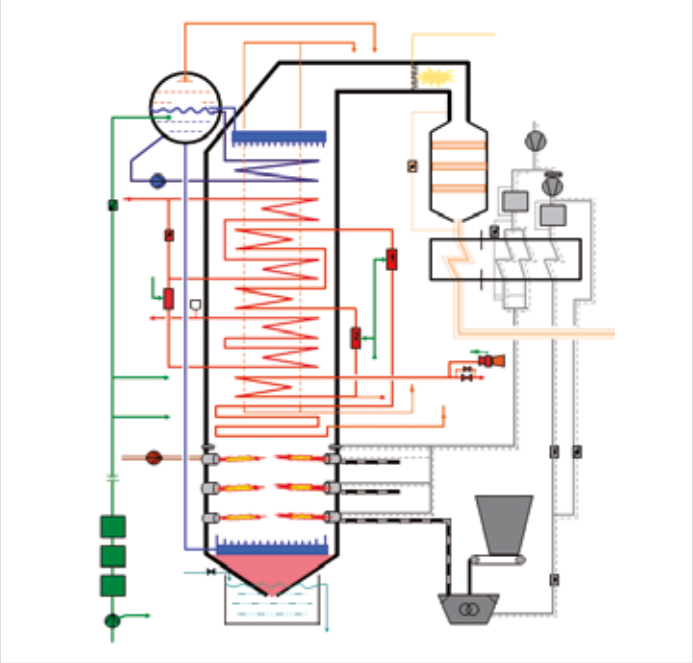
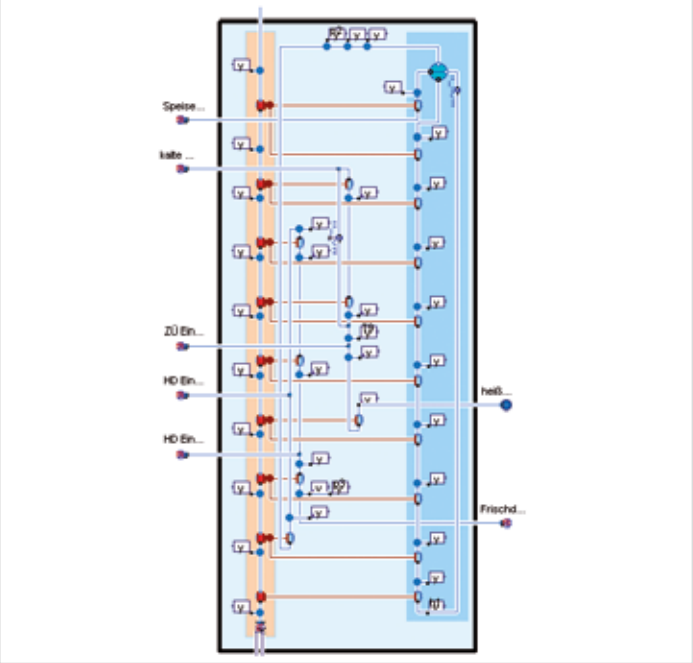
Efficiency for Power Generation

# SootBlowMax
# Monitor cleanliness of individual boiler sections

ABB's SootBlowMax uses rigorous boiler modeling for heat transfer calculations to determine actual heat transfer performance from measured operating data. Expected performance data is calculated for similar operating conditions from predictive boiler model.





**The combustion of coal generates a lot of ash deposits on boiler walls and heat exchangers, called boiler fouling. The ash layer insulates the heat exchanger surface, reduces heat transfer from flue gas to steam and causes higher flue gas boiler exit temperature eg, increased heat losses.**

## Challenge

Sootblowing cleans the heat exchanger surfaces i.e. increases efficiency, but entails costs for steam or compressed air. It is a plant operational task to tradeoff between costs for blowing and heat losses. Also cleaning soot-free surfaces can cause tube erosion over time.

## Solution

OPTIMAX® SootBlowMax allows to adjust the soot blowing to the actual operating conditions, maximizing overall boiler efficiency. SootBlowMax determines the cleanliness of individual boiler sections. The result can be visualized in operator screens and used as advisory information. Moreover the result can be exploited to optimize automatic triggers of soot blowing sequences. This enables

- Optimized operation of soot blowing system
- Continuously taking into consideration the performance of furnace, water walls, super heater, economizer, air heater based on continuous on-line measurements
- Selective soot blowing per boiler area based on trends of zonal absorption
- Using a boiler model that is configured and tuned to unit-specific boiler data
- Accounting for costs due to sootblowing (e.g. steam consumption) vs. increased revenues due to the effect of soot blowing (the cleaning improves boiler efficiency).

## Services

ABB takes over complete turnkey responsibility for engineering, installation, training, commissioning and support.

## Working Principle of SootBlowMax

The boiler efficiency decreases and the heat losses increase with the amount of soot on the heat transfer areas. The heat losses can be decreased by applying sootblowing more frequently (mid-blue curve). On the other hand side heat is lost during sootblowing through the used steam ( dark blue curve). Optimal sootblowing determines the overall optimum (minimum of light blue curve). The optimum changes depending on the fuel used and actual operating conditions. This is why an online calculation is beneficial.

The existing operational measurements are used to solve the boiler model backwards for unknown flue gas temperatures and heat transfer coefficients. This gives the cleanliness per boiler section over four days as plotted exemplary in figure 2.

SootBlowMax is based on a detailed steady-state boiler model covering the flue gas side, the water/steam side and all relevant heat transfer areas.

The boiler models are built using a graphical user interface and a standard model builder software together with ABBs boiler library.

Mass and energy balances as well as heat transfers are calculated for each key heat transfer section of the boiler.

The specific objectives include improved overall heat rates, and reduction of unnecessary losses and tube erosion due to excessive soot-blowing.



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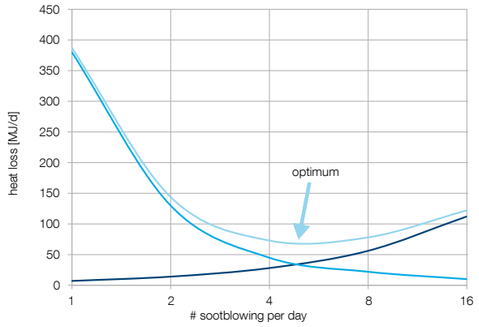

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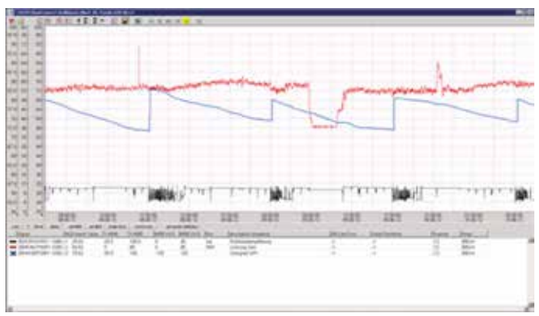
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**1 Mainova STPP HKW West 2 | 2 Sask Power STPP Boundary Dam Unit 3 | 3 Matla STPP Unit 3, Unit 6**

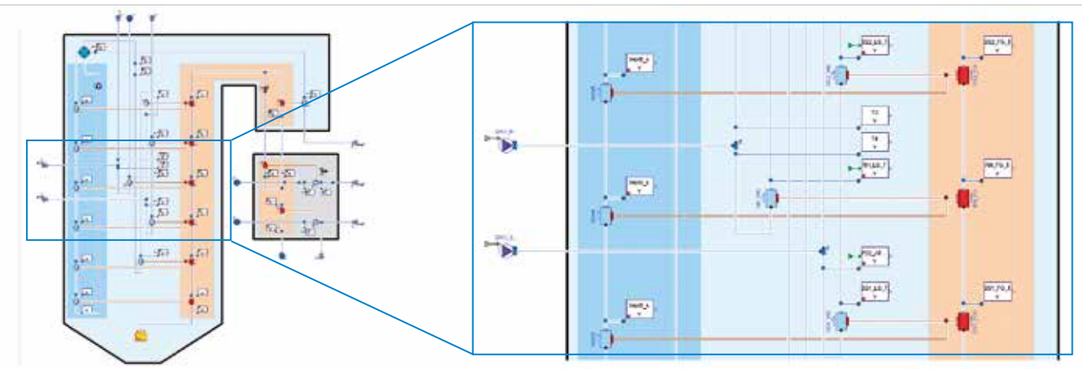
**1 Visualization of the optimization objective | 2 Cleanliness per boiler section over four days | 3 User interface for graphical modeling**




1



2



3

## Benefits of SootBlowMax

- Improved overall heat rate
- Reduction of unnecessary losses and tube erosion due to excessive soot-blowing
- Advice to operators improve operator decissions

## Selected references

### Mainova STPP HKW West 2, Germany

Coal fired unit, 61 MWel, 105 MWth

### Sask Power STPP Boundary Dam Unit 3, Canada

Coal fired unit, 139 MWel

### Matla STPP Unit 3, 6, South Africa

Coal fired unit, 600 MWel

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