Eco Drive with Power Manager

Overview

Lenovo's ThinkVantage Power Manager is a power management program to helps users and IT administrators adjust power settings to achieve the best balance between system performance and power saving (Figure 1, Figure 2). Power Manager provides a variety of power-saving features. The user can specify the level of power saving by simply using the slider, or go into advanced features that configure power plans to meet specific power saving needs, stretch battery life by disabling unnecessary devices, enable quick resume, and monitor detailed battery information. Power Manager provides all these function with industry leading, Lenovo-unique features.

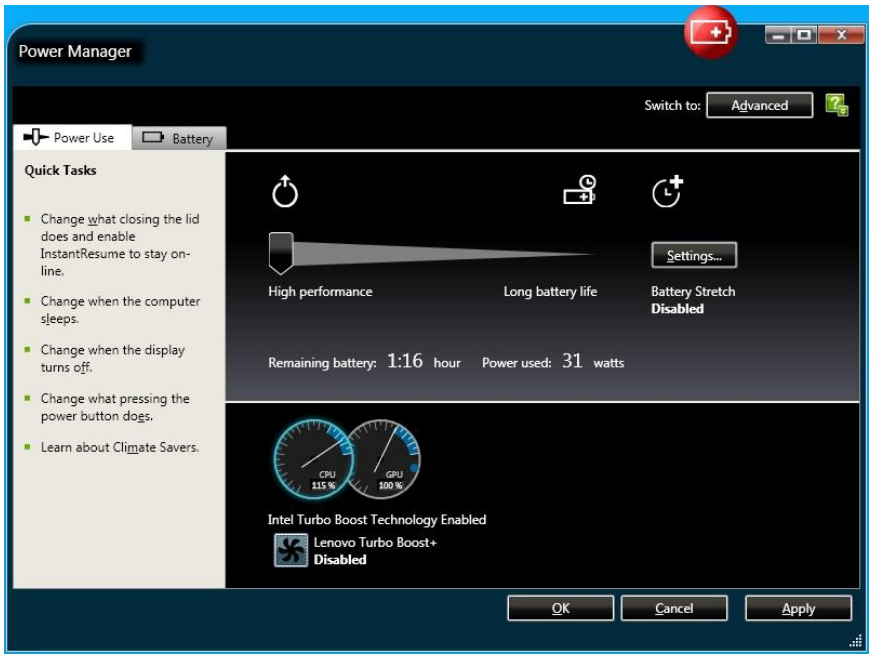

Figure 1. Power Manager User Interface

Figure 2. Power Manager Battery Gauge in Taskbar

Power Management of a computer is an important "green" feature since it can help users save energy and money. When the IT administrator applies power management strategy on computers throughout the entire organization, the savings can be far more substantial. Power Manager is configured by default to use its energy efficiency features. Power Manager also gives the IT administrator numerous options for tailoring power management settings to optimize energy efficiency throughout their organizations.

Power Manager allows for management of system power in several different ways.

First, the user and the user's IT support desk may use the basic power management settings for "usage based" power savings such as turning off the monitor or going into sleep state after several minutes of inactivity.

Second,Power Manager allows users and IT administrators the ability to set "time of day based" settings by using the "Power Agenda" feature (on select systems). This is important for peak power handling. Peak power refers to the time of day when there is the most demand for electricity, requiring more power from the electrical grid. Power plants are developed to meet peak power and often power is wasted during off-peak periods. Many power utility companies offer time-of-day electricity pricing and power agenda can alter power use based on that schedule to save energy at peak usage hours. Peak Power Scheduler in Power Manager details are presented later in this paper

Third, the IT administrator may connect the ThinkPad into the Cisco EnergyWise enterprise power management solution that manages power use across the entire enterprise. Cisco EnergyWise details are presented later in this paper. The Lenovo ThinkPad is the first computer product to support Cisco EnergyWise.

ThinkPad and "SmartGrid"

Power manager has many "Smart Grid" technologies built in. IT Administrators may "push" power settings out to their user communities via "Active Directory", "LanDesk", and Cisco "EnergyWise" technologies.

As is mentioned above, sleep and the ability to turn off the display is important to save power. Windows has features to automatically place into sleep/hibernation modes, or power off the display after a period of user inactivity. Power Manager goes beyond this by enabling the user to schedule power actions by creating power agendas to meet the specific needs. With Power Manager, users have not only sleep and display off timers, but also can change the display brightness, power plan switch, and Peak Power Scheduler can be scheduled activated. Peak Power Scheduler is described in the next chapter.

Power Manager also enables an IT administrator to deploy a power agenda by Active Directory as shown in Figure 3. The IT administrator can update the power agenda settings of client computers remotely and the users of client computers can have those power agenda work automatically without configuring power agendas by themselves.

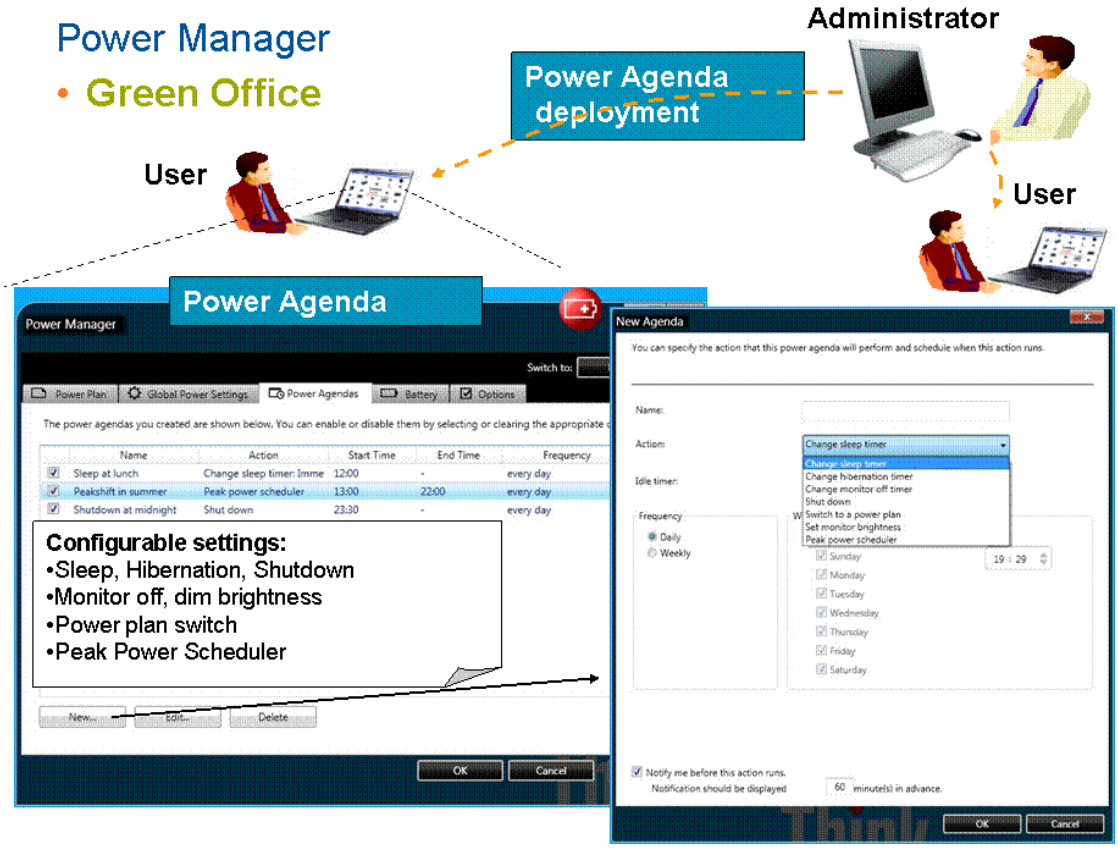

Figure 3. Power Agenda deployment

Peak Power Handling

Peak power is the maximum level of energy demand on the power company "grid." Power plants are developed to meet the peak power demand. The amount of electrical energy demand varies over time and depends on weather, but is often high during midday as shown in the picture 2. Nuclear power generation is constantly available and is used throughout the day. During midday, oil, LNG, or gas are more used in power plant to meet peak power, and results in large CO2 emissions during midday as show in the Figure 4 and Figure 5. Reducing peak power leads to less fossil fuel consumption and peak hour power cost.

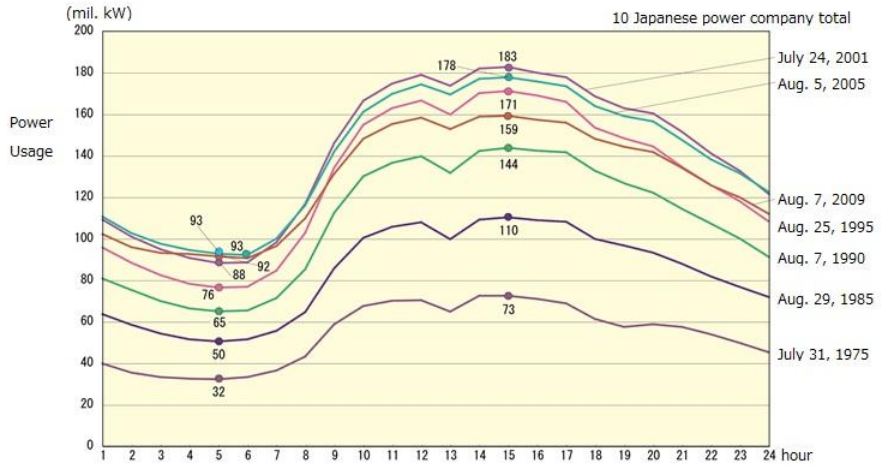

Figure 4. Daily power usage

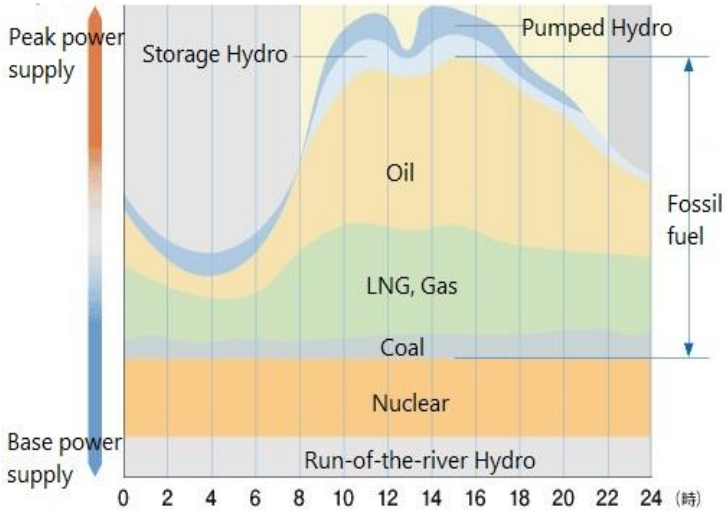

Figure 5. Daily energy type usage

ThinkPad batteries can be used for energy storage to reduce peak power. Electrical energy is stored during the night and the stores are used at peak time as shown in the Figure 6. In Power Manager, “Peak Power Scheduler” is offered to do this as shown in the Figure 7. This is possible because ThinkPad hardware and embedded controller is designed to have ability to discharge battery even when AC adapter is connected.

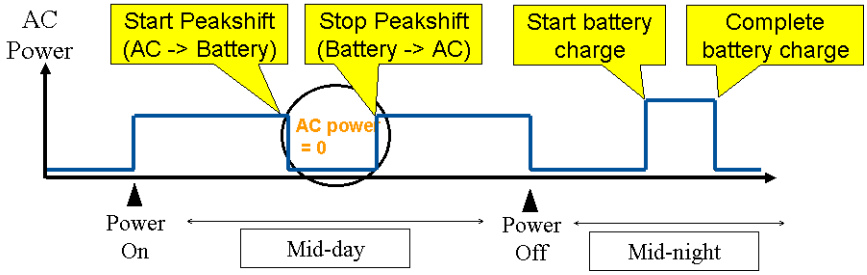

Figure 6. How Peak Power Scheduler works

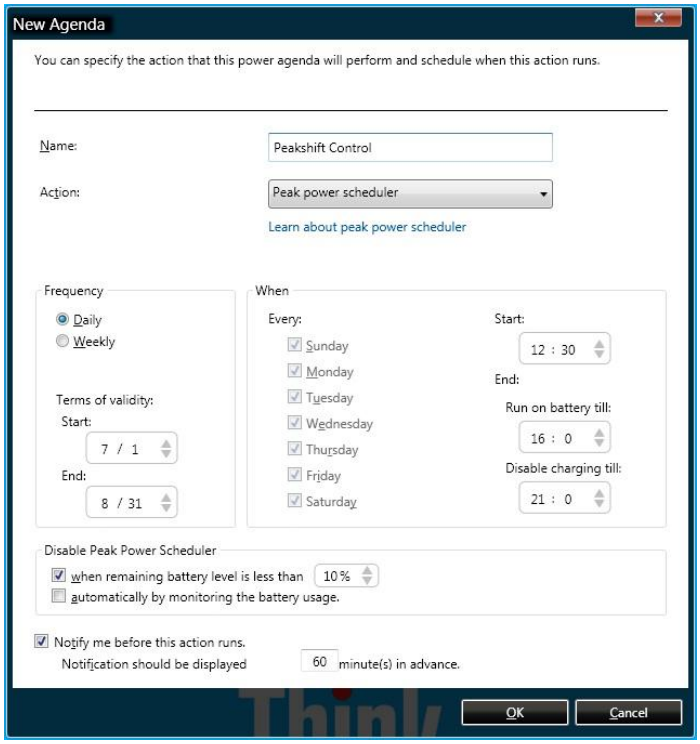

Figure 7. Peak Power Scheduler User Interface

Cisco EnergyWise

Cisco EnergyWise is an IOS based software application that allows Cisco networks to control and perform energy management. The Cisco EnergyWise software enables customers to monitor, control and report on the energy use of building equipment and IT devices using a Cisco EnergyWise enabled network. More importantly, Cisco EnergyWise enables customers to set dynamic power policies that enable them to save money and reduce green house gas emissions when equipment is not in use.

Lenovo and Cisco worked together to make ThinkPad the first computer product to support Cisco EnergyWise. The ThinkPad has the ability to measure its power consumed and the IT administrator is able to monitor actual power consumption of ThinkPad as shown in the Figure 8. Most common power monitors in the world are not based on measured power consumption, but are based on prediction. The actual data the ThinkPad provides will allow the IT administrator to know accurate power costs and help determine the proper action. Also, the IT administrator is able to place ThinkPad into sleep, hibernation and shutdown together with all other endpoints connected to Cisco network.

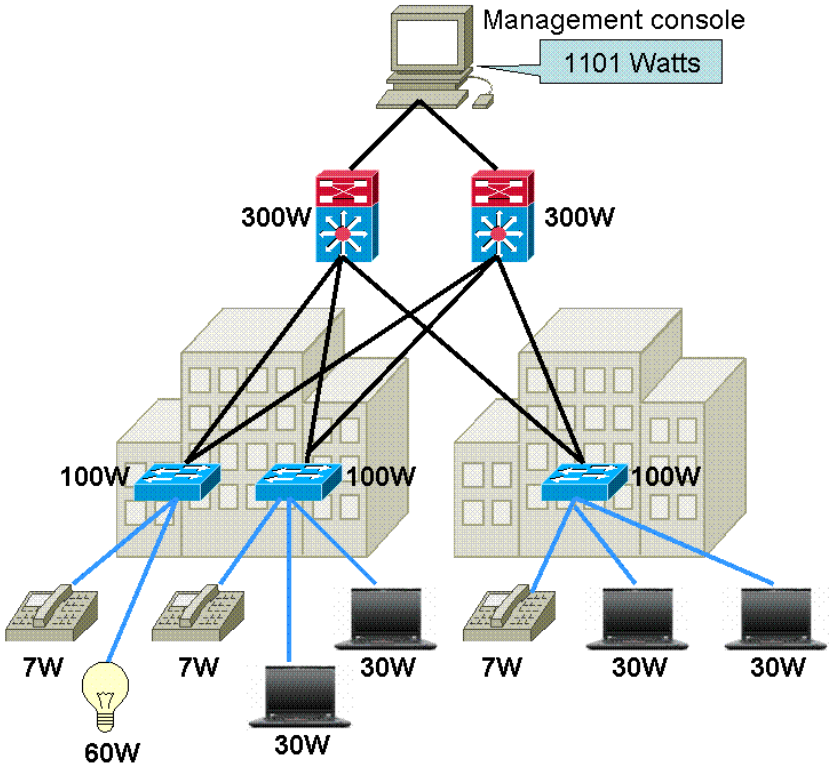

Figure 8. Cisco EnergyWise and ThinkPad

Discussion

Three green technologies mentioned in this paper in Lenovo Power Manager allow users and enterprise customers to better manage their power utilization. These technologies are very helpful not only for "green," but also for power crisis management. Recently, there have been cases where power load demand exceeds power generation capacity. In 2007, a power crisis happened in California due to heat wave. In March 2011, the tragic earthquake in Japan damaged nuclear energy plant, and many cities in Japan are still facing severe power shortages. We believe that our green technology can help customers in through difficult times like these.

Often times the greenest energy sources are intermittent (such as solar in the daytime, or wind when it is windy), and the technology in ThinkPads can help balance out our energy use.

Resources

ENERGY STAR® Program Requirements for Computers
http://www.energystar.gov/
Cisco EnergyWise
http://developer.cisco.com/web/esdk/home

Biography

Takumi Imai

Takumi Imai lives and works for Lenovo in the Tokyo area of Japan. He has a M.S. in Robotics Engineering from The University of Tokyo. As a Lenovo Staff SW Engineer, he currently architects and develops software for ThinkVantage Power Manager (along with a group of highly talented co-workers). Imai-san is also a member of the ThinkPad “Green” team.

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