

Maximising re-use through end of life process – A Producers Perspective

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Re-using Product or Waste?

As environmental practice and legislation has developed, the need for ethical and sustainable use of resources has increased. This extends to the Information Technology (IT) industry where producers, including Dell, have been working to reduce environmental impact through their design for environment programmes [1]. These programmes ensure that all aspects and impacts of the product design, manufacture and lifetime are evenly distributed and aid in re-use and recovery.

The WEEE Directive (2002/96/EC) [2] requires that “priority should be given to the re-use of WEEE and its components.” and only recognises re-use as counting towards obligations if it has first been declared as WEEE. Traditionally the re-use industry collects and treats the items as functional product, unless required otherwise by circumstances, with product entering the waste stream as and where determined by functional or cosmetic condition.

This paper explores the current IT re-use market and legislation to determine the optimum way of ensuring practical and environmentally sound re-use.

1 Business and Consumer re-use

For the purpose of this document it is necessary to differentiate between business and consumer re-use. Where references of re-use are made in this document the following meanings apply:

- Business – IT product or equipment used in a commercial business environment.
- Consumer – IT product or equipment used in a household environment.

1.1 Business

The business IT re-use market has developed to become an essential value added service for business customers. Dell has been operating its Asset Recovery Services programme since 1991 [3] and has recovered 46.27 million kilos of product through its take back programmes in 2007, a 20 percent increase over 2006. A business will generally refresh its IT hardware every three to five years. According to a study by the UK National Audit Office [4] the optimum time to refresh hardware for the best financial return is three years. A business system with an age profile of three to five years and in good condition will still hold residual value in resale markets and would generally be managed through Dell’s Asset Recovery Services programme. Alternatively, a business system deposited at Dell WEEE collection points is on average five or more years old, in poor condition and generally unsuitable for re-use. [3]

1.2 Consumer

Since 2002 Dell has been holding consumer recycling events globally, which have been focussed on educating consumers on how to recycle equipment in an environmentally appropriate manner. From recycling events held in Europe (Limerick & Dublin–Ireland, Bracknell–UK, Munich–Germany, Paris–France, Madrid–Spain) the age of collected items has varied from five years to twenty years with the majority of collected consumer product being seven years old. This indicates that consumers will either use the product until technically obsolete and incapable to run up to date software or it will be re-used by a family member or private buyer. Most consumer IT product collected as WEEE through collection points is not of an appropriate specification or condition for re-use. The product is often received in various states of disassembly having had components including hard drives removed for re-use.

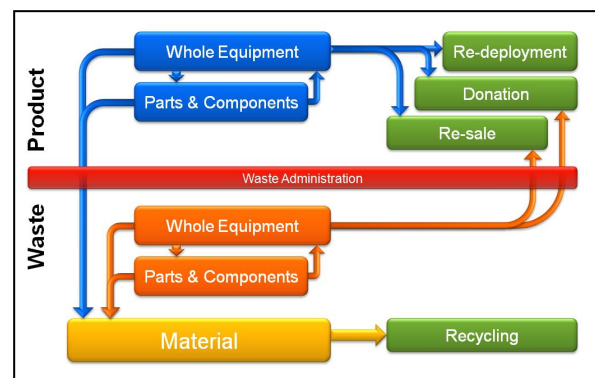


Figure 1: The re-use flow

2 Re-use of whole equipment

The aim of re-using equipment is to keep it out of landfill preventing needless waste of potentially useful equipment and resources. It is easy to re-use whole equipment that has not entered the waste stream as the condition is usually good both cosmetically and functionally. There is no waste management paperwork required. Equipment from business customers is preferable for re-use as it is newer than consumer product by up to four years. It should always be a priority to assess business product for re-use.

That said, some frequently raised objections and concerns of business customers to re-use are:

- Fear of issues with data protection. What will happen to the data on my hard drive? Can it be recovered even if I wipe the data using proprietary data wiping software? Who takes responsibility for the data when it has been re-sold?
- The future liability for the equipment. If I re-sell it will I be required to warranty it? If it is sold on to another user will I have responsibility for its end of life treatment?

Even with the aim of re-using whole equipment, sometimes, system components will fail resulting in either the whole product or parts of it becoming waste where it cannot be repaired. Functional components from failed equipment can still be re-used to repair other whole equipment.

Whilst the re-use of whole equipment has a positive impact on the environment some aspects need to be taken into consideration:

- Is the equipment of a sufficient specification to run the operating system and software?
- Will the extended lifetime have a detrimental environmental impact on carbon emissions through power supply inefficiency?
- Is the product destined for a developing country where the end of life infrastructure is also developing?
- What precautions for data security need to be taken into account for the original users data to protect against potential identity theft?
- Does the asset recovery company carrying out the re-use have the necessary registrations, licenses and operational standards to do so in accordance with legislation?

Personal Data when not removed from hard drives presents risk for the original user. The BBC Real Story programme broadcasted on 14th August 2006

[5] showed how a computer hard drive was purchased in Nigeria and traced back to the original owner in the UK who had deposited his old computer at a local civic amenity site in good faith that it was going to be recycled ethically. The investigation found personal data relating to the owner and family members and also internet banking information on the drive. This study has highlighted the potential for legal risk where equipment deposited at collection points has been re-used without control or due diligence over the management of data destruction. A reputable re-use organisation will ensure data is wiped from the hard drive as part of their best practice procedure regardless of whether the previous user has done so. Best practice controls should be enforced for collection points and re-use organisations to minimise legal risks. For businesses it is essential to ensure that all end of life services include data wiping and certification as standard. It is clear that data remains the responsibility of the owner in the case of both consumer and business.

With the WEEE directive now in place across all EU member states there is a requirement for WEEE and its components to be re-used where appropriate. This means that the WEEE will need to be assessed and deemed to be functional before being re-introduced into the market as product for donation or resale. A complete audit trail of the assessment process is required. Re-using WEEE is administratively burdensome and requires significant effort for a small reward. The re-use of waste product is more suited to white goods due to specification and economies of scale.

A large area of environmental risk comes from illegal shipments of product designated as waste. Under the Waste Shipment Regulations (2006/1013/EC) [6] exporters of product for re-use need to ensure that appropriate evidence is available to prove the items are functional if required by the authorities. In theory this prevents unscrupulous organisations from shipping items designated as waste to other countries as product without the necessary paperwork. The focus of authorities in enforcing this area of illegal exports has been welcomed by ethical re-use organisations.

Where functional items are removed from desks, they are not classed as waste until they are deemed to be non-functional or unsuitable for re-use. This not only avoids the administrative burden of waste management paperwork but ensures that only appropriate equipment will become waste.

The three main areas for re-use are as follows:

2.1 Re-deployment

To ensure the lifetime of the product is maximised some businesses will operate a redeployment programme at the time of a hardware refresh or operating system migration. A minimum specification is set and those products falling below this specification along with faulty items can be re-sold or recycled as appropriate. Products meeting specification will have the hard drives wiped, imaged and be re-deployed back into the business.

Re-deployment normally takes place within a business organisation. It ensures that the IT product estate is managed efficiently to get maximum usage from equipment.

2.2 Re-sale

Where product is in good cosmetic and functional condition and meets the necessary specification it will most likely hold value in the re-sale market. One factor affecting the value is the market conditions. Depending on specification, client product can return value from new to up to five years of age.

Through effective estate management businesses can release asset value through resale. In the study by the National Audit Office [4] it highlights a number of factors pointing towards reselling at three years:

- Revenue gained from resale at three years can offset the cost of asset recovery services.
- Little or no revenue available from resale at five years, the cost for asset recovery services has to be met through normal IT budget.
- Reduced maintenance costs.
- Increased staff productivity.

It is essential in the re-use process that all hard drives are wiped clean of data to a recognised standard. This removes data security risk for the business customer.

2.3 Donation

Of the three main types of re-use, the donation process has been more open to abuse than others. Some donation organisations have taken receipt of all products whether functional or faulty and accepted the responsibility to ensure disposal of unsuitable items. This places undue financial burden and environmental responsibility on the receiving organisation. It is the donor's responsibility to ensure the product meets the functional requirements and their data has been wiped prior to donation. This ensures responsible donation and reduces the overheads of the donation organisation allowing more effective use of precious re-

sources. Where donation organisations are part of the Community Microsoft Authorised Refurbisher programme [7] they can add value to the recipient in providing the product pre-loaded with an appropriate operating system.

The donation process should not shift the environmental burden to a developing country where the end of life infrastructure is also developing. In-country donation from donor right through to recipient prevents this from happening.

To avoid the waste management paperwork burden all donated equipment should be functional and should be able to be counted under WEEE obligations as re-use.

3 Re-use of parts and components

This area of re-use of parts works in concert with the re-use of whole equipment (see section 2).

Where whole equipment fails functional assessment there are two potential outcomes, either; the faulty equipment can be repaired by replacing the failed parts or components or if the cost of parts and labour are too high to be economically viable, the equipment can be harvested for parts and the remainder treated as waste for recycling. This process ensures that where possible the lifetime of products is extended in a sustainable way, maximising re-use and minimising waste. Any faulty parts identified at this point will enter into the waste stream for material re-use. Where equipment or parts have already become waste it is essential to test them and retain records to prove the parts are no longer waste, the process of administration to do this is burdensome.

Use of components for IT products is limited to main components such as the CPU, fans and heat sinks. Only components of value would be stripped from a faulty product. Component level repair on printed circuit board parts is not practical due to the labour cost for repair. Any components that are declared as waste at this point will go into the material re-use stream for recycling.

4 Re-use of material

The process of turning redundant equipment or waste material streams resulting from treatment into material for re-use is classed as recycling per the definition in Article 3 of the WEEE Directive. "the reprocessing in a production process of the waste materials for the original purpose or for other purposes" [2].

If there is a high accuracy of material separation during the treatment process the value of the sorted material will increase. Where a producer sends its product to a single treatment facility and a high level of sepa-

ration of material is achieved this material can then be introduced back into the supply chain as raw material for new product.

As the quality of material available for re-use improves, more producers will be willing to use the closed loop manufacturing process ensuring that recycled material will be used. The transposition and introduction of Individual Producer Responsibility (IPR) under article 8.2 of the WEEE Directive [2] into all EU member states is one way that can encourage material re-use through closed loop manufacturing. IPR gives producers responsibility for the take back and recycling of their own product which incentivises the incorporation of eco design attributes for ease of re-use and recyclability to reduce treatment costs.

5 Regulation and accountability

Where a business is contracting an asset recovery service they have the right to know the operational and environmental integrity of the service and company behind it. Regulation is achieved through questioning the processes and partners used and ensuring all required licences and certifications are in place. Accountability is achieved through detailed reporting of items processed, activities carried out and certification of data security and environmental treatment.

To reduce environmental and data security risk, baseline operating and environmental standards should be met and validated through regular audits. Standards that Dell asset recovery partners are required to meet globally are:

- ISO9001 and ISO14001 certification.
- Downstream partners for resale and recycling conforming to export compliance and environmental treatment standards.
- Data destruction with triple pass software wipe (e.g. US DoD, UK HMG Infosec 5 Enhanced) with inoperable drives physically disabled and destroyed.
- Detailed customer inventory reporting including data security and environmental aspects.

Dell partners are independently audited on an annual basis to verify compliance to Dell standards as well as required legislative and environmental standards. This process ensures that partners are held accountable for their actions and there is integrity in the downstream channels.

6 Conclusions

Summary of conclusions for optimised re-use reached in this paper:

- Business users should take active interest in the end of life process their equipment will pass through ensuring the operational and environmental integrity of the service provider.
- All equipment should be classed as product until deemed to be non-functional and thus waste. This will avoid burdensome waste management requirements and reduce costs.
- All re-use activities should be focused on:
 - Whole unit re-use before the item enters the waste stream
 - Parts and component re-use taking place within the waste stream
- Parts and components should be used where appropriate to extend useful equipment life.
- All re-use of whole units should count towards individual producer obligations under the WEEE Directive.
- Any re-use of WEEE should not place additional burden on producers.
- *All* environmental aspects and impacts should be taken into consideration before re-using product.
- Consideration should be given to the potential legal risk of re-using equipment arising from civic amenity/municipal collection sites by ensuring due diligence with the destruction of data contained on hard drives.

7 Literature

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