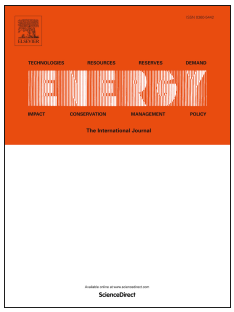
Accepted Manuscript



Experimental performance evaluation and parametric study of a solar-ground source heat pump system operated in heating modes

Weibo Yang, Heng Zhang, Xingfu Liang

PII: S0360-5442(18)30271-8

DOI: 10.1016/j.energy.2018.02.043

Reference: EGY 12343

To appear in: *Energy*

Received Date: 12 September 2017

Revised Date: 7 January 2018

Accepted Date: 10 February 2018

Please cite this article as: Yang W, Zhang H, Liang X, Experimental performance evaluation and parametric study of a solar-ground source heat pump system operated in heating modes, *Energy* (2018), doi: 10.1016/j.energy.2018.02.043.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Experimental performance evaluation and parametric study of a solar-ground source heat pump system operated in heating modes

Weibo Yang [a, b, c,*], Heng Zhang [a], Xingfu Liang [a]

[a] *School of Hydraulic, Energy and Power Engineering, Yangzhou University, Yangzhou, Jiangsu 225127, PR China*

[b] *State Key Laboratory for GeoMechanics and Deep Underground Engineering, China University of Mining & Technology, Xuzhou, Jiangsu 221008, PR China*

[c] *Key Laboratory of Thermo-Fluid Science and Engineering (Xi'an Jiaotong University), Ministry of Education, Xi'an 710049, PR China*

Abstract

The dual heat source coupling modes of solar-ground source heat pump system (SGSHPS) directly determine its operation characteristics. In this paper, the thermal performance of a SGSHPS operated in different dual heat source coupling modes were studied experimentally. The unit COP, solar collecting efficiency and inlet and outlet temperatures of GHE were tested for various modes. The results show that for the combination operation mode, solar and ground heat source are dynamically coupled by the water tank and flat heat exchanger, and the average unit COP and collecting efficiency are 3.61 and 51.5%, respectively. For the water tank heat storage mode, the inlet water temperature of evaporator in the daytime stop mode of GSHP is 1.85□ higher than daytime operation mode of GSHP, and the average unit COP and collecting efficiency are respectively 3.43 and 34.8%, 3.91and 34.9% for the daytime stop mode of GSHP and daytime operation mode of GSHP. For the ground heat storage mode, the ground temperature can be improved effectively for ground continuous heat storage mode and the outlet temperature of GHE can be increased significantly for ground intermittent heat storage mode. The average unit COP and collecting efficiency are 3.65 and 47.9%, 3.8 and 41.5% for the ground intermittent and continuous heat storage mode, respectively. A TRNSYS dynamical simulation model of the SGSHPS was established to explore the influences of key parameters on the system performance. The results indicate that the collector area and GHE number have evident influences on the system efficiency, but the impact of water tank volume is very small. The suitable collector area and GHE number are found to be 80 m^2 and 9, respectively, and the water tank volume should be set as small as possible with the permission of actual conditions.

* Corresponding author at: School of Hydraulic, Energy and Power Engineering, Yangzhou University, Yangzhou, Jiangsu 225127, PR China. Tel.: +86 514 8797 1315; fax: +86 514 8797 1315.
E-mail address: yangwb2004@163.com

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
✓ امکان دانلود نسخه ترجمه شده مقالات
✓ پذیرش سفارش ترجمه تخصصی
✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
✓ دانلود فوری مقاله پس از پرداخت آنلاین
✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات