1. An integrated research for architecture-based energy management in sustainable airports

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Abstract: Energy Management (EM) has become crucial and much more complicated for airports with the introduction of various energy sources, technologies and different comfort requirements. Regarding the aviation industry as one of the major sources of global warming and air pollution, this situation becomes highly critical. However, the review of literature on Energy Management Information Systems (EMIS) for airports shows that the proposed solutions are usually domain-specific, platform-depended and away from suggesting complete solutions and architectures. Therefore, the main argument of this study is that a holistic and integrated approach should be adopted for EM in airports and we claim the notion of sustainability through the use of Enterprise Architecture (EA)-based EM. In this paper, we present the results of a two-faced research study. Action Research (AR) and Design Science Research (DSR) methods are combined to adopt an integrated approach. At the first phase, an EA is developed and evaluated, and then, this is followed by the second phase with three cases to find the potential energy savings in stanbul Airport. Along with the findings, the primary and secondary contributions of this research brought to the EM knowledge domain are presented. Consequently, there is an important potential for energy saving in the terminal buildings, which would be approximately 70% of the total airport energy consumption. There is also a nearly 250.000 $/year potential saving, and also 121.397 $/year for the daylight time and period. This research can be seen as an initial attempt to the enhancement of sustainable airports, and therefore, it has showed the potential for using EAs as a means to improve EM in airports. We hope that this study may help researchers to obtain an overview of existing and possible approaches to sustainability through the use of EAs for EM practices. © 2017 Elsevier Ltd (52 refs)
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