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New Energy Star standard

How has cost of power changed over the years?

We have for some years been familiar with the entry on printer specification sheets that informs us of the device's compliance with the Energy Star standard. In fact, we may have become so familiar with it that we are now either blind to it, assuming that all printers are compliant, or have forgotten its significance.

As from 1st April 2007, the U.S. Environmental Protection Agency's and EU Commission's Energy Star program has been revamped to introduce new, and more stringent, requirements that must be met in order for office equipment to comply with the standard.

Projections from the EPA suggest that, in 2007, Energy Star compliant office equipment will save US homes and businesses \$2bn from their energy bills – apparently the equivalent of taking 7 million cars off the roads.

Other estimates suggest that, in 2003, \$3.5bn was saved in energy costs just through the purchase of new Energy Star equipment in American homes. Suggestions are that this equates to a reduction of about 19bn pounds of greenhouse gases not released into the atmosphere and that using Energy Star devices at home instead of standard devices could save the equivalent energy of the entire lighting bill for the house for four years.

Where printers are concerned, this kind of statistic is difficult to equate as a reality because most printers have operated with low energy consumption for a decade now. The days when printers had no sleep mode are long gone, so making comparisons of this nature between Energy Star compliant and non-compliant models that much more difficult.



Hewlett-Packard
LaserJet 4Si

Even where models do not comply, and 75% of hard copy devices are expected not to comply with the standard without being re-engineered, in terms of straight energy consumption the differences are likely to be relatively small.

What the EPA in the US appears to be attempting to do is to compare today's Energy Star models with printers from more than a decade ago that had no sleep mode. At least recognition is given to the fact that office equipment is usually left powered on for 24 hours a day.

So, lets have a look back in time and see how the situation in the mid-90's compares and contrasts with today's situation and why.

In 1995, power consumption was a major issue and had a massive impact on the Total Cost of Printing. Our estimates indicate that power consumption could account for as much as 17.6% of the long-term Total Cost of Printing! Or, it could account for as little as 1.0%.

Comparing running costs of four top-selling printers (16-18ppm workgroup printers, 6,000-page monthly print volume), three with and one without sleep mode, we saw a phenomenal 30x difference in the estimated total power consumption over a three year period of ownership.

This was caused not just by the lack of sleep mode but also by the higher overall power consumption of the model with no sleep mode (QMS PS1725). By comparison, the Hewlett-Packard LaserJet 4SiMX would use half the power while printing and less than one-sixth of the power while in Stand-by mode waiting for the next print job. Then,

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add to this the fact that power consumption dropped to a mere 45 Watts when the device went into sleep mode, compared to 855 Watts consumed all the time by the QMS device with no sleep mode, and the figures speak for themselves.

If we look at the power consumption situation with current models, we find that the proportion of the Total Cost of Printing that is accounted for by power has actually risen in the case of two of the printers but fallen rather significantly on the case of the Kyocera Mita model.

UK – 1995 Power Consumption	Printing (Watts)	Stand-by (Watts)	Sleep (Watts)	Estimated cost of power	Power as % of Total Expenditure
Hewlett-Packard LaserJet 4SiMX	425	131	45	£112	1.94%
Kyocera FS-3500MPe	500	450	110	£261	5.92%
Lexmark Optra Lxi	310	68	20	£56	1.00%
QMS PS1725	950	855	n/a (855)	£1698	17.59%

UK – 1995 Cost of Printing	Purchase	Print Speed	Nominal CPP	Long-term CPP over 3 years
Hewlett-Packard LaserJet 4SiMX	£4,099	16 ppm	0.78 pence	2.69 pence
Kyocera FS-3500MPe	£3,069	18 ppm	0.70 pence	2.04 pence
Lexmark Optra Lxi	£3,059	16 ppm	1.26 pence	2.59 pence
QMS PS1725	£4,295	17 ppm	1.71 pence	4.47 pence

This is down to two main factors.

Firstly, power consumption while printing has tended to rise, although consumption in stand-by mode has fallen.

Lexmark in particular is consuming much more power

In fact, Lexmark's power consumption (Optra Lxi) at the time were even lower than Hewlett-Packard's (LaserJet 4SiMX), working out at half the cost over three years.

in its current 43ppm T642dtn than it did in its 16ppm Optra Lxi in 1995 – 760 Watts in comparison to 310 Watts. This gives us a change of manufacturer with least expensive power consumption from Lexmark to Kyocera Mita.

In terms of Total Cost of Printing, there was not a very large difference in long-term CPP between the Hewlett-Packard, Kyocera and Lexmark models, though Kyocera had a distinct edge (by 24%) because of its ECOSYS long-life drum technology and lower purchase price.

In fact, rather a lot has changed over these last 12 years.

It was the QMS PS1725 that failed in every sense to compete. Not only was it the most expensive to buy but its power consumption absolutely soared through the roof and the cost of its consumables was 36% higher than its nearest competitor (Lexmark). This meant that the overall Total Cost of Printing was an incredible 75% higher than the Lexmark and 119% higher than the Kyocera.

- Lexmark is consuming 25% more power overall
- Hewlett-Packard is consuming 57% less power overall
- Kyocera Mita is consuming 89% less power overall
- Typical print speed of powerful workgroup printers has risen 2.6 times, from around 16-18ppm to around 43-45ppm ...
- ... while purchase price has fallen by 70% on average
- Nominal CPP has fallen by 16% on average (excluding QMS)

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- Long-term Total Cost of Printing has fallen by 46% on average (excluding QMS)

Secondly, as we have seen, the Total Cost of Printing has, in fact, fallen significantly over the period but the cost of power to the consumer has risen by about 26%.

UK – 2007 Power Consumption	Printing (Watts)	Stand-by (Watts)	Sleep (Watts)	Estimated cost of power	Power as % of Total Expenditure
Hewlett-Packard LaserJet 4250dtn	680	20	13	£61	2.0%
Kyocera Mita FS-4000D(T)N	510	10	5.5	£35	2.0%
Lexmark T642dtn	760	95	20	£88	2.5%
Konica Minolta (formerly QMS) does not have A4 mono laser printers above 20ppm					

UK – 2007 Cost of Printing	Purchase	Print Speed	Nominal CPP	Long-term CPP over 3 years
Hewlett-Packard LaserJet 4250dtn	£1,319	43 ppm	0.80 pence	1.45 pence
Kyocera Mita FS-4000D(T)N	£1,026	45 ppm	0.30 pence	0.80 pence
Lexmark T642dtn	£914	43 ppm	1.19 pence	1.67 pence
Konica Minolta (formerly QMS) does not have A4 mono laser printers above 20ppm				



Kyocera Mita FS-4000D(T)N



Hewlett-Packard LaserJet 4250dtn



Lexmark T642dtn

We now find that Kyocera Mita has the most economical printer by a much larger margin (45%) and that Lexmark is now the most expensive of the three.

Put these two factors together – higher energy prices and lower Total Cost of Printing – and the proportion of cost accounted for by power has had little choice but to rise.

However, we can look at the situation from another angle. We have already seen that actual power consumption on the part of both Hewlett-Packard and Kyocera has fallen significantly but, considering that the Total Cost of Printing has fallen by 46%, we can also clearly claim that the part played by power consumption (of the low-power models) in the overall Cost of Printing has actually fallen significantly relative to the position 12 years ago.

	Total Expenditure 1995	Cost of Power 2007	Cost of Power in 2007 relative to Total Expenditure in 1995
Hewlett-Packard LaserJet 4250dtn	£5808	£61.26	1.05%
Kyocera Mita FS-4000D(T)N	£4408	£35.26	0.80%
Lexmark T642dtn	£5605	£88.45	1.58%
Average Compared to 1995 average			1.14% 2.95%

So, when the EPA makes the claim that US homes and businesses could save \$2bn by using Energy Star hardware, in terms of printers we may be talking about

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replacing printers that are at least 12 years old if savings on that scale are to be achieved. Perhaps the vast majority of the savings are made on the PCs rather than on the printers. It is very difficult to know precisely what the saving is really measured against.

What we can say is that, without a shadow of a doubt, printers bought now will save most users a considerable amount on their power bill compared to printers bought 12 years ago even though energy prices have risen. If we talk in terms of replacing old printers, and particularly pre-sleep mode printers, then the savings are phenomenal and any user having not done so already is paying through the nose for nothing.

And yes, there are organisations still using printers of that age – and more. Two organisations in offices in the same complex as CharisCo are both running

8ppm LaserJet 4 models, dating as far back as 1992; I know of one other organisation and a household also running LaserJet 4 models; and Hewlett-Packard is certainly aware of customers still running 20-year-old laser printers.

LaserJet 4 printers are “built like tanks – will go on forever”, according to the PC support manager of one the UK government agencies.

Although the LaserJet 4 does have a Stand-by mode that reduces power from a pretty hefty 660 Watts to 95 Watts, the power configuration precedes the current Printing/Stand-by/Sleep configuration.

Next week, we’ll consider the new Energy Star standard itself in a bit more detail and see what it really means in terms of the printers we will be buying from here on.

Finding ways to avoid printing is still the best way to save money on hard copy ... and more

One city council in the UK is reported to have increased the productivity of its benefit inspectors by at least 50% by equipping them with tablet PCs with remote access to central data systems.

Inspectors have to make a large number of home visits to verify benefit claims but spend up to 20% of their time in the office preparing for those visits. In-office tasks include printing out each and every claim, with background information, so that they have the relevant information with them during the visit.



Hewlett-Packard tablet PC and Nokia 6310i Bluetooth mobile computing combination

By utilising tablet PCs as part of a mobile data system, inspectors are able to avoid wasted time travelling to and from their

office just to enter data onto the council’s IT system and they have all information available to them in electronic format, removing the need to print every claim.

While the reduction in hard copy would represent a relatively small part of the overall cost and efficiency saving here, this emphasises the enormity of the benefits to be gained by finding other ways to accomplish certain tasks without relying on printing information onto paper.

Reducing the print volume of a printer results in a higher cost per page. Every cost analysis we undertake proves this fact and reducing the number of pages printed in an organisation pushes up the cost of each page that is printed.

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However, remember that the goal of reducing pages printed is not just to reduce paper consumption or toner consumption – it is to reduce the number of printers and copiers that the organisation needs and the time spent in managing those pieces of paper.

If the number of hardware devices required can be reduced, and staff paper-handling time can be reduced, then the cost of each page that is printed within the organisation does not need to rise as print volumes fall because the cost of hardware and time is reducing in line with volumes – or perhaps more-so. Either way, there is

huge potential for reducing overall expenditure on hard copy related issues.

This is particularly relevant in situations like the one outlined above where the need to print actually imposes a requirement to travel – with all of its associated costs: cost of time; cost of fuel; cost of vehicle; environmental impact; etc.

Inventiveness and innovation of this nature can certainly reduce the need to print and cut costs. Even if costs are only shifted elsewhere, there may be productivity benefits that outweigh the lack of visible cost reduction.

End

