Case Study – Reducing carbon footprint in ICT upgrade at Glasgow Kelvin College

Background

Glasgow Kelvin College recently upgraded their ICT infrastructure to improve the speed and performance of their lab and shared PC computer equipment. By employing life cycle impact mapping prior to the procurement process, they identified climate risks associated with purchasing new computers, which stimulated discussions around creative alternatives.

The result was that the college instead trialled replacing Hard-Disk Drives with new Solid State Hard Drives and upgrading computer memory. This cost-effective solution resulted in a vast increase in computer performance at a significantly lower carbon footprint compared to buying new computers. Upgrading more than 400 computers across Glasgow Kelvin College’s campus and a number of partner learning centres has improved the speed of computers, and increased user satisfaction.

Glasgow Kelvin College now plans to roll these upgrades out across a further 150 PCs at Community Learning Centres in the greater Glasgow area, which provide free use of computers and College learning to underprivileged communities who would not otherwise have access to fast PCs.

The pre-procurement decisions involved in this project have allowed Glasgow Kelvin College to reduce the carbon footprint of their ICT upgrade, save money, and improve education and modern, digital skills.

The requirement

The college owns more than 400 lab and shared PCs that are approximately 6 years old. These were no longer running efficiently, so an ICT upgrade was required.

Procurement Process

The Procurement Team invested time on the pre-procurement processes of establishing whether to buy, what to buy, and how much to buy. When considering whether to buy they compared both the cost and environmental impact of purchasing new PCs versus purchasing new solid state hard drives and upgrading the memory of existing PCs.

Once a decision had been made to pilot updating hard drives and memory of PCs, the procurement team utilised the Southern Universities Purchasing Consortium (SUPC) IT Peripherals Framework for their upgrade.

Embedding sustainability requirements

Early on in the pre-procurement discussions, climate was identified as a risk factor due to the large carbon footprint associated with ICT equipment. Identifying climate as a risk area gave the team the motivation to undertake a life cycle costing assessment of purchasing new computers vs purchasing solid state hard drives and upgrading memory. This identified that upgrading existing equipment would save carbon across all stages of the equipment’s life cycle (Table 1).

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| --- | --- |
| **New computers** | **Hard drives and memory upgrade** |
| **Impacts of obtaining raw materials** |
| * ICT production uses rare earth materials such as gold, silver, and palladium, whose extraction uses a lot of carbon.
* Because of this, ICT production is very carbon intensive
 | * While both Solid State Drives (SSDs) and Hard-Disk Drives (HDDs) require rare earth metals for their production, the quantity required for SSDs is significantly lower, meaning that less carbon is required for their manufacture
* SSDs last longer, meaning that carbon in production is lowered through extended lifecycles and less frequent replacement
* Producing a hard drive requires vastly less energy than producing an entire computer
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| **Impacts of manufacturing and logistics** |
| * Many different components to manufacture (hard drives, screens, keyboards, batteries, webcams etc.). Carbon associated with each component.
* Heavy and large – high carbon cost of shipping
* High packaging requirement to protect equipment (Styrofoam, plastic, cardboard)
 | * Only one component to manufacture (hard drive)
* Light and small – can ship more per vehicle, lowering the carbon cost of shipping
* Plastic and cardboard only, and less than required for a computer
 |
| **Impacts during use of product/service** |
| * Increased energy efficiency compared to old computers
* Electricity usage on standby
 | * Hard drive and memory upgrade allow old computers to match the energy efficiency of new computers
* Extends the life of existing computers – SSDs last approximately 5 years and could be replaced again after this time
* Electricity usage on standby
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| **Impacts at end of life/disposal** |
| * High volume of material to landfill
* Lots of different components – difficult and carbon intensive to recycle
 | * Low volume of material to landfill
* Only one component which makes recycling much easier
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The Outcome

Procurement professionals at Kelvin College made use of the SUPC IT peripherals framework to pilot an initial upgrade of 20 computers. The supplier upgraded computer hard drives which were previously using traditional Hard Disk Drives to new Solid State Drives, which are faster, last longer, and are more energy efficient. The supplier additionally upgraded computer memory to further improve the task speed of computers.

These upgrades vastly improved the performance of PCs, resulting in a further energy reduction during their use. For example, the first time login time was reduced from 2.09 minutes to 29 seconds, and the time from Powered Off to Login Screen was reduced to just 5 seconds. Memory upgrades also meant that applications ran faster, allowing students to complete assignments more efficiently. After the success of this initial pilot, the program was expanded to upgrade a further 380 PCs across Glasgow Kelvin College’s campus and a number of partner learning centres.

Comments from partner:

*“Solid State Drives have been installed in all the desktop PCs and has completed Re-imaging for both centres. Our PCs are now running at optimum speed so logging in, accessing word etc. takes very little time at all. It’s always a pleasure to work with our college colleagues and the professionalism they show is second to none.”*

The increase in start-up time meant that the log off and restart buttons could be removed so that PCs are shutdown at the point of students walking away from the device. This meant that PCs were not left on standby and resulted in a further reduction in energy consumption.

Glasgow Kelvin College’s Vision is to transform lives through education, which includes partnering with community organisations to support 44 community-based learning centres throughout Glasgow and central Scotland. Kelvin College next plan to upgrade 150 PCs at these Community Learning Centres, thereby providing communities with access to improve education and modern digital skills.

Contribution to National Outcomes

* We are well educated, skilled and able to contribute to society
* We value, enjoy, protect and enhance our environment
* We are open, connected and make a positive contribution internationally
* We tackle poverty by sharing opportunities, wealth and power more equally

Lessons Learned

Incorporating life cycle impact mapping into this project has given the team confidence to use this approach on wider scales. The success of the project has encouraged wider long-term, whole life cycle thinking. The team reflected that in the future, a reporting criteria would strengthen this procurement exercise, as collecting more before/after data on carbon would provide solid metrics of success.