

Optimal design of technologies for low grade heat utilization with economic analysis

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Low grade heat which cannot be used as a heat source is usually rejected as a waste heat. However, this wasted heat has a large potential to be further utilized in the process, leading to high energy efficiency. In this study, the design method using site analysis technique is applied to find the potential for the recovery of low grade heat, and effective ways to utilize low grade heat are suggested. Four methods considered in this study include boiler feed water heating, heat pump, organic Rankine cycle, and absorption refrigeration. Key design variables are chosen in each method through thermodynamic analysis, and each technology is modeled and optimized in an integrated manner for maximizing synergetic benefits associated with the introduction of low-grade heat-utilizing technologies. Economic analysis has also been carried out to assess implications of capital and energy cost.

Acknowledgement: This research was supported by the International Research & Development Program of the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (No. 2011-0031290).