



# Reference Report

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**BOSCH**  
Invented for life

## System concept comprising conventional and renewable energy sources

### The operator

Founded in 1971, Fixkraft Futtermittel GmbH, which has its headquarters in the Danube port town of Enns in Austria, produces high-quality animal feed for all types of livestock. The company's portfolio comprises approximately 420 specially developed feed mixes structured in various ways, ranging from mealy feed to pellets and feed in the form of muesli. With approximately 80 employees and an annual production output of around 180,000 tons, Fixkraft is the largest privately owned manufacturer of compound feed in Austria.



### The project

As a result of an increase in production capacity, in 2012, Fixkraft decided to restructure its energy supply. Alongside reliable and cost-effective steam provision, an important criterion in the decision-making process undertaken by the feed manufacturer was the use of alternative energies. Finally, a system concept combining conventional and renewable energies from plant construction company Ing. Aigner Wasser - Wärme - Umwelt GmbH in Neuhausen/Krems, Austria was selected.

A steam boiler from Bosch Industriekessel with an output of 2,500 kg of steam per hour, combined with a solar thermal system, provides the process heat required to manufacture the animal feed. Production runs all year round, around the clock. The saturated steam is introduced directly into the product, meaning that the amount of condensate that is returned is very low. A solar system with an installed collector area of 320 m<sup>2</sup> is used to help preheat the feed water.



The modern Universal ULS steam boiler

The solar system helps to heat the feed water

### Feed water heating with solar energy and heat recovery

The fresh water needed is taken from the company's own well. A softening system removes ions causing hardness (calcium and magnesium) from the raw water and forwards it to an osmosis plant for desalting. The softened water is pressed through a membrane at high pressure. The majority of the salts and all other substances are left behind and the pure water that exits the membrane is fed into a heat storage tank with a capacity of 6,000 litres.

The collectors in the solar system absorb the sun's rays through the absorber plate. A heat transfer fluid flows through the collectors and is heated. The energy is passed on to the water in the heat storage tank via a heat exchanger. The tank temperature increases to up to 90 °C. The cooled liquid is fed back to the collector so that it can be warmed up again there.

The sun's energy is passed on to the water in the heat storage tank



The Bosch WSM-V water service module degases the make-up water in order to remove active gases such as carbon dioxide and oxygen. The water is heated to approx. 103 °C, causing the gases contained in the water to dissolve and leave the degassing system with a small quantity of steam (exhaust vapour). This exhaust vapour also contains useful thermal energy. The vapour is condensed in a vapour cooler and reduced to the permissible waste water temperature. The thermal energy is taken from the make-up water and fed back into the degassing system. The quantity of heating-up steam of the water service module is reduced and the energy efficiency of the plant increases.



The water service module provides the boiler with treated feed water

The feed water itself is heated further in the economizer, to approx. 139 °C. As a consequence, the flue gas temperature of the boiler falls to approx. 127 °C.

For a further increase in efficiency, a condensing heat exchanger made of stainless steel is installed downstream of the economizer. The water preheated by the solar system from the storage tank is used for flue gas condensation at the pipe walls of the flue gas heat exchanger. The resulting condensation heat heats the make-up water for the degassing process. Efficiency is increased.



The condensing heat exchanger increases the efficiency of the plant

### Firing system

The steam boiler is fitted with a modern modulating gas burner. The speed-controlled fan reduces electricity consumption. The fan speed can be flexibly adapted to the actual burner capacity, whereas in conventional burners the combustion air fan runs at full speed even in the low power range. As well as electricity being saved at partial load, noise emissions are reduced.

Integrated oxygen regulation monitors and optimises the combustion process. It continually measures the oxygen content in the flue gas and controls the air supply accordingly. Compared with conventional systems, increased excess air can be avoided. The efficiency of the plant increases and emissions are reduced.



### Control system

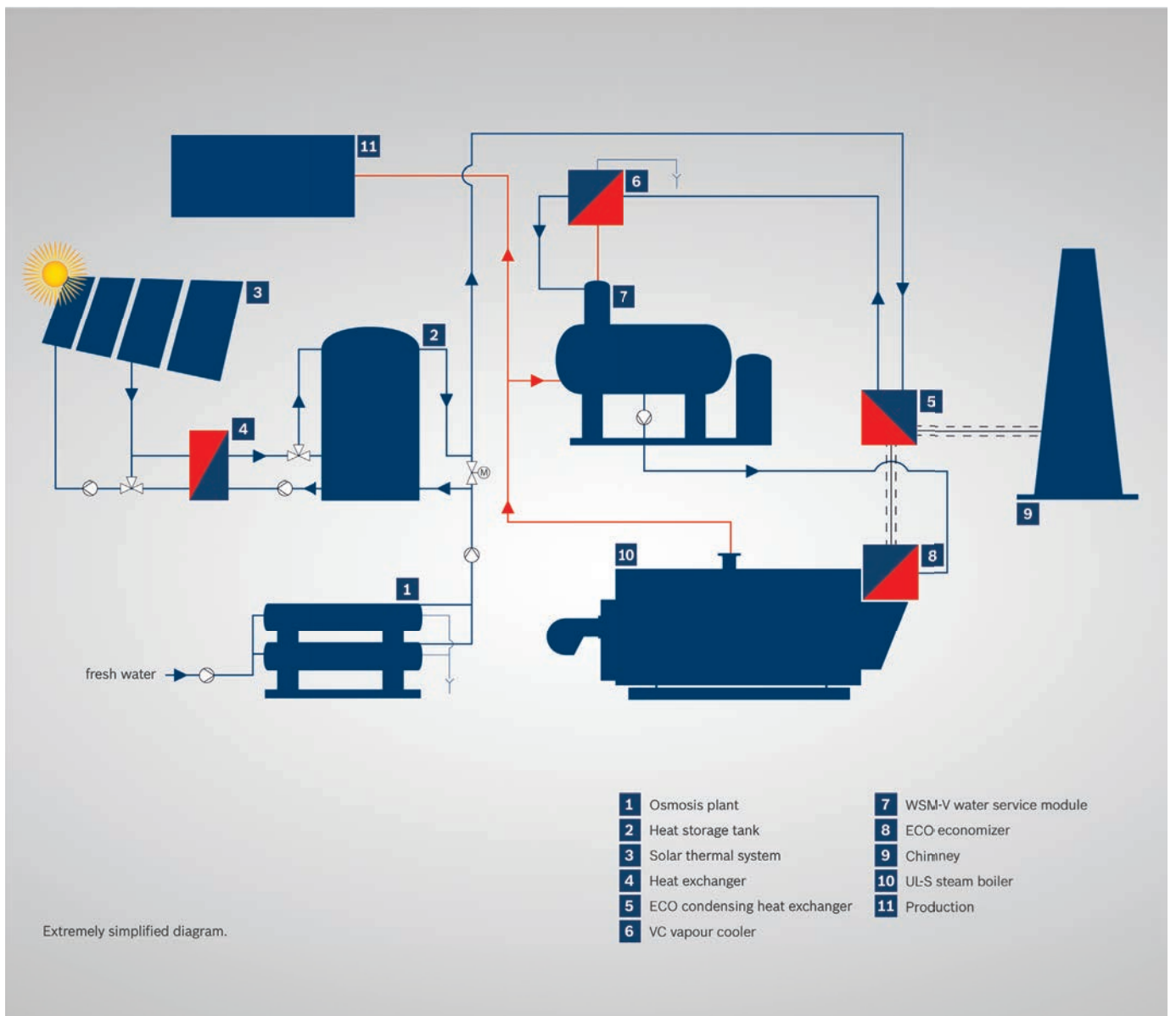
Modern touchscreen controls optimise the operation of the boiler and the plant. All operating data (fuel consumption, steam quantity, pressure history and the number of times the burner is switched on and off, for example) is saved in the management systems and can be accessed in the form of line graphs or total figures. They are equipped with integrated monitoring and protective functions to prevent incorrect operation, so safeguarding the steam supply. A remote service connection is also available, allowing operating data to be accessed, analysed and optimised remotely.

**Implementation phases of the modernisation measures**

- ▶ Building of a new boiler house
- ▶ Installation of a solar thermal system on the company site
- ▶ Integration of a modern steam boiler with integrated economizer
- ▶ Use of oxygen-regulated and speed-controlled firing
- ▶ Installation of a downstream condensing heat exchanger
- ▶ Installation of a water treatment plant
- ▶ Integration of programmable controls with remote service function



The excellent data transparency of the boiler control enables operation to be optimised



System diagram steam boiler combined with a solar thermal system and heat recovery equipment

## The result

Compared with the old plant, Fixkraft is achieving an energy saving of around 15% with the combined steam boiler/solar thermal system. It is also cutting its CO<sub>2</sub> emissions by 85 tons per year. The use of solar energy and heat recovery equipment has resulted in a solution for heating feed water that is both cost-effective and environmentally-friendly. Energy use is reduced and efficiency increased.



## Participating companies

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