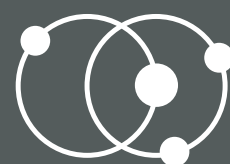# THREE BIG MYTHS ABOUT BIG DATA

HOW ANALYTICS CAN OPTIMIZE ENTERPRISE-LEVEL ENERGY MANAGEMENT

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EXECUTIVE SUMMARY

Big data and data analytics are terms used increasingly to describe the current state and future opportunities of enterprise energy management. To gain greater insight, GreenBiz Group conducted a quantitative survey of energy managers from large corporations, hospital systems, governments and educational institutions. The research sought to identify the impact of big data and advanced analytics when it comes to managing their enterprise-wide building portfolio. We also conducted in-depth interviews with 10 executives responsible for enterprise energy management at their organizations.

The results highlight the early nature of using big-data analytics for enterprise-level energy management. With a plethora of vendors making wide-ranging claims, it's not surprising that there are misconceptions. We highlight three of the most pervasive "myths":

MYTH 1:

One Size Fits All. There has been a proliferation of big-data analytics solutions and visualization dashboards that claim to do all things for all companies. The best advice is caveat emptor — buyer beware — as potential solutions must be evaluated based upon the specific requirements of an enterprise-wide building portfolio.

MYTH 2:

It's All About Technology. Solutions for enterprise energy management may provide critical information that can improve the performance of an enterprise's portfolio, but more important is the element of human expertise needed to analyze various situations and take corrective action.

MYTH 3:

Data Equals Information. No matter how "big," an incomplete or otherwise flawed set of data cannot provide actionable information. The proper analytics can be developed only with a clear understanding of the quality and quantity of available data.

These and other myths are similar to those that occurred during previous technology revolutions, such as the rise of the personal computer and later the Internet. As more organizations deploy big-data analytics for enterprise energy management, the path to success will become clearer.

We conclude this paper with five actions energy managers can take today to advance along this journey.

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GreenBiz Group would like to thank Siemens Building Technologies for their support of this report
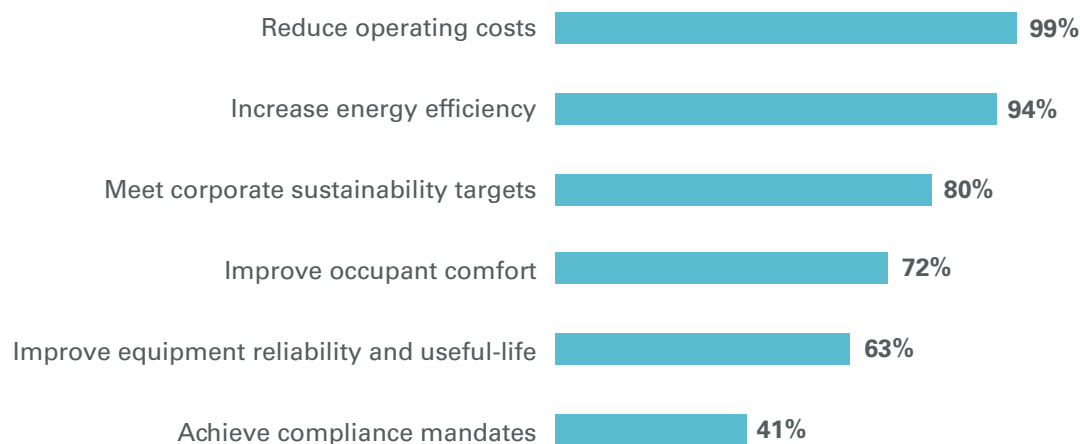
INTRODUCTION

The IT research firm Gartner defines big data as high-volume, high-velocity, and/or high-variety information assets that require new forms of processing to enable enhanced decision making, insight discovery and process optimization.

Many large factories and office buildings generate vast amounts of data. According to General Motors' Global Energy Manager Al Hildreth, "We get data about the positions of valves and dampers and other operating information about the heating and ventilating and air conditioning systems. It's a lot of data, about two-and-a-half million data points a minute." And that accounts for only the high-volume and high-velocity data being generated by sensors and other means of automated data collection within an enterprise's portfolio of building assets.

The exponential increase of data being collected will drive improvements only if that data is put to use. That is where technology providers promote the use of big-data analytics to sort through all the data. Big-data analytics can be conducted with a new breed of software tools that can perform data mining and predictive analytics.

Big-data analytics can help energy managers understand where and when things like set points can be changed or equipment proactively repaired or replaced. That's just the beginning, however. A Jetsons-like future has been promised, with self-healing buildings that respond to factors such

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

Goal	Percentage
Reduce operating costs	99%
Increase energy efficiency	94%
Meet corporate sustainability targets	80%
Improve occupant comfort	72%
Improve equipment reliability and useful-life	63%
Achieve compliance mandates	41%

as weather, occupancy and production schedules as a building's performance is continuously and automatically optimized.

It is a compelling vision of the future, but we're just in the early stages of realizing the impressive benefits that can come from the use of analytics and data visualization in the built environment. To get a better understanding of what is being implemented today and what enterprise energy managers envision for the future, Siemens commissioned GreenBiz Group to conduct primary research on the use of big data and analytics for enterprise energy management.

GreenBiz Group conducted a quantitative survey of close to 800 energy managers from large organizations and received responses from 94 of those managers across a wide range of industries. We then conducted in-depth interviews with 10 executives responsible for enterprise energy

management at their organizations.

Not surprisingly, close to 100 percent of survey respondents seek to reduce operating costs and increase energy efficiency. And all of those with the largest portfolios (1,000 or more buildings) indicated that improving occupant comfort was a key goal.

But when it came to big data and analytics, only 44 percent of respondents currently have a dashboard to visualize building/portfolio data across their enterprise, while roughly the same number (43 percent) would like to utilize a dashboard in the near future but don't have one currently. The larger the organization, the more likely they are to have a dashboard in place.
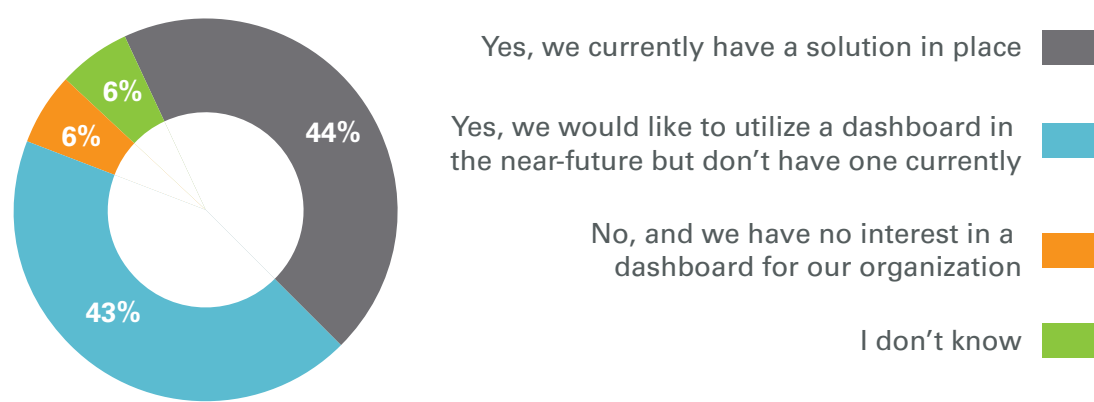
While that certainly appears to be a positive trend, 60 percent of those using software for data analysis and visualization are not confident or are only somewhat confident that their solutions will help them realize their portfolio goals.

These are early days and there are many claims being made about how big data and data analytics will allow those managing enterprise real estate portfolios to achieve breakthroughs in their operations. During our interviews with executives, the current level of technological capabilities was likened to the 1990's Internet era or an earlier 1980's age of DOS-based PCs.

As one respondent commented, "We're in the trough of disillusionment in the typical IT curve. There was a lot of promise and most of it was marketing. Some of our properties invested in companies that claimed they could solve our problems and many of those investments have not generated the returns we expected."

In order to cut through the hype and identify the way forward, we've identified three myths about big data for enterprise energy management. But lest you feel things are moving too slowly, we've also identified five actions that can be taken to start laying the foundation to gain the promised benefits from big data and data analytics.

Are you currently or do you have plans to utilize a dashboard to visualize building/portfolio data across your enterprise

44%

43%

6%

6%

Yes, we currently have a solution in place

Yes, we would like to utilize a dashboard in the near-future but don't have one currently

No, and we have no interest in a dashboard for our organization

I don't know

THREE MYTHS ABOUT BIG DATA FOR ENTERPRISE ENERGY MANAGEMENT

There are three widely held misconceptions that were identified in GreenBiz Group's quantitative research and in-depth executive interviews regarding big-data analytics for enterprise energy management. Each of these "myths" represent a disconnect between the promise of big-data analytics and the current state of the market. While these myths are true today, they can also serve as guideposts for improvements in the future. Here they are, in no particular order.

MYTH 1: ONE SIZE FITS ALL

When it comes to choosing big-data analytics software to manage energy and sustainability for an enterprise real estate portfolio, not all solutions are created equal, or have equal application.

In our interviews, executives estimated that there are somewhere between 50 and 150 companies that have some kind of product offering, whether it's a building automation system, analytics, fault detection or some other solution. Several of the executives we talked with were bemused by how most of these providers say they do similar things, claiming "we can do fault detection" or "we can aggregate and analyze all your data for you," even though reality doesn't always live up to such claims.

Clearly, not everybody can do everything. According to Steve Frank of the National Renewable Energy Laboratory (NREL), "A provider might claim to do fault detection diagnostics for your building when, in reality, the fault detection and diagnostics are very, very specific to certain kinds of systems. So you might have a company that claims, 'We do fault detection diagnostics for HVAC systems.' But what they really mean is, 'We do fault detection diagnostics for packaged rooftop units,' and that's it."

Another obvious factor that providers often overlook is that different buildings have different requirements. Chris Magee, Executive Director of Sustainable Facilities for MGM Resorts International, observes, "Big box retailers like Target and Walmart do a really good job, but they have a straightforward path. They can build a central office that might handle HVAC and lighting control. We have such a diverse infrastructure with theaters and changes in occupancy in our buildings and the towers and the ballrooms. So we have to take a very sophisticated approach."

Chrysler Energy Manager Faiz Yono concurs. "There is probably more effort spent on the commercial side of things doing data analytics then there is on the industrial side. They're looking at more of a pattern of occupancy in determining how they mine the data versus what we look for with a 24-hour operation. I have to be a lot more creative about the type of energy efficiency projects I do in this environment and that requires different analytics."

It is critical to understand the requirements of a specific organization's enterprise-wide building portfolio when determining a big-data analytics strategy. This will drive a solution that works best for your enterprise.

Technology providers often overlook that different buildings have different requirements.

MYTH 2: IT'S ALL ABOUT TECHNOLOGY

While many of the components and software packages that support big-data analytics and data visualization can be deployed today, the missing ingredient for many companies is the people necessary to do the work. In our survey, 67 percent of respondents claimed that a "lack of resources to help implement and manage a solution" is delaying their technology purchase.

According to James Gray-Donald, VP Sustainability at Bentall Kennedy, one of North America's largest real estate investment advisors, "I think it's important to assess the readiness of people at the property level for big data. Is there the literacy, willingness and skill set to transition to digital technologies? I think that's the largest constraint that we face and will continue to face despite having rich energy performance data available."

MGM's Magee agrees. "You have to continually evaluate whether you have the right resources. Do you have the team that's going to be able to effectively respond when you get alarms or highlights, who will come up with the proper remedy, and do you have the right kind of team structure at that particular facility?"

One executive adds, "Ultimately the data is the data, but you need that human interaction, the people to maximize the value of that data, whether it's somebody telling the system what to do under certain scenarios or somebody that's directly acting because of the data they're getting."
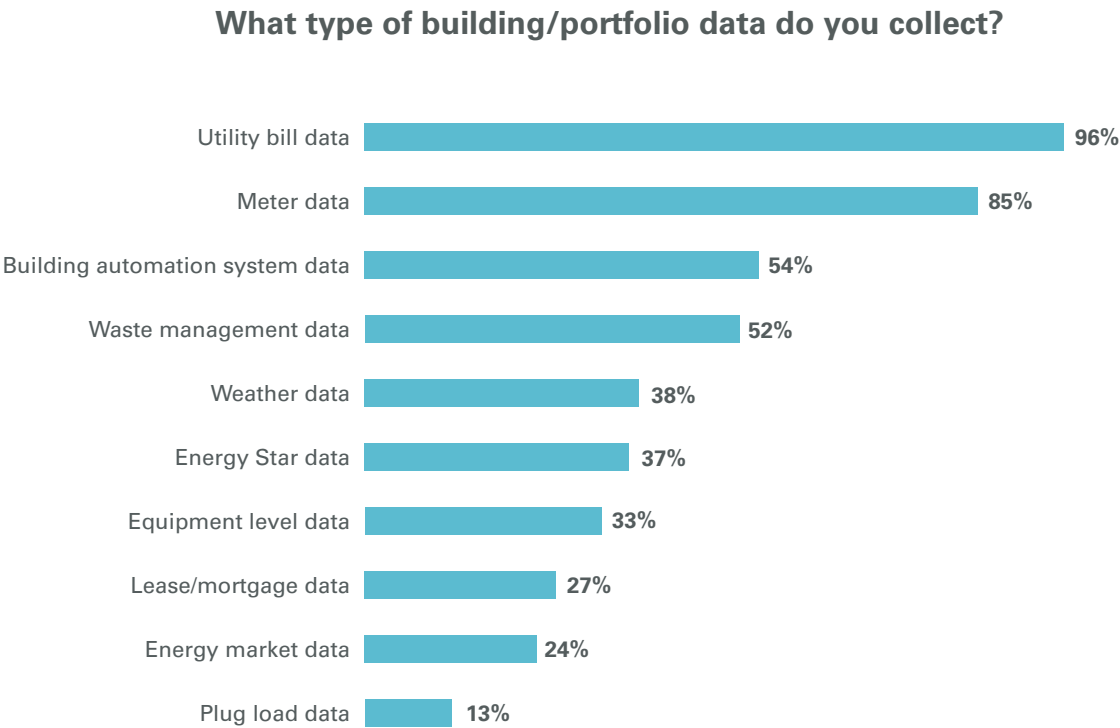
That can be a challenge. As another interviewee noted, "We're a $4.6 billion company and I am the entire energy management team." Another energy manager related that, "Probably the biggest challenge I face is just having the time to actually sit down and look at the data and make changes or see what's wrong."

NREL's Commercial Buildings research group hosts a wide range of organizations at its facilities. As a result, Steve Frank hears a lot of stories about how companies cope with energy issues. "Whether it's a university or a retail chain, one common mistake they make is that they don't allocate sufficient resources to address the issues as they come up. In those cases, you don't get your return on investment, because the energy information system is telling you that things are wrong, but you're overwhelmed and cannot deal with them."

Some forward-looking companies are adding staff

to focus on resource use and waste and recycling issues using the same model they used to analyze energy. According to Grainger's Senior Manager, Corporate Facilities and Global Sustainability Jeff Rehm, "We've had positive results in terms of measuring, tracking, and changing behaviors around how we manage waste in the facilities and that is directly related to how we've staffed up."

The technology to improve your enterprise-wide portfolio is only as good as the engineers and staff that support your efforts on a daily basis. Budget effectively for supporting the insights gained from implementing big data analytics.

What type of building/portfolio data do you collect?

Utility bill data	96%
Meter data	85%
Building automation system data	54%
Waste management data	52%
Weather data	38%
Energy Star data	37%
Equipment level data	33%
Lease/mortgage data	27%
Energy market data	24%
Plug load data	13%

MYTH 3: DATA EQUALS INFORMATION

In our research, utility bill and meter data is the most collected data (96 percent and 85 percent respectively), followed by building automation system data (54 percent) and waste management data (52 percent). But there is a lack of confidence in much of the data collected.

About half of our survey respondents (49 percent) are not satisfied with the quantity and quality of the data they are collecting. For those who have already implemented an energy management dashboard, 44 percent are not satisfied with the data they are getting, while 62 percent of those planning to utilize a dashboard are not satisfied with their portfolio data.

Bentall Kennedy's Gray-Donald explains, "The hard part is getting clear and consistent data across a broad range of geographies, asset types, and across a number of years. There hasn't typically been the same rigor to nonfinancial data as there has been to financial data."

He continues: "So, big data is great. It's actually very easy to understand correlations if you have the data. But other than one or two European organizations, I haven't heard of anyone having

the depth of datasets in a consistent enough manner with a high degree of confidence about accuracy such that analysis at the portfolio level is useful."

MGM's Magee notes, "The biggest challenge is really logistical in the sense that we've got a lot of equipment that has no sensors, has no control ability, and it's extremely difficult to get the data out of. So sometimes we have a very incomplete picture."

That doesn't even take into account data that is not capable of being easily automated, such as repair and inspection records, certifications or tenant complaints and requests. Marty Sedler, Intel Corporation's Director of Global Utilities and Infrastructure, underscores the problem. "You have to put in so much assumed data that it's only as good as the curves and the models, and the updates that you keep on it. And if you don't update it with the right data, it gives you the wrong answer… A ton of data doesn't do any good if it doesn't turn into information."

Implementing an enterprise-wide big data analytics solution requires more than utility bill and meter data. Integrating processes and technologies that collect more robust data will lead to a more strategic solution.

Only 33 percent of owners report capturing equipment-level data.

THE FUTURE OF BIG DATA AND ANALYTICS HOLDS GREAT PROMISE

There are certainly more than three myths when it comes to the current state of big data and analytics for enterprise energy management. The market is functioning in a similar manner to past technology booms, where there will be winners and losers and, in some cases, innovations we can't even see today.

MGM's Chris Magee looks at it "like you're at a big outdoor concert and you're trying to hear somebody whispering from the back of the stage. That's kind of what we're doing when we look at these sometimes years' worth of data points and try to figure out where these little anomalies might be. Maybe it's at two o'clock in the morning every night and we need to pull that out and find out — it might be an operator, or some programming that's turning on exhaust fans. And then we can pinpoint that and find out why it's being done and then either alter it or refine it."

General Motor's internal dashboard is an early example of what others can expect as well. As Al Hildreth relates, "Data really drives our business. Without looking at energy use data alongside production and climate data and all the other factors that affect our energy use you really can't manage the business. So we do that to the most granular level that becomes cost effective for us. Typically that's at a department level, sometimes a business unit level. If a facility is fairly small then we might just do it at the facility level. So we look at energy and water use as the information's available on really a real time basis to provide us with information that we can use to manage the business."

Grainger's Jeff Rehm concurs, "Data has allowed us to make investment decisions and be more specific in our recommendations."

James Gray-Donald adds, "We'll start seeing more sophisticated correlations of how sustainability programs correlate to financial value. 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. There will then be a very high degree of detailed data transparency right through to the investor on ESG [environmental, social and governance] metrics. Then people like me won't be the intermediary. They won't call me up and say, 'How are we doing on this and that?' They'll have access to the data and have tools to run intuitive analysis."

Are you satisfied with quantity and quality of the data you are collecting?

No	49%
Yes	44%
I don't know	6%
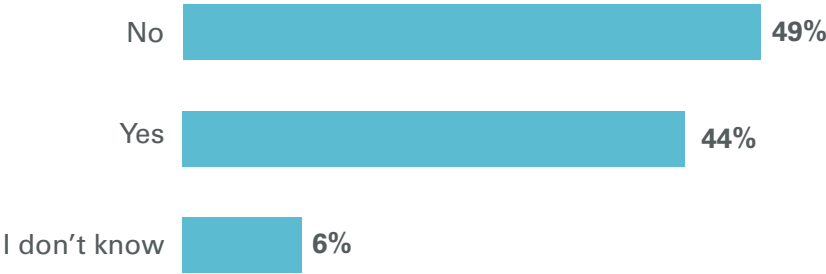
FIVE ACTIONS TO TAKE TODAY

Most companies are in the early stages of the journey toward a sophisticated use of big-data and analytics for enterprise energy management. Through our interviews and quantitative data collection, we've unearthed advice that should make those efforts more productive.
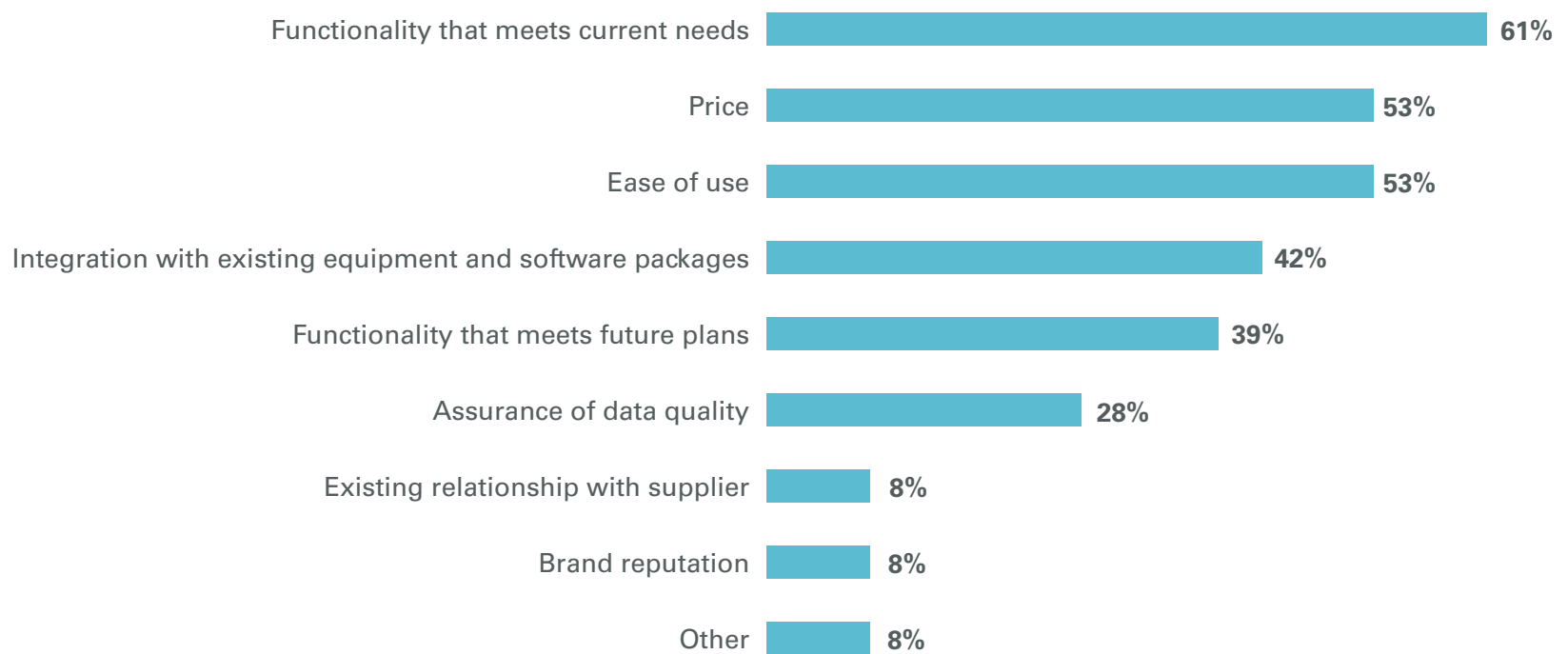
1. Learn from Your Peers. It's important to not only spend time familiarizing yourself with the providers, but also with what others have implemented and how they went about procuring systems. GM's Hildreth recommends "researching other companies that have done it. We participate in industry organizations and other groups to share best practices. Get out there and find out what your competitors or your peers have done successfully and what they used for the business case. If you learn someone did something on a two-year payback, that's positive information you can take back and put into your business case to sell internally."

2. Align Incentives with Actions. Many of the executives we interviewed create energy trend reports that are distributed to upper management. These reports often provide for a deeper dive into the data. B-K's Gray-Donald notes, "This carries a lot of weight because energy use intensities form part of the annual incentives for various property managers as well as regional vice presidents. They have access to energy data on a pretty fine-grained basis through a software-as-a-service tool. And they're able to perform detailed analytics. Whether they do or not is up to them. But if their performance is off, it does get noticed by more senior people."

3. Reserve Money to Address Issues. NREL's Steve Frank advises, "You cannot expect to pay money to a vendor and not reserve any money internally to address the problems that will inevitably come up."

4. Consider Enterprise-wide Budgeting. Several of the executives we interviewed emphasized portfolio-wide budgeting rather than budgets for individual properties. Following this scenario, a site doesn't get its own funding for a project. Rather, the data gets shared across multiple sites and doesn't get lost in one location. This allows projects to be tracked along with other projects, along with the savings, costs, MVPs and ROIs, etc. This becomes a database for seeding new projects or identifying projects that should go into new construction.

A ton of data doesn't do any good if it doesn't turn into information.

What were the top factors that were considered when buying a big data/analytics solution?

Factor	Percentage
Functionality that meets current needs	61%
Price	53%
Ease of use	53%
Integration with existing equipment and software packages	42%
Functionality that meets future plans	39%
Assurance of data quality	28%
Existing relationship with supplier	8%
Brand reputation	8%
Other	8%

5. Don't Boil the Ocean. Finally, Intel's Marty Sedler advises, "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. Break it down into pieces where you can see progress rather than trying to get there in one jump."

Our research identified that organizations have specific challenges in attaining energy and sustainability goals. The appropriate application of technology can help organizations attain those goals. When evaluating solutions, our respondents indicated that the most important factor for success when buying a big-data analytics solution is the ensure there is "functionality that meets current needs." Big-data analytics promises to enable enhanced decision-making and improve enterprise-level energy management when the solution deployed meets the organization's needs.

"We're in an exciting time for enterprise-level use of data analytics as its potential is just now starting to be realized. The feedback we're getting from our customers is a positive sign that we're headed in the right direction as we've made it a point of emphasis to blend industry-leading technology with our analytical expertise. It's crucially important that we're able to help our customers cut through the clutter in order to find meaningful information that drives real business results. This is easier said than done, but with the advent of advance metering technologies and data-transparency platforms like Advantage™ Navigator from Siemens we're confident that we can help put "big data" to work for you."

-Dave Hopping, Vice President, Building Performance & Sustainability, Siemens Building Technologies.

ABOUT GREENBIZ

GreenBiz Group's mission is to define and accelerate the business of sustainability. It does this through a wide range of products and services, including its acclaimed website GreenBiz.com and daily e-newsletter GreenBuzz; webcasts on topics of importance to sustainability and energy executives; research reports, including the award-winning annual State of Green Business; the GreenBiz Executive Network, a membership-based, peer-to-peer learning forum for sustainability executives from Fortune 1000 companies; and conferences such as the GreenBiz Forum and VERGE. For more information, visit GreenBiz.com.

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