Case Study: Business Intelligence for Energy-Smart Buildings

Background:

U.S. businesses spend approximately US$100 billion for office energy annually. Worldwide, buildings account for about 40 percent of energy consumption. Estimates for smart energy management indicate that a 20-25% reduction in energy costs can be attained in this sector. This case study examines collaborative work between Microsoft, Accenture and the Lawrence Berkeley National Laboratory creating a smart-building, cloud-based, business intelligence solution to reduce costs and reduce energy consumption.

Solution:

Microsoft's Real Estate and Facilities organization conducted a study across 13 buildings on the company's main campus. This included three different smart-building system vendors, as well as an analytical layer on top of the existing building management systems. This layer allowed aggregation and analysis of energy and cost data. The "actionable insights" of this layer were:

1. **Fault detection and diagnosis.** When equipment is detected to be faulty or under-performing, targeted interventions are generated.
2. **Alarm management.** Building system notifications can "cascade" when equipment malfunctions, this prioritized repair steps for maximum impact; this system helps manage the cascade.
3. **Energy Management.** Building energy consumption was systematically tracked and optimized over time.

Results:

Microsoft reports an initial investment of less than 10 percent of annual energy costs, with an expected payback period of less than two years[i]. Furthermore, implementing this approach promises to have enduring payback over the "periodic review/optimization of individual systems" approach used in the past, and corresponds with industry results[ii]. Microsoft hopes to save millions of dollars annually by optimizing the base load on the buildings. And, building engineers report greater job effectiveness as they "work smarter" by "waking to" and resolving problems of the greatest impact, rather than "walking around" to undercover issues.

About the Case Study Author:

Bonnie Holub, Ph.D.
Business Intelligence Consultant
ArcLight, Inc.
bonnie.holub@arclight.biz
612-720-4960

[i] Accenture, "Energy-Smart Buildings: Demonstrating how information technology can cut energy use and cost of real estate portfolios, "http://www.greenbiz.com/sites/default/files/energy-smart-buildings-whitepaper.pdf, downloaded 2011/11/16.

[ii] Granderson, J., Piette, M.A., and Ghatikar, G., "Building energy information systems: user case studies," Springer, 16 June, 2010.