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DEARNESS CONSERVATION

COMPUTERS OFF



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Using Computers Efficiently

Mythology about Computer Switching

It is a popular misconception that desktop computers should actually be left running continuously to avoid harming them. There is no evidence to suggest that they will be adversely affected by normal switching. Further, computer companies are not overly worried about thermal cycling or deterioration of internal components from turning equipment on and off.

A study done by the Swiss Federal Institute of Technology demonstrated that monitors can be switched on and off 5 times per day with no noticeable impact on reliability over typical equipment lifetime. It was found that the emission of the cathode (the device which discharges a stream of electrons against the monitor screen) would not start to weaken until 20,000 switching cycles or 17 to 20 years of service. They recommend shutting off monitors if not used for 15 minutes or more.

Some of the concerns about problems occurring, due to shutting off computers, may actually result from improperly shutting down the computer. Incorrect shut down results in delays during the next start-up. For example, with Windows 98™, temporary files will be saved, error messages will appear on the screen, and scandisk will be run.

Computer Operating Life versus Hours of Operation

Computer product life is a direct function of the number of hours of operation. A computer operating continuously will probably fail sooner than one that is shut-off overnight and on weekends.

Typical Computer Load

Depending on the model, the average computer requires from 80 to 110 watts of electricity; including the monitor and central processing unit (CPU). Fifteen-inch colour monitors consume about 60 watts while the CPU requires about 40 watts. The trend is towards larger monitors; hence higher energy needs are anticipated.

Switching Off Results in Significant Energy Savings

Switching off computers results in substantial energy savings. Figure 1 below illustrates the magnitude of energy savings by simply shutting-off a computer after the workday. Based on 9 cents per kWh electricity cost, and 100 watts of load, a computer running 24 hours/day will cost about \$79 per year. Simply shutting it off at the end of the workday will reduce the to \$18 per year---yielding a net savings of \$61 per year or 78 per cent. A school with 40 computers could save as much as \$2,440 per year on electricity alone!

Many computers, especially in administration or office areas, are actually only used for an average of 2 to 4 hours per day. Hence, additional savings as high as 40 per cent or more can be achieved by fully utilizing the available energy savings software that is available. It may simply be a matter of activating the existing software or loading it onto your computer or network. In Figure 1, this would reduce the cost from \$18/year to about \$11/year.



Further electricity savings will be achieved by offsetting the cooling load----on those schools with mechanical cooling systems.

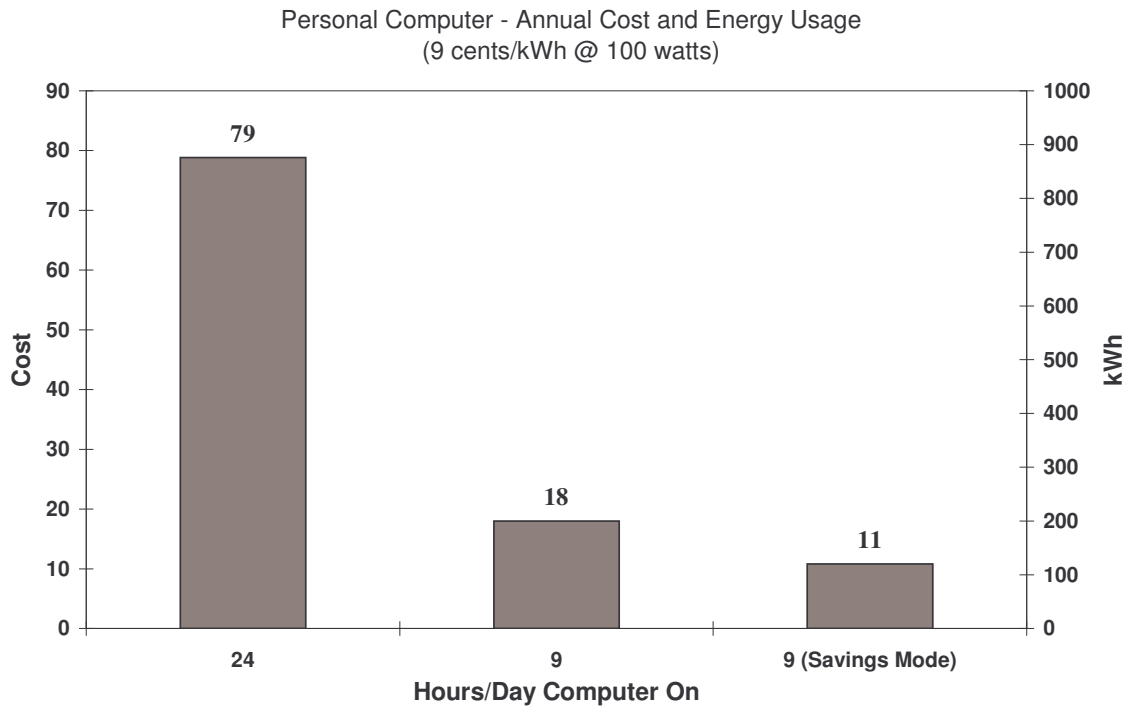


Figure 1

Computer Life and Heat Load

As stated earlier, the average personal computer (CPU and monitor) consumes between 80 and 110 watts of electricity. Ultimately, this electricity converts into waste heat. This means that each computer also functions as an electric heater, which may be a bonus during the heating season but not in the cooling season. A computer lab with 30 computers could generate a cooling load of up to 3 kW.

Excess heat is the enemy of any electronic device. Personal computers have a maximum operating temperature of 32 degrees C. An enclosed room with many computers left on during vacant periods can easily overheat, resulting in premature failure of electronic components. With the HVAC system off, there is no provision for normal cooling and ventilation. Depending on conditions and either separately or in combination, sunshine, outside air temperature, and computer heat gain can cause the room temperature to rise to a level that is harmful to the electronic components.

Optimize Existing Energy Savings Options on Computers

The Environmental Protection Association of United States encourages the manufacture of energy efficient computers. As an incentive, the US government will only purchase equipment that meets Energy Star™ guidelines for computers, monitors, and printers. Energy Star™ is a US government program to promote energy efficiency. In order to meet government specifications, most manufacturers have improved the energy efficiency of their products. It is suggested that



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any new computers purchased should be specified to meet or exceed Energy Star™ guidelines. If loaded, Energy Star™ software automatically places the monitor into a low energy use mode when the keyboard or mouse has not been used for a specified period. Again, this saves energy, preserves the monitor screen and prolongs equipment life.

Since the inception of the Energy Star program, most computers have been designed with built-in energy saving capability. MacIntosh™ computers, for example, typically have sleep and standby modes on the menu. Standby mode reduces power consumption from 100 W to about 40 W. Sleep mode reduces consumption to about 2 W. A switch at the back will totally shut-off all power and should be used during vacation periods.

On IBM™ type computers, power management options are normally located in Windows™ Control Panel with the following options: 1) Shut-off monitor, 2) Standby mode – shut-off monitor and hard drive 3) Shut-off hard drive, 4) Hibernation – save existing data and screen configuration in memory and shut-off computer. Each of these modes can be preset to activate after a period of inactivity from between 1 minute and 5 hours.

Energy savings modes and options are very effective but they must be used and optimized. Check with manufacturer's instructions for specific information.

Screensaver

The purpose of a screensaver is to prevent the monitor from having common symbols permanently burned into the screen. Only about 10 watts is saved during screensaver mode. It would be better to use the auto monitor shut off mode, which saves about 60 watts while at the same time saving the screen.

Monitors and Radiation

Monitors do emit radiation. Due to health concerns, low radiation designs have been introduced. An additional benefit of monitors that are either off or in screensaver or sleep mode is that they emit far less radiation. It does not hurt to have an additional safety margin.

A Caution about File Servers

Where several computers are part of a network, one computer will function as the file server. The file server is the brain centre for all the other computers and may need to be left on continuously for various reasons. Check with the network administrator before shutting-off. It may also be a good idea to clearly mark the file server to avoid inadvertent shut down.