

Many Shades of Green

A Practical Roadmap to Sustainable Computing

“Green IT” is in danger of becoming whatever the marketing departments at the big manufacturers want it to be. Reasonable people want green to mean “Earth-friendly,” environmentally responsible. But for the IT industry, going green has provided an opportunity to sell new hardware and services in the guise of energy efficiency—not a very Earth-friendly outcome once all of the environmental impacts are added up. Sustainability, on the other hand, is something we can measure and manage, a concept that offers quantitative benefits to our businesses, our society, and the Earth. Improved sustainability requires new strategies, not new hardware. And corporate technology users who adopt sustainability as their goal will improve not only their environmental impact – achieving truly green results – but their profitability as well.

Guiding principles. Reduce, reuse, recycle—sometimes even government-authored clichés stumble on the big picture. The IT industry developed many wasteful habits years ago when hardware was less reliable and not powerful enough to keep up with the growing demands of software—and when IT itself was not as aligned with the businesses it served. The reliability and power of today’s hardware give asset managers more options than ever before. IT is now accountable for demonstrating a reasonable return on investment from its expenditures. Happily, most sustainability initiatives will improve ROI while they improve everything else. The true test of an organization’s commitment to sustainability will be its willingness to consider the impact of its practices beyond the four walls of its business.

The fully loaded cost of manufacture. The huge environmental costs of manufacturing IT hardware are rarely considered, yet provide a compelling argument for lengthening lifecycles for all computing devices. Approximately 90% by weight of the average PC is comprised of plastic (32%), steel (28%), aluminum (20%) and copper (10%). Refining the base elements of these raw materials into virgin feedstock for manufacturing requires more than 1.2 million BTU’s of energy for a typical twenty-four pound desktop, not counting the greenhouse gas emissions, toxic emissions and solid waste generated in the process. A PC’s more exotic components impose an even greater environmental burden. For example, 1,200 grams of fossil fuels, 72 grams of various nasty chemicals and 32,000

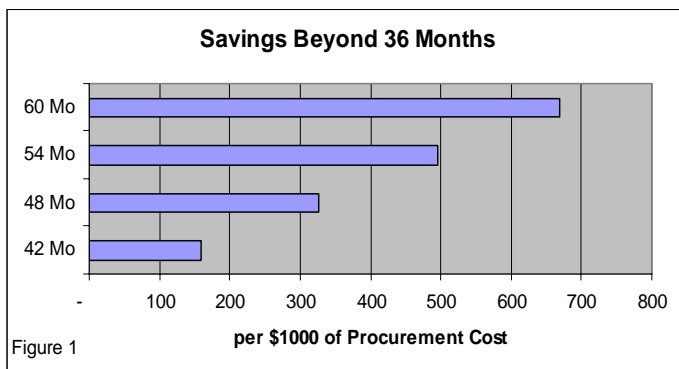
gallons of water are needed to produce a single 2-gram memory chip. Copper, steel and aluminum are not renewable resources, of course, and the open pit mining used for their extraction levies additional environmental overhead in the form of habitat destruction and groundwater contamination. Making new computers is an unavoidable necessity of modern life. How big a hole in the ground each of us leaves behind, and how much pollution we generate as a result of our computer use, is a straightforward factor of how many boxes we have owned.

The ungreen truth about energy efficiency. Energy efficiency is a good thing in the abstract, but too often IT professionals take a straw view that only accounts for the energy used by a device while it is plugged into the grid. From a holistic perspective, 85% of the energy that a given widget will ever consume is used during its manufacture. So replacing functional devices with more energy efficient ones actually consumes much more energy than is saved overall. Contrary to manufacturer arguments and profit interests, the only time energy efficiency should motivate procurement decisions is at the beginning of a long, carefully planned lifecycle. Only then will the incremental savings produce a true net gain in sustainability terms. Virtualize, consolidate, manage; but don’t retire a good piece of hardware before its time.

Plan. Achieving greater levels of sustainability requires consistent strategy, and disciplined execution over the long term. It should be an iterative process of plan...execute...measure/inspect...adjust...and repeat. A target lifecycle should be defined for every hardware category. Many companies began extending lifecycles before sustainability was an issue, and have subsequently been enjoying lower total cost of ownership (see figure 1). It is common now for laptops to be used for 42 months, printers, servers and desktops for 60 months, display, telecom and some network devices for up to 84 months or longer. Such extended lifecycles will exceed the standard manufacturer’s warranties, so break/fix maintenance tactics should also be defined at the time of purchase. Often, for less expensive assets, it is most cost effective to maintain a modest stock of replacement spares, and to use depot repair for the inoperative units where repair costs are below a defined threshold. Non-repairable units can be used as a source of parts.

It is important to define reuse standards. In most cases, anytime an asset becomes idled during the first three-fifths of its lifecycle, it is worth refurbishing and redeploying. After that, an asset should usually be considered end-of-life and retired. Having a mature asset disposition plan is important to cost effectively recovering idle assets, and when reuse is not practical, quickly providing for the optimal disposition according to corporate objectives: resale, donation, employee sale or recycle.

Because many organizations have failed to plan for asset disposition, millions of electronic devices are in storage, and having lost some or all of their value while in limbo, now represent a large unrecognized liability to their owners for their eventual disposal.



Buy. In addition to all the usual considerations, new hardware should be evaluated according to qualities that effect sustainability. Using the Electronic Product Environmental Assessment Tool (<http://www.epeat.net>) makes it easy to compare. The time to consider energy efficiency is at the time of purchase as a component of total cost of ownership. Buying for a longer lifecycle sometimes requires being a little less conservative with product specifications to ensure that enough horsepower is available for good productivity upon installation, and for years thereafter. Check that common points of failure such as hard drives and power supplies are not proprietary. Be sure that the hardware will easily accommodate likely upgrades such as memory or the operating system, and finally, confirm how well a product can be recycled. Though manufacturers are beginning to think about designing for end-of-life processing, many products still are designed in ways that both complicate recycling and reduce the value of the recovered commodities.

Last, buy so that product is delivered just-in-time, in just the quantities needed. Avoiding stockpiles and log jams of IT hardware will improve ROI and reduce costs.

Reuse, please. Longer lifecycles, combined with the facility and staffing dynamics of a typical organization, make reuse a practical necessity, but success can be elusive when redeploying used technology. The foremost challenge to any reuse plan is cultural. Given the opportunity, users always

want a shiny new one. IT will want to oblige the end user’s vision of hardware nirvana because they hold dear the bias that a shiny new one will be less trouble. Therefore, every redeployment must be preceded by an understanding that reuse is a winning business strategy—a communications plan is a first, critical success factor. Then, when the end user opens the box, she should find a shiny used one. Not just refurbishment quality, but packaging quality must delight the user. Finally, the redeployed hardware should be at least as reliable as a new item; in many cases, it will be even more reliable. Organizations that are serious about reuse will provide visibility to used inventory via their procurement tools. Corporate policy should stipulate that procurement of a new item is approved only if a refurbished equivalent is not available. With a bit of history, redeployment assumptions can be built into budgets. Cost of ownership will be reduced, ROI will increase and sustainability will improve. There is an old fashioned word for this—thrift.

Real energy savings. Regardless of the relative energy efficiency of an infrastructure, there are straightforward ways to save power and money that are easy to implement. First and foremost, everyone should get in the habit of turning things off. The time honored practice of leaving computing devices running 24/7 persists in spite of common sense. A best practice is to plug everything into a surge adapter, including power adapters for laptops, printers and monitors, then switch off the adapter at the end of the day. Computers should have power management enabled to shut down displays and hard drives after a few minutes of inactivity. Power management applications provide even more options to PC administrators. Instead of refreshing hardware for greater energy efficiency, remind everyone of that conservation principle their mothers taught them: turn the lights off when you’re done.

Plan for secondary use. Most devices have a useful life of eight years or more, so a significant secondary life extends beyond the corporate lifecycle if organizations plan ahead. Whenever the environmental impact of the device is amortized during a longer life, sustainability is improved. For secondary use to be financially advantageous, an asset’s residual market value must be sufficient to underwrite the costs of its distribution to the second user. Given that used electronics can depreciate 2-3% per month, speed of disposition is of the essence, so have disposition procedures well defined, and vendors chosen, well in advance of major refresh activity. Organizations wishing to uphold high standards of sustainability will allow the sale of only tested, working products. Non-working systems should have working parts removed, and the balance recycled. As it is almost always more expensive to manage internally, IT asset disposition (ITAD) is the ideal process to outsource to a specialist.

Finally, recycle...really. Obviously at some point every computing device falls beyond any useful purpose, and has no further value except for its component commodities. As commodity prices have increased in recent years, the value of

scrap electronics has been widely recognized by the scrap metal industry, and a thriving trade has developed between the industrial, computer-saturated world, and low wage countries where environmental and worker safety laws do not inhibit the manual processing of e-waste for recovery of valuable materials, and subsequent dumping of the balance. This toxic trade in e-waste has simultaneously contaminated developing countries with lead and other noxious substances, while suppressing the development of a responsible recycling infrastructure to serve the United States and other developed markets. The demand side of the equation is enlightened, as the end user community of large corporations recognizes the social and environmental damage done by these exports, and contractually forbids them. Unfortunately, the recycling industry has become adept at a shell game where a certificate of destruction and guarantees of domestic recycling are offered, but where some if not all of the e-waste received is exported. This literal fraud is committed by most recyclers, most of the time, with unconscionable human and environmental results.

Companies that forbid the export of e-waste and want their contractual due in sustainability terms must demand greater accountability and transparency from their recycling

vendors—and then they must be willing to audit for compliance. They also must be willing to insist on comprehensive reporting of material dispositions by commodity type and weight. The sum total of all e-waste shipped to a recycler must equal the sum total of all commodities shipped out. The output of any recycling process must have discrete commercial value if the material is to consistently be kept out of the landfill. By looking more closely than ever before at the end-of-life process, companies will demonstrate caring; and that is the underlying spirit of all sustainability.

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