex equipment while greatly lowering fuel consumption, maintenance costs and site emissions.

#### 4:00 p.m. - 5:00 p.m.

##### 601109 **Navigating the complex world of energy supply and demand**

Energy supply portfolios are getting more complex with the introduction of renewable energy projects, demand sessions, multiple configurations of combined cycle gas turbine (CCGT) assets and market structures. This session highlights short-term optimization of a portfolio, including forecasting renewable energy and demand response sessions, optimizing both renewable and conventional generation schedules, integrating portfolio optimization tools with asset steering and monitoring and portfolio reporting to senior management.

### Thursday, March 5, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601110 **Integrating renewables on the grid: wind and solar case studies**

Increasing numbers of wind farms and solar parks are connecting to the grid, challenging transmission system operators, utilities and developers alike. Renewable power generators, like all generating facilities, must operate reliably so as not to disrupt network operations and still deliver energy production and profitability. The session presents both transmission and distribution level case studies, including a wind farm and solar PV cluster, helped by dynamic reactive power solutions that have facilitated seamless connection to the grid.

#### 2:30 p.m. - 3:30 p.m.

##### 601111 **When disaster strikes: a hydro plant's approach to safety and reliability**

After a disastrous overfill incident resulted in deterioration of the supporting walls of a hydro power plant, the plant owner was left with an environmental catastrophe and an emergency plant shutdown. In the process of rebuilding and returning to commercial operation, the plant decided to replace most of the control and protection systems in a massive effort to improve the plant's operational safety and reliability. Learn how the owner modernized this plant and the solutions ABB provided to bring the plant to current safety and reliability standards.

#### 4:00 p.m. - 5:00 p.m.

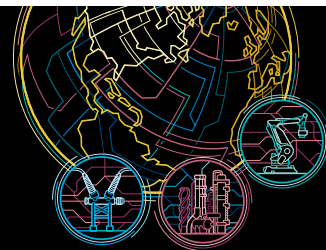
##### 601112 **Improving wind and solar bankability with transformers**

Both solar and wind energy projects have special transformer requirements, affected by site conditions and power variability. Harmonics, sizing, current, losses and safety are critical design considerations for these renewable generation sites. This session studies the issues unique to wind and solar applications and offers solutions and examples that improve reliability and reduce lifetime costs.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Best practices for utilities

### Grid modernization

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601201 **Distribution automation applications using Tropos wireless communications**

This session concentrates on several distribution automation examples using ABB-Tropos wireless communications. It examines high speed applications employing IEC 61850 8-1 GOOSE across Tropos wireless communications and compares test results for Tropos wireless communications versus hard wire LAN.

##### 2:30 p.m. - 3:30 p.m.

###### 601202 **Using enterprise software to operate the grid closer to its limits**

Modern distribution networks are undergoing dramatic changes that are forcing utilities to change how they manage and operate the grid. New smart grid technologies, such as distribution automation and advanced distribution management systems (ADMS), have enabled utilities to implement solutions which improve energy efficiency, power quality, reliability and customer satisfaction. This session focuses on the enterprise solutions and advanced applications that allow a utility to effectively monitor, forecast and take proactive course correction of the network as needed.

##### 4:00 p.m. - 5:00 p.m.

###### 601203 **Duke Energy vacuum reactance load tap changer (VRLTC) pilot project and case study**

This session details the 2+ year pilot project involving ABB's vacuum reactance load tap changer (VRLTC) at Duke Energy, including the project inception, the goals of the project, the background of Duke Energy's LTC retrofit program and performance monitoring. Findings from the 2 year inspection are reviewed.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601204 **Variable shunt reactors: optimizing transmission systems**

The market interest in variable shunt reactors (VSRs) is steadily increasing. The VSR is able to control fluctuations in reactive power that require too many switching actions for a switched reactor or capacitor but where the advanced control possibilities of a static var compensator (SVC) are not needed. This session presents the transmission system benefits and applications, like improved power quality, optimized grid operation and even the possibility of interaction with other regulation devices to maximized the dynamic capacity of the network at network failures.

##### 2:30 p.m. - 3:30 p.m.

###### 601205 **Volt-var optimization**

A volt-var pilot project incorporated real-time measurements for voltage violations, demand reduction and loss reduction in the volt-var optimization (VVO) algorithm. This cutting edge application can run centralized or decentralized and does not require a network model. Learn how to optimize and manage unbalanced KW/KVAR and per phase voltages that are common on distribution circuits, without over-operating the existing equipment, by utilizing the simulation mode to show the results during load conditions over 24 hours.

##### 4:00 p.m. - 5:00 p.m.

###### 601206 **Real world example of using IEC 61850 in recloser controls for distribution automation**

The need for electric utilities to future-proof their investments in distribution grid upgrades combined with the need for system interoperability, improved reliability and lower design, commissioning and operating costs underscore the importance of implementing IEC 61850 in distribution networks. This session explores a real world example of using IEC 61850 to perform an auto-transfer scheme at South Central Indiana (SCI) REMC. It highlights the reasons for using IEC 61850, issues and lessons learned, system configurations and contingencies, and actions that SCI considered.

## Best practices for utilities

### Grid modernization

#### Wednesday, March 4, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601207 **Newark Energy Center 230 kV underground connection**

In 2014 ABB High Voltage Cables (HVC) in Huntersville, NC commissioned a 230 kV XLPE cable system for the newly constructed Newark Energy Center in Newark, NJ. The cable system provides the grid connection for a new 650 MW natural gas power plant. Given the congested nature of the route, extensive engineering was required to ensure proper cable ratings and power delivery capacity. The project was delivered on time and marks a key milestone for the new HVC team in the US, this being the first major project manufactured, delivered and executed by the local team.

##### 2:30 p.m. - 3:30 p.m.

###### 601208 **Modernizing distribution feeders with real-time communications at First Energy**

Providing reliable communications for feeder distribution automation applications is critical to grid modernization efforts. Deploying a self-healing, smart grid technology starts with non-traditional systems that can enhance reliability, reduce downtime and monitor in real-time. In this session, First Energy and ABB provide details about a large-scale pilot project, addressing challenges encountered along with the methods used to meet those challenges.

##### 4:00 p.m. - 5:00 p.m.

###### 601209 **Coordinating self-healing and volt/var smart grid applications on distribution circuits**

This session explains the interaction between self-healing networks, in conjunction with voltage reduction and power factor control programs. Combining smart grid applications optimizes investments in communications, automation, distribution sensors, meters, switches, regulators, load tap changes and capacitor banks. This approach delivers a faster return on investment, increases capacity potential without significant investment, improves system reliability and improves safety and working conditions for linemen and system operators.

#### Thursday, March 5, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601210 **The digital substation: the evolution of protection, control and automation**

What is so special about the digital substation? The digital substation's key benefits include safety, reliability, functional consolidation and cost drivers leading to customer savings. Utilities are facing an increased demand for substation information, and the digital substation opens the door for real-time data exchange. The digital substation's key technologies (Relion relays, advanced substation automation and modern instrument transformers) are advantages, whereby IEC 61850/Ethernet and cyber security become technology enablers, not obstacles.

##### 2:30 p.m. - 3:30 p.m.

###### 601211 **A secure field area communication network architecture for smart grids**

A smart grid integrates communication and information technology into all areas of utility operations. With this integration comes an increased fear of cyber-attacks, making security a key consideration in smart grid deployment. This session lays out security requirements for smart grid field area communication networks. The Tropos wireless network architecture provides field network security through adaptability, open standards and defense-in-depth. Networks based on this architecture form a secure infrastructure with flexible security policies to support many applications and endpoints.

##### 4:00 p.m. - 5:00 p.m.

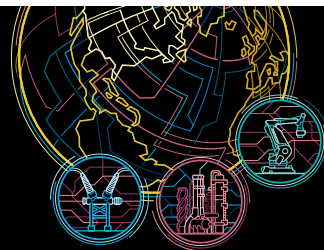
###### 601212 **PASS advantages and success stories for a changing market**

PASS is a modern hybrid switchgear which is insulated in SF6 gas and integrates multiple circuit breaker functions in one single bay. PASS has been sold globally for 15 years, but is a newer offering in North America. In a changing market where capex and opex cost reduction is key, PASS could be the solution, especially where available space is an issue. Con Edison recently decided to use PASS M0S 420 kV hybrid switching modules to help bolster the reliability of their East 13th Street substation.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Best practices for utilities

### Reliability and resiliency

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601301 **FirstEnergy's experience with static var compensators (SVCs)**

FirstEnergy is a major transmission utility in Pennsylvania, New Jersey and Maryland (PJM). Since 2012, FirstEnergy has deployed more than 10 static var compensators (SVCs) in the high voltage (HV) and extra high voltage (EHV) network, making them one of the largest SVC users in North America. This session looks at the reliability and capacity challenges faced by FirstEnergy, describes how SVCs have addressed those challenges and details the scale and scope of FirstEnergy's recent and ongoing SVC projects.

##### 2:30 p.m. - 3:30 p.m.

###### 601302 **Preparing for the worst: storm hardening and elevated substations**

Historically, substation designs have been based on standardized engineering practices and traditional technology. Given the challenges associated with recent super storms, especially in flood prone environments, implementing traditional designs may not be the best approach. Storm and flood hardening of substations vulnerable to flooding can improve reliability, lifecycle costs, security and, most importantly, public safety. Innovative substation solutions and new technologies can improve grid storm hardening by detecting floods early or by producing substations with environmental immunity.

##### 4:00 p.m. - 5:00 p.m.

###### 601303 **Nuclear plant reliability improvement with generator breaker**

TVA Sequoyah Nuclear Power Plant operated over 25 years without a generator circuit breaker (GCB); but due to system auxiliary requirements, a GCB was installed in 2013. This session reviews the reason for the addition of GCB and the lessons learned during installation.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601304 **Medium voltage system designs to support metropolitan low voltage network distribution systems**

Medium voltage (MV) ring bus designs are frequently applied to maximize the reliability of power in the case of an unplanned loss of a sourced transformer or main bus supporting a metropolitan city network distribution system. Medium voltage apparatus equipment combinations are now available that provide improved system performance, reduced footprint and a carrying capacity of up to 350 MVA.

##### 2:30 p.m. - 3:30 p.m.

###### 601305 **Communications for the implementation of relay protection schemes**

Communications between substations are essential for the implementation of line protection schemes and direct transfer tripping, commonly called teleprotection services. This session examines the fundamentals of the technologies frequently used for communications between substations, from power line carrier to fiber optics, and the role that packet switched networks (Ethernet) are playing in the substation protection field.

##### 4:00 p.m. - 5:00 p.m.

###### 601306 **The impact of geomagnetically induced currents (GIC) on power transformers and power systems**

Understanding the impact of geomagnetically induced currents (GIC) on power systems is a key requirement to ensure system stability. GIC studies identify key areas of concern and options for magnetic and thermal evaluation. Most power transformers would not experience significant overheating or damage from high levels of GIC. However, the system impact must be considered, including causes of GIC, effect of DC and GIC on power transformers, impact of a GIC event on power systems, mitigation of GIC effects, GIC capability of a transformer design and system impact.

# Best practices for utilities

## Reliability and resiliency

### Wednesday, March 4, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601307 **Increasing the reliability of feeder processing at Con Edison of New York's Brownsville substation**

This case study describes required upgrades that led to reliability improvements at Con Edison's Brownsville substation. A Con Edison representative walks you through the challenges that were faced on this project regarding access to equipment, space constraints, timelines and technical requirements, including the unique requirements on this project that required special design changes and collaboration between ABB and Con Edison to upgrade the system.

#### 2:30 p.m. - 3:30 p.m.

##### 601308 **Substation physical security**

The 2013 attack on PG&E's Metcalf substation alerted the US power industry of the potential danger of a physical attack on US substations. Many North American Electric Reliability Council (NERC), Federal Energy Regulatory Commission (FERC) and Institute of Electrical and Electronic Engineers (IEEE) standards are being modified to provide utilities with guidelines on substation security. This session analyzes what happened at the Metcalf substation and reviews the power industry's direction regarding substation physical security.

#### 4:00 p.m. - 5:00 p.m.

##### 601309 **Power quality control during faults**

Major faults on networks having two or more high voltage/medium voltage (HV/MV) sourced transformers will cause a voltage drop on all connected buses. The voltage reduction depth and duration is determined by the fault ampere size and protective device's clearing time. ABB now offers percentage control of that voltage reduction on non-faulted buses.

### Thursday, March 5, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601310 **Reviving a GE Frame 5 combustion turbine at Arizona Public Service's Douglas Power Plant**

In today's generation market, utilities are facing the decision of reviving outdated assets versus buying new generation assets to keep up with capacity requirements. Failed starts on an aging combustion turbine fleet can cost a utility serious revenue losses. Arizona Public Service (APS) had to decide what to do with a 1970s vintage GE Frame 5 combustion turbine with the original OEM controls. New generation proved to be uneconomical so APS made the decision to upgrade the outdated control system with a new Symphony Plus system.

#### 2:30 p.m. - 3:30 p.m.

##### 601311 **Brownfield GIS substation retrofits**

With the aging electrical infrastructure and the need for keeping the power on at old substations, retrofitting existing AIS substations with GIS equipment is becoming more frequent. This session will present the benefits of retrofitting an AIS substation with GIS equipment. Several case studies will be presented showing success in this type of project.

#### 4:00 p.m. - 5:00 p.m.

##### 601312 **High fidelity, optical information to drive adoption of IEC 61850 and enable the digital substation**

IEC 61850 promises to improve the reliability and resiliency of the 21st century digital substation, but the standard is limited by the accuracy and stability of the ITs that provide the input signal. Unlike early optical sensors that have proven to be unreliable, intensity modulated optical sensors provide a field stable solution to this input signal problem. This session presents data from on-going trials and demonstrates how intensity modulated optical sensors can be used to simplify the merging unit architecture and deliver the full promise of 61850 to utilities and their customers.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Best practices for utilities

### Safety and regulatory compliance

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601401 **Reliability and economic impacts of regulatory carbon reduction plans, past and present**

In investigating the reliability and economic impacts of the regional greenhouse gas initiative (RGGI), studies showed that, as CO<sub>2</sub> prices increase, coal plants run less and average locational marginal pricing (LMP) increases significantly. The decreasing use of coal could force some plants to retire, possibly violating NERC requirements. Additional scenarios, such as the influence of renewable portfolio standards and nuclear retirement, were also investigated to quantify the impacts on CO<sub>2</sub> emission amounts. With the advent of the EPA's Clean Power Plan, greater challenges are near.

##### 2:30 p.m. - 3:30 p.m.

###### 601402 **The MATS conundrum: how do the GHG New Source Performance Standards impact Old Smokey Power?**

In 2013, the EPA began implementing the Climate Action Plan. The EPA rescinded proposed CO<sub>2</sub> limits on new utility sources under the New Source Performance Standards (NSPS) and proposed new NSPS rules to control the types of electrical generation to be built in the future; this change likely represents the end of new coal-fired generation and will also affect existing units. This session looks at how this rule impacts the Mercury and Air Toxic Standards (MATS) conundrum relative to Old Smokey Power, which will co-fire natural gas with coal based on a Monte Carlo simulation.

##### 4:00 p.m. - 5:00 p.m.

###### 601403 **Changes to 1910.269, the Generation, Transmission and Distribution Code of federal regulations**

As of July 14, 2014, OSHA's Generation, Transmission and Distribution Code standard (CFR 1910.269) has been fully adopted in the Code of Federal Regulations (CFR) dedicated to construction. Now both the construction contractor and the utility have legal responsibility to adhere to the same general code of practice. CFR 1910.269 references consensus standards, such as the Standard for Electrical Safety in the Workplace (NFPA 70E) and the National Electrical Safety Code (IEEE NESC). These changes will require industry-wide standardization.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 601404 **A review of the recent 316b ruling and its implications for power generators and industry**

The 316b ruling has a varied effect on both power generators and large industrial manufacturing facilities. Today, those affected are going through an evaluation phase. Possible responses to this ruling include modifications to the intake structure along with additional cooling towers. Come learn what the implications may be for you in an open forum discussion.

##### 2:30 p.m. - 3:30 p.m.

###### 601405 **Effective management of natural disasters affecting industrial electrical systems**

Newly published Institute of Electrical and Electronics Engineers (IEEE) Standard 1716, Presidential Policy Directive #8, and National Fire Protection Association (NFPA) 1600 form the basis of this comprehensive discussion addressing the resilience of industrial electrical systems. Business continuity and disaster management continues to be an emerging business trend in the industrial arena. Learn what disasters could shut your facility down, how to be prepared and the economic impacts if proper preparations are not made.

##### 4:00 p.m. - 5:00 p.m.

###### 601406 **How to identify the optimal technical and economic solution in response to FERC Order 1000**

The Federal Energy Regulatory Commission (FERC) is driving changes in the competitive landscape of US electric transmission. While Order 1000 will increasingly become more relevant through the removal of the right of first refusal (ROFR) from regional tariffs, it opens up the playing field for both incumbents and non-incumbents to propose solutions. Only the most technically and economically justified proposals will win open opportunities by identifying optimal transmission solutions (such as HVdc and FACTS) that have the potential to decrease overall production cost.

# Best practices for utilities

## Safety and regulatory compliance

### Wednesday, March 4, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601407 **Review of measurement technology trends to meet tightening EPA emission regulations**

Growing pressure to reduce emissions from major industrial sources is driving instrument companies to measure more components at lower concentrations than ever before. This session studies the latest EPA regulations affecting the oil, gas and petrochemical industry, power utilities, cement plants, and waste incinerators, including monitoring requirements and measuring technology trends.

#### 2:30 p.m. - 3:30 p.m.

##### 601408 **Best utility practices for modeling modern power system loads**

Transmission owners are under regulatory scrutiny for system reliability, which is further complicated as generation is retired near load centers to comply with Environmental Protection Agency (EPA) and other regulations for emissions. Load growth in urban areas is driven by complex loads that can have a significant influence on power system reliability during transient conditions, when the grid is most vulnerable. This session focuses on the best practices for modeling and how one utility is addressing the reliability concerns driven by modern, complex loads.

#### 4:00 p.m. - 5:00 p.m.

##### 601409 **Best practices for launching a cyber security plan at your power plant**

From the corporate organizational structure down to the network control loops, there are many points to consider when launching a new cyber security session. Portland General Electric (PGE) shares their approach and challenges faced when launching the cyber security plan at their Coyote Springs Power Plant. With an organizational plan in place, PGE and ABB worked collaboratively to integrate ABB's Security Workplace with the distributed control system. This session clarifies high level security best practices and includes a technical dive into ABB's Security Workplace solution.

### Thursday, March 5, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 601410 **DOE 2016 is just around the corner: are you ready?**

The Department of Energy (DOE) 2016 distribution transformer efficiency requirements are just around the corner. Take a look at DOE 2016 and its projected impact on the industry, along with ABB's planned actions and timetable for implementation.

#### 2:30 p.m. - 3:30 p.m.

##### 601411 **Getting the most out of a clean power plan**

New regulations regarding power generation CO<sub>2</sub> reductions have moved from the far horizon into the limelight. If all goes as planned, new rules will be established by the Environmental Protection Agency (EPA) this June, targeting an eventual CO<sub>2</sub> reduction of 30% from the US power industry by 2030, as measured from a 2005 baseline. This session describes the Coal-Plant Survival Kit, a series of recommendations within a clean power strategy, allowing the traditional fleet operator to move forward into the 2015-2030 time period.

#### 4:00 p.m. - 5:00 p.m.

##### 601412 **Understanding OSHA final rule and mitigation methods to minimize arc flash hazard**

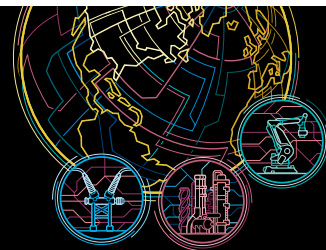
Five to ten arc flash explosions occur every day. Some of these explosions can be fatal. OSHA issued a Final Rule on July 10, 2014, revising the standards for electric power systems and encompassing risk analysis, minimum approach distance, personal protective equipment and other concerns. The Final Rule imposed several compliance dates as early as January 1, 2015. This session covers highlights of the new law and arc flash mitigation methods that can minimize possible harm.

Register today at [www.abb.com/apw](http://www.abb.com/apw)

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Industry forum

### Power generation

#### Tuesday, March 3, 2015

10:00 a.m. - 11:30 a.m.

##### 201601 Regulation and compliance in the US power generation industry

Many environmental regulations have a direct impact on the US power generation industry. Some of these regulations are cause for uncertainty and the subject of ongoing debate and litigation. This session targets the most pressing environmental regulations affecting the power generation industry and offers the views of industry participants as well as those of the regulatory community.

#### Wednesday, March 4, 2015

10:00 a.m. - 11:30 a.m.

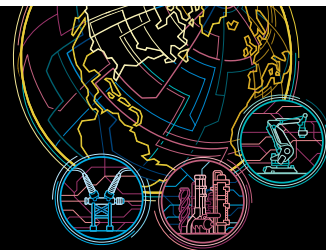
##### 201602 Power plant security versus compliance

This session clarifies and addresses the challenges of maintaining a robust and reliable power plant control system when faced with new cyber security and compliance requirements. It stresses key measures for achieving the desired level of cyber security while being in a position to meet the compliance requirements of the future, in particular, the current and future versions of the North American Electric Reliability Council's Critical Infrastructure Protection standards (NERC CIP).

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Industry forum

### Transmission and distribution

#### Tuesday, March 3, 2015

10:00 a.m. - 11:30 a.m.

201801 **Securing the grid**

The power grid faces a variety of threats today: physical and cyber threats as well as threats from natural causes have the potential to affect both national security and a utility's bottom line. This session covers the latest North American Electric Reliability Council's Critical Infrastructure Protection standards (NERC CIP), risk management strategies and trending security controls. An expert panel provides real-world guidance on how to protect critical substation assets and secure enterprise software systems into the next decade.

#### Wednesday, March 4, 2015

10:00 a.m. - 11:30 a.m.

201802 **Get prepared: resiliency planning for the transmission grid**

Grid resiliency, or the ability to withstand and then recover from failures or events, is a major concern for most utilities today. Historically, aging infrastructure, load growth, and severe storms were the main challenges stressing the power grid. Today, new issues such as sabotage, physical security and emerging regulations are making grid hardening and resiliency planning even more critical. An expert panel examines some best practices to address these stresses and increase the reliability and resiliency of your grid.

#### Thursday, March 5, 2015

10:00 a.m. - 11:30 a.m.

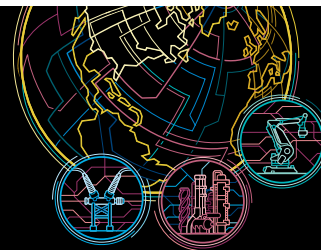
201803 **Restructuring distribution: how technology can enable the transition**

Regulatory mandates, customer requirements, technological advances and new market entrants are driving change to the electric utility business model. Distribution system operators are responsible for the safe and reliable operation of the system, but must perform amid increasing challenges to resources from customers, microgrids and merchant providers of distributed energy resources (DER). This panel explores how technology, IT infrastructure, communications and data analytics can help utilities manage the transition and plan for future changes in this new regulatory environment.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Industry forum

### Water and waste water

#### Tuesday, March 3, 2015

10:00 a.m. - 11:30 a.m.

##### 201901 **What utilities are doing about non-revenue water**

With some utilities losing up to 30 percent of the clean water produced, the mismanagement of water resources has become apparent. Non-revenue water (NRW) is defined as water that has been “lost” before reaching the customer. NRW represents more than just leaks in a distribution system. It also accounts for leaks of data, misinformation and meter reading. As utilities invest in chemical costs, energy usage and operations for each gallon of water produced, NRW turns into a major expense. Hear what the City of Houston and other municipalities are doing about this looming problem.

#### Wednesday, March 4, 2015

10:00 a.m. - 11:30 a.m.

##### 201902 **Planning for your water future**

The demands of population growth and socioeconomics on global water resources have required communities and industries around the world to focus on the future of water availability. Some states, municipalities and industries are meeting water challenges through new technology, data gathering, infrastructure design changes, water conservation and new resource management. Leaders from various industries discuss the solutions they are turning to when planning for their water future.

#### Thursday, March 5, 2015

10:00 a.m. - 11:30 a.m.

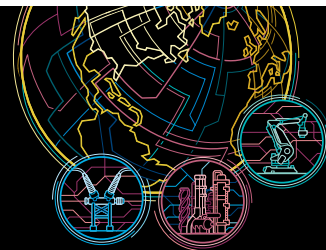
##### 201903 **11,000,000 GPM: The story of the New Orleans Permanent Canal Closure Project**

On Aug 29, 2005 Hurricane Katrina impacted the U.S. Gulf Coast with devastating results. With 50+ levee failures in New Orleans, over 80% of the city was flooded impacting 134K homes and displacing 254K residents. A total of 17 mega pumps driven by Baldor's innovative vertical gearmotors, will support three pumping stations that will protect New Orleans during similar events in the future. Once fully operational, these stations will be able to pump >10 million gallons per minute! That is enough water to fill an Olympic-sized swimming pool in 3.63 sec or the Superdome in < 90 min.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Industry forum

### Wind and solar energy

#### Tuesday, March 3, 2015

10:00 a.m. - 11:30 a.m.

##### 202001 CEOs share insights on wind and solar

There is no denying that wind and solar will play a major role in tomorrow's energy landscape. Wind, solar and other renewable energy sources are already being used across the US to provide a cleaner, more economical source of energy. Meet two CEOs who are helping drive this change as they discuss trends in this industry and share insights on the future of renewables for the country.

#### Wednesday, March 4, 2015

10:00 a.m. - 11:30 a.m.

##### 202002 Winds of change: an update on the wind market in North America

At the end of 2013, there were over 13 gigawatts (GW) of construction starts on wind projects in the US. In this session, experts track the buildout of these projects over 2014 and 2015.

#### Thursday, March 5, 2015

10:00 a.m. - 11:30 a.m.

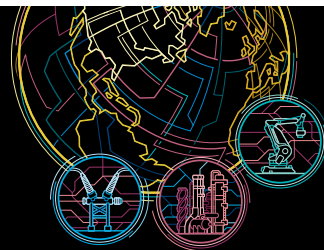
##### 202003 Where will solar power show up next?

Solar energy is abundant, clean and scalable for installations of any size. Whether at home, at the office or even in an industrial scale utility, solar power is proving to be a low-cost energy alternative. This new phase for solar is a result of technology advances paired with the growing demand for affordable energy. A panel of experts defines the solar landscape of tomorrow and the impact it will have on the grid.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## New and updated products

### Power Products

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701201 **Lessons learned during application of MV GIS in oil and gas critical applications**

This case study features a real application of medium voltage (MV) gas insulated switchgear (GIS) in critical installations; namely, power system upgrades to existing offshore oil and gas platforms in Alaska. The consulting engineer on the project and the product application engineers review the differences between air insulated switchgear (AIS) and GIS, including the selection criteria, technical differences and installation and operational differences. They also share lessons learned from the project.

##### 2:30 p.m. - 3:30 p.m.

###### 701202 **Leveraging next generation reclosers to optimize your distribution grid**

With its communication and hardware capabilities, the GridShield recloser helps electric utilities meet today's requirements for safety, reliability and operational efficiencies while preparing for tomorrow's smart grid needs. Open standards and protocols, such as the International Electrotechnical Commission's IEC 61850 and distributed network protocols (DNP), give utilities the foundation for the interoperability and integration of equipment and systems. This session highlights smart grid implementations, such as fault-detection-isolation-restoration and distributed generation integration.

##### 4:00 p.m. - 5:00 p.m.

###### 701203 **Dry-type technologies transcend past limitations**

Historically, dry-type transformers were limited to 34.5 kV and lower efficiency levels compared to liquid filled transformers. Through intense research and development, ABB has exceeded past limitations. The safety and environmental friendliness of dry-type transformers are now available for more markets and applications than ever before. This session explores these technological advances and success stories where customers are reaping the benefits of ABB's culture of innovation.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701204 **Introducing FOCS, an instrument transformer optic solution that enables digital substations**

Digital substations are gaining traction, with real world commercial installations being accepted among utilities. Main enablers for this technology are non-conventional instrument transformers and standalone merging units, utilizing IEC 61850 process bus communication. This session discusses basic application variants, results and field experiences involving the ABB FOCS sensor family, combined with the flexibility and modularity of the SAM600 process bus IO system. Both products allow for optimized and efficient deployment of process bus components in the switchyard.

##### 2:30 p.m. - 3:30 p.m.

###### 701205 **Reducing footprint requirements and project costs with 26-inch wide MV switchgear**

Today's environment requires replacing existing medium voltage (MV) air insulated switchgear in areas that modern 36-inch wide switchgear cannot accommodate. An alternative is to employ a narrow design switchgear solution, such as ABB's new ReliaGear ND. Learn how to lower project costs with narrow design switchgear. This session relates real-life problems that were advantageously solved with narrow design switchgear.

##### 4:00 p.m. - 5:00 p.m.

###### 701206 **Addressing the need for physical transformer security**

With the emerging focus on protecting the power grid from both physical attacks and natural disasters, transmission and distribution grid operators and manufacturers must begin to think differently. Many utilities are now creating response plans for future equipment that is impervious to these attacks and natural disasters, while also considering how to protect their installed fleets. This session considers perspectives from utilities and grid operators on the forefront of grid security as well as what manufacturers are doing to improve security.

## New and updated products

### Power Products

#### Wednesday, March 4, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701207 **Liquid filled transformer fluid options and their impact on transformer design and life expectation**

This session covers the investigations, calculations and measurements that identify the special material characteristics needed to design the core and windings of transformers for an alternative to mineral oil. It also considers other factors in the selection, design and determination of the voltage and current ratings of key components (such as bushings and tap-changers) in liquid filled power transformers. In addition, this session identifies design changes required because of the properties of alternative fluids.

##### 2:30 p.m. - 3:30 p.m.

###### 701208 **Increased reliability and efficiency with the DS1 synchronous capacitor switch**

Utilities are constantly working to improve voltage regulation to reduce distribution system losses as well as meet mandatory voltage tolerance requirements. Capacitor banks, both substation based and pole mounted, are widely used for this purpose. Conventional switching schemes for substation capacitor banks require separate capacitor switches, inrush reactors and surge arresters. ABB's new DS1 capacitor switch utilizes solid state technology and synchronous switching to eliminate the need for supplemental equipment.

##### 4:00 p.m. - 5:00 p.m.

###### 701209 **Next generation oil-free and paper-free condenser bushings**

Increase operating safety and reliability, while reducing the cost of outages, maintenance and collateral damage, with the next generation of oil-free and paper-free condenser bushings. Learn about type O Plus Dry bushings, the most reliable technology available for bushings.

#### Thursday, March 5, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701210 **Integrated automation solution for a power distribution network**

Often smart grid applications consist of products and solutions from different vendors. Issues can arise if the products / systems are not fully integrated or do not work well together on the same distribution network. Based on published ABB patent US20140149101, this session discusses the requirements, challenges and methods to integrate fault detection, isolation and restoration (FDIR), volt/var control and voltage optimization (VVO), load balancing and load shedding in one product.

##### 2:30 p.m. - 3:30 p.m.

###### 701211 **Transformers for oil and gas and other challenging environments**

Environments such as those encountered in the oil and gas industries pose challenging transformer reliability and safety concerns. During this session, the most recent possibilities for transformer safety and environmental hardening are reviewed.

##### 4:00 p.m. - 5:00 p.m.

###### 701212 **Reinforced dry MV transformers: more value for data center applications**

The world's hunger for data seems insatiable. Whether national security or online movie streaming, the backbone of the data revolution is the infrastructure of data centers and their critical power systems. ABB introduces the transient voltage resistant transformer, which ensures power for critical computing and is designed to be robust enough to survive frequent fast switching as data centers are upgraded and maintained.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## New and updated products

### Power Systems

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701301 **Steam turbine EHC system life extension**

Today's evolving power generation marketplaces are increasing demands on existing steam turbine/generator assets. Steam turbine electrohydraulic control (EHC) systems play a critical role in meeting these demands; and the proper maintenance and care of these systems ensure successful operation and availability of the steam turbine. This session explores EHC fluid testing and conditioning, EHC fluid changes, hydraulic supply system enhancements, trip system upgrades, component maintenance, equipment refurbishment, EHC system flushing and related topics.

##### 2:30 p.m. - 3:30 p.m.

###### 701302 **High penetration renewable power microgrids**

To reduce greenhouse gas emissions, lower the kWh cost of energy to their customers and wean themselves from the use of fossil fuels, many remote and island communities are investing in renewable generation. However, these renewable sources present challenges to power grid operators. The greatest obstacle has been grid instability caused by output intermittencies. This session showcases a commercialized solution and explains how grid operators can leverage this technology to fully utilize available renewable energy resources.

##### 4:00 p.m. - 5:00 p.m.

###### 701303 **Innovations in Relion protection and control and introduction to SDM600 for advanced data management**

Open standards and support for cyber security compliance are critical in today's networks. The new Relion 670 series, which offers multi-object protection for digital substations, works together with substation data management SDM600 to ensure that systems run the latest software and to manage the collection and collation of disturbance data. Discover how the SDM600 can serve as the gatekeeper to the automation network where fragmented directory policies risk exposing critical vulnerabilities and where centralized security logging and account management is essential.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701304 **Symphony Plus: enhancing plant control system security**

ABB's systems are designed with security in mind. This session explains how ABB's organizational approach ensures that cyber security is properly addressed during product development and highlights the security features and capabilities built into Symphony Plus to enable the concepts of secure by design, secure by default and secure in deployment.

##### 2:30 p.m. - 3:30 p.m.

###### 701305 **S+ Operations**

S+ Operations is the human/machine interface (HMI) for the supervision and operation of all Symphony Plus control systems as well as a SCADA solution for distributed applications like water management networks, solar power installations and wind farms and fleets. Designed for improved operator effectiveness, S+ Operations provides an intuitive, easy-to-use environment to facilitate process monitoring and control, fault mitigation and optimization. In addition to providing an overview of the key features of S+ Operations, this session shows what's new in S+ Operations 2.0.

##### 4:00 p.m. - 5:00 p.m.

###### 701306 **Overview of high voltage direct current (HVDC) technologies for reliable transmission systems**

Transmission systems have been relying on two main technologies for transferring power: alternating current (AC) and direct current (DC). Both have served the transmission systems well, with AC being more mature and common in applications. HVDC technologies have been evolving to complement the AC systems and provide feasible solutions to upgrade the infrastructure. This session focuses on HVDC technologies, mainly current source converters and voltage source converters, with applications and features such as black start.

## New and updated products

### Power Systems

#### Wednesday, March 4, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701307 **System standardization for the evolving energy storage market**

As the energy storage market matures, aligning product development with customer needs is essential. This session illuminates ABB's approach to system standardization for hardware, controls and applications. It introduces ABB's EssPro power conditioning system (PCS) product line and the standard controls, operation modes and applications for this dynamic market.

##### 2:30 p.m. - 3:30 p.m.

###### 701308 **S+ Control and I/O**

S+ Control and I/O is a comprehensive suite of standards-based hardware and software that meets the requirements for total plant control. The portfolio includes the SD Series (Symphony DIN) and HR Series (Harmony Rack). The energy efficient SD Series features modular DIN rail packaging; flexible, high-performance, Ethernet-based plant network; intelligent electrical and field device integration; PROFIBUS, HART, IEC61850 (MMS and GOOSE) and Modbus TCP communication protocols; and an integrated turbine control solution.

##### 4:00 p.m. - 5:00 p.m.

###### 701309 **Critical power applications for microgrids**

The latest innovation in microgrid technology addresses the high reliability needs of critical power applications. Critical power users cannot afford even a momentary interruption or degradation of power; such users include data centers, hospitals, mining, oil and gas refineries and emergency response operations. This session assesses current practices used to create ultra-high reliability for critical power applications.

#### Thursday, March 5, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 701310 **Tools for modeling static var compensators (SVCs) in PSS/E**

tatic var compensators (SVCs) are increasingly used by utility transmission planners to solve a variety of capacity and reliability issues related to voltage and reactive support. This session focuses on the documentation and use of standard models for SVCs in power system simulators for engineering (PSS/E) and PSLF power systems analysis software, with examples of model parameters that have been set to address actual SVC applications.

##### 2:30 p.m. - 3:30 p.m.

###### 701311 **S+ Engineering**

Based on the Composer platform, the S+ Engineering tool brings together many automation aspects into one environment. With its unified engineering workbench, S+ Engineering provides flexibility in engineering, empowering energy performance contractors (EPCs) and end users with the tools and methods to reduce project design cycles, shorten commission and start-up times and minimize operational maintenance costs. The recently released S+ Engineering 1.0 offers all the necessary functionality needed to engineer, configure, administrate, secure, commission and maintain your S+ system.

##### 4:00 p.m. - 5:00 p.m.

###### 701312 **Symphony Plus condition monitoring**

The power generation and process industries depend on the reliable and predictable operation of rotating machinery. Nearly every plant monitors its critical and essential rotating machinery assets with a continuous online protection system. Symphony Plus' condition monitoring products integrate powerful hardware with intelligent software. When used along with a proactive maintenance policy, they can reduce and often eliminate costly machine failures. ABB has solutions for continuous improvement that help increase your plant's uptime and profitability.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Technical training

### Distribution Automation

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 801001 Using real-time phasor plots to diagnose wiring problems

Real-time phasor plots are used to diagnose wiring issues during commissioning of transformer protection, when multiple sets of currents and voltages with phase shifts between windings are connected to the relay. This session demonstrates a phasor plotting tool to diagnose swapped phases, reversed polarity connections and incorrect phase shift between windings.

##### 2:30 p.m. - 3:30 p.m.

###### 801002 Automatic transfer scheme (ATS) via IEC 61850 GOOSE • (NOTE: 1.5 hour session)

An automatic transfer scheme (ATS) assists electric power system control and automation operations. In a main-tie-main bus configuration of two independent sources with a normally open tie breaker, ATS can automatically restore a bus affected by loss of its main source. Automatic retransfer occurs by opening the tie breaker and closing the affected main breaker once the source returns. This session shows how to develop a generic object oriented substation event (GOOSE) ATS scheme; it requires a basic understanding of power system protection philosophy, PCM600 software and the REF615 relay.

##### 4:00 p.m. - 5:00 p.m.

###### 801003 Easy to implement IEC 61850

This hands-on session focuses on the use of IEC 61850. The IEC 61850 protocol supports a method to directly exchange data between two or more intelligent electronic devices (IEDs). The concept is based on sending a multicast over the Ethernet. Whoever needs the information, detects the telegram by its source address, reads the telegram and deals with it. In this session's exercise a load can be fed from two sources; only one source can be connected at a given time.

#### Tuesday, March 3, 2015

##### 10:00 a.m. - 11:30 a.m.

###### 801004 Automatic transfer scheme (ATS) via IEC 61850 GOOSE • (NOTE: 1.5 hour session)

An automatic transfer scheme (ATS) assists electric power system control and automation operations. In a main-tie-main bus configuration of two independent sources with a normally open tie breaker, ATS can automatically restore a bus affected by loss of its main source. Automatic retransfer occurs by opening the tie breaker and closing the affected main breaker once the source returns. This session shows how to develop a generic object oriented substation event (GOOSE) ATS scheme; it requires a basic understanding of power system protection philosophy, PCM600 software and the REF615 relay. 1.5 hour session.

##### 1:00 p.m. - 2:00 p.m.

###### 801005 Easy to implement IEC 61850

This hands-on session focuses on the use of IEC 61850. The IEC 61850 protocol supports a method to directly exchange data between two or more intelligent electronic devices (IEDs). The concept is based on sending a multicast over the Ethernet. Whoever needs the information, detects the telegram by its source address, reads the telegram and deals with it. In this session's exercise a load can be fed from two sources; only one source can be connected at a given time.

##### 2:30 p.m. - 3:30 p.m.

###### 801006 Automatic transfer scheme (ATS) via IEC 61850 GOOSE

An automatic transfer scheme (ATS) assists electric power system control and automation operations. In a main-tie-main bus configuration of two independent sources with a normally open tie breaker, ATS can automatically restore a bus affected by loss of its main source. Automatic retransfer occurs by opening the tie breaker and closing the affected main breaker once the source returns. This session shows how to develop a generic object oriented substation event (GOOSE) ATS scheme; it requires a basic understanding of power system protection philosophy, PCM600 software and the REF615 relay.

##### 4:00 p.m. - 5:00 p.m.

###### 801007 Using real-time phasor plots to diagnose wiring problems

Real-time phasor plots are used to diagnose wiring issues during commissioning of transformer protection, when multiple sets of currents and voltages with phase shifts between windings are connected to the relay. This session demonstrates a phasor plotting tool to diagnose swapped phases, reversed polarity connections and incorrect phase shift between windings.

# Technical training

## Distribution Automation

### Wednesday, March 4, 2015

#### 10:00 a.m. - 11:30 a.m.

##### 801008 Automatic transfer scheme (ATS) via IEC 61850 GOOSE • (NOTE: 1.5 hour session)

An automatic transfer scheme (ATS) assists electric power system control and automation operations. In a main-tie-main bus configuration of two independent sources with a normally open tie breaker, ATS can automatically restore a bus affected by loss of its main source. Automatic retransfer occurs by opening the tie breaker and closing the affected main breaker once the source returns. This session shows how to develop a generic object oriented substation event (GOOSE) ATS scheme; it requires a basic understanding of power system protection philosophy, PCM600 software and the REF615 relay.

#### 1:00 p.m. - 2:00 p.m.

##### 801009 Using real-time phasor plots to diagnose wiring problems

Real-time phasor plots are used to diagnose wiring issues during commissioning of transformer protection, when multiple sets of currents and voltages with phase shifts between windings are connected to the relay. This session demonstrates a phasor plotting tool to diagnose swapped phases, reversed polarity connections and incorrect phase shift between windings.

#### 2:30 p.m. - 3:30 p.m.

##### 801010 Automatic transfer scheme (ATS) via IEC 61850 GOOSE

An automatic transfer scheme (ATS) assists electric power system control and automation operations. In a main-tie-main bus configuration of two independent sources with a normally open tie breaker, ATS can automatically restore a bus affected by loss of its main source. Automatic retransfer occurs by opening the tie breaker and closing the affected main breaker once the source returns. This session shows how to develop a generic object oriented substation event (GOOSE) ATS scheme; it requires a basic understanding of power system protection philosophy, PCM600 software and the REF615 relay.

#### 4:00 p.m. - 5:00 p.m.

##### 801011 Easy to implement IEC 61850

This hands-on session focuses on the use of IEC 61850. The IEC 61850 protocol supports a method to directly exchange data between two or more intelligent electronic devices (IEDs). The concept is based on sending a multicast over the Ethernet. Whoever needs the information, detects the telegram by its source address, reads the telegram and deals with it. In this session's exercise a load can be fed from two sources; only one source can be connected at a given time.

### Thursday, March 5, 2015

#### 10:00 a.m. - 11:30 a.m.

##### 801012 Automatic transfer scheme (ATS) via IEC 61850 GOOSE • (NOTE: 1.5 hour session)

An automatic transfer scheme (ATS) assists electric power system control and automation operations. In a main-tie-main bus configuration of two independent sources with a normally open tie breaker, ATS can automatically restore a bus affected by loss of its main source. Automatic retransfer occurs by opening the tie breaker and closing the affected main breaker once the source returns. This session shows how to develop a generic object oriented substation event (GOOSE) ATS scheme; it requires a basic understanding of power system protection philosophy, PCM600 software and the REF615 relay.

#### 1:00 p.m. - 2:00 p.m.

##### 801013 Easy to implement IEC 61850

This hands-on session focuses on the use of IEC 61850. The IEC 61850 protocol supports a method to directly exchange data between two or more intelligent electronic devices (IEDs). The concept is based on sending a multicast over the Ethernet. Whoever needs the information, detects the telegram by its source address, reads the telegram and deals with it. In this session's exercise a load can be fed from two sources; only one source can be connected at a given time.

#### 2:30 p.m. - 3:30 p.m.

##### 801014 Automatic transfer scheme (ATS) via IEC 61850 GOOSE

An automatic transfer scheme (ATS) assists electric power system control and automation operations. In a main-tie-main bus configuration of two independent sources with a normally open tie breaker, ATS can automatically restore a bus affected by loss of its main source. Automatic retransfer occurs by opening the tie breaker and closing the affected main breaker once the source returns. This session shows how to develop a generic object oriented substation event (GOOSE) ATS scheme; it requires a basic understanding of power system protection philosophy, PCM600 software and the REF615 relay.

#### 4:00 p.m. - 5:00 p.m.

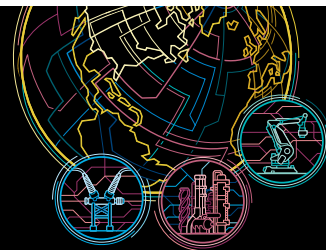
##### 801015 Easy to implement IEC 61850

This hands-on session focuses on the use of IEC 61850. The IEC 61850 protocol supports a method to directly exchange data between two or more intelligent electronic devices (IEDs). The concept is based on sending a multicast over the Ethernet. Whoever needs the information, detects the telegram by its source address, reads the telegram and deals with it. In this session's exercise a load can be fed from two sources; only one source can be connected at a given time.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Technical training

### Power 101

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 801401 **Technology solutions for smarter grids**

In the future more robust power delivery systems will be required. Drivers include renewable energy integration as well as new loads, such as electric vehicles. This session introduces participants to technology solutions that will help meet new demands for a smarter grid.

##### 2:30 p.m. - 4:30 p.m.

###### 801402 **Overview of power generation, transmission and distribution • (NOTE: 2 hour session)**

This session is targeted to new engineers and professionals in the power industry, providing a basic understanding of electric power generation, transmission and distribution systems, including the roles of major equipment.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 801403 **Introduction to distribution transformers for residential and industrial applications**

This session covers distribution transformers for residential, commercial and industrial applications. Technologies include pole mounted, pad mounted and dry type units. The session surveys transformer construction, key design considerations and the concept of transformer losses.

##### 2:30 p.m. - 3:30 p.m.

###### 801404 **Distribution feeder equipment for grid optimization**

This session reviews equipment on the distribution system, encompassing distribution substation breakers, reclosers, line switches and fused cutouts, including the roles of each device and how they work together to minimize system disturbances.

##### 4:00 p.m. - 5:00 p.m.

###### 801405 **Insulation coordination and surge protection**

This session reviews the classification of insulation systems by basic insulation level (BIL) and the operation of surge arresters on the power system. Learn about various surge voltage wave shapes and the corresponding arrester characteristic to consider for adequate protection. The session also describes surge arrester design options and best application practices.

# Technical training

## Power 101

### Wednesday, March 4, 2015

#### 10:00 a.m. - 11:30 a.m.

##### 801406 Overview of power generation, transmission and distribution • (NOTE: 1.5 hour session)

This session is targeted to new engineers and professionals in the power industry, who will gain a basic understanding of electric power generation, transmission and distribution systems, including the roles of major equipment.

#### 1:00 p.m. - 2:00 p.m.

##### 801407 Introduction to substation transformers

In explaining the function of substation transformers and basic transformer construction, this session discusses transformer ratings KVA, temperature rise, voltage, basic insulation level (BIL), impedance, overload ratings and transformer losses. Common transformer accessories for monitoring, cooling, tap changing and external connection options are also reviewed.

#### 2:30 p.m. - 3:30 p.m.

##### 801408 High voltage substation equipment

This session about high voltage equipment in the substation addresses power breakers, their role in the system, the difference between live and dead tank breakers, transformers and the range of ratings available.

#### 4:00 p.m. - 5:00 p.m.

##### 801409 Maintaining substation transformers and high voltage equipment

The service opportunities to maintain and upgrade substation transformers and breakers encompass installation and commissioning, maintenance inspections, lifecycle assessments, remote monitoring and repair options (field versus factory).

### Thursday, March 5, 2015

#### 1:00 p.m. - 2:00 p.m.

##### 801410 Introduction to protection and control

Hear about the role of relays for the protection and control of power systems, including relay classifications, relay applications, basic protection principles and relaying philosophy. Learn how to identify the Institute of Electrical and Electronics Engineers (IEEE) device numbers for various types of protective functions and about IEEE and International Electrotechnical Commission (IEC) symbols on circuit diagrams.

#### 2:30 p.m. - 3:30 p.m.

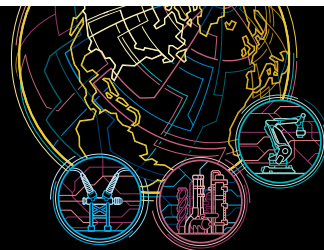
##### 801411 Manage outages before they manage you

Utilities today are faced with unprecedented challenges in managing outages, including an increase in the number and severity of unplanned events, increased consumer demand for accurate and timely communications, complex networks and new regulatory requirements. The traditional system and approach to outage management are not designed to handle these complex issues. This session will focus on solutions that integrate IT and OT technologies and address the end-to-end outage lifecycle and how this enables utilities to improve reliability and customer satisfaction in a cost effect manner.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Technical training

### Power Services

#### Monday, March 2, 2015

##### 1:00 p.m. - 2:00 p.m.

###### 801501 **Intelligent monitoring solutions for high voltage breakers, transformers and MV switchgear**

Solution intelligence makes the difference in condition-based and remote monitoring solutions. This session demonstrates ABB's newest solution for power assets (circuit breakers, power transformers and switchgear). Continuously fed data keeps an eye on the equipment even when it is remote. From a dynamic health score to real-time results that yield root cause analysis of problems, ABB's solution uses the power of data to drive down operation and management (O&M) costs while improving reliability and availability.

##### 2:30 p.m. - 3:30 p.m.

###### 801502 **Repair and overhaul of ABB high voltage breaker operating mechanism**

Proper mechanism maintenance is one of the key factors to maintaining an abundance of reliable energy during the life of your high voltage circuit breaker, gas insulated switchgear (GIS) or generator circuit breaker (GCB). During this hands-on training session, learn how to diagnose common mechanism issues and how to overhaul and repair ABB type HMB (hydraulic-spring) mechanisms.

#### Tuesday, March 3, 2015

##### 1:00 p.m. - 3:00 p.m.

###### 801503 **High voltage breaker advanced diagnostics and maintenance options for reliability and cost control (NOTE: 2 hour session)**

High voltage SF6 circuit breaker maintenance has expanded into many options for diagnostic maintenance. This hands-on session details cost-effective maintenance strategies to maximize high voltage (HV) breaker longevity and reliability using both internal and external inspections. The session has two sections: traditional breaker maintenance options and new diagnostic maintenance options. Radiography is the X-ray inspection and evaluation of SF6 switchgear. It typically reduces outage costs and time by 50% or more.

#### Wednesday, March 4, 2015

##### 10:00 a.m. - 11:30 a.m.

###### 801504 **Generator circuit breaker (GCB) condition monitoring system • (NOTE: 1.5 hour session)**

State-of-the-art technology is used to check the condition of a generator circuit breaker (GCB), and this session explains the theory and application developed to track wear and tear. The device also tracks SF6 gas leakage, for reporting to the Environment Protection Agency (EPA), and the main generator bus conditions.

##### 1:00 p.m. - 2:00 p.m.

###### 801505 **Intelligent monitoring solutions for high voltage breakers, transformers and MV switchgear**

Solution intelligence makes the difference in condition-based and remote monitoring solutions. This session demonstrates ABB's newest solution for power assets (circuit breakers, power transformers and switchgear). Continuously fed data keeps an eye on the equipment even when it is remote. From a dynamic health score to real-time results that yield root cause analysis of problems, ABB's solution uses the power of data to drive down operation and management (O&M) costs while improving reliability and availability.

##### 2:30 p.m. - 3:30 p.m.

###### 801506 **Repair and overhaul of ABB high voltage breaker operating mechanism**

Proper mechanism maintenance is one of the key factors to maintaining an abundance of reliable energy during the life of your high voltage circuit breaker, gas insulated switchgear (GIS) or generator circuit breaker (GCB). During this hands-on training session, learn how to diagnose common mechanism issues and how to overhaul and repair ABB type HMB (hydraulic-spring) mechanisms.

(see next page for Thursday schedule)

## Technical training

### Power Services

Thursday, March 5, 2015

**10:00 a.m. - 11:30 a.m.**

801507 **Generator circuit breaker (GCB) condition monitoring system • (NOTE: 1.5 hour session)**

State-of-the-art technology is used to check the condition of a generator circuit breaker (GCB), and this session explains the theory and application developed to track wear and tear. The device also tracks SF6 gas leakage, for reporting to the Environment Protection Agency (EPA), and the main generator bus conditions.

**1:00 p.m. - 3:00 p.m.**

801508 **High voltage breaker advanced diagnostics and maintenance options for reliability and cost control (NOTE: 2 hour session)**

High voltage SF6 circuit breaker maintenance has expanded into many options for diagnostic maintenance. This hands-on session details cost-effective maintenance strategies to maximize high voltage (HV) breaker longevity and reliability using both internal and external inspections. The session has two sections: traditional breaker maintenance options and new diagnostic maintenance options. Radiography is the X-ray inspection and evaluation of SF6 switchgear. It typically reduces outage costs and time by 50% or more.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Technical training

### Symphony Plus

#### Monday, March 2, 2015

**1:00 p.m. - 3:00 p.m.**

801701 **Symphony Plus operations • (NOTE: 2 hour session)**

In this 2-hour hands-on technical training session, find out about the Symphony Plus human/machine interface, the Symphony Plus architecture, the function of the different components, navigation within the SPlus Operation Explorer and graphic elements.

#### Tuesday, March 3, 2015

**10:00 a.m. - 11:30 a.m.**

801702 **Symphony Plus hardware • (NOTE: 1.5 hour session)**

This hands-on technical training session introduces the Symphony Plus architecture and the functions of different components, including S+ Communications, setup of the S+ controllers, basic function codes and configuration changes using engineering tools.

**1:00 p.m. - 3:00 p.m.**

801703 **Symphony Plus operations: advanced engineering • (NOTE: 2 hour session)**

In this 2-hour hands-on technical training session, find out how to set up OPC tags, create reports from a history server and set up network distribution classes. This session provides laboratory exercises and networked computers to help simulate the environment discussed.

#### Wednesday, March 4, 2015

**10:00 a.m. - 11:30 a.m.**

801704 **Symphony Plus hardware • (NOTE: 1.5 hour session)**

This hands-on technical training session introduces the Symphony Plus architecture and the functions of different components, including S+ Communications, setup of the S+ controllers, basic function codes and configuration changes using engineering tools.

**1:00 p.m. - 3:00 p.m.**

801705 **Symphony Plus operations • (NOTE: 2 hour session)**

In this 2-hour hands-on technical training session, find out about the Symphony Plus human/machine interface, the Symphony Plus architecture, the function of the different components, navigation within the SPlus Operation Explorer and graphic elements.

#### Thursday, March 5, 2015

**10:00 a.m. - 11:30 a.m.**

801706 **Symphony Plus operations • (NOTE: 1.5 hour session)**

In this 2-hour hands-on technical training session, find out about the Symphony Plus human/machine interface, the Symphony Plus architecture, the function of the different components, navigation within the SPlus Operation Explorer and graphic elements.

**1:00 p.m. - 3:00 p.m.**

801707 **Symphony Plus operations: advanced engineering • (NOTE: 2 hour session)**

In this 2-hour hands-on technical training session, find out how to set up OPC tags, create reports from a history server and set up network distribution classes. This session provides laboratory exercises and networked computers to help simulate the environment discussed.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Technical training

### System 800xA Extended Automation 1

#### Monday, March 2, 2015

**1:00 p.m. - 3:00 p.m.**

**801801 System 800xA engineering using ControlBuilder • (NOTE: 2 hour session)**

This 2-hour, hands-on technical training session introduces the 800xA system, basic system architecture and fundamental configuration skills using the ControlBuilder engineering tool.

#### Tuesday, March 3, 2015

**10:00 a.m. - 11:30 a.m.**

**801802 Cyber security for ABB automation systems • (NOTE: 1.5 hour session)**

This hands-on technical training session provides information about cyber security services used to protect your ABB system. Topics include patch management, antivirus, malware remediation and disaster recovery. Laboratory exercises are associated with the patch management portion of this session.

**1:00 p.m. - 3:00 p.m.**

**801803 System 800xA human/machine interface with PG2 graphics • (NOTE: 2 hour session)**

In this 2-hour hands-on technical training session, learn about the 800xA console and PG2 graphics, including the operator workplace, graphic elements, faceplates and graphic displays.

#### Wednesday, March 4, 2015

**1:00 p.m. - 3:00 p.m.**

**801804 System 800xA engineering using ControlBuilder • (NOTE: 2 hour session)**

This 2-hour, hands-on technical training session introduces the 800xA system, basic system architecture and fundamental configuration skills using the ControlBuilder engineering tool.

#### Thursday, March 5, 2015

**10:00 a.m. - 11:30 a.m.**

**801805 Cyber security for ABB automation systems • (NOTE: 1.5 hour session)**

This hands-on technical training session provides information about cyber security services used to protect your ABB system. Topics include patch management, antivirus, malware remediation and disaster recovery. Laboratory exercises are associated with the patch management portion of this session.

**1:00 p.m. - 3:00 p.m.**

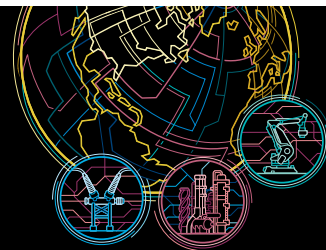
**801806 System 800xA human/machine interface with PG2 graphics • (NOTE: 2 hour session)**

In this 2-hour hands-on technical training session, learn about the 800xA console and PG2 graphics, including the operator workplace, graphic elements, faceplates and graphic displays.

# Harnessing the power of change

## Automation & Power World

### March 2-5, 2015 | Houston, TX



## Technical training

### System 800xA Extended Automation 2

#### Monday, March 2, 2015

**1:00 p.m. - 3:00 p.m.**

801807 **System 800xA alarm management • (NOTE: 2 hour session)**

This session explores advanced features of alarm management in 800xA, including priority, grouping, shelving, hiding, response and analysis.

#### Tuesday, March 3, 2015

**1:00 p.m. - 3:00 p.m.**

801808 **System 800xA alarm management • (NOTE: 2 hour session)**

This session explores advanced features of alarm management in 800xA, including priority, grouping, shelving, hiding, response and analysis.

#### Wednesday, March 4, 2015

**10:00 a.m. - 11:30 a.m.**

801809 **Introduction to System 800xA • (NOTE: 1.5 hour session)**

This session touches on many key components in System 800xA, including architecture, features/functions, graphics, integration and configuration.

**1:00 p.m. - 3:00 p.m.**

801810 **System 800xA alarm management • (NOTE: 2 hour session)**

This session explores advanced features of alarm management in 800xA, including priority, grouping, shelving, hiding, response and analysis.

#### Thursday, March 5, 2015

**10:00 a.m. - 11:30 a.m.**

801811 **Introduction to System 800xA • (NOTE: 1.5 hour session)**

This session touches on many key components in System 800xA, including architecture, features/functions, graphics, integration and configuration.

**1:00 p.m. - 3:00 p.m.**

801812 **System 800xA alarm management • (NOTE: 2 hour session)**

This session explores advanced features of alarm management in 800xA, including priority, grouping, shelving, hiding, response and analysis.