A User's Guide to Comprehensive Energy Management

GreenBiz group

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Executive Summary

Energy management is undergoing a rapid transformation. Large companies and government agencies are increasingly connecting their buildings to the cloud, accessing more data points, discovering new energy supply options and leveraging innovative financing structures. This transformation is enabling accelerated project development across energy supply, conservation and generation.

Despite these market and technology changes, GreenBiz and Siemens discovered, through a web survey and set of phone interviews with energy management leaders, that many large organizations are not fully prepared for this new energy future.

71%

of companies surveyed pursued energy projects to achieve GHG reduction goals

However,

88%

indicated they would benefit from a more comprehensive approach to energy

And,

83%

want better data gathering and analysis tools

To achieve success in comprehensive energy management and accelerate the pace of investment in a clean energy future, your approach to comprehensive energy management should incorporate the following best practices:

KEY RECOMMENDATIONS

1. Set specific goals
2. Collect relevant and current data
3. Develop a strategic energy plan
4. Bolster your case with energy efficiency wins
5. Establish a portfolio approach
6. Collaborate across a range of stakeholders
7. Leverage innovative financing
8. Factor resilience into your strategy
9. Focus on employee engagement
10. Learn from real-world technology deployments

Introduction

Historically, large organizations treat energy as a cost center. They track and pay their energy bills from their regional utility provider with a relatively fixed budget allocated to energy spend. Energy consumption is often managed by a very small team of isolated facility or energy managers, and large organizations sometimes are unable to account for risks associated with energy price volatility.

This is changing as leading companies make energy decisions based on their overall business impact and based on deep analytical insights. No longer should an energy purchasing decision or energy conservation action be done in a "bubble." Rather, a strategic approach is required — one that drives overall performance and reliability for the organization.

Prioritizing energy management is complex, especially for large companies with a global footprint operating across different regions or countries. Indeed, executing on energy projects in today's market requires a higher level of sophistication and a more technical set of knowledge than ever before. Major energy trends include:

1. ***Decentralization –***
   Incumbent energy providers face more competition, companies have more energy options and regulations are rapidly changing.

2. ***Digitization and IoT-enablement –***
   New technologies including Internet of Things (IoT), energy storage and micro grids offer access to new data points and secure cloud-based networks.

3. ***Distributed and accessible –***
   New purchasing and financing models are emerging to support energy efficiency and renewable procurement initiatives.

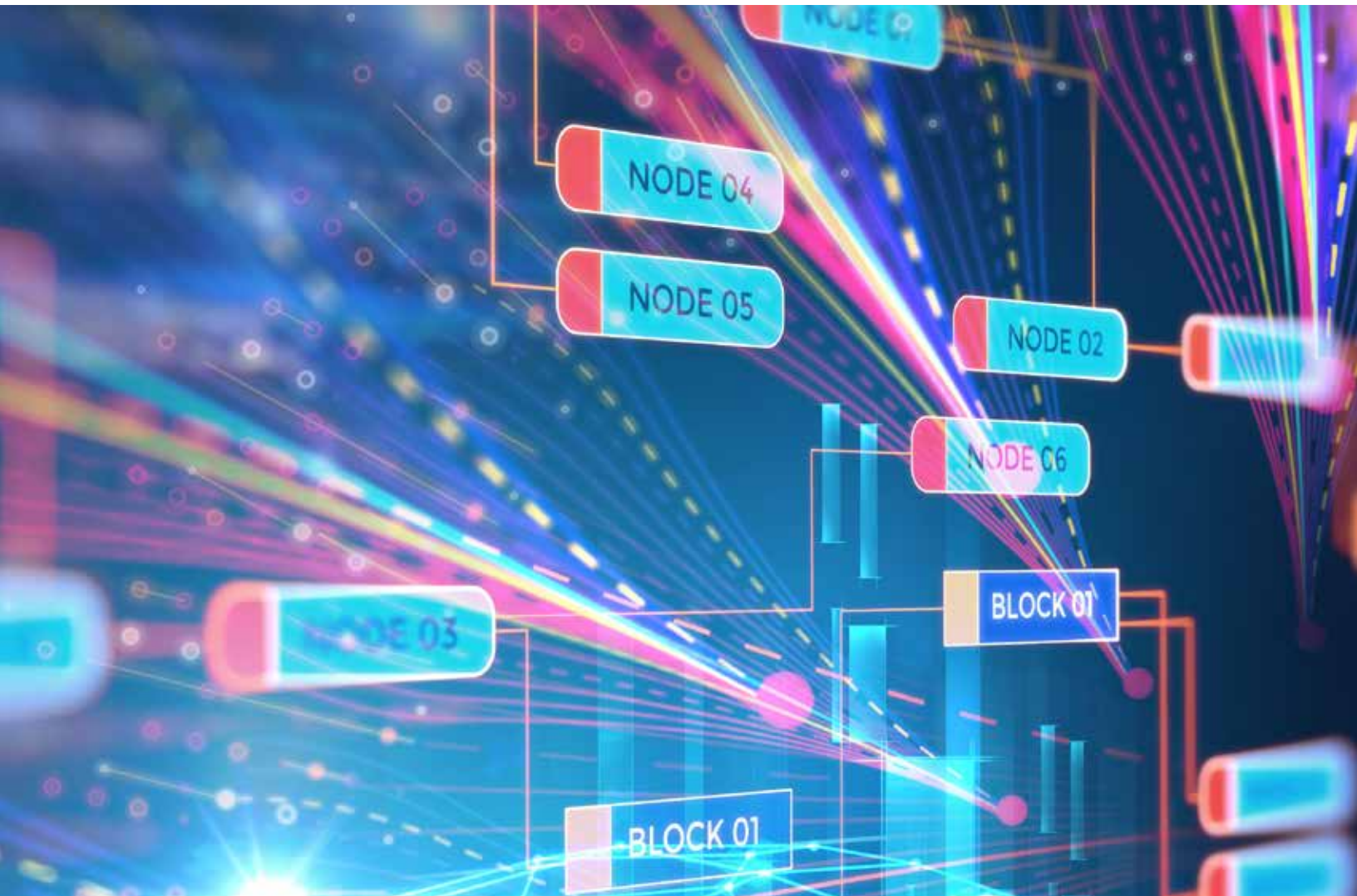
While this new energy market offers myriad opportunities for action, various barriers still face large global companies. These include:

1. ***Difficulty of internally selling the business value –***
   The top barrier reported by 43 percent of large organizations was “difficult to make the business case/ROI.”

2. ***Many companies face a lack of internal bandwidth and internal alignment —***
   The second leading barrier reported by 38 percent of large organizations was “misalignment of internal objectives.”

3. **Data is ubiquitous but can be difficult to analyze —**
   Data collection and analysis can be difficult, especially across utility bills and legacy energy management systems.

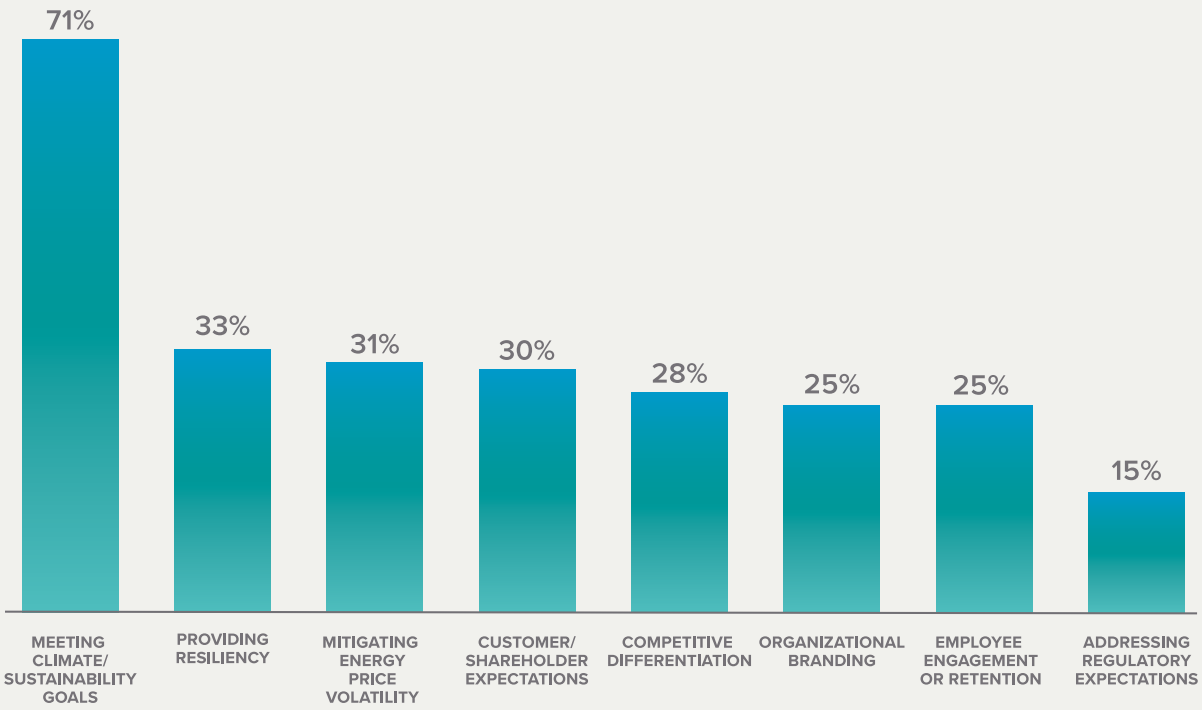
This user’s guide to energy management offers recommendations for large companies, higher education institutions, government agencies and industry professionals looking to take action on energy in a comprehensive manner. But first, let’s consider what’s driving this interest in energy management, as well as some obstacles that might make developing a holistic strategy more difficult.



Key Drivers and Barriers for Comprehensive Energy Management

When asked about the primary factors, beyond cost savings, that motivate an interest in comprehensive energy management, most respondents from large organizations indicated it was for "meeting climate/sustainability goals" (71 percent), followed by an interest in providing resiliency for their operations (33 percent). Perhaps surprisingly, only 25 percent of respondents indicated that their leading motivator was "organizational branding" and an even smaller percentage (15 percent) indicated it was related to "addressing regulatory requirements."

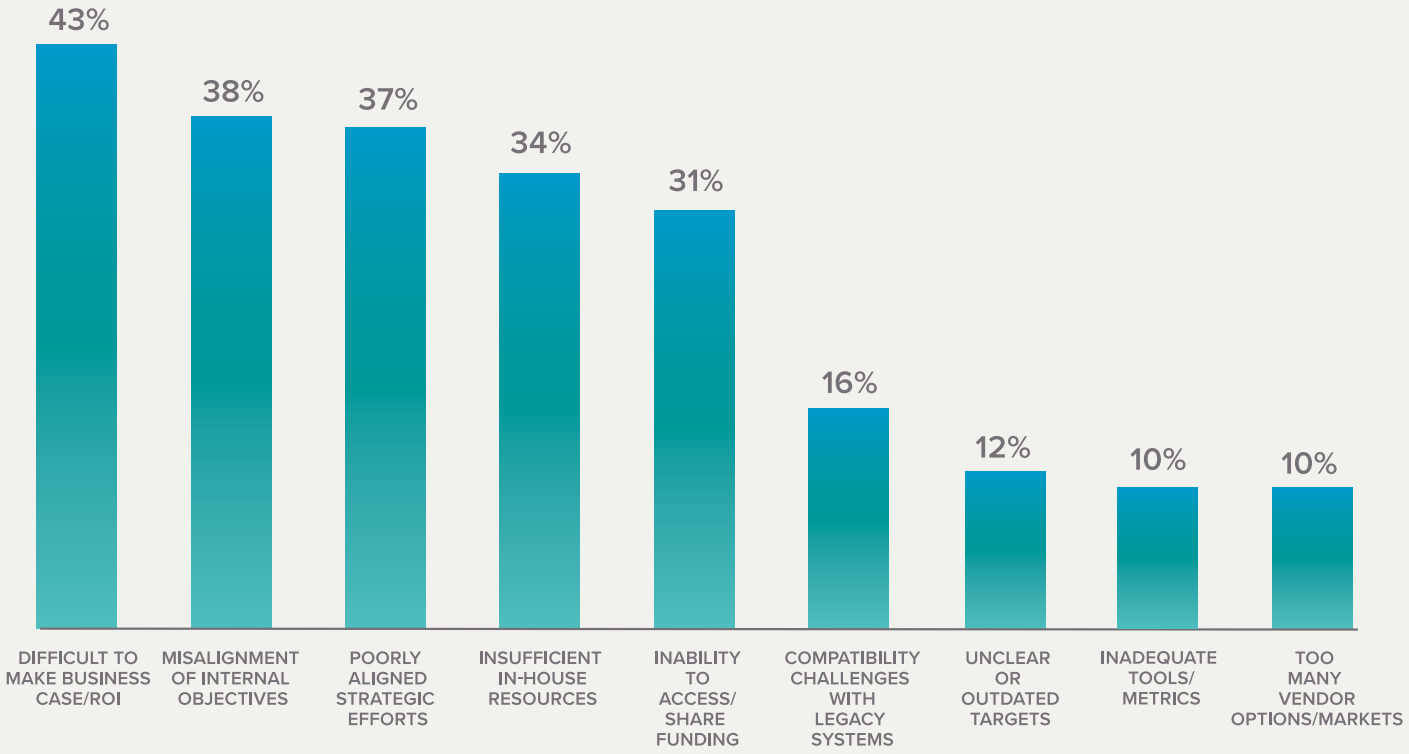
Table 1: Beyond cost savings, what are the primary drivers for executing comprehensive energy reduction, procurement and generation projects?



AMONG LARGE COMPANIES ($250M+ IN ANNUAL REVENUE) AND GOVERNMENT AGENCIES (n=102)

The largest barriers to comprehensive energy management are largely internal challenges rather than technology concerns. The most significant description chosen among those surveyed was “difficult to make the business case/ROI” (43 percent), followed by “misalignment of internal objectives” (38 percent). Technology-oriented barriers such as “compatibility challenges with legacy systems” (16 percent) fell relatively low on the list of perceived barriers cited by survey respondents.

Table 2: What are the biggest internal barriers that prevent your organization from taking a more comprehensive approach to accelerate adoption of energy reduction, procurement and generation projects?



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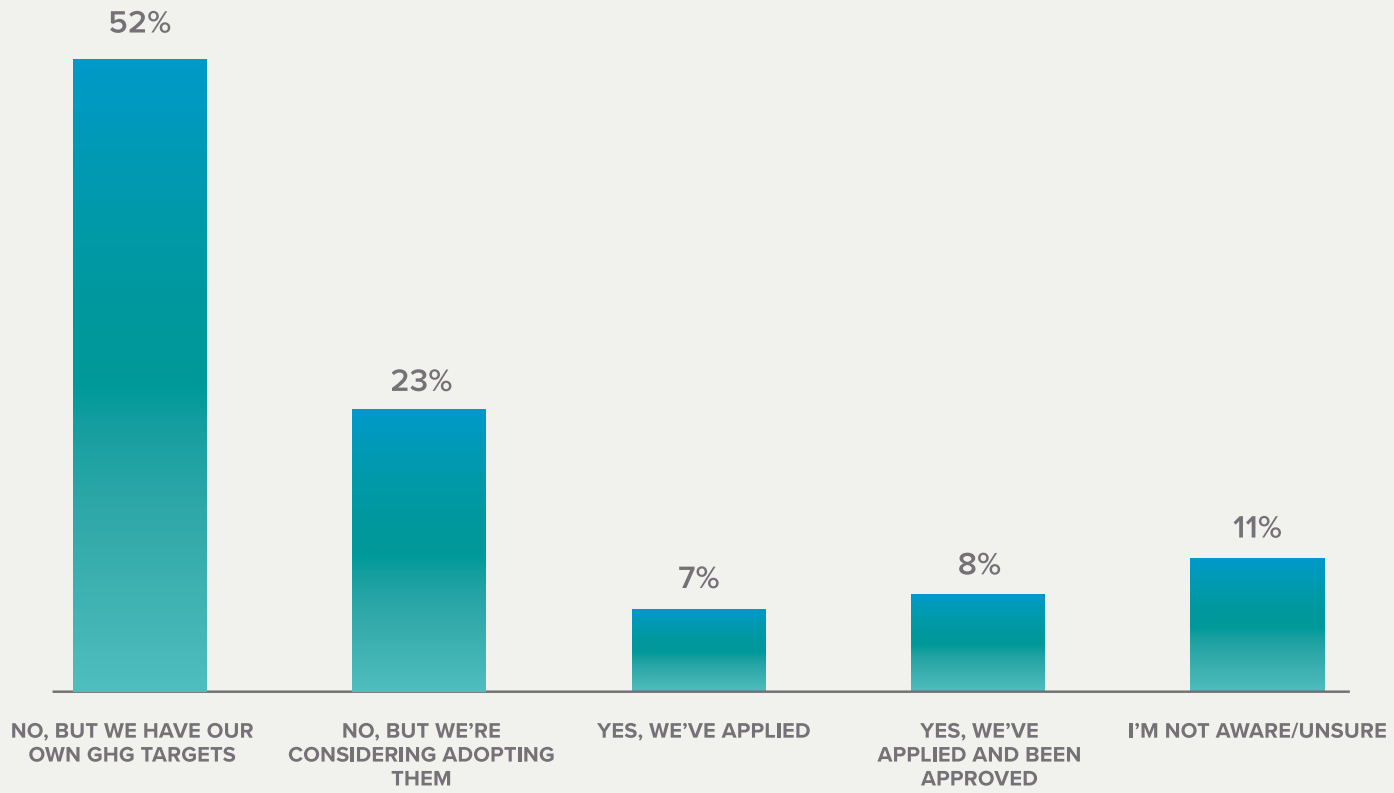
10 Recommendations to Achieve Comprehensive Energy Management

1. Set specific goals.

As of mid-2018, more than 450 companies had begun taking action to shrink their carbon footprints through the Science Based Targets initiative, a partnership between CDP, U.N. Global Compact, World Resources Institute (WRI) and World Wildlife Fund (WWF). While this is an example of one way to publicly set greenhouse gas emissions (GHG) reduction goals, many other large organizations are reducing emissions as part of their own initiatives and commitments. Indeed, GreenBiz found that 52 percent of large organizations have set GHG reduction goals. Beyond those large organizations, an additional 15 percent have applied and been approved as a part of the Science Based Targets Initiative.

Table 3: Has your organization adopted Science Based Targets?



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Several web-survey respondents and phone interviewees pointed to the importance of implementing GHG reduction targets as a way to help gain internal alignment from senior leadership. One web-survey respondent wrote, "The key to realizing gains in energy management is buy-in from senior leadership. Without a consistent message from the top, energy management gets lost in the other business initiatives."

Among companies that have approved science-based targets, several indicated the importance of developing key performance indicators and using the initiative to set a global target for the entire company.

2. Collect relevant and current data.

There is strong recognition that energy-related data is an important aspect of setting goals, making a business case, demonstrating results and being transparent with internal and external stakeholders. Many organizations struggle with the collection of data from utilities, because of the number of touch points involved, the numerous formats used to collect and manage the data, and the varying intervals at which building meter data is captured. Compounding the difficulty of this task are numerous other sources of data — such as information from individual building management systems and third-party products — that are often stored in proprietary systems that can be difficult to aggregate.

Web survey responses indicated that 83 percent of larger respondents think their organizations would benefit from better data gathering and analysis tools.

One recommendation is to not just analyze but to translate sources of data in a way that speaks to the needs of a specific set of stakeholders. "Data doesn't necessarily tell a story — you have to be able to tell a story with the data," said Jay Antle, executive director of the Sustainability Center at Johnson County Community College in Kansas. "Be very clear and upfront and transparent. We have our data on our webpage so anyone can look at it any time. It has been tremendously helpful in building credibility."

3. Develop a strategic energy plan.

Beyond goal-setting and strategically using data, numerous respondents agreed with the importance of developing a long-term strategic energy plan. However, 37 percent of those from larger organizations indicated that a major barrier to project acceleration is "poorly aligned strategic planning efforts." Thirty-four percent cited challenges based on "insufficient in-house resources." These responses suggest that while many large organizations recognize the importance of strategic energy planning, they may not have the resources internally to plan in a long-term, strategic manner.

Combine demand-side and supply-side into one comprehensive strategy and budget request and fully integrate with sustainability goals. For any long-term renewable [power purchase agreement] deals, get finance, procurement, accounting and legal involved very early in the process."

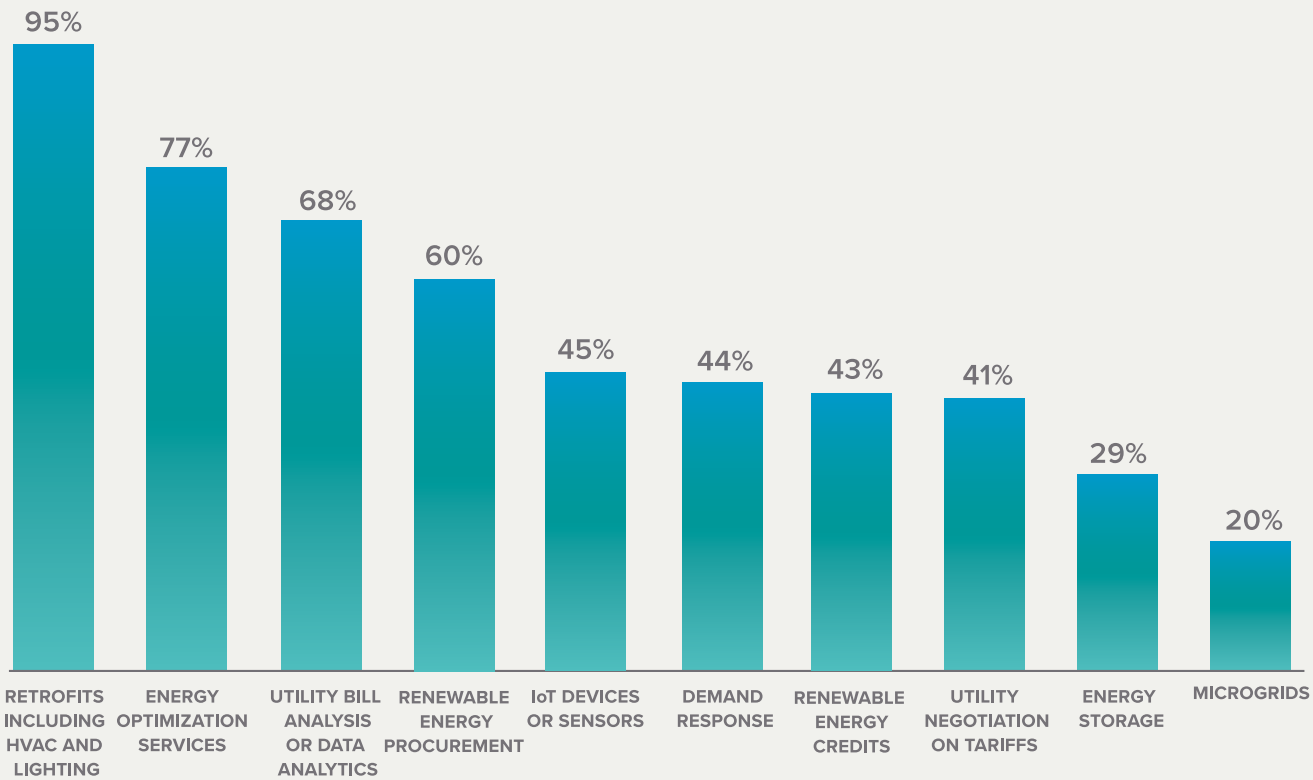
– Andy Smith, global sustainability manager, Cisco Systems

A strategic energy plan may be a part of a broader strategic or master plan and ideally should be tied directly to specific key performance metrics and reach across both energy efficiency and energy procurement initiatives.

4. Bolster your case with energy efficiency wins.

Energy efficiency retrofits including upgrades of heating, ventilation and air conditioning (HVAC) and lighting are, by far, the most commonly implemented projects by large organizations.

Table 4: What types of tools/solutions has your organization evaluated or implemented within the past three years?



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Several respondents and interviewees cited the importance of starting with energy efficiency, across both operating expense (OPEX) and capital expense (CAPEX) projects, to make buildings more efficient first before moving onto projects that involve procuring renewable energy.

"This is not about simply offsetting your footprint, but fundamentally changing what it is. And the only way you can do that is by reducing your consumption first, and then provisioning energy from a decarbonized grid."

– Vince Digneo, sustainability manager, Adobe Systems

A higher education professional suggested, "Start with picking 'low-hanging fruit' (such as LED lighting change-outs) to promote, document cost savings and help smooth the path with finance. Help make the business case with finance for further action, pointing to the positive results of early steps. Finance is too often blinded by 'first cost' dollar signs — help them see the longer-range, positive financial picture. Assist operational managers with finding external sources of capital to fund projects."

5. Establish a portfolio approach.

Many organizations have established clear guidelines for OPEX and CAPEX projects related to energy and sustainability. In addition, it is important to quantify and continually demonstrate cost savings and other non-cost related benefits to all levels of the organization across energy supply and demand projects.

88 percent of larger respondents think their organization would benefit from a more comprehensive approach to energy management

According to Michael Kruklinski, head of Siemens Real Estate for Region Americas, "We have very clear requirements on making a business case including how to broadly determine ROI and who to include internally. For energy efficiency and renewable energy projects, we're looking at a certain ROI but we also take a portfolio approach across a wide range of non-financial considerations."

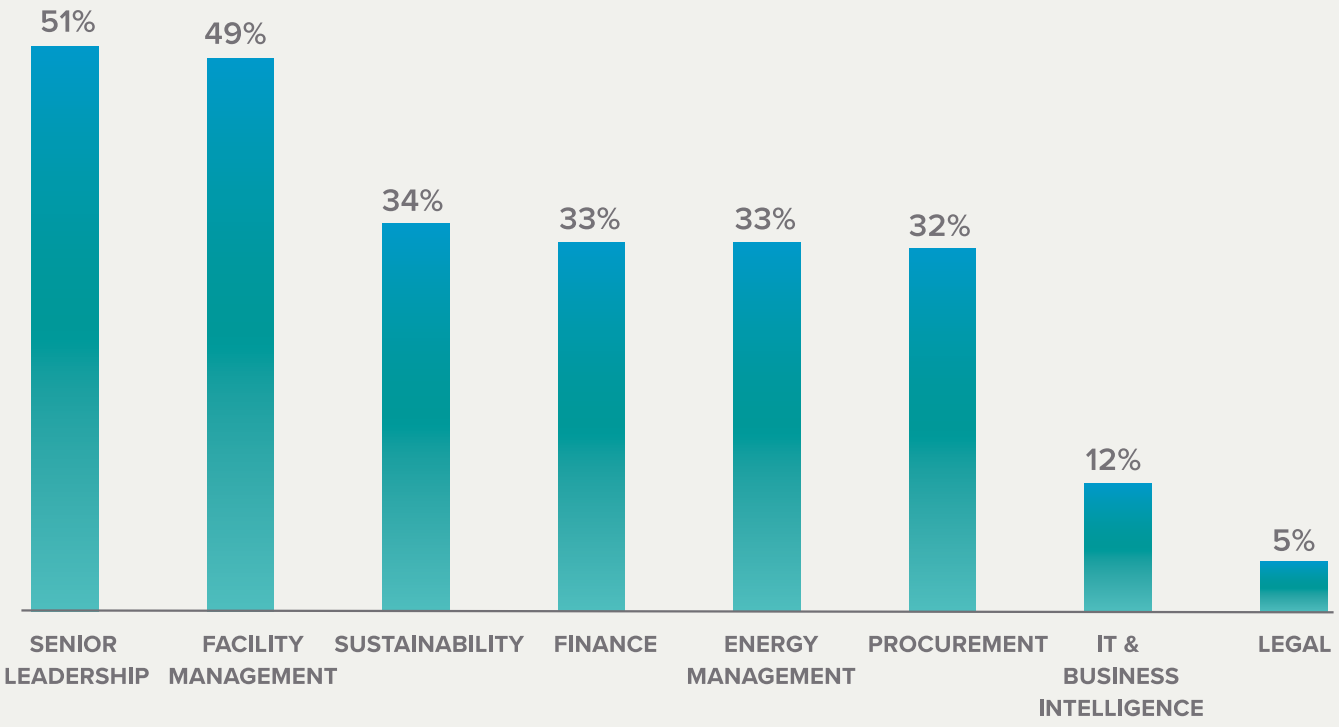
These guidelines are critical to strengthen the business case and translate these benefits to different stakeholders within the organization. The guidelines ideally should incorporate a range of project variables across project size, scope and funding source while offering flexibility on larger, more strategic projects.

As Jerry Meek, senior manager energy and water from Genentech, summarized, "Capital projects are more flexible in terms of ROI whereas the expense side is all about the budget."

6. Collaborate across a range of internal stakeholders.

It can be challenging to engage a range of internal stakeholders who have varying interests and knowledge levels when it comes to energy or sustainability priorities. Among the key stakeholders who survey respondents believed should be more deeply involved with energy projects, senior leadership was the most commonly selected (51 percent) among large organizations.

Table 5: Which of the following internal stakeholder(s) should be more involved in comprehensive energy project decision making?



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One notable role highlighted several times by interviewees was the importance of including information technology (IT) teams. However, only 12 percent of respondents representing large organizations indicated that IT was a key stakeholder to engage.

Corey Blatt, smart buildings program manager for the federal government's agency, the General Services Administration (GSA), said, "IT is extremely involved in everything we do now, and that is just going to grow in that area. The IT folks are no longer just a guy coming up to your desk and making sure your Ethernet cable is plugged in. They really are starting to learn about systems integration across mechanical systems, lighting and metering. They're learning what operates the building, how they integrate and how they talk."

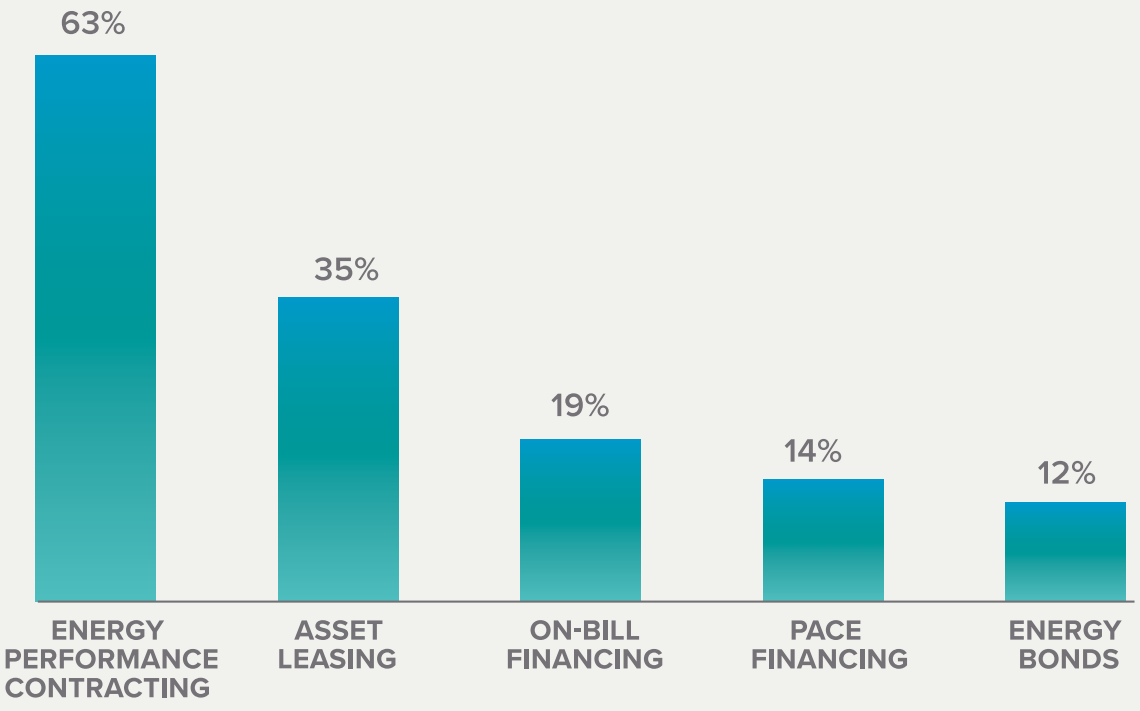
"We recruit people [internally]. We go to the different peer groups; we find the hand-raisers or the people we think can be convinced, and we say, 'Look, this monitoring-based commissioning concept could be a great opportunity at your facility. It will give you the ability to detect when something is out of whack so you can fix it quickly.'"

– Seth Baruch, national director for energy and utilities, Kaiser Permanente

7. Leverage innovative financing.

A range of innovative financing models are available to support energy efficiency and energy procurement initiatives. Some, such as energy performance contracting, a budget-neutral approach to building improvements, are more traditionally targeted at the so-called MUSH (municipal, universities, schools and hospitals) market, while others such as energy bonds are traditionally suited for larger companies. These financing mechanisms, while sometimes complicated, can greatly accelerate the pace of project adoption by streamlining project approvals while minimizing the project risk.

Table 6: What financing strategies and/or tools is your organization planning to use over the next 12 months to accelerate energy projects?



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While most large organizations have conducted energy performance contracting (63 percent), other opportunities to leverage more innovative forms of financing may require a set of partners. GreenBiz found that several financing mechanisms are not commonly used but may offer the potential to overcome project financing barriers. Large organizations more infrequently used asset leasing (35 percent), on-bill financing (19 percent), PACE financing (14 percent) or energy bonds (12 percent).

Common Project Financing

Asset leasing

An asset lease is a simple financing structure that allows a customer to use energy efficiency, renewable energy, or other generation equipment without purchasing it outright.

Clean energy bonds (CREBs)

Financing mechanism that can be used to finance clean energy projects by issuing the bondholder a federal tax credit in lieu of a portion of the traditional bond interest, resulting in a lower effective rate for the borrower.

Energy performance contracting

Under an energy savings performance contract (ESPC), an energy service company (ESCO) coordinates installation and maintenance of efficiency equipment in a customer's facilities and is paid from the associated energy savings.

On-bill financing (OBF) and repayment (OBR)

Financing options in which a utility or private lender supplies capital to a customer to fund energy efficiency, renewable energy, or other generation projects and is repaid through regular payments on an existing utility bill.

Property Assessed Clean Energy (PACE)

A financing structure in which building owners borrow money for energy efficiency, renewable energy, or other projects and make repayments via an assessment on their property tax bill.

Revolving loan fund

Pools of capital from which loans can be made for clean energy projects—as loans are repaid, the capital is then reloaned for another project.

(sources: DOE Better Buildings Challenge and energy.gov)

8. Factor resilience into your strategy.

Last December, an article on GreenBiz.com, entitled "In 2018, resilience will become the new normal," cited the 2017 hurricane season as the most expensive on record, with $202 billion in damages. Since then, fires across the Western United States and Canada further have focused the energy conversation on the need for more resilient infrastructure of all types.

Among the top drivers for comprehensive energy projects cited by the survey respondents, "providing resiliency" ranked second, with 33 percent of large organizations citing this as a major driver. In addition, several executives interviewed by GreenBiz said their organization has a sharper focus on resilience, especially when it comes to thinking about global climate change-related events including hurricanes and other natural disasters. Others indicated the importance of looking to advanced technologies such as distributed generation, energy storage, microgrids and any other technology that is less reliant on the centralized power grid.

"You just have to look at what happened recently in Houston or in Puerto Rico. We've just implemented district cooling from Lake Ontario in our Toronto General Hospital. And as part of the project, we built in powering a significant portion of the cooling system on emergency power, which was not possible before, and added a whole level of redundancy so we can provide 100 percent cooling should we lose a system."

– Ed Rubinstein, director, environmental compliance, energy, and sustainability, University Health Network (Toronto, Canada)

9. Focus on employee engagement.

Despite falling relatively low on the list of key drivers for larger organizations, employee engagement remains an undervalued and hard-to-quantify aspect of comprehensive energy management.

Only 25 percent of larger organizations ranked employee engagement as a key priority. (Employee engagement ranked seventh overall on the list of priorities.) However, several interviewees recommended focusing on engaging employees through energy efficiency initiatives and during workplace design processes. The success of such efforts can be further bolstered by using sensors and IoT devices to improve the design and workflow

of the office environment. A broad range of sensors and IOT devices range from basic occupancy sensors to more integrated platforms that use data to track the health, wellness and productivity of occupants.

"One of the most exciting aspects of being in real estate is that there are multiple stakeholders. It's good for our customers to improve a site and drive positive impact on a business by helping them perform better. It's also good for shareholders to see cost savings by providing a site with technology. We're also very focused on employee satisfaction. HR is carefully measuring employee satisfaction and the benefits are a little more difficult quantify but it's still incredibly important for the company."

– Michael Kruklinski, head of Siemens Real Estate for Region Americas

A senior partner at a United Kingdom-based strategy consultant observed, "Incentivize employee engagement by rewarding both practical and positive energy initiatives suggested and a percentage bonus against cost/efficiency goals achieved."

10. Learn from real-world technology deployments.

According to Bloomberg New Energy Finance's 2018 New Energy Outlook, lithium-ion battery prices already have fallen 79 percent since 2010, and prices are expected to fall by an additional 67 percent from today to 2030. Meanwhile, the cost of an average solar PV plant will fall by 71 percent by 2050, and wind energy prices will fall by 58 percent over the same period, according to the BNEF forecast.

Several respondents cited dramatic cost declines in recent years associated with renewable energy and energy storage projects as one factor that's helping them consider both more seriously.

While there is extensive promise of advanced technology, Ed Rubinstein, director, environmental compliance, energy, and sustainability at University Health Network in Toronto, recommended a cautious approach to getting started with new technology. "Technology, despite all its hiccups, is coming. Things like IoT and artificial intelligence — you have to separate what's actually happening from the marketing, which is part of what we do. But I definitely think microgrids are coming." When asked about roadblocks to micgrogrid deployment, Rubinstein said, "From what I see, the obstacles are mainly regulatory and policy based, both of which are slowly changing as utility companies adapt and transition from traditional roles and structures."

"I see the price of batteries going the same direction as solar PV in the last five to 10 years. We waited on solar PV for the price to come down, and it came down significantly — almost 70 percent in a five-year period of time. I'm looking at the same type of cost reductions over the period of time with batteries. So batteries and solar PV go hand in hand."

– Jerry Meek, energy and sustainability manager, Genentech

The Path Forward

Navigating the new energy landscape — one that is decentralized, IoT-enabled and increasingly dynamic due to the increase of e-mobility solutions such as electric vehicles — requires a higher level of sophistication than in previous years. In addition, this level of complexity requires the engagement of various external partners including knowledgeable service providers, utilities, third party financing entities and trusted technology partners. This shift creates potential challenges for large companies and government agencies but also potential opportunities.

The biggest challenges largely remain internal to large organizations, and involve the need to make a strong business case and align internal objectives across a range of stakeholders. The opportunities center around internal and external collaboration to ensure a comprehensive approach from planning to execution across a wide range of projects. The strategic use of data remains a key opportunity across planning, developing a strong business case, measuring results and translating the analysis to respective internal stakeholders.

Your approach to comprehensive energy management should incorporate the following best practices:

1. **Develop a data-driven plan —** Leverage a range of data sources to increase visibility, gain support from senior management and develop a data-driven strategic energy plan

2. **Internal collaboration is key —** Gain internal alignment across departments; for more complex projects, be sure to include senior leadership, finance, procurement and IT.

3. **Energy is complex – don't go alone —** Partner with the right provider that can help develop your plan, gain internal alignment and identify innovative financing strategies

Siemens employs a strategy called "Total Energy Management" which involves creating a customized energy program using advanced technology and data analysis.

About this Research

GreenBiz worked closely with Siemens to generate this report. The findings summarize results of both quantitative and qualitative research. The quantitative results are based on a survey of the GreenBiz Intelligence Panel, consisting of executives and thought leaders in corporate sustainability and energy. For the web-survey portion of this project, panel members participate in brief monthly surveys to provide their expertise and perspective on corporate energy and sustainability initiatives, technologies, policies and regulations.

This report presents the findings of an online survey conducted by GreenBiz in late May and early June 2018 among a sample of respondents within the GreenBiz Intelligence Panel. An email link invited the panel's 3,800 members to participate anonymously in the survey. We analyzed the results from 206 respondents in 13 industries. GreenBiz also partnered with the Association for the Advancement of Sustainability in Higher Education (AASHE), which helped deliver 35 responses from higher-education sustainability professionals.

The overall response rate was 5.8 percent. About 50 percent of respondents are from organizations with revenues greater than $250 million or that represent government agencies. The respondents are evenly distributed across two respondent pools: small organizations (defined as businesses with an annual revenue of $250 million or less); and large organizations (companies with annual revenue of more than $250 million and government agencies). GreenBiz conducted eight phone interviews with energy and sustainability managers responsible for a global energy footprint and representing a range of industries.

It is important to note that the quantitative data in the report reflects the demographic of the GreenBiz panel and AASHE — those respondents represent a broad span of corporate sustainability experience. The qualitative research consisted of one-on-one phone interviews with active members of the GreenBiz Executive Network, a membership-based, peer-to-peer learning forum for sustainability executives from the world's largest companies (more than $1 billion in annual revenue).