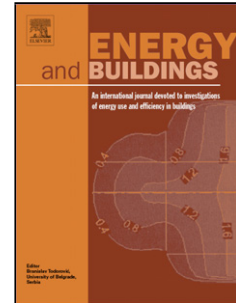


## Accepted Manuscript

Title: Operational thermal load forecasting in district heating networks using machine learning and expert advice

Author: Davy Geysen Oscar De Somer Christian Johansson  
Jens Brage Dirk Vanhoudt



PII: S0378-7788(17)31207-0  
DOI: <https://doi.org/doi:10.1016/j.enbuild.2017.12.042>  
Reference: ENB 8235

To appear in: *ENB*

Received date: 6-4-2017  
Revised date: 18-12-2017  
Accepted date: 18-12-2017

Please cite this article as: Davy Geysen, Oscar De Somer, Christian Johansson, Jens Brage, Dirk Vanhoudt, Operational thermal load forecasting in district heating networks using machine learning and expert advice, *Energy & Buildings* (2017), <https://doi.org/10.1016/j.enbuild.2017.12.042>

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.

# Operational thermal load forecasting in district heating networks using machine learning and expert advice

Davy Geysen<sup>a,b,\*</sup>, Oscar De Somer<sup>a,b</sup>, Christian Johansson<sup>c</sup>, Jens Brage<sup>c</sup>, Dirk Vanhoudt<sup>a,b</sup>

<sup>a</sup>*VITO, Boeretang 200, 2400 Mol, Belgium*

<sup>b</sup>*EnergyVille, Thor Park 8310, 3600 Genk, Belgium*

<sup>c</sup>*NODA, Biblioteksgatan 4, 374 35 Karlshamn, Sweden*

---

## Abstract

Forecasting thermal load is a key component for the majority of optimization solutions for controlling district heating and cooling systems. Recent studies have analysed the results of a number of data-driven methods applied to thermal load forecasting, this paper presents the results of combining a collection of these individual methods in an expert system. The expert system will combine multiple thermal load forecasts in a way that it always tracks the best expert in the system. This solution is tested and validated using a thermal load dataset of 27 months obtained from 10 residential buildings located in Rottne, Sweden together with outdoor temperature information received from a weather forecast service. The expert system is composed of the following data-driven methods: linear regression, extremely randomized trees regression, feed-forward neural network and support vector machine. The results of the proposed solution are compared with the results of the individual methods.

*Keywords:* District heating, Data driven modelling, Machine learning, Aggregation rules, Expert advice, Ensemble methods

---

\*Corresponding author

*Email address:* [davy.geysen@vito.be](mailto:davy.geysen@vito.be) (Davy Geysen)

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

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