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Energy Data Management System Commercial Product Summary

September 2017

KM Fowler
C Anderson
BE Ford



Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Richland, Washington 99352

Acronyms

DOE	Department of Energy
EISA	Energy Independence and Security Act
EPAct	Energy Policy Act
EUI	energy use intensity
FEMP	Federal Energy Management Program
HVAC	heating, ventilation, and air-conditioning
OAT	outdoor air temperature
PNNL	Pacific Northwest National Laboratory
SaaS	software-as-a-service

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Introduction

The Department of Energy's (DOE) Federal Energy Management Program (FEMP) published guidance (DOE 2014b) to clarify the Federal building metering requirements established in the Energy Policy Act of 2005 (EPAct), the Energy Independence and Security Act of 2007 (EISA), and the 2015 Executive Order 13693 - Planning for Federal Sustainability in the Next Decade. These requirements include that Federal agencies are to have installed electricity, natural gas, steam, and water meters on all (appropriate) Federal buildings, incorporated the usage data into Federal energy tracking systems, and made the data available to Federal facility managers. In addition to the guidance document, FEMP issued a metering best practices guide (Parker, et al 2015) to facilitate Federal agencies to achieve potential energy and water savings using meter data. While working to meet these requirements, Federal agencies have expressed that managing metered data has been a challenge for a variety of reasons, including:

- Determining whether to *develop* an agency-level system or *purchase* a commercially available energy data management system
- *Funding* the development or purchase of an energy data management system
- Finding available *staff time* to manage data management system and analyze the data
- Providing *training* to staff to maintain the data management system
- Addressing agency *information technology/cyber security concerns*
- Performing monthly data analysis to identify efficiency opportunities

To address the challenge of identifying potentially viable energy data management systems, this report offers a comparative review of commercially available energy data management systems. Federally-developed tools were addressed in a previously published FEMP sponsored report *Federal Metering Data Analysis Needs and Existing Tools* (Henderson & Fowler 2015). This review of commercially available systems was performed without contacting developers or users of the systems, but rather a review of the features publicly available. The inclusion of a system in this document should not be interpreted as an endorsement of the product by FEMP. Data management is a rapidly growing field, thus this report does not cover all currently available commercial systems. The review structure provided in this document could be used to review additional energy data management systems.

Energy Data Management Systems include hardware, software, and communication systems to enable the collection, storage, and analysis of metered energy data.

Energy Data Management Systems

Energy data management systems have five main components: meters, data acquisition, communication service, data storage, and data analysis. **Meter** refers to the metering hardware installed to measure energy and water consumption in a building. **Data acquisition** refers to the hardware and associated communications equipment and protocols used to transfer data from the meters to a data acquisition system at the facility. At specified intervals, the data acquisition system transmits the data via a **communication service** to some form of **data storage** where the data are processed and warehoused. **Analysis** is then performed to extract meaningful information from the data, performing analytical calculations on the query and displaying the results in user-friendly formats.



Meters

Energy meters include the hardware installed to measure energy consumption. There is a range of metering technologies available, with varying measurement capabilities. The most basic meters simply measure energy consumption as it passes through the meter, while more sophisticated meters can track peak demand, measure power quality, and more. Meters vary in size, type, accuracy, and price (Parker, et al 2015).

Whole-building metering means that meters are installed at the source before a utility is distributed to various end uses within the building. Sub-metering refers to metering of the energy and water systems within a building. Sub-metering can be implemented at various levels, from building systems (e.g., heating, ventilation, and air conditioning [HVAC], lighting), to branch circuits serving specific areas or loads, to individual equipment such as boilers and chillers. Sub-metering allows energy managers to disaggregate overall energy usage and identify specific drivers of energy and water consumption within a building.

Federal law requires that, at a minimum, agencies must measure the whole-building consumption of electricity, natural gas, water, and steam, where appropriate and cost-effective. (DOE 2014b)

Data Acquisition

Data acquisition refers to the hardware and associated communications equipment and protocols used to transfer data from the meters to a data acquisition system. The data acquisition system may be an individual unit or part of a building automation system. The data acquisition system coordinates the collection of interval data from all of the meters in the building and prepares the combined data for transfer to a data storage system.

Communication Service

Communication service is the wired or wireless transmission of data from the data acquisition system at regular intervals to a data storage system. The communication service can be combined with the data acquisition system. The communication service is one of the elements of the energy data management system that likely has agency information technology and cyber security personnel involved in the selection and operation of the system.

Data Storage

A data storage system allows for the collection and long-term warehousing of energy data. A centralized data storage system allows for the collection of data from buildings across the agency portfolio to enable subsequent energy data analysis. For data to be useful for analysis, the data need to be ‘processed’ according to validation, estimation, and editing rules which address potential data quality challenges such as missing observations and anomalous measurements (Fowler et al, 2015). Depending on an agency’s data ownership requirements, data may be hosted on the agency’s internal servers and maintained by agency staff or the data may be hosted on a vendor’s servers and maintained by the vendor (software-as-a-service, SaaS).

Analysis

Meter data are only useful if they can be transformed into actionable information capable of guiding energy managers’ decision making and influencing building occupants’ behavior. The final component of a meter data management system is analysis, in which meaningful information is extracted from the data, typically using a web- or application-based front-end client capable of issuing queries to the data storage system, performing analytical calculations on the query results, and displaying those results in a variety of visual formats.

Meter data management systems range in their analytical capabilities, from simple systems that track key performance metrics and provide limited tabular and graphical displays of data, to systems capable of integrating a vast number of data sources and third-party platforms, performing advanced energy and cost modeling, and displaying analysis results with a suite of customizable visualizations.

Commercial Tool Review

Some Federal agencies have developed their own energy data management systems, such as the General Services Administration's Energy Use Analysis System. These tools were developed for their specific needs, using internal resources and are not intended for use by others. There have been some Federally-developed energy data management systems and related tools intended to be used by other Federal agencies, such as ENERGY STAR Portfolio Manager (U.S. DOE. 2014a). As mentioned earlier, a summary of those tools can be found in the *Federal Metering Data Analysis Needs and Existing Tools* report (Henderson & Fowler 2015). The purpose of this report is to provide a review on the commercially available energy data management system tools.

Key Energy Data Management System Parameters

There are many system features highlighted by vendors of commercially available energy data management systems. When determining which features best suit your Federal agency consider the key needs of your building operators and campus/agency managers, and look for systems that can provide quick, action-based analysis of interval data. When evaluating commercially available systems or developing new systems consider who will be using the system and what are the energy analysis, data management, and reporting needs. The features used to compare the commercial energy data management systems in this report include:

- Style of *data storage*
- Quality of *user interface*
- *Benchmarking* capability
- *Interval data analysis* capability
- *Financial analysis* capability
- Use of *alarm and notification* techniques
- *Advanced analytics* capability
- *Demand response* capability
- Ability to *control* or *manage* the building systems

These features were selected because they exist in many of the systems currently on the market. It is understood that not all of these features are of interest to all Federal energy managers, thus a tool that doesn't appear to have strengths in all of these features may be suited for an agency's needs. Each feature is described in detail below.

Data Storage

There are two common data storage options found in commercially available energy data management systems: on-site storage and software-as-a-service (SaaS). On-site storage can be managed by the Federal agency personnel or vendors. SaaS is a platform offered by many energy data management system vendors. The SaaS software delivery model has software licensed as a subscription service and the vendor manages data storage, security, and upgrades for the customer. The requirement of the SaaS model to transmit energy and water data to external servers over the public internet will require agencies to consult with their information technology and cyber security personnel before selecting this option.

User Interface

The user interface is the front-end display through which the user accesses the energy data, visualizations and analyses. The typical user interface will present the user with a dashboard summarizing key performance metrics and trends across the user’s portfolio of buildings. The user interface also provides access to a variety of analysis and support features, such as report scheduling, data import/export, and interface customization options.

Dashboards are displays that contain an arrangement of summary graphics on various trends and key performance indicators. They may be designed for an individual building or scaled up to report across an entire portfolio. They allow a building operator to gain rapid insight into building performance and potential operational issues and can be configured as a public informational display for building occupants.

Benchmarking

Federal agencies are required to use the ENERGY STAR Portfolio Manager to benchmark their buildings (DOE 2014a). Energy managers may be interested in performing additional benchmarking such as comparing performance to industry standards for similar buildings. Examples of benchmarking graphics are provided below.

Aggregated benchmarking graphs compare measures of building performance, such as energy use intensity (EUI), across a portfolio. Benchmarking graphs can help to identify buildings with high overall consumption relative to a baseline such as portfolio average. Figure 1 offers an example of a benchmarking graph. In this example building performance is being compared across a portfolio of similar buildings. The graph shows that “Building 2” is not performing as well as the other buildings in the portfolio.

Benchmarking is the practice of accounting for and comparing a metered building’s current energy performance with its energy baseline or historical performance, or comparing a metered building’s energy performance with the energy performance of similar types of buildings.
(DOE 2014a)

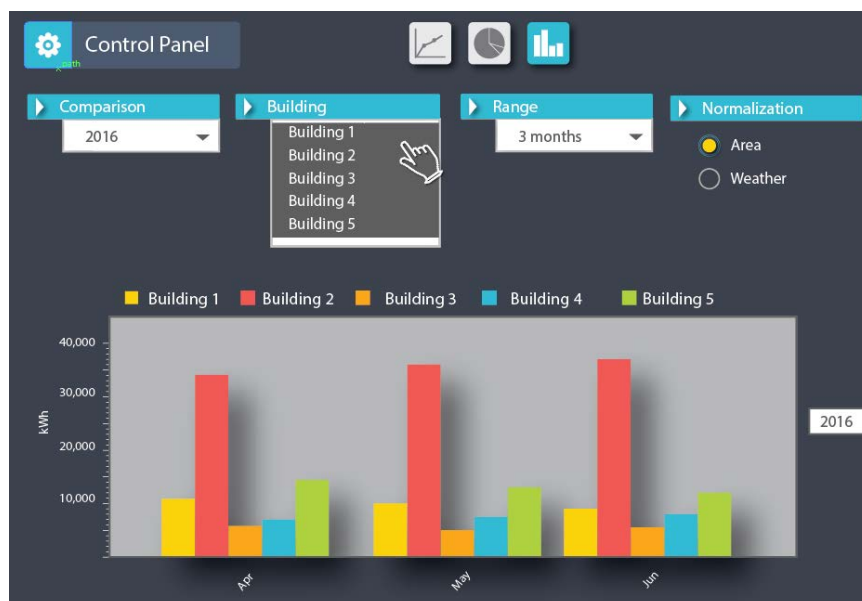


Figure 1 – Example Aggregated Benchmarking Graph

Portfolio view offers a quick snap shot of building portfolio, functioning like a rectangular pie chart. In Figure 2 each rectangle represents a building, and the size of each rectangle represents its contribution to the site-level energy use. The color of each rectangle indicates the building’s performance relative to a user-defined time period (last month, for example). In this example “Building 1” is not performing as well as the other buildings in the portfolio and is also using more energy than the other buildings.



Figure 2 – Example Portfolio Graph

Savings estimation encompasses a range of calculations comparing a building’s actual performance to some other measure of performance, such as a defined baseline or the building’s previous performance for a corresponding period. Savings estimates can be calculated to identify deviation from defined baselines, perform project measurement and verification tracking, and support what-if scenarios. Figure 3 shows lighting energy use for the current year compared to the previous year. In this example the building used less lighting energy over the year, but had higher lighting use in the month of August.

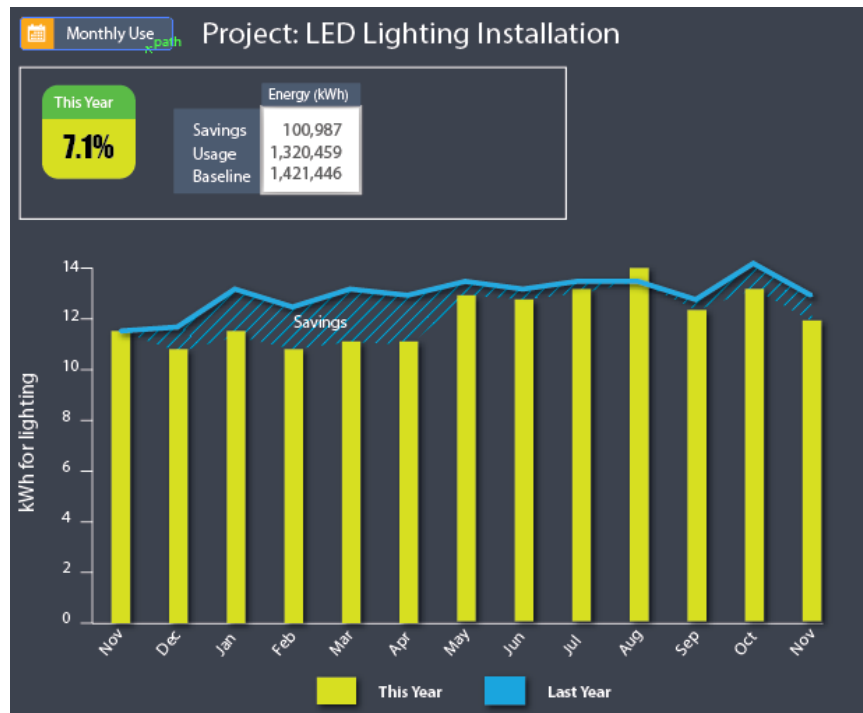


Figure 3 – Example Savings Estimation Graph

Normalization uses metadata and external time series data, such as building area and outside air temperature (OAT), to standardize performance measures for comparison of buildings across a portfolio. Figure 4 offers an example graph of how normalization can be used to inform benchmarking analysis. The image on the left compares 2 years of energy data without weather normalization. This image implies the current year's energy use is higher than it should be compared to the previous year. The image on the right shows the two years of data normalized for the weather. Weather normalization is useful when comparing different years of data, and it can also be used to compare buildings in different climate zones.

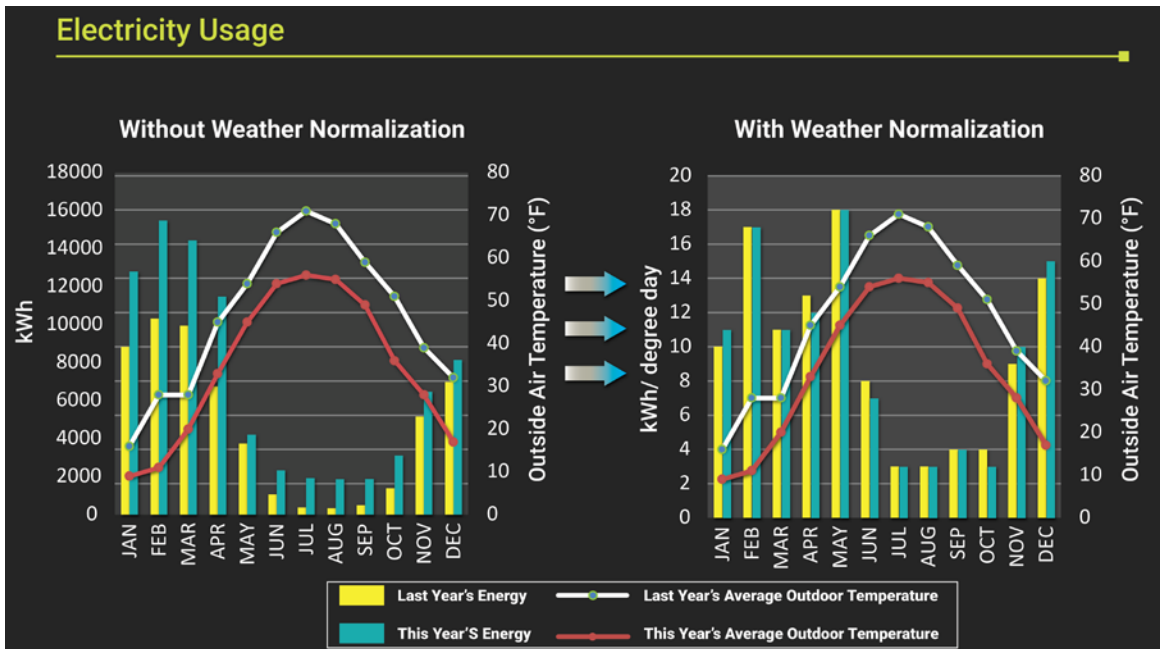


Figure 4 – Example Normalization Graph

Interval Data Analysis

Meter interval data are time-stamped measurements that can be displayed on a time series plot. Visual investigation of utility time series data allows users to identify one-time or recurring usage spikes, patterns in daily consumption, and seasonal and longer-term trends.

Time series plots display meter interval data over a specified time period. They may include options to overlay time series data from other sources (e.g. OAT) and to plot actual performance against historical or user-defined trends.

Consumption profiles display average utility consumption profiles for a specified interval, e.g., day of the week, weekday/weekend, month; may include option to plot against comparison curves like defined baseline and portfolio average. Consumption profiles aid in visual identification of patterns of performance, such as high baseloads and early building startup. Figure 5 shows a daily load consumption profile comparing multiple days in the same building. This type of image could be used to identify energy efficiency opportunities and to document energy savings after energy conservation measures have been implemented.



Figure 5 – Example Consumption Profiles Graph

Heat maps are grid displays of a building’s hour-by-hour energy consumption over a specified interval, with days on one axis, hour-of-day on the other, and each cell’s color proportional to hourly consumption. Heat maps can help users identify unusually high consumption during unoccupied hours. The heat map in Figure 6 shows that the HVAC system was left on overnight.

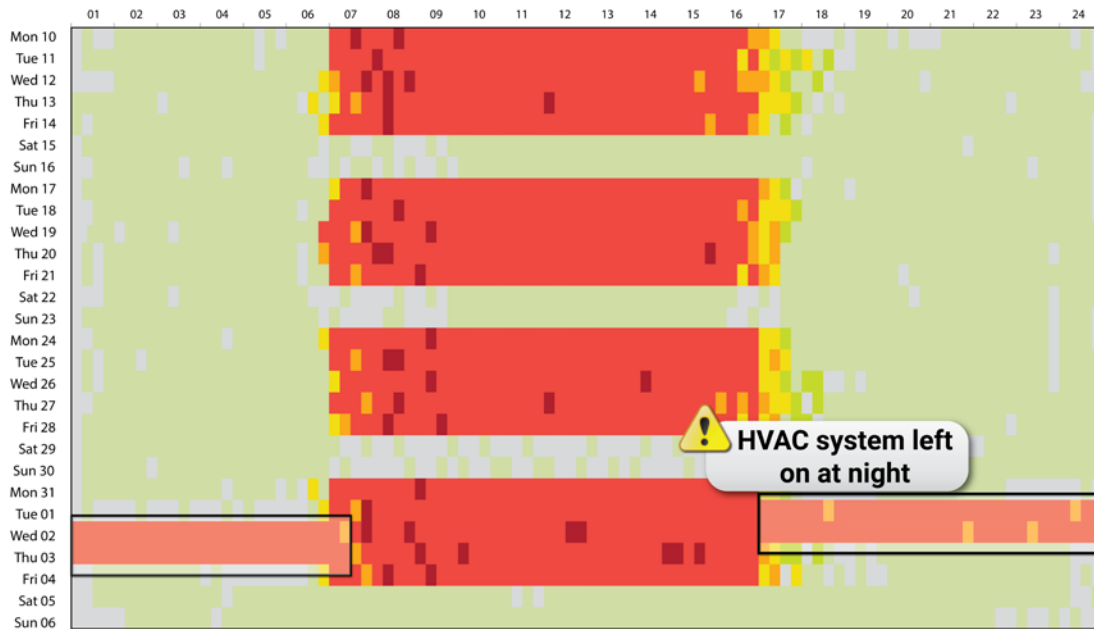


Figure 6 – Example Heat Map Graph

Financial Analysis

Financial analysis combines energy and water use data with utility tariff schedule information to estimate the cost of energy and water consumption. Cost estimation can be used track which buildings have the highest operating expenses for utility bill verification and for project cost savings estimations. Figure 7 shows the utility tariff costs which could be used to target energy conservation measures that could reduce overall costs.



Figure 7 – Example Financial Analysis Graph: Utility Tariff Schedule

Figure 8 compares the the total energy costs between different buildings.

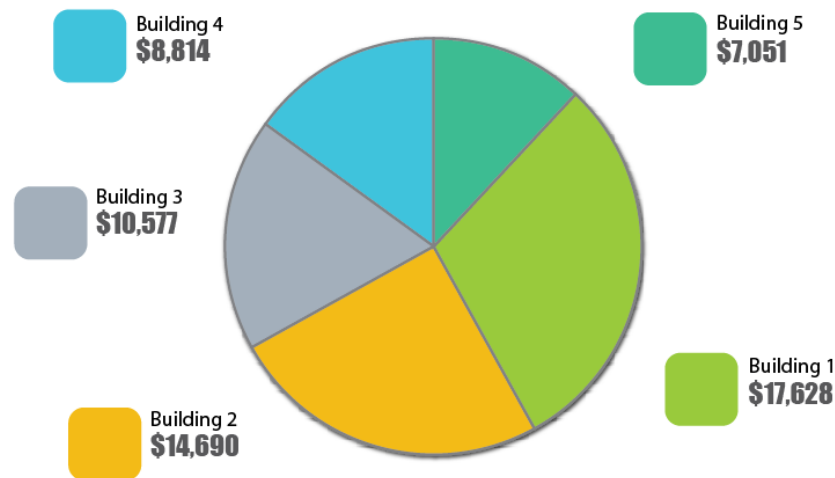


Figure 8 – Example Financial Analysis Graph: Building Energy Cost Comparison

Advanced Analytics

Beyond basic analytical capabilities such as benchmarking and savings estimation, many energy data management systems offer a range of more advanced analysis options. A few examples are discussed below.

Scatter plots allow the user to visually investigate the relationship between building energy performance-related variables, such as energy consumption and OAT, holding time constant.

Regression analysis comprises a set of statistical modeling techniques to estimate the significance and strength of relationships between variables. A common application of regression analysis to building meter data is energy savings estimation using weather-normalized energy consumption models.

Predictive modeling can use traditional building energy modeling, machine learning algorithms, and other advanced techniques to predict future energy and water performance.

Alarms and Notifications

Energy data management systems are often configurable to alert the user when abnormal conditions are detected; for example, if electricity demand exceeds a pre-defined threshold or if utility consumption is sustained above a certain level during nighttime hours. Delivery methods for alarms and notifications can be customized based on the time-sensitivity and severity of the condition detected. Figure 9 shows how an alarm or notification would be present when energy usage occurs outside of normal work hours.

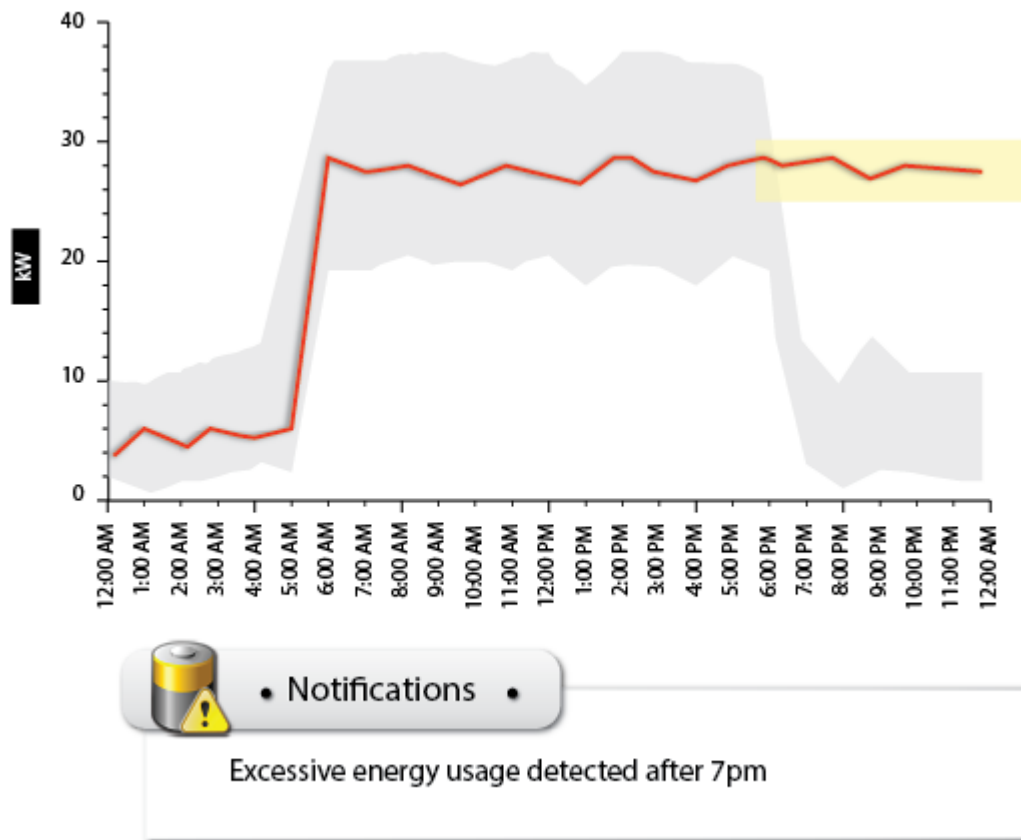


Figure 9 – Example Notifications Graph

Demand Response

In addition to providing interval data which can be used to track peak demand occurrences, some energy data management systems are capable of gaining insight into what is driving the peaks. Demand response is determining what equipment is on when the peaks occur. At more advanced levels it involves applying that knowledge to develop control strategies to mitigate demand spikes by load shedding and peak shaving and in some cases interfacing with the control system to maintain a predetermined peak threshold.

Building Control System Management

Some energy data management systems are capable of integrating with existing building automation systems to adjust equipment operating parameters directly from the energy data management system user interface. Control management is a less common feature of energy data management system, which are designed to serve primarily as reporting and analysis tools.

Commercial Tool Summary

Energy data management systems developed by 34 companies are reviewed in this document. The list of products should not be viewed as a comprehensive market study of all available products, but instead a survey of the types of products available and the functionalities they tend to offer. In developing the list of products, several previous studies of existing energy data management systems were consulted, including studies by Lawrence Berkeley National Laboratory (Granderson, et al 2009), by Verdantix (Verdantix 2015), and by PNNL (Henderson & Fowler 2015). PNNL's survey of applications for its own energy data management system was also referenced. PNNL also performed a survey of available energy data management products on behalf of the Army (Ford & Anderson, 2017). Finally, some additional web searching was performed to supplement the list. As mentioned previously, this review does not cover all currently available commercial systems and no endorsement should be inferred from inclusion in this report.

Once identified as an existing product, an additional screening step was applied for a product to be selected for review, including the following requirements of an energy data management system:

- Must support a graphical user interface including benchmarking graphs
- Must support metering and metered data acquisition/storage¹
- Cannot be a broader data management system requiring extensive tailoring to support energy data management

The process of comparing products was done by surveying publicly available information from the developers' websites. Table 1 contains the review criteria definitions for each parameter. For each parameter, there are three levels of review. If a website for a product did not explicitly mention support for a given parameter, that product was given a *no star* rating. If the website mentioned a parameter at any level of detail the product was given at least a *half star*. Products given the *full star* provided significant details about the parameter on the developer's website.

Table 2 is the summary of commercially available energy data management systems aligned with the review parameters. This review is intended to provide basic information about each of the commercially available systems based on publicly available information. It is not an endorsement of any particular tool, nor is it a comprehensive list of all energy data management systems. As mentioned previously, Federal agencies or energy managers considering using a commercially available energy data management system should consider the audience, analysis needs, and information technology/cyber security requirements before selecting a system.

¹ Exceptions: Three utility billing products were included in this survey that do not support metering or automated meter data upload. These products support similar analytic functions.

Table 1 – Review Criteria Definitions

	☆	★	★
User Interface		Graphical user interface with file tree navigation.	State-of-the-art graphical user interface, liberal use of drill down lists and file trees, automatic reporting, help menus.
Benchmarking		Portfolio energy consumption comparisons, normalization by area (energy use intensity).	Configurable categorical building groupings (building type, size, region), normalization by area and weather, ranking by energy use intensity.
Interval Data Analysis	Does not support live data streams.	Graphical viewing of time series data including overlays.	Customizable time periods, historic time series data comparisons, overlays of multiple data sources and types, user-defined baselines, advanced visuals (heat mapping, calendar views, etc.)
Financial Analysis	Does not support utility billing data or rate structures.	Utility consumption data, rate structure information, energy cost estimates.	Complex rate structures, automatic utility provider data upload.
Alarms and Notifications	Does not support notifications of equipment issues or energy consumption thresholds.	User notification when energy or demand exceeds a defined threshold.	Selectable, rule-based or user-defined alarms based on energy baselines, alerts for potential meter maintenance issues, generation of graphs with no data gaps/spikes.
Advanced Analytics	Does not support project tracking or statistical analysis.	Project tracking, some statistical analysis.	Advanced statistical analysis, including regression, predictive analysis and scatter plots.
Demand Response	Not geared toward demand response.	Daily and monthly peak demand identification at any drill-down level, analysis of demand drivers.	Control of BCS to mitigate demand spikes, assistance with load shedding, peak shaving and demand control schemes.
Control Management	No integration with building controls	Integration with some building controls (e.g., thermostats).	Interfaces with BCS, adjustment of building and equipment operating parameters.

Table 2 – Review of Commercially Available Energy Data Management Systems

Tool	Developer	Data Storage	User Interface	Bench- marking	Interval Data Analysis	Financial Analysis	Alarms and Notifications	Advanced Analytics	Demand Response	Control Management
Activelogix	Periscope	SaaS/ On Site	★	★	★	☆	★	★	★	☆
aquicore	aquicore	SaaS	★	★	★	★	★	☆	☆	☆
BuildingOS	lucid	SaaS	★	★	★	★	★	☆	☆	☆
Clockworks*	KGS Buildings	SaaS	★	★	★	★	★	★	☆	☆
DEXCell	DEXMA Energy Management	SaaS	★	★	★	★	★	☆	☆	★
digitalenergy	digitalenergy	SaaS	☆	★	☆	★	★	☆	☆	☆
EEM Suite	McKinstry	SaaS	☆	★	★	★	★	☆	★	☆
Energy Analytix*	Iconics	SaaS/ On Site	★	★	★	★	★	☆	☆	★
Energy Intelligence Software	EnerNOC	SaaS/ On Site	★	★	★	★	★	☆	★	☆
Energy Worksite	Building iQ	SaaS	★	★	★	★	★	★	★	★
EnergyCAP	EnergyCAP	SaaS	★	★	★	★	★	☆	☆	☆
energyDECK	energyDECK	SaaS	★	★	★	☆	★	★	☆	☆
EnergyFlow	NOVEDA Technologies	SaaS	☆	☆	☆	★	★	☆	☆	☆
EnergyPrint	EnergyPrint	SaaS	★	★	★	★	★	☆	☆	☆
EnergyWitness*	Interval Data Systems	SaaS/ On Site	★	★	☆	★	★	☆	☆	★
enVizi	enVizi	SaaS	★	★	★	★	★	☆	☆	☆
eSightenterprise	eSightenergy	SaaS/ On Site	★	★	★	★	★	☆	☆	☆
FirstFuel	FirstFuel	SaaS	★	★	★	★	★	☆	☆	☆
GridPoint Energy Manager	GridPoint	SaaS	★	☆	☆	★	★	☆	★	★
HELios*	HELios	SaaS	☆	★	☆	☆	★	☆	☆	★
IBM Data Model	IBM	SaaS	☆	☆	★	★	★	☆	★	☆
Kaizen	CopperTree	SaaS	★	★	★	★	★	☆	★	☆
Load Profiler	Automated Energy	SaaS	★	★	★	★	★	☆	☆	☆

* Either designed to interface with a building control system or as part of a larger software suite integrated with a building control system

Tool	Developer	Data Storage	User Interface	Bench-marking	Interval Data	Financial Analysis	Alarms and Notifications	Advanced Analytics	Demand Response	Control Management
Meazon	Meazon	SaaS	★	★	★	★	★	☆	☆	☆
myMCS	MCS	SaaS/ On Site	★	★	★	★	★	☆	☆	☆
Navigator*	Siemens	SaaS	★	★	★	☆	★	★	★	★
Operational Insight*	Matrikon/ Honeywell	SaaS	★	★	★	★	★	☆	☆	★
Opus Orchestrator*	Novar	SaaS	★	★	★	☆	★	★	★	★
Panoptix*	JCI	SaaS	★	★	★	☆	★	★	☆	★
PI System*	OSISoft	SaaS/ On Site	★	★	★	☆	★	☆	☆	★
Power TakeOff	Power TakeOff	SaaS	★	★	★	☆	★	☆	★	☆
PowerLogic IonEEM*	Schneider Electric	SaaS/ On Site	★	★	★	★	★	★	★	★
Sigma Energy Management	Team	SaaS	★	☆	☆	☆	☆	☆	☆	☆
Wattics	Wattics Innovative Energy	SaaS/ On Site	★	★	★	★	★	★	★	★

* Either designed to interface with a building control system or as part of a larger software suite integrated with a building control system

Sampling of System Descriptions

This section includes a sampling of energy data management systems. The six systems summarized here were randomly selected from the full list in Table 2. No endorsement should be inferred from inclusion in this section.

Panoptix

Panoptix is an open platform, cloud-based software as a service application designed to provide energy data analytics by integrating with a building(s)' building automation system. Panoptix is a mobile solution accessible at any location by the internet. It supports a suite of apps including community sharing, reviewing comments by energy experts, and providing detailed analytics and summaries. The developer of Panoptix, Johnson Controls, is a developer of building automation systems, was founded in 1885, and employees 120,000 people in 2,000 worldwide locations.

Energy Analytix

Energy Analytix is an energy management system developed by Iconics to collect meter data and interface with the Smart Grid for rate and supply information. It includes a database of meter manufacturers and model numbers to expedite connectivity. Iconics is a developer of a suite of software applications that include building automation software which can be packaged with Energy Analytix. Iconics was founded in 1986, employees in the order of 100 people, and includes the Department of Defense in its customer base.

PowerLogic ION EEM

PowerLogic ION EEM is an enterprise energy management software that integrates with power monitoring and control systems, metering systems, SCADA systems, building and process automation systems, and utility billing systems. PowerLogic ION EEM supports data analytics as well as power quality analysis and demand response. Schneider Electric was founded in 1836, employees in the order of 200,000 people worldwide, and includes the Air Force Medical Service in its customer base.

Aquicore

Aquicore is a cloud-based SaaS energy management platform capable of integrating with whole-building meters, submeters, and sensors to deliver real-time reporting and analytics. Aquicore is marketed to real estate management professionals, and includes features for facilities and lease management, tenant billing, and accounting integration. Aquicore was founded in Washington, D.C. in 2012, and currently employs fewer than 50 staff. At the time of evaluation, there was no evidence to suggest that Aquicore has experience working directly with federal customers.

BuildingOS

BuildingOS by lucid is a cloud-based SaaS energy management platform. The platform offers a wide range of dashboard and analytics features, including GIS-based enterprise navigation, M&V analysis, and advanced machine learning-based forecasting. The company lucid was founded in Oakland, California in 2004, and currently employs fewer than 50 staff and has experience working with federal customers, including General Services Administration, the Department of Defense, Lawrence Berkeley National Laboratory, and Pacific Northwest National Laboratory.

Clockworks

Clockworks by KGS Buildings is a cloud-based SaaS energy management platform. Clockworks offers an extensive array of highly customizable modules for tracking and analyzing building energy data, and includes a module for tracking compliance with U.S. Green Building Council's Leadership in Energy and Environmental Design requirements. Clockworks allows customers to select individual modules to suit their particular needs. Clockworks was founded in Somerville, Massachusetts in 2007 as a Massachusetts Institute Technology-based startup, and currently employs fewer than 50 staff.

Commercial Tool Webpages

The webpages for each of the energy data management systems included in Table 2 are provided in Table 3.

Table 3 – Webpage Links for Commercially Available Energy Data Management Systems

Tool	Webpage Address
Activelogix	http://periscopedashboard.com/legacy-viewlets/
aquicore	https://aquicore.com/meter-management/
BuildingOS	https://lucidconnects.com/solutions/building-data-analysis
Clockworks	http://www.kgsbuildings.com/clockworks
DEXCell	http://www.dexmatech.com/software/
digitalenergy	http://www.digitalenergy.org.uk/page.php?uid=239
EEM Suite	http://www.mckinstryeem.com/eemsuite/overview.html
Energy Analytix	http://www.iconics.com/Home/Products/AnalytiX/Energy-AnalytiX.aspx#.WUqcDu3yvmE
Energy Intelligence Software	https://www.enernoc.com/problems-we-solve/wasted-operating-expense
Energy Worksite	https://buildingiq.com/products/visualization/#energy-worksite
EnergyCAP	http://www.energycap.com/
energyDECK	https://www.energydeck.com/services/energydeck-platform/
EnergyFlow	https://www.noveda.com/solutions
EnergyPrint	http://energyprint.com/
EnergyWitness	http://intdatsys.com/technology/#bdm
enVizi	http://envizi.com/solutions/
eSightenterprise	https://www.esightenergy.com/us/
FirstFuel	http://www.firstfuel.com/
GridPoint Energy Manager	https://www.gridpoint.com/
HELios	http://www.heliosenergyus.com/energy-management-systems
IBM Data Model	https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=BR&infotype=PM&htmlfid=IMB14176USEN&attachment=IMB14176USEN.PDF
Kaizen	http://www.coppertreeanalytics.com/technology/energy-analytics/
Load Profiler	http://www.automatedenergy.com/solutions/commercial-tools
Meazon	http://meazon.com/
myMCS	https://www.mcssolutions.com/software/
Navigator	http://www.buildingtechnologies.siemens.com/bt/global/en/building-solutions/bps/strategy-planning/advantage-navigator/pages/advantage-navigator.aspx
Operational Insight	https://www.honeywellprocess.com/en-US/explore/products/advanced-applications/uniformance/uniformance-technology-applications/Pages/operational-insight.aspx
Opus Orchestrator	http://www.novar.com/technology/opus-bas-technology/item/opus-supervisor
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