Save Energy in the Campus or Distributed Office

Introduction

Energy is the largest unmanaged expense in any organization, and it is easy to see why. For years, solutions to manage energy consumption and utilization have been expensive, inadequate, and difficult to implement. Today this is changing for the better. Many organizations are focused on reducing power usage and maximizing efficiency, particularly across "always-on" distributed office environments. And new solutions for enterprise energy management are delivering unprecedented visibility into energy consumption and the ability to analyze and manage energy usage for dramatic cost savings: up to 60 percent in some cases.

A new approach to managing energy for the distributed office is shifting the way organizations think about their power needs. Rising energy costs, sustainability initiatives, and regulatory requirements also play a role. Together, these forces are promotingthe shift toward energy following the productive user. With technology available today, enterprises can transition their energy management approach from "always on" to "available when needed" without impeding productivity or service-level agreements. The results of this shift include significant cost savings, reductions in carbon emissions, and increased visibility into energy consumption that can aid capacity planning, policy decisions, and more.

Energy Management for the Distributed Office Environment

The distributed office is a black hole of power consumption. PCs, Macs, voice over IP (VoIP) phones, wireless access points, servers, copiers, printers, videoconferencing equipment, and facilities equipment are all drawing power at various levels and times. Even with best practice guidelines and employee policies, organizations cannotknow for sure how much power each device is consuming. Some companies can only rely on device specs to make estimates. The device specs (faceplate data) are grossly overstated and do not measure actual energy use of the device. With little or no visibility into energy consumption or utilization by device, it is impossible to make incremental reductions in power consumption without impeding productivity.

Today, new enterprise energy management solutions are providing a consolidated energy utilization dashboard for every network-connected device in the distributed office. This delivers unprecedented visibility into the energy consumption and utilization of every device, system, and facilities asset connected to the network. It also gives organizations the ability to actively monitor and manage power for cost savings without slowing productivity.

However, not all energy management solutions for the distributed office are the same. Some solutions only measure a portion of the devices in the distributed office environment and therefore do not provide complete visibility into energy utilization. In addition, solutions that require the installation of software on the devices can actually increase costs due to configuration, maintenance, and management hassles.

The ideal solution makes implementing energy management simple, fast, and cost-effective, with no software agents to install and no network reconfiguration or expensive hardware meters required. The benefits of energy management for the distributed office include:

- **Cost savings:** As energy use management follows productive users, automated policies can power down idle or unused equipment until it is needed.
- **Energy visibility and intelligence:** Comprehensive visibility of actual energy consumption, cost, and utilization helps with comparisons, analysis, strategic planning, and more.
- **Carbon emission reductions:** Supports sustainability goals and compliance with emerging regulations.

How Does It Work? Four Functions of Enterprise Energy Management

A network-based solution for enterprise energy management gives organizations the ability to see, measure, and manage electricity use for distributed office equipment through policy-based energy optimization. Four technology functions enable the see, measure, manage process, including:

- **Discovery and measurement:** Finds all the network-connected devices, systems, and facilities assets in the enterprise.
- **Assessment and simulation:** Analyzes energy usage, temperature, carbon emissions, utilization, and costs by device, location, division, business unit, department, cost center, and more; simulates policy scenarios to determine highest cost savings and preserve productivity.
- **Policy and control:** Executes automated energy management policies or alerts by device, time, location, or event, resulting in energy that follows the productive user and cost savings.
- **Reporting and decision support:** Delivers comprehensive reporting about the way energy is used and cost/carbon savings for individual offices or the entire enterprise.

Figure 1 shows four major functions of Cisco Energy Management Suite.

Figure 1.   Cisco Energy Management
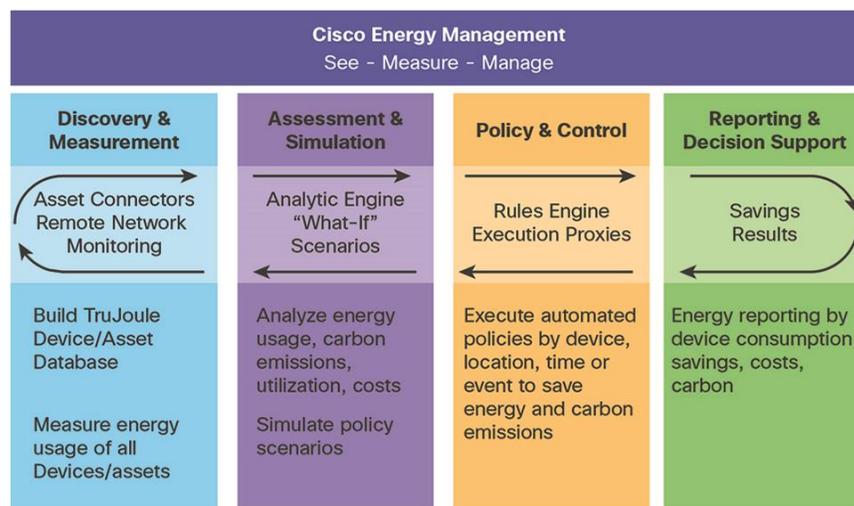
Automated asset discovery is the first step in energy management for the distributed office. A network-based solution will use remote network monitoring to build a device database and perform initial measurement. The initial monitoring period provides a baseline for energy consumption and utilization.

An analytics engine within the solution can then analyze energy consumption, costs, and carbon emissions by business unit, cost center, department, device, and location down to the application and virtual machine. The analytics engine can also perform "what if" energy management scenarios to test various cost-saving strategies and make sure that SLAs and productivity remain intact.

The solution should also include a rules engine, which is used to create and automatically execute energy management policies based on time, event, or location. These automated policies control the power state of each device or system connected to the network and enable flexible load-adaptive computing. Reporting and decision support give organizations the tracking, statistics, and useful comparisons they need to specifically determineenergy-saving opportunities and track energy/carbon reduction goals.

Using Policy to Create Energy Savings

With a network-based, comprehensive solution, enterprises will gain the ability to optimize and reduce energy consumption across distributed office environments. They will also be able to create policies to automatically and remotely manage power for distributed office equipment, powering systems down when idle/not needed. When energy follows productive users, enforced by automated policies, capacity aligns with demand across the distributed office environment, and savings are achieved. This shifts thinking and practice from consuming maximum power at all times by default to dynamically consuming the amount of power needed.

Organizations that have already adopted an enterprise energy management solution are making some interesting discoveries about employee work habits and power drawn by various office equipment. For example, one company learned that its video teleconferencing system was drawing as much energy overnight as an entire floor's worth of devices and equipment. By automating a time-based policy to power down this system during idle hours, the company achieved significant, immediate savings.

Another organization learned that many of its supposedly mobile computing devices never left the building. Furthermore, many of these devices were often left on overnight while not in use. Automated policies that power down idle, unproductive office equipment can save 30 to 60 percent in energy costs. An ideal solution will provide opt-in/opt-out policies for end users to preserve productivity.

Event-based policies designed to support energy following the productive user can power up/down campus devices when employees enter and exit a facility. Time-based policies power down PCs, monitors, access points, printers, copiers, and lights after hours and on weekends. Additionally, another capability, load-adaptive computing, adds even more granular flexibility to managing energy consumption in the distributed office environment.

Figure 2 shows Cisco Energy Management dashboard.

Figure 2.   Network Dashboard for I.T. and Network Administrators
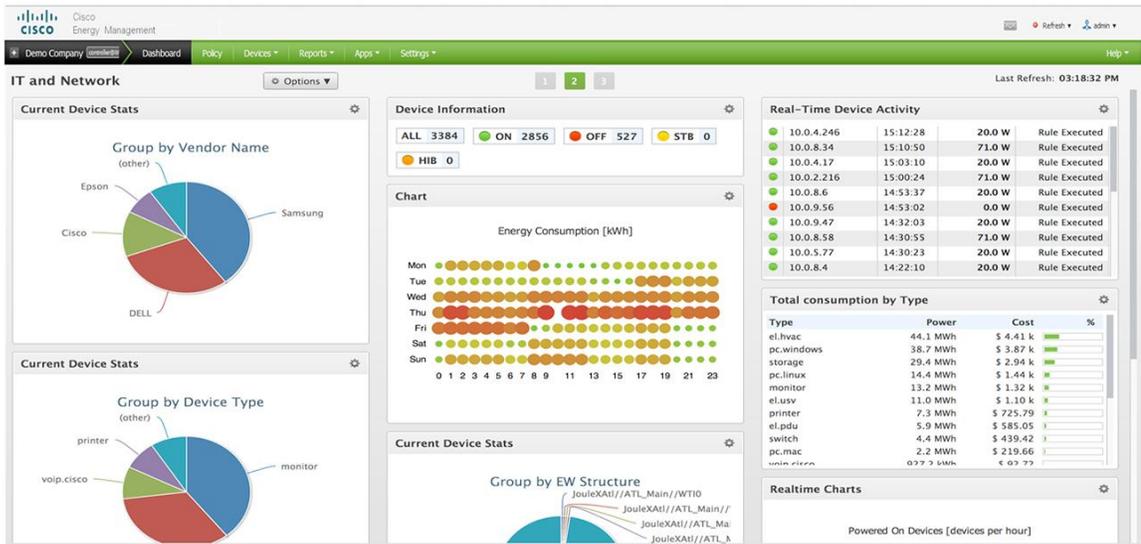
Load-Adaptive Computing: Match Power with Utilization

A common and widely accepted tenet of IT energy reduction is to turn PCs off at night and on weekends, when they are noting use. But even when enterprise PCs are in use, they waste up to 30 percent of the energy they consume. Most employees use only a fraction of the processing power that their PCs actually need to operate during the workday. Before now, this energy waste was largely unrecognized. But Microsoft Windows and other PC improvements have resulted in more power-efficient equipment. Power policies in Windows automatically place a PC in idle mode and automatic sleep mode, helping to reduce power draw.

But there is still a significant amount of energy on the table that could be further reduced to save costs and carbon emissions for both PCs and other distributed office equipment that does not have built-in power management. To achieve the ultimate energy efficiency without affecting the end-user experience, organizations need an enterprise energy management solution that enables load-adaptive computing.

Load-adaptive computing is a behavioral analysis capability that helps optimize and align a device's energy consumption with the way it is being utilized. Load-adaptive computing enables more granular, flexible PC power management during the day, when users are most active, by dynamically adjusting processor performance levels based on utilization. For example, if a PC is under heavy utilization, the solution allows it to continue operating at full speed. But if, over time, monitoring shows that the PC has light or little utilization, the solution can reduce the power consumption ratio for that PC, saving up to 30 percent of the machine's energy without affecting the user experience. This is a powerful capability for a company that operates 24 hours a day, broken into three shifts. Although it might seem as if there is no opportunity to turn devices off, load-adaptive computing provides the opportunity to adjust power based on periods of higher or lower utilization during each shift.

Load-adaptive computing also works to maximize energy efficiency for other campus devices that do not have built-in power management capabilities. Monitors, printers, VoIP phones, and more can benefit from load-adaptive computing, which better matches their energy consumption to the way they are being utilized in the workplace. The combination of load-adaptive computing and location-based policy promotes efficiency in the distributed office. Together, these capabilities illustrate how devices are being utilized, and when devices are in use, they help organizations adjust performance and power, respectively.

Achieve It with Cisco Energy Management

Cisco Energy Management software for distributed offices helps reduce energy costs by monitoring, analyzing, and managing the energy of all network-connected devices, systems, and facilities assets. With no agents to install and no hardware meters required, Cisco Energy Management provides a detailed view of energy consumption for a wide range of devices, from PCs, Macs, and thin clients to wireless access points, network routers, switches, servers, and more.

Cisco Energy Management uses a unique network-based discovery method to automatically find all devices in the distributed office environment. After discovery, Cisco Energy Management continually monitors and reports energy usage and utilization, enabling organizations to monitor, analyze, and manage energy consumption. Based on the energy metrics and intelligence collected, organizations use Cisco Energy Management to develop policies and rules to optimize energy usage and reduce costs on a massive scale. A typical organization can achieve energy savings of 30 to 60 percent annually. Cisco Energy Management also provides robust reporting to support corporate sustainability initiatives and show incremental improvements over time.

For energy to follow the productive user, Cisco Energy Management enables organizations to create policies that automatically control energy consumption using Cisco Energy Management's time-based, location-based, and robust event-based policies. Cisco Energy Management's execution proxies use existing network and systems management infrastructure to automatically control energy usage of devices and systems. These policies can be implemented by device type, device location, priority of the device, and other parameters. In addition, Cisco Energy Management enables load-adaptive computing to allocate the right amount of power only to those devices that need to perform productive work, minimizing the amount of energy supplied when idle or operating at less than full capacity.

Let Us Prove It

Cisco and our authorized partners can provide an energy assessment for your distributed office or perform a proof of concept that will reveal energy-saving opportunities. To learn more about the Cisco Energy Management suite of products and service and potential energy savings, visit www.cisco.com/go/energymanagement.