

## **Benefits of Green Computing**

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### **The Green Movement**

Around the world, interest levels in supporting the environment are increasing. Some of that's related to increasing fears of global warming, the rapid use of irreplaceable resources, or the increase in man-made pollution. Some of it's simply the recognition of maturing societies that individuals and businesses as well as governments must play a role in keeping the world a clean and pleasant place.

This interest may be expressed in better individual behavior, by buying goods based on replaceable and recycled materials, and supporting community efforts for clean air, public transportation, effective land usage, and recycling. It might be expressed by participation in efforts to pass new laws. Often, it is demonstrated by a new level of business interest in buying energy efficient equipment and preferring products that are produced using "green" manufacturing techniques.

We can expect all of these activities to continue and increase. Our world isn't getting any bigger, but growth in population and the demand of emerging countries for more goods and services increases the pressure on existing resources. In the future, we will need to find more and better ways to share our planet and its resources, while minimizing our impact on its air, its water, and our fellow citizens.

### **The Green Movement and Computers**

The computer industry has been a particular target for "greening." Personal computers include many hazardous materials (including lead, cadmium, mercury, and flame retardants according to the Silicon Valley Toxics Coalition), exposing workers in the manufacturing process of components and systems, as well as anyone who comes in contact with discarded PC's.

Unfortunately, there are lots of PCs that just get tossed out. According to a Safety Council Study, only 11% of the 20 million computers discarded in 1998 were recycled. That same report notes that it expects discarded PCs will exceed newly purchased PC's this year. To look at it another way, the EPA estimates that the U.S. throws out about 220 tons of computers and other obsolete electronics each year.

Moreover, we're not just affecting the U.S. It's estimated that 50 to 80% of U.S. electronics end up in Asian countries for disposal. The Basel Action Network, in

a February, 2002 report, stated "The open burning, acid baths and toxic dumping pour pollution into the land, air and water and exposes the men, women and children of Asia's poorer peoples to poison. "

Responsible U.S. recycling activities attempt to disassemble and properly dispose of hazardous materials. This includes both independent recycling firms and some U.S. computer manufacturers. The problem, of course, is that it's cheaper to export the problem than to deal with it properly at home.

There is another way to do this. If PC manufacturers built and distributed green computers eventually the disposal problem would resolve itself. To think about this, we first have to agree on **what's a green computer**.

- o Many think a green computer means a computer which is energy conserving, but that's only one step in the right direction.
- o Building a green computer is an end-to-end process, with careful thinking about the effects on the environment going into every step.
  - o The computer must be designed to use only non-toxic materials, to be energy efficient, and to have minimal impact on the environment in every stage of its life cycle.
  - o The computer must be built from non-toxic materials
  - o The manufacturing process must avoid any methods which would be environmentally hazardous to workers or the environment
  - o The computer must be designed so that its user will not be environmentally impacted in any way and the computer will use the least possible amount of resources (such as energy) to support its function.
  - o A recycling strategy should be considered part of the computer's design, e.g., the computer should be designed for easy disassembly and disposal or made so that it is safe to discard.

Until that happens, PC users need to develop their own recycling strategies. They might find their own recycler; C/NET publishes a list and some hints in their Thinking Green section. Or you could try the Consumer Education Initiative site, which lists many recycling locations. (See **References**)

Most PC Manufacturers have some sort of recycling program of their own. Today, these tend to be after-the-fact programs. That is, they are offered to users as a fee-paid service which users may exercise, at their option, when they're ready to discard an obsolete computer. Typically, users return obsolete products to the vendor for disposal. Some vendors, like IBM, try to refurbish used PC's where possible, and give them as gifts to non-profit organizations. Otherwise, the systems are stripped for parts, disassembled, and recycled or

discarded at the component level. Be sure to ask **how** recycling will occur; you wouldn't want to pay for a program that ships your computer to Asia.

It's hard to get users as individuals to participate in these fee-paid recycling programs. Many users, for example, are accustomed to handing down their PC's to schools or other non-profits, so they see no need to pay an up-front fee to guarantee recycling. It's viewed as someone else's problem. Others point out that if the PC materials or design is the problem, manufacturers should design eco-friendly products.

## **Status of Green Computers**

We've had some interest in greener computers for a long time. Most of the emphasis has been on how the computer is **used** rather than on how the computer is designed, manufactured, or discarded.

More recently, programs to let users responsibly dispose of obsolete computers have become more available, as we've noted above. Since these programs require paying a fee and taking voluntary action, only a small percentage of PC's are actually disposed of this way; most of them end up in the trash, adding chemicals and heavy metals to existing pollution.

In the future, much more emphasis will be placed on designing environmental considerations into the PC rather than trying to add them in layers around an environmentally-unfriendly object. Manufacturing will be done using only "clean and green" techniques. Recycling will be built in, either through pre-paid fees or (better yet) by making the PC a safe, disposable unit, as easy to discard as a cardboard box or a paper bag.

You can see this happening all around:

- o Most major vendors offer recycling programs. Some will even recycle any brand of PC, not just their own.
- o Alternative recyclers are available for occasions where the PC vendor is not available or does not provide support.
- o CRT's are difficult to manufacture without dangerous materials, e.g. lead (and hard to discard), and some manufacturers are looking at ways to manufacture less toxic CRT's. Flat panels are increasingly replacing CRT's. They take up less space, are more aesthetically pleasing, and easier to dispose of.
- o Round the world, governments are becoming more aware of the toxic components of PC's and the side affects of the PC manufacturing and disposal process. Rules are being enacted, especially in Japan, calling for tougher design and manufacturing standards and pre-paid disposal. Ultimately, these rules will affect PC markets worldwide.

## **NEC Desktops and the Green Computer Movement**

It's time for businesses and individuals to take responsibility for their PC-buying decisions, selecting a fully modern PC which is also completely "green." NEC's PowerMate Eco, designed against an eco-friendly specification, with a lead-free mother board and a flat panel (lead-free) display, is targeted especially to healthcare facilities, financial trading rooms, reception areas, call centers, and government agencies who need environmentally safe or energy saving PC's or wherever more work space is needed.

The NEC PowerMate Eco has a small footprint and a boxless design, with the systems functions integrated into the display unit. It is Energy-Star compliant. The Eco is designed to function without a fan, making it as silent as a whisper at 20 dB. It employs the low-power-consumption Transmeta Crusoe chip.

PowerMate Eco will run in a minimal space, using the minimum amount of power, while providing a modern computing experience, running on Windows 2000 or Windows XP. The user gives up nothing in features and pays no premium price for choosing a green computing environment.

In the research paper **Project "Green Machine": Cost Effective Energy Savings with Computers and Office Equipment**, the author notes that not only will a fully activated Energy-Star PC save approximately 10% in power costs, when less power is consumed, facilities managers can recalculate their cooling needs, saving in system installation and maintenance costs as well. The University of Michigan Guidelines estimate that if all PC's in the US were Energy Star compliant we would save \$2 billion in electricity bills and save pollution equivalent to the emissions from 5 million automobiles.

## **Benefiting from Green Computing**

It's too soon to talk about what NEC customers are doing with "greener" computers via the case studies of actual customers, but we can offer some illustrative scenarios to point to what will likely happen.

**Doing Well by Doing Good:** In many ways, buying green costs no more – and sometimes less – than buying less ecologically friendly PC's. A small business such as an insurance agency with seven employees might require eight PC's (one for each employee plus a server).

These PC's would be bought on an as needed basis, as employees were added or as computers could no longer keep up with the demands of new software. But the agency adds a new insurance agency customer relationship management software product, customized just for their needs. Most of the computers are

pretty old so the budget for the project includes eight new computers to be certain the agency gets the most out of its new investment in software – and the training it's about to provide its employees.

Several hardware bids are considered. Conventional desktops have fairly competitive prices, but the agency is also considering new “green” computers which not only offer significant energy dollar savings over the three to five year life of the system, but also avoid both the local fee for discarding a computer system (\$20) or the other vendors’ fees for recycling (about \$30-40 per system). Of course, the idea of some computers being discardable because they have no harmful components is a new one, but it’s very attractive.

It's appealing because it lets the agency be a good citizen and save money, too. They're hoping to get the local newspaper to write up the campaign to get the city waste people to recognize this new kind of computer – that would be good publicity for the Insurance agency and a good way to convince business colleagues to buy green computers, too.

### **Being Eco-Friendly**

A manufacturing company near Los Angeles is looking for a way to connect with the community. It discovers there is need for business support for preserving and improving the environment and the company wonders if this would be a good way to get involved. The company is planning for their new IT system. They'll be buying more than 100 new desktop PC's. Some are to replace really old PC's. Others are to get tools onto more desks so everyone will be able to participate in the new systems for email, customer service, and information access. Several systems alternatives are being considered.

The company can participate in the community's ecology initiative at little or no cost by how it chooses its PC's. The IT manager asks potential bidders for more information and agrees that they can easily buy PC's which were produced in an eco-friendly way and can be disposed of safely at the end of their life cycle. By selecting Energy Star PC's they will have immediate and ongoing savings on their electric bill and the silent operation of fanless systems will make the workplace more pleasant and more productive. The company agrees to spend a bit extra (about \$40 per PC) to send the obsolete PC's being replaced off to an approved recycling center. The savvy IT manager negotiates with the PC vendors and gets the recycling charges included in the price of the new PC's.

Company executives huddle with the company's PR manager to write a news release announcing their support for the community's environmental goals and everyone's a hero.

## If you'd like to Think Green

Computer buyers have clear choices. They can support a greener future by selecting and buying green computers – not just computers which use less energy, but computers which are manufactured using green techniques and materials. Pick a computer that either is built for easy disposal with no environmental impact, or plan on buying a computer with a green disposal policy and then exercising that option when you're ready to trade up to your next computer.

## References

For more information on NEC's PowerMate eco visit their website at:  
[www.necsolutions-am.com/mobilesolutions](http://www.necsolutions-am.com/mobilesolutions)

*For more information on the whole topic of green computers, here are some helpful web sources:*

In Search of the Green PC, PC World,  
<http://www.pcworld.com/news/article/0,aid,101556,00.asp>

Silicon Valley Toxic Coalition, <http://www.svtc.org/>

Project "Green Machine": Cost Effective Energy Savings with Computers and Office Equipment, [www.ema.org.nz/webDocuments/papers/adcock1996.pdf](http://www.ema.org.nz/webDocuments/papers/adcock1996.pdf)

UM Guide to Green Computing, [http://www.plantops.umich.edu/ems/Green\\_Computing.html](http://www.plantops.umich.edu/ems/Green_Computing.html)

Making Computers Green, [http://www.eng.nsf.gov/engnews/1999/Think\\_Green/think\\_green.htm](http://www.eng.nsf.gov/engnews/1999/Think_Green/think_green.htm)

Think E-Green: Delete and Donate Old Computers,  
[http://www.beststuff.com/article.php3?story\\_id=3196&submit=print](http://www.beststuff.com/article.php3?story_id=3196&submit=print)

EPR2 Baseline Report: Recycling of Selected Electronic Products in the United States, National Safety Council, <http://www.nsc.org/ehc/epr2/baseline.htm>

Exporting Harm: The High-Tech Trashing of Asia, Basel Action Network, <http://www.ban.org/>

FEMP, President Orders Use of Energy Efficient Devices  
<http://www.eren.doe.gov/femp/resources/neweo.html>

Federal Bill Targets e-Waste <http://zdnet.com.com/2100-1103-945092.html>

### *Finding a Recycling Center*

CNet TechTrends "Thinking Green" <http://computers.cnet.com/techtrends/0-6014-8-8104840-5.html>tag=st.sr.6014-8-8104840-1.txt.6014-8-8104840-5>

Consumer Education Initiative, <http://www.eiae.org/>

### **About Wohl Associates**

Amy D. Wohl has been commenting on, consulting to, and writing about the computer industry for more than 25 years. She is the editor of Amy D. Wohl's Opinions, a weekly e-newsletter which focuses on emerging technologies. Her consulting practice focuses on emerging technologies and concepts and the markets they create. She often helps vendors explore these opportunities, often defining the terms of the new markets in the process, as well as helping with their marketing and positioning efforts.