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Perfect combination: CHP unit with 4-pass boiler

Reference Report Bosch Industrial

Electric power, heat and steam for Traunstein Hospital

The operator

The Traunstein Hospital is an academic teaching hospital of the Ludwig-Maximilians-University Munich and a hospital with regionally specialized medical services in diagnosis and therapy. As the largest hospital in the “Kliniken Südostbayern AG” hospital association the Traunstein Hospital ensures medical care for the city of Traunstein and the entire southern Chiemgau region. 518 beds at 22 wards, two emergency rooms and the central sterilization department have to be supplied with energy 24/7. Additionally there are several day hospitals and competence centers. Attached to the Traunstein Hospital is the rescue helicopter station “Christoph 14”.

The project

As part of the renovation of its central energy generation and sterile supply department, Traunstein Hospital has decided for an efficient system solution from Bosch. The system consists of a combined heat and power unit (CHP) and a four-pass boiler that are perfectly matched with each other. In the future the system will provide part of the required electrical power and heat, as well as the required process steam for the hospital operation. The energy system is completed by intelligent Bosch control technology. The integrated remote technology MEC Remote, for example, facilitates the forward-looking monitoring of the CHP unit. The retrieval of relevant system data is performed by the means of a protected web portal with commercially available devices – similar to online banking via PC, tablet or smartphone.

Effective use of waste heat sources: The CHP waste heat with temperatures of up to 550 °C are passed through the fourth pass of the steam boiler and used for the steam generation.

Simultaneous generation of heat and power

For energy-intensive operations such as hospitals the use of CHP units is especially profitable. The continuous, simultaneous power and heat demand ensures long operating times and thus substantially contributes to reduce electricity costs. Additionally the locally produced power causes just half as much CO_2 emissions as power from the German grid. The Bosch CHP unit in the Traunstein Hospital has an electrical output of 237 kW and a thermal output of 374 kW. The waste heat of the motor powered by natural gas is used to preheat the feed water for the steam generation, to heat the building and for DHW heating. In addition it is used to heat the helicopter platform of the hospital during the winter months. The landing pad is thus free of ice and snow and ensures a rapid treatment of emergency patients.

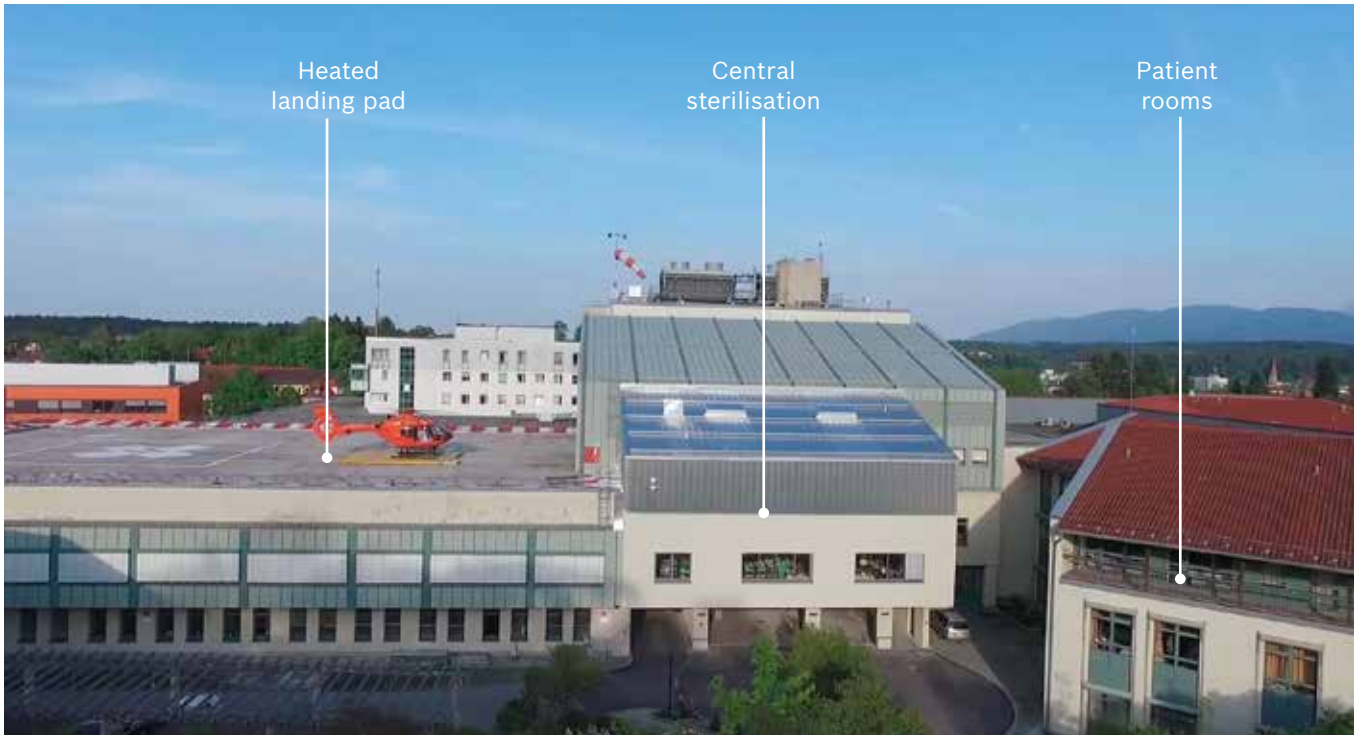
Perfectly combined – CHP unit and 4-pass boiler

In order to further increase the efficiency of the system, the remaining flue gas heat of the CHP is used for steam generation in the Traunstein Hospital. Therefore the UL-S steam boiler is equipped with a fourth pass where the flue gases transfer heat to the water. Together with the natural gas-powered firing the boiler generates up to 1,600 kg of steam per hour. A downstream heat exchanger ensures that maximum heat is recovered from the flue gases. The hospital benefits from an extremely economic, continuous steam supply for optimal sterilization and hygiene.

Maximum security in the hospital operation

In order to ensure maximum steam supply reliability, a 3-pass steam boiler with heat maintenance is additionally integrated in the hospital. The heating coil at the boiler end keeps the steam generator warm at reduced pressure. This ensures a significantly faster availability and increases the service life of the system due to less cold starts. With the integrated economizer the heat of the boiler flue gases is used to preheat the feed water. The lower emissions and reduced fuel input preserve the environment and save operating costs. Additional equipment for heat recovery and modules for water treatment and automation complete the total system. These perfectly matched components increase the energy efficiency and ensure a long service life.

Furthermore, a heating boiler UT-L supports heating with an output of up to 1,900 kW. In combination with



Main consumer of steam and heat in the Traunstein Hospital.

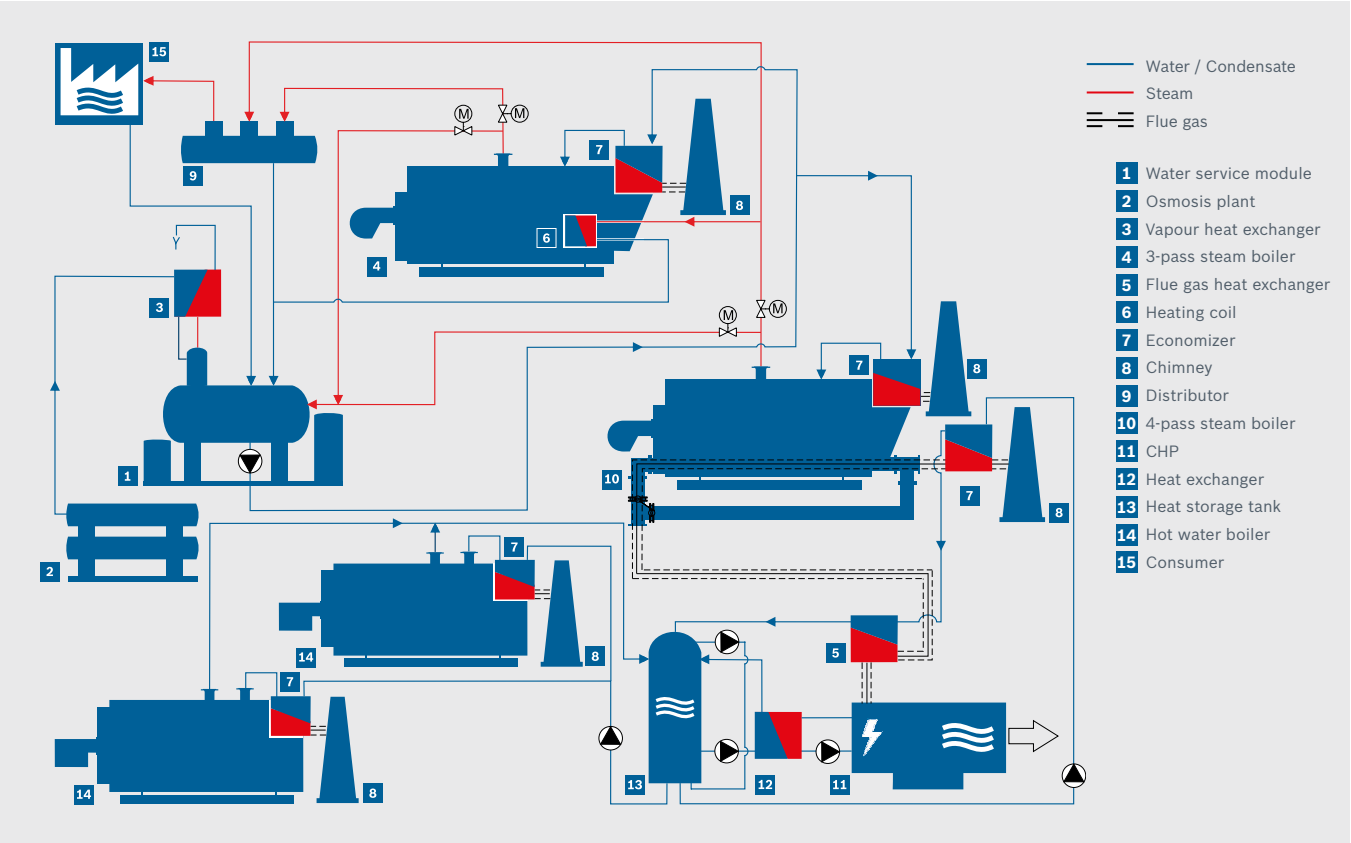
a flue gas heat exchanger the boiler reaches an efficiency of more than 98 % in gas operation mode. Thanks to the dual fuel burners both backup boilers can also be operated with light fuel oil in case of gas supply shortages. This maximizes the reliability.

The conception and planning of this pioneering system was carried out by the consultant engineers Dickert Beratende Ingenieure GmbH. The fitting and installation of the energy system was performed by the plant construction company Auma-Tec during ongoing operation without interrupting the supply. The existing steam and hot water boilers (built 1986) were replaced with new Bosch energy generators step by step. Crucial challenges were the limited space in the basement and the insertion of the CHP unit and the boilers through a narrow shaft.

The result

The Traunstein Hospital benefits from a throughout reliable energy system from a single source. The use of and the compensation for self-generated power as well as the efficient use of waste heat sources for the steam generation keep energy costs low: around 11 % can be saved every year. The reduced gas consumption and considerably lowered emissions preserve the environment and natural resources.

The commissioning of the total system and the comprehensive instruction of the operator's staff was carried out by the Bosch customer service – for an optimally adjusted boiler system and efficient operation.



Simplified schematic diagram of the energy supply system in the Traunstein Hospital.

The companies involved

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