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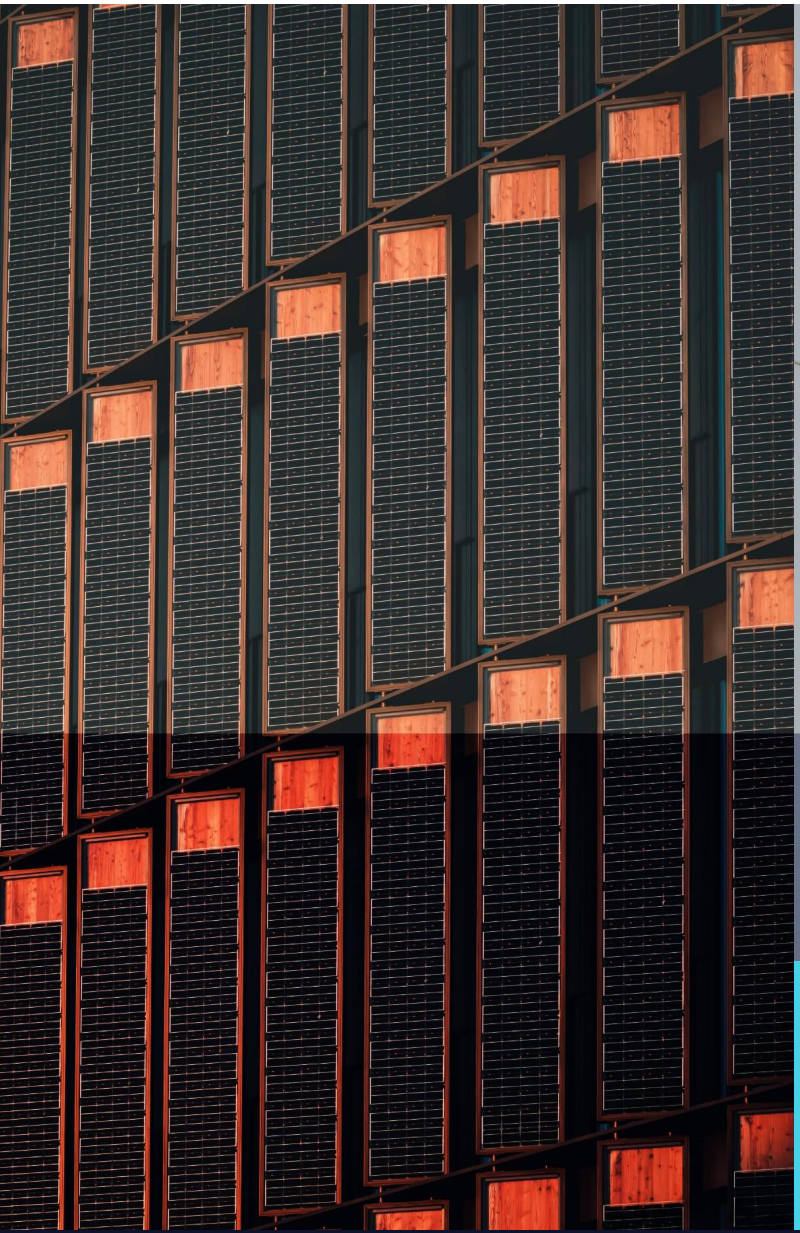
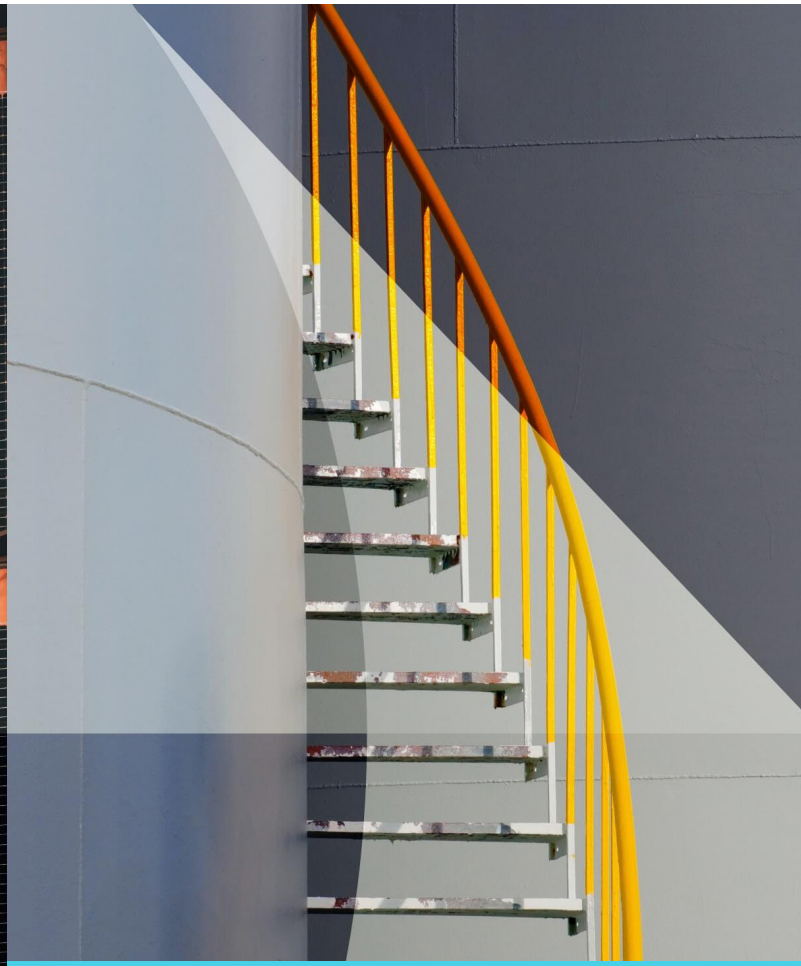
Real Estate & Built Environment

Buyer's Guide: Energy Management Software (2024)

By Harry Wilson
With Claire Stephens

July 2024





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Buyer's Guide: Energy Management Software (2024)

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This report provides real estate executives responsible for energy within their buildings with an up-to-date analysis of 76 vendors offering energy management software (EMS), and a detailed analysis of 11 software offerings available on the market today. This report supplements our recently published Green Quadrant benchmark of the leading 15 vendors of EMS, with different solution focuses, alongside vendor heritage and case study analysis (see Verdantix Green Quadrant: Energy Management Software 2023). The study collected data directly from vendors through questionnaires, briefings and other information submitted to Verdantix. Where vendors did not actively participate in this research, we used publicly available information. Our analysis finds that the EMS market is vast, with hundreds of solutions available for buyers to choose from. Providers are embracing AI and including it in their solutions' feature sets, as well as incorporating carbon accounting functionality to ease reporting processes for buyers subject to new regulations. Buyers of EMS should leverage this report to gain an understanding of the vast array of solutions in the market today, and to appreciate the various heritages and specialisms of solutions, in order to narrow down their search for software that meets their bespoke requirements.

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Organizations mentioned

75F, ABB, Accruent, Acuity Brands, aedifion, Airthings, Amazon Web Services (AWS), Ameresco, Appspace, Aquicore, Arbejdernes Landsbank, ArcelorMittal, ASHRAE, Atrius, AutoGrid, Avison Young, Bedrock Detroit, Beeldi, BNP Paribas, BrainBox AI, Bridge Commercial Real Estate, Bueno Systems, BuildingMinds, C3 AI, Carrier, CDP, CIM, Clockwork Analytics, Cloudfm Group, CopperTree Analytics, Cortex Sustainability Intelligence, Daikin, Danone, Dapesco, dataArrows, Datakwip, David Lloyd Leisure, Dell, Distech Controls, Eagle Street Partners, Eaton, EcoEnergy Insights, Ecogen Energy, Encycle, Enel X, Energy Advantage, EnergyCAP, Energy Elephant, ENERGY STAR, ENOWA (NEOM), ENTO, Entronix, E.ON, Eptura, EY, Fabriq, Facilio, Faradai Energy, Fifth Third Bank, FM:Systems, FogHorn, Fujitsu, Global Reporting Initiative (GRI), GPR Ventures, GPT Group, Grand Hyatt, GRESB, GridDuck, GridPoint, Groupe Pochet, GSK, Hark Systems, Hilton, Hines, Honeywell, IBM, ICONICS, inavitas, Infogrid, Innovatus Capital Partners, International Organization for Standardization (ISO), JLL, JLL Technologies (JLLT), Johnson Controls (JCI), KODE Labs, LaSalle Investment Management, Lehotsky Capital, Manchester Metropolitan University, Marriott, mCloud Technologies, Measurabl, Metrikus, METRON, Microsoft, Mindsett, MRI Software, Myrspoven, Net Zero Tracker, Nome Capital Partners, Nordomatic, Northzone, Ofgem, Oil and Gas Climate Initiative (OGCI), Optergy, Optima Energy, Optimum Energy, Oxford Properties, Panoramic Power, Park Hotels & Resorts, PassiveLogic, Phoenix Energy Technologies, Planon, PointGrab, Powerhouse Dynamics, Prescriptive Data, PTT, QuadReal Property Group, R8 Technologies, REsustain, Royal London Asset Management, Rudin Management, Sabey Data Centers, SAIL Outdoors, Schneider Electric, ServiceNow, Shell, Shell Energy, Siemens, SkyFoundry, Slack, Smarkia, Spacewell, Spectral Energy, Spica Technologies, Stark, Switch Automation, Tango, Task Force on Climate-related Financial Disclosures (TCFD), Tesco, Thing-it, T-Mobile, TotalEnergies, Tridium, Uplight, US Energy Information Administration (EIA), US Securities and Exchange Commission (SEC), Verizon, Vitality, Washington & Lee University, WatchWire, Wattics, Weber State University, Willow, Zenatix.

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This Buyer's Guide reprint has been customized for use by Planon. It has been adapted to incorporate Planon's profile. This version of the report does not contain other vendor profiles.

The Verdantix Buyer's Guide to energy management software (EMS)

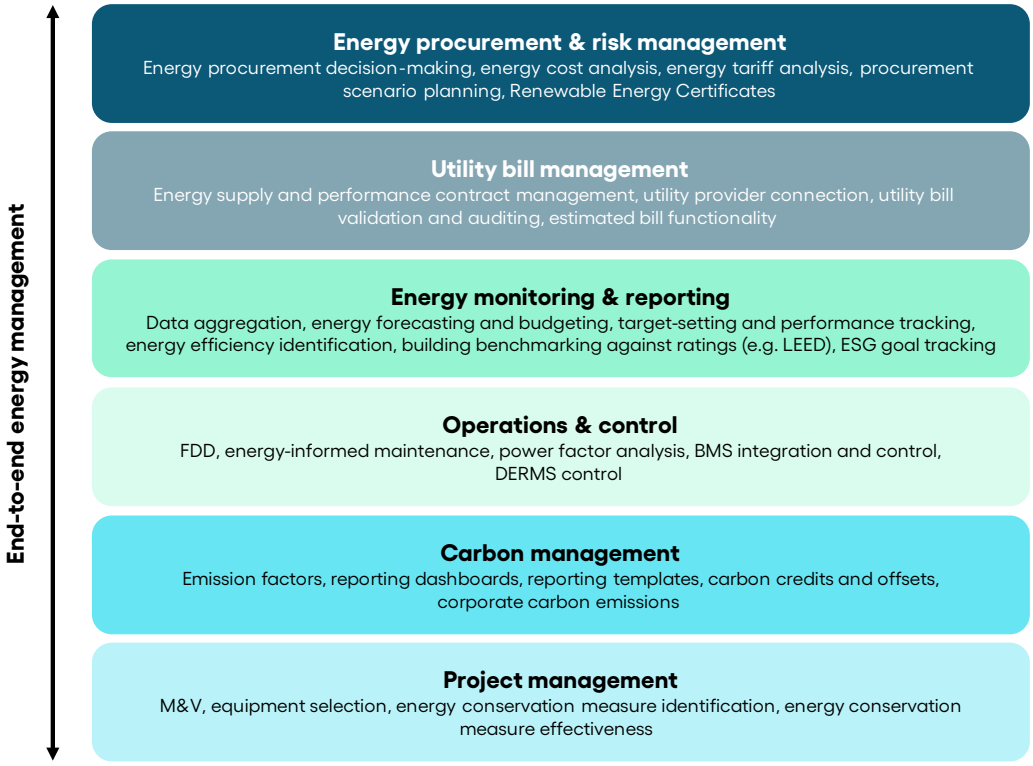
This report provides an up-to-date analysis of 76 vendors offering energy management software (EMS), and a detailed analysis of 11 software offerings available on the market today. In the report, we review providers' functionality and new product releases across six defined energy management functionality categories (see **Figure 1**): energy procurement and risk management; utility bill management; energy monitoring and reporting; operations and control; carbon management; and project management. The solutions considered span a range of functionality, with some providers offering just one or two of these capabilities, and others boasting all six – and more. This research complements and extends our analysis of the EMS sphere in general; Verdantix has discussed EMS over the course of more than 15 years, with our latest releases in this area being our 2023 Green Quadrant and Smart Innovators reports (see Verdantix Green Quadrant: Energy Management Software 2023 and Verdantix Smart Innovators: Energy Management Software).

Verdantix defines EMS as:

> *"Enterprise-scale software that enables firms to monitor, analyse, report and reduce energy consumption across building portfolios, for the purposes of cost and carbon reduction and ESG reporting."*

In this report, we provide prospective buyers with a comprehensive list of solutions available in the market today and list key considerations for readers starting the EMS procurement process. This report features dedicated solution profiles for the following vendors: 75F, Acuity Brands (Atrius), CIM, E.ON, JLL (Hank), Infogrid, KODE Labs, Metrikus, METRON, Uplight (AutoGrid) and Verdigris.

Figure 1
The six-part functionality of energy management software



Source: Verdantix analysis

Firms leverage EMS to realize cost and carbon savings simultaneously

The key desired outcomes for buyers when adopting EMS pertain to carbon, cost and energy savings. Verdantix has collated a range of case studies of example deployments (see **Figure 2**). Buyers are adopting EMS solutions to:

- **Reduce exposure to volatile energy pricing.**
  Energy prices continue to be volatile, with markets rocked by ongoing geopolitical conflicts and other factors, such as extreme weather. These events create uncertainty around both future supply and demand, and price swings are therefore not uncommon in many global regions. End-energy consumers may be shielded from direct exposure to prices – take the UK, for example, where the energy regulator Ofgem mandates a price cap for units of energy consumption – but large energy-consuming assets, such as data centres and manufacturing facilities, with in-house energy procurement, could be susceptible to significant increases in operational expenditure. However, there appears to be some light on the horizon, with wholesale energy prices beginning to decline. As of February 2024, the US benchmark Henry Hub national gas month-ahead futures were trading as low as $1.52 per million British thermal units (BTU) – a value not seen since 2020, and far from the $10 per million BTU witnessed 18 months previously.

- **Lower business operational expenditure.**
  Inflation and central bank interest rates remain high across various geographies, exerting pressure on businesses and forcing operational teams to cut expenditure wherever possible. EMS unlocks multiple avenues of cost efficiencies: the easiest to picture are direct savings on utility spend, but other cost savings come in the forms of lower maintenance costs through fault detection and diagnostics (FDD), and reduced labour costs, enabled by solutions that aggregate and manipulate data automatically, and thus allow for the repurposing of the workforce performing those tasks. The operational expenditure required to maintain EMS deployments can be offset by financial incentives such as green and sustainability-linked loans, to fund 'material improvement' in energy efficiency; improvements are validated through international accreditations such as BREEAM Refurbishment and Fit-Out and LEED (see Verdantix Market Overview: The Emergence Of Smart Building Certifications and Verdantix Strategic Focus: LEED v5 Signals A Bright Future For Smart Building Technology Vendors). In addition, the payback on EMS deployments can be as little as several months, more than justifying solution installation.

- **Measure and report on carbon emissions.**
  From 2024, firms already subject to the EU's Non-Financial Reporting Directive (NFRD) – including those with listed securities on an EU-regulated market and with over 500 employees – will need to consolidate emissions data under the Corporate Sustainability Reporting Directive (CSRD) and report these from 2025 (see Verdantix Strategic Focus: CSRD And ESG Reporting Readiness and Verdantix Strategic Focus: Responding To ESG Disclosure Requirements In Real Estate). Other firms will be susceptible to these reporting requirements in coming years. On the other side of the Atlantic, the US Securities and Exchange Commission (SEC) announced in March 2024 the passing of its Climate Disclosure rule, which – once in effect – is set to mandate public organizations in the US to report on their Scope 1 and 2 emissions. These legislative initiatives are driving buyers towards the adoption of EMS, with these solutions able to aggregate data from utilities, and – after validating this information against interval meter data – calculate emissions associated with consumption. Some vendors have prepared their offerings in advance of the legislation, with automatic report generation and other streamlined processes available to buyers out of the box.

- **Assist with decarbonization agendas.**
  Alongside reporting commitments, firms across the globe have made varying commitments to achieving net zero in their business operations. Data from zerotracker – a public tracker of net zero commitments made by countries and firms globally – reveal that 51% of global businesses have committed to net zero. There is large variety in the targets set, with many opting for milestone years of 2030, 2035 or 2050. A crucial step in this process – regardless of primary industry – is the reduction of energy consumption within occupied buildings.

- **Attract and retain tenants, whilst increasing asset value.**
  In commercial real estate in particular, energy and environmentally efficient buildings can command higher rents. 'Green premiums' – the higher costs associated with the purchasing of sustainable goods or services – are prevalent in real estate around the globe. In a 2023 study, LaSalle found that efficient buildings, particularly those accredited externally by certifications such as LEED, were between 5% and 15% more expensive in terms of rent, and between 5% and 25% more costly to purchase. Adopting EMS aids green credential achievement, and thus enables assets to command these higher rental and capital returns.

Figure 2
EMS deployment case studies

Vendor	Client	Key outcomes
Atrius	Weber State University	Solution deployment resulted in the identification and targeting of $1.4m of energy savings in year 1, and $1.6m in year 2 – in total, a 33% reduction in planned energy budget. Of the total savings achieved, 9% came directly from the solution's scheduling and other control optimizations.
BrainBoxAI	SAIL Outdoors	Achieved 40% average carbon emission reductions across three retail stores through reduced electricity and gas consumption (23% and 44% reductions, respectively). Deployed solution to autonomously control HVAC equipment.
CIM	Eagle Street Partners	Deployed solution in 70,000sq. ft Grade A office space within 16 days. Deployment resulted in an 18% electricity reduction whilst maintaing and visualizing occupant comfort across 187 discrete zones.
ENTO	Arbejdernes Landsbank	Solution consolidated utility consumption data directly from the utility provider for a portfolio of over 70 bank branches across Denmark. Savings at branch level were observed to be as high as 67%, thanks to AI-powered energy optimization measures identified by the solution. It is important to note, however, that savings depend entirely on previous control measures; the branch that achieved 67% savings – although maintaining sufficient occupant comfort and IAQ levels – was controlled in an energy-inefficient manner.
IBM	GPT Group	Deployed Envizi across a range of over 120 properties, leading to a reduction of up to 52% in energy intensity and over $20m in annual savings. The solution aggregated utility and interval meter data to identify areas of energy wastage; as of 2021, it had successfully realized an 82% carbon emissions reduction from a 2005 baseline.
Phoenix Energy Technologies	National US clothing retailer	Deployed EMS across a network of sites to aggregate and analyse energy consumption. The solution allowed for fault detection and diagnostics across installed equipment, and identified areas of erroneous energy consumption. Savings amounted to 5% of energy spend, and a threefold ROI.
Prescriptive Data	Rudin Management	Across eight different NYC properties, Rudin Management observed $5m in energy savings compared with the situation before solution deployment. The solution optimized energy consumpton both in occupied and out-of-occupancy hours, to yield average annual savings of 9.4% and 13.6%, respectively.
SkyFoundry	Lehotsky Capital	Deployed solution in a 700,000sq. ft Class A office building to provide ongoing monitoring of energy consumption and identify methods to reduce wastage. Savings identifed in year 1 anounted to 11% (annualized); the solution's ENERGY STAR integration allowed for an increase in score to 85, alongside support in achieving LEED Gold O&M certification. Ongoing monitoring and ECM implementation resulted in 6% annualized savings in year 2 and 7.6% in year 3.
Switch Automation	Fifth Third Bank	Average monthly energy savings across 500 buildings amounted to 25%-26%, thanks to entire building and portoflio-level analytics. Solution allowed for benchmarking between sites and opened new possibilities for reporting against sustainability bodies and achieving and maintaining building performance accreditations.
Verdigris	Grand Hyatt	Achieved 20% load reduction, thanks to initiatives such as peak demand charge avoidance for non-critical equipment, with equipment controlled intelligently and only switched off when guest comfort would not be compromised. Monthly ROI was valued at 41% and initial investment payback time was less than 6 months.

Source: Verdantix analysis

Figure 3
Vendor heritages of EMS solution providers

Heritage	Description	Relationship to energy management	Example vendors
Energy management software	Vendors with an EMS heritage came to market with software to allow users to visualize, manage and reduce their energy consumption. Traditional EMS solutions have focused on utility bill management and utility meter or provider connection. In recent years, solutions have enriched their capabilities, wiith increased levels of data capture and integrations with existing building systems and applications, to drive further energy reductions.	N/A	• Cortex Sustainability Intelligence • EcoEnergy Insights (Carrier) • Envizi (IBM) • E.ON • GridDuck • GridPoint • Wattics (EnergyCAP)
FDD/maintenance	Fault detection and diagnostic (FDD) and maintenance solutions are used to detect – and predict – equipment failures. They reduce equipment downtime, increase equipment lifetime and lower costs. To achieve these outcomes, solutions must integrate with existing building systems and collect large amounts of data throughout normal building operations. The solutions can then identify abnormalities in behaviour, with advanced solutions able to identify failure precursors, thus allowing for predictive maintenance.	FDD and maintenance solutions collate energy consumption data to identify equipment failures. The data can be visualized and monitored within the application. Increased energy consumption is common when equipment is due to fail – for example, fan power increases in air-handling units when the filter needs changing. When solutions identify such instances, maintenance can be carried out to reduce energy consumption and resolve the issue, thereby preventing failure. FDD solutions interface directly with equipment, allowing for equipment-level control to avoid failure conditions and reduce energy consumption.	• Bueno Systems • Clockworks Analytics • CopperTree Analytics
Emissions management	Emissions management solutions aggregate carbon emissions data to aid users with their carbon reporting and disclosure requirements. The solutions harness utility and meter data to accurately calculate the carbon emissions associated with energy use, and allow for easy report generation for varying personas.	Energy and carbon emissions are intrinsically linked, so long as the energy we consume emits carbon (see Verdantix Strategic Focus: Building Decarbonization And Energy Management Will Decouple And Transform Over 30 Years). Emissions management solutions harness energy meter data to calculate and visualize carbon emissions. The solutions also tie in with utility providers to calculate carbon factors for certain points throughout the day. These solutions empower users to reduce their energy consumption, to lower their carbon emissions. As such, this heritage of solution achieves almost the same outcomes as EMS.	• Faradai Energy • Measurabl

Figure 3 (continued) ↓

Figure 3 (continued)

IoT	IoT platforms are modern, cloud-hosted solutions that allow for a large range of applications and integrations. The solutions consolidate building data from a variety of sources (the 'things' in Internet of Things) and allow for information exchange between devices and systems without human intervention. IoT platforms feature analytics to evaluate and deliver actionable insights to users. The solutions are used to monitor assets remotely and automate their control, whilst optimizing performance. For further IoT platform insight, see the dedicated Verdantix Buyer's Guide (see Verdantix Buyer's Guide: Smart Building IoT Platforms (2022))	IoT platforms achieve energy management alongside other outcomes. Energy consumption can be visualized in terms of other sensor data (e.g. occupancy) and other information ingested from the variety of 'things'. As solutions are cloud-hosted, users can visualize entire portfolio energy data and compare as required, or manipulate the data for reporting purposes.	• 75F • Infogrid • KODE Labs • mCloud Technologies • Metrikus • Verdigris
BMS/automation	Building management system applications connect and enhance BMS equipment control commands. These solutions possess strong equipment control capabilities and can automate control commands based on BMS-connected sensors, allowing for the automated switching-on/off of equipment based on occupancy and other inputs. The solutions connect to meters to capture energy consumption and visualize consumption for users.	HVAC and other BMS-connected equipment are large sources of energy consumption in buildings, and more often than not, account for significant amounts of energy wastage. Solutions that automate and enhance control philosophies and offer autonomous control unlock energy efficiencies and aid users in reducing their consumption.	• BrainBox AI • ICONICS • R8 Technologies • Switch Automation
CMMS	Computerized maintenance management systems (CMMS) have been used since the late 20th century to manage maintenance activities and enhance efficient maintenance operations. The solutions often possess FDD elements that allow for automatic maintenance scheduling. They are integration-rich, with connections to IWMS/CPIP solutions and either connections to EMS or incorporation of its functionality.	CMMS solutions assist with energy management by efficiently organizing and managing maintenance-related activities; well-maintained equipment allows for the same outcomes as FDD solutions, and for the subsequent energy efficiencies associated with equipment operating in optimal conditions. Solutions have adopted energy consumption monitoring functionality to inform maintenance scheduling.	• Facilio
DER/microgrid	Distributed energy resource (DER) management and microgrid control solutions are used to manage on-site renewable energy production, as well as energy storage for resiliency. The solutions integrate with building systems and utility providers to deliver produced or stored energy as demanded.	Solutions must integrate with building systems in order to load-shed at times of failure of primary power consumption. The solutions also visualize building energy consumption and allow users to identify out-of-hours or erroneous consumption. Solutions that integrate with utility providers allow for intelligent load-shifting to reduce cost and carbon emissions.	• Uplight (AutoGrid)

Figure 3 (continued) ↓

Figure 3 (continued)

Building tech	Building technology vendors are traditionally hardware-focused; however, in recent years they have diversified their offerings to incorporate digital solutions. The solutions that have come to market from these vendors feature rich integrations with equipment and building systems. Vendors have increased their digital functionality through targeted acqusitions, and some have embraced new IoT platforms that boost the capabilities and functionality available to users.	Traditional hardware manufacturers have offered energy management solutions for many years, and their equipment expertise has brought solutions to market that are advanced in equipment monitoring and control. The size and coverage of these large market players has allowed for rapid functionality development, and given rise to substantial innovation and R&D budgets. As such, their energy management solutions are well-rounded and typically cover multiple, if not all, aspects of functionality.	• ABB • Carrier • Eaton • Honeywell • Johnson Controls (JCI) • Schneider Electric • Siemens
Digital twin	Digital twin solutions allow for the creation of a dynamic virtual replica of a building to enhance operational decision-making and drive building performance. The models created duplicate a building's physical properties, systems and processes. They can be computationally intensive to run, due to the large number of inputs and data manipulation required, and often take significant time to create.	Digital twin solutions allow for the real-time identification of energy-efficiency opportunities, as well as the extensive simulation of energy conservation measures. Sensor data aggregated by solutions can be utilized to inform occupancy-based lighting and HVAC control, while equipment connectivity informs improved HVAC lifecycle management and system optimization.	• Willow
IWMS/CPIP	Vendors of integrated workplace management systems (IWMS) – and their latest evolution, connected portfolio intelligence platforms (CPIP) – offer unified solutions to centralize and integrate portfolio, lease, asset, maintenance, energy, space and workplace management data and processes. CPIP solutions are next-generation, drawing from various data sources, such as data clouds, lakes and warehouses.	IWMS and CPIP solutions aggregate data from within a building and combine these with data held within data stores to provide whole-building analytics. IWMS solutions, in their traditional form, were not designed to capture real-time building data, instead gathering fixed data, such as from lease agreements. In modern times, solutions have emerged with interval data aggregation capabilities from meters and sensors, allowing for energy management. CPIP solutions – with their native compatability with data stores – can harness energy data to allow for energy efficiency improvement identification and for condition-based or predictive maintenance.	• Accruent • DEXMA (Spacewell) • Eptura • IBM • JLLT (Corrigo, Hank) • Planon • Spica (Nordomatic)

Source: Verdantix analysis

The wide umbrella of EMS covers more solutions than ever before

Over the years, energy management as a business priority has varied in importance, due to external market factors. During the market downturn of the mid-2010s, vendors found themselves forced to diversify and differentiate their offerings to attract and retain customers. As a result of these fluctuations, Verdantix finds that:

- **Vendors have broadened their functionality.**
  The EMS umbrella grows ever larger as vendors encapsulate new functionality in their existing offerings (see Verdantix The New Landscape Of Energy Management Software). Traditional monitoring and reporting capabilities have been enriched by the integration of FDD and carbon reporting and accounting capabilities. This has led to greater energy efficiencies, with solutions now able to monitor at a more granular level, whilst also allowing for streamlined business processes as solutions automate mundane tasks such as data aggregation and cleaning.
- **EMS solutions are descendants of various heritages.**
  Vendors offering energy management solutions descend from various heritages (see **Figure 3**) and solutions often achieve energy management as a by-product; for example, FDD solutions aim to reduce equipment failures and decrease maintenance, and thus, through optimal equipment operation, save energy. Other solutions offer energy management functionality whilst achieving other outcomes simultaneously. Internet of Things (IoT) platforms, for instance, consolidate a range of data sources to monitor and optimize entire building performance, and these data can be utilized to identify erroneous and irregular energy consumption and behaviour. Buyers should be aware of the primary use case of each software – and its vendor's heritage – to tailor their selection to their bespoke needs.
- **M&As have enriched existing capabilities and prompted vendor consolidation.**
  Larger vendors have historically gained market share and new functionality through targeted acquisitions; today, acquisitions in the energy sphere continue at pace (see Verdantix Market Insight: Financial Flows And M&As In The Energy Management Software Space). Notable recent market activity saw the sale of AutoGrid, a distributed energy resource management system (DERMS) provider, by Schneider Electric to Uplight, a utility energy management solution provider – and the acquisition of WatchWire, an energy and sustainability management software solution, by Tango. Alongside the full acquisitions of their peers, vendors have conducted targeted acquisitions to enrich their technical capabilities: for example, Johnson Controls acquired FogHorn in early 2022 and has since implemented its AI capabilities throughout the OpenBlue platform.

Buyers must prioritize integration- and connection-rich solutions, and ensure that these meet their bespoke needs

With a wealth of solutions and business models available to consumers – coupled with strong investment appetite for new deployments and solution upgrades – it is important that due diligence is given to procurement decisions and solution outcomes. Incorrect or inappropriate solution selection and installation can prove a costly error; with that in mind, buyers must remember that:

- **EMS application integrations are paramount to unlocking greater energy efficiencies.**
  Solutions that integrate with other building applications drive larger energy efficiency improvements, whilst unlocking other advantages. It is imperative to select a solution that can interact with applications such as integrated workplace management systems (IWMS), space and workplace solutions, and asset management solutions such as computer-aided facility management (CAFM) packages or computerized maintenance management systems (CMMS) (see Verdantix Strategic Focus: The Latest Wave Of CMMS Investment Is Upon Us). These integrations – particularly when best-of-breed and correctly set up – allow for insights such as the provision of data on energy per occupant. An open application programming interface (API) for inputting and retrieving data from a solution should also be a desired solution trait for buyers, as this allows for easy non-native integrations.

- **Interval data analysis mandates equipment and building system connectivity.**
  Granular insights that unlock greater energy efficiencies are offered through solutions that aggregate and analyse interval data from meters and equipment – verification of energy conservation measures is possible through IPMVP Option B at this level of detail. By comparison, utility bill data analysis – while better than no analysis at all – is flawed, as it does not offer the same level of detail: bills are often delivered in paper form, at monthly intervals, and several months after consumption has occurred. Analysis of utility data does allow for month-to-month and building-level comparisons, as well as whole-building measurement and verification (M&V) (IPMVP Option C), but it provides limited insight into the causes of increased consumption or savings. Buyers should prioritize adoption of a solution that can interact with their existing building systems to consolidate their data at the highest possible resolution.

- **Vendors offer varying degrees of managed services behind their software.**
  Energy improvement measures are now complemented by a range of managed services, to unlock greater efficiencies. Services offered by vendors range from implementation and onboarding support, through to complete energy-as-a-service (EaaS) offerings, where vendors control all aspects of a customer's energy. Naturally, these services command higher charges; however, they can be valuable to small organizations that lack workforce, as well as to large organizations that decide that developing in-house teams for portfolio-level management would not be cost-effective or important to their core business strategy. Buyers should examine their own organizational resources before commencing procurement, to select an offering that meets their desired level of support.

Review of key product enhancements

This section of the report reviews functional development trends across the energy management sphere over the past 12 months – with a particular focus on the 11 featured vendors – as well as considering the developments made by Green Quadrant vendors since our solution assessment in Q3 2023 (see Verdantix Green Quadrant: Energy Management Software 2023).

AI is being adopted en masse

Vendors have embraced AI and deployed it throughout their solution offerings (see Verdantix Market Insight: New And Emerging Applications Of AI In The Built Environment). Emerging solutions have the upper hand in this regard, as they can be entirely cloud-native and feature a data architecture suitable for AI workflows. However, established players continue to innovate and adopt this functionality. Common use cases in EMS offerings are:

- **ML (machine learning) algorithms for predictive analytics and building control.**
  Future predictions for consumption require detailed analysis of previous consumption and the factors that influenced it. ML algorithms identify dependencies between variables and can predict future events based on previous occurrences. Applied to energy management, this equates to predictive energy consumption based on varying weather, occupancy, space utilization and other metrics harnessed by modern solutions. The amount of data required for ML algorithms to produce accurate results varies; CIM's ML engine, for example, requires only a few weeks of building data to identify relationships between equipment and building use and subsequently to predict future energy consumption – and the models become more accurate as they are exposed to more data. Similarly, JLL's Hank uses ML to enact predictive control of HVAC equipment at a micro level; after a two-week training period, the solution varies control signals to ensure energy efficiency without compromising occupant comfort.

- **Natural language processing (NLP) for conversational interaction with solutions.**
  Solutions are beginning to incorporate (or vendors are releasing) conversational chatbots for users to interface with solutions. 75F released its Saffron AI tool in late 2023; customers can pose conversational requests for information and control changes within their sites that utilize the solution. NLP does not necessarily enrich EMS solutions from a functional point of view, but it does greatly improve the usability of solutions and the user experience, and may mitigate staff shortages and skills gaps. As large language models (LLMs) become trained on energy-management-related data, we will see more of these chatbots come to market.

- **Computer vision for automatic processing of visual information.**
  Computer vision as an aspect of functionality is still nascent in the sphere of energy management, due to the fact that energy data are typically already available in digital form, and visualization through computer vision is therefore not generally required. However, utility bill processing functionality from some vendors has been enriched by computer vision that automatically identifies bill information and imports it into the solution. An example solution with this functionality is EnergyCAP's Bill CAPture component within its Utility Management solution, which identifies and ingests information from both digital and printed bills. Accruent plans to release similar functionality in the coming year for its EMS offering.

Vendors are rushing to incorporate carbon management capabilities

With European emission reporting regulations coming into effect, alongside the SEC's approval of its Climate Disclosure rule – albeit only for Scope 1 and 2 emissions tracking – buyers urgently need to take stock of the emissions associated with their building operations and energy consumption. EMS vendors are perfectly placed to address this demand, and are:

- **Incorporating carbon accounting functionality within their solutions.**
  Vendors are incorporating global emissions libraries in their solutions to allow for the instant calculation of carbon emissions associated with energy consumption at a whole portfolio, or granular equipment level. This allows users to easily perform comparisons between buildings and equipment in their portfolios, for benchmarking purposes. METRON offers a database of more than 20,000 anonymized buildings to users of its solution; customers can visualize historical building energy performance and subsequent carbon impacts for comparison against similar asset types and locations.

- **Providing templates for easy reporting.**
  Reporting to international standards requires data to be consolidated and formatted in certain ways, and vendors have released functionality to streamline this data processing for users. Atrius from Acuity Brands offers preconfigured dashboard templates out of the box for users for reporting against CDP, CSRD, GRESB and the Global Reporting Initiative (GRI), while Infogrid has a bespoke function that exports data from the solution into the GRESB Asset-Level worksheet. Such dashboards and export functionality ease the workload for corporate sustainability teams and allow for consistent and validated emissions calculation. They also require sustainability and facilities teams to be aware of one another's needs, which in itself may improve energy and carbon performance.

- **Forming partnerships with consultancies.**
  As corporate firms prioritize both achieving their net zero plans and complying with regulatory emission reporting requirements, they are increasingly turning to consultancies to plan their approach. Vendors are beginning to form partnerships with consultancies to put solutions within easy reach of customers. In early 2024, EY announced that it had formed a new global collaboration with IBM regarding its Envizi offering. Envizi, originally a building energy management software solution, has been enriched since its acquisition by IBM to encompass social and governance functionality (alongside the 'environmental' in ESG). We will likely see more of these partnerships as consultancies' sustainability client bases grow and their clients demand technical solutions, rather than simply strategic guidance.

Findings from the 2023 Verdantix Green Quadrant for EMS

In the Verdantix 2023 Green Quadrant analysis (see Verdantix Green Quadrant: Energy Management Software 2023) we identified and benchmarked 15 leading vendors of EMS in the market. This research was conducted over a five-month period, with vendor solutions assessed in August and September 2023. With a reasonably significant amount of time for vendors to release new functionality since publication of the Green Quadrant, Verdantix reached out to all participants to enquire about their new and upcoming developments since December 2023 (see **Figure 4**).

Figure 4

Green Quadrant vendor solution updates and upcoming releases

Vendor	Features released since GQ assessment	Upcoming feature releases
ABB	• New UI and UX dashbaord with comparison visualizations	
Accruent	• ENERGY STAR Potfolio Manager implementation, with support for certification and accreditation • Energy-saving recommendations delivered to users based on building type and ENERGY STAR rating	• Business Intelligence (BI) reporting enhancements • Broadening of energy data ingestion methods with new APIs • AI-powered paper bill processing
Bueno Systems	• Launch of 'deployment app' to manage incoming data streams to the solution, to make it easier for customers to install the solution themselves, rather than relying on direct vendor support	• New graphical interface that provides AI-driven equipment tagging suggestions, reducing self-serve onboarding and solution implementation time by up to 50%
EnergyCAP	• Bill processing functionality, allowing for the management of payments direct to utility providers	
Johnson Controls (JCI)	• ENERGY STAR Portfolio Manager support • EV station charging management • Increased number of utility provider automation APIs supported, to improve resiliency and redundancy of utility bill data • Support for autonomous control of ground-source heat pumps – compatible with both JCI and non-JCI equipment	• EV station charging control due this year, to further visualization and analysis • Metadata tagging overhaul, for easy reporting against different standards and varying terminologies • Increased integration with FM:Systems for occupancy-contextualized energy data
Siemens	• Global release of Building X Sustainability Manager • Increased rollout of solutions to new countries • Functionality support for local legislation and reporting requirements, e.g. NY Local Law 97 • New global sustainability target and certification tracking functionality • Enriched AI and ML capabilities for forecasting and other solution features	• UI refinements • Increasing the number of supported APIs to enable customers to co-create with the vendor
Spacewell	• New equipment-level analysis pages, to provide greater detail	• Automatic portfolio-level calculation of Scope 1 and 2 carbon emissions from energy data • Automatic portfolio-level calculation of solar PV production figures • New energy analytics functionality, with visualization refinement and multi-parameter comparison

Source: Verdantix analysis

Inclusion criteria for the 2024 Buyer's Guide to EMS

In a mature market segment such as EMS, there are hundreds of solutions available to buyers, with varying functionality and maturity. For this report, Verdantix has endeavoured to capture a significant proportion of the EMS market and has produced a list of 76 vendors (see **Figure 5**), which buyers should utilize to assess relevant solutions. The information contained within this list is derived from a mix of vendor-completed questionnaires, publicly available data, and information previously provided to Verdantix. Alongside this, we cover 11 EMS suppliers in dedicated profiles in this study. These 11 vendors:

- **Offer at least four out of the six EMS functionality areas.**
  Providers must have functionality that spans four out of the six functionality areas. Participating vendors indicated that they provided some capabilities within these categories.
- **Did not feature in the Verdantix 2023 EMS Green Quadrant.**
  With the recent publication of the Green Quadrant report in December 2023, and this report seeking to complement this previous analysis, we did not invite vendors that participated in the Green Quadrant to be included in this Buyer's Guide in the form of a dedicated solution profile. Verdantix encourages buyers to read the Green Quadrant report, to supplement this Buyer's Guide, to better understand the capabilities and market momentum of the assessed 15 Green Quadrant vendors (see Verdantix Green Quadrant: Energy Management Software 2023).
- **Have over 50 employees.**
  This Buyer's Guide profiles software providers with at least 50 employees. This ensures that featured vendors have the resources necessary to meet the energy management requirements of large, multi-site enterprises.

Based on these criteria – and vendor willingness to participate in this research exercise – this report provides profiles of 75F, Acuity Brands (Atrius), CIM, E.ON, JLL (Hank), Infogrid, KODE Labs, Metrikus, METRON, Uplight (AutoGrid) and Verdigris.

Other vendors that feature in the main report table and met these criteria were approached with regard to featuring in a dedicated profile; however, they either declined to participate or did not respond within the timeframe for publication. As such, they have not been profiled.

Figure 5
List of EMS solution providers

	Functionality											
Vendor	Energy procurement & risk management	Utility bill management	Energy monitoring & reporting	Operations & control	Carbon management	Project management	EMEA	Americas	APAC	Employees	HQ	Founded
75F		X	X	X	X		◑	◑	●	201-500	Minneapolis, MN	2012
ABB	X	X	X	X	X	X	●	◑	◑	10k+	Zurich, Switzerland	1988
Accruent	X	X	X	X	X	X	◑	●	◑	1k-5k	Austin, TX	1995
aedifion			X	X	X		●	◑	◑	51-200	Cologne, Germany	2017
Ameresco		X	X	X	X	X	◑	●	○	1k-5k	Framingham, MA	2000
Atrius (Acuity Brands)		X	X		X	X	◑	●	◑	10k+	Atlanta, GA	1892
Beeldi			X			X	●	○	○	11-50	Paris, France	2017
BrainBox AI		X	X	X	X		◑	●	◑	51-200	Montreal, QC	2017
Bueno Systems			X	X	X	X	◑	◑	●	11-50	Melbourne, VIC, Australia	2013
BuildingMinds			X		X	X	◑	◑	◑	51-200	Berlin, Germany	2018
C3 AI		X	X	X	X		◑	●	◑	1k-5k	Redwood City, CA	2009
Carrier			X	X	X	X	◑	◑	●	10k+	Atlanta, GA	1915
CIM			X	X	X	X	◑	◑	●	51-200	Sydney, NSW, Australia	2013
Clockworks Analytics			X	X	X		◑	●	◑	11-50	Boston, MA	2008
Cloudfm Mindsett			X	X		X	●	◑	◑	51-200	Colchester, UK	2011
CopperTree Analytics			X	X	X		◑	●	◑	11-50	Surrey, BC, Canada	2012

Figure 5 (continued) ↓

Figure 5 (continued)

Cortex Sustainability Intelligence			X	X			○	●	○	11-50	Nashville, TN	2014
dataArrows			X	X			○	●	○	2-10	Boston, MA	2019
Datakwip			X	X			○	●	○	2-10	Frederick, MD	2015
Eaton	X		X	X			◑	●	◑	10k+	Dublin, Ireland	1911
Encycle			X	X			◑	●	○	51-200	San Marcos, CA	2005
Enel X	X	X	X	X			●	◑	◑	1k-5k	Rome, Italy	2017
Energy Advantage		X	X		X		○	●	○	51-200	Burlington, OT, Canada	1996
EnergyCAP	X	X	X	X	X	X	◑	●	◑	51-200	State College, PA	1982
Energy Elephant		X	X		X	X	●	◑	○	11-50	Dublin, Ireland	2015
ENTO			X	X	X	X	●	◑	○	11-50	Aarhus, Denmark	2019
Entronix		X	X	X			○	●	○	11-50	Frisco, TX	2014
E.ON Optimum		X	X	X	X	X	●	○	○	10k+	Coventry, UK (Essen, Germany)	2000
Eptura		X	X	X	X	X	◑	●	◑	1k-5k	Atlanta, GA	1991
Fabriq			X		X		●	◑	○	11-50	London, UK	2011
Facilio		X	X	X	X	X	●	◑	◑	51-200	New York, NY	2017
Faradai Energy	X	X	X	X	X	X	●	○	◑	11-50	London, UK	2017
GridDuck			X	X	X		●	○	○	2-10	London, UK	2015
GridPoint		X	X	X	X	X	○	●	○	51-200	Reston, VA	2003
Hark Systems			X	X		X	●	◑	○	11-50	Leeds, UK	2016
Honeywell	X	X	X	X	X	X	◑	◑	◑	10k+	Charlotte, NC	1906
IBM (Envizi)		X	X		X	X	◑	◑	◑	10k+	Armonk, NY	1911

Figure 5 (continued) ↓

Figure 5 (continued)

ICONICS		X	X	X			◑	●	◑	51-200	Foxborough, MA	1986
inavitas			X		X		●	◑	◑	51-200	Ankara, Turkey	2012
Infogrid		X	X	X	X	X	●	●	○	51-200	London, UK	2018
JLL			X	X	X	X	◑	●	◑	10k+	Chicago, IL	1999
Johnson Controls	X	X	X	X	X	X	◑	◑	◑	10k+	Cork, Ireland	1885
KODE Labs	X	X	X	X	X	X	◑	●	◑	51-200	Detroit, MI	2017
mCloud Technologies	X		X	X	X	X	◑	●	◑	201-500	Vancouver, BC, Canada	2016
Measurabl		X	X		X		◑	●	◑	201-500	San Diego, CA	2013
Metrikus		X	X	X	X		●	◑	◑	51-200	London, UK	2019
METRON	X	X	X	X	X	X	●	◑	◑	51-200	Paris, France	2013
MRI Software	X	X	X	X	X	X	◑	●	◑	1k-5k	Solon, OH	1972
Myrspoven			X	X	X		●	◑	○	11-50	Stockholm, Sweden	2017
Nordomatic (Spica Technologies)			X	X		X	●	◑	○	51-200	Birmingham, UK	2014
Optergy		X	X	X			◑	◑	●	51-200	Silverwater, NSW, Australia	2004
Optima Energy		X	X		X		●	○	○	11-50	London, UK	~1995
Optimum Energy			X	X			○	●	○	51-200	Seattle, WA	2005
Panoramic Power			X		X		◑	◑	◑	11-50	Tel Aviv, Israel (Windsor, UK)	2009
PassiveLogic			X	X		X	○	●	○	51-200	Salt Lake City, UT	2016
Phoenix Energy Technologies		X	X	X	X		○	●	○	51-200	Irvine, CA	2004
Planon	X	X	X		X	X	●	◑	◑	1k-5k	Nijmegen, The Netherlands	1982

Figure 5 (continued) ↓

Figure 5 (continued)

Powerhouse Dynamics			X	X			○	●	○	11-50	Boston, MA	2009
Prescriptive Data		X	X	X	X	X	○	●	○	11-50	New York, NY	2013
R8 Technologies			X	X	X	X	●	◑	○	11-50	Tallinn, Estonia	2017
REsustain		X	X	X		X	●	○	○	11-50	London, UK	2021
Schneider Electric	X	X	X	X	X	X	◑	◑	◑	10k+	Paris, France	1836
Siemens	X	X	X	X	X	X	●	◑	◑	10k+	Munich, Germany	1847
SkyFoundry		X	X	X		X	◑	●	◑	2-10	Glen Allen, VA	2009
Smarkia		X	X				●	○	○	11-50	Leon, Spain	2011
Spacewell Energy	X	X	X	X		X	●	◑	◑	51-200	Barcelona, Spain	2007
Spectral Energy	X	X	X	X	X		●	○	○	51-200	Amsterdam, The Netherlands	2016
Stark		X	X		X		●	○	○	501-1k	Buffalo, NY	1989
Switch Automation		X	X	X	X	X	◑	◑	●	51-200	Denver, CO	2012
Tango		X	X		X	X	○	●	○	275	Dallas, TX	2008
Thing-it			X	X	X	X	●	○	○	11-50	Frankfurt, Germany	2015
Uplight (AutoGrid)	X	X	X	X		X	◑	●	◑	501-1k	Boulder, CO	2004
Verdigris			X	X	X	X	◑	●	◑	51-200	Moffett Field, CA	2011
Vitality		X	X				○	●	○	11-50	Murray, UT	2013
Willow			X	X	X		◑	◑	●	201-500	Sydney, NSW, Australia	2017
Zenatix			X	X			◑	○	●	51-200	Gurgaon, India	2014

An X indicates the vendor has some evidence of functionality within each category

Verdantix recommends that buyers engage directly with vendors to understand the scope of their fuctionality within these categories

Highlighted information is calculated by Verdantix and is based on office location, case studies and other public information

Verdantix recommends that buyers engage directly with vendors to understand their geographical presence

Strong presence (~ >50%)	●
Some presence (~ <50%)	◑
Limited/no presence	○

Source: Verdantix analysis

Planon's Energy and Sustainability module aggregates from multiple data sets to offer cross-portfolio benchmarking

Founded in 1982 and headquartered in Nijmegen, the Netherlands, Planon has built up a global presence as an integrated workplace management system (IWMS) provider that aims to improve efficiency, while reducing costs, by managing real estate, facilities, project and operational data, including information from the Internet of Things (IoT), in its range of modules. In recent years, it has evolved into a connected portfolio intelligence platform (CPIP) with functionality such as automated IoT data aggregation and analysis and real-time operational insights. These advancements – alongside the strategic acquisition of French energy management software provider Ubigreen – have led to the development of Planon's Energy & Sustainability Management module, which harnesses utility and metering data alongside building management system (BMS) connectivity to provide buyers with comprehensive energy management functionality and help them achieve their carbon reduction goals. The solution is utilized by customers worldwide across various sectors; users are predominantly Europe-based, and owners/occupiers of corporate, retail, public and healthcare real estate. Verdantix finds that Planon's solution:

- **Aggregates data from a range of sources to provide buyers with a single source of truth.** Planon's solution offers advanced data aggregation capabilities, ingesting data from various sources and technical architectures. Equipment and meter data, alongside IoT device information, enter the solution through configured gateways on a customer's BMS network – or through physical radio modules (IoT) and gateway devices, where BMS network ports cannot be opened or are absent. The solution also boasts native integrations with utility providers to automatically receive utility consumption data. This broad capture of data presents users of the solution with a single source of truth for their portfolio operations, allowing for robust data governance and audit-ready information.
- **Offers customizable dashboards and report generation for easy cross-portfolio benchmarking.** To supplement its aggregation capabilities, Planon has developed a fully customizable suite of dashboarding and report generation functionality, which customers can use to create their own visualizations in a no-code manner. Out-of-the-box dashboards are configured, allowing for the visualization of cross-portfolio energy and emission data trends, as well as contextualized data against contract and invoice information – including real estate and utility data – which the solution holds, thanks to its IWMS heritage. Visualizations are continuously updated with dynamic real-time data, allowing for accurate carbon, energy and financial reporting.

Planon plans to enrich its current functionality by:

- **Broadening the solution's integrations for data ingestion and exporting.** Planon aims to release a new application programming interface (API) termed 'Exposure', which will build on its existing export functionality for enterprise resource planning (ERP) systems. This will allow customers to connect aggregated emissions data within the solution to various industry benchmark and reporting frameworks, such as the European Sustainability Reporting Standards (ESRS) and GRESB, accelerating customer workflows and streamlining carbon reporting. In addition, Planon plans to enrich its utility provider connection capabilities with new international energy provider interfaces, allowing more utility data to be natively ingested by the platform. These new integrations will supplement those already productized with SAP and Schneider Electric.
- **Incorporating machine learning (ML) for advanced analytics.** The solution is set to embrace new ML analytics as part of the firm's roadmap, bringing functionality such as equipment predictive maintenance to customers, along with advanced analytics. ML-driven algorithms will be deployed across the data aggregated by the solution, allowing for deeper insights not only into energy consumption, but into carbon emissions and costs – and, crucially, the interaction and relationships between these.

Figure 6

Planon solution overview

Category	Attributes	Details
Vendor overview	Vendor name	Planon
	HQ	Nijmegen, the Netherlands
	Founded	1982
	Employees	1,100
EMS offering	Solution name(s)	Planon Energy & Sustainability Management
	Functionality	Energy procurement Utility bill management Energy monitoring & reporting *Operations & control (limited)* Carbon management Project management
	Services offering	Expert services offered in conjunction with the solution, covering installation, customization and ongoing support
	Differentiating features	Fully integrated solution for real estate and facilities management, with cross-functionality unified data management for easy portfolio-level reporting, and contextualized metrics Open system architecture and configuration flexibility, allowing customers across industries to deploy the solution on their existing technology stack Tailored functionality for building operators and owners, including the smart distribution of service costs based on elements beyond floor area
EMS customer footprint	No. of customers	115
	Location of customers	Americas: 12% APAC: 5% EMEA: 83% (Europe: 80%)
	Asset type focus	Commercial; retail; healthcare
	Typical deployments	Full solution deployment
	Example customers	ADP Group, Assistance Publique – Hôpitaux de Paris, SG Group

Source: Verdantix analysis

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Contact

Verdantix Ltd, 30 Stamford Street, London SE1 9LQ, United Kingdom

contact@verdantix.com

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