
BIM-BASED ENERGY MANAGEMENT FOR SMART BUILT ENVIRONMENTS

Jianchao Zhang
Boon-Chong Seet
Tek-Jing Lie

Auckland University of Technology

Abstract

Building Information Modeling (BIM) provides architectural 3D visualisation and a standardised way to share and exchange information about building data [1]. Recently, there is an increasing interest in using BIM, not only during the construction phase, but also the post-construction phase for day-to-day management of the built facility [2].

Meanwhile, in order to lower the carbon foot print, building energy management is crucial in today's building maintenance. With the emergence of *Smart Built Environment* technology which embeds most spaces and objects with sensors and actuators [3], building managers can be provided with the added capability of real-time monitoring and control of their building's energy loads as well as energy resources with the goal of maintaining reliable electricity supply and safe operation.

Although there have been research on various aspects of Smart Environments, very little attention has been focused on the role and application of BIM tools and techniques in Smart Built Environments. This motivates us to explore the use of BIM for day-to-day energy management of future smart buildings where real-time information objects (sensors, smart meters, etc.) and distributed energy resources (DER) are deployed.

Since BIM is designed to host information of the building throughout its life cycle, the scope of this research has covered from architecture design to facility management phases: first BIM has been extended in the building design phase to provide Material/Device profiling and information exchange interface for sensors, smart meters and DER; Next, a facility management tool has been designed and implemented to provide advanced energy management functions based on the BIM produced in previous phase. Through a basic but functional prototype of a smart house energy management system using Revit and xBIM toolkit, we have successfully demonstrated that BIM can be utilised for the design and smart energy management of future Smart Built Environments.

References

- [1] L. Sabol, "Building information modelling and facility management," Proc. of IFMA World Workplace, Dallas, TX, USA, October 2008.
- [2] P. Teicholz (Ed.), "BIM for facility managers", John Wiley & Sons, New Jersey, USA, 2013, 332 pages.
- [3] H. Nakashima, H. K. Aghajan, and J. C. Augusto (Eds.), "Handbook of Ambient Intelligence and Smart Environments", Springer, New York, USA, 2010, 1293 pages.

Presenting author: Jianchao Zhang (jizhang@aut.ac.nz)

Word count: 299