ENERGY EFFICIENCY LANDSCAPES: AN ENERGY EFFICIENCY VISUAL TOOL FOR SUPPORTING DECISION MAKING IN BUILDINGS

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Abstract

Energy efficiency in buildings is a key issue in achieving sustainable development. Many decision support methodologies and tools have been developed, mainly based on energy consumption measurements or simulations and rules designed by experts to construct Building Energy Management Systems. An extension of this information from raw consumptions to energy efficiency is required. In addition, a visual depiction of this information with temporal and spatial resolution, applied to the different energy forms and services will certainly lead to a much higher comprehension about energy efficiency, definitely supporting the decision making process.

In this work we propose a methodology that can be used to analyze energy efficiency indices in terms of a multi-resolution representation. This results in an *Energy Efficiency Landscape* (EEL) as a means of providing meaningful information concerning energy efficiency for decision makers.

An EEL represents an extensible definition of efficiency, and its representation decomposed in time, space, and/or energy form and service. Hence, it provides a mechanism to focus activity on identifiable problem areas. As such it can be used as an iterative visual tool supporting forensic analysis. This leads to solutions to problems that constitute real cost and hence should be interpreted as a real financial benefit.

As a proof of concept, we show examples of EEL using data collected in *Torre de Cristal,* a multi-story office building in Madrid, Spain. Finally, we discuss how EEL would support operation and maintenance companies, end users, and even policy makers in increasing energy efficiency.

Key words: building energy management systems, decision support, energy efficiency index, energy efficiency landscape, energy inventory

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