

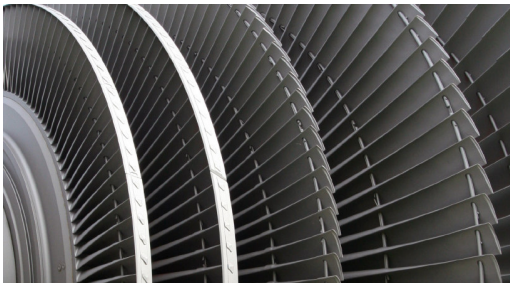
POWER GENERATION



In today's market, tight margins, limited budget and increasing fuel costs adversely affect power-generating infrastructure competitiveness. Enero Solutions is a results-oriented company dedicated to the implementation of advanced engineering technologies that optimize cost efficiency and profitability.

Enero Solutions regularly performs online process and control optimization projects without affecting your day-to-day operation. These performance projects will provide the following benefits:

- **Faster Unit Response** helps you modulate power output and take advantage of higher rates during peak periods and lower power generation during lower power demand
- **Optimize your station's dynamic response** by managing "hard constraints" to maximize the price at which power is sold
- **Improved Heat Rate** during steady state and transient conditions



What can we do for you?

Enero Solutions provides specialized expertise in the following areas:

Addressing Strategic Challenges that Impact Profitability

Dynamic response analysis of a power station is a complex science as many process variables are coupled and have constraints that cannot be violated. These constraints are typically mechanical and thermal and will negatively affect a power station if violated. Examples of hard constraints include furnace pressure operation under a vacuum or required level of a boiler drum to operate at pre-defined low and high limits.

With existing commonly used process dynamics and basic control strategies, the operation team selects a conservative value for a megawatt ramp rate to ensure the continued operation of a power plant. For example, a power plant might limit their MW ramp to 3MW/min based on the fact that a faster ramp rate would put the station at risk of high drum level trip.

In an Enero Drum Level Solutions Performance Project, the optimization work would consist of implementing advanced model-based control logic allowing the drum level to operate further away from its limits thereby enabling the operators to select faster unit ramp rates thereby

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improving the profitability for the power station.

Full Integration for Superior Performance and Lower Costs

The Heat Rate (HR) of a power plant is defined as the amount of energy needed to produce one kWh of net electrical energy. The evaluation, tracking and reduction of the HR are critical to the profitability of a unit. During steady state conditions, the capability of steam turbines or gas turbines to convert energy into power depends mostly on their efficiency, process operating conditions and process variability. **Enero Solutions** Performance Project reduces overall process variability by:

1. Allowing the operation team to shift process setpoints closer to the equipment constraints. For example, a reduction in steam temperature variability allows an increase in steam temperature setpoint
2. Increasing the power throughput of the unit. For example, the heat rate is higher if the main steam header peak-to-peak variation is 20 psi instead of 10 psi
3. Improve long-term equipment efficiency. For example, steam turbine efficiency will drop faster if a 20 degree cycle exists in the process



Enero Solutions consultants have the experience to improve power station control through the implementation of Advanced Process and Control technologies to manage the following key variables:

- Furnace Draft
- Excess Air
- NO_x Emissions
- Drum Level
- Steam Temperature

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