Modern Power Plant Controls

Drivers and Recent Activities

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LEAP Workshop
November 3, 2021
Strategic Drivers for Advanced Control

- Operational Flexibility
- Optimizing O&M
- Cost Competitiveness
- Workforce Transition
Program 227 – Process Controls and Automation

- **Key Objectives**
  - Advanced process control strategies for flexible operations
  - Automation development/solutions for consistent operation and reduced operator burden
  - Improvements in existing process control systems
    - DCS management for operational improvements
    - Alarm management logic techniques
    - Improved actuation techniques to minimize process variability
  - Controllability of emerging power systems and low carbon processes
  - Optimization techniques for plants, unit operations and fleet

- **Value to Funders**
  - Plant demonstrations with member participation
  - On demand training via guidance documents and innovative product delivery
  - Novel and emerging control techniques evaluations via EPRI’s Research Simulator

*Improved and integrated process control as well as automation techniques to reduce damage, improve plant performance, and enable consistent operations during flexible operations.*
Program Value Statement / Tech Transfer Awards

- Steam Temperature Control Strategies for Combined Cycle Units, 2019 (3002016316)
  - Tech transfer award recipient
  - MPC successfully deployed on a CC plant with superior performance to PID

- Process Control Strategies for Low Load Operation, 2019 (3002020541, 3002016325)
  - Six controls improvements implemented
  - Lower, stable minimum load
  - Increased efficiency at minimum loads
  - Improved ramp rate from minimum loads

- Increased Automation, 2019 (3002016326)
  - Options, approaches, practices
  - Readiness index developed
Exploring Plant Control Strategies to Support Grid Frequency Response

Objective

▪ Explore gaps in the research related to frequency response in the area of generator and governor controls

Research Value

▪ Understand requirements and gaps of generator and governor control strategies to support frequency response
▪ Better frequency response strategies can help support power system stability

Key Activities/Deliverables

▪ Report on current state and gaps
▪ Developing plant simulations showing techniques and improvements
Digital Demonstration Facility

**Objective**
- Establish a Demonstration Facility that
  - Provides the needed infrastructure to reduce implementation time for demonstration of emerging technologies
  - Creates a data pipeline between utility and EPRI for model development
  - Integrates plant digitization technologies to demonstrate step-change benefits
  - Assesses challenges and benefits of technologies
  - Accelerates evaluation and adoption of beneficial technologies

**Current Status**
- 6 Utilities, International participation
- 12 total projects
- 7 EPRI Programs currently in collaboration
- 3 Universities
- 1 National Lab
- 7 Technology Providers
- 1 OEM
- ~$12.25M in Research
- Extensive use of EPRI’s Data Analytics Stack for data sharing/controls simulator

Accelerated evaluation and demonstration of intelligent technologies
Intelligent and Autonomous Plants Grand Challenge Working Group

- Monthly Meetings
  - Roll Call/Announcements
  - Project deep dives
- Multidisciplinary

- Free to Participate
- Have others that may be interested? Let us know!

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