

Green Computing – the CIO's Role

Ruth Harenchar
Author & Presenter

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Picture this....A private corporate data center goes green. As a result of its state-of-the-art solar energy panels and near-by wind farm, it is a net energy producer rather than an energy guzzler. Counting the tax credits for renewal energy, selling excess energy to the local utility company, and eliminating electricity bills, the positive Return-On-Investment (ROI) on the conversion capital costs is 26 months. The green computing effect is a benefit to the planet. But in the real world of business, it is the green effect on the company's bottom line that counts. Now the number of variable factors that a Chief Information Officer (CIO) must consider when making decisions has increased again – making the working landscape more complex. However, the green computing effect also offers new opportunities for the CIO to contribute tangibly to their company's corporate well-being.

To be a successful Green CIO, you must exercise CSR through IUN measured by EPEAT and acquired through ERP. Translation: you must exercise Corporate Social Responsibility (CSR) through the use of Intelligent Utility Network (IUN) devices measured by Electronic Product Environmental Assessment Tools (EPEAT) and acquired via Environmentally Responsible Purchasing (ERP). As much or more than any new wave in technology, green computing has its own vocabulary and set of metrics. It is not just your old ERP (Enterprise Resource Planning) any more.

Now when executive colleagues, customers, or the board of directors inquire how the Information Technology (IT) organization will implement their ERP program, they may be referring to Environmentally Responsible Purchasing. In this context, ERP is defined as a program that ensures the purchase of cost-

competitive products and services which have a reduced negative effect on human and environmental health compared to competing products and services intended for the same purpose. Best practice ERP principles take several factors into account during product evaluation including raw materials acquisition, production, manufacturing, packaging, distribution, reuse options, operation maintenance, and disposal of the product or service.

Translating these principles into practical IT operations and eco-friendly, properly prioritized decision-making starts with a few key ideas. If a standardized Request For Proposal (RFP) process for spending decisions exists, work with the Purchasing Department to incorporate environmental questions into the RFP template. Encourage your staff to include environmental factors and impact assessments in their recommendations to you as the CIO for IT initiatives or projects. Work with your Financial Controllers to incorporate the cost of disposal in Total Cost of Ownership (TCO) calculations. Encourage team members to add their green computing recommendations to the analysis process. Finally, expand the benchmark or metrics program to accommodate environmental metrics criteria, especially for hardware decisions. Initial cost and performance are no longer adequate benchmarks in the technology world today.

As stated at the beginning, the green computing that matters in the world of business is the green that comes with profits. So make your Chief Financial Officer (CFO) happy and save money on utility bills. IT is an energy hog and energy conservation is a green strategy whose positive impact is easy to measure in dollars and sense.

The sense piece is a reduction in the number of adverse environmental and social incidents associated with energy production and consumption including air pollution, acid rain, global warming, oil spills, water pollution, loss of wilderness, new power plant construction, foreign energy dependence, and the all too real risk of international conflict over dwindling energy supplies.

The dollars part can begin with your data centers. Data centers are the SUVs of computing. In the United States, they consume as much power annually as that generated by five power plants. With their mainframes, servers, storage devices, networking equipment, air conditioning, and more, data centers used 1.2% of all U.S. electrical power generated in 2005.

In its *CIO's Guide to Going Green*, IBM demonstrates how using less energy creates more shareholder value. When energy was really cheap, such as it was in the U.S. for decades, energy savings would not have been a big win for the CIO. Every stop you make at the gas pump for your car should be a reminder that the days of cheap energy are no longer with us. So take a look at your energy guzzling data center. Surveys show that data centers constitute an average of 2% of a company's floor space but consume 40% of its energy usage.

Data centers have doubled their energy consumption in the past five years while energy costs have soared 10% per year compounded since 2005.

Saving money on electric bills is now relevant, but do you know how much you spend annually on electricity? Only about a quarter of CIOs pay their energy bills directly since utility costs and IT are often budgeted separately. However, you have access to your company's energy bills and can leverage energy cost reductions to your benefit and to your company's benefit.

CIOs must remember that energy usage is as much or more about cooling as about direct hardware consumption. Make use of your partners and other readily available resources to provide information for intelligent energy reduction decisions.

- Vendors can provide information and techniques for calculating energy and cooling cost savings. Crossbeam Systems has a white paper for calculating energy savings based on consolidating and virtualizing all the equipment involved in information security at the data center and enterprise level.
- Alternatively, the Lawrence Berkeley National Lab offers a web site with instructions for self-benchmarking data center energy consumption and for identifying areas that present the greatest savings opportunities.
- The non-profit Green Computing Impact Organization offers free energy audits for baseline benchmarking to their members.
- Other companies provide energy audit services as well.

Prior to conducting an energy audit, you will need to decide what to include – such as IT equipment, cooling units, as well as lighting, heating, ventilation, and other systems that draw power. Then determine what level of granularity to measure. It may be sufficient to measure the output of your Power Distribution Units (PDUs) that supply the computer equipment rather than the actual hardware. Smaller data centers or those that want more detailed information might want to measure power further downstream such as at the individual server racks. It may also be helpful to measure and account for power loss at different points along the distribution chain such as the aforementioned PDUs; the Uninterrupted Power Supply (UPS) units or standby generators. Energy auditors can hook up measuring devices specific pieces of equipment. Some local power companies will loan such devices to customers wanting to do self-measurement. However, most newer computing devices are equipped with built-in capabilities to provide power use data.

CIOs can then use these energy audit statistics to benchmark energy reduction efforts and to set clear goals for the future. Be sure that any cost-

benefit ratio calculations you use for your investment decisions incorporate green costs and savings since the figure will already include the actual equipment acquisition costs. A final consideration is end-of-life cost factors for proper disposal and avoidance of any regulatory fines.

While data centers may be the SUVs of IT, do not ignore desktops and laptops. For some companies, these number in the tens of thousands and they have a significant impact on a company's green computing efforts. For example, most Personal Computers (PCs) and printers are not being used the majority of the time but run continuously. They generate heat and require cooling which can boost energy costs, especially cooling bills in the summer. To apply green computing, CIOs should maximize use of the sleep mode and remember that screen saver images do not save energy. All employees should be encouraged to turn off PCs and peripherals at night, on weekends and before holidays. The concern that turning such devices on and off frequently will damage the equipment is a completely out-of-date concern.

The bottom line is that the effective CIO has numerous areas in which to apply energy savings. These include server virtualization such as grid computing, multicore processors, and blades; data management including data storage virtualization and reduced data redundancy; data center design optimization; power management software; energy-optimized hardware; directed cooling to servers; cooling controlled by sensors that can direct cooling to the needed spot; a segregated server room which cools from other spaces in the building, so that office space is not over-cooled; the evaluation of chips based on performance per watt in addition to speed; and desk top virtualization.

Other green action steps are also available, such as recycling. For the CIO, recycling is primarily about the safe disposal of large quantities of potentially toxic materials. The United Nations (UN) now estimates that twenty to fifty million tons of computer gear and cell phones end up in landfills annually and together they constitute the single fastest growing segment of waste. The majority of the toxicity in this segment comes from lead, mercury, other heavy metals, and PVC leaching into the water and soil.

But there is good news. Phthalate plastic softeners, brominated flame retardants, and lead based solder all have varying degrees of value to recyclers. Many manufacturers offer Extended Producer Responsibility (EPR) programs. These include take back programs, jointly sponsored initiatives like the Electronic Manufacturers Recycling Management Company, and credits toward a new purchase if the used product is returned to the manufacturer. All of these options make it easier for CIOs to efficiently and effectively recycle IT gear.

While the approaches to green computing mentioned so far are under the CIO's direct or fairly direct control, some efforts are bigger picture and require cooperation across the corporate infrastructure. The most frequently cited are a

reduction in employee commuting and business travel via telecommunications technology. Telecommuting has its obstacles. There is the required investment in remote access infrastructure; managers who are reluctant to allow remote workers; concerns over information security; and questions about reimbursing employees for personal equipment and high speed access that enable remote workers. Meeting these challenges will surely pay off for the CIO and his company.

So will finding ways to make current buildings smarter and more energy efficient. The McKinsey analysis done for The Climate Group paper entitled *SMART2020: Enabling the Low Carbon Economy in the Information Age* finds that there is five times the opportunity for energy reductions in the macro-level applications of IT, especially in the key areas of building design logistics, electrical grids, and industrial motor systems. While not every CIO will have the opportunity to participate in the design of a brand new corporate building, every CIO can use green ideas to discover ways to make current buildings smarter and more energy efficient.

The challenge for CIOs is to stop thinking parochially and only about narrowly defined IT “stuff”. The biggest pay-off for CIOs in green computing is what it can do for your business and what your innovation suggestions can do for your relationship with your business line executive colleagues. Focus on knowing your company’s business. Focus on building dynamic relationships with your executive peers. Focus on leveraging those dynamic relationships to brainstorm ways to use technology to evolve core business processes.

Here is an example of what I mean. The CIO at a financial printing company formed a dynamic relationship with both the head of print operations and the head of strategic planning. Between them they fostered ideas from their collective teams that over a period of three years produced dramatic cost reductions and printing operations efficiencies in the core of the company’s revenue generating business. While driving efficiencies, the ideas also reduced the amount of ink and toxic chemicals in the printing process.

This is an example of green computing at its best – green for the planet and green\$ for the business. Ultimately, the successful green CIO is one who delivers in terms of dollars and environmental sense.