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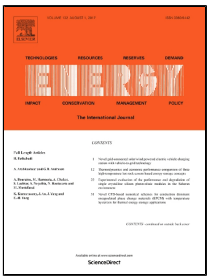

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New district heating system based on natural gas-fired boilers with absorption heat exchangers

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Abstract

Current district heating systems based on natural gas-fired boilers have lower primary energy efficiency due to its higher-temperature exhaust flue gas, and it cannot meet high-density heat load demand by the existing primary heating network. A new district heating system based on natural gas-fired boilers with absorption heat exchangers is presented to increase its primary energy efficiency and meet high-density heat load demand. In this new district heating system, absorption heat exchangers installed in heating substations could greatly decrease return water temperature of the primary heating network. The lower temperature return water could be used to cool exhaust flue gas and increase heat transmission capacity of the existing primary heating network. This new district heating system was analyzed by thermodynamics and economics. Results show that its primary energy efficiency and heat transmission capacity of the primary heating network are increased by about 11% and 47% respectively. when the heat transmission distance of the primary heating network is over 2.6 km, the new district heating system has better thermodynamic performance, economic benefit and environmental benefit, therefore, it would be a