IX Minsk International Seminar "Heat Pipes, Heat Pumps, Refrigerators, Power Sources",
Minsk, Belarus, 07-10 September, 2015

APPLICATION OF NEW GENERATION HEAT PUMP TECHNOLOGIES USING ALTERNATIVE ENERGY SOURCES TO GENERATE ADDITIONAL HEAT ENERGY AT THE HEAT POWER PLANTS-2 (ASTANA CITY)

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Abstract

It is proposed to implementation maximally adapted to work in harsh environments of Kazakhstan and Russia (up to –45 °C) application technology of heat pumps (HP) of new generation, which works on triangular thermodynamic cycle of the Lorenz, with use of alternative(non-traditional) energy. Research of energetical, economic and environmental efficiency of modern HP has been conducted, with use of circulating water's heat from turbine condensers, which is current at JSC "TPP-2" (Astana, Republic of Kazakhstan). It was found that application of HP of new generation in scheme of Thermal Power Plant (TPP) by using low-grade heatsource (LHS) of water from turbine condensers with temperature up to +35 °C, which is directed to the evaporators of HP instead of cooling towers, will provide scheme of TPP with water which has temperature up to +85 °C and higher, will provide sufficiently high efficiency (the average energy conversion efficiency $\varphi = 8.3$). Research results are being used on developing feasibility study of the project application of HP of new generation on the TPP-2 Astana and on carrying out planned pilot tests HP (2015–2017).