

Business outcomes for data-driven facilities

A New Look at Building Value

How building technology, people and processes improve business outcomes and create greater operational value

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While the U.S. economy continues to improve, organizations across sectors remain laser-focused on cutting costs and increasing return on investment. Managing balance sheets has never required more skill. In this age of finding savings and generating income, one line item deserves more attention – an organization’s facility. Facilities are assets, but maintaining them is expensive. When organizations with multiple facilities take into account a single building, it’s typically associated with the cost side of the ledger, reflecting infrastructure expenditures and depreciation.

Innovative executive teams, however, take a comprehensive, results-oriented approach to facility management – they generate greater financial returns by cutting facility costs. Utilizing new technologies, trained technicians and systematic processes, they reduce energy and operational costs up to 30% or more while creating intelligent, data-driven facilities, often referred to as “smart buildings.” Data-driven buildings, whether stand-alone or part of a campus, can help diverse organizations achieve significant business goals by improving operational and energy efficiency while increasing overall shareholder value.

A high-efficiency, data-driven facility is not created overnight. It starts with building an infrastructure of integrated systems. It also requires an investment in technology that provides information about your facilities’ operations which can be used to make significant financial returns. This technology includes a robust building automation system (BAS) that can integrate all of your various building components such as HVAC, lighting, security, and fire & life safety. With proper programming, a BAS can generate reports, provide transparency into system health, and communicate alerts in real time to maintenance and service personnel.

The data-driven facility also utilizes new software platforms and applications to further control costs and savings across your portfolio of buildings. These tools capture and analyze big data through cloud computing networks. It may take several years to achieve optimal results, but the sooner you have the infrastructure in place, the faster your portfolio will meet your business objectives.

This paper speaks to the financial and business benefits of a fully connected, data-driven smart building. Its goal is to help managers responsible for profit and loss to begin gaining greater financial return from existing facilities. It identifies the basics behind a data-driven

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facility – a strong BAS, use of big data, smart building software and software platforms. It then outlines a strategic process for working with your facility management team to begin achieving business goals.

Facilities as Dynamic Assets

While often viewed as cost centers, buildings carry a lot of weight as financial assets. In the midst of the recession, the total value of commercial real estate in the United States equaled an estimated \$5.3 trillion, according to the 2007 Standard & Poor's Real Estate Indices¹. By the end of 2009, the CoStar Group, Inc. estimated the total value of all U.S. commercial real estate to be \$11.5 trillion, more than double the 2007 Standard & Poor's estimate. These financial values are measured in purchase value only.

Management teams that look at facilities beyond their real estate value realize that improving the facilities' operating value – the value derived from increasing operating efficiency and lowering costs – can contribute significantly to their profit margins.

A 2014 research report published by the GreenBiz Group, *Three Big Myths About Big Data, How Analytics Can Optimize Enterprise-level Energy Management*, supports the focus on operating value. In the report, James Gray-Donald, Vice President of Sustainability at Bentall Kennedy, one of North America's largest real estate advisors, spoke about the value of sustainability programs. "We will start seeing more sophisticated correlations of how sustainability programs correlate to financial value," Gray-Donald said. "Right now, it's mostly conjecture. But I see in the next three years basically getting better breadth,

depth, and quality of data such that the correlation to financial performance in three to five years will become clear."

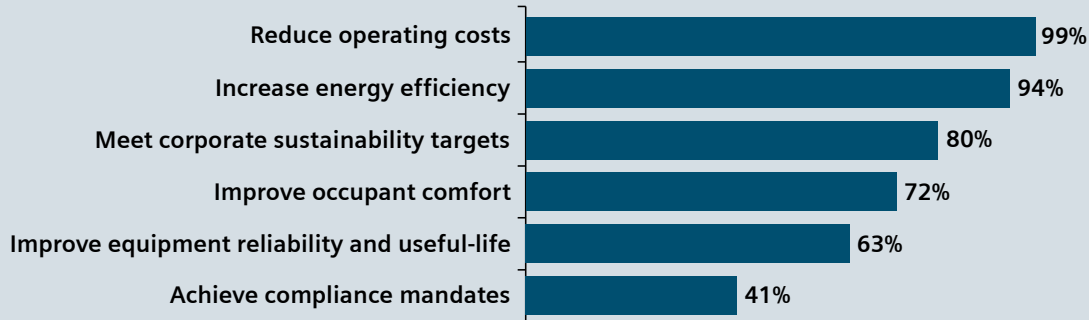
Measuring Operating Value

Measuring a building's operating value provides a new metric for assessing the value of a building. It measures dollars generated from savings – or reduced costs – on a daily basis. Measurements can include energy saved, operational costs reduced, lowered carbon footprints and greater water conservation. Cost savings are quantified using new data-management platforms and software applications with sophisticated reporting capabilities. These applications help facility managers to track and document savings and efficiency.

On a national level, the cumulative total of operating value for buildings has not yet been measured. But organizations are documenting significant value and energy savings within individual buildings and throughout their entire building portfolio. Some owners report savings of 30 percent or more on energy costs alone. By measuring a building's operating value, the real value of a facility can grow tremendously for an organization.

What's behind the explosive growth in operating value for commercial buildings? Highly sophisticated building automation systems empowered by advances in big data are dramatically reshaping facility management. The financial benefits for an organization are profound. To capitalize on these benefits, it's helpful to have a high-level understanding of a building automation system, big data, and their combined impact on a building's value.

What goals does your organization hope to meet through the management of your enterprise real estate portfolio?



Source: Three Big Myths About Big Data, How Analytics Can Optimize Enterprise-level Energy Management, John Davies, VP Senior Analyst, GreenBiz, © 2014

A New Look at Buildings

Achieving significant outcomes from data-driven facilities starts with changing how we look at buildings. Think beyond the brick, mortar and glass, and consider buildings as complex eco-systems. They provide productive places for hundreds of people who have a range of tasks and responsibilities. They consume huge amounts of natural resources, including air, water, electricity and gas. All the while, they keep extreme elements out, allowing workers and customers to thrive in comfortable, secure environments. At the heart of this eco-system is the building's automation system.

Looking at your building as an eco-system with a lifecycle of its own may help expand your thinking on how this asset can improve your bottom line. You likely have some expectations for your building that relate to energy efficiency, comfort and security. You are not alone. Today, managers are establishing specific goals and extending them across their entire real estate portfolio. In fact, Siemens and the GreenBiz Group conducted a recent survey of building executives. The results underscore the expectation for buildings to work harder to reduce costs and increase efficiency.

Whatever views you currently have of your real estate, chances are you have established your own goals related to your property. You may also have a building technology platform and an internal facilities management team that can help realize these goals. But, as a finance or operations leader, you might not have clarity about how building technology can actually improve your bottom line through lower operating costs, while helping meet sustainability objectives and other operational needs. Understanding your BAS helps explain what a fully utilized system can do for business across your enterprise, from cost reduction strategies to customer or tenant satisfaction.

Automation 101: A Lesson That Pays

Your BAS is a distributed control system: a computer network that monitors and controls the mechanical, security, fire, lighting and HVAC systems. However, it's important to note that your BAS isn't just a single system, behind the scenes, helping to manage your facilities. It's a collection of systems, including lighting, heating, ventilation, air conditioning and water, that is largely controlled by automated systems and maintained by facility management.



Building automation systems have become extremely powerful and sophisticated control centers. One BAS can operate all of the vital systems within a portfolio of buildings across the country. It collects and analyzes data, the first step in achieving significant energy and operational efficiency. The BAS can flag irregularities, transmit information to service personnel, receive adjustments, and in some cases make or flag repairs remotely, avoiding malfunction before a service team arrives at the facility. With an intelligent BAS, comfort and

other environmental conditions can adjust to anticipate needs or changes in the environment.

Unfortunately, the capabilities of most building automation systems are sorely under-utilized, leaving room within many organizations to reap greater efficiency with a modicum of investment.

A truly utilized BAS, working with a sophisticated controls system, can close the loop in managing a variety of systems and reach productivity goals and the desired business outcomes. It forms the core of a smart building. The United States General Services Administration (GSA), which is responsible for improving the performance of U.S. Government facilities, reports the following advantages of smart buildings:

- Energy efficiency: More accurate monitoring and control of energy-intensive systems like HVAC and lighting help reduce inefficiencies and reduce impact on the environment.
- Fast and effective service: Intelligent building technologies give building management and service personnel better tools to better serve tenants, occupants and users.
- Simplified property management: With GSA smart building technologies, maintenance crews can take pressure readings or make valve adjustments from the network operations center with a few, simple keystrokes, eliminating the need to take them by hand at multiple locations.
- Enhances life safety and security: If there is a fire in a smart building, the alarm sounds and other building systems begin to react. Exhaust dampers open, the internet protocol (IP) paging and intercom system issues instructions, the cross-control system unlocks doors for evacuation, etc.
- Anticipation of future technologies: A building with a robust BAS and IP backbone will be ready to adapt to, and support, almost any new technology being developed, allowing for easy modernization of the facility.
- Environmentally friendly: Careful measurement and monitoring of energy use for the purpose of reducing consumption is a hallmark of GSA green and smart buildings.

Duke Energy's Goal-Driven Facility Plan

The management team at Duke Energy also understands the power of a building automation and control system. It included BAS specifications when constructing a new, 48-story tower in Charlotte, N.C. When the Duke Energy Center opened, it became one of the leading models for energy efficiency and sustainability in the nation. At that time, it was the tallest building in North Carolina, and the

only to achieve LEED Platinum Core & Shell 2.0 certification, the highest level awarded by the U.S. Green Building Council for Leadership in Energy and Environmental Design (LEED).

"In a facility like this, there has to be a lot of emphasis on control systems," said Ron Roach, chief engineer for Childress Klein Properties, the building management company for the Duke Energy Center. "They are essentially our eyes in the field, so that we can see what our tenants need and take the right actions."



Duke Energy Center, Charlotte, North Carolina

In addition to LEED Platinum certification, the Duke Energy Center achieved significant operational goals, including:

- Achieving energy efficiency that is 22 percent greater than a traditionally built tower of comparable size. This has saved the Center approximately five million kilowatt hours of electricity per year.
- Integration and monitoring of 480,000 gallons of harvested groundwater, rainwater and grey water, which reduced costs and helped the Center save 30 million gallons of water per year.

The Role of Big Data

Regardless of which business outcome you desire, a BAS can help you achieve it. The key to achieving your goals is how your system is being utilized across your enterprise – and which services you are using to gain greater transparency into your buildings' performance. Big data is playing a greater role in managing building services and achieving greater outcomes. This is especially true across an enterprise. To understand its benefits, it's helpful to have a deeper understanding of big data and how it works with a building automation system.

From consumer goods to military operations, big data is changing the world. But what exactly is it? With highly sophisticated microchips, data can be collected almost anywhere. Our mobile phones, building sensors, web browsers, cars, streetlights, etc., all have the ability to collect data and transmit it through landline or wireless

A Word about Smart Buildings

The term “smart buildings” is often associated with the promises of enhanced software and technology platforms. However, smart buildings are more than software applications or hardware. Smart buildings are products of smarter strategies for building efficiency. The essence of a smart building rests on three, key elements to your strategy — people, process and technology.

People: You need the experience of facility technicians who understand building systems, products and services. Experienced facility experts know how each component contributes to the health and well-being of a specific building, and how they are orchestrated together.

Process: Smart buildings require a clear and effective process for collecting data from your building and distributing it to decision makers and implementers throughout your enterprise.

Technology: The right technology includes the software and communications platforms that support big data. That technology needs to be grounded with an open and robust building automation system that can connect all systems in a building, collect the data, and communicate critical information to facility managers and data analysts.

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A more comprehensive definition of big data goes even further; it includes analyzing the data to find underlying relationships. By identifying these relationships, analysts gain insight into what has happened and, more importantly, what will happen. The predictive modeling that big data provides is key — providing insight into relationships that indicate future events. That’s what drives the greatest business value behind the big data concept.

Along those lines, some assert that to gain the most benefit from big data, we need to understand that big data represents a new way of thinking. Kenneth Cukier and Viktor Mayer-Schoenberger, authors of the 2013 book *Big Data: A Revolution That Will Transform How We Live, Work, and Think*, espouse this view. They say that big data is a new mentality, an approach to managing the world. Cukier and Mayer-Schoenberger argue that big data is more than the ability to collect large amounts of data; it is also the ability to quantify many aspects of the world that have never been quantified before. They call it “datafication.”

The sophisticated technology required to collect, transmit and analyze data creates new requirements for facility personnel. Demand for experienced technicians with the knowledge and ability to analyze conditions and equipment is superseding demand for traditional mechanics who repair mechanically based equipment.

As a result, entire buildings are becoming highly sophisticated, data-driven assets commonly called “smart buildings.” They require new, recently introduced data

management platforms and educated, experienced technicians to keep them maintained and able to deliver optimal results. A data-driven smart building can produce hundreds of thousands of dollars in savings for an organization and make the entire enterprise more competitive.

Here are a number of outcomes you can expect when you combine big data, data-management platforms and software applications with your BAS:

- Higher energy efficiency: Track and compare consumption and performance patterns across your enterprise, a single building or your equipment, and identify where improvements need to be made.
- Real-time efficiency monitoring: Eliminate surprises by identifying the need for improved performance optimization measures and energy savings measures on a continuous basis.
- Reduce repair costs and down-time: With greater transparency, monitor system performance and reliability, and detect irregularities immediately.
- Improve energy procurement: Reduce risk in energy pricing by combining multiple energy procurement options, conducting comparisons and analyzing long-term costs.
- Eliminate pricing errors: Gain transparency and insight into energy supplier invoices, energy costs and energy market pricing.
- Achieve sustainability: Monitor sustainability targets with comprehensive insight into energy usage, greenhouse gas inventory, and total CO2 emissions data over time and across buildings.

Achieving Business Goals with Your Facility

Corporations across sectors are looking to their facilities to help achieve improved financial outcomes. R.R. Donnelley in Chicago, Illinois, is a global provider of integrated communications. Seeing changes in building technologies, Donnelley decided to put technology and energy improvements at the forefront of its facility goals at its Chicago office tower. Through a variety of facility improvement measures and other services, which cost less than \$1 million in 2010, it achieved a return on investment in less than three years and is realizing a projected annual energy savings of about \$150,000.

To turn your facilities into buildings with high operational value, industry leaders recommend the following as starting points:

1. Clearly identify your goals and priorities

Our organizations are not static. Outside forces cause priorities to shift. To keep moving forward, it's critical to establish and clearly define goals, and ensure everyone is aware of them. To help define and prioritize your facilities' goals, start with your overall business goals. This is where the vision of creating a facility portfolio that supports your business objectives begins to take shape. Ask yourself, where do energy efficiency, operational efficiency, worker productivity, and sustainability best support your desired business outcomes? Aligning your facility goals with your business goals will provide insight into which has highest priority. For your facility goals, it's best to focus on one or two specific areas. Review with your facility team and identify low-hanging fruit where you can achieve the quickest results.

In the GreenBiz Group paper, Marty Sedler, Intel Corporation's Director of Global Utilities and Infrastructure, recommends taking measured steps. "We always try to go in and say we're going to solve the whole big problem and it becomes so overwhelming that you never reach the end game, the success," Sedler said. "Break it down into pieces where you can see progress rather than trying to get there in one jump."

2. Conduct a thorough assessment of your facility

Just as you would conduct a financial audit of your accounting activities, or an audit other areas of your business, you will also want to conduct a facility audit. Note the various levels of audits that can be conducted; whether integrating separate building systems, identifying energy waste, or connecting facilities with cloud-based analytics, you will need a thorough assessment in order to create an effective plan. Your facility team or outside building technologies consultant can best recommend the level of audit needed to achieve your goals. A third-party

Starting the Conversation

The first step in getting more from your building is to have a conversation with your facilities manager. He or she may already have ideas for reducing costs or increasing energy efficiencies of existing technology and equipment. They may have additional ideas about the services necessary to achieve these goals. Before you can explore any of these ideas, you will need to find the answers to the following questions together:

1. Which goals can the facilities team help to achieve?
2. How are we measuring the success of the following goals?
 - Reduce operating costs
 - Increase energy efficiency
 - Meet corporate sustainability targets
 - Improve occupant comfort and safety
 - Improve equipment reliability and useful life
 - Achieve compliance mandates
3. Do we have a plan in place to reduce operating costs, increase efficiencies, etc.?
4. What infrastructure changes or investments are necessary to insure the plan is successful?
5. Do we have in-house expertise to meet these goals, or do we need to bring in outside experts?
6. What are the gaps in achieving our goals, and how do we fill them?
7. Which goals can you affect more than others? Which gives us the best bang for our buck? Which will be the easiest to achieve?

team will most likely be required to conduct the audit, whereas managing the audit can be handed over to your facilities team.

3. Create an implementation plan and investment strategy

With goals established and a facility audit in place, you and your team are ready to outline an implementation plan. Your building technologies partner can help create a plan that meets your short-term and long-term goals. The plan may encompass several years, beginning with quick wins for specific buildings, and growing to connect an entire portfolio of facilities. Look at the implementation plan as an investment strategy. Ask: What will generate quick



returns and what will require longer-term investments? Your implementation plan/investment strategy should provide a five-year road map to bring your organization where it needs to be.

When developing your investment plan, be sure to start at the building level, not just the enterprise level. While the goal of having a portfolio of buildings that communicate and regulate each other is exciting, your plan will fail if each building isn't at a suitable level. To have all buildings working together, each one will need to have connectivity among its own internal systems.

Summary

Facilities are tremendous financial assets and they are poised to increase in value. The power of building portfolios in the economy cannot be underestimated. BOMA, the Building Owners & Managers Association, estimates its members own or manage more than 9.9 billion square feet of office space alone. That's enough to cover the state of Texas 1.3 times. BOMA estimates its members, through their facilities, contribute \$205 billion to the U.S. gross domestic product.

The value of real estate portfolios can increase by creating data-driven facilities, sometimes known as smart buildings. While data-driven facilities are defined by new software programs, cloud computing and big data, at their core are robust building automation systems, increasingly sophisticated facility experts, and proven processes. Together, people, process and technology improve a building's operating value, and its organization's overall valuation. But improving the operating value of a portfolio of facilities doesn't happen overnight. It takes planning and an organized approach. The sooner you get started, the sooner your facilities will begin contributing real value to shareholders and other stakeholders within your organization.

1. S&P/GR Commercial Real Estate Indices (SPCREX™), David Blitzer and Larry Souza, 2008, Standard & Poor's

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