# 59th ISA Power Industry Division (POWID) Symposium 2016

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# Technical Program

## Wednesday, 29 June
### Building 3, EPRI Campus

**7:00 a.m. – 8:00 a.m.**
Breakfast (EPRI Cafeteria)

**7:00 a.m. – 5:00 p.m.**
Speaker/Conference Check-in (Lobby, Building 3, EPRI Campus)

**8:00 a.m. – 5:00 p.m.**
Vendor Exhibit
Sessions

### Session 5A – GENERATION

**POW16-003:** Disturbance Observer-Based Multi-Model Predictive Control with Application to Superheated Temperature System

**POW16-010:** Model Predictive Control for Increased Steam Turbine Operational Flexibility

**POW16-016:** Calibration Best Practices – Optimal Testing Parameters

**POW16-030:** An Android Based Smart Isolation and Anti-Misoperation System

**POW16-033:** Shift Operation in a Pilot-Scale Oxy-Fuel Combustion Furnace

### Session 5B – FOSSIL

**POW16-007:** Deaerator Water Level Control Techniques in Supercritical Power Plants

**POW16-009:** Control of Feedwater Flow for the Coal-Fired Power Plant Combination of Two Circulating Fluidized Bed Combustion Boilers and One 1,000 MW Steam Turbine

**POW16-015:** NSRs & Clean Power Plan Efficiency Improvements

**POW16-018:** Master Control System for Taean Integrated Gasification Combined Cycle (IGCC)

**POW16-038:** Developments in Simulation-Based Training in Power Plant Dynamics, Control Structure, and Tuning

### Session 5C – CYBERSECURITY

**EPRI –** Decentralized End Point Hardware Based Cybersecurity for Secure Remote Access within Power Generation and Distribution

**POW16-012:** How Machine Learning is Revolutionizing the Cybersecurity Landscape

**POW16-011:** Deterministic Security, Deterministic ROI – Utilizing Data Diodes to Protect Power Plants

**POW16-029:** Intelligent Monitoring and Control: Essential Guidance for Critical Infrastructure Security

Panel Debate

### Session 5D – NUCLEAR

**POW16-002:** Krsko Emergency Control Room – Isolator System

**POW16-023:** Aging Assessments of 40-Year-Old Nuclear Power Plant Cables

**POW16-061:** Applicability of IEC61508 to the Nuclear Power Generation Industry

**POW16-066:** On-Line Monitoring (OlM) Applications for Instrumentation Surveillance Management and Reduction of O&M Costs

**POW16-071:** IEEE Std. 1012 and NEI 96-07, Appendix D – Strange Bedfellows?

**9:45 a.m. – 10:00 a.m.**
Break

**11:30 a.m. – 1:30 p.m.**
Lunch (EPRI Cafeteria)
Vendor Exhibits and Networking

**1:30 p.m. – 5:00 p.m.**
Sessions

### Session 6A – GENERATION

**POW16-005:** Machine Learning and Cognitive Fingerprinting™ Delivers Next Generation Analytics to Improve Safety, Performance, and Reliability in Today's Modern Wind Turbines

**POW16-034:** The Scalability of Diagnostics and Prognostics Algorithms to Big Data Settings

**POW16-046:** Monitoring and Diagnosing Unit Transformers Using Advanced Pattern Recognition and Case-Based Reasoning

**POW16-049:** Advanced Gas Turbine Combustor Health Monitoring Using Combustion Dynamics Data

**POW16-053:** Innovations in Plant-Wide Monitoring Diagnostics & Optimization

### Session 6B – FOSSIL

**POW16-039:** Using a Validated Dynamic Model to Develop and Test Solutions for a Severe MFT Furnace Pressure Excursion

**POW16-043:** Cascade IMC-PID Control of Superheated Steam Temperature Based on Closed-Loop Identification in the Frequency Domain

**POW16-044:** Biomimetic Approach to Control of Energy Systems

**POW16-047:** Two-Degrees-of-Freedom Controller Application in Thermal Power Plant

**POW16-040:** The Use of Simulation to Optimize Equipment Selection and Sizing

### Session 6C – EMERGING TECHNOLOGIES

**POW16-013:** Keeping the Operator in Focus: Building on the Four Pillars of Operator Effectiveness

**POW16-060:** Patch Theory: Robustness/Performance Enhancement of Power Plant PID Control Clusters Through Analytical Design

**POW16-025:** Recurrent Neural Network Application to a Fuel Cell Turbine Hybrid Power System

**POW16-064:** Multi-Input Output Control Strategy for Gas Turbine Hybrids

### Session 6D – RENEWABLE & DISTRIBUTED GENERATION

**POW16-001:** IMC-PID Controller Design for Turbine Control Loop Based on Closed-Loop Identification

**POW16-008:** High Fidelity Model-Based, Simulation and Control of Solar Thermal Photovoltaic Parabolic Through Tracking System

**POW16-017:** Neuroevolution of a Hybrid Fuel Cell Power Plant Simulator Using NEAT

**POW16-020:** Control Solutions for Molten Salt Tower Concentrated Solar Plant

**POW16-027:** Operating PV with Integrated Battery Energy Storage System During Unbalanced Fault Conditions

# Thursday, 30 June
### Building 3, EPRI Campus

**7:00 a.m. – 8:00 a.m.**
Breakfast (EPRI Cafeteria)

**7:00 a.m. – 12:00 p.m.**
Speaker/Conference Check-in (Lobby, Building 3, EPRI Campus)

**8:00 a.m. – 1:00 p.m.**
Exhibitor Showcase

**8:00 a.m. – 11:30 a.m.**
Sessions

### Session 7A – GENERATION

**POW16-019:** The Research of the False Level Phenomenon in the Boiler Drums Water Level

**POW16-022:** Boiler Drum Water Level Instrument Configuration Best Practices

**POW16-035:** A Differential Pressure Multipoint Anti-Blockage Gas Flow Sensor System

**POW16-048:** Sensor Network Design Algorithm for Power Plant Efficiency Maximization and its Application

**POW16-051:** Temperature Field Monitoring in a Small Mimic Boiler Using Optically Generated Acoustic Waves

### Session 7B – FOSSIL

**POW16-054:** Optimal Sensor Placement for Fault Diagnosis in an Integrated Gasification Combined Cycle Plant

**POW16-055:** Distributed Sensor Placement for Condition Monitoring by Using a Novel EKF-GA Approach

**POW16-042:** A Hybrid Simulation Software for Transient Analysis of PV Impacts in Distribution Networks

**POW16-052:** Integration and Control of Solar PV Plants – Present and Future

# Technical Program

## Session 7C – CYBERSECURITY

**POW16-031:** Top Three Considerations for Acing Your ICS Cybersecurity Report Card

**POW16-014:** The Art & Science of Obtaining Funding for ICS Security Projects

**POW16-041:** CyberSquirrel Commando Squad

## Session 7D – NUCLEAR

**POW16-028:** Thermal Flow Sensors for Future Nuclear Power Applications

**POW16-057:** Online Monitoring of Manual Valves Using Wireless Valve Position Indication Sensors

**POW16-063:** Advanced Human-System Interfaces for New Nuclear Power Plants

**POW16-07:** New EPRI Guideline on Preventing or Limiting Digital System

**POW16-072:** Human Factors Engineering Guidelines for Nuclear Power Plant Control Room and Other Human System Interfaces

**11:30 a.m. – 1:00 p.m.**
Lunch and Exhibitor Showcase

**1:00 p.m. – 5:00 p.m.**
Exhibit Breakdown

**1:00 p.m. – 5:00 p.m.**
Sessions

## Session 8A – GENERATION

**POW16-037:** Overcoming Common Objections to High Performance HMI Migration

**POW16-045:** Application of Model Predictive Control (MPC) to Improve Steam Temperature Control on a Pulverized-Coal Unit

**POW16-056:** An Ant Foraging Behavior Approach to Condition Monitoring of Power Generation Plants

**POW16-058:** Control Rooms Based on Video Display Unit Implemented with HFE Methodology

**POW16-059:** Case Study of Economic Benefits with Online Performance Optimization at Power Plants

## Session 8B – CYBERSECURITY

**POW16-069:** Solving the ICS Operations Tech and Information Tech Barriers

**POW16-006:** Convergence of Cybersecurity and Engineered Layers of Protection: Cyber-Physical Integration for the Modern Plant

**POW16-036:** Protecting Multiple Control System Platforms: Does Standardization Even Exist?

**POW16-026:** From the Newspaper to the Network: How Well Chronicled Cyber-Attacks Can Damage Nation's Utilities

Session Developer Debate Topic: Patching an ICS

## Session 8C–EMERGING TECHNOLOGIES

**POW16-004:** Phasor Measurement Units Traceable Type Acceptance Testing in Compliance with IEEE C37.118.1a

**POW16-062:** Imaging a High Temperature Gas-Solid Flow Using ECVT sensors

**POW16-065:** Wireless Battery-Free Microwave Acoustic Sensors for Harsh Environment Power Plant Applications

**POW16-068:** Microwave and Photonics Sensors for in Situ Monitoring in Harsh Environment

**POW16-070:** Optical Fiber Sensor Research at Virginia Tech

## Session 8D – RENEWABLE & DISTRIBUTED GENERATION

**POW16-042:** A Hybrid Simulation Software for Transient Analysis of PV Impacts in Distribution Networks

**POW16-052:** Integration and Control of Solar PV Plants – Present and Future

# Friday, 1 July
**Building 3, EPRI Campus**

**8:30 a.m. – 10:00 a.m.**
ISA POWID Executive Committee Meeting

**10:00 a.m. – 12:00 p.m.**
ISA POWID Symposium 2017 Committee Meeting