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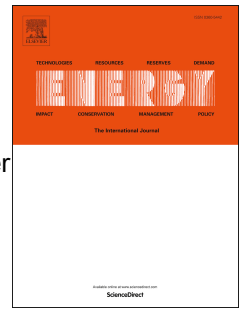

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Entransy Analysis of Secondary Network Flow Distribution in Absorption Heat Exchanger

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Abstract

For substations in large-area district heating systems, the primary network supply water can be used as a driving force to realize heat transfer between the primary and secondary networks under an absorption heat-exchanger technique. An absorption heat-exchanger comprises an absorption heat pump (driven by hot water) and a conventional water-water heat exchanger. Generally, the return water of the secondary network is divided into two parts: one part is sent into the water-water heat exchanger, which is heated by the primary network; the other part is heated in the absorption heat pump. Finally, the water from each part is mixed and transmitted to the end user. The flow distribution of the secondary network affects the return water temperature of the primary network. This paper presents a theoretical analysis of the flow distribution principle for the secondary network. Here, an entransy analysis is adopted as an optimization method for the heat exchange process. The absorption heat-exchanger model is simplified and the mathematical representations of each entransy dissipation part are provided. The optimal flow distribution principle is obtained by calculating the minimum value of the total entransy dissipation. The principle provides a reference for optimized design and operation of the absorption heat exchanger.