Today’s Combined Cycle Operational Challenges

The shifting power industry landscape from conventional steam plant domination to more gas-fired generation is significantly changing the operating modes of existing combined cycle plants. More frequent and cyclic operation is creating a host of challenges that are not only increasing capital spending and routine O&M costs, but decreasing plant reliability and availability.

Can your combined cycle units operate reliably through daily cycling to meet increased load demand?

With low gas prices, older combined cycle plants need to quickly change operating modes when renewables are added into the generation mix. Units designed for baseload operation now require increased operational flexibility and more frequent starts.

Are changes in operating mode increasing your O&M costs and the risk of forced outages?

Today’s complex operating profiles require combined cycle units to swing loads quickly while avoiding temperature excursions. This reality comes with reduced performance as well as increased fuel costs and fatigue-related equipment damage.
Emerson’s combined cycle optimization solutions can enhance your plant’s performance by leveraging advanced control concepts. Our experienced consultants review key plant operational and market factors to produce a prioritized list of potential improvements along with an estimated return on investment. Typical benefits are highlighted below.

**Combined Cycle Optimization**

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**Reduced Hot Start Fuel Usage**
Emerson applied its expertise in combined cycle plant control and operations with several Ovation™ advanced power applications to help a utility decrease fuel costs during unit startups. The result was a 67 percent reduction in average 2x1 hot start fuel usage. Additionally, average transition fuel usage – the fuel used to bring another combustion turbine/heat recovery steam generator (HRSG) train online and blend it with the running units – was reduced by 31 percent.

**Decreased Reagent Cost**
Emerson implemented model-based SCR optimization to cost-effectively improve the NOx reduction efficiencies of a combined cycle plant’s installed SCR technology. Emerson’s solution statistically filtered noisy analyzer signals for precise SCR control. The optimization strategy coordinated SCR processes with the catalyst reaction time to reduce reagent slip. After implementation, the plant experienced a 27% decrease in NOx emissions.
Cost-Effective Automation Solutions for Improved Plant Performance

One Platform Delivering Infinite Solutions.

Ovation™ goes well beyond the bounds of traditional distributed plant control. In addition to native advanced applications for optimizing plant operations, Ovation now supports integrated machinery health monitoring and generator excitation as well as embedded simulation and enhanced cybersecurity solutions.

### Application: Reduce Startup Time & Fuel Usage
- Prestart automation
- Procedural automation
- Steam header blending automation
- Steam turbine rotor dynamic stress evaluation

### Benefit:
- Faster, more consistent starts
- Reduced starting fuel usage
- Time-accurate release to dispatch
- Decreased risk of water induction

### Application: Improve Participation in Ancillary Services
- Model-based steam temperature control
- Duct burner AGC
- Model-based load demand control

### Benefit:
- Faster ramping
- Improved heat rate
- Enhanced spinning reserve capability
- Lower O&M costs

### Application: Increase Starting & Operational Reliability
- Advanced inlet pressure control
- Freeze protection
- Advanced gas path trip reduction

### Benefit:
- Improved operational reliability at low loads
- Reduced turbine trips due to balance-of-plant events
- Decreased failed starts or unit trips due to cold weather conditions

### Application: Reduce Emissions
- Model-predictive SCR control

### Benefit:
- Reduced ammonia usage and slip
- Protection of downstream HRSG components
- Extended catalyst life

For more information:
www.Emerson.com/Ovation

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