Building Evaluation

What is Building Evaluation?

Building evaluation typically entails measuring the actual performance of a building in terms of resource consumption (i.e., energy, water), as compared to design goals or a peer group. This aspect of building evaluation is frequently referred to as Building Performance Evaluation (BPE). Other measures that may be included in a BPE include accessibility, aesthetics, cost-effectiveness, productivity, safety and security, and sustainability. Building evaluation may also include systematic evaluation of the opinions of building users (occupants, visitors, etc.). This additional aspect of building evaluation commonly falls under the rubric of Post Occupancy Evaluation (POE). Both BPE and POE can improve the functionality and efficiency of the target building as well as inform future green building design strategies. These evaluation methods are valuable yet often overlooked aspects of commercial green building.

In a green building, the most significant areas for evaluation include satisfaction of occupants, indoor environmental quality including air quality, lighting, acoustics, thermal comfort and other areas, occupant health, energy efficiency, and water conservation. Other factors that may be important to evaluate, depending on the location, include use of alternative transportation and site-specific choices like landscaping or other outdoor amenities.

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How to Perform a Building Evaluation

BPEs or POEs can be implemented in a number of ways. An important first step in the process is determining the criteria for evaluation as well as the methods. For example, a green building evaluation may involve a combination of the following: interviews with occupants, space utilization surveys and/or floor plan analysis, analysis of utility data, deployment of monitoring/metering equipment and analysis of its results, indoor air quality tests, and other indicative, investigative or diagnostic tools.\(^3\)

Comprehensive building evaluations include monitoring systems and smart metering. Smart metering uses technology to capture complex energy use information and ties into communication systems that can capture and transmit energy use information as it happens.\(^4\) See also *Smart Metering and Interactive Energy Management Tools*.

Examples

The Rutgers Center for Green Building has conducted a number of green building evaluations of various building types. Several of these are available on the Center’s website and on the NJ Green Building Manual site and have included a full menu of BPE and POE components. A number of key findings have been common across these building evaluations:

- Building occupants rarely behave as designers expect
- Glare problems continue to plague successful implementation of daylighting strategies
- Further coordination between building design and interior space design/management is needed
- Highly sophisticated equipment calls for an equally sophisticated/full-time facilities manager
- Green buildings generally outperform conventional buildings in energy consumption, but underperform their design intent
- Energy models may be flawed


\(^4\) New York State Energy Research and Development Authority (NYSERDA). *A Primer on Smart Metering* (Fall 2003).
Benefits

Building evaluation identifies both success and failures in building performance, with an emphasis on the human interaction with building systems. BPE and POE can contribute to more efficient system operations, greater occupant comfort, and cost savings. Understanding trends in performance will also inform new developments in predictive software for building designers and highlight the need for new technologies and more accurate modeling of realistic occupants. Finally, building evaluation helps build a body of knowledge about the performance of homes that can inform future projects.

Costs

Depending on the level of evaluation and time constraints, costs for a building evaluation will vary. Depending on the resources of the organization, some aspects of a building evaluation can be accomplished with in-house staff. In the experience of the Rutgers Center for Green Building, building evaluations range from $15,000 for a very basic one through upwards of $150,000 for a robust building evaluation including multiple data points over time (longitudinal study).

Resources

The Rutgers Center for Green Building – Green Building Post Occupancy Evaluation http://rcgb.rutgers.edu/projects.asp?Level2ItemID=57

US GSA. Post Occupancy Evaluation.
http://www.gsa.gov/portal/content/103959

UC Berkeley Center for the Built Environment – Occupant Indoor Environmental Quality (IEQ) Survey
http://www.cbe.berkeley.edu/research/survey.htm

Whole Building Design Guide - Facility Performance Evaluation
http://www.wbdg.org/resources/fpe.php#ar