Energy Management and Higher Education

A case study in billing and cost allocation
Introduction:

Large college campuses are essentially small cities. Massive campuses include housing, classrooms, research and athletic facilities, dining areas and entertainment spaces. Providing service for thousands of students and faculty, campuses are major consumers of energy. The U.S. Department of Energy estimates higher education spends $14 billion annually on energy.

As academic stewards of their communities, universities are expected to exhibit sustainable energy practices. This includes efficient energy use and low energy costs for on campus consumers. Key to this mission is a comprehensive system for reviewing and validating utility billing. This includes allocating costs to departments on campus, and analyzing energy usage on an individual building basis.

This case study profiles two large universities in North America. We’ll follow their efforts to curtail energy consumption, validate utility billing, and allocate organizational costs.
Subject Schools:

The University of Utah

The University of Utah is located in Salt Lake City in the foothills of the Wasatch Mountains. This flagship institution of higher learning serves over 31,000 students from across the world. Offering almost 200 major fields of study, the university prepares students to compete in the global workplace. Their offerings include law, medicine, and robust undergraduate and Masters level courses of study.

Most of the energy used by the University campus comes from fossil fuel sources. As a result, building energy use is the primary contributor to the U’s carbon footprint.

Building energy use accounts for three-quarters of the University’s greenhouse gas emissions. To reduce the University’s energy consumption, the Energy Management Office focuses on savings opportunities.

These changes include: occupant behavioral changes, energy efficiency upgrades, and installation of renewable technologies.
Subject Schools:

A Leading University in the Southern United States

With roughly 50,000 students and future-focused facilities, leaders at this southern university are some of the best minds in their fields. It’s no wonder the University is consistently ranked among the nation’s top universities. They see things differently. Dedicated to excellence, the University’s students conduct research as freshmen and sophomores. The University believes tomorrow’s solutions should be found today. They measure success not in awards won, but in lives changed. Big breakthroughs are seen as tools to achieve even better ones. The University is passionate about striving for a better world through better research.

The school is committed to academic and administrative sustainability. They operate with a goal to be carbon neutral by 2025. In fact, 34 academic departments offer at least one sustainability-related course. The University puts this dedication to sustainability into practice across the campus. A recent water saving laundry initiative has saved 7 million gallons of fresh water.

From a facilities perspective, the Physical Plant Division of their Utilities and Energy Services Department handles central utilities, energy management, and building automation initiatives.
Before Energy Management

Without a software system for managing utility billing, the university relied on home-grown solutions to track energy usage. Rich Miller, business systems analyst with workplace services at the University of Utah, said, “We were always about a month behind on billing because it was such a manual process.”

Miller went on to say, “It would take us a month alone to read all 300 utility meters, much less the time to data enter this information and manually check it for errors.” Collecting usage data and distributing utility costs was time consuming and prone to errors.

Building energy use accounts for three-quarters of the University’s greenhouse gas emissions.

The southern University provided a different scenario. An internally developed database and spreadsheets tracked energy usage for the University. The manager of information and technology services with the physical plant division of the University explained, “Although the system worked pretty well, the technology was approaching end-of-life and we needed a new solution.”

They recognized this need to change as an opportunity to further automate the process, integrate it with other systems, provide reliability, and realize cost savings.

Utility managers for large institutions know the challenge. Billing from vendors can be difficult to interpret, analyze and validate. Manual and home-grown energy management systems are cumbersome and error prone. It’s tough to analyze usage patterns—especially by building—with a manual system. And, internal energy rate and invoices
Billing from vendors can be difficult to interpret, analyze and validate. Manual and home-grown energy management systems are cumbersome and error prone. It’s tough to analyze usage patterns – especially by building – with a manual system. And, internal energy rate and invoices are difficult to calculate, generate and troubleshoot. All of which distracts from the larger goal of energy efficiency, and cost savings.

Enter AiM’s Energy Management

Observing customer and industry needs, AssetWorks crafted a holistic approach to energy management. They seized the opportunity to add value to their AiM Integrated Workplace Management System (IWMS) software.

Besides managing utility costs, their comprehensive energy management solution:

● Pinpoints areas for savings

● Contributes to the bottom line through maintenance cost avoidance

● Improves an organization’s sustainability.
AssetWorks announced its intention to build a better EM system at its annual users conference (AssetWorld). The system would be created using a process called a Special Interest Group (SIG).

Unlike soliciting feedback from customers, or advisory boards, the SIG process engages customers. Feedback is used in the creation of a new software product. From requirements gathering to design through development, testing and production implementation, feedback is critical.

For AssetWorks, it's a dedication to work with individual customers - while balancing the needs of the group. However, the result is a superior product that meets the needs of the market - from the first release.

As AiM customers seeking a sophisticated energy solution, both universities were perfect candidates.

Both schools knew they needed a new solution. The SIG process presented a unique opportunity to join in the creation of a new product. Both universities brought their most complicated utility bills and invoicing scenarios to the AssetWorks team. The process was extensive. There were several iterations before the creation of the resulting AiM Energy Management.
It’s worth noting, the group wasn’t just tracking energy consumption and automating billing.

They wanted to discover how energy management fit into the bigger picture of integrated workplace management. This included automated equipment monitoring to detect trouble spots and trigger preventative maintenance. Which was something only a truly integrated solution could do. The foundation was laid for revolutionary Energy Management solution.
Implementing EM & How it Works

“The turning point came when we realized that utility meters are assets, with associated costs including the energy they provide and the associated maintenance costs,” said Tony Rovano, senior product manager with AssetWorks. “Everything fell into place, and energy management became a natural part of an integrated workplace management system,” he went on to say.

The first step in implementing AiM EM is to define all utility meters as assets. Then, determine their relationship to facilities and departments (hierarchy).

The University of Utah gathers, tracks, reports and manages energy data, including rate structure through the Energy Management office.

Consumption data is collected across the university. It is then broken into comprehensive usage data by submetering individual facilities. Defining the meter hierarchy by building facilitates the analysis of consumption. It also allows for the allocation of costs by department.

“The turning point came when we realized that utility meters are assets, with associated costs including the energy they provide and the associated maintenance costs,” - Tony Rovano
Data from newer meters is automatically uploaded into AiM. Automation eliminates the manual process of reading meters and data entry. However, not every meter is automated. “Although it sounds great, getting to 100% of meters automated doesn’t make sense,” said Miller, “You have old legacy meters, such as a gas meter on an old house. Our goal is to automate everything that makes sense, and accept there may always be a manual component.”

With energy usage and maintenance data tied to the meter asset, it becomes easy to allocate and distribute a total cost back to the customer (campus department). AiM EM also makes it easy to analyze usage trends. This allows pinpointing facilities for optimization with the IQ business intelligence and ad-hoc reporting module.

**Many Benefits**

The benefits of AiM Energy Management are many. This begins with the ability to replace spreadsheets, and home-grown, siloed systems that aren’t part of an IWMS. With AiM EM, utility managers benefit from reduced complexity and increased efficiency. This is accomplished through a truly integrated solution, automatic accuracy checks and configurable data validation.

The hierarchy of utility meters defined within a comprehensive asset management system creates an easy way to track and report total energy costs by building. Such a system automatically distributes those costs to the responsible departments.
The hierarchy of utility meters defined within a comprehensive asset management system creates an easy way to track and report total energy costs by building. Such a system automatically distributes those costs to the responsible departments.

AiM Energy Management provides visibility into energy usage by building. This facilitates benchmarking performance between buildings, and identifying facilities with the biggest improvement needs. This further facilitates proactive maintenance and making plans for capital improvements.

With regard to these specific capabilities, Miller said, “Having all the information at your fingertips for utility costs per square foot, makes AiM EM superior to any other product available.”

Energy managers no longer have to deal with complex meter hierarchies or accounting schemas to track the distribution and recovery of costs. AiM Energy Management facilitates the automated allocation and distribution of costs. By combining utility costs, maintenance costs to pass along to the end customers (departments). AiM EM makes it easy for finance managers to recover costs through flexible, rules-based invoice generation.

Savvy energy managers understand that what they manage is part of a bigger whole. They know that what goes on with energy has an impact on maintenance, capital planning, and more. AiM EM’s powerful reporting and analytics enable energy managers to make better business decisions. AiM’s insight into energy usage and spending, including forecasting and trend analysis brings accountability and accuracy.
The Results (ROI) & What the Future Holds

There are a variety of ways to measure return on investment (ROI) with an integrated energy management system. Eliminating manual processes (spreadsheets and manual calculations for billing) improves accuracy, eliminates data entry time, and saves time tracking down errors. Furthermore, “You’d be surprised how many errors we discovered in utility company billing,” said Rovano,

“We found errors in the rate charges, charges for meters that no longer existed, and more.” The savings from fixing these issues alone would have paid from the system, but that was really just the beginning.

Most people think of efficiency gains when considering an Energy Management system. Important gains include time savings from automation and energy savings itself.

You’d be surprised how many errors we discovered in utility company billing. We found errors in the rate charges, charges for meters that no longer existed, and more.”

- Tony Rovano
The University of Utah used to manually read 300 utility meters, which took the better part of each month, leaving them a month behind in billing. “This month-long process has been cut down to 2 days,” says Miller. Digital meter readings eliminate manual labor, improve accuracy and provide more actionable data for decision making.

The improvements seen by University of Utah include:

- Improved efficiency
- Digitalization of manual processes
- Increased accuracy
- Actionable data for better decisions

Our Southern University

The University in the south has focused on the automation side. Capturing data electronically has translated to cost savings by eliminating manpower and improving reliability.

For this University, implementation of this enterprise-level database for meter management, meter readings and utility billing has resulted in:

- Improved system reliability and better process control
- Centralization and standardization of meter management
- Improved tracking of meter assets
- Improved ability to identify metering issues sooner
- Ability to break down utility costs based upon the locations served
Energy Management is often thought of as tracking energy consumption and automating utility billing. But, it can be so much more than that when it’s part of an integrated workplace management system. Maintenance costs are automatically added to utility costs for a complete picture of energy expenses. Automated equipment monitoring detects trouble spots and triggers preventative maintenance, preventing costly breakdowns. Monitoring usage trends and benchmarking facilities against each other helps in strategic capital plans.

As a key component of an Integrated Workplace Management System (IWMS), the foundation has been laid for a revolution in Energy Management.

What’s next?

AssetWorks will continue to work with the University of Utah and the southern University to perfect their energy management platform and increase efficiencies. Stay tuned for more exciting updates as we continue to bring the best, most innovative products for facilities management.
Do you have questions about energy management at your facility?

Contact us today to find out more about energy solutions for your campus.