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Editorial

Efficiency and Optimization of Buildings Energy Consumption Volume II

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1. Introduction

This issue, as a continuation of a previous Special Issue on "Efficiency and Optimization of Buildings Energy Consumption," gives an up-to-date overview of new technologies based on Machine Learning (ML) and Internet of Things (IoT) procedures to improve the mathematical approach of algorithms that allow control systems to be improved with the aim of reducing housing sector energy consumption.

2. Energy Optimization Procedures

To achieve the objective of reducing buildings' energy consumption, some papers aim to improve building constructive characteristics and materials [1], but always within the realistic economical and health limitations [2,3], and others look for other energy sources implemented with different control system algorithms [4,5]. To improve this, construction materials showed an expected reduction of 30% and implementation of a Passivhaus resulted in a reduction of 85% in heating demand [2]. Finally, the control of daylighting accounted for the highest energy savings of 14% [4].

In consequence, the key is to define a correct algorithm based on correct variables (such as weather conditions [6]) and, at other times, to employ a more adequate machine learning method. In this sense, a Support Vector Machine [7] was shown to be adequate for global solar prediction, but short memory neural networks were preferred for the prediction of other classical variables related to energy consumption in buildings, such as thermal inertia and input time lag [8]. More examples of machine learning methods were employed to predict [9] and to define building parameters like the Heat Loss Coefficient [8], reaching a maximum error of 6%. Results showed that weather data control systems may reach 23% [6].

3. Future Tasks

As a pending research task, a smart grid optimized by artificial intelligence and employing Internet of Things technology let a multilayer feed-forward artificial neural network improve the previous results in real case studies [10].

Conflicts of Interest: The authors declare no conflict of interest.

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