

Ecological (Foot)Print – How to “Green” Printing and Computing in Your Office

Elah Feder, MSc

University of Toronto Sustainability Office

As the global environmental crisis deepens, individuals, communities and institutions are increasingly seeking opportunities to effectively reduce the impacts of their activities, with particular emphasis on minimizing greenhouse gas emissions. One important area where reductions can be achieved is information technology (IT), a large and rapidly growing industry. It is estimated that there are currently over 1 billion personal computers world-wide, with the number expected to double by 2015.¹ The manufacturing, operation and disposal of these units is associated with tremendous energy and resource consumption. Furthermore, one of the unexpected consequences of the digital age has been the increase of paper consumption, even as ostensibly paper-saving technologies have proliferated. Over the past 20 years, consumption of printing and writing paper in Canada has *doubled* to approximately 20,000 sheets per person annually.² In this paper, we explore opportunities for minimizing IT-related energy, paper and waste in offices, focusing on printing and personal computers.

Printing

In addition to the consumption of wood, the pulp and paper industry is among the most energy-intensive.³ While some estimates suggest that paper made of post-consumer recycled fibres can use as 64% less than the energy required to produce a sheet from virgin materials,⁴ producing recycled paper remains an energy- and resource-intensive process, and therefore, reduction of consumption should be emphasized before resourcing.

There are a number of ways offices can easily reduce their paper consumption. First, **printed documents should be duplexed (double-sided) wherever possible.** While traditionally, office documents have been single-sided, most documents can be double-sided without compromising usability. One challenge is that many offices still possess printers that do not support duplexing; therefore, it is essential that all printers purchased be duplex-capable, and that all office members have easy access to these. However, this in itself will not guarantee paper savings, our Office has found that even where duplex-capable printers are used, the 80% of printing jobs are single-sided out of habit, convenience, disinterest, or lack of familiarity with the duplexing feature. To ensure that duplexing is the convenient choice, duplexing should be set as the default.

Another practice which has been adopted by many offices is the **reuse of paper which has been printed on one side.** This is most appropriate for internal documents, particularly those with a short lifespan, such as an article which has been printed for ease of reading and disposed of shortly afterwards. This practice is most easily achieved if selected printers or printer trays are dedicated to “scrap” paper.

In some cases, printing can be largely avoided. Sustainability Office studies suggest that one fifth of printing consists of emails and web pages, and in many cases this is unnecessary, and individuals should consider in which cases printing is truly required. Where web pages are needed for later reference, a number of free programs are available that can convert pages into PDFs. Where back-ups are required, electronic copies of both web pages and emails can be stored on CDs, external drives and servers as needed. Digitally stored documents have the advantages of being electronically searchable and password protectable. However, the impacts of particular electronic storage decisions should also be considered. For example, a shift to server-based storage in some cases may mean the use of additional servers that operate continuously and result in increased demand for cooling.

Finally, paper use is unavoidable in some instances; however, it is possible to substantially reduce impacts by purchasing more sustainable paper products, including products with high post-consumer recycled fibre content and those certified by third party organizations such as the Forest Stewardship Council (FSC). The Environmental Defense Fund’s paper calculator⁵ can be used to estimate the quantity of energy, greenhouse gases, waste water, wood, and solid waste that is avoidable by switching to more sustainably derived paper products.

Computers

When purchasing equipment, a number of assessment tools are available for selecting environmentally-friendly products. Perhaps the most well-known program is ENERGY STAR®, which specifies the energy consumption of displays and computers when on and in sleep modes.

In addition to purchasing energy-efficient equipment, an important way to save energy is to ensure that computers are turned off when not in use. It has been found that approximately one third of office computers are left on overnight.⁶ Business hours only account for approximately 25% of each year, meaning that when PCs are left on at all times, as much as 75% of the energy

¹ Forrester. (2007). *One Billion PCs In Use By The End Of 2008*. Retrieved Feb 2009 from <http://www.forrester.com/ER/Press/Release/0,1769,1151,00.html>

² CBC. (2006). *Paperless office is pure fiction: report*. Retrieved Feb 2009 from <http://www.cbc.ca/technology/story/2006/11/10/tech-paperless.html>

³ Environmental Defense Fund. (2007). *Tips for selecting, buying, and reducing paper*. Retrieved Feb 2009 from <http://www.edf.org/article.cfm?contentid=1689>

⁴ Bureau of International Recycling. (2002). *About Recycling*. Retrieved Feb 2009 from <http://www.bir.org/aboutrecycling/index.asp>

⁵ <http://www.edf.org/papercalculator/>

⁶ 1E. (2007). *PC Energy Report 2007: United States*. Retrieved Feb 2009 from <http://www.1e.com/EnergyCampaign/downloads/1E%20Energy%20Report%20US.pdf>

used to operate them is unnecessary! It is estimated that in the United States, regularly turning off office computers at night could save over \$1.72 billion and 15 million tonnes of greenhouse gas.⁷

In some institutions, addressing this issue is as easy as training users to turn off computers at the end of the work day and/or enabling power management settings. In others, however, computers are left on to allow remote access or night-time software updates. Fortunately, a number of free and commercial solutions exist which allow computers to be woken up when needed.⁸ Where more sophisticated commercial solutions are chosen, payback periods under a year may be achievable through energy savings.

It is essential to note that the energy consumption of computers during their operation is ultimately a small slice of their total environmental impacts. For instance, it is estimated that manufacturing of computers consumes nearly 5 times the energy consumed through their years of operation.⁹ Currently, computers are replaced at an unprecedented rate, typically kept for only 2-5 years. In addition to manufacturing impacts, this high turnover rate results in tremendous quantities of toxic e-waste, approximately 20-50 million tonnes annually. Therefore, **perhaps the most important method through which can reduce our IT impacts is the extension of computer lifespan.**

Often computers are replaced due to obsolescence rather than malfunction. Wherever possible, it is important to select products which can be easily upgraded (e.g. have additional slots for RAM, and hard drive capacity is easily upgraded). A helpful tool in making these choices is the Electronic Products Environmental Assessment Tool (EPEAT) which ranks desktops, notebooks and displays according to a broad range of environmental criteria, including upgradeability and longevity.

⁷ *Ibid.*

⁸ More information about selected case studies can be found at http://www.energystar.gov/index.cfm?c=power_mgt,pr_power_mgt_ss

⁹ Williams, E.D. (2004). *Revisiting energy used to manufacture a desktop computer: hybrid analysis combining process and economic input-output methods*. Conference Record, 2004 IEEE International Symposium on 10-13 May 2004 p. 80-85