

POWER MANAGEMENT IMPLEMENTATION

/// CASE STUDY



Inspired by the Climate Savers Computing Initiative, EDS wanted to align more than 90,000 computers to EnergyStar power management standards. Through an internal system and multiphase plan, the company implemented a small change with a big impact.

ABOUT EDS

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EDS (NYSE: EDS) is a leading global technology services company delivering business solutions to its clients. EDS founded the information technology outsourcing industry 45 years ago. Today, EDS delivers a broad portfolio of information technology and business process outsourcing services to clients in the manufacturing, financial services, healthcare, communications, energy, transportation, and consumer and retail industries and to governments around the world. Learn more at eds.com.

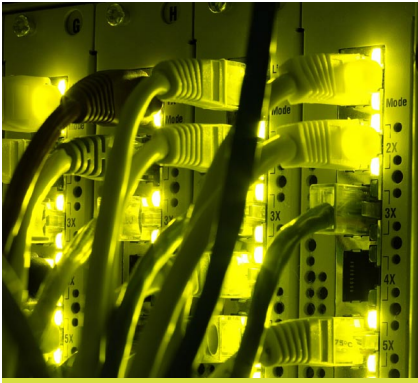
Computer power management cuts electric bill, carbon footprint

EDS, an HP company, is committed to protecting valuable economic and ecological resources - and, like most businesses, yielding a more sustainable bottom line. One of the ways that EDS targeted this dual objective was to move to an environmentally friendly IT power management plan. By simply changing power settings on individual personal computers, which are significant electricity drains that pull between 50 and 750 watts each, the company expects to reduce its direct and indirect carbon footprint and cut its electric bill in the process.

EDS owns and maintains about 140,000 personal computers (30 percent desktops/70 percent laptops), about 90,000 of which are managed via the internal network link and fall under the company's managed workspace service. EDS refreshes this equipment every 36 months and loads new devices with the "EDS image," a standard set of software and settings that go onto every computer that is deployed.

Employees log on to their PCs with individually set passwords and are connected to EDS' Virtual Private Network (VPN), a connection that provides users in remote locations throughout the world with secure access to the main EDS network and servers. The VPN also serves as a delivery path for the Enterprise Management Framework, a program that automatically and routinely installs or updates software, settings and patches as needed to keep each device synced with the current EDS image. This is administered internally by the Consistent Office Environment (COE) group of EDS.

With the delivery method already in place, EDS needed only to create and implement the power management plan. To effectively address this issue, EDS partnered with the Climate Savers Computing Initiative, a nonprofit group that works to promote development, deployment and adoption of smart technologies that can both improve the efficiency of a computer's power delivery and reduce the energy consumed when the computer is in an inactive state. The initiative has developed computer power setting guidelines that meet or, in some cases, exceed the United States Environmental Protection Agency (EPA) EnergyStar recommendations for reducing electricity use and CO2 (carbon) emissions.



The EDS plan was two-fold. First, as replacements are needed, start issuing Energy Star 4.0 compliant devices with power management set at recommended levels. Second, use the Enterprise Management Framework (on-site access) and VPN (remote access) capability to reconfigure employee's current PCs to the desired settings. The changes were announced as part of a companywide environmental sustainability launch, which included information on the power management rollout, articles and features on the EDS corporate "green" policies and programs and other educational materials.

While it was simple to execute the replacement plan, the changes to current PC settings proved a little more challenging. Early testing showed that when power management settings were manually changed to the new standards, some laptops would not achieve standby mode on a VPN connection, on an EDS wireless LAN or on a hardwire to the EDS network. Monitors would dim but not go into standby. These problems occurred most often on older models. However, the updated settings seemed to work effectively on devices that had newer versions of the EDS image - as opposed to an older set of software and settings augmented by patches - and that were running Windows XP (deployed on most EDS computers).

Another challenge was that the stricter power management settings sometimes interrupted or stopped network-based backup and recovery mechanisms, systems management server (SMS) tools trying to update software and deploy patches, and other automated functions. Conversely, the VPN connection prevented the computer from entering the power saver or standby modes.

Before launching a companywide power management scheme, EDS tested computer settings using a lab setting to approximate use in the field. Lab testing helped determine how the new power management settings would work with everyday use.

Because of these issues, the rollout will be implemented in several phases. A phased approach allows for continuous testing and monitoring of the solution without affecting all EDS users at one time if a problem occurs. Older machines can be left at the older settings until all issues have been researched and resolved while allowing a push to newer machines that can take advantage of the settings immediately. Some settings require more testing for impact than others. For example, sending a machine into complete hibernation may stop an automated process. EDS' complex IT environment requires that more investigation be done on the more advanced settings to limit the negative impact of some settings.

Table A: Original Settings

	Energy Star Recommended	Desktop	Laptop Powered	Laptop Battery	Energy Star Compliant
Monitor/display sleep*	Turn off after 15 minutes (or less)	20 minutes	20 minutes	5 minutes	No
Turn off hard drives/hard disk sleep	Turn off after 15 minutes (or less)	Never	Never	10 minutes	No
System standby/sleep	Turn off after 30 minutes (or less)	Never	Never	5 minutes	No
Hibernation	N/A	Never	Never	Never	N/A
Wake-On LAN	Enabled	Disabled	Disabled	Disabled	No

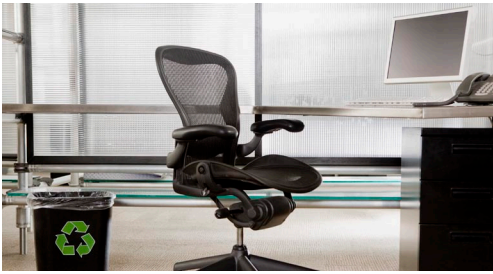
Table B: Phase 1

	Energy Star Recommended	Desktop	Laptop Powered	Laptop Battery	Energy Star Compliant
Monitor/display sleep*	Turn off after 15 minutes (or less)	15 minutes	15 minutes	5 minutes	Yes
Turn off hard drives/hard disk sleep	Turn off after 15 minutes (or less)	15 minutes	15 minutes	10 minutes	Yes
System standby/sleep	Turn off after 30 minutes (or less)	Never	Never	5 minutes	No
Hibernation	N/A	Never	Never	Never	N/A
Wake-On LAN	Enabled	Enabled	Enabled	Enabled	Yes

Table C: Phase 2

	Energy Star Recommended	Desktop	Laptop Powered	Laptop Battery	Energy Star Compliant
Monitor/display sleep*	Turn off after 15 minutes (or less)	15 minutes	15 minutes	5 minutes	Yes
Turn off hard drives/hard disk sleep	Turn off after 15 minutes (or less)	15 minutes	15 minutes	10 minutes	Yes
System standby/sleep	Turn off after 30 minutes (or less)	30 minutes	30 minutes	15 minutes	Yes
Hibernation	N/A	Never	Never	1 hour	N/A
Wake-On LAN	Enabled	Enabled	Enabled	Enabled	Yes

*On a laptop, the monitor is the biggest culprit in battery consumption, accounting for 70 percent of energy use.



A savings of just 20 to 30 watts in power consumption translates into a savings of 60 kWh per year for a desktop/laptop computer that is powered on 2,000 hours per year (40 hours/week, 50 weeks/year). This power reduction gives savings of \$7.20 per year in direct energy costs at a price of \$0.12/kWh for electricity (a typical residential rate) or \$5.31 per year at a rate of \$0.0885. In an air-conditioned home or office, the total savings increases to approximately \$7 to \$10 per year. Looking only at direct energy cost savings, 60 kWh's reduced across each of 90,000 desktop/laptops annually equals 5.4 million kWh's total. The 5.4 million kWh's reduction at a rate of \$0.0885 equals an annual cost savings of \$477,900.

Phase 1 (Q4 2007 and Q1 2008):

- Addressed three out of the four current noncompliant Power Management settings (Wake-On-LAN, Display Sleep and Hard Disk Drive Sleep)
- Updated new computers (or those requiring a new software image) using the EDS image with settings configured as detailed above
- Updated Power Management settings in the forthcoming Windows XP and Vista EDS image (EDS COE team will implement during system installations.)

Phase 2 (Q2 2008):

- Addressed System Standby, the final noncompliant Power Management setting (Testing results determined implementation process.)
- Set up Model Office and COE Impact testing of the Sleep/Hibernate function in Windows XP and Vista against current COE application estate
- Implemented final Power Management settings in the forthcoming Windows XP and Vista EDS image (EDS COE team will implement during system installations.)
- Communicated and distributed updated Power Management settings through the Enterprise Management Framework for existing COE-managed machines

Within a few months, EDS will have pushed power management changes to more than 90,000 computers, reconfiguring each to reduce electricity use without any action on the part of end users. This small change has an expected annual savings of \$477,900 in electricity spend, reducing EDS' annual carbon footprint from electricity production by 3,048 metric tons.* By implementing personal computer power management, EDS lowers costs and reduces our environmental impact.

*The usage-weighted global average greenhouse gas emission factor across EDS is 0.5644 kilograms of carbon dioxide equivalent per kWh delivered.

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