A Research on Demand Response Energy Optimization System for Smart Grid: Focusing on Commercial Buildings

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Abstract. This study proposes a demand response energy optimization system for the smart grid focusing on the commercial buildings. The system is effective and efficient in optimizing the energy used by the commercial buildings as it can control the energy use according to the characteristics of electric power load arranged on each floor when reduction of energy use has been requested by the demand response server.

Keywords: Demand Response, Energy Optimization, Commercial Buildings, Smart Grid, Micro Grid.

1 Introduction

The demand response energy optimization system for the commercial buildings may include a multiple number of sub-energy managers that monitor and control one or more power loads arranged on each floor, one or more main energy managers that monitor and control one or more power loads by communicating with a number of sub-energy managers, an energy management system server that stores the information about these loads by communicating with one or more main energy managers, and a demand response server that communicates with one or more main energy manager and transmits the information about the external demand reduction request to the sub-energy manager. The system is effective and efficient in optimizing the energy used by the commercial buildings as it can control the energy use according to the electric power load arranged on each floor when reduction of energy use has been requested by the demand response server.

2 Demand Response Energy Optimization System

The system model introduced in this study is shown in [Fig. 1]. The main energy manager (105) monitors the information such as power consumption for each load (120), hours/time slots of power use. Such monitoring can be carried out via sub-energy manager (110), or in some cases, it can only perform the function of collecting the information monitored by the sub-energy manager (110).