NAVIGANT
RESEARCH

RESEARCH REPORT

Navigant Research Leaderboard Report: Building Energy Management Systems

Assessment of Strategy and Execution for 15 Intelligent Building Software Solutions Providers

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Section 1
EXECUTIVE SUMMARY

1.1 Market Introduction

The building energy management system (BEMS) market is gaining momentum worldwide. However, the diversity of this market creates a significant challenge for market maturation because the resulting customer confusion and uncertainty threaten deeper and broader investment. Customers are faced with making purchase decisions among software offerings that fall under the same BEMS umbrella but diverge in terms of functionality and supplier viability. Segmentation will become clear over time as commonalities distinguish products in terms of technical capabilities or domain expertise. This report aims to provide a framework for comparing BEMS vendors and evaluating the strengths and weaknesses of options available today.

Navigant Research provides the following definition of BEMSs to specify the boundary around technologies and services that shape the broad market evaluated in this report:

> *"IT-based solutions that extends the capabilities of sensing, control, and automation hardware to direct automated and/or manual improvements to system operations utilizing the data from multiple data streams."*

Navigant Research suggests that on this path toward market maturity, there are criteria that can help differentiate BEMSs and assess their value and viability. This *Navigant Research Leaderboard Report* assesses BEMS vendors against 12 criteria that evaluate Strategy and Execution as the key metrics for market success:

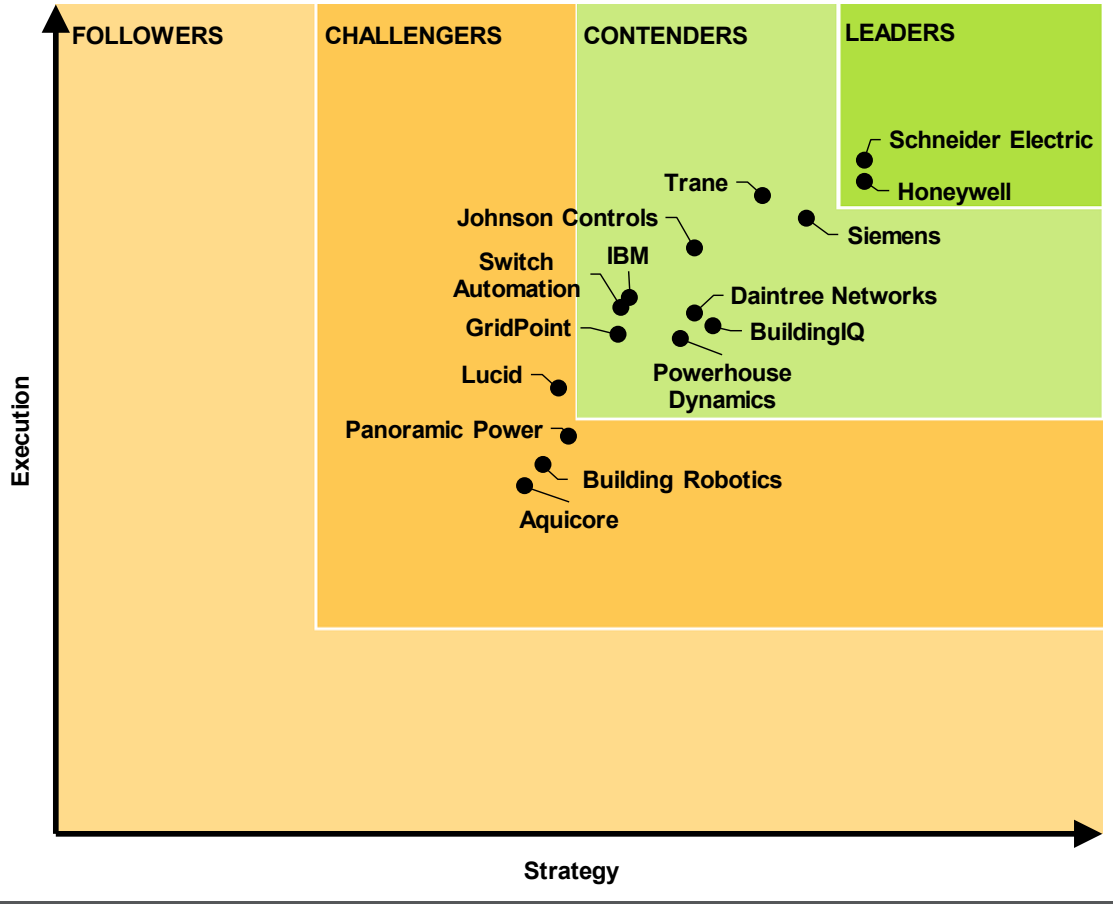
- Vision
- Go-to-Market Strategy
- Partners
- Production Strategy
- Technology
- Geographic Reach
- Sales, Marketing, and Distribution
- Product Performance
- Product Quality and Reliability
- Product Portfolio
- Pricing
- Staying Power

Detailed descriptions of each criterion are provided in the "Criteria Definitions" section of this report.

1.2 The Navigant Research Leaderboard Grid

The positioning of BEMS vendors in this *Leaderboard Report* reflects the multidimensional assessment of both Strategy and Execution. There are shifts underway that signal increasing segmentation will emerge in the midterm with BEMS classes that suit the need of particular customer types, use cases, and functionality. The group of vendors assessed in this report have distinct strengths and weaknesses, but this analysis is intended to highlight the overall position of these 15 key industry players.

Chart 1.1 The Navigant Research Leaderboard Grid



(Source: Navigant Research)

In the long term, success in the BEMS market will be based on both Strategy and Execution. The players considered in this *Leaderboard Report* have demonstrated an ability to compete effectively in this market to date. Continued investment in this market will be required in order to maintain differentiation and to remain a Leader as it matures; some

players profiled in this *Leaderboard* are better poised for this transition than others. A rapid fire pattern of partnerships and acquisitions in the BEMS market suggests this analysis provides a snapshot of success, and the analysis highlights Navigant Research's outlook on criteria for long-term viability and growth.

In this evaluation, Schneider Electric and Honeywell are identified as Leaders in the market due to strong scores in both Strategy and Execution. They are followed by a number of strong Contenders that have shown the potential to become Leaders. All of these companies have developed comprehensive platforms and innovative approaches to market development. Their positioning reflects Navigant Research's assessment of their Strategy and Execution today.

Section 2
MARKET OVERVIEW

2.1 Introduction

The intelligent buildings market continues to be the source of innovation in technology designed for commercial facility optimization. It has been over a decade since the first building energy management systems (BEMSs) emerged as software solutions to minimize utility costs and support strategic business decisions around energy consumption. The market continues to grow and remains competitive and fragmented. Customers are still challenged to differentiate between software offerings in a landscape of vastly different vendors and solutions that range across a spectrum of capabilities. The aim of this *Navigant Research Leaderboard Report* is to showcase the strengths and weaknesses of 15 solutions providers and provide a framework to compare offerings in this dynamic marketplace.

The vendors assessed in this report can be organized generally into three broad categories: building technology incumbents, early- to mid-stage software-centric startups, and large technology vendors. The single assessment of these three classes of vendors reflects the real market conditions. As customers explore their options for investment in intelligent building software solutions, they must navigate the competitive and fragmented landscape in which vendors in these two categories compete against one another.

2.2 Market Definition

A BEMS is the keystone technology for the intelligent building. This category of software is the vehicle that can translate the increasing array of facility data into actionable information. These tools are important for customers looking to invest in data-driven solutions to energy and operational management challenges. BEMSs help customers recognize and act on opportunities to improve system performance and behavior that deliver cost savings and business improvements.

The BEMS market has evolved in tandem with the intelligent buildings ecosystem of technologies including control systems, wireless technologies, and services. Energy management capabilities are the unifying characteristics of this category of software. The business case, however, continues to morph as the market begins the journey toward maturation. Increasingly, the solutions that fall under the BEMS category have use cases outside energy efficiency and management such as operational efficiency, space utilization, productivity, occupant engagement, and sustainability.

Several companies have strong offerings in the market with a narrower focus positioned to support specific customer needs today. The companies included in this *Leaderboard Report* provide offerings that are representative of the current market. This assessment intends to demonstrate the key criteria that differentiate players in the market with an

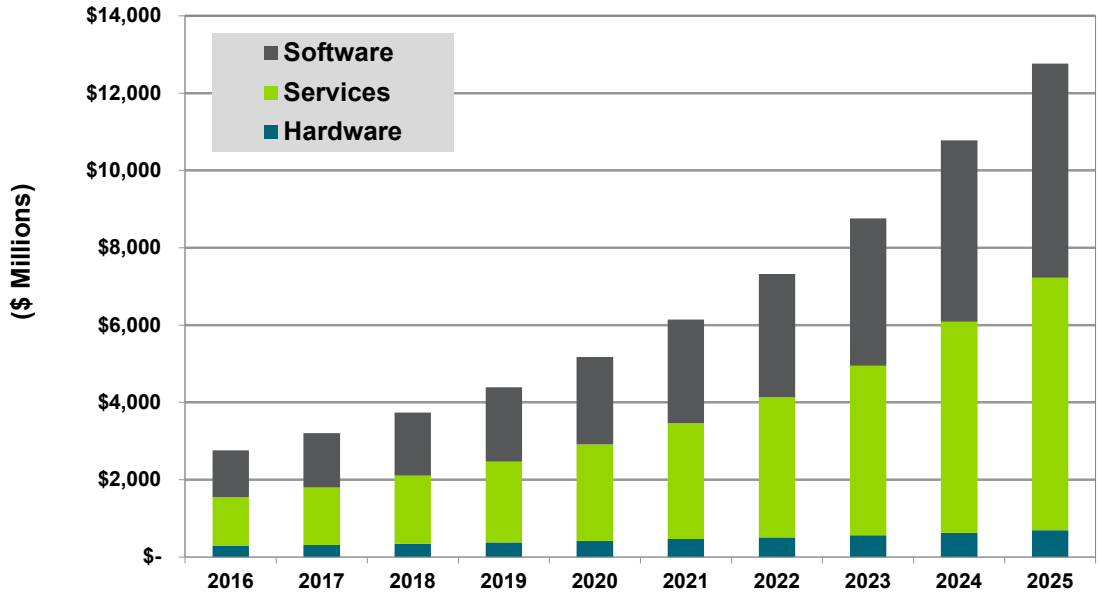
analysis of business and offering characteristics. The vendors selected have demonstrated commercialization of their solutions (moving beyond the pre-revenue startup phase of development), recent strategic activity to demonstrate ongoing market presence, offerings beyond energy management to demonstrate understanding of the shifting customer demands, and capabilities across more than one BEMS offering class (visualization and reporting, fault detection and diagnostics, predictive maintenance, and continuous improvement or optimization).

BEMSs evaluated in this *Leaderboard Report* vary from data aggregation and analytics offerings that unify energy and business information to integrated offerings that optimize multiple building systems across facility portfolios. Navigant Research defines BEMSs to encompass the market of offerings across this spectrum of functionality:

> *"A building energy management system is an IT-based solution that extends the capabilities of sensing, control, and automation hardware to direct automated and/or manual improvements to system operations utilizing the data from multiple data streams."*

According to Navigant Research's report, *Building Energy Management Systems for the Midmarket*, the global BEMS market is expected to grow from $2.7 billion in 2016 to $12.8 billion in 2025 at a compound annual growth rate (CAGR) of 18.2%. In 2016, hardware only contributes an estimated 10% of BEMS revenue, while software and services nearly split the remaining revenue, contributing 44% and 46%, respectively.

Chart 2.1 BEMS Revenue by Offering Type, World Markets: 2016-2025



(Source: Navigant Research)

2.3 Market Barriers

The barriers to BEMS adoption reflect an evolving market. Vendors are continuing to refine use cases for investment, architecture for specific offerings, and strategy for growing market share. As BEMS providers solidify these aspects of their business, the market will become more clearly segmented and customers will see easier investment options.

2.4 Market Trends

The BEMS market is dynamic, as major building technology incumbents continue to evolve their software offerings, mergers and acquisitions create new categories of suppliers, and software startups continue to enter the market. Today, customers who invest in BEMS can still be classified as early adopters. There is a vast addressable market for BEMSs in the commercial segment. The scale of the opportunity affords the largest suppliers a position of advantage in which they can utilize their reach for market education and awareness and legacy relationships with the largest building owners and businesses.

2.4.1 BEMS Architecture

The majority of BEMS offerings are sold in the software as a service (SaaS) model with monthly to multiyear contract agreements. The configuration ranges from no-touch software that runs algorithms on modeled performance against estimated energy use from utility bills to fully integrated solutions that push automated system changes for operational and energy improvements. The one unifying aspect of the BEMS software class is the solutions are designed to be open and technology agnostic to be able to support customers with diverse building portfolios in terms of size and technology infrastructure. More specifically, common elements of BEMS architecture include:

- Integration via BACnet
- Supplemental data collection and wireless or cellular communication devices including sensors, meters, and gateways
- Cloud-based software analytics accessible via web or mobile applications
- Network operations center for orchestrating managed services

These components are delivered in a variety of ways. Large building technology incumbents like Schneider Electric, Siemens, Honeywell, and Johnson Controls may offer an end-to-end solution for large enterprise customers. Other smaller companies may partner to deliver comprehensive solutions. The customer's goals for implementing BEMSs can influence the appropriate configuration. There can be a push toward more data, more instrumentation, and more control by the solutions providers, but it is evident the right mix of technology and engagement will deliver the most impactful results. The following section outlines the common use cases for investment in BEMSs and indication of different configurations to meet the various goals.

2.4.1.1 BEMS Use Cases

Even the name "building energy management system" reflects the central focus on energy for the foundational software in the intelligent buildings market. Energy management has been the primary use case for software as the intelligent buildings market has developed since the mid-2000s. The story is evolving, however, and vendors are positioning their software analytics in new ways to engage a broader set of customers:

- **Energy management** remains an important use case for BEMSs because the performance improvements of building systems deliver a transparent return on investment through utility bill reductions.
- **Operational efficiency** has become a priority for customers looking to streamline maintenance and repair processes and improve asset management strategies. An increasing number of BEMS offerings integrate with other business intelligence tools such as workplace management solutions or analytics that prioritize alerts for more efficient repair team deployment.
- **Space utilization** is another growing area of BEMS applications. The commercial office and federal government segments in particular face specific pressures for space utilization. BEMS applications that provide insight on space utilization are valuable to corporate and commercial real estate customers as they aim future-proof their real estate portfolios.
- **Occupant engagement** is also driving innovation among BEMS providers. The trend reflects two market dynamics: the shifting expectations of the employee base and the opportunity to use technology to tackle the most significant business costs of people. Real estate and corporate customers are looking to technology to meet the demands of the millennial generation, which is now the largest segment of the workforce.

2.4.2 Growth Strategy

Leaders in the BEMS market will need to refine growth strategies as they push toward deeper market penetration. Leaders will be differentiated by targeting specific customer segments and engaging in technology and strategic partnerships. This will help grow the BEMS market by delivering solutions that meet the specific needs of potential customers:

- **Target markets:** BEMS vendors are benefiting from honing offerings to meet the nuanced needs of different customer segments. The pressures driving customer interest in BEMS range from sustainability reporting to reliability requirements. BEMS vendors that tailor configuration and functionality of offerings are gaining market share.
- **Partnerships:** A notable uptick in technology and strategic partnerships is emerging in the BEMS market. Technology partnerships can be a more cost-effective and productive strategy for building specific BEMS capabilities than organic growth in some situations. In addition, channel partners can help overcome barriers to engagement by leveraging existing trusted advisor relationships.

Section 3
THE NAVIGANT RESEARCH LEADERBOARD

3.1 The Navigant Research Leaderboard Categories

Navigant Research scored the vendors in this *Navigant Research Leaderboard Report* according to four categories: Leaders, Contenders, Challengers, and Followers. These categories are defined below.

3.1.1 Leaders

Leaders are vendors that scored 75 or above in both Strategy and Execution. These companies have clearly differentiated themselves from the competition through exceptional product development, strong partner relationships, and a sustainable business model. Leaders are currently in the strongest position for long-term success in the BEMS market.

3.1.2 Contenders

Contenders are vendors that scored between 50 and 75 in both Strategy and Execution. While these companies have a solid foundation for growth and long-term success, they have not attained a superior position in the market. They are well positioned to become Leaders, but have not yet fully executed their product launches, need to differentiate themselves via unique BEMS offerings or cost breakthroughs, are seeing weaker-than-expected demand, or have limited market penetration.

3.1.3 Challengers

Challengers are vendors that scored higher than 25 in Strategy and Execution but are not yet Contenders for market leadership. While the vendors are fundamentally sound, they face significant challenges stemming from a lack of strategic vision or investments, or risks to successful potential execution. Challengers may also be early in their arc of BEMS launch, therefore resulting in Execution scores that are based on small numbers of offerings.

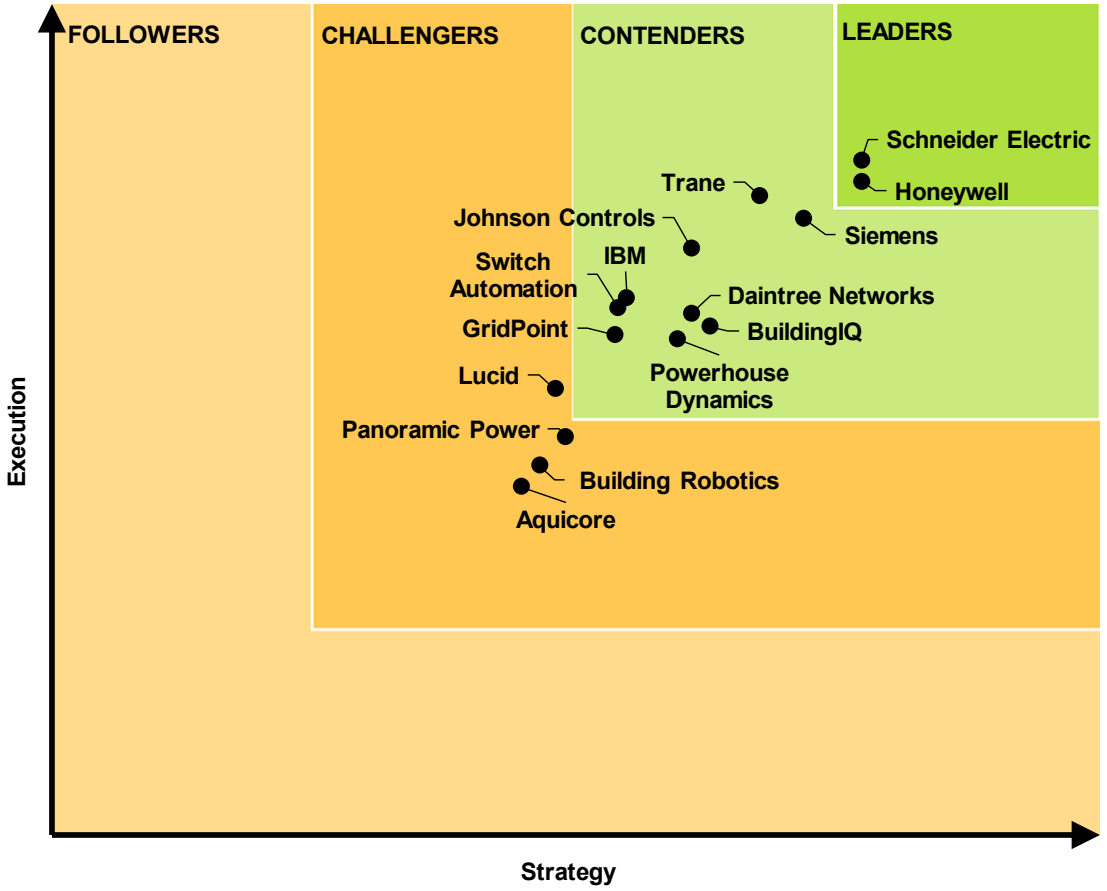
3.1.4 Followers

Followers are vendors that have failed to distinguish themselves and scored below 25 in either Strategy or Execution. These companies are not currently expected to challenge the Leaders unless they can substantially alter their strategic vision and expand their resources. Their long-term viability is in doubt unless systemic changes are made within the organization. None of the BEMS companies featured in this report fell into this category.

3.2 The Navigant Research Leaderboard Grid

The BEMS market is crowded and evolving. Customer expectations and demands for business solutions are shifting as they become more reliant on software and services to support their corporate objectives. This general increase in the understanding of the value of software helps BEMS providers introduce their solutions and communicate the benefits to potential customers. While the market is growing, BEMS is still characterized in the early adopter stage of market maturity. As described in Section 2.4.1.1, there is a wide range of options available to customers today that all help improve energy management while addressing a variety of other important business challenges. As a result, there is no clear single winner today, but a landscape of vendors vying for market share and visibility. This *Navigant Research Leaderboard Report aims* to highlight the relative strengths and weaknesses of companies that have demonstrated market adoption and vision for the intelligent building.

Chart 3.1 The Navigant Research Leaderboard Grid



(Source: Navigant Research)

The list of vendors profiled in this report reflect the specific selection criteria outlined in Section 2. The goal is to analyze how companies are addressing the opportunity to promote the development of intelligent buildings through software analytics that support multiple system optimization, working toward coordinated and comprehensive operational improvement. The companies analyzed in this report offer a variety of capabilities that aim to optimize multiple building systems and provide enterprise energy management improvements.

The top five players in this market demonstrate a deep track record within the building technology industry. These companies can offer customers a wide array of software analytics, services, and data collection options while providing confidence in long-term customer support through their legacy market presence. It is not, however, an insurmountable competitive challenge for newer entrants such as BuildingIQ and Daintree Networks, whose focus on software innovation has led to significant success within the BEMS market. Table 3.1 presents the final scores for the 15 BEMS providers evaluated in this *Leaderboard Report.*

Table 3.1 The Navigant Research Leaderboard Overall Scores

Rank	Company	Score
1	Schneider Electric	79.3
2	Honeywell	78.0
3	Siemens	73.0
4	Trane	72.4
5	Johnson Controls	66.1
6	BuildingIQ	62.0
7	Daintree Networks	61.9
8	IBM	60.0
9	Powerhouse Dynamics	59.8
10	Switch Automation	58.9
11	GridPoint	57.1
12	Lucid	51.0
13	Panoramic Power	48.5
14	Building Robotics	45.5
15	Aquicore	43.4

(Source: Navigant Research)

Section 4
COMPANY RANKINGS

4.1 Leaders

The Leaders category includes companies that scored 75 or more in both Strategy and Execution. Two vendors scored in the Leaders category of this *Navigant Research Leaderboard Report*: Schneider Electric and Honeywell.

4.1.1 Schneider Electric

Overall Score: 79.3

Strategy: 77.3

Execution: 81.3

For the last 5 years, French giant Schneider Electric—based in Paris, France—has been fine-tuning its integrated intelligent building platform approach for commercial buildings. The company first made a significant movement in 2011 with the acquisition of Summit Energy, which became the foundation of the StruxureWare BEMS platform. In the following years, the company has announced a variety of partnerships and acquisitions to deepen its capabilities in the intelligent buildings analytics realm. Today, SmartStruxure (powered by StruxureWare Building Operations software) is offered as the enterprise BEMS offering. The offering includes hardware, software, and services aimed to expand the benefits beyond the capabilities of traditional building automation.

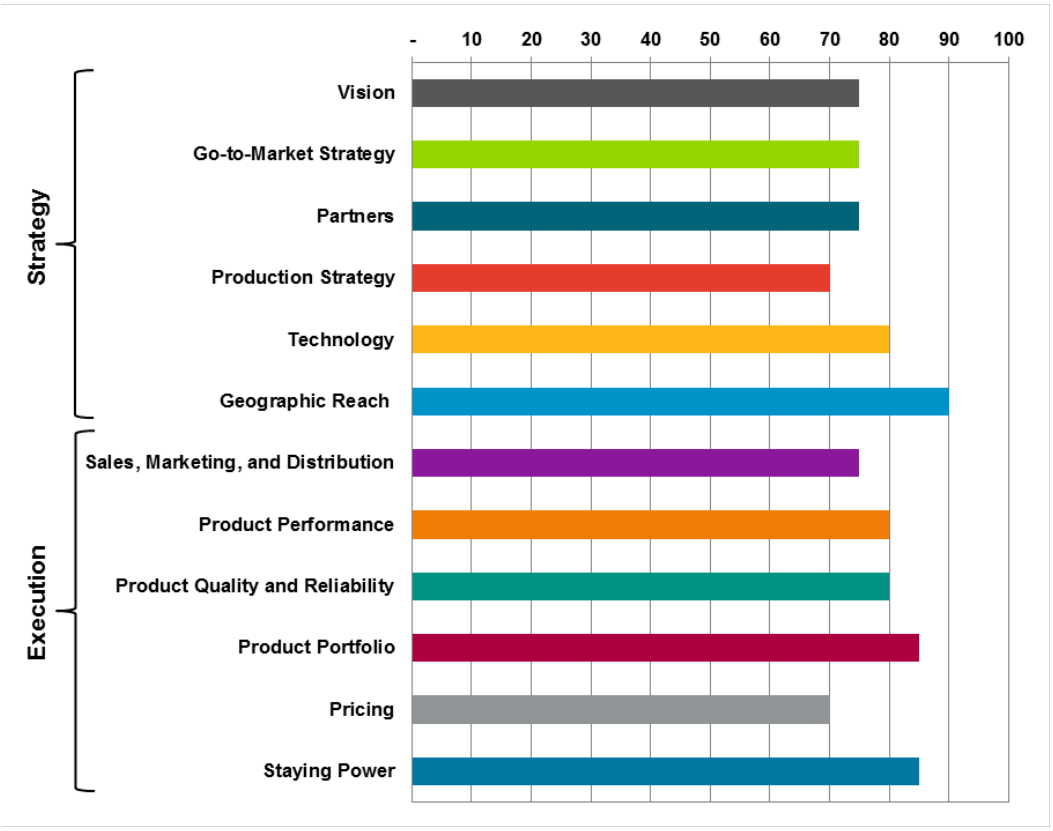
In 2015, Schneider unveiled its most recent branding effort, Life is On, aimed to capitalize on the digital transformation and Internet of Things (IoT) industry trends. In its Building Solutions business, the company has positioned its offerings to support the interrelated goals of safety, comfort, reliability, efficiency, and sustainability. The integrated SmartStruxure platform enables building system control for energy management through the analysis of data from power use, lighting, heating, ventilation, and air conditioning (HVAC), fire and safety systems, and electrical distribution. The sheer size of the company and time dedicated to the development of its BEMS offerings provide strength in terms of product portfolio, geographic reach, and staying power.

Schneider faces twofold challenges to further market penetration. First, there is a level of push back from some customers on leveraging BEMS offerings for enterprise facility optimization because of a perception of partiality. This challenge is not unique to Schneider but one that other large building technology incumbents face as well. The second challenge relates to the major opportunity in the midmarket and the hurdles Schneider faces in approaching this segment. In the near term, Schneider can continue to build business through its enterprise clients that may have smaller buildings. The technical capacity to serve these smaller facilities is not the challenge; looking mid to long term, the

company will be challenged to revisit engagement approaches for smaller customers as the market matures and the enterprise customer segment becomes saturated.

www.schneiderelectric.com

Chart 4.1 Schneider Electric Strategy and Execution Scores



(Source: Navigant Research)

4.1.2 Honeywell

Overall Score: 78.0

Strategy: 77.3

Execution: 78.8

Honeywell, the Morris Plains, New Jersey-based multinational, approaches the intelligent buildings market with its Enterprise Buildings Integrator platform, designed to expand the capabilities of its traditional controls and automation approach to deliver enterprise insights and optimization. Honeywell's Command and Control Suite is a BEMS offering that provides visualization, reporting, data aggregation for stakeholders outside of engineering within a customer's organization. The software provides a holistic view of facility operations

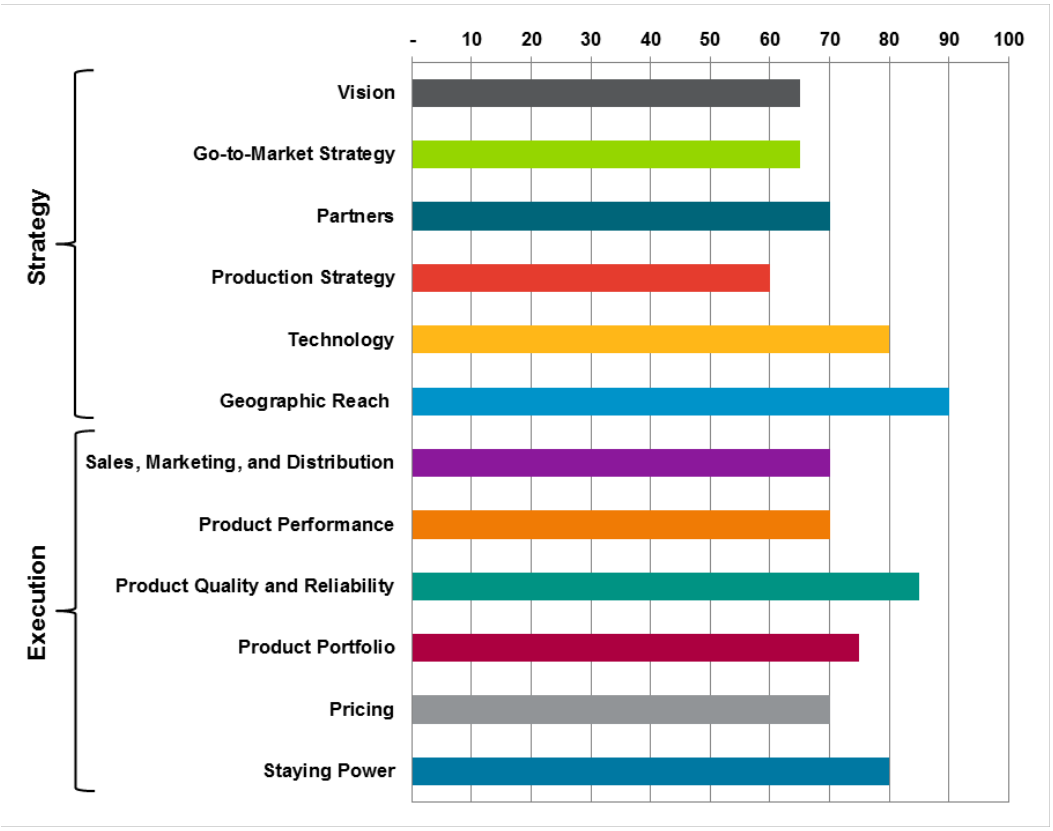
across the enterprise or within the facility. There are two main applications within the touch-screen monitor interface: incident workflow and dashboards. The product, designed to create ease of access to actionable information, launched in 2015.

The strength of Honeywell's integrated approach to intelligent buildings positions it as a Leader in this market evaluation. In 2016, the demand and adoption is centered among early adopters and the Honeywell breadth of offerings—services, controls, and software—positions it well to support the first generation of adopters in the market.

Honeywell has taken a different approach from other BEMS providers by providing distinct software offerings for different stakeholders within the organization. Command and Control Suite is a relatively simplistic visualization tool compared to other BEMS offerings that have sophisticated analytics and controls capabilities. The company has also limited the applicability of the offering by building it off the Enterprise Building Integrator platform. Without the standalone cloud-based analytics approach the market penetration is limited in the long term. The connection to Enterprise Building Integrator gives it certain strengths for more sophisticated customers, but can be perceived as limited to new customers aiming for technology agnostic solutions.

www.honeywell.com

Chart 4.2 Honeywell Strategy and Execution Scores



(Source: Navigant Research)

4.2 Contenders

To fall into the Contenders category, a company must score between 50 and 75 in both Strategy and Execution. Navigant Research identified nine companies as Contenders in this *Leaderboard Report*.

4.2.1 Siemens

Overall Score: 73.0

Strategy: 71.8

Execution: 74.3

Siemens, the Munich, Germany-based building technology and engineering conglomerate, offers Advantage Navigator BEMS—a cloud-based software solution for enterprisewide transparency and data analysis to support energy and operational efficiency, sustainability, and building performance goals. The Navigator software platform was launched in 2014. The product was an evolution from the Energy Management and Controlling offering to provide a more comprehensive toolkit for energy management by incorporating supply

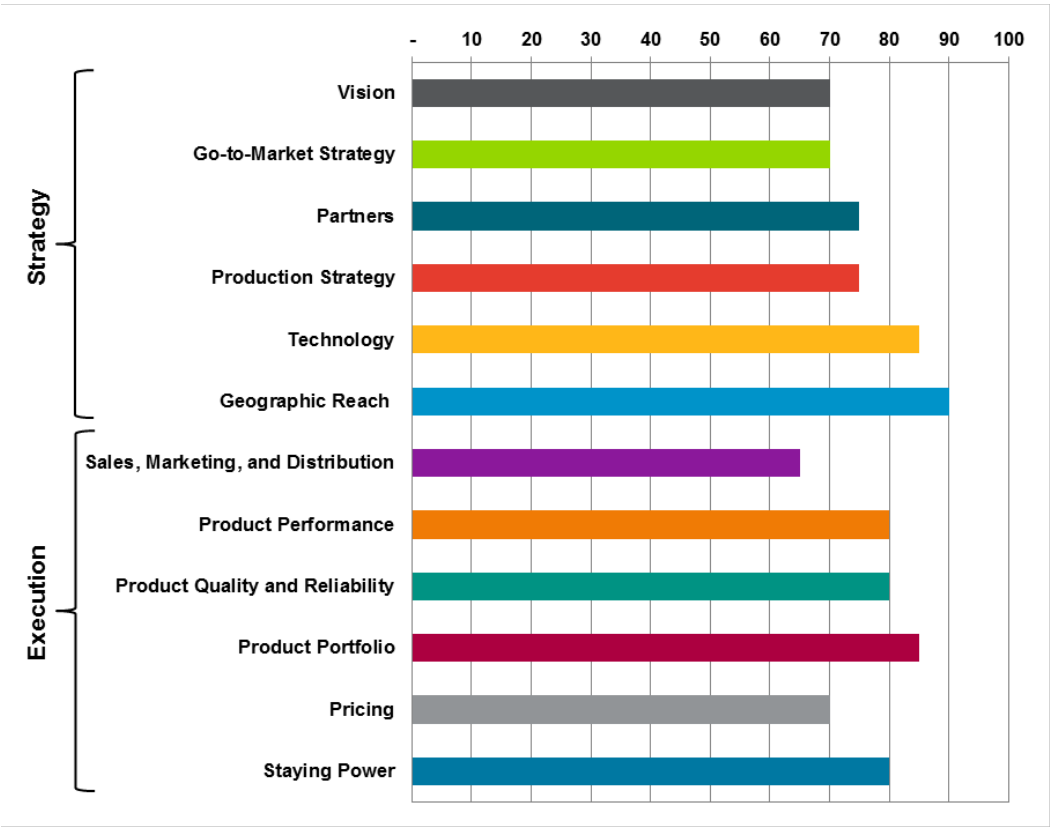
management and services. The supply-side focus is particularly valuable to the largest customers deploying strategies for cost containment.

The Advantage Navigator platform includes visualization and analytics, but also services. Customers receive analysis of their facility or portfolio performance and the Siemens engineering services teams identify opportunities for energy efficiency and system performance. This approach provides Siemens with a channel to ongoing customer engagement and new potential sales. The platform also tracks performance in terms of carbon accounting metrics—Scope 1 and 2 emissions for sustainability reporting. The main strengths for Siemens tie to its geographic reach, product portfolio, and technology. It also has a strong position in the development of BEMS offerings for enterprise customers.

The challenge for Siemens in the BEMS market is positioning offerings to customers with non-Siemens building automation systems (BASs) and smaller facilities without automation or controls. Siemens has had more limited promotion of standalone BEMS capabilities, and a less clear vision for the evolving market than in other segments they serve.

www.siemens.com

Chart 4.3 Siemens Strategy and Execution Scores



(Source: Navigant Research)

4.2.2 Trane

Overall Score: 72.4

Strategy: 67.5

Execution: 77.0

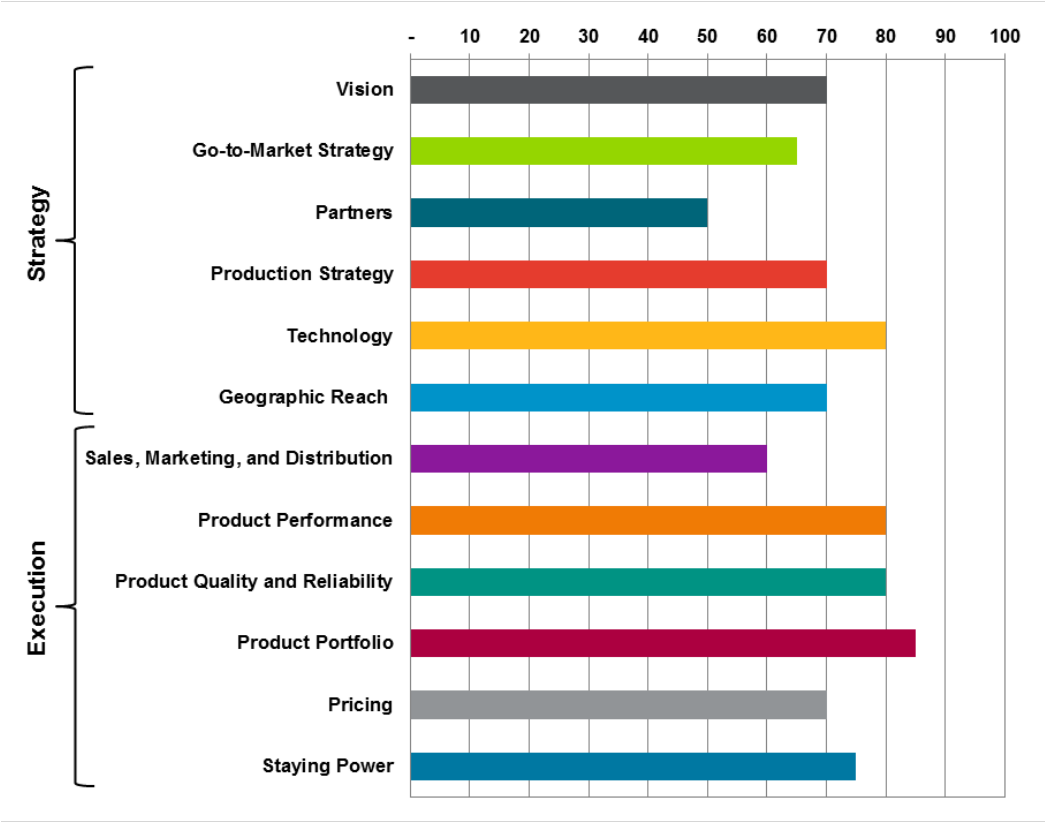
Trane, the Dublin, Ireland-based subsidiary of Ingersoll Rand, provides Energy Management Systems and Services under the Trane Building Advantage platform. The Intelligent Services offering providers monitoring, analysis, alerts, reporting, and visualization of building system performance. The cloud-based software offering is provided alongside engineering services to support implementation of energy conservation measures for ongoing energy efficiency improvement.

Trane offers six complementary software and service options including Intelligent Services, Building Performance (HVAC optimization), Energy Performance (BEMS), Energy Assessment (visualization), Active Monitoring (network operating center), and Energy Optics (3D visualization). Trane Energy Performance includes applications for visualization and reporting, including spectral analysis of real-time data, energy consumption analysis and reporting, and dashboards.

The main challenges to Trane's BEMS offerings from a competitive standpoint stem from limitations in promoting its capabilities in the market. The company has fallen short of directing an aggressive partnership and marketing strategy. The BEMS offering is not promoted as a standalone software solution to compete directly with others in the market and potential customers may find it difficult to determine how the software can support their non-Trane facilities.

www.trane.com

Chart 4.4 Trane Strategy and Execution Scores



(Source: Navigant Research)

4.2.3 Johnson Controls

Overall Score: 66.1

Strategy: 61.0

Execution: 70.8

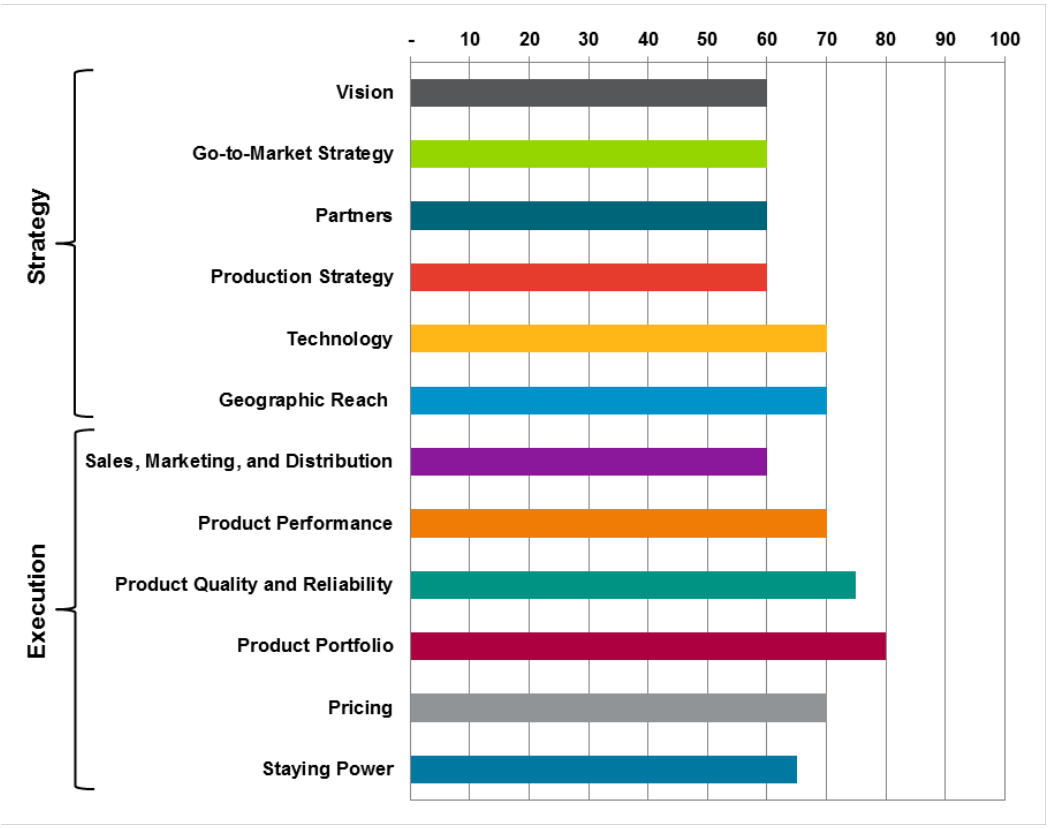
Johnson Controls, the Milwaukee, Wisconsin-based multinational, provides BEMS offerings, now an element of the Metasys product line, which is inclusive of HVAC equipment optimization, building automation, building optimization, plant optimization, and enterprise optimization. The data analytics that were core to Johnson Controls Panoptix platform are now embedded in the most recent Metasys release, and more specifically the building optimization offering. During a period of transition, the Panoptix brand remains in the market for existing customers. The repositioning aims to showcase benefits beyond energy efficiency including asset uptime and accessibility. The company made the strategic decision to retire the separate branding and focus on the software capabilities within the market-recognized Metasys brand. Customers can use the optimization software for non-Metasys buildings with standard internet protocol for data integration.

Metasys Building Optimization supports occupant comfort, facility resilience, and efficiency. There are four applications: equipment, central plant, building, and enterprise. The applications are designed to refine the monitoring and work order capabilities within Metasys for improvements in operation and maintenance.

Johnson Controls' Panoptix solution was the foundation of a directional shift the company took in 2011. The vision was to provide an open platform that enabled third-party innovation in applications for building optimization. Johnson Controls offered a core set of applications, including fault detection and diagnostics, carbon and energy reporting, energy consumption and savings monitoring, and a customizable energy analyzer. The platform included on-demand support. Johnson Controls struggled to engage third-party developers and pivoted in 2015, pulling back from Panoptix with a refocus on the evolution of Metasys, the company's building automation and controls platform.

www.johnsoncontrols.com

Chart 4.5 Johnson Controls Strategy and Execution Scores



(Source: Navigant Research)

4.2.4 BuildingIQ

Overall Score: 62.0

Strategy: 62.8

Execution: 61.3

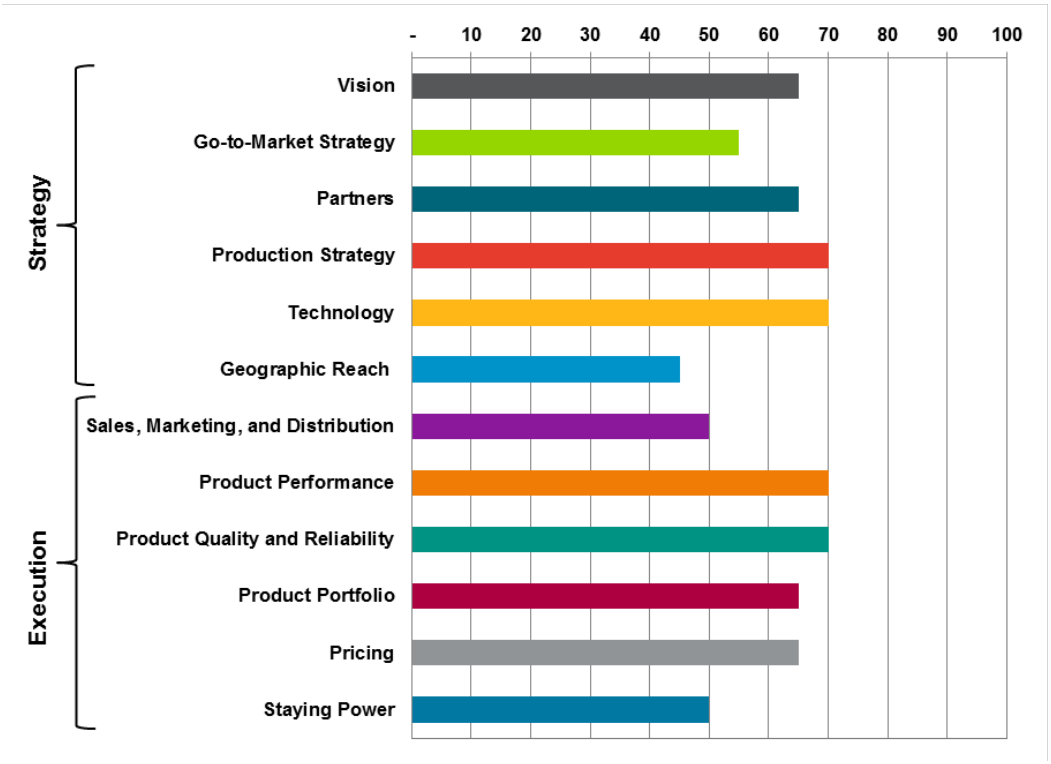
BuildingIQ, the Australian-born, San Mateo, California-based startup's Predictive Energy Optimization platform was built off the research from CSIRO, the Australian national labs on HVAC control algorithms. The company has expanded from automated adjustments to air handling systems in response to external weather and dynamic pricing conditions to include work order management, energy benchmarking and reporting, and managed services. In 2015, BuildingIQ listed on the Australian stock exchange after raising a $20 million initial public offering, which effectively transitioned the company from a pre-revenue startup to a competitive public company. Navigant Research suggests the initial public offering positions BuildingIQ for strong growth from a strategic perspective because of the burdens of shareholder accountability. One example of the company's positive moves in this direction is the 2016 acquisitions of Facility and Energy Worksite energy information management applications from NorthWrite expanded BuildingIQ's capabilities and market presence.

BuildingIQ has a multi-prong approach to growth harnessing technology and channel partners, direct sales to commercial customers, and innovative engagements with electric utilities. Technology and service partners include Schneider Electric, Siemens, AtSite (a Washington, DC-based service provider) and AE Smith (Melbourne, Australia-based service provider). BuildingIQ works with NV Energy, the public utility in Nevada, and Direct Energy, the competitive electric retailer, subsidiary of Centrica plc, which positioned BuildingIQ well from the partnership score dimension of the assessment compared to the other vendors that ranked as Contenders.

BuildingIQ has tailored offerings for nine customer segments: commercial real estate building owners, owner-occupied buildings, utilities, office buildings, government, hospitality, education campuses, large retail stores, and healthcare facilities. The company's focus on differentiating offerings for the unique use cases and pain points of distinct customer segments is a strength.

buildingiq.com

Chart 4.6 BuildingIQ Strategy and Execution Scores



(Source: Navigant Research)

4.2.5 Daintree Networks

Overall Score: 61.9

Strategy: 61.0

Execution: 62.8

Daintree Networks, the Australian startup based in Los Altos, California and now embedded in GE's startup Current, has built its BEMS offerings off a legacy business in intelligent lighting. The company is positioned as an Enterprise Internet of Things provider following the 2016 acquisition by Current Powered by GE. Daintree solutions are designed to optimize HVAC, lighting, and plug load energy consumption using its ControlScope wireless energy management platform. The open standards-based approach leverages Daintree wireless area controllers and system controllers, technology partner products, and cloud analytics for energy management and business improvement in commercial buildings.

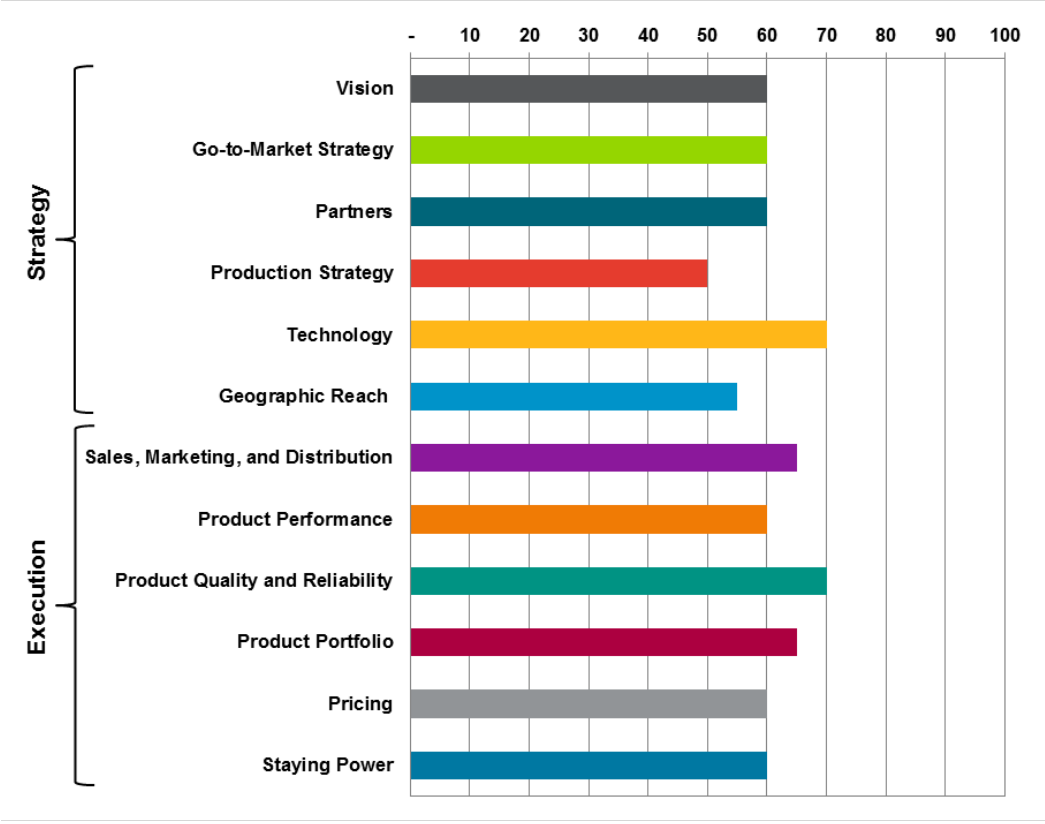
Daintree is well positioned to support the midmarket, where many facilities have been underserved due to a lack of existing control infrastructure. In 2014, the company introduced Building Energy Management as a Service to shift from the on-premise to

cloud-based approach to analytics. It has marketed its solutions to meet the challenges of both specific building types (warehouse, office, retail, parking, sports arenas), and customer segments (manufacturing, financial services, retail, restaurants, education, and government). The technology criteria is an area of strength for Daintree because of the low-cost devices, open architecture, and services the company offers its customers.

The company has an extensive network of technology partners, mainly lighting manufacturers including Cooper Lighting, GE Lighting, and OSRAM SLYVANIA as well as resellers and systems integrators. The main challenge for Daintree will be how well the company can grow inside Current by GE. The vision of a startup within one of the largest industry players is innovative, but other major technology incumbents have faltered in the past with the struggle to evolve corporate culture that is a pivot from the traditional business. In addition, Daintree has been positioned to support enterprise customers, but also those without traditional BAS. The IoT platform focus is a strength for smaller buildings, but ongoing market penetration with the largest buildings could be a challenge.

www.daintree.net

Chart 4.7 Daintree Networks Strategy and Execution Scores



(Source: Navigant Research)

4.2.6 IBM

Overall Score: 60.0

Strategy: 54.8

Execution: 64.8

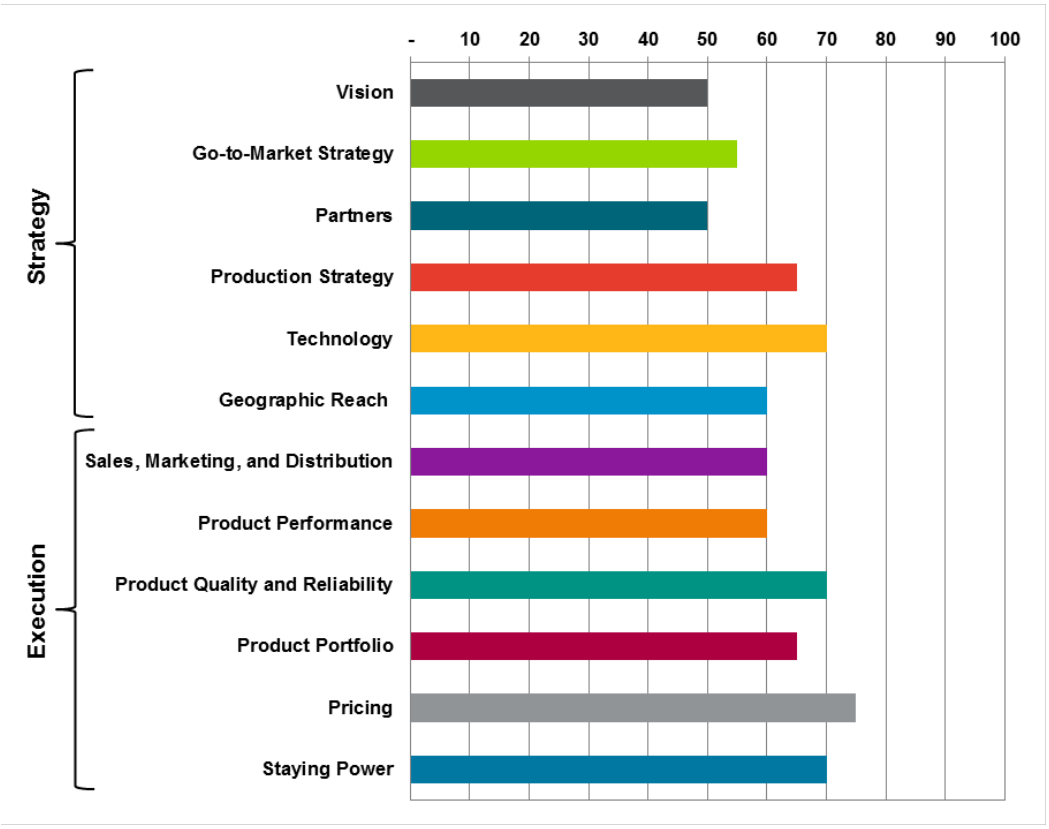
IBM, the North Castle, New York-based information technology and services giant, offers TRIRIGA Environmental and Energy Management Software—a BEMS offering that integrates data aggregation and visualization, work order management, and reporting. The solution is based on the TRIRIGA acquisition made in 2011. The TRIRIGA offering is more expansive than BEMS alone and includes applications for financial, real estate, and facilities management in addition to the energy management capabilities. The energy management application is a visualization and reporting platform for tracking energy consumption and savings.

IBM continues to expand its BEMS and building optimization capabilities through its IoT initiatives. In June 2016, the company announced a strategy partnership with ISS, based in Copenhagen. The partnership gives IBM increased market share with a starting point of the more than 25,000 buildings in the ISS portfolio worldwide. The partnership will use data analytics to optimize facility use and performance spanning energy and non-energy business activities including space utilization and air conditioning.

IBM's strength is in its reach, financial strength, partnership strategies, and vision for comprehensive energy and operations optimization through technology. Its challenge is in bringing more sophisticated analytics for control and automation specific to energy.

www-03.ibm.com/software/products/en/ibmtrirenviandenermanasoft

Chart 4.8 IBM Strategy and Execution Scores



(Source: Navigant Research)

4.2.7 Powerhouse Dynamics

Overall Score: 59.8

Strategy: 59.8

Execution: 59.8

Powerhouse Dynamics' SiteSage BEMS is designed to optimize portfolios of small to medium sized buildings. Cloud-based analytics use patented algorithms for real-time monitoring and control of energy consuming assets via wireless thermostats, equipment controllers, sensors, gateways, and circuit-level metering.

The Newton, Massachusetts-based startup targets the market both directly to end users and through channel partners. The engagement with manufacturers provides customers with a new opportunity for greater insight for sales and potential for new services.

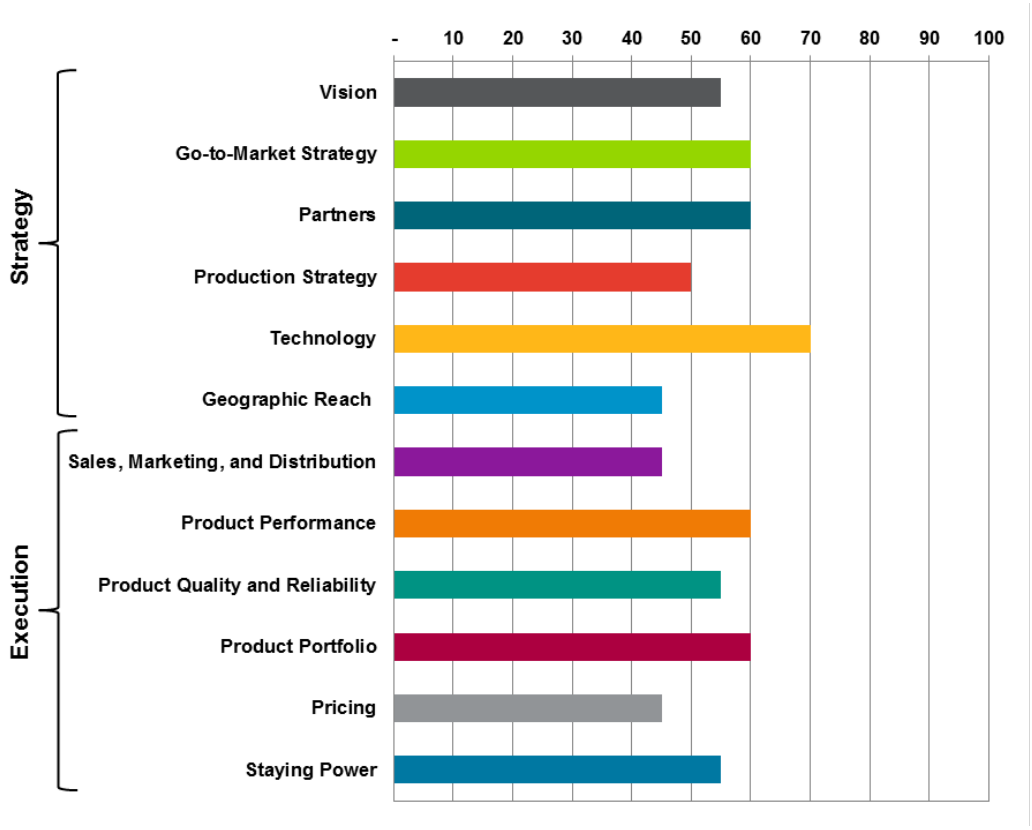
SiteSage is designed to support restaurants, convenience, retail, and other small commercial facilities. The technology was originally designed for residential market, but was repositioned in 2011 for small commercial HVAC control, food safety, and utility bill

management. Powerhouse Dynamics has been able to highlight capabilities that address core pain points beyond energy management, which is fundamental to engaging the target market, and helps differentiate the company.

Investors in the privately held company include ventures funds and, notably, Ingersoll Rand and Constellation. The company has demonstrated its commitment to cybersecurity with Payment Card Industry Data Security Standard PCI Level 1 certification of its cloud-based analytics, a distinction in positioning around security.

powerhousedynamics.com

Chart 4.9 Powerhouse Dynamics Strategy and Execution Scores



(Source: Navigant Research)

4.2.8 Switch Automation

Overall Score: 58.9

Strategy: 54.0

Execution: 63.5

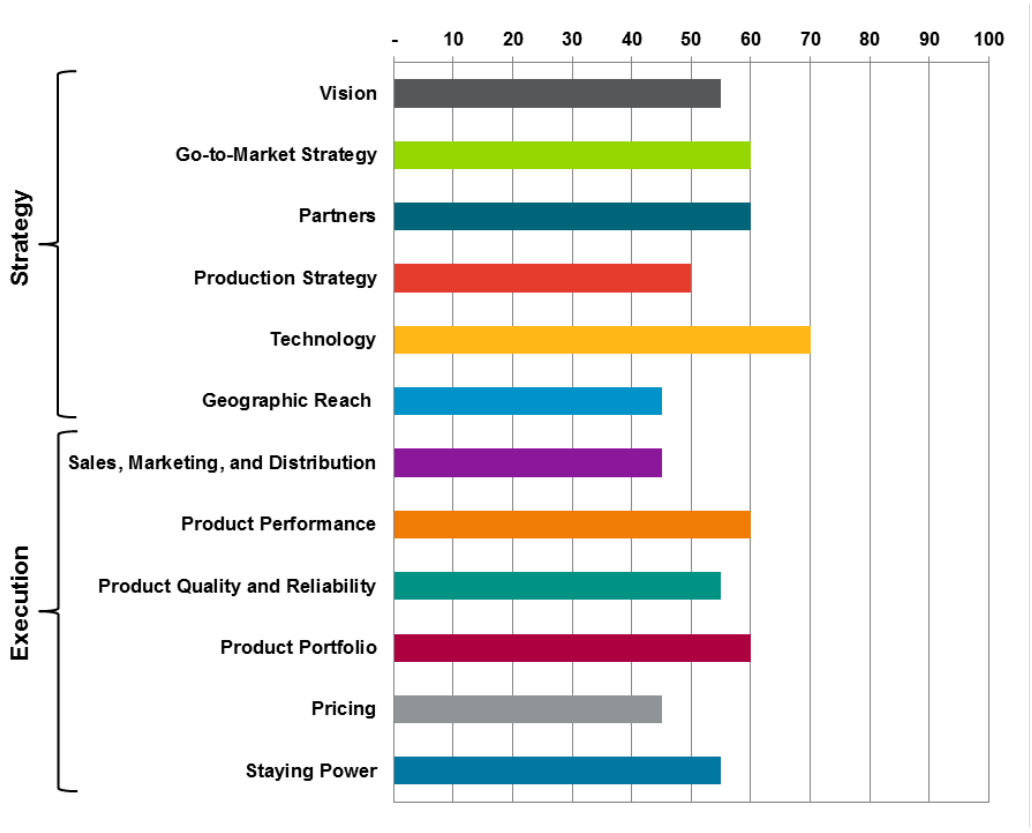
Switch Automation, the Sydney, Australia-based startup, offers individual facility and enterprise monitoring and analysis of building performance data in a single platform. The Switch Automation solution also includes applications for vendor/supplier management, occupant satisfaction, proactive maintenance, measurement and verification, energy and sustainability reporting, and enables improved automation and controls of building systems. Switch Services offers customers engineering support for planning and implementing energy efficiency improvement programs.

Switch Automation is a privately held startup, launched in 2012 and built on algorithmic-based analytics from the Australian national labs (CSIRO). The SaaS offerings are technology agnostic. The analytics determine building system improvements and enable commissioning and demand response through BAS integration. The foundational analytics and solution capabilities gave the company strong scores in technology, product portfolio, and performance.

Switch has developed a market beyond Australia to the Philippines, the Ukraine, and the United States. In 2016, the company surpassed engagement in approximately 8,000 buildings and opened its fifth worldwide office in Denver, Colorado. The new offices are a positive sign for the company from a growth perspective, and worth noting in the analysis, but the market penetration is centered in Australia and the United States, which accounts for the specific score on geography.

www.switchautomation.com

Chart 4.10 Switch Automation Strategy and Execution Scores



(Source: Navigant Research)

4.2.9 GridPoint

Overall Score: 57.1

Strategy: 53.8

Execution: 60.3

GridPoint, the Arlington, Virginia-based subsidiary of Twenty First Century Utilities (TFC Utilities), offers hardware, enterprise software, mobile applications, and managed services for commercial building optimization. The Enterprise Energy Management Solution (EMS) is a BEMS that provides real-time visualization, cloud-based analytics, automated alerts, portfolio-wide insight into equipment performance, remote equipment control, and energy management project tracking.

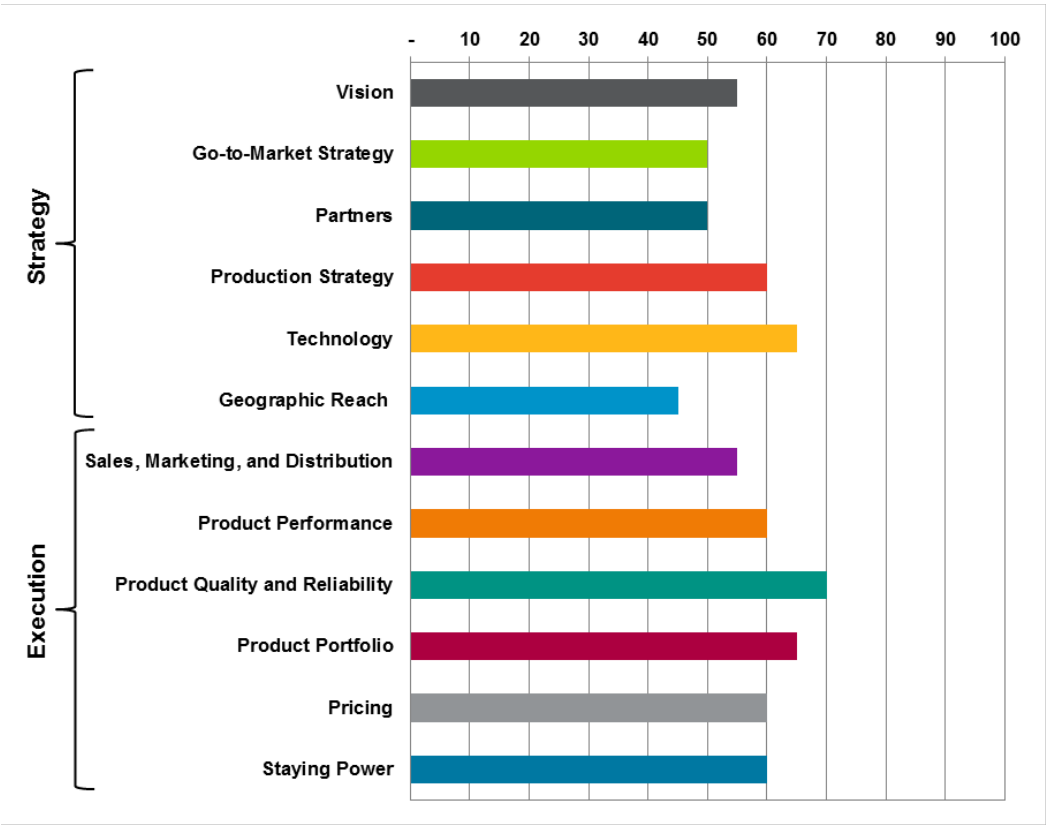
GridPoint EMS is enabled by the company's controls, submetering, and monitoring wireless devices. The company was acquired in 2015 by the newly formed TFC Utilities. The acquisition was designed to support the TFC Utilities vision to deliver technology through utility channels as the company acquires and invests in regulated utilities. The

hardware is core to GridPoint's value proposition for midmarket customers that manage its facilities without traditional BASs. The development of its devices and the focus on hardware, software, and services as a complete solution gave the company strong scores in technology, product quality and reliability, and product portfolio.

The midmarket is the primary target for GridPoint, focusing on delivering data-driven analytics and controls via its wireless devices. Fast serve restaurants, retail, grocery, and convenience stores have been specific targets for the company. GridPoint has had limited geographic reach, and has focused its marketing on specific US retail and fast serve restaurant successes. In addition, it may be challenged to compete with SaaS-based offerings that are device-agnostic as IoT becomes a more pervasive midmarket trend.

www.gridpoint.com

Chart 4.11 GridPoint Strategy and Execution Scores



(Source: Navigant Research)

4.3 Challengers

Challengers are vendors that scored higher than 25 in Strategy and Execution but are not yet Contenders for market leadership. In this *Navigant Research Leaderboard Report*, four companies are identified as Challengers.

4.3.1 Lucid

Overall Score: 51.0

Strategy: 48.0

Execution: 53.8

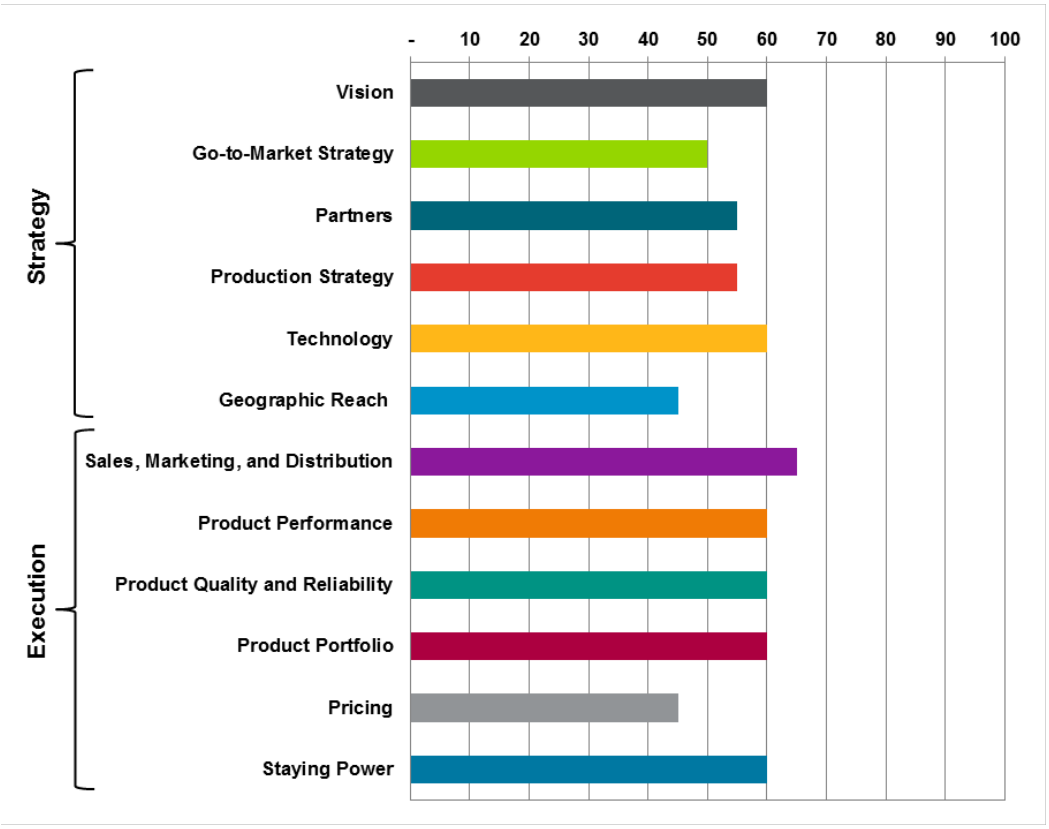
Lucid, the Oakland, California-based startup's BuildingOS BEMS offering, is fundamentally a data aggregation platform for enterprisewide insight into energy and facility performance. The cloud-based offering leverages third-party data from utility bills, BASs, smart meters, submetering, and sensors. The company's vision is to provide a centralized and unified source of data that can be transformed into the information needed by decision makers across an organization.

Lucid has partnered with device manufacturers and technology providers including 38 Zeros, Obvius, Weather Underground, and Wegowise. It is also partnering with industry, government, and service providers including ENERGY STAR, Constellation, Ecova, and the US Green Building Council. The company has been developing and refining its offerings since 2004. The partnerships are valuable in deepening the capabilities of data aggregation and analysis, but they are limited to other small players in the market.

The company has limited geographic reach, and a pure-place software vision. As the market matures, Navigant Research projects that customers demand scalable solutions that have broad capabilities, and Lucid has defined its position to provide insight and analysis without the capability of automated system improvement,

lucidconnects.com

Chart 4.12 Lucid Strategy and Execution Scores



(Source: Navigant Research)

4.3.2 Panoramic Power

Overall Score: 48.5

Strategy: 49.0

Execution: 48.0

Panoramic Power, the New York, New York-based Direct Energy subsidiary, provides device-level energy management via data collection and analysis from circuit-level sensors. The key differentiator for Panoramic Power is the low-cost, self-powered, wireless circuit sensors. These devices give customers detailed insight into building system performance through cloud-based interfaces that monitor and report data. The company was acquired by Texas-based electricity retailer Direct Energy in 2015.

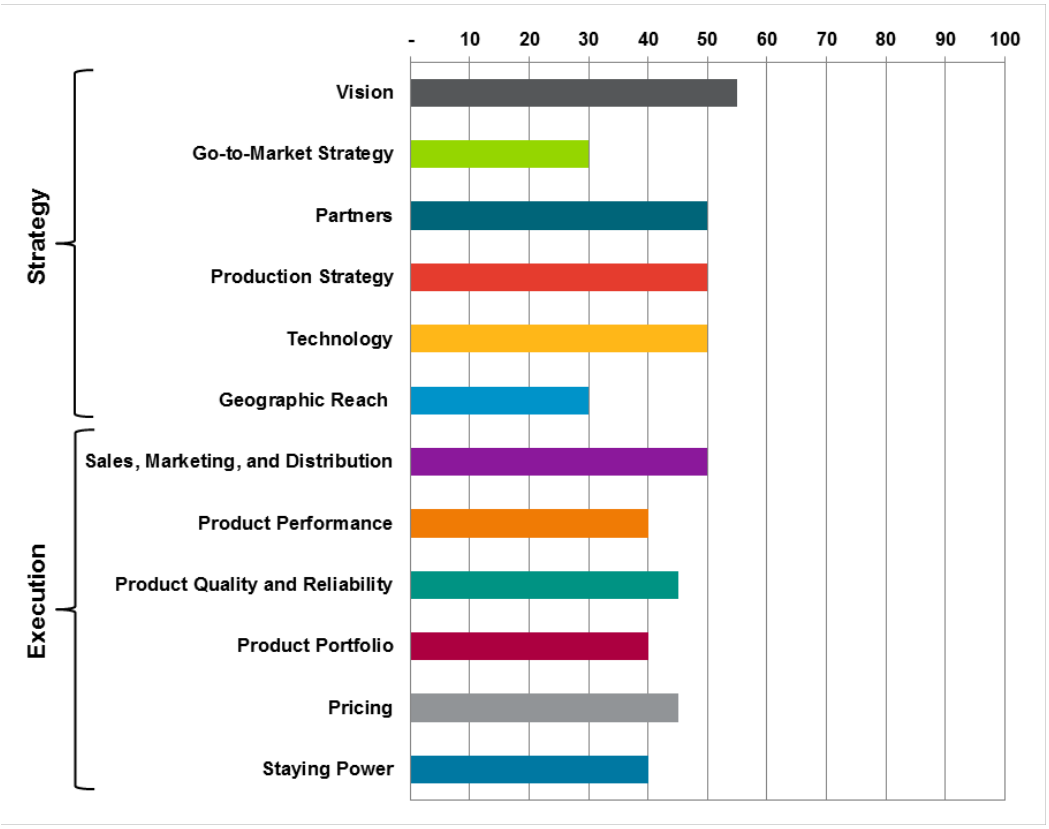
The patented Panoramic Power sensors communicate equipment performance data every 10 seconds through the company's wireless communications gateways (Wi-Fi/Ethernet or 3G) to the cloud computing engine. Customers receive real-time alerts, reports, and can access web-based or mobile visualization tools. There is an application programming

interface for data extraction to third-party software. Customers range across industry verticals and include McDonalds, The North Face, Vornado, and Wrangler.

Panoramic Power's vision score was an area of strength for the company because of the unique offering of devices at no-cost and the positioning with Direct Energy. As a newer company, Panoramic Power still struggles in terms of geographic reach.

www.panpwr.com

Chart 4.13 Panoramic Power Strategy and Execution Scores



(Source: Navigant Research)

4.3.3 Building Robotics

Overall Score: 45.5

Strategy: 46.5

Execution: 44.5

The Oakland, California-based startup Building Robotics has garnered significant media, public, and industry attention with its Comfy smartphone app for occupant comfort. Comfy is designed to reduce employee complaints of being hot or cold by individualizing room

temperatures. The privately held company was founded in 2013 and in June 2016 announced the closing of a $12 million Series B funding round led by Emergence Capital, a tech-focused Silicon Valley venture firm. Other notable investors include Microsoft Ventures and CBRE.

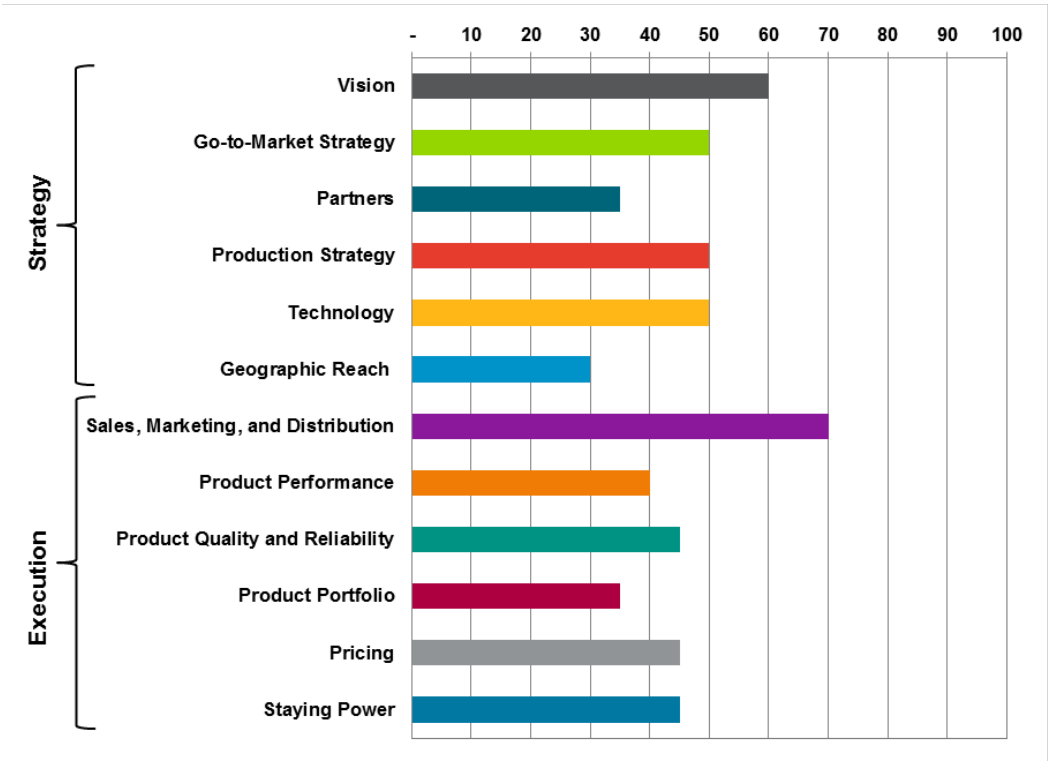
The SaaS Comfy solution is a unique offering in its approach to leverage occupants as the data source for HVAC optimization. Individuals opt in and use their smartphones as the sensor network within a commercial office. Customers sign up for Comfy on a monthly subscription basis with no hardware installation costs. The company reports deployment in 3.5 million square feet worldwide and 90% reduction in hot/cold requests from employees to building managers.

High profile customers include CBRE, Google, Johnson Controls, and Under Armour. +Comfy (Plus Comfy) is the company's approach to expanding beyond HVAC optimization to maximize performance of lighting, access controls, and space use. Partners include CommScope, Intel, Lutron, and Redwood. The vision is to expand the occupant-centric data input for building optimization.

Vision is Building Robotics' primary strength. Its solution approach using occupants as data sources is unique and disruptive. Comfy tackles occupant engagement as a top priority, which reflects a key aspect of the BEMS market evolution. The challenge for the company will be scalability. Customers demand solutions that can evolve to meet more sophisticated demands as they move along the path of energy management to optimization.

comfyapp.com

Chart 4.14 Building Robotics Strategy and Execution Scores



(Source: Navigant Research)

4.3.4 Aquicore

Overall Score: 43.4

Strategy: 44.8

Execution: 42.0

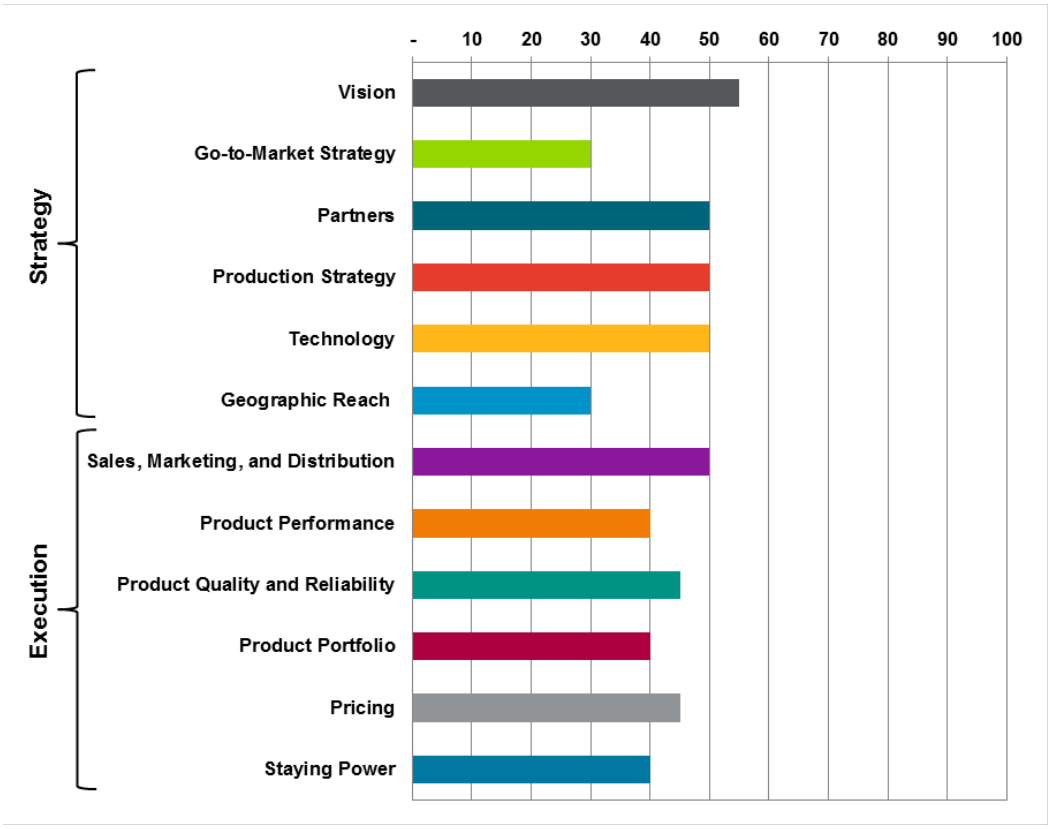
Washington, DC-based Aquicore is a cloud-based data aggregation and reporting platform for tenant billing, visualization, measurement and verification, and monitoring energy consumption. It leverages meter and submeter data on electricity, water, and gas to provide insight into consumption that can be broken down into areas within a facility or attributed to specific tenants. Aquicore entered the market as a solution to sub-billing in multi-tenant commercial facilities, but has evolved to offer a more complete BEMS.

Aquicore is a new entrant in the BEMS market compared to many of the vendors in this assessment. The approach to multi-resource management is key to its inclusion in the report. Aquicore helps customers manage costs and provides a vision for optimization beyond energy management in-line with how the BEMS market is evolving.

The company is a startup and therefore struggles from a go-to-market strategy and geographic reach perspective based on its maturity. It has recently evolved from a tenant sub-billing to more comprehensive set of offerings, and faces the challenges of competition against much larger BEMS players as well as those that have been evolving their offerings even over a few years.

aquicore.com

Chart 4.15 Aquicore Strategy and Execution Scores



(Source: Navigant Research)

Section 5
ACRONYM AND ABBREVIATION LIST

3G	Third Generation
BAS	Building Automation System
BEMS	Building Energy Management System
CAGR	Compound Annual Growth Rate
EMS	Enterprise Energy Management Solution
GEO	Global Energy Optimization
HVAC	Heating, Ventilation, and Air Conditioning
IoT	Internet of Things
LED	Light-Emitting Diode
OEM	Original Equipment Manufacturer
SaaS	Software as a Service
TFC Utilities	Twenty First Century Utilities
US	United States

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8.1 Scope of Study

The scope of this report is limited to the strategy and execution associated with leaders in the global market for BEMSs. These systems tend to be based on software (often via SaaS), though often associated with value-added services and hardware. The companies active in this market are diverse, ranging from building controls and equipment OEMs to software pure plays.

Note that company rankings capture the vendor's standing at the time of the report and are not a retrospective of past accomplishments or an indication of future success. The ratings are likely to change rapidly as this market matures and business models continue to evolve. The report is not exhaustive. There are other global and smaller players in the market that were not included because of their specific focus on one aspect of the market or their lack of geographic reach.

8.2 Sources and Methodology

Navigant Research's industry analysts utilize a variety of research sources in preparing Research Reports. The key component of Navigant Research's analysis is primary research gained from phone and in-person interviews with industry leaders including executives, engineers, and marketing professionals. Analysts are diligent in ensuring that they speak with representatives from every part of the value chain, including but not limited to technology companies, utilities and other service providers, industry associations, government agencies, and the investment community.

Additional analysis includes secondary research conducted by Navigant Research's analysts and its staff of research assistants. Where applicable, all secondary research sources are appropriately cited within this report.

These primary and secondary research sources, combined with the analyst's industry expertise, are synthesized into the qualitative and quantitative analysis presented in Navigant Research's reports. Great care is taken in making sure that all analysis is well-supported by facts, but where the facts are unknown and assumptions must be made, analysts document their assumptions and are prepared to explain their methodology, both within the body of a report and in direct conversations with clients.

Navigant Research is a market research group whose goal is to present an objective, unbiased view of market opportunities within its coverage areas. Navigant Research is not beholden to any special interests and is thus able to offer clear, actionable advice to help clients succeed in the industry, unfettered by technology hype, political agendas, or emotional factors that are inherent in cleantech markets.

8.2.1 Vendor Selection

Navigant Research tracks the active global BEMS market, and there are hundreds of BEMS providers that could have been considered for inclusion in this report. By necessity, this report focuses on a subset of players that have demonstrated a strong track record within the BEMS market, as well as the scalability and staying power to continue to grow over time. Although there are a number of very strong players that offer excellent solutions focused on a specific type of system (e.g., HVAC, lighting, etc.), this report focuses on companies that provide platforms with enterprise-level energy management capabilities.

While revenue was not used as one of the criteria, most of the companies active in this market are selling at least $5 million per year of BEMS software and the associated services and hardware. In some cases, BEMSs represent just a small fraction of a company's revenue; in others, they represent virtually all of a company's revenue.

8.2.2 Ratings Scale

Companies are rated relative to each other using the following point system. The ratings are a snapshot in time, showing the current state of the company. These scores are likely to be fluid as new competitors enter the market and customer requirements evolve.

- Very Strong 91 – 100
- Strong 76 – 90
- Strong Moderate 56 – 75
- Moderate 36 – 55
- Weak Moderate 21 – 35
- Weak 11 – 20
- Very Weak 1 – 10

8.2.2.1 Score Calculations

The scores for Strategy and Execution are weighted averages based on the subcategories. The overall score is calculated based on the root mean square of the Strategy and Execution scores.

8.2.3 Criteria Definitions

8.2.3.1 Strategy

- **Vision:** Measures the company's stated goals in designing market solutions against the actual needs of customers based on the entire environment in which they will operate. Clear and compelling visions that are effectively communicated to the industry result in higher scores.
- **Go-to-Market Strategy:** Evaluates the company's strategy for reaching the target market, including the sales and marketing channels to be used, as well as the processes established for informing the target market about brand differentiation and unique product value.

- **Partners:** Measures the company's established partnerships with key organizations that will provide an advantage in financial backing, sales, business, and product development. Affiliations with well-known building technology (HVAC and automation) manufacturers and other established vendors in the supply chain, as well as a track record of financial strength through fundraising or profitable product sales, positively affect scores in this *Navigant Research Leaderboard Report*.
- **Production Strategy:** Evaluates the long-term competitiveness of the product development as an effective solution that satisfies market requirements and meets market needs.
- **Technology:** Evaluates whether the company has developed and/or patented technology that provides a significant business advantage over competitors that is likely to have an enduring impact on its success. Higher scores are given if the company's technology is already a proven market success or delivers unique product attributes.
- **Geographic Reach:** An evaluation of companies' ability to reach national and international customers through networks of distributors and resellers.

8.2.3.2 Execution

- **Sales, Marketing, and Distribution:** Evaluates the company's marketing and sales performance and current distribution channels. Higher scores are given to companies with a large global network with access and support for current product.
- **Product Performance:** Evaluates the competitive performance of the BEMS. Higher scores are given to companies that provide automated improvement to multiple building systems.
- **Product Quality and Reliability:** Evaluates the quality and reliability of the software offerings delivered to customers, the company's strategy to develop quality applications for the market, and its current product line.
- **Product Portfolio:** Addresses the products' relative competitiveness in and suitability to the market. Points are awarded for uniqueness and flexibility for target markets.
- **Pricing:** Determines the suitability of product pricing based on its feature set, including whether products are available at multiple price points and how pricing compares to that of competitor products.
- **Staying Power:** Evaluates whether the company has the financial resources to withstand variable and evolving market demands. Also measures the company's likelihood to continue to pursue BEMS products in the event of market softening. Higher scores are given to companies with better financial performance and greater capability to survive market downturns.

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