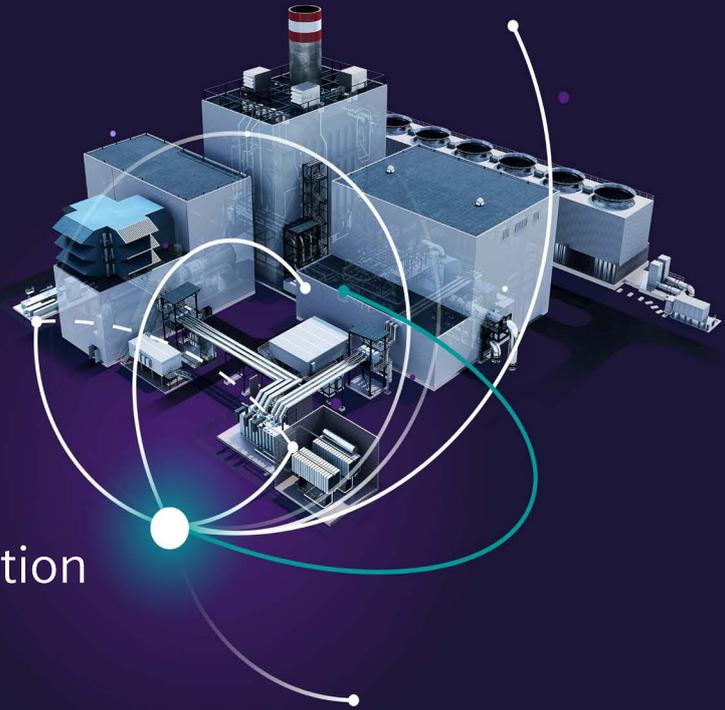


Es Murterar Power Station, Endesa, Spain

Reduced operating costs and improved efficiency by digitalization of combustion dynamics



The Plant

Endesa is the largest energy supplier in Spain with more than ten million customers annually. Its thermal power plant Es Murterar, which is located in Alcudia, consists of four steam turbines and two gas turbines and generates a total output of 585 MW, which covers approximately 70% of the energy demand of the island of Mallorca.



The Task

Boosting plant performance without major investments and keeping emissions as low as possible sounds like an impossible challenge? Endesa was looking for just such a solution: an option to boost Es Murterar's plant efficiency, without major modifications of its mechanical equipment, while at the same time limiting emissions. Endesa was also aiming to use contemporary, digital means to achieve their goals.

The Solution

In order to achieve these objectives Endesa worked closely with Siemens Energy in form of a pioneering digitalization project with performance optimization solutions from the Omnivise Digital Services Suite. Siemens Energy and Endesa rooted for a combination of the solutions Sootblower Optimizer and Combustion Optimizer for improved sootblowing and a more homogeneous and thus efficient combustion in order to optimize the efficiency of the entire plant process. It is a closed-loop solution which interacts continuously and automatically with the combustion process.

0.83%
increase in
plant
efficiency

The solution for the improvement of overall process efficiency comprises three steps:

1. Digitalization of the combustion dynamics:

using laser technology, the main combustion parameters (temperature, oxygen, CO, CO₂, water) are directly measured in the combustion zone at 1000°C and not, like with other approaches, far away at the outlet of the boiler (burner) at 300°C. This enables greater transparency of the processes in the boiler, as well as an easier monitoring of the combustion process and the distribution of temperature, oxygen and CO.

2. Automation of the combustion process:

leads to reduction of the manual mode during operation. Combustion Optimizer supports more flexible operation of the boiler by manipulating fuel and air control settings via closed-loop biases. This improves the combustion characteristics in the boiler, making it possible to operate in the optimum zone while keeping emissions low. By means of digitalization the optimized firing control significantly contributes to improved efficiency.

3. Optimized operation of soot blowers:

Condition-based sootblowing balances the heat transfer to the water-steam cycle and the effects of fouling against other parameters, including cleaning intervals and the long-term effects of ash removal. An optimal sootblowing schedule minimizes the impact on hardware and operations and helps to minimize operating costs. This way, Sootblower Optimizer perfectly complements the Combustion Optimizer solution: While the Combustion Optimizer handles the fuel-air coordination and related heat generation, Sootblower Optimizer ensures that the subsequent transfer of heat is shaped and controlled, so as to complete the task of boosting efficiency.

The optimization solution is adaptive to the varying operational boundary conditions, e.g. coal type and quality, and is designed to perform under variable process conditions.

The visualization to the operator of specific optimization targets, process limitations and resulting interaction with the process leads to performance improvement and a reduction of unscheduled shutdowns.

The Result

- **Increased plant efficiency:**
Remarkable 0.83% increase in plant efficiency
- **Reduction of operating costs**
- **Higher level of automation of combustion**
- **Reduction of coal consumption and emissions**



“The combustion optimization project is an innovative project, a reference for Endesa worldwide, which combines digitalization with operational efficiency.”

Pablo Gutiérrez, Director of Alcudia thermal power plant, Endesa

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