

CABA's Intelligent Building Programs

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ABSTRACT

The following paper describes two recent programs developed by the Continental Automated Buildings Association (CABA). This trade association for building automation includes many world-leading companies that seek to educate the industry in the benefits of their products and services. The first program is the Building Intelligence Quotient (BiQ). The BiQ program ranks building automation systems in already existing large commercial office buildings. The history, value, and workings of the intelligence ranking program are described, and the reasons for LonMark's support of the BiQ are explained. The second program is the Life-Cycle Cost Calculator (LCC), which was created in partnership with RSMeans cost engineering information. The LCC allows those involved in designing new buildings to compare the life-cycle costs of a building where investment is made on intelligent systems versus one where it is not. The research and development of the LCC are reviewed. The link between these two programs and industry developments on the interoperability of building systems is brought out. Finally, it is argued that BiQ and the LCC can play an important role in the increasing convergence of green and intelligent building programs.

The Building Intelligence Quotient Program

Over the last twenty years there has been much discussion and debate about the concept of an intelligent building. Work has gone on in many forums to define and quantify what the term really means; the end result of these efforts is that an intelligent building is not just one thing. It can be defined as the use of technology and process to create a building that is safer and more productive for its occupants and more operationally efficient for its owners. Moreover, the result of implementing these intelligent technologies and processes are buildings that cost less to operate and are worth more to their occupants. For building projects that are owner-occupied, such as corporate, government and institutions, the benefits of an intelligent building provide an immediate return-on-investment in terms of higher employee productivity and reduced operating expenses. For commercial developments, intelligent building projects are expected to result in above market rents, improved retention, higher occupancy rates and lower operating expenses. All around this is a win-win situation.

What then are the technologies and processes required to create intelligent building projects, whether new construction or retrofit? The Continental Automated Buildings Association (CABA) recently released a tool entitled the Building Intelligence Quotient (BiQ) that individually determines the technological requirements to make a building "smarter" by assessing the status of the building's intelligent technology. The BiQ ranking tool has three functions. It serves as: i) a means to evaluate and measure the "value" of intelligent building performance; ii) a design guide for the integration of building intelligence in new building projects; and iii) a building automation retrofit action plan tool.

"The Building Intelligence Quotient is designed to paint a clear picture of your building intelligence performance against best practices for design, installation and operation," states

Ronald J. Zimmer, CABA President & CEO. “It gives practical advice for improvements, offers resources for making the upgrades, and provides additional information on relevant strategies and technologies.”

The tool allows property owners and managers to receive a rating of a building’s intelligence and provides design guidance to ensure that all relevant issues are considered when making a choice of subsystems and their level of integration. Owners and developers with multiple properties can also use the BiQ tool to assess and compare the building intelligence systems in their portfolio. In addition, as more and more buildings are BiQ verified, point scores will be aggregated in an anonymous database, enabling users to analyze how their building intelligence design performs in relation both to the median and to buildings that are similar in terms, type and region.

Because the assessment is completely online, owners and managers have the ability to keep their assessment up-to-date as the buildings are retrofitted and building intelligence changes. Building intelligence results in higher building value, improved comfort, security, flexibility and reliability while reducing costs and increasing productivity. Lower costs and higher property and lease values can result in aggressive return-on-investments and are clear justifications for making buildings more intelligent.

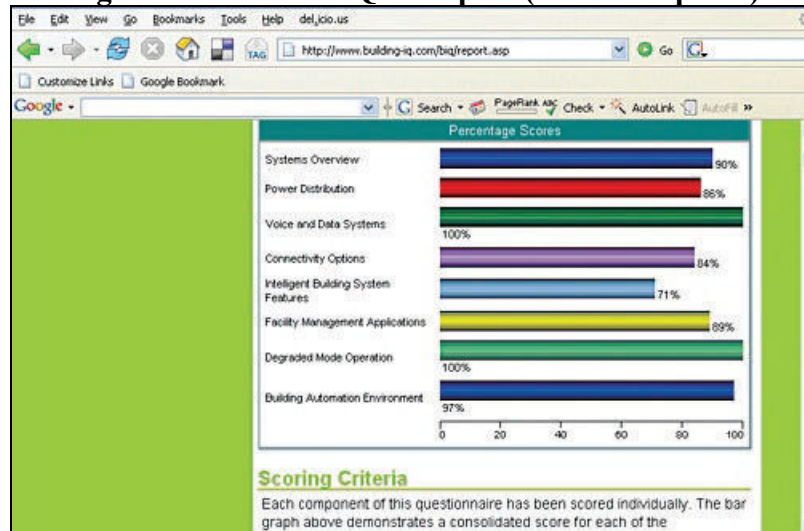
How does BiQ work? The BiQ asks questions pertaining to integrated design processes, the presence and integration of intelligent building subsystems, failure and emergency operations and building support and maintenance. Based on this information, the BiQ then generates a report that will provide benchmark rankings as well as recommendations for improvements in the following categories: communication systems; building automation; annunciation, security and control systems; facility management applications; and building structure and systems (see Figure 1).

CABA has also introduced a validation, training and award program to compliment the tool. In order to create added value for BiQ users, CABA is implementing a validation procedure. For an additional fee, validation will provide BiQ users with an individualized site visit by a professional to determine whether their property actually conforms to BiQ criteria. BiQ professionals will also provide portfolio analysis services. Firms with more than one property under BIQ assessment will be able to purchase a corporate portfolio analysis in order to compare all their buildings. Undertaken by BiQ professionals, validation and analysis will allow for a more personalized, detailed on-site examination of intelligent building systems.

To support the demand for validation and corporate portfolio analysis, CABA is also introducing a BiQ training program. The program will certify evaluators, giving them the skills required to undertake BiQ evaluations and assign validation scores. Professionals seeking BiQ evaluator certification may be engineers, system integrators and technical experts in building automation.

Validation scores from the BiQ tool will be used to assess the intrinsic value of a building by supporting associations and the industry-at-large. Currently, CABA is negotiating with the Appraisal Institute, the International Facility Management Association and other associations to endorse the tool. Once a building is either assigned platinum, gold or silver validation by a BiQ professional, CABA will acknowledge the validation by issuing a plaque to the building’s owners or managers. Ranked buildings will be eligible to win awards. The BiQ awards program will recognize buildings that exhibit excellence in building intelligence integration and that rank high on CABA’s building intelligence assessment. The top three BiQ validated buildings will receive a CABA Intelligent Building Award at an annual awards ceremony, beginning in 2009.

Figure 1. Chart of BiQ in Report (Screen Capture)



LonMark International Supports BiQ Tool

Most recently, LonMark International has become the first supporting organization for CABA's online Building Intelligence Quotient tool. As an official supporter, LonMark International will actively promote and encourage the use of the BiQ tool amongst the industry in general and its membership in particular. LonMark International is a non-profit trade association that advances the business of efficient and effective integration of open, multi-vendor control systems, including those focused on building automation, utilizing ANSI/CEA 709.1 and related standards.

"Interest has been expressed in the concept of a building ranking system that evaluates and measures the intrinsic value of intelligent building performance," states Ron Bernstein, Executive Director of LonMark International. "We are proponents of this concept since we see it as broadening the range of specialized services and advice, specifically tailored to those interested in offering seamlessly connected building infrastructure."

LonMark International expects the ranking system to provide its membership with an objective means to evaluate and measure building performance and provide a design guide for the integration of building intelligence in new building projects and retrofits. LonMark International members will also benefit from an expanded marketplace.

"CABA is proud that LonMark International is supporting the BiQ tool," states Ronald J. Zimmer, CABA President & CEO. "We feel that the advanced methodology we employ to rank building intelligence will result in higher building value, improved comfort, security, flexibility and reliability while reducing costs and increasing productivity. This can only benefit LonMark International members by expanding the market for their products and services."

LonMark International members include manufacturers, integrators and users of control systems in a variety of industries, including building automation, security, lighting, home/white goods, elevators, mass transit, semiconductor manufacturing equipment, consumer appliances, sun blinds, energy metering, construction, commercial real estate, and industrial automation.

FREE BiQ 60 Day Trial

To participate please go to www.caba.org/biq and complete the registration information. In the Payment section check the circle for: *I will call CABA to arrange payment* and then send an email to dkatz@building-iq.com requesting the 60 Day FREE trial. You will be notified when you are approved. After the 60 days you may be asked to complete a small survey questionnaire to help us improve future versions. You are under no further obligation but CABA will ask you to purchase the BiQ for continued usage of the program for one year.

The LCC Program for New Commercial Office Buildings

The BiQ, which calculates the intelligence of building systems already in place, is complemented by CABA's Life-Cycle Cost Calculator (LCC). The LCC is a Web-based tool that enables those within the building system integration industry to obtain unbiased, third-party confirmation of the life-cycle costs of a new integrated or intelligent building, as compared to those are not.

The tool makes extensive use of RSMeans databases, including: the RSMeans Square Foot Models for initial construction costs; RSMeans Facilities Maintenance & Repair and Preventative Maintenance & Repair databases to determine operational costs; and the RSMeans Assembly databases which determine efficiencies from the use of intelligent building automation systems. The tool also includes usage guides from the U.S. Department of Energy to calculate average energy costs.

"Users of this tool will be able to look at the different degrees of intelligence and integration of a variety of automated building systems," said Tim Duggan, Senior Consultant with RSMeans Business Solutions. "The final calculated results created by the tool will provide a report outlining assembly costs and a 10-year costs analysis for return on investment applicable to fully intelligent and integrated automated building controls" (see Figure 2).

The creation of the tool has been an involved process that first emerged in 2004, when CABA undertook an industry-wide survey to aid in the development of a parametric model that would analyze the life-cycle costs of buildings. CABA developed the survey based upon a white paper that argued that by utilizing life-cycle costing methodology, owners and operators could estimate the total cost benefit of deploying integrated and intelligent building technologies over the lifespan of an entire building.

Driven by CABA's Intelligent & Integrated Buildings Council, industry initiatives continued through 2005 to develop methods to evaluate intelligent and integrated building systems in order to actually monitor operating and maintenance costs and verify holistic cost reductions.

With the support of the U.S. Department of Energy and other industry members, CABA then contracted with Reed Construction Data/RSMeans to develop an in-depth assessment of best practices for buildings with full or partial building control integration. The purpose of the study was to apply best practices information for new buildings to define life-cycle costs. Office buildings were chosen as the primary building type for the assessment. The assessment found that owners were primarily concerned with first costs and building appearance as well as operating costs. The reality however is that over a 30-year period, initial building costs account for only two per cent of total building costs, while operations and maintenance costs equal six per cent and personnel costs equal 92 per cent. CABA's study conclusively found that office

buildings of 50,000 to 100,000 square feet demonstrated the best return-on-investment for integrated systems, but that there was a lack of tools to evaluate the overall life-cycle costs of implementation. As a consequence, CABA undertook the development of a life-cycle analysis tool with RSMeans to provide detailed cost models and associated life-cycle costs assessments based upon specific geographic location factors.

“RSMeans has gathered all of CABA’s research, combined it with their experience in the building industry and their vast database of square-foot costs, and have produced an online software tool that will be extremely beneficial to industry,” stated Ronald J. Zimmer, CABA President & CEO.

Figure 2. LCC Website Screen Shot



RSMeans has the cost information database for many types of buildings and intends to expand the LCC tool to these buildings in the future. Most buildings still use the lowest first cost building automation systems that meet the minimum specification requirements. With the advent of the green building revolution, many more buildings are seeking LEED or Green Globe certification requiring energy modeling and the potential for using the energy management systems to gain innovation credits. Life cycle costs are an important part of the integrated design process and more recognition is being given to the benefits of building automation systems that can optimize the sequence of operations, provide alarms as soon as problems occur and data log normal operations in real time to validate the energy model performance predictions.

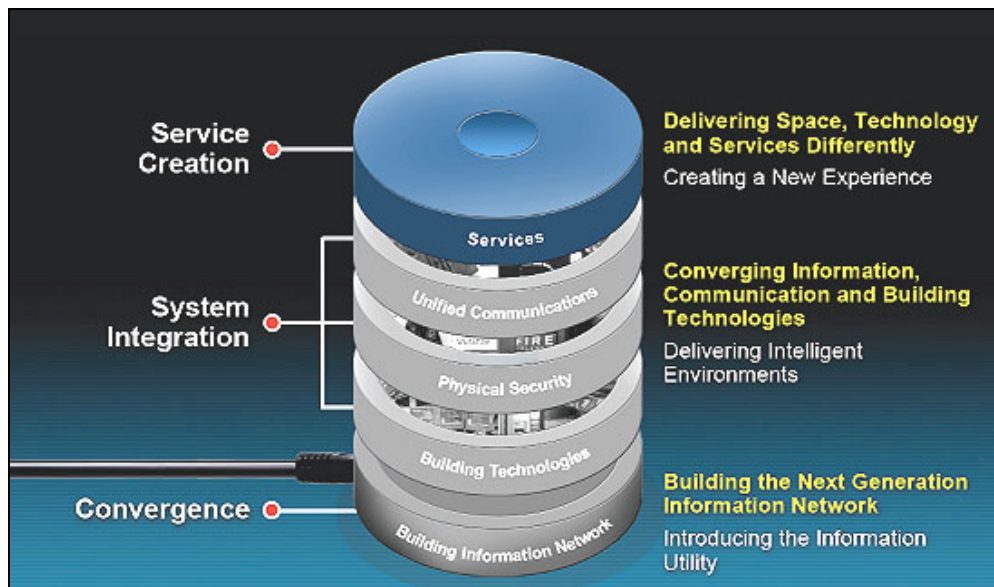
A beta test of the life-cycle cost calculator was undertaken. Approximately 600 users responded. Out of those, 50 users actually followed through on the site and submitted specific project requests. RSMeans plans to survey each of the respondents to evaluate the need in the marketplace. Thomas M. Keel, Chair of CABA’s Intelligent & Integrated Building Council’s Life-Cycle Costs Task Force, added: “We are pleased to see this tool come to fruition.

As more and more buildings are built with more sophisticated building automation systems the RSMeans database will grow and the accuracy of the predicted life cycle costs will improve. To purchase the Life Cycle Cost tool go to www.caba.org/lifecycle

Interoperability and Information Exchange

The interoperability of systems plays a major role in the overall intelligence of a building's systems. Both the BiQ and the LCC are linked to CABA's work on creating a standard to allow the interoperability of information systems. CABA and industry leaders created oBIX (www.obix.org), an industry-wide initiative to define XML- and Web services-based mechanisms for building control systems. oBIX will allow the building control systems to exchange information with the enterprise software programs. Broadband capabilities, the so-called "fourth utility," are actually already in most buildings and allow for the possibility of information exchange (Figure 3).

Figure 3. Using Broadband to Exchange Information



Conclusion

All three CABA programs point to the convergence of the information technology revolution with energy and demand response building automation. Such convergence is evident when companies like CISCO adapt their Connected Real Estate model to address sustainable energy and buildings (Figure 4).

In fact there are many areas of commonality between a green building program such as Green Globes and the BiQ intelligent building programs (Figure 5). As new information technology and the use of the Internet permeates all areas of buildings, both in the traditional business enterprise software and hardware systems and the direct digital control building automation systems, the opportunities to use the information for multiple sustainable purposes increases.

Figure 4. CISCO Connected Real Estate Model

CRE and Environmental Benefits

Cisco Connected Real Estate can help owners and operators of commercial real estate improve their environmental performance through:

- Energy efficiency and greenhouse gas emissions reductions
- Prolonged Systems Life – Landfill Reduction
- Preserve Natural Resources / Reduce Cabling
- Enhanced Productivity – Carbon Footprint reductions
- Reduced consumption of materials and equipment

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Figure 5. Common Concepts of GREEN Globe and BiQ

COMMON CONCEPTS

BOMA Go Green/ Green Globes

BIQ

- Training
- HVAC Control
- Operation Manual
- Maintenance Schedule
- Water management
- Filtration System
- Mould detection
- Storage Tank monitoring
- Emergency Response
- Emergency Power Generator
- CO₂ & CO Control (indoor air quality)
- Lighting and Daylighting Control
- Control over the ventilation
- Energy Monitoring ,Metering and Sub-Metering
- Water consumption Monitoring ,Metering and Sub-Metering

The BiQ and the LCC programs are complimentary as they approach both the issue of features and cost effectiveness. In both new construction and existing building retrofits and upgrades, the programs will help facilitate an integrated design process needed to make the buildings more intelligent and sustainable. ASHRAE has released the new High Performance Building Standard. Canadian Standards Association (CSA) is developing a Sustainable Building Standard. CABA programs like the BiQ and LCC will contribute to these intelligent building standards.