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# Electricity Consumption and Economic Analyses of District Heating System with Distributed Variable Speed Pumps

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## Highlights

- In this work, we evaluated that highlights is
- A new district heating system is presented and analyzed.
- An approach for minimum of the capital costs and energy consumption in new network is presented.
- The network used DVFSP technology has great potential in energy efficient.

**Abstract:** The increasing of energy efficiency and decreasing the transportation power consumption of District Heating (DH) systems have been increasingly focused due to the need to save energy. In this paper a new district heating network with distributed variable-frequency speed pumps (DVFSP) is presented and analyzed. The approach for minimum of the capital costs and energy consumption in a district heating network is presented using a case study based on a district heating network with DVFSP in Dalian, China. The computational tool is a commercial software package, which is used to design and analyze DH networks. Increasing temperature difference between supply and return pipes, the annual total electricity consumption and the equivalent annual cost are reduced. The energy efficiency in the DH system with the DVFSP was compared with the one in the DH system with conventional central circulating pump (CCCP). Analysis results show that the average electrical energy saved by the DH system with the DVFSP is 49.41% of the one saved by the DH system with conventional central circulating pump. The average pumps power consumption of heating area per square meter in primary heat supply network is 0.325kWh/m<sup>2</sup>.

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