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FEASIBILITY STUDY OF APPLICATION OF HEAT PUMP TECHNOLOGY FOR HOT WATER SUPPLY OF UNDERGROUND MINING ENTERPRISES

*O. V. Samusia, post-graduate student, SHEI «National Mining University»,
olga.samusia@gmail.com*

Research methodology. Results of calculation of payback periods of capital expenditure and depreciation charges when using heat pump technologies are received according to the diminishing-balance method, based on data of the net present value when operating heat pump devices for hot water supply of the underground facilities.

Results. Based on the analysis of the factors that define energetic and economic efficiency of heat pump technologies, it is shown that calculations of unit costs of generation of thermal energy at various stages of realization need to be carried out on a single methodological basis. The main energy and costs indexes of heat pumping devices are defined for various durations of a daily work cycle. It is found that the greatest annual economic effect is realized at a 24-hour work cycle of heat pump system.

Novelty. Based on the conducted calculations, the dependences of the net present value on life cycle of the heat pumping system are received. They allow establishing the rational duration of a job cycle taking into account the minimum payback period of capital costs.

Practical value. In the conducted research, the factors that determine energy and cost efficiency of the usage of heat pump technologies for hot water supply of coal mines using low-potential exhaust heat are analyzed. The calculation method of payback period and unit costs for thermal energy generation by the means of heat pump systems in the underground facilities is developed.

Keywords: economic efficiency, waste heat, heat pump system, mining enterprise.

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