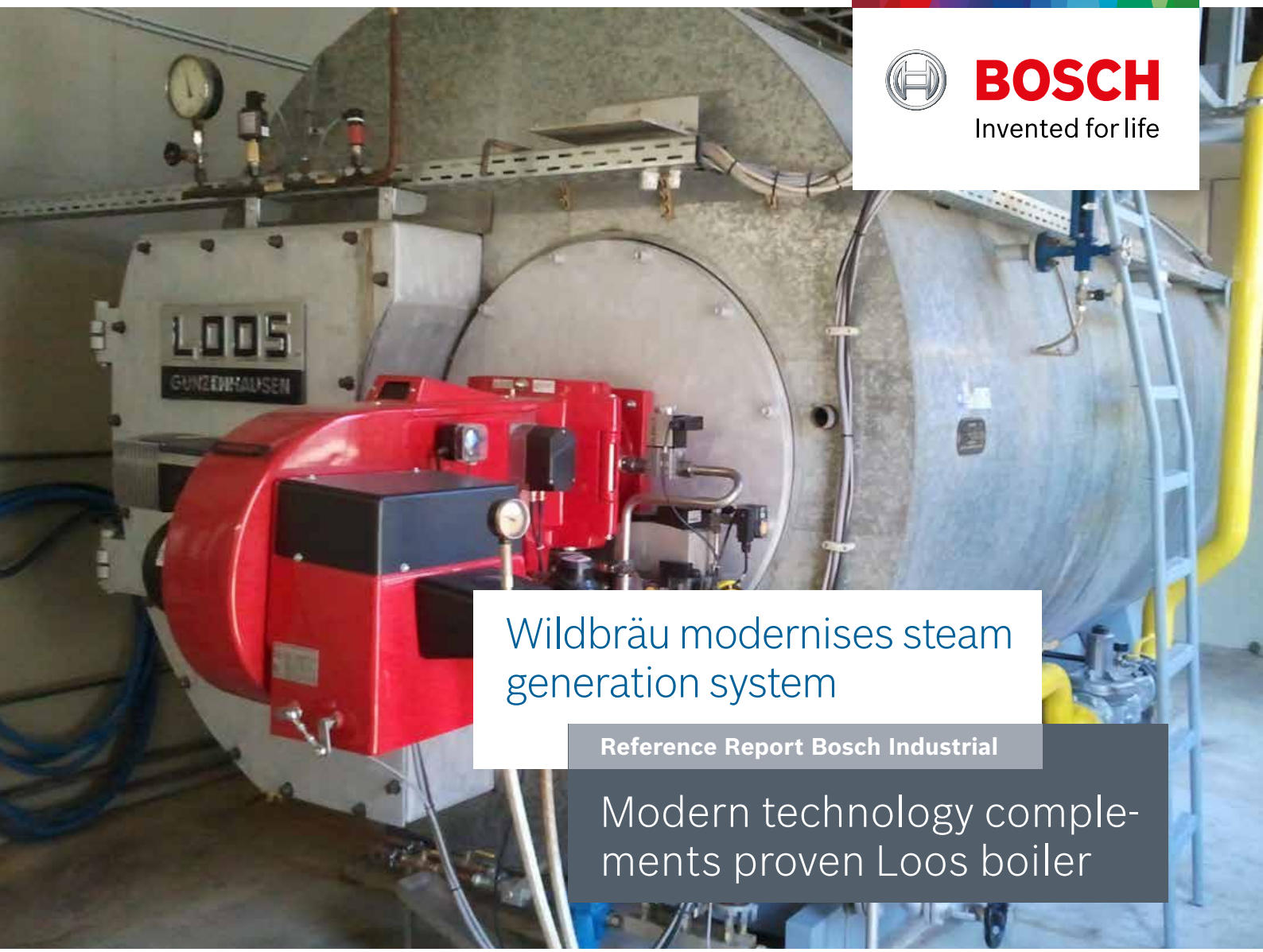

BOSCH
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Wildbräu modernises steam generation system

Reference Report Bosch Industrial

Modern technology complements proven Loos boiler

The operator

Since 1616, the Wildbräu brewery has dedicated its almost 400 years in existence to preserving the importance of time-honoured recipes and Bavarian brewing culture. As part of this, it relies on using home-grown, high-quality raw materials in its production processes. Around 30 employees at the brewery's site in the town of Grafing carry out traditional brewing methods to create the unmistakable taste that comes with Wildbräu-Grandauer specialty beers.

The project

A UL steam boiler from Loos with an output of 4 tons of steam per hour has been responsible for supplying the process steam since 1978. The brewery decided it was time to modernise this system in order to bring its energy efficiency in line with modern standards.

An economizer was retrofitted to ensure efficient use of the flue gases, which can reach temperatures of up to 230 °C. The boiler feed water is preheated while the flue gas temperature is reduced by around 100 °C. The boiler efficiency is increased through the reduction in flue gas losses of approximately 5 percent; similarly, fuel consumption is reduced at full load.

To boost efficiency levels even further, the existing light oil burner was replaced with a state-of-the-art dual burner. Natural gas is used as the main fuel and light fuel oil is only used during peak load operation or in an emergency.

An electronic combined control now ensures correct dosing of the fuel/air ratio. In the old burner, the combined control was a mechanical type. As time passes and machinery ages, the wear exerted on mechanical components creates an increasingly high level of backlash (hysteresis), which means that more excess air is required. As a result, an unnecessary high amount of cold air is heated. This reduces

Increased efficiency: The new firing with speed regulation and oxygen control as well as the retrofitted economizer.

efficiency levels. Using a firing with electronic combined control, however, enables the excess air level to be set with greater precision, which in turn creates savings.

In addition, the new firing enables completely infinitely variable operation with a turndown ratio of 1 : 5 during gas operation. The previous oil burner was only able to achieve a turndown ratio of 1 : 2. Consequently, the burner can now adapt itself much more readily to actual steam requirements. If, for example, just 30 percent of the steam quantity is required instead of the nominal load, the burner output is simply reduced. In the old burner's case, this kind of output reduction led to pulsating burner operation. This resulted in a sequence of events where the firing mechanism was switched off, pre-ventilation* was carried out with corresponding energy losses, the firing mechanism was switched back on and then, a short time later, switched off again.

The fan motor of the old burner was operated at a constant speed and the air damper varied the air quantity. The new burner regulates the motor speed of the fan in relation to the actual burner output. The electrical power consumption in the partial load range is considerably lower and at the same time there is also a significant reduction in the sound pressure level.

Even the oxygen content in the flue gas is continually recorded (see page 3). If this is too high, making combustion ineffective, the volume of combustion air is reduced. As a result, there is no need for increased levels of excess air, as is required in conventional systems. The oxygen regulation thus optimises the efficiency of the burner system, reduces its environmental impact, and helps to save energy costs.

The process of optimising systems requires in-depth analyses before any work is actually carried out. PLC based boiler management systems provides high data transparency. The new integrated BCO boiler control includes all the necessary information and functions for optimised boiler operation. The touchscreen display visualizes a wide range of information such as operating states, operating data and measured values.

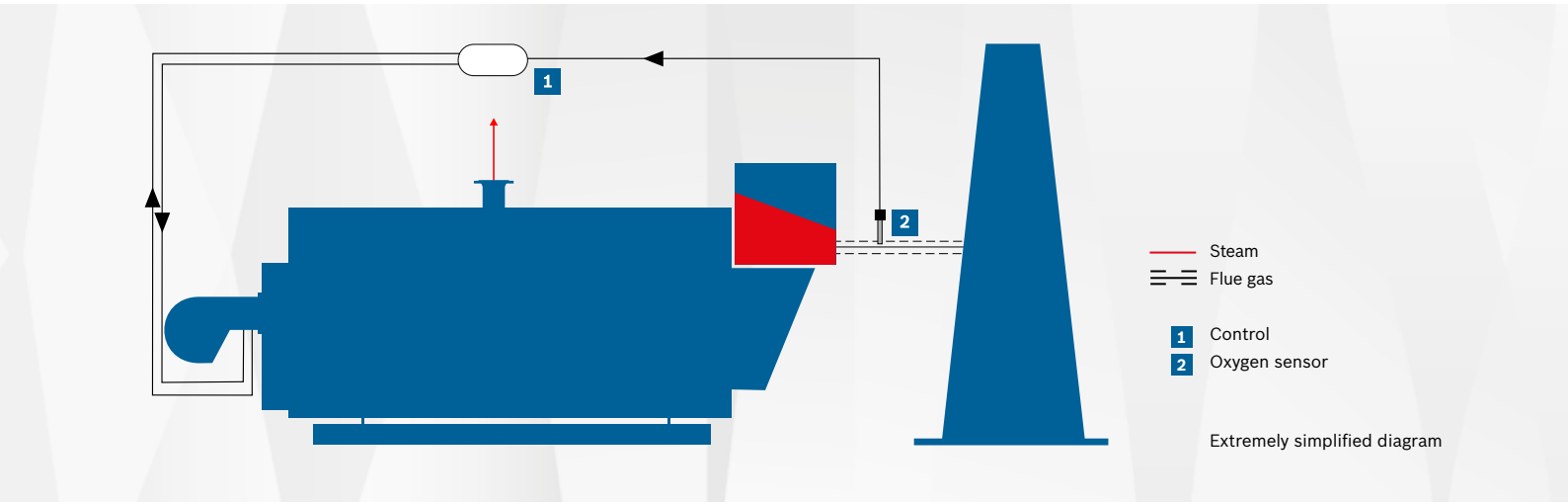
Implementation phases of the modernisation measures

- Retrofitting an economizer
- Replacing the oil burner with a modulating dual burner
- Use of energy-saving speed regulation
- Combustion-optimising control that monitor the remaining oxygen content in the flue gas
- Optimising the system control with the help of a modern, programmable control

The result: Annual cost savings of 36,000 euros

Thanks to the measures taken, Wildbräu Grafing GmbH has been able to reduce the energy consumption of the system by approximately 90 MWh hours per year. The modernisation and switch to natural gas save the brewery around 36,000 euros in running costs per year. The return on investment is 40 percent. In addition, the CO_2 emissions are reduced by 21 tons per year.

**Explanation of pre-ventilation losses:*
For safety reasons, the flue gas ducts in heat generators are „pre-ventilated" before firing. This means that, rather than firing taking place, the first stage involves the firing fan starting up as required. This is intended to render harmless any potentially ignitable mixtures that could have formed in the event of a fault. Three changes of air in the flame tube, smoke tube and flue volume are required. This does, however, involve a certain amount of energy loss as cold intake air is conducted via the heating surfaces of the boiler. Switching the firing mechanism on and off too frequently should be avoided.



Schematic diagram oxygen control.

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