Intelligent Buildings: The Grid Starts Here

How we create, distribute, and consume energy has become one of the defining issues of our times. "Increased demand and new regulations demand a new approach, and governments and the energy industry are turning to smart grids as one answer," says Sanket Amberkar, manager for network systems, Cisco.

What Is a Smart Grid?
Until recently, businesses and households could only find out about their energy consumption once a month, after their meters were read. Information flowed one way, from the consumer to the operator.

"A smart grid upends this model, providing near-real-time, two-way communications so that government, businesses, and individuals can see their current energy consumption and adjust their behavior to meet their specific goals," says Tere' Bracco, senior manager for network systems, Cisco. As a simple example, private citizens who want to participate in their utility's incentive program can see they need to increase their conservation efforts, inspiring them, for example, to postpone running the dishwasher and washing machine until after peak hours.

How the Smart Grid Makes for Better Government
Government agencies and businesses can take advantage of the smart grid to curtail their consumption, too, and on a much larger scale. Many utilities have implemented a demand-response program. On high-demand days, they send an electronic request to government agencies and other subscribers, offering financial incentives to reduce consumption. The agency can either manually adjust temperature set points and lighting, or, for faster response (and more savings), invest in a Cisco Network Building Mediator, which receives the request and performs the adjustments automatically. Agencies set up policies for which equipment settings to change to shed a certain amount of load. "Within 20 minutes of receiving the demand-response request from the utility, one Cisco customer reduces lighting by 50 percent and raises the temperature set point by four degrees, shedding 1.1 megawatts," says Amberkar. "Over an 18-month period they saved an estimated $2 million in energy costs, which equates to a 25 percent estimated annual energy reduction."

Smart and Safe
Like any other critical infrastructure, the grid needs physical security controls to keep out unauthorized people. "An intelligent IP infrastructure gives greater protection from attacks by hackers or terrorists," says Bracco. "Government and energy companies also have a responsibility to protect the privacy of citizen's energy information, for example, to prevent would-be burglars from monitoring energy usage to deduce when people are on vacation."

Security technologies that should be part of smart grid plans for government agencies and energy companies include:

- **Video surveillance and physical access controls:** Cisco Video Surveillance Manager helps agencies and utilities detect and monitor physical threats to the infrastructure. Cameras are connected to the IP network, so authorized personnel can monitor video from any web browser.
- **Physical access controls:** Cisco Physical Access Control solutions provide role-based access to secure areas using card readers and biometric sensors. They can be integrated with the video surveillance system, so that a card swipe, for example, triggers the camera to begin recording video.
- **Communications interoperability:** If a threat to the grid is detected, personnel from multiple agencies using different types of communications devices need to collaborate on a response. Cisco IP Interoperability and Collaboration System (IPICS) enables security personnel and first responders to communicate directly using any type of radio as well as traditional phones, IP phones, mobile phones, and laptops.
- **Role-based access to networks:** Cisco Identity-Based Networking Solutions enable organizations to define and enforce role-based policies controlling which individuals and groups can access smart grid applications and information.
- **Network intrusion prevention:** Energy companies and agencies need early awareness of unusual network activities that might signal a security breach, and the ability to automatically block attacks. The Cisco Intrusion Prevention System now combines local inspection of traffic with information about global threats, a capability called global threat correlation. This helps agencies and utilities distinguish between unusual but harmless traffic and genuine threats.
- **Firewalls:** These help to keep unauthorized people out of the agency's or utility's network.

First Steps to Smarter Buildings
Government customers worldwide can use Cisco EnergyWise, Cisco Smart Connected Building technologies, Cisco security solutions, and Cisco Services to lower energy costs and reduce their carbon footprint. The Ministry of Education in Portugal, for example, uses Cisco EnergyWise technology to monitor and reduce power consumption of devices such as IP phones, IP cameras, and wireless access points.

To watch a short video about the Cisco Smart Grid, visit: **www.cisco.com/go/smartgrid**

To read about the Cisco Network Building Mediator, visit: **www.cisco.com/go/mediator**

To learn more about Cisco EnergyWise, visit: **www.cisco.com/go/energywise**

To read about the Cisco network security solutions mentioned in this article, visit: **www.cisco.com/go/security**

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