



## IT | Strategy

### Green IT – Green Light for New Hardware?

Commentary by Michael Henze, 10<sup>th</sup> June, 2009

Green IT has long been a subject of conversation but it is still a long way from arriving in all computing centres and offices. Even though the environmental debate is now extending to IT, with the promotion of the greenest Macbooks ever and the presentation of a 'Green World' at CeBIT, the economic viability is still unclear in many areas. Numerous articles and analyses have tried to provide answers to this. However, these often only concentrate on percentage savings on individual cost-items and usually fail to include a total investment calculation and a consideration of the relative savings potential in relation to the company as a whole. This fuels an expectation of Green IT which, on closer analysis, cannot always be corroborated.

Green IT aims to protect the environment through the use of IT or in IT itself. The green movement has put particular pressure on CIOs to act. In addition to their previous task of saving IT costs, they now also face the challenge of creating an environmentally-friendly company image through their energy-efficiency measures. But what avenues exist in this respect? And what is the real return on investment?

These questions are becoming increasingly relevant because the amount of power consumed by information and communications technologies is increasing each year. This trend is due to the exploding global exchange of data and is set to continue growing according to the Fraunhofer Institute. By 2012, computers will swallow an additional 30% of energy. According to data from the International Energy Agency, the price of electricity (which has doubled in the last five years) will also continue to increase at the same rate as consumption.

Such recent information has helped businesses become aware of the problems of energy efficiency. The uncertainty fuelled through this is a breeding ground for countless 'green' offerings – in particular the hardware manufacturers want to use 'energy saving miracles' as new selling points. And here they encounter consumers who often have no idea at all how much energy is used by their IT, but who definitely want to keep up in terms of their environmental image, often without exactly knowing whether this is commercially sensible. Unfortunately, the technical journals do not offer any productive advice either. Although they constantly extol the virtues of new technologies, they do not refer as a matter of course to the role played by costs for IT energy throughout the company and the significance that such new acquisitions should therefore assume.

In business reality, there is only rarely transparency in terms of the specific point of origin and the level of energy costs. For example, only one in four computer centre operators carried out regular measurements. But these are not only the basis for an energy assessment, they also constitute the economic considerations of Green IT measures.

In our view, the actual significance of Green IT can best be clarified with tangible Euro amounts in one specific example which can be transferred in principle to most companies. Let us take the example of a medium-sized German service company with total costs of EUR 100 million per year, that uses 1,000 PC workstations, connects various business processes to the Internet and operates its own computing centre for this purpose. Let's call the company 'ServCo.'

### **Energy costs within the company**

IT contributes on average about ten percent to the total costs of a service company. At *ServCo*, this would therefore amount to EUR 10 million per year. In turn, the energy proportion of the IT-costs is ten percent, which comes to a total of EUR 1 million in this case. On average, according to the Fraunhofer Institute, 96% of electricity consumption is used in the two largest assets: the computing centre (60%) and user desktop devices (36%). Thus, our example company has EUR 600,000 of energy costs per year in the computer centre and EUR 360,000 for the user desktop devices.

### **Green IT in the computing centre**

The computing centre is both the heart of the company's IT and also the largest originator of electricity costs. Essentially, this is broken down into the three consumption areas of cooling technology (45%), uninterrupted power supply (18%) and IT equipment with servers, network and storage (30%), which each add EUR 270,000, 108,000 and 180,000 respectively onto *ServCo*'s books.

There are many approaches to reducing these costs, but in pole position is the consolidation of server and memory performance. As the servers in use are currently only working at between 10% and 30% of capacity, a class change from many small servers to a few large mid-range and high-end servers has high potential, even for companies that do not intend to outsource their computing centres. Modern virtualisation server technology, such as blades and middleware, supports this type of consolidation. Mainframes can also be purchased in energy-saving variants. Thus, the physical infrastructure, networking and cooling systems of streamlined computing centres can also be reduced.

There is even more potential in the area of cooling in particular. However, due to the high proportion of mechanical systems in use, significant results tend only to be achieved where a new computing centre is in planning or there is a switch to new methods, such as the use of water instead of air or direct device cooling. Here, cooling energy is routed directly to the devices and the heated air is extracted again without the computer centre itself being air conditioned.

The list of possibilities is long, but budgets are generally tight – so what can a company really save?

According to the Experton Group, between 10 and 35% of their energy costs. In an ideal scenario, savings of up to 40% can be achieved as seen in the prime example of the German Ministry of the Environment, where 2 large servers replaced 66 small ones. In the case of *ServCo* for example, we can assume an average of 30%, therefore EUR 180,000. Any costs for planning and staff plus any investments for new server acquisitions and possibly also for a completely new cooling system must be measured against this amount. Depending on the design and structure of the 'old IT,' we assume that such investments would consume amounts ranging from EUR 2 - 5 million. Even in the ideal case, this would mean a payback period of over 10 years. A positive NPV – i.e. the consideration of a

corresponding interest rate on the capital deployed – would therefore be unlikely here.

But can savings also be made without massive new investments?

The answer is Yes! For example, as far as IT equipment is concerned, operating speeds of hard disks can be curtailed, load profiles set up or servers shut down overnight or at the weekends. In some cases, it is even possible to eliminate servers without any substitutions. If, however, a virtualisation were necessary here, then this would entail high costs for setting up the software and the administration. The total cost of ownership is not reduced by such putative rationalisation measures, since virtualisation only pays off in connection with the switch to high end servers mentioned above.

However, there are other options as far as cooling is concerned. In mild temperatures, the air conditioning can be simply switched off. Alternatively, it is possible to determine the maximum temperatures at which the servers can run without malfunctioning and then run the computing centre at 35 degrees.

IBM has stated that energy costs can be reduced by 20% merely by implementing such simple measures and many companies have proven that a lot more is often possible in practice. But if we assume a figure of 20% for *ServCo*, it is clear that EUR 120,000 can still be saved in the computer centre without any detrimental effect on the investment cash flow.

### **Green IT in the office**

New technology for user desktop devices is extolled as Green IT. In particular, 'green clients' and 'thin clients' should help to improve energy efficiency in working environments. The first group includes low-energy PCs which work without fans and at lower voltage. Thin Clients, on the other hand, are restricted to input and output as data processing takes place on the servers in computing centres. Often sufficient for normal office use, their deployment is especially recommended where only one or a few applications are required, such as at airport check-in desks, hotel receptions or petrol station tills. However, a prerequisite for this technology is particularly large availability and places high demands on bandwidth and security.

If one were to believe the statements from the manufacturers, there is no way of bypassing the new hardware. But at what price and with what result?

According to the German Energy Agency, *ServCo* would be able to decrease its annual electricity costs by EUR 30,000 by exchanging old PCs for Green Clients or, in other words, by EUR 30 per user terminal device. However, if such a terminal device were only to cost EUR 150, then the full return would only be achieved after a 5 year usage period. Once interest rates are taken into account, it would be fair to expect zero profit. Much more promising is the 'Virtual Desktop Infrastructure' concept of Thin Clients, whereby the electricity consumption can be reduced by between 20 and 50%. Given that *ServCo* pays EUR 360,000 per annum for electricity consumption, this corresponds to between EUR 72,000 and EUR 180,000 for the end user desktop devices. In addition to the prevailing purchase price of EUR 250 per piece, extra software and backup servers are often required in the computer centre. Server licenses for the software must also be purchased if a centralised installation is permitted at all. Added to this are technical problems with the programs as these have generally been designed for fully-fledged PCs and end-user desktop devices cannot cope fully with a requirement for employee mobility. All these factors must be considered in each specific case and they reduce a potential value proposition of new purchases.

Can our example company still make savings if the existing infrastructure is used in a different way?

A German company such as *ServCo* with 1,000 PCs wastes 150,000 kilowatt hours of electricity per year (equating to EUR 28,500) by always leaving the terminal devices switched on. So, if employees learn to shut down their PCs or to switch them to standby mode as a matter of course, then immediately there are potential savings to be made. These changes in behaviour can be supported by 'desktop management software'. Currently barely deployed, this software enables specific computers to be switched on or off if, for example, software is distributed outside of working hours or an employee has forgotten to shut down.

But if replacement hardware investments are pending anyway, then it makes commercial sense to simply choose the appropriate hardware. On average, notebooks consume much less energy and performance characteristics should also be aligned to the actual requirements. CPUs and graphics cards with smaller clock cycles and less working memory improve cash flow not only in terms of purchasing, but also due to lower consumption in the subsequent years.

### **Green IT often raises unrealistic expectations**

In total, *ServCo* can reduce its energy costs by EUR 148,500 by implementing simple measures and without the need for new purchases. Through consolidation, virtualisation and alternative cooling systems in the computer centre and with new office hardware, these savings could even reach EUR 360,000 (split 50/50 between the computing centre and the offices). But before these results can be achieved, massive new investments are required that rarely lead to positive returns.

Finally, the possible results must be considered in the overall context. Even if *ServCo* were to save EUR 360,000, then that would only represent 0.36% of the total costs of the company. This fact makes it clear that Green IT will never be the main player in cost reduction programs and Green IT in the narrower sense will not revolutionise IT departments over the next few years. Green IT will therefore become a point to consider for any replacement investments already pending.

Even if the financial impact of Green IT is actually rather low, isn't a "We are Green" marketing strategy a necessity in today's world ?

### **Green IT as a Marketing Tool**

When considering investment in Green IT for image reasons, it is useful to take note of customer attitudes. A survey by Ernst and Young revealed that two thirds of business customers admit they would only want to pay a maximum of 5% more for Green IT. One quarter of those surveyed stated that Green IT should not cost any more than before. And not even one in ten companies is prepared to pay an additional 15% or more.

A similar situation exists for private customers - i.e. the potential end-user customers of *ServCo*. Although to date, environmental aspects are only a selling point for a very small group of consumers. In the USA, only one third of customers believe in the credibility of the IT manufacturers in this regard. Western Europe comes off better here with two thirds. But this will only have a minor influence on the mass consumer acceptance.

In each case, both for private and business customers, no large investments have to be made. Often, the commitment to environmentally-aware behaviour suffices, for example through central printers in the company, video-conferences instead of business trips or by extending the scope of home working. Additional investments in an environmental image have a heavily diminishing marginal utility for most companies and marketing budgets can generally be better deployed.

### **Conclusion**

Green IT has a lot of promise. However, in the case of pure cost reduction projects, it is seldom possible to generate savings through the comprehensive acquisition of new hardware. And the implementation of Green IT as part of outsourcing strategies through cloud computing and software as a service only have limited suitability for European companies. Finally, unlike in the USA, these focus on their individual business processes as a differentiating feature and full IT outsourcing can only be considered for standard software. On the other hand, the adaptation and administration requirements of bespoke software are too high for it to be outsourced cost-effectively. Companies should therefore only switch to Green IT when replacement investments are to be made in any case. This ensures that the total investment is not to be compared to the savings but rather only the 'green' additional investment. Before this takes place, however, significant savings can be achieved through very simple measures which can also support the green company image in appropriate campaigns.