

Accepted Manuscript

Lessons learned from long term monitoring of a multisource heat pump system

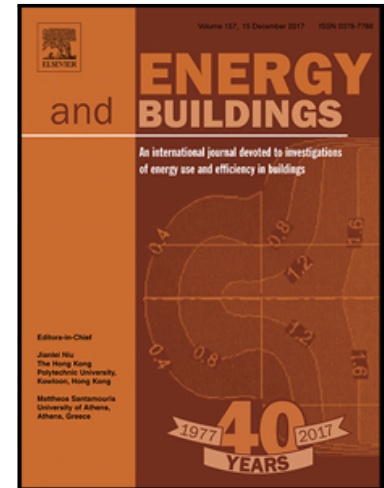
Renato Lazzarin , Marco Noro

PII: S0378-7788(18)30471-7
DOI: [10.1016/j.enbuild.2018.06.051](https://doi.org/10.1016/j.enbuild.2018.06.051)
Reference: ENB 8653

To appear in: *Energy & Buildings*

Received date: 7 February 2018
Revised date: 12 June 2018
Accepted date: 23 June 2018

Please cite this article as: Renato Lazzarin , Marco Noro , Lessons learned from long term monitoring of a multisource heat pump system, *Energy & Buildings* (2018), doi: [10.1016/j.enbuild.2018.06.051](https://doi.org/10.1016/j.enbuild.2018.06.051)



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.

Lessons learned from long term monitoring of a multisource heat pump system

Renato Lazzarin*, Marco Noro

Department of Management and Engineering - University of Padova - Stradella S. Nicola, 3, 36100

Vicenza – Italy

*Corresponding author. Tel.: +39 0444 998733; Fax: +39 0444 998889

e-mail address: renato.lazzarin@unipd.it

ABSTRACT

Dual or multisource heat pumps were conceived to obviate to the defects of a single source, outside air or ground or solar radiation. Many studies simulated the possible behavior of combination of sources, but only few experimental results based on long term surveys on operating buildings are available in literature.

A long term survey on a multisource heat pump system for the heating of a school building located in northern Italy gives the possibility of an evaluation based on real data. The main design features of the building incorporate a well insulated envelope, and a space heating and ventilation system driven by an innovative multisource heat pumps system. The latter incorporates outdoor air, ground, solar radiation, and heat recovery as heat sources, so enhancing the performance in terms of heating capacity and overall efficiency. The surveyed period concerns the last five heating seasons (2012-2017) allowing an assessment of the energy performance of the system based on real data monitored. The analysis permitted to identify incorrect settings, bad operation of the plant and heat pumps underutilization. The heating service was all the same assured, and the natural gas demand, almost steady if not in slight decrease, did not worry the management. Only the availability of data records and a careful analysis allowed to identify the bad working of the plant and the failure to achieve potential energy savings.

The main novelty of this work is the highlighting of the paramount importance of monitoring and carefully analyzing recorded data as a guide to the plant management to keep correct operations, particularly when the plant integrates many different technologies even in the long term.

Keywords: monitoring; ground coupled heat pump; heat recovery; multisource system; solar thermal collector.

Download English Version:

<https://daneshyari.com/en/article/6727356>

Download Persian Version:

<https://daneshyari.com/article/6727356>

[Daneshyari.com](https://daneshyari.com)