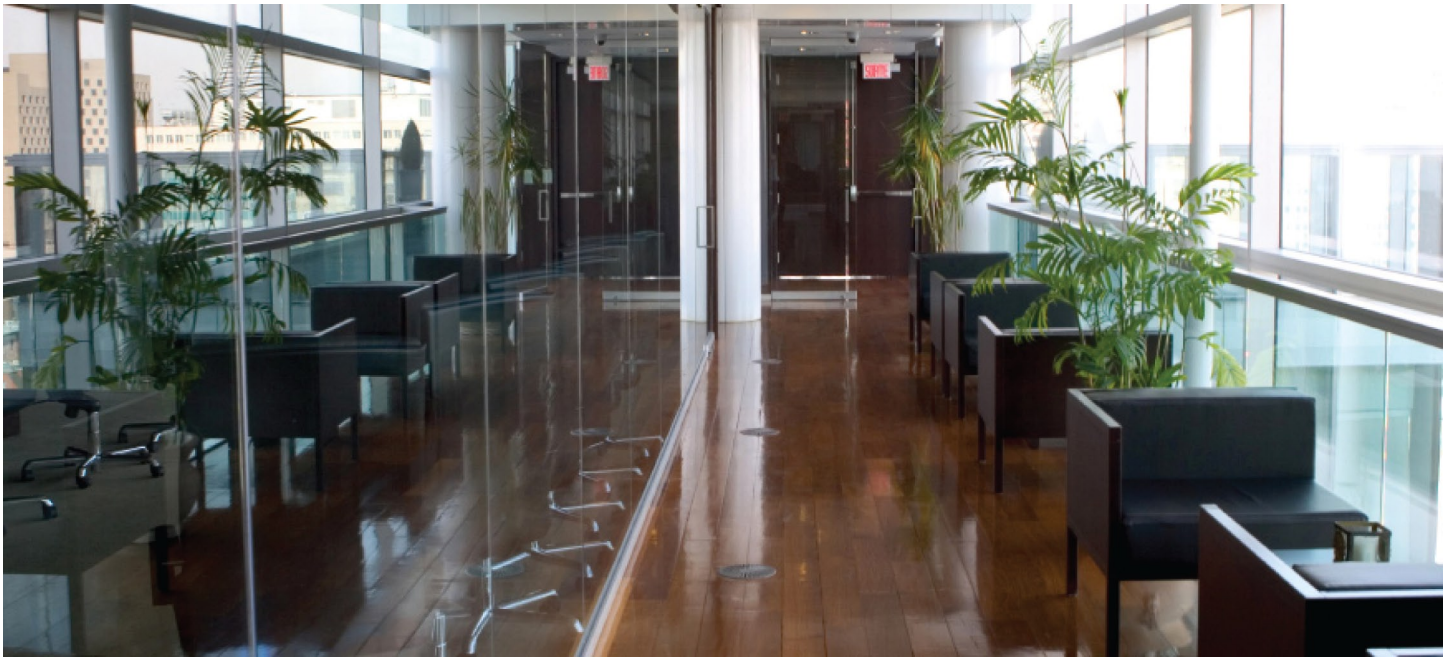


Achieving and Sustaining the U.S. Federal Mandates for Energy Reduction

United States Executive Order 13423 issued on January 27, 2007, mandates that federal buildings reduce their energy use by 3 percent per year, resulting in a 30-percent reduction in energy use by 2015.

> "It is the policy of the United States that Federal agencies conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner."
>
> Executive Order 13423, January 26, 2007

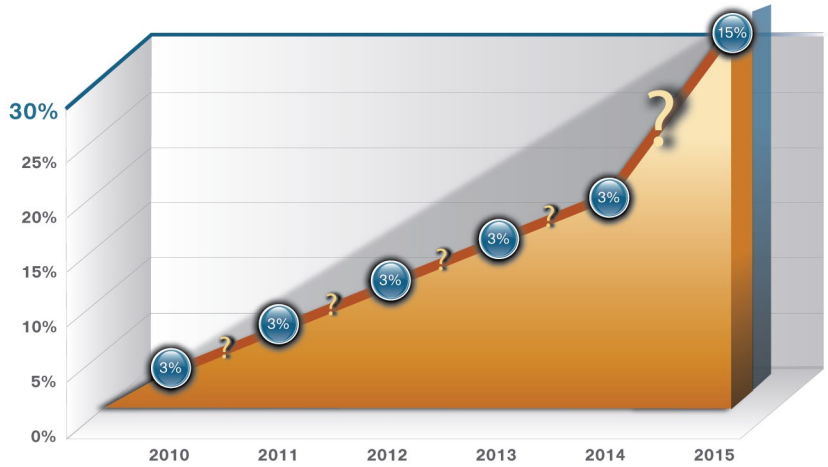
You can achieve the 3-percent energy reduction mandate by making improvements to insulation or windows or better monitoring of lights when rooms are unoccupied. However, attaining and sustaining a 30-percent reduction in energy use requires a more cohesive system for energy management (Figure 1).

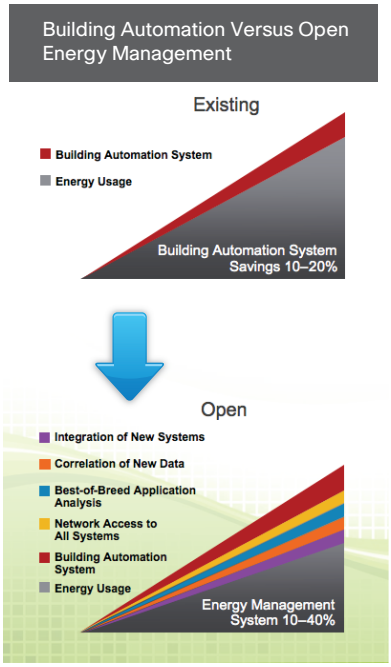
Just as the problem of climate change will likely require several technologies to lower carbon emissions, achieving the mandated 30-percent reduction will also warrant a systematic approach to energy management. There is no single magical solution.

Benefits of the Cisco Energy Management Solutions

- Reduces energy usage
- Enables sustainable energy reduction
- Scales to incorporate new energy technologies
- Incorporates leading products/solutions to take full advantage of application innovation
- Evolves to meet new regulatory requirements
- Offers flexibility to make use of new demand-response programs

Figure 1. Reaching Energy Reduction Goals by 2015





What can you do to get from your current state of energy usage to a system that enables you to lower usage in a systematic, sustainable way? To meet the 30-percent reduction, will you take advantage of changes in networked energy management systems, ENERGY STAR systems and alternate energy sources, new regulations, and demand-response programs by energy providers?

Cisco is leveraging its depth and strength through proven technology and thought leadership to exploit the power of the network as the foundational platform for enabling a Networked Energy Management System that allows you to:

- Access all the energy-using systems in a building
- Analyze the data from these systems to lower energy usage
- Act to continuously improve your ability to lower energy usage
- Scale your energy management system to flexibly take advantage of new technologies, regulations, and programs

Getting Started: What Is Your Energy Usage Today?

Let's look at how a U.S. federal building can progress from its current state to meeting the mandated 3-percent and 30-percent energy-reduction goals. Most U.S. federal buildings have heating, cooling, lighting, and several other systems and devices that are major consumers of energy. Also, many of these buildings have a dedicated meter that measures energy consumption. A utility company provides the energy and issues bills monthly. Most U.S. federal buildings have occupants who need the energy levels in the building to be environmentally hospitable, so they can maintain their productivity.

The fastest and least expensive way to lower energy usage is to optimize the building's insulation and windows for energy efficiency and put in sensors, which can turn off lights and monitor air quality. (If these initial actions are not taken, they can be pursued concurrently with the additional steps that enable the 30-percent energy reduction target to be met.)

The Cisco Energy Management Solution: Achieve and Sustain the Goals

You cannot manage what you cannot measure. The building's meter gives you a usage number for any point in time. But if you do not have the specifics about where that number comes from, it is not very useful.

Access to all the systems and devices using the building's energy is critical to successfully controlling energy usage. To contain and control usage, an energy management system must provide access to the usage data: when, how much, and which system is using the energy. You cannot manage what you cannot measure, and you cannot measure what you cannot access.

However, the challenge is that many of these systems and devices have unique data protocols and unique data formats. The Cisco® Network Building Mediator provides access to the data from all these systems—including lighting; heating, ventilation, and air conditioning (HVAC); trash compactor; access control; computer systems; and more. Think of the Mediator as an energy data router into the network.

Case Study: Controlling 1000 State Buildings Across Missouri

The State of Missouri was spending $300 million annually to operate and maintain some 32 million square feet of space in approximately 1000 buildings. Rising costs for energy and real estate, along with an ever-increasing backlog of deferred maintenance, were continually driving up expenses. In 2005, the state announced that it planned to reduce its energy consumption by 15 percent by 2010.

Challenge:

- Multitude of building control systems
- Cost-effective energy management of 3800 state buildings

Solution:

- Installed IT network with centralized monitoring of energy consumption and automatic alerts
- Integrated with maintenance, security, energy, and supply chain business applications
- Aggregated 9000 utility bills

Benefits:

- Combined savings of more than $35 million a year; future $20 million savings per annum purely on energy
- ROI within 18 months
- Significant reduction in emissions that cause climate change and acid rain: more than 205 million pounds of carbon dioxide, 307,000 pounds of nitrogen oxides, and 583,000 pounds of sulfur oxides

If your energy management system has access to these building systems through the Mediator, it can determine how much energy they use and when.

You can then analyze that data in real time and determine:

- Energy usage patterns
- Correlations between systems that impact energy usage
- Whether alarms, warnings, or changes in energy usage require servicing of equipment
- When peak periods occur and what causes those peaks that impact energy costs

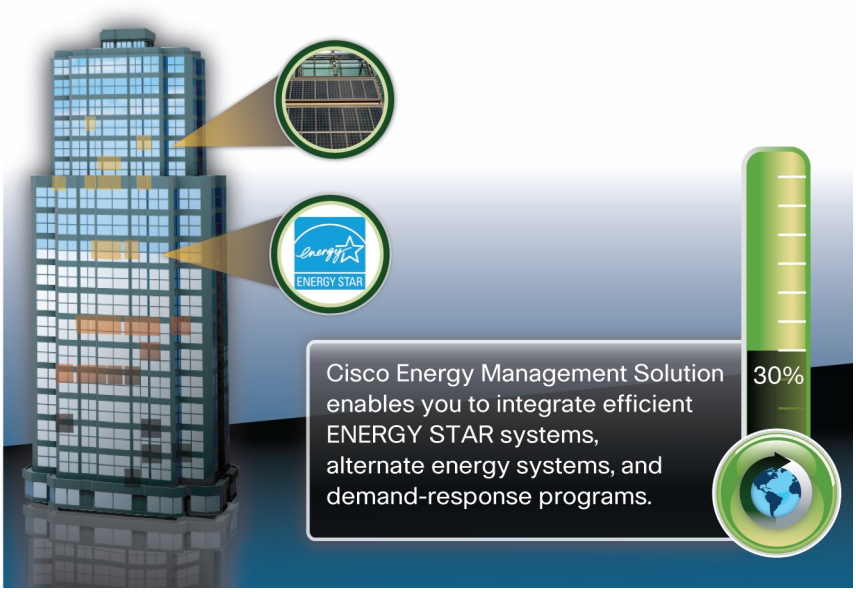
Cisco has technology partners who provide energy scorecard, fault detection and diagnosis, facilities management, and other applications which can analyze data and enable you to determine energy-saving actions and policies.

These applications are promoting the innovation in energy management that will create new opportunities for additional energy savings. The Cisco Network Building Mediator sends application data in industry-standard XML format, allowing you to take advantage of these innovations in ways not provided through a proprietary interface. An industry-standard interface means you can add or change applications to save even more energy as applications evolve and improve.

Analysis provides you opportunities to act. For example, you can correlate lighting, heating, cooling, building access, air quality, and other systems to reduce energy usage. Or, upon analysis, you may discover the slow deterioration of a component in a major system, which you can then act upon to optimize energy usage and increase the life of that system. Access to and analysis of building systems' data enables you to determine when to turn on and off systems to lower energy use without impacting productivity.

Knowing when and where energy is consumed reduces peak usage and offers more flexibility in meeting utility company demand-response programs (Figure 2). These programs allow the largest energy users to lower their bills when they assist the utility company by reducing their energy consumption during peak usage periods.

Figure 2. Meeting and Sustaining Energy Reduction Mandates



Moreover, the standards-based Cisco Energy Management Solution enables you to integrate efficient ENERGY STAR systems and alternate energy systems, such as solar panels, into your overall energy management system without having to wait for a proprietary interface to be developed. This scalability helps eliminate the costs of disparate energy-reducing devices such as black boxes on trash compactors. And because these systems are accessible via the network, you have a greater ability to control and correlate energy usage.

Summary

The Networked Energy Management System provided by Cisco and our partners allows you to access, analyze, and act upon energy usage information, integrate new systems, and flexibly respond to new regulations and demand-response systems. This ability to access, analyze, and act will allow you to systematically cut building energy consumption to meet and sustain the mandated 30-percent energy reduction goal.

Although there is no single magical solution, there is a roadmap to successfully reach these targets by 2015:

1. Start with the basics of better insulation, windows, and lighting sensors.
2. Implement a networked energy management system that can access all the energy-using systems and devices in the building. Then, analyze and act upon that information to find new ways to control and lower energy usage (Figure 3).

Figure 3. Networked Energy Management System: Access, Analyze, and Act

3. Next, integrate and add new ENERGY STAR systems and alternate energy systems.
4. Incorporate demand-response programs from utility companies and evolve with any new regulations.

Start Saving Today

Contact your Cisco account team or partner to learn how network-enabled energy management products, services, and partners can help you meet your green goals.

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