Fusion Trade, Inc. Saves $70 per PC Annually with Computer Power Management

Fusion Trade, Inc., an electronic parts distributor based in Andover, Massachusetts, recently began saving $70 per computer per year by activating sleep settings on PCs. ENERGY STAR's free EZ GPO tool allowed Fusion's network administrator to centrally control computer power management settings on Windows XP PCs using Group Policy Objects. With 40 computers, the company will save about $2,800 annually – demonstrating that activating power management features is well worth the effort, even for small businesses.

"In these tight economic times every penny counts. Close to $3,000 in savings annually was well worth the time spent on the effort," said Mike Sirois, Fusion's Network Manager.

"Fusion has demonstrated -- with minimal IT effort and no impact on user experience -- that activating power management settings on computers and monitors can save a substantial amount of money," said Steve Ryan of EPA ENERGY STAR.

The Problem – Computers and Monitors Burning 24/7

Despite its modest size, Fusion is one of the largest independent electronic parts and components distributors in the world. Fusion's competitive advantage stems from their dedication to reducing inefficiencies in the procurement, ownership and disposition of electronic components. Mike Sirois, Network Manager at Fusion, realized that the company's policy of leaving computers powered on 24/7 was, contrary to companies' business model, inefficient.

As is the case in many companies, computers were left on 24/7 to accommodate night-time software updates such as Windows security patches and new antivirus definitions, as well as the need for remote administration while offices were unoccupied. Power management settings were not activated on computers and only some monitors. The result of these two policies was that some employee workstations, which included a computer and two LCD monitors, were on all day, all night, and weekends. "We had to find a simple way to save energy but not interfere with the day to day duties of the sales staff, software patching or off-hours remote administration," said Mr. Sirois.

Mr. Sirois found everything he needed by joining the ENERGY STAR's Low Carbon IT Campaign. The Campaign promotes the activation of computer sleep settings, which allow computers and monitors to enter a low power sleep mode after a period of inactivity. The Campaign provides:

- **Free technical expertise** and assistance to help you determine the best way to activate monitor power management (MPM) and computer power management (CPM) features in your IT environment;
- An **estimate of your organizations' energy and carbon savings**, which you can apply towards your carbon reduction goals.
- An official **certificate of recognition** from EPA acknowledging your efforts on behalf of energy efficiency and the environment. (See Fusion's certificate below.)


CERTIFICATE OF RECOGNITION

ENERGY STAR

PRESENTED TO

Fusion Trade, Inc.

By the United States Environmental Protection Agency in recognition of their commitment to a better environment and reducing greenhouse gas emissions as a participant in the Low Carbon IT Campaign.

Awarded in November 2008.

Steven Ryan
ENERGY STAR
U.S. Environmental Protection Agency

The Solution – EZ GPO Tool and Task Scheduler

At the Campaign website,[i] Mr. Sirois reviewed the various tools available to activate sleep settings quickly and easily across his network of Windows XP

machines. He selected the EZ GPO tool – a free application from EPA that allows network administrators running Windows Active Directory to configure and manage client power management settings using Group Policy Objects (GPOs).[ii] EPA also offers free technical support for organizations implementing CPM, and help with estimating savings. Via a conference call with EPA experts, Mr. Sirois was able to resolve minor implementation issues and better understand the energy savings potential for the project.

Once CPM features were activated, Fusion would need to wake up sleeping machines at night in order to accommodate centralized night-time updates using Windows Server Update Services (WSUS). After reviewing the options, Mr. Sirois selected Windows Task Scheduler[iii], a tool built into Windows XP, to wake computers. In Task Scheduler, Mr. Sirois programmed a scheduled event[iv] and copied the event to all PCs.[v, vi] In summary, night-time updates worked in the following manner:

- During normal business hours, WSUS allows the PC to download updates. Once downloaded, updates sit in queue, waiting for 3:00 AM as per WSUS update policy.
- 90 minutes after the user leaves for the day, the computer sleeps.
- At 3:00 AM, the Windows Task Scheduler wakes the computer and installs updates in the queue.[vii]

An additional challenge involved giving administrators access to sleeping PCs. The administrator can send a wake packet using Fusion-WOL or comparable Wake-On-LAN tool, and then remotes into it using Remote Desktop Protocol (RDP). When the RDP session ends, the PC goes back to sleep -- maximizing power savings potential while not interfering with remote support.

Documenting Savings: the Metering Study

To demonstrate the energy savings associated with Fusion's CPM implementation, EPA used 10 "Watts Up Pro" power meters (see picture below) log power draw in Watts every minute for five weeks at the power strip beneath employee desks. The meters logged total workstation power draw – including two LCD monitors, the computer, and a charger for a telephone headset (which used very little power). During the first week of the metering study, sleep settings were not changed on any PCs and a baseline energy use profile was established. During the second week, EZ GPO was used to distribute the sleep settings. 45 minutes of inactivity would trigger sleep on the monitors. 90 minutes of inactivity would trigger sleep on the computer.

The Results

Figure 1a and 1b shows one type of PC at the site, where monitor power management settings had already been activated by the end user, and shows time versus power readings (in watts).

- From November 11th to 18th, the baseline behavior is observed. The Dell Optiplex 210L computer and two Dell E172FPt LCD monitors draw roughly 115 to 170 watts when active -- depending on the level of computer usage. At night and on weekends, the readings drop to just below 80 watts as the computer remains on and the monitors drop into a low-power sleep mode.
- On Tuesday night, November 18th, computer sleep settings were activated. First the monitors go into sleep mode and total workstation power draw drops to just below 80 watts. Shortly thereafter the computer goes to sleep, reducing total power draw to only 5 watts. The 5 watt draw is observed on nights, weekends and holidays. Power usage "spikes" in the middle of the night are scheduled 3 am night-time software updates.

Similarly, Figure 2a and 2b shows a different PC where the MPM setting had not been activated prior to the metering study.

- From November 11th to 24th, the baseline behavior is observed. For 24 hours a day, the Dell Optiplex 170L computer and two Dell 1707FPt LCD monitors draw roughly 130 to 200 watts -- depending on the degree of computer processor utilization. Because the monitor power management setting is not activated, power consumption does not drop during nights or weekends. (The only exception being November 13, when the user powered down the machine manually.)
- On Monday night, November 24th, computer sleep settings were activated. The monitor goes into sleep mode first and total workstation power draw drops to around 90 watts. Then the computer goes to sleep, dropping total power consumption to only 5 watts. The 5 watt power draw is observed during nights, weekends and holidays, except at 3 am when scheduled night-time software updates are running.

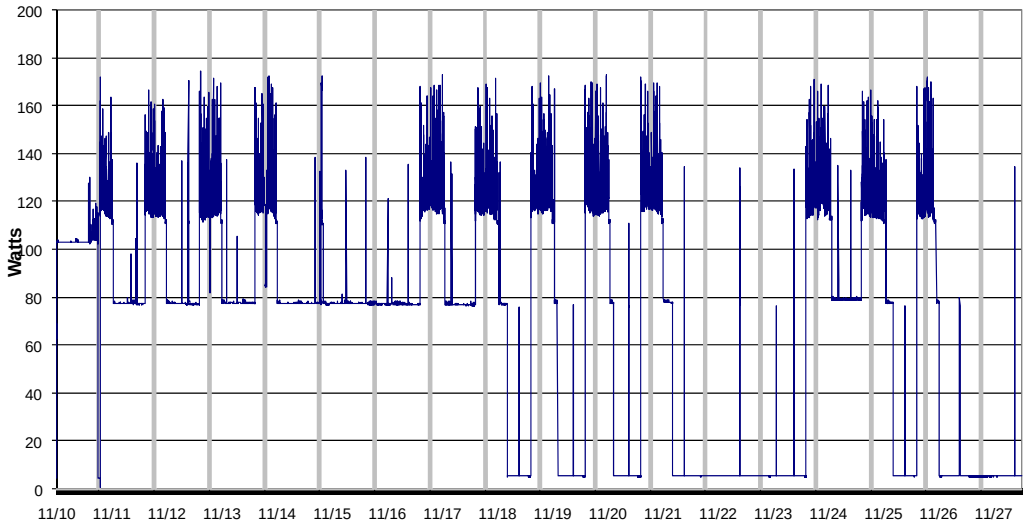
Based on metering, EPA estimates energy savings associated with Fusion's power management initiative at roughly 450 kWh annually per computer. At 16 cents per kWh, this comes out to $70 per PC annually.

Conclusion

With minimal commitment of IT staff time and no software costs, Fusion Trade configured computers to enter sleep mode using the free EZ GPO tool from ENERGY STAR. WindowsTask Scheduler (built into Windows XP) provided a way to wake PCs at night for software patching. The effort has resulted in $70 of energy savings per PC annually.

Figure 1a

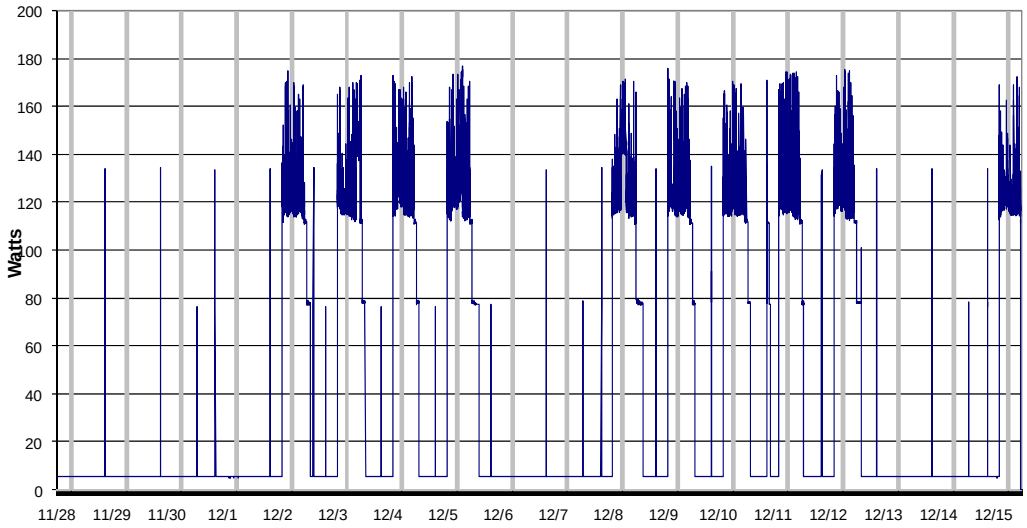
Power Use at J. Pierce's PC (Watts UP 1203)
Read at power strip attached to computer, 2 LCD monitors and headset
Monitor shut down set to 45 minutes; System standby set to 90 minutes



Grey Line Indicates Noon

Figure 1b

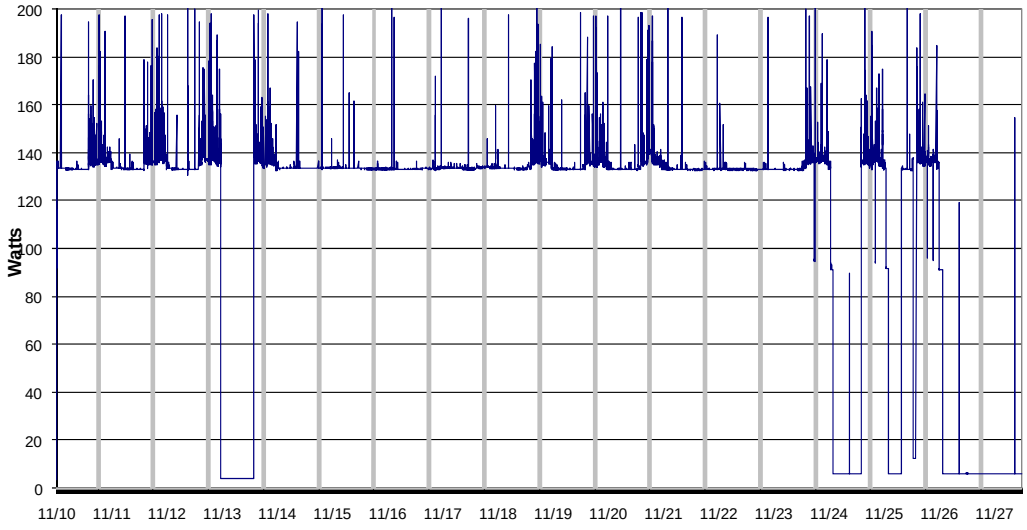
Power Use at J. Pierce's PC (Watts UP 1203)
Read at power strip attached to computer, 2 LCD monitors and headset
Monitor shut down set to 45 minutes; System standby set to 90 minutes



Grey Line Indicates Noon

Figure 2a

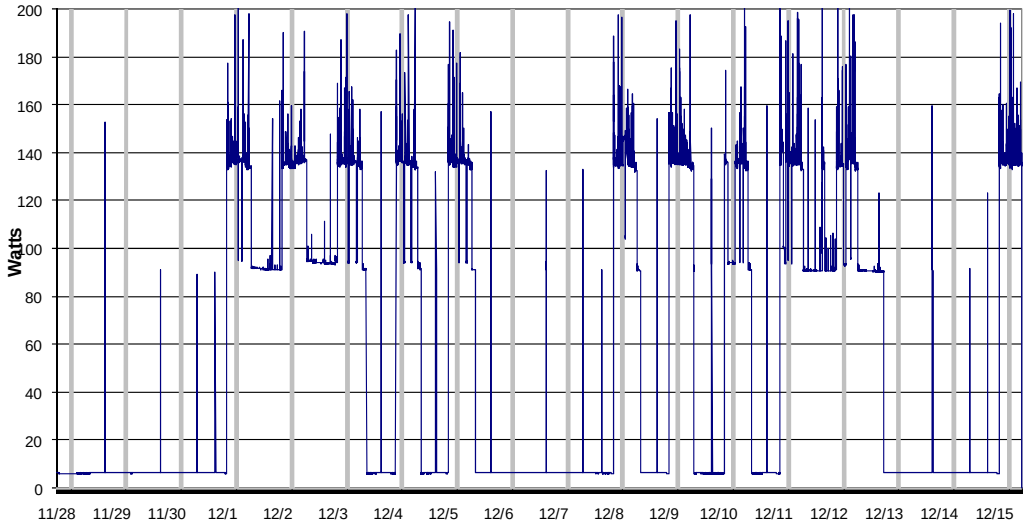
Power Use at B. Masterson's PC (Watts UP 1215)
Read at power strip attached to computer, 2 LCD monitors and headset
Monitor shut down set to 45 minutes; System standby set to 90 minutes



Grey Line Indicates Noon

Figure 2b

Power Use at B. Masterson's PC (Watts UP 1215)
Read at power strip attached to computer, 2 LCD monitors and headset
Monitor shut down set to 45 minutes; System standby set to 90 minutes



Grey Line Indicates Noon

[i] www.energystar.gov/lowcarbonit

[ii] Go to “Implementation Resources” link at www.energystar.gov/powermanagement to download the EZ GPO tool and to read about other ways to activate power management.

[iii] Scheduled tasks use the real time clock (RTC) and power management events (PMEs) provided by the Advanced Configuration and Power Interface (ACPI) to wake the machine out of system standby or hibernate. On the settings tab of a scheduled task, an option labeled "Wake the machine to run this task" will set a PME inside the RTC and wake the machine when the task is scheduled to run.

[iv] A blank scheduled event configured to "Wake up the machine to run this task" should not be used because the PC will sleep immediately after a blank scheduled event. Instead, the wakeup event was a batch file set to ping a server for 3 minutes – granting the computer 3 minutes to see if the updates were downloaded. See more information on scheduled tasks at:
http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_win_task

[v] “My Network Places” was used to browse to each PC on the LAN and paste the scheduled event in each PC. Larger organizations may want to use 3rd party software or a custom script to distribute the scheduled task.

[vi] Unfortunately, the security credentials do not get copied and had to be re-copied manually to each PC. The credentials should be an account with at least administrative privileges to the local PC. Mike Sirois created a dedicated administrative account on the domain and set it with a strong password and used this account to authenticate the task scheduler when it runs the event. If anything goes wrong, the PC can register the event and the user account, referenced in the event log, to indicate what failed. This is a common practice among any Windows service that needs admin privileges to accomplish a task or to run a service and helps in troubleshooting.

[vii] If updates exist, Windows will install them and reboot the computer if needed. If a reboot occurred, the machine will not sleep again for 90 minutes. If there are no updates or if a reboot was not needed, the PC sleeps immediately because there was no restart or keyboard/ mouse input to reset the counter.