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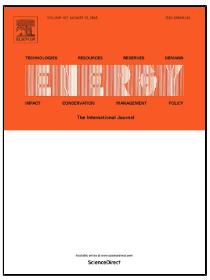

Assessment of wastewater heat potential for district heating in Hungary

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Assessment of wastewater heat potential for district heating in Hungary

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ABSTRACT

The wastewater entering the treatment facility has a significant energy content providing sufficient circumstances for the biological processes, but it passes through the system without further utilization and it is released in the receiving water body causing heat pollution. If recovered, the heat could be used for several purposes; this paper addresses the options for using the wastewater excess heat in district heating systems in Hungary. Geographic information system tools were used to determine the distance between heat sources and areas with district heating to show where the excess heat could be used. Five scenarios were created as a function of distance in which the reclaimed heat would be transported to an already existing district heating station. Considering a temperature drop of 2 K, calculation showed that installing the system under 14,000 population equivalents would not be possible. In the other 79 cases, the major factors of return were the distances from the district heating station and the expenditures of the heat pump and pipelines. Under the chosen circumstances only a fraction of the investments (40% for the best scenario) showed return in less than 10 years. In only 12 cases would the payback period be below 5 years.

HIGHLIGHTS

- GIS supported WWTP heat source modelling framework for DH systems has been developed.
- 592 WWTP was investigated, of which 37 returned within 10 years in DH systems.
- The effects of temperature drop of 2 and 4 K was presented for the return.
- Future gas and electricity prices was discussed from the feasibility point of view.

KEYWORDS

wastewater, waste heat, heat reclamation, district heating, Geographic Information System, heat potential

1. INTRODUCTION

Waste heat can come from various industrial sources [1], from steel industry [2] to data centres [3]. According to statistics of 2010, in the energy and industrial sectors 11.3 EJ heat was

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