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### AUTOMATED METHOD OF CALCULATING THE PARAMETERS OF THE COMPLEX HYDROELECTRIC POWER SYSTEM OPERATING IN HEATING MODE

The use of heat pumps is one of the most energy-efficient ways of heating residential and industrial premises. Electricity consumption for the heat pump drive is usually lower than gas consumption in the boiler plant, both in energy equivalent (reduced to conventional fuel) and in monetary terms [1-4].

The purpose of the work is to develop an automated method for calculating rational parameters for a complex hydroelectric power plant system operating in heating mode.

The automated method of calculating the parameters of the integrated HPP system operating in the heating mode includes the following algorithm:

1. Assignment of power of the hydraulic unit, geometric head of the station, initial and final temperatures of water that gives heat to the DHW and water in the heating and hot water system, physical parameters of water and refrigerant, technical parameters of the heat pump.
2. Formation of the functions of changing parameters of the refrigeration cycle from the heat capacity of the condenser and the condensation temperature of the refrigerant for constant evaporation temperatures, necessary for modeling the operation of heat pumps.

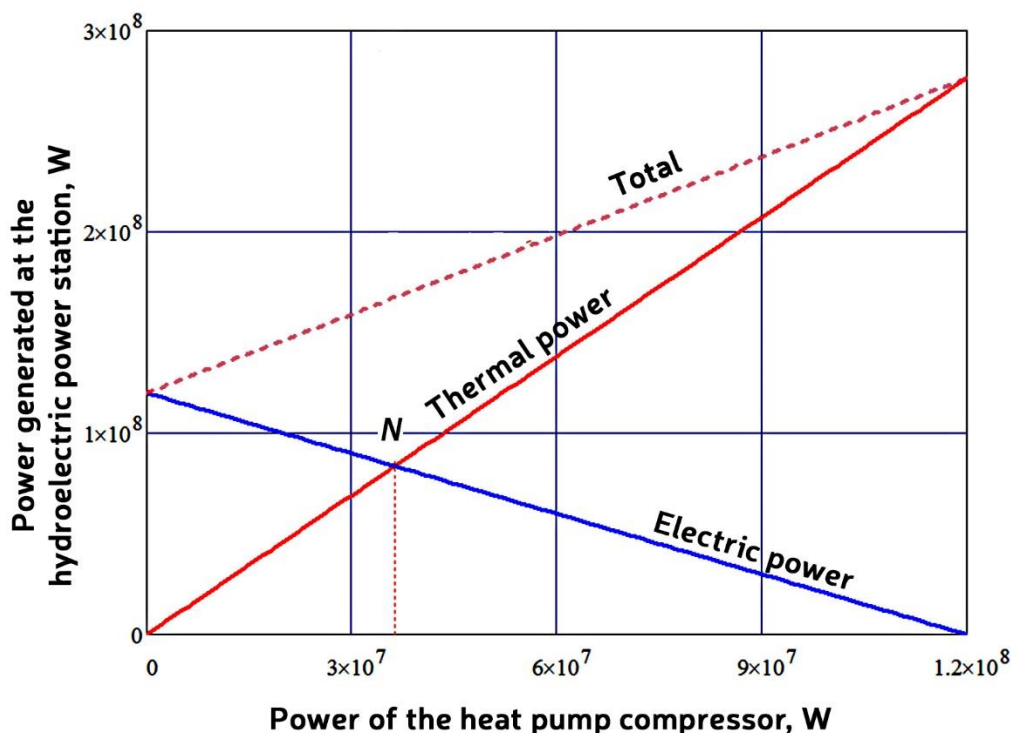


Fig. 1. Determination of the balance power  $N$  of the HP compressor for a refrigerant condensation temperature of 90 °C

3. Formation of the function of the dependence of thermal power of HP and the function of dependence of electric power going to the electricity supply of consumers from the electric power of the HP compressor for a given refrigerant condensation temperature.

4. Determination of the balance power of the HP compressor and its corresponding HP parameters and the power supply of electricity consumers.

5. Formation of the function of the dependence of the electric power of the HP compressor and the function of the dependence of the electric power going to the electricity supply of consumers on the thermal power of the HP for a given refrigerant condensation temperature.

6. Determination of HP parameters and capacity of HPP electricity consumers for arbitrary values of compressor power or HP thermal power.

7. Analysis and comparison of the received parameters of the HP and the power supply system of the hydroelectric power station and the choice of a more profitable heating mode of operation of the hydroelectric power station.

According to this technology, the operation of a hydro unit with a typical capacity of 120 MW in the heating mode for various energy consumptions for the electric drive of the HP compressor was investigated. In accordance with these costs, the values and ratio of the electric and thermal generation shares of the improved HPP changed (Fig. 1).

### References

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