Verdiem® PC Power Management: Maximizing Energy Savings with Microsoft® Windows 7

How to Leverage OS and Networking Technologies to Save up to 60% on Power

This white paper has been written for IT Directors and Desktop Administrators contemplating PC Power Management and wondering if Windows 7 will deliver on its energy savings promise. This piece discusses key elements of an effective PC power management solution, the enhancements delivered in Windows 7, and how Verdiem SURVEYOR leverages these capabilities to deliver a complete enterprise-level PC power management solution that maximizes your energy savings.

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Introducing Power Management

Everybody wins when you reduce the number of watts each computer in your company consumes: your organization reduces operating expenses; the environment benefits due to less demand for power; and you demonstrate your commitment to greener business practices. No wonder, then, that 43% of organizations are now implementing PC power management programs, and another 48% are considering it.[1]

PC power management offers several secondary benefits, ranging from reducing office cooling requirements and decreasing any utility peak-load demand surcharges, to possibly even gaining financial rewards for environmentally conscious computing practices.[2]

Key Elements of a PC Power Management Solution

Most IT administrators have never before needed to grapple with power management issues. If the discipline of power management is new to you, you might understandably reason, "I'll just tell my users to turn their computers off when they can. What's the point of a commercial power management solution?" But when theory turns into practice, the complexities of managing power across an enterprise without impeding the company mission quickly reveal the reasons you need a sophisticated solution.

Shutting down PCs has the potential to impact the whole company. If not implemented properly, conservation efforts can reduce employee productivity and disrupt revenue-generating business processes. To avoid these negatives, your search for a successful power management solution should consider the following issues.

- **Saving energy should not burden your users nor impede your business.** Your company exists for an important reason, and your power reduction program must not interfere with getting that job done. In order to avoid harming productivity, you have several key issues to work through:
    - ***Be smart about when PCs are shut down and when they are turned on*** – each workgroup may have different usage patterns. Getting this right is crucial to avoiding help desk calls whilst maximizing energy savings.
    - ***Avoid losing important data or crashing critical applications*** – before putting PCs into low power modes, some applications may need to be gracefully terminated while others may be just too important to interrupt. In the latter case, these PCs may need to be exempted from power management.

[1] Forrester survey, "The State of PC Power Management: 2009."

[2] These and other benefits are cited by New Star Energy Services in their PC Power Management FAQ.

"From our green building requirements to our clean vehicle policies, sustainability is a critical component of the City of Boston's future. Using Verdiem's Surveyor demonstrates the city's commitment to lead by example by reducing energy use and harmful greenhouse gas emissions while saving taxpayer money."

—Thomas M. Menino
Mayor of Boston

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  - ***Enable users that access their machines remotely, say from home, unhindered access*** – sleeping machines that are turned off will not accept remote access connections, potentially, impacting user productivity.

- **Saving energy should not disrupt PC maintenance.** Saving energy by turning off PCs cannot be asserted at the cost of vital IT services that maintain the health, reliability, and security of your PCs.
  - ***Ensure all target PCs are awake for scheduled off-hours IT maintenance*** – for example, wake up all machines for patch Tuesday from 2 AM – 5 AM.
  - ***Allow on-demand power state control of targeted PCs for unscheduled activity*** – ad hoc updates dictate that PCs be woken up and/or rebooted on-demand (for example, installing anti-virus updates to head off a new, rapidly spreading threat).
- **Saving energy should add as little overhead as possible to IT duties.** The key objective of IT is to support core business objectives. Thus, PC power management should have 100% uptime, work seamlessly and cannot burden IT with additional administrative overhead and added help desk calls.
  - ***Automatically assign comprehensive policies to a dynamic set of machines*** – PCs are constantly moved, reassigned and repurposed. The PC's power policy should change automatically and match the needs of the associated workgroup, their business applications and IT maintenance activity.
  - ***Pick a reliable solution for PC power state control*** – Wake-on-LAN (WoL) is one mechanism that can facilitate real-time control of PC power state. However, WoL will not work reliably in most network configurations. Make sure your solution offers a reliable, zero-overhead alternative.
  - ***Fewer moving parts, means lower cost of ownership*** – minimum overhead implies simple, elegant architecture with one-stop-shop for all key functions. A good solution should cover ad hoc as well as policy-based power control, easy troubleshooting of power management issues and credible energy consumption/savings reporting for the IT manager, energy manager and C-level audiences.

You can now see why setting a global policy such as a GPO or relying on your users to turn off their computers at night is an unrealistic approach. An effective enterprise PC power management solution must address the above considerations, and more.

The improvements in Windows 7 power consumption, though welcome, do not sufficiently address the administrative aspects of reliability, security or availability. However, using a combination of OS-level features in Microsoft Windows 7 and enterprise-focused features in Verdiem SURVEYOR software, you can achieve the ideal solution. Without burdening users, without slowing business, without disrupting maintenance, without compounding overhead, you can enjoy dramatic savings in your electric bill. The rest of this paper details the features in Windows 7 and SURVEYOR that make that ideal a reality.

"Lowering energy costs is one of our key sustainability initiatives and Verdiem's PC power management solution has quickly and non-disruptively produced tangible reductions in energy consumption and carbon emissions."

— Wayne Shurts, CIO, Cadbury

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Power Management Enhancements in Windows 7

Windows 7 contains many capabilities designed to reduce how much power an individual desktop or laptop computer consumes. Many of these features target reducing CPU processing and improving battery performance. Below are a few technical details about how Windows 7 improves battery performance:

- **Fewer background processes mean less energy consumed.** Smarter prioritization of background events promises to reduce power consumption even while the PC is actively used. Unlike prior versions of Windows, background processes in Windows 7 can start only when needed. For example, an imaging service that would run always can be modified for Windows 7 by the device vendor to start only when the camera is connected to the PC, and stop when the camera disconnects. Fewer running processes requires less CPU and memory usage; hence, less power. The new *Trigger Start Services* included in the re-architected Windows 7 Service Controller make this capability possible.
- **Fewer applications can force the OS to stay awake.** In previous versions of Windows, any application could ask the OS to stay awake. The new *Power Availability Request* interface keeps better track of what applications are asking the OS to stay on. Windows 7 now allows programs that have system-level privilege, the right to terminate "stay awake" requests made by unworthy candidates like a media or Flash player. It also imposes specification of a "reason code" on the wake requests so that legitimate requests can be easily parsed out.
- **System activity "bursts" instead of "chats," increasing PC idle time.** With a new *Timer Coalescing function*, Windows 7 compresses system activity into smaller chunks of time. Smarter coordination of automated events makes the OS less chatty and creates longer periods of quiet time. This allows more opportunity for power management features to work. Core system processes automatically leverage this new Windows 7 feature, but other applications must be re-written using the new *Timer Coalescing API* to take advantage of it.
- **Display brightness can reduce automatically.** This new feature may increase battery performance. It can be used as a first step before eventually putting the PC into a sleep mode.
- **New diagnostics point to issues that may affect battery performance.** The *powercfg* utility has been enhanced to help PC manufacturers and driver and application developers, prior to shipment of new PC models, proactively troubleshoot issues in their code that may affect battery life. For individual PCs, the utility can flag applications that may not adhere to power management best practices.

These and other features make Windows 7 power usage increasingly efficient. However, these OS-level improvements can be refined and leveraged even further. That is where Verdiem SURVEYOR comes in.

Verdiem is a Microsoft Gold Certified Partner and SURVEYOR 5.2 PC power management solution has achieved the "Compatible with Windows 7" certification. SURVEYOR offers seamless integration across mixed Windows OS environments for enterprise customers who are engaged in a phased migration to Windows 7.

Winner of the 2008 Microsoft Partner of the Year award for ISV/Software Solutions & Innovation.

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Verdiem SURVEYOR Leverages Windows 7 Capabilities

SURVEYOR's enterprise PC power management functions build on some of the new features in Windows 7 and leverages them more practically beyond the individual PC level:

- You can use the Windows 7 *PowerCfg* diagnostic utility to identify misbehaving, "power-hog" applications on individual PCs, but *PowerCfg* cannot resolve issues. Using SURVEYOR, you can review issues centrally across all of your PCs, author policies that gracefully terminate these apps and save power without causing corrupted sessions or lost application data.
- Windows 7 creates more periods of idle time on each PC. SURVEYOR can analyze and report this utilization. It allows you to, in a single policy, include multiple power schemes that match the various inactivity periods. You'll save more energy than was possible before, and without disrupting users.
- Because Windows 7 runs processes only when they're needed, machines can boot up more quickly. SURVEYOR tracks end-users' utilization and machine power state changes over time. This feature together with the faster boot up time can be leveraged to auto-wake PCs closer to when employees begin their work yielding more aggressive energy savings without annoying users.

Clearly, Windows 7 OS-level enhancements – as welcome as they are – do not account for complexities encountered when centrally managing many PCs. For one thing, many of these improvements are designed to improve battery life, which may not translate into much savings from your utility bill. But more importantly, as recognized by Microsoft:

> *Energy efficiency requires investments across the entire platform, not only in the core hardware or in the operating system. While Windows 7 can have a significant impact on platform energy efficiency, attached devices, and non-Microsoft and end-user applications, other platform extensions often have a larger total impact. The complexity and quantity of platform extensions require a broad approach to energy efficiency beyond focusing on a single component in the platform.*[3]

Windows 7 can help reduce some power consumption at the individual PC level. However, to achieve significant, measurable power savings without impacting critical business, the real-world challenges of end-user disruption, patch management efficacy and over-burned IT staff, demands a low-overhead, enterprise-class solution that can centrally manage all PCs and enhance IT-business alignment. Verdiem's SURVEYOR satisfies requirements for all environments large and small. In a simple to use package, it addresses all challenges elegantly and efficiently. Read on to understand how.

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[3] "Windows 7 Power Management" white paper, April 2009, available from Microsoft's Environmental and Sustainability Blog.

Extending Windows 7 Power Management to the Enterprise

Windows 7 adds some interesting power management settings in its operating system, but alone it will not offer significant and far reaching energy savings. Verdiem SURVEYOR adds many enterprise-level features that reduce PC energy costs up to 60% with the added benefit of enhancing IT patch management effectiveness. It can do this whilst ensuring no impact to end users or burdening IT with additional work – a high ROI, quick payback and low cost of ownership solution.

SURVEYOR represents a solution that increases IT operational efficiency and effectiveness with an accurate, credible means to report your return on investment. The following SURVEYOR features are vital to enhancing IT management of PCs as well as extracting the most savings within the shortest duration:

- **Extract the most savings without impact to users or business applications** – SURVEYOR provides important facilities to help you identify exactly when users are actively using their PCs. This intelligence together with a comprehensive selection of policy exceptions means there is no need to exclude vast number of PCs from power management or settle for very timid power policies that limit savings.
    - ***Analytical approach to policy management*** – SURVEYOR provides historical trending of end-user usage as well as PC power state transitions. This helps to group machines with similar usage, analyze what-if policy scenarios and establish policies that best match the workgroup pattern. One can even identify lull intra-day periods and capture all inactivity periods in a single policy. This analytical approach extracts much more savings than a one-size-fits-all, guesswork approach to power policies.
    - ***Comprehensive policy exceptions*** – policies can include rules to skip power management if critical applications are encountered or gracefully terminate applications (including saving data) before placing PCs in a low power mode. Other examples of policy exception are the disabling of power management when a PC has active remote access connections or empowering users to skip scheduled power state changes.
    - ***SURVEYOR offers outstanding remote access support, for any employee***. For users that need to access their office machines from home or other remote locations, SURVEYOR's *Wake on Web* feature provides users the ability to wake up their machines so that they can successfully login remotely.
    - ***Credible reporting that targets C-level and corporate audiences***. SURVEYOR offers easy and accurate measurement of energy consumption prior to activating power management. This results in credible dashboard views that allows management to see at-a-glance how power efficiency initiatives are faring. Administrators can create visually compelling charts, showing energy usage in various forms such as carbon equivalent units, fuel saved, dollars saved, cars off the road; whatever. Reports can also be viewed by geographical region or business unit.

"In selecting a best in class partner, we conducted a rigorous evaluation process of PC power management solutions and Verdiem was the clear choice. Our people don't even know it's there. We're saving nearly 40% on power usage, but we have no impact on the operation whatsoever. Any organization serious about sustainability and green-IT should be looking at Verdiem."

— Peter West, VP of ITOPs & Development, Cox Communications

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- **Enhance your IT patch management and software distribution success.** For decades, IT directors have encouraged workers to leave computers on all night so that maintenance can occur. That is a huge waste of power. SURVEYOR enables off-hours patching without all-night power ups.
  - ***Robust Wake-on-LAN (WoL) feature can wake up PCs on-demand.*** SURVEYOR implements an enterprise-class WoL solution called *Wake on WAN*. It operates in any network topology and enables PCs to be automatically woken up just before a scheduled patch. Machines go back to sleep when the patching process is done.
  - ***Prevent interruption of patch, software updates.*** A feature in Windows can cause PCs that are woken up for maintenance, to go back to sleep before receiving the patch or software update. SURVEYOR adds policy attributes that can ensure PCs remain awake during the maintenance window.
- **Deploy your solution quickly with low administrative overhead and on-going maintenance**. SURVEYOR software can be deployed and configured in a matter of days. This means that energy savings can be accrued in short order with payback in as little as 6 months.
  - ***Elegant architecture with a single agent and server.*** SURVEYOR reduces complexity of securely managing a large PC network in both centralized and decentralized IT organizations.
  - ***Zero-overhead policy management.*** Policies can be dynamically assigned to groups of PCs using business rules that test various client attributes such as name, IP address, etc. This provides hands-off power management for any PC environment.
  - ***Zero-administration Wake-on-LAN works reliably in any network topology.*** With just a few clicks, SURVEYOR automatically manages subnets and fault-tolerant wake proxies to ensure all PCs in the network can be controlled in real-time.
  - ***Detection and automatic resolution of incidents.*** SURVEYOR detects and automatically resolves misbehaving applications that can prevent PC sleep and shutdown states which means no added work for the administrator while maximizing energy savings.
  - ***Solution is platform independent but also works seamlessly with any desktop management suite.*** SURVEYOR is a complete one-stop shop for PC power management. Additionally, it can also work in concert with any client management suite including Symantec Altiris, Novell ZENworks, BMC Marimba, HP Client Automation or Microsoft System Center ConfigMgr. An integration module for Microsoft System Center ConfigMgr adds further capabilities that enhance the administration experience.

Teaming with Microsoft

Verdiem is a certified Microsoft Gold Partner achieving the highest level of competence and expertise with Microsoft technologies. As a Gold Certified Partner, Verdiem has built a close working relationship with Microsoft to ensure that Verdiem products take advantage of the latest technology advances and stay in lock-step with Microsoft product releases, including Windows 7 certification for SURVEYOR.

How to Learn More

Visit our website for more information. There you can see first-hand how SURVEYOR technology works, schedule a WebEx product demo or evaluate SURVEYOR with a free 30 day trial. Or simply call us toll-free at 1-866-837-3436.

About Verdiem

Verdiem is an enterprise software company focused on PC Power Management and Green IT. Verdiem's flagship SURVEYOR software enables customers to centrally control and reduce the energy used by PCs on their network by up to 60 percent without impacting end users or IT. Over 400 corporations, government agencies, and universities have deployed SURVEYOR on over 1 million PCs to have a positive impact on the environment-reducing PC energy waste and carbon footprint.

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