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Authors: Hengfang Deng, David Fannon, Matthew J. Eckelman



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**Predictive Modeling for US Commercial Building Energy Use:  
A Comparison of Existing Statistical and Machine Learning Algorithms  
using CBECS microdata**

Hengfang Deng<sup>1</sup>, David Fannon<sup>1,2</sup>, and Matthew J. Eckelman<sup>1,\*</sup>

<sup>1</sup> Department of Civil and Environmental Engineering, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, United States

<sup>2</sup> School of Architecture, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, United States

\* Corresponding author: m.eckelman@northeastern.edu, +1 617 373 4256

**Abstract**

With the growing trove of publicly available building energy data, there are now ample opportunities to apply machine learning methods for prediction of building energy performance. In this study, we test different predictive modeling approaches for estimating Energy Use Intensity (EUI) for US commercial office buildings and the individual energy end-uses of HVAC, plug loads, and lighting, based on the latest Commercial Building Energy Consumption Survey (CBECS) 2012 microdata. After preliminary statistical analysis, six regression or machine learning techniques are applied and compared for prediction performance. Among all candidates, Support Vector Machine and Random Forest demonstrate both accuracy and stability. However, machine learning algorithms are better than the linear regression only to a limited extent, with on

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