Power Xpert Architecture

Energy management solutions

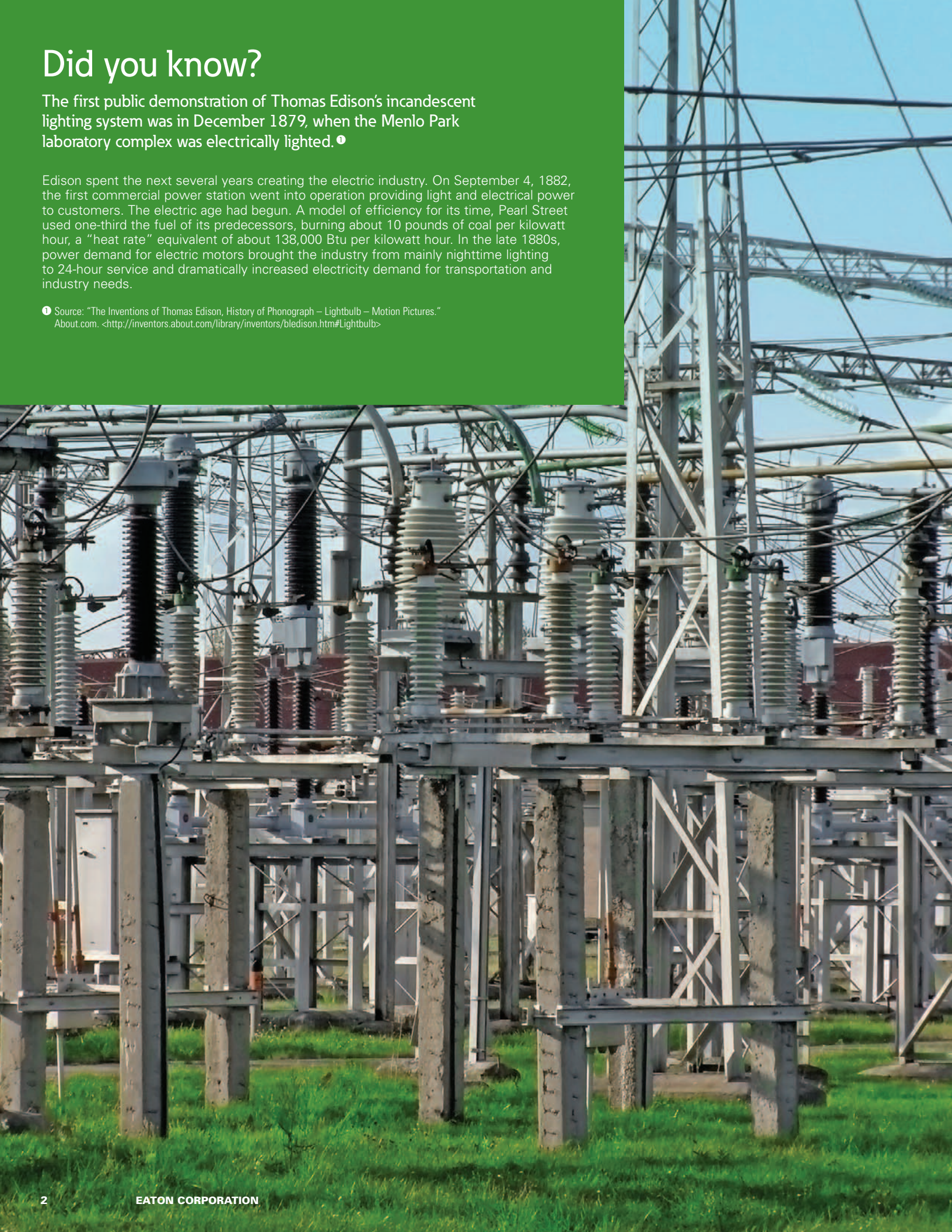
Powering Business Worldwide

Did you know?

The first public demonstration of Thomas Edison's incandescent lighting system was in December 1879, when the Menlo Park laboratory complex was electrically lighted. [1]

Edison spent the next several years creating the electric industry. On September 4, 1882, the first commercial power station went into operation providing light and electrical power to customers. The electric age had begun. A model of efficiency for its time, Pearl Street used one-third the fuel of its predecessors, burning about 10 pounds of coal per kilowatt hour, a "heat rate" equivalent of about 138,000 Btu per kilowatt hour. In the late 1880s, power demand for electric motors brought the industry from mainly nighttime lighting to 24-hour service and dramatically increased electricity demand for transportation and industry needs.

[1] Source: "The Inventions of Thomas Edison, History of Phonograph – Lightbulb – Motion Pictures." About.com. <http://inventors.about.com/library/inventors/bledison.htm#Lightbulb>



Energy management is in

Save money and be green with an energy management plan

Taken together, the Energy Policy Act, the American Competitiveness Initiative and the Advanced Energy Initiative provide an aggressive strategy for tackling the long-term energy challenges we face.❶ The Energy Policy Act allows for businesses to get deductions for new or renovated buildings that save 50% or more of projected annual energy costs for heating, cooling and lighting compared with model national standards, and partial deductions for efficiency improvements to individual lighting, HVAC and water heating, or envelope systems.❷

It's official.

The government wants us to save energy and have a greener planet.

Energy Policy Act of 2005 >>> EPACT 2005

Energy Independence and Security Act of 2007 >>> EISA 2007

American Recovery and Reinvestment Act of 2009 >>> ARRA 2009

❶ Source: On the Road to Energy Security; Implementing a Comprehensive Energy Strategy: A Status Report, http://www.energy.gov/media/FINAL_8-14_DOE_booklet_copy_sep.pdf

❷ Source: The Tax Incentives Assistance Project Web site: http://energytaxincentives.org/business/

Energy management solutions
Managing energy using smart meters

Are you looking for options for your energy management needs? Do you wonder where your energy is being used or, worse, wasted? Can you sit down in front of a computer and develop a baseline of your energy usage in the building, your campus or your entire global enterprise? Do you have the tools in place to implement an efficient, cost saving energy management program?

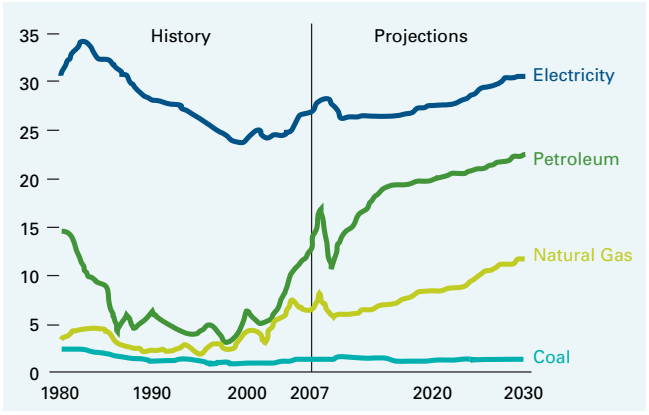
Energy management is the means to reduce operating costs and develop a cleaner environment. Energy management is a continual improvement process involving visualizing real-time energy consumption, measurement, analysis and implementation of programs to reduce usage and cost.

The Energy Policy Act of 2005 laid the groundwork, mandating that federal buildings be energy efficient and strongly recommending that private enterprises follow suit. It strongly recommends implementing energy-efficient and savings processes and equipment. The American Recovery and Reinvestment Act gives us the details and envisions a modernized, more energy-efficient America through targeted investments in updating your infrastructure.

Every business and enterprise can implement an energy management program, which becomes particularly effective when supported with the right metering equipment and monitoring solutions. Many programs begin with energy consumption goals and objectives; then an energy audit is performed to identify all the possible energy improvement opportunities at a site. Once these improvement recommendations are implemented, the metering and monitoring help ensure that these improvements are realized and sustained.

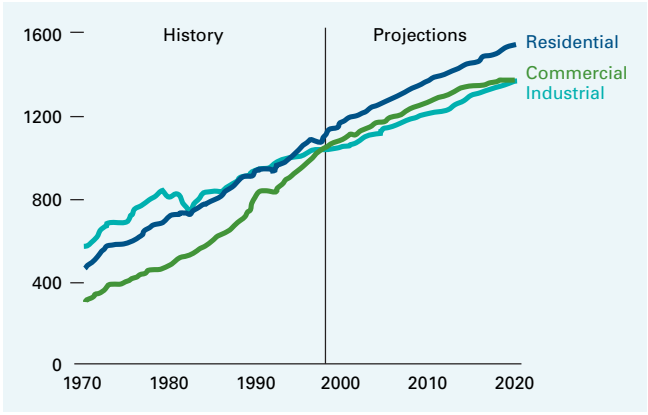
"The [Power Xpert® System's] customized user interface and reporting are what we count on. It's not just a 'nice thing to have'—it's vital and we rely on it. As a result of it, we have been very successful in not just creating an environment that is very energy efficient, but one that also enables us to accurately project our energy consumption and bills, which is crucial to our financial performance."

—Bryan Mehaffey, Vice President of Technology and Systems Engineering, Ave Maria University



Energy Prices, 1980–2030 (2007 dollars per million Btu) ❶

❶ Sources: 2009: Energy Information Administration (EIA); Annual Energy Outlook 2009 (March 2009); Web site: http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2009).pdf.



Annual Electricity Sales by Sector, 1970–2020 (billion kilowatthours) ❷

❷ Sources: 2009: Energy Information Administration (EIA); Annual Energy Outlook 2009 (March 2009); Web site: http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2009).pdf.

Energy management solutions

The first step: energy management planning

Energy management planning defined: a systematic approach or program to ensure the most efficient use of energy in a business, facility and/or system.

Why do I need to plan for energy management?

The government mandates are clear. Reduce overall energy use. Rely more on energy from renewable sources. Measure and manage energy use more carefully. Of course, the mandates apply to all government buildings, but the government and utilities strongly urge commercial and industrial enterprises to manage their energy usage.

Four areas to develop for your energy management plan:

- Strategy and planning
- Operational plan
- Execution and implementation
- Measurement and continuous improvement

Eaton can assist you with any or all of your energy management journey, helping to ensure actionable, measurable and sustainable results.

Your goals and objectives can include regulatory requirements, business objectives, facility certifications, specific energy reduction targets, renewable energy integration and so on.

If you perform an energy audit, it should consider technology, people and operation/control strategies, and focus on the complete energy picture, not just the lighting or HVAC. It should look at all utilities and not just electrical consumption inside a facility.

Your plans and recommendations must consider key business factors and the quality of the work environment.

Real-world results with Eaton's intelligent hardware

Large manufacturer

Using the information available from local meters, a large manufacturer noticed that the plant's peak demand was occurring at the same time each day—at noon. He previously had assumed that peak demand was in the morning. Yet, start-shifts were staggered in the morning. So why noon? After a closer look at some trending reports, it was discovered that all the electric forklifts were plugged in at noon for recharging, sending the peak demand soaring. The management team initiated staggered lunch breaks. This simple peak management action saved the plant money. On a $2.4 million electric bill, the savings was $120,000, or 5%, just from this single initiative.

Enterprise or university campus

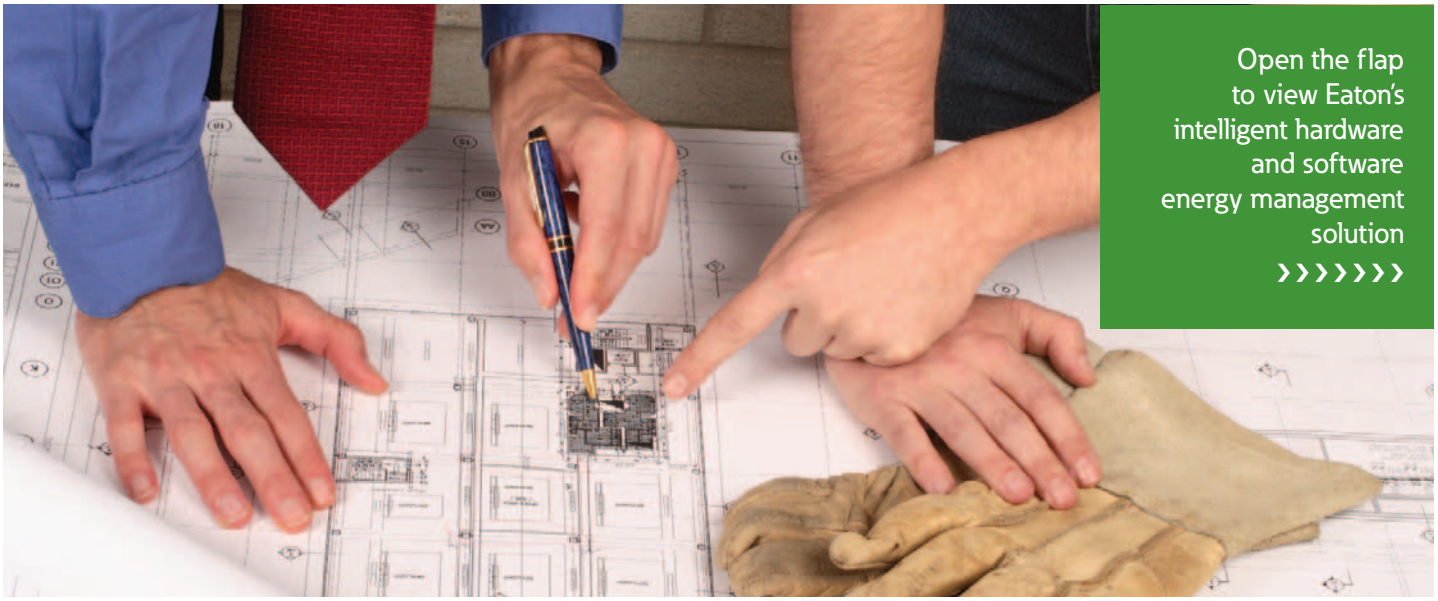
By submetering, several things can be accomplished. First, activity-based costing is an excellent way to generate revenue. Providing an energy bill for special events (for example, sporting events, television, concerts and outside functions) can generate additional revenue. The fact that energy consumption is documented separately and accurately for the specific event institutionalizes that cost as "over and above" overhead, such as space rental and the like. In addition, providing accurate cost data for research projects, especially high energy consuming projects, can provide a way to more accurately document overall project costs—and justify additional billings. Second, departmental or building billing/cost allocation is a way to focus energy-saving programs.

The most significant problem with saving energy is that, once the energy is distributed into the campus, it disappears. There is no record of where the energy is consumed. Submetering within the campus, in each building, provides the ability to analyze where power is going. The meters would be placed at the point where energy enters the building and on each of the major loads within the building—lighting, air conditioning, laboratory equipment and so on. The load profiles generated will identify problem buildings and wasteful energy practices within a building. Providing that information to occupants or implementing automatic controls will lead to more appropriate energy usage patterns.

Within the first six months of operation, a southern university saved in excess of $25,000 in electricity costs by focusing on wasteful practices.

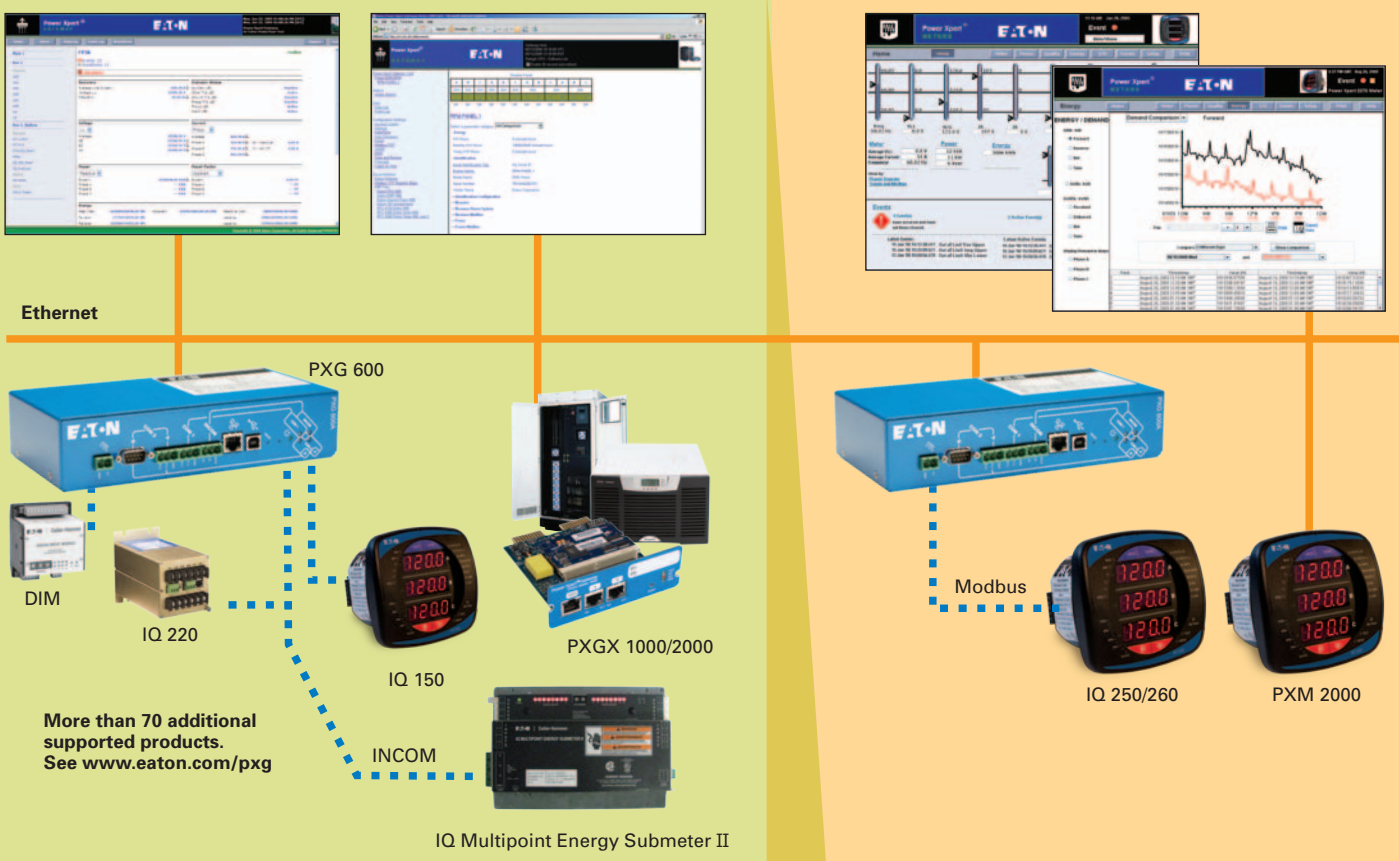
Large single-company office building

A recent example of identifying wasteful energy usage involves a new, 140,000-sq.-ft. corporate headquarters building in the Pittsburgh area. The HVAC system in this building is integrated with the electrical distribution system and offers occupants zone-temperature monitoring with automatic adjustment of occupied or unoccupied zones. The energy management system offers local and remote monitoring of all major electrical loads via submeters. After analyzing the historical energy trending of this system, the corporation was able to alter its morning warm-up cycle and cut 150 kW from monthly peak demand charges. This action resulted in a $60,000 cost savings per year.



Open the flap to view Eaton's intelligent hardware and software energy management solution ›››››››

Eaton's intelligent hardware and software energy



Entry level metering energy management

This is a flexible, low-cost metering solution for energy management. Various meters feed data through a Web-enabled gateway, providing a complete solution for many smaller campuses or businesses.

This solution offers:

- A variety of Eaton metering options focusing on basic energy measurement
  - IQ MES II—a revenue-grade multi-point meter for up to 16 circuits per unit
  - IQ 220—a cost-effective INCOM meter with optional display
  - IQ 150—a revenue-grade meter with Modbus® communications
- Power Xpert Gateway
  - On-board Web server providing energy trending per device
  - Modbus interface option for third-party system integration
  - Interval demand data from most gateway-supported devices, allowing Eaton to use any of our legacy devices (including breakers and relays)
- Digital Input Module (DIM)
  - Independently monitors KYZ counts, pulse counts or digital indications
  - Provides a cost-effective and reliable method to log and transmit consumption data for water, air, gas, electric and steam (WAGES)

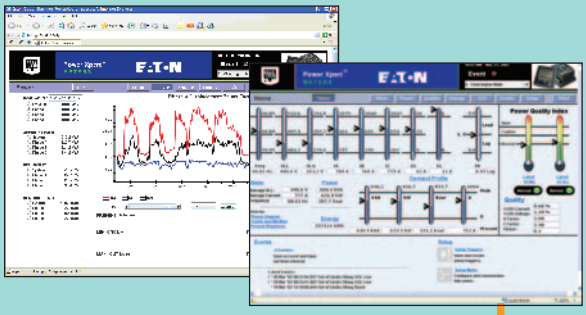
Metering energy management with power quality

Understanding your power quality is often the next layer in an energy management plan. By adding power metering to your system, you can identify power quality anomalies such as harmonic, voltage or current distortion, enabling you to further understand your power system.

This solution offers:

- All of the options in the entry-level solution
- Extended metering system capabilities with the IQ 250/260 connected via a Power Xpert Gateway, adding power quality, input/output and data logging capabilities
- The Power Xpert 2000 Meter family provides direct Ethernet connectivity and an on-board Web server, allowing power quality and energy information to be viewed in a standard Web browser

management solution



Free Energy Management Software Download

The Power Xpert Meter Energy Profiler software allows you to compare "expected" energy consumption patterns to present usage and flag areas of concern. It is also a predictor. It can predict what energy consumption would be expected later in a day.

PXM 4000/6000/8000

Energy management with advanced power quality

Eaton's top-tier solution includes advanced power quality and energy monitoring capabilities, including Web-based tools and graphics to develop an energy baseline. By adding advanced power quality to your solution, you can perform ITIC diagnostics, capture waveforms, trend data and more. In addition, the high-speed sampling rate accurately detects fast transients, allowing for extensive diagnostics of power quality.

This solution offers:

- All of the functionality of the solution with power quality
- The ability to locally store up to seven years' worth of energy and power quality information
- Tools to contrast and compare quality and consumption across time periods
- Access to Eaton's Power Xpert Meter Energy Profiler to find hidden patterns of energy waste and predict future energy use
- A full set of power quality analytics to look at a variety of issues that reduce system efficiency

Addition to any sized solution

Power Xpert Software and Power Xpert Reporting

As you can see, Power Xpert intelligent hardware is easily scalable to fit your energy management requirements. As your systems and energy management needs grow or become better defined, or if you are already a large, multi-campus, national or global enterprise, you will likely determine that a central monitoring system is essential to pull all of this data together into understandable, actionable information.

The addition of a software and/or reporting system allows you to easily identify energy-saving opportunities throughout your buildings and campuses, worldwide. You can create a baseline for one facility or all facilities. You can contrast and compare energy usage throughout your organization. This provides the detailed information you need in the short term and the long term to identify energy, cost saving and power quality enhancement opportunities, through control, monitoring and management of your power systems.

Eaton's intelligent hardware energy management solutions

"You can't manage what you can't measure"

You've heard it a million times, but have you done anything about it? Individually or working together, Eaton's smart meters and intelligent hardware help you measure, and therefore manage, your power and energy usage.

Meters

- IQ 130/140/150
- IQ 250/260
- IQ Multipoint Energy Submeter II
- Power Xpert Meter 2250/2260/2270
- Power Xpert Meter 4000/6000/8000

Gateways

- Power Xpert Gateway 600A
- Power Xpert Gateway Series 1000 Card for PDUs
- Power Xpert Gateway Series 2000 Card for UPSs

Eaton's software energy management solutions

If you have the meters and gateways in place, you've got an excellent start to your energy management program. Eaton's smart meters provide all the information you need to measure, and therefore manage, your energy usage.

However, larger enterprises may want to consolidate their energy data from buildings around the city or around the globe into simple-to-understand information and reports. Eaton's software solutions work in conjunction with hardware to provide the information you need to reduce those energy bills.

Eaton's software solutions

- Power Xpert Meter Energy Profiler
- Power Xpert Software
- Power Xpert Reporting

Eaton energy management solutions assist you in reducing your energy consumption, minimizing environmental and economic impacts associated with excessive energy use.

Energy management services

Eaton's team helps you optimize your energy usage as well as create a "Green Culture" throughout your organization. Eaton achieves this through a comprehensive portfolio of services tailored for every stage of your energy management program, from planning and advising, energy audits, and finally to our turnkey project services. Our solutions integrate and optimize elements of your energy management system to make sure it is aligned with federal, state and local government goals for energy reduction and measurement. We are an industry leader in energy services so you can concentrate on your core business.

Energy management planning and advisory services

- Develop an energy policy and/or energy management strategy
- Develop corporate and organizational energy goals and objectives
- Provide organizational capability support in terms of identifying energy-focused resources, roles and responsibilities
- Provide organizational energy management awareness training
- Assist in the periodic review of energy goals and performance against these, including integration of changes or refinements to your energy strategy, plan or program
- Keep your organization current with energy regulatory requirements and technology

Energy audits

- Review organizational readiness and buy-in to energy management plans and goals
- Collect and analyze historical energy use
- Study your building and its operational characteristics
- Identify energy conservation opportunities
- Perform an engineering and economic analysis of potential modifications and operational improvements
- Identify financially viable projects that improve energy usage and/or efficiency and improve application and utilization of alternative energy sources or strategies
- Prepare a rank-ordered list of appropriate modifications and/or operational improvements

Turnkey energy conservation project services

- Specializing in project management, project execution and accountability
- Leverage a national footprint, Eaton Certified Contractor Network and mature supply chain
- Assist in accelerating the implementation process and reduce the cost—when involved with the energy audit
- Guarantee that the project ties back to original energy goals and objectives
- Assist with financial solutions, ensuring that viable projects and energy reductions are not just studied and reported on, but are actually realized in the shortest time possible

Successful energy management starts with the understanding that your energy must be managed as an integrated, strategic asset and a cost of your operation. When that happens, your energy management system is positioned to return real benefits that not only help your organization's bottom line, but help to create a greener global economy.

Go green.

An Eaton Green Solution

Power Xpert Architecture helps you go green

Eaton's products and services are designed with energy efficiency in mind and collectively have the potential to contribute up to 40% of the credit points toward the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) certification. Eaton has at least one LEED Accredited Professional in every district sales office across America.

The use of on-site renewable energy will require a means to measure the percentage of building energy requirements. Eaton's intelligent hardware energy management solutions can provide the backbone of load control, measurement and monitoring for on-site power sources.

the green grid℠ member

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Note: Features and specifications listed in this document are subject to change without notice and represent the maximum capabilities of the software and products with all options installed. This is not a complete feature list. Features and functionality may vary depending on selected options.