

Utilization of excess heat from data centers

Master's thesis number: 8238

Introduction and background:

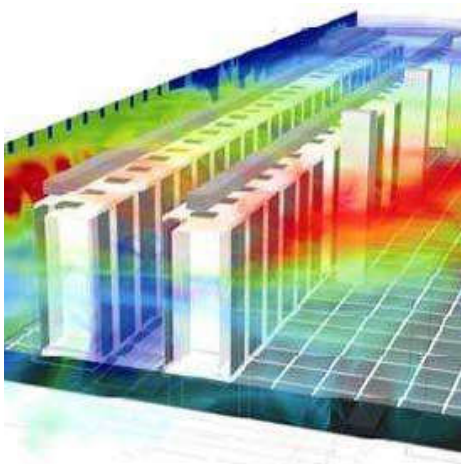
A data center is a place to keep information and communication technology. Data centers produce a considerable amount of heat because of their servers and a large number of electric components. The purpose of this study was to evaluate utilization of waste heat from a data center by different heat pumps. Different type of Heat pumps was simulated by ASPEN HYSYS and based on them, economical potential and payback period were evaluated.

According to the studies by ebrahimi et al, the temperature of heat waste from air-cooled servers is around 35-45°C. This range is sufficient for reuse heating needs such as domestic heating. Also, by using liquid cooling in data centers it is possible to provide a slightly higher quality of waste heat up to 50-60°C which can be used in district heating. However, if a higher temperature is required for DH, there is necessary to use heat pumps due to the increase in the temperature of waste heat.

Problem description and objective:

The goal of this master thesis is utilize of excess heat from data centers. The quality of waste heat is improved. Three alternative heat pumps were evaluated and payback period and economical potential were evaluated.

It is observed that the payback period increases by decreasing COP or increasing the temperature of the district heating network. Also, by increasing the temperature of district heating or decreasing COP, the economical potential is decreased and vice versa.



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