

Europe Takes Measured Steps to a Sustainable Energy Future

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Energy-Smart Businesses are exposing their energy waste and doing something about it. Significant advances in wireless-mesh and internet technologies for demand-side energy monitoring, control, and management are making it possible, on a truly broad scale, to understand exactly how energy is being consumed in multiple buildings and operations.

In a series of world-leading decisions, the European Union has set the course for a sustainable energy future by committing member states as well as public and private sectors to transform how energy is supplied and consumed. In 2008, the European Parliament agreed to promote a low-carbon economy and increase energy security. The agreement established legally binding targets that aim to, by 2020,

- cut greenhouse gas emissions by 20%
- establish a 20% share for renewable energy
- improve energy efficiency by 20%

This move strengthens the actions already in motion. In 2006, member states and leading businesses responded to Directive 2006/32/EC by beginning to develop and execute plans for energy end-use efficiency and energy services. The recent agreement charts incremental annual targets and charges that all measures must be verifiable as well as measurable or estimable. These groups are moving towards a more diverse and open energy market, emphasizing the use of renewable/green energy and energy conservation. Central to driving success is removing any resistance to change and enabling energy-conscious consumers in a new energy market. This market will include clean energy alternatives and information flows to achieve smarter consumption through behavioral change, intelligent energy management, and benchmarking.

From a business perspective, information technology is a proven way to transform energy consumption across an enterprise as “You can’t manage what you don’t measure.” Much of Directive 2006/32/EC and resulting action plans describe an inability to view the effects of operational change and infrastructure investments, detailing a need for data and calculations to report progress. For example, with regard to End-use load data, the Directive states, “Energy use of a building or facility can be fully monitored to record energy demand before and after the introduction of an energy-efficiency improvement measure. Important relevant factors (e.g. production process, special equipment, heating installations) may be metered more closely.” Until recently, such energy consumption data did not have top-level visibility. If measured at all, it was an inconsistently captured element of operation or utility bill detail. Moving forward, CIOs and senior management personnel will be able to see the value of monitoring and controlling energy consumption and its enterprise-wide strategic importance.

An Opportunity

Businesses are already taking measured steps toward becoming more energy efficient. Driven not only by social and political pressure, businesses aiming to lead and seize opportunities to become more sustainable, efficient, and competitive desire to strengthen executive leadership and wise investment of capital. It is now recognized that a lack of visibility and control over energy waste is as comparable and as detrimental to business survival and future performance as other deficiencies (i.e. financial, inventory, quality, and supply chain) addressed in prior business cycles.

Consider this analogy: Decades ago, the retail industry recognized it had a problem – it had no idea what its customers bought. Its only metric was the cash in the drawer each night. So, it wastefully pushed the wrong product out to the market. This poor inventory tracking cut deeply into profits. Today, the retail industry uses point-of-sale registers and other technologies to reduce shrinkage and optimize its operations. In addition, it has gained a greater understanding of customer buying preferences and behavior to become more intelligent in targeting sub-markets. Today, most companies have similar gaps in energy information.

So what can be done about the information gaps and energy waste?

The Energy-Smart Business needs to have a point-of-use capability for energy, like the point-of-sale capability adopted by retailers. Energy consumption in buildings must be measured and controlled so that managers may become informed as to how they can



operate more intelligently. For businesses consuming energy across many facilities, it is vital to establish energy policies, enable and enforce compliance, measure performance, and develop a culture of continuous improvement across the enterprise. This is a *change process* that many organizations currently use for quality improvements and IT governance.

Let's start by outlining a pragmatic and actionable strategy for the Energy-Smart Business:

1. Expose the waste. Enlighten consumers, managers, and cross-functional teams with detailed, accurate, and real-time energy consumption information from every room and major piece of equipment (point-of-use).
2. Enable managers to rapidly and broadly establish a consistent and sensible energy policy in every building.
3. Elevate awareness and motivation through an enterprise dashboard that benchmarks and compares buildings beyond organizational boundaries.
4. Empower decision-makers with the quality of information necessary to make informed decisions about energy policies and guide investments for further improvements.

The Measured Step Forward

Best-in-class companies are already moving to lower energy costs and waste, guided by economics that demonstrate substantial savings and paybacks within one to two years. Utility and government incentive programs that aim to improve energy efficiency and conservation make it even more attractive for businesses to take action. Executive guidance is provided by many sources, including in ISO 14000 and by responding to the requirements of Article 14(2) of the Energy End-Use Efficiency and Energy Services Directive (ESD) of Directive 2006/32/EC.

As with today's financial, quality, manufacturing, and supply chain processes, the value of energy information depends on its accuracy and timeliness. Real-time, bottom-up data enables an enterprise-wide perspective on energy consumption before and after investment. This information can be compiled to provide information about:

- Entire companies
- Specific departments
- Individual equipment and processes

This provides senior management with visibility to the company's overall progress and priorities. Departmental indicators enable organization-to-organization and facility-to-facility comparisons and benchmarks. This allows business energy policies and processes to be established, enforced, monitored, and continuously improved upon. Detailed real-time load profiles and operational data help identify

opportunities to improve energy efficiency. Indicators can be used to compare:

- Machines of different capacities
- Processes using different technologies
- Machines producing similar products
- The efficiency of similar machines

Many of the easy fixes for improving energy efficiency have already been implemented, often by upgrading existing facilities or by designing ultra-efficient new facilities. However, sustainable performance requires an on-going and active management effort. Buildings stand to reveal many more opportunities by retrofitting older locations to take control and gain visibility of areas that consume large amounts of energy and take control. This requires an approach that leverages existing infrastructure (facility assets) and enables a new level of monitoring and ability to change policies, modify operating procedures, and upgrade facility assets.

Enterprise energy management solutions are well aligned with this approach. They combine wireless sensor networks (within a building) and web-based software (across the enterprise) as key enabling technologies. Wireless solutions are ideal for retrofit installations, as implementation is simple and non-invasive. Web-based solutions offer secure access and visibility to managers at multiple levels (so energy information is not hidden in the boiler room and monthly energy bill). This makes it possible to rapidly, affordably, and consistently deploy monitoring sensors and controllers across multiple portfolios of buildings.

Some Best-in-Class Examples

Best-in-class companies frequently aim to determine and eliminate energy waste in order to better respond to peak energy demand. Taking an enterprise-wide approach, these companies find it cost-effective and advantageous to rapidly deploy wireless sensor networks comprised of monitoring and control devices designed to ease deployment and operate robustly at a low cost. The devices can be installed within minutes to monitor selected points of energy use such as lighting, HVAC, and production equipment. The wireless network is designed to automatically form and manage itself without administration or IT support. Each building in the network is linked via the internet to provide enterprise-wide visibility and management.

For example, a major retail chain operating approximately 1000 supermarkets is in the process of deploying such an enterprise-wide system. Starting in 2008, it implemented a Millennial Net wireless system comprised of devices designed to read utility meter outputs and measure the temperatures of various sources. To monitor major electric circuits and equipment (e.g. lighting, HVAC, refrigeration), it

installed several dozen sub-meters by LEM, Inc. at each site. The LEM submeters and other vendor-supplied devices communicate and work together to form a system based on Millennial Net[®]'s MeshScape wireless mesh sensor network. The deployment has been managed by a European-based system integrator. After a 3 month startup, during which the installation methods and centralized software application were refined, installation rates accelerated and deployments became more governed by scheduling and authorization processes. To date, a deployment in one European country of around hundred sites is nearing completion as plans are being made for the next set of countries. The company expects to realize a payback on the project within 12 to 18 months.

Before implementing energy management systems, those paying the bills and those managing costs relied solely on monthly consumption data to make decisions, which seriously limited any in-depth analysis. Now, commercial real estate owners plan to use similar wireless systems across their portfolios to reduce costs to tenants and increase the value and attractiveness of their properties. Banks, restaurants, and retailers, who operate tens to hundreds of branches and stores, now have a solution to monitor, control, and benchmark sites on a comparative basis. Benchmarks and "competition" between site managers can create a positive dynamic to reduce consumption. Private and public schools free-up money for education by reducing energy consumption by 30% and gaining valuable insight into the performance of their HVAC systems.

However, to realize this progress organizations need technologies that have been proven to work, can be easily deployed, and will be rapidly absorbed. An affordable and non-invasive wireless sensor network is an attractive solution, but it must be able to monitor and control as managers need while simultaneously

being sufficiently scalable, robust, and reliable to operate in commercial and public building environments.

These retailers, businesses, schools, and others use Millennial Net's Energy Management Solutions to closely monitor, control, and analyze energy use within each site and take measures on both local and enterprise levels to reduce energy consumption. Within minutes of having installed temperature, humidity, electrical, and other sub-meters, vital data from these devices can be found online. Immediate benefits of the system include the ability to monitor current and historical energy consumption information in detail, aggregate, and comparison, including:

- Real-time status of each separate zone
- Electric demand spikes
- Historical trends look back on particular periods
- Comparisons of consumption profiles reveal differences in operational loads and anomalies

Global and Pragmatic Approaches

Thousands of commercial and public buildings, businesses, and government organizations have an opportunity make a substantial and measured step toward their goal of creating a more productive and sustainable Europe by retrofitting buildings with wireless energy management systems. Continuous energy monitoring and performance metrics allow executives to see the real benefits of capital and operating improvements. The bottom line is that exposing and reducing costs related to energy waste can help reduce the pressure to cut other necessary items.

Citizens, managers, investors, and taxpayers see value in taking action to improve sustainability for both the planet and their budgets. Saving energy is good for the community, the world, and your business.

For more information, see
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