

Efficiency solutions for biomass boiler plants

About

The second stage flue gas condensing economizer together with the absorption heat pump allows the recovery of additional heat from the low-temperature potential heat source. This technology differs from a compressor heat pump in that the driving force is not electricity, but heat with a high temperature potential. This equipment increases the efficiency of the existing boiler plant, allows for efficient use of fuel, emits less CO₂ and helps reduce the cost of thermal energy for consumers.

System advantages



HEAT RECOVERY FROM FLUE GAS, WHICH INCREASES THE EFFICIENCY OF THE BIOMASS BOILER PLANT BY 8-12%
(in terms of boiler thermal input)



GREEN INVESTMENT



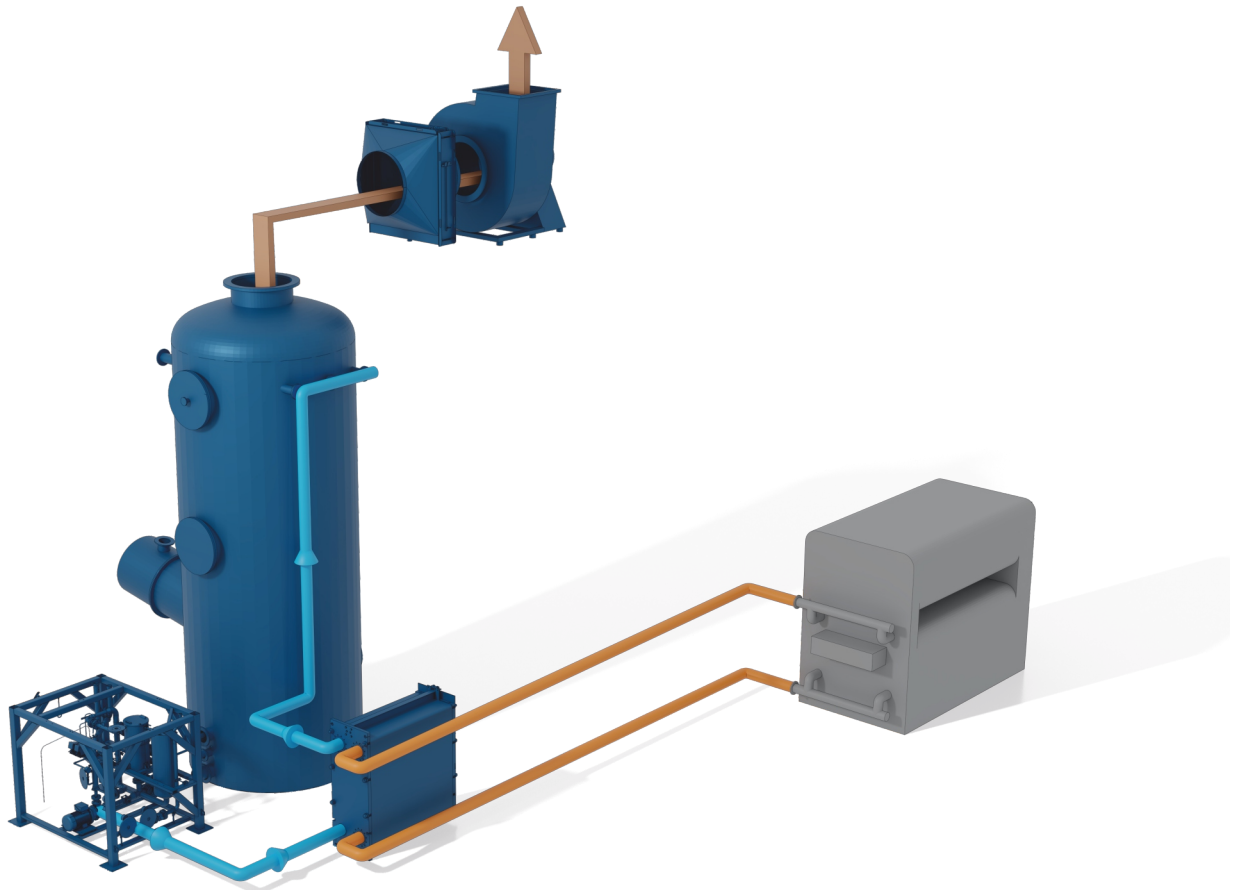
SUPPORT FROM EU FUNDS



REDUCES THE COST OF ENERGY PRODUCTION



SUITABLE FOR BOTH RENOVATED AND NEWLY BUILT FACILITIES



Absorption heat pump



The absorption heat pump is used for continuous cooling of liquids such as flue gas condensate. The absorption heat pump requires:

- Hot process fluid (water or steam) at a temperature of at least 110 °C, in some cases up to 80 °C, such as hot boiler water or steam.
- Warm process water up to 50 °C, for example, return district heating water.

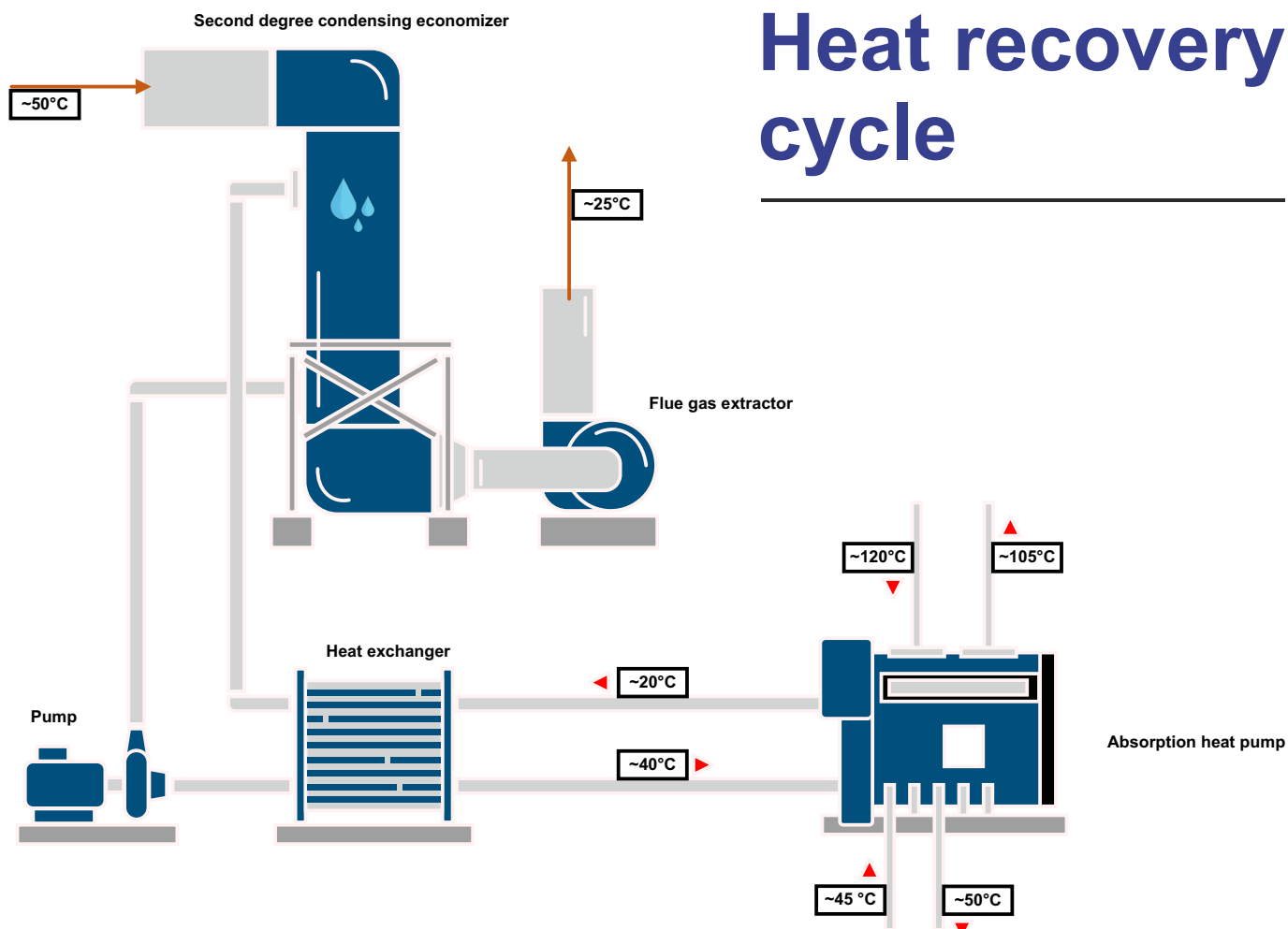
IMPORTANT: the technology must contain a medium with a low temperature energy potential, such as flue gas.



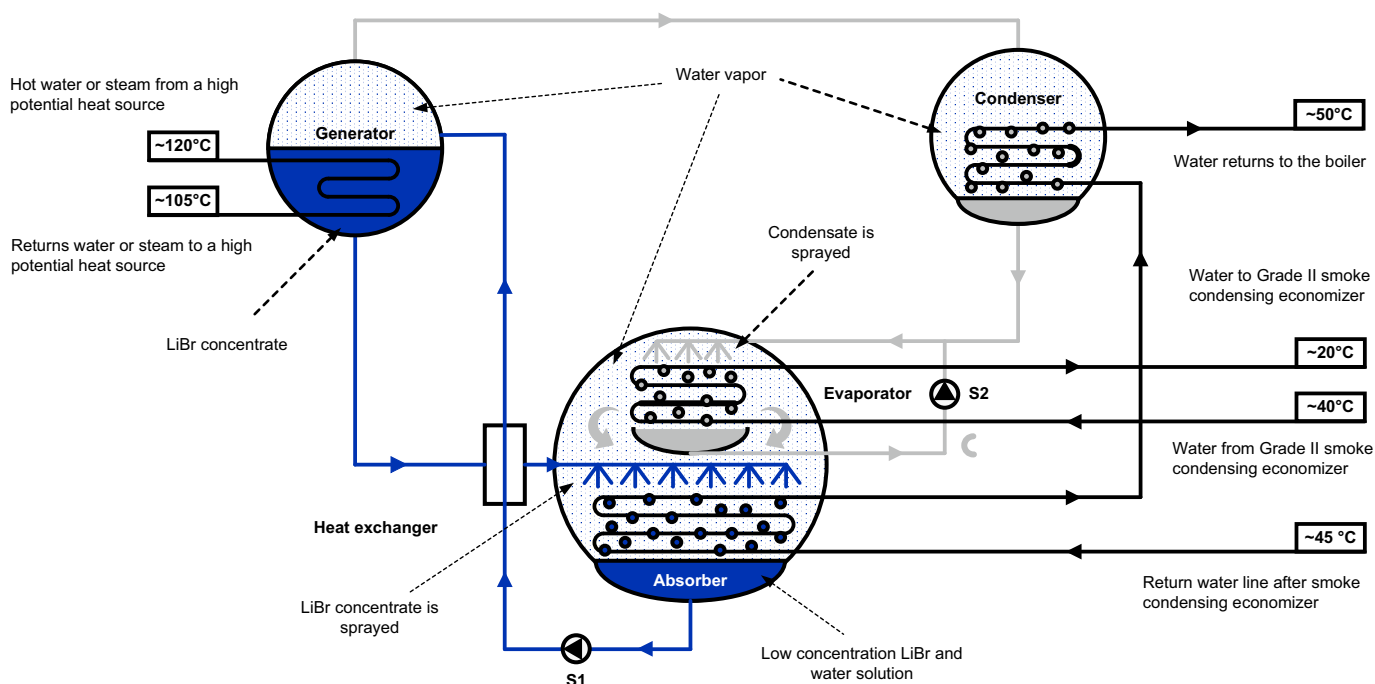
Second stage flue gas condensing economizer

The second stage condensing economizer uses condensate to cool the flue gas. The said condensate is constantly cooled in an absorption heat pump, so the heat recovered from the condensate will be transferred to the heat networks. For thermal input up to 3 MW, we can offer a GRP (glass fibre reinforced plastic) composite flue gas condensing economizer.

The flue gas condensing economizer is designed to recover additional residual heat by cooling the biomass combustion products (flue gas) to 22-35 °C. The main exclusive feature of economizer is the solid construction, which is obtained using Glass fibre Reinforced Plastic (GRP) moulding technology. For higher capacity, we can offer a vertical flue gas condensing economizer, the maximum thermal input of which can be adjusted according to your needs and technological possibilities.



The absorption heat pump consists of an evaporator, an absorber, a condenser, a generator, a solution heat exchanger, an absorber heat exchanger, a coolant/solution pump, a purge pump and control equipment. The operation of the absorption heat pump is initiated by starting to supply a high temperature fluid (e.g., heating water from the boiler or steam) to the generator circuit. At that time, the thermal energy of the low-temperature condensate accumulated in the evaporator circuit, in the second stage flue gas condensing economizer, is used to evaporate the operating fluid. The total thermal energy supplied from the generator circuit and obtained in the evaporator circuit is transferred to the heating water or other process fluid in the absorber and condenser circuits.



For the cooling process to take place continuously, the generated steam in the evaporator circuit must be removed. A solution of lithium bromide in the absorber circuit is used to absorb these liquid vapours. During this process, lithium bromide is diluted, resulting in a decrease in its absorption capacity. The pumps transfer this solution to a generator in which the hot water/steam flowing in the circuit heats the diluted lithium bromide solution and reaches the boiling point. The boiling of the coolant increases the concentration of lithium bromide. The coolant vapour emitted on the generator circuit side enters the condenser where it returns to the liquid state when cooled. The coolant returns to the evaporator and begins a new cycle.

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