Optimization of Fired Heaters & Boilers

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Sector: Multiple

Why chose **ORTO** for this application?

The challenge with fired heaters and boilers is to allow for non-linearity and changes in process dynamics as operating demands vary. For some smaller systems (e.g., smaller packaged boilers), the return on investment is often insufficient to justify installing traditional real-time optimization technologies.

ORTO schemes however are easy to design and implement, significantly reducing the time, cost and expertise needed. This means optimization can be economically justified on fired heaters and boilers, where only relatively small energy saving opportunities exist.

The technology is also very scalable, enabling optimization to be applied to a small scope and then expanded easily over time to capture increased savings.

Business Objective

Minimize energy use and manage the risk of sub-stoichiometric operation, when faced with changing operational needs. For example, changing steam demands, electricity generation, heated stream temperature, kiln clinker qualities etc.

Typical Optimization Objective Function

Minimize cost of combustion fuel, whilst meeting operating needs and ensuring equipment safety.

By manipulating, within a permitted range:

- Air to fuel ratio
- Fuel ratios, if a range of fuels are used
- Preheated air temperatures
- Air flow splits to different regions of the fired equipment
- Duty split between parallel equipment (e.g., preheat trains, parallel furnaces or boilers)

Subject to the following constraints:

- Equipment temperature limits
- Stack gas quality limits e.g., excess O2, CO
- Exit temperatures and / or pressures

Solution

On most fired heaters and boilers, 2 to 4 agents will be sufficient. On more complex systems up to10 or more agents may be required.

Benefits

The typical benefit is a 2-5% reduction in energy use.