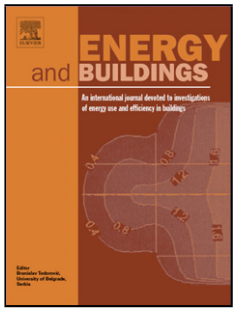

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Change Point and Degree Day Baseline Regression Models in Industrial Facilities

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Abstract

Industrial facilities account for 33% of the annual energy usage within the United States [17] and this large sector of the domestic energy budget presents significant opportunities for energy efficiency. In order to effectively analyze energy savings opportunities in industrial facilities, adequate baseline models of energy usage in the facilities are needed. Multiple methods of creating baseline energy models have been used in commercial and residential buildings, however, few of these techniques have been made applied to develop baseline energy models in industrial facilities.

The paper investigates the application of standard regression models used for commercial and residential buildings to industrial facilities using sparse energy consumption data. An analysis of the effectiveness of three parameter cooling (3PC) and cooling degree day (CDD) regression models to develop baseline energy usage models in industrial facilities from commonly available utility bill data is presented. Two case studies are investigated: in both case studies a comparison between 3PC model and CDD model is presented. In both cases the baseline regression models meet the recommended NMBE from the ASHRAE Guideline 14. A method to determine process equipment energy usage and cooling end use due to internal loads is presented.

Key Words: change-point, cooling degree day, industrial facility energy consumption, regression

1 Introduction

Over the past few decades the topic of energy has become prominent in the sciences, politics, and the

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