



## Hydrogeothermal Cascade Heat Pump – Economic and Ecologic Appropriacy

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**Abstract.** The article considers economy of exploiting heat from low-temperature geothermal sources for high-temperature heating of buildings using a heat pump. For the exploitation of low-temperature geothermal sources, a two stage heat pump with a heat transmitter was planned. The pump consists of two single stage heat pumps which use different refrigerants at each stage. At stage one, the calculation of the heat pump is conducted with refrigerant R407c; at stage two of the heat pump, the refrigerant R600a is used. The main operational characteristics of a two stage heat pump are presented in the form of diagrams. For the exploitation of heat from geothermal water with a temperature of 45°C, a profitability evaluation of the investment in the heat pump was carried out, using the method of the net present value. In the research, also the coefficient of profitability and the period of time in which the investment is going to return itself were established.

### Key words

Geothermal energy, heat pump, coefficient of performance, refrigerant, economy

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