Potential Energy Flexibility for a Hot-Water Based Heating System in Smart Buildings Via Economic Model Predictive Control

This paper studies the potential of shifting the heating energy consumption in a residential building to low price periods based on varying electricity price signals using Economic Model Predictive Control strategy. The investigated heating system consists of a heat pump incorporated with a hot water tank as active thermal energy storage, where two optimization problems are integrated together to optimize both the heat pump electricity consumption and the building heating consumption. A sensitivity analysis for the system flexibility is examined. The results revealed that the proposed controller can successfully achieve significant shifting potentials compared to a baseline case.

General information
Publication status: Published
Organisations: Department of Electrical Engineering, Center for Electric Power and Energy, University of Oldenburg, Østfold University College, University of Zaragoza, Sichuan University
Number of pages: 5
Pages: 1-5
Publication date: 2017

Host publication information
Title of host publication: Proceedings of 2017 International Symposium on Computer Science and Intelligent Controls
Publisher: IEEE
ISBN (Print): 978-1-5386-2941-3
Keywords: Building Energy Management System, Demand Response, Economic Model Predictive Control, Energy Flexibility, Heat Pumps, Smart Buildings, Thermal Energy Storage
DOIs: 10.1109/ISCSIC.2017.14
Source: FindIt
Source ID: 2396620466
Research output: Chapter in Book/Report/Conference proceeding › Article in proceedings – Annual report year: 2018 › Research › peer-review