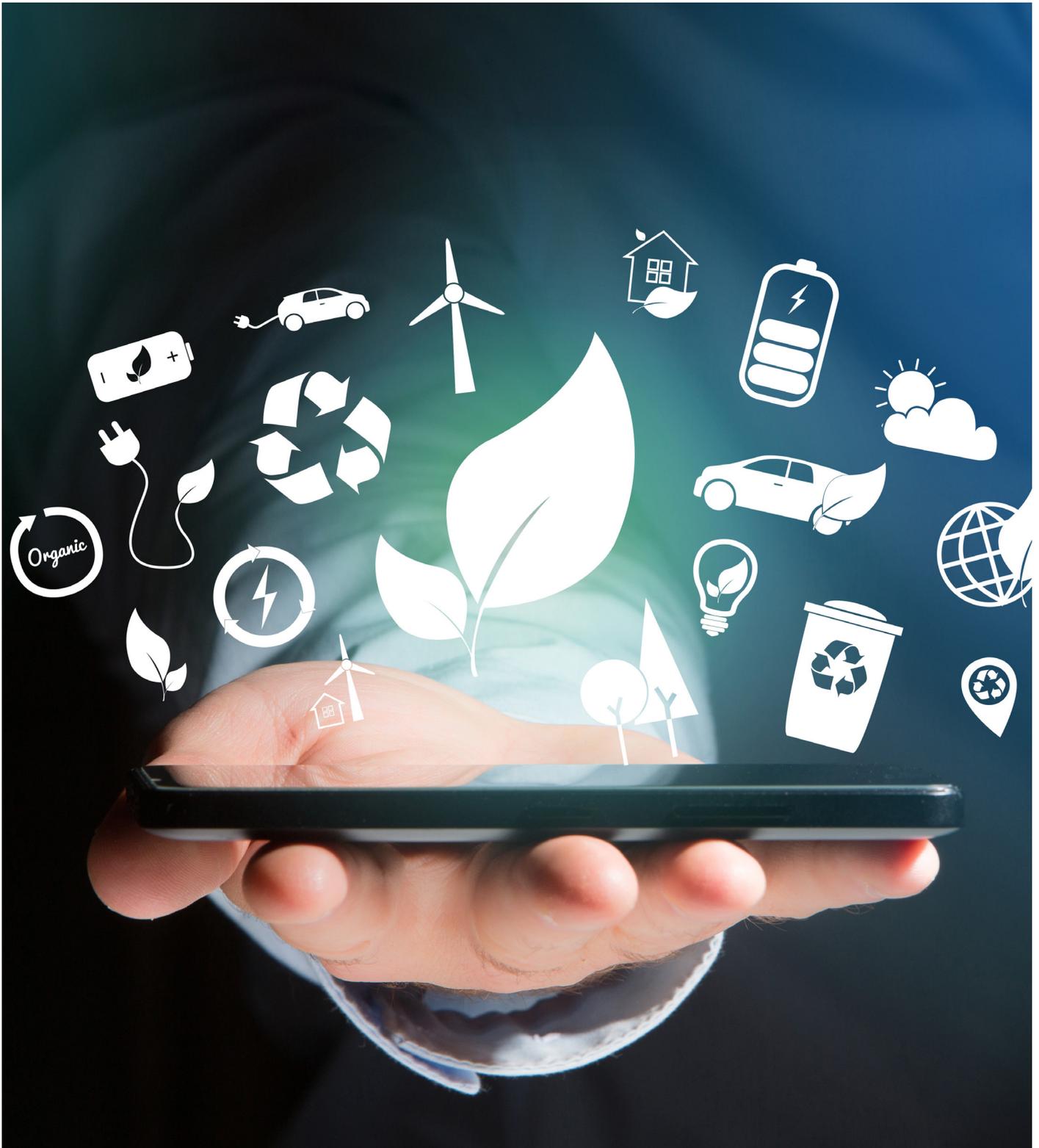


# Reuse | Repair | Remanufacture in the ICT Sector

techUK report | June 2018



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# Introduction

Resource productivity has rapidly become a key priority for industrial manufacturers. Recent shifts in both supply and demand, including rising resource security concerns and demographic changes, are increasingly seen as trends that will remain for decades to come.

The previous focus on marginal and incremental improvements in resource efficiency have made way for more systematic thinking about the use of materials, product design and valorisation at the end of life.

**Now more than ever, manufacturers are collaborating with end of life experts and setting ambitious future goals to reduce reliance on virgin materials. Businesses also recognise the link between a resource efficient business and carbon efficient one.**

This paper outlines the steps that manufacturers in the ICT sector are adopting in response to this agenda and highlights the potential of new technologies, such as the Internet of Things (IoT) and 3D printing, in prolonging the life of products in the future. Finally, we set out policy recommendations to further boost activity in this space.

# Summary of Policy Recommendations

## Place safety and quality in the heart of our flourishing professional after-service sector.

- Recognise the trusted status of the UK's network of authorised repair networks and refurbishment/remanufacturing facilities.
- Protect the intellectual property rights in the after-sales, maintenance and repair market, in particular with respect to license agreements and access to proprietary information.
- Promote the safety risks of unauthorised repairs carried out without the necessary training.

## Incentivise the adoption of technologies in industry that supports resource efficiency:

Market penetration of these technologies should be encouraged in a similar way to technologies that support energy efficiency, which currently qualify for enhanced capital allowances. The Enhanced Capital Allowance (ECA) Scheme for energy-saving technologies allows profit or loss-making businesses to benefit from tax breaks when investing in eligible energy-saving equipment. Explore the opportunity to extend to the ECA scheme to technologies that supports resource efficiency.

## Consider the waste impacts of consumer rights policy:

Reflect on rebalancing consumer rights policy to support more repair activity rather than giving consumers the right to refunds or brand new replacements.

## Provide consistent advice on the deletion of data on devices:

Ensure that there is consistent clear advice to consumers on the deletion of data from devices to encourage repair, reuse and recycling.

## Harmonise material efficiency product design rules with the

**Eco-Design Directive:** Ideally, unless clear circumstances warrant otherwise, the UK should harmonise with the material efficiency standards set under the Eco-Design Directive. In the Clean Growth Strategy, Government has already promised to harmonise, with flexibility, with energy standards set under the Eco-Design Directive.

### **Assess the economics of repair and conduct an assessment of the repair market**

- Conduct a market assessment of the repair market and launch a call for evidence to better understand the economics of the repair.
- Assess the case for introducing a VAT reduction on the repair labour activities.

### **Developing secondary plastic supply chains**

- Work within international fora to establish recovered plastics standards and supply chains.
- Conduct a study assessing which recycled plastics are best deployed and where, prioritising single use plastics.

**Safeguard the “repaired as produced principle” for spare parts as recognised in the EU Directive restricting the use of hazardous substances in electrical and electronic equipment (RoHS):** The availability of spare parts for electronics is key to ensuring that repair, reuse and upgrades of equipment are carried out economically. Without this principle, equipment would either become prematurely obsolete, or at best, increase the cost of repair and upgrades.

**Encourage remanufacturing, refurbishment and repair by easing waste regulatory burdens:** Ensure products destined for repair, refurbishment and remanufacturing are not considered waste when being repaired, refurbished or remanufactured within national boundaries and internationally.

**Create a specific custom code for used EEE sent for repair:** More reliable data on the flow of products in and out of the UK for repair would help policy makers to better assess this market and add legitimacy to this activity.

**Research the use of 3D printing to generate simple spare parts:** Trial the use of 3D printing to generate simple spare parts for common faults in domestic appliances.

# Section One

## Durability and Reliability

- Software updates, cloud services, improved water proofing of devices and improvements to hardware design are helping to increase the life of tech products. Research by WRAP suggests certain ICT products are between 53-96 per cent more durable than consumers expect.
- Connected devices are heralding in new services based on predictive maintenance allowing products to be serviced and repaired before a fault develops, helping to prolong the life of products.
- New European standards are being developed for the first time to define durability and establish common tests to assess product longevity. This will then be reflected in European product design rules if enhanced longevity is deemed to be important for particular products.

In the early 2000s, the average amount of time an electronic product was in use became shorter as technology developments accelerated and newer devices were more desirable. More recently, however, electronic devices are becoming more durable and are being used for longer.<sup>1</sup>

More durable products have been created largely through design: by eliminating common points of failure, such as minimising exposure to dust, humidity and water and by using high quality materials and components. For example, industry is increasingly offering waterproof devices so smartphones and wearables are less likely to fail or be in need of repair after being exposed to water.

Other changes are helping older devices remain an attractive option. Software support ensures older generation devices can still be used without compromising security or data protection. These allow customers to use functions developed after the initial purchase, keeping content fresh and up to date. Cloud services have made upgrades to obtain more storage obsolete.

Work by WRAP suggests that the durability of ICT products is now significantly longer than consumer expectations.<sup>2</sup> For laptops and computers, consumers on average anticipate a life of 4.9 years, half the actual life of products (9.6 years on average), while televisions last nearly 53 per cent longer than anticipated. While WRAP estimates that 48 per cent of mobile phones and 19 per cent of laptops are still replacing functional products, as users upgrade their phones for newer models, there is strong evidence that used devices are supporting a thriving reuse market ([see next section](#)).

Indeed, its research has shown that product failure rates are much lower than return rates suggest. Around 5-10 per cent of products are ultimately returned. But while 57 per cent of shoppers cited product faults as the reason for return the product, WRAPs research with retailers indicated a much lower product fault rate. This represents a significant hidden source of wastage in the sector, exacerbated “right to return” retailer policies even if there is nothing wrong with a product.

Often poor handling of returned products in the supply chain means that these often have to be scrapped. Collaborative work is now underway to improve the management of products returned to retailers.

Nevertheless, despite improvements to product design over the last 10 years, concerns remain. The European Commission has asked the European standardisation bodies to develop standards that allow a products durability to be assessed, along with other material efficiency design aspects, which will be used to support new design requirements on durability for energy related products ([see Material Efficiency case study](#)).

Increasingly, companies operating in the digital economy are helping others to unlock new opportunities for resource efficiency. The Government’s review of industrial digitalisation, Made Smarter<sup>3</sup>, shows how digital technologies could completely reshape production and consumption, disrupting and creating new business models and sectors and reconfiguring supply chains. The report estimates it could reduce business resource costs by £10 billion. One example can be seen in new services based on predictive maintenance which allows connected products, i.e. industrial machinery with sensors with digital connectivity, to be serviced and repaired before a fault develops helping to prolong the life of machines ([see SAP case study](#)).

These opportunities aren’t confined to industry. Home energy management systems powered by artificial intelligence are already on the market which, along with other features, can detect appliance deterioration and the cause of the problem. In future, particularly as market penetration of smart appliances increases, predictive maintenance will help consumers to prolong life and fix appliances before they fail, overcoming some of the barriers to repair – namely the time required to obtain the right spare part and an appointment with an engineer to install it. However, the key barrier for products with these functions is interoperability of standards – the ability for different products from different manufacturers to communicate to one another. Government interventions should focus on the framework within which the value of these technologies is determined, encouraging industry driven, consensus-based standards.

## Policy recommendations

**Harmonise material efficiency product design rules with the Eco-Design Directive:** Ideally, unless clear circumstances warrant otherwise, the UK should harmonise with the material efficiency standards set under the Eco-Design Directive. In the Clean Growth Strategy, Government has already promised to harmonise, with flexibility, with energy standards set under the Eco-Design Directive.

**Incentivise the adoption of technologies in industry that support resource efficiency:** Market penetration of these technologies should be encouraged in a similar way to technologies that support energy efficiency, which currently qualify for enhanced capital allowances. The ECA Scheme for energy-saving technologies allows profit or loss-making businesses to benefit from tax breaks when investing in eligible energy-saving equipment. Explore the opportunity to extend to the ECA scheme to technologies that support resource efficiency.

**Consider the waste impacts of consumer rights policy:** Reflect on rebalancing consumer rights policy to support more repair activity rather than giving consumers the right for refunds or brand new replacements.

## Section Two

### Reuse

- There is a thriving marketplace for used electronics with products being sold online, traded locally, cashed in or passed on to family or friends. In 2016, 120 million used smartphones were sold or traded by consumers around the world.
- The tech sector is increasingly collaborating with end of life partners at the design stage to discuss design for reuse and part replacement along with other material efficiency design features.
- Increasing numbers of manufacturers are offering leasing to customers, from office printers to smartphone customers, supporting a world-class service network for reuse.

Demand for used devices is rising, parts are increasingly harvested from used products to use again and discussions are underway between manufacturers and end of life operators to design products that enable more reuse of parts and materials ([see this testimony from SIMS](#)). Some have made public their commitment, for example Apple’s aspiration to reuse parts and materials to the point that they want to be free of mining in future ([see Apple: Ending reliance on mining testimony](#)).

Deloitte Global estimated that hundreds of millions of used smartphones were sold or traded in by consumers in 2016, calling it the “\$17 billion market you may never have heard of”.<sup>4</sup> It is a fast-growing market, outperforming the overall smartphone market by four to five times. IDC expects the global market for used smartphones to grow to \$30bn by 2020.<sup>5</sup>

The Deloitte Mobile Consumer Survey 2016 in twelve European countries found 19 per cent of the participants had passed on their previous phone to a family member or friend when purchasing a new one. Another 10 per cent sold or traded the old phone through different channels<sup>6</sup>, including:

- Online market places like eBay and Amazon Marketplace
- Giving the device to family or friends
- Donation to charity
- Trade-in to companies like CEX and musicMagpie or directly to manufacturers or network providers.

UK evidence shows consumers are cashing in too. Deloitte’s more recent survey of consumers in 20 countries found that UK consumers were the most likely to sell their phone for cash, driven by rising trade-in values: the average price of a used handset increased from \$30 in 2007 to \$165 in 2013<sup>7</sup>. Green Alliance estimates that by keeping a smartphone in use for even an additional year cuts its CO<sub>2</sub> impact by just under a third.<sup>8</sup>

The market for used IT equipment is even larger. As the Green Alliance puts it: “A circular economy for consumer electronics is already here ...the value of Apple devices sold on eBay in the US in 2013 was nearly \$2 billion ...WRAP estimated in 2013 that the value of two to three year old laptops in the UK was £720 million and two to three year old tablets were worth £90 million after any collection and repair costs were taken into account.”<sup>9</sup>

Reuse in the B2B market is far more established, and activity will differ from product to product depending largely on its inherent value.

**HPE Financial Services:**  
Asset Recovery Service and Lease Program operates a business with reuse rates which are approximately as follows:

		Resold	Recycled
Asset Recovery Service	Servers	77%	23%
End-of-leases	Servers	88%	12%
Asset Recovery Service	Storage	31%	69%
End-of-leases	Storage	33%	67%

*The difference between the resold percentages are related to data security issues, mechanical failure modes of hard-drive based storage technology, and the longer, initial use of new storage products which make second life uses less attractive.*

A key barrier to greater reuse are concerns about personal data security, which is reportedly discouraging 35 per cent of UK households from selling their products at end of life or recycling them, resulting in the hoarding of electronics. While some manufacturers are working to overcome this by offering attractive take-back propositions and improving the ability for users to eradicate their data, there is still a need for consistent clear advice on data sanitation which does overly promote device destruction.

Reuse activities in the sector is also focusing on the reuse of materials with a particular focus on plastics ([see Dell and Sky case studies](#)). While around 90,000 tonnes of plastics is derived from waste electrical and electronic waste in the UK , this is made up of a wide range of plastics (ABS, PP and (HI)PS as well as complex blends such as PC+ABS) often with a variety of fillers and additives (glass fibre, talcum fillers, flame retardants).

This, in addition to their relative low volumes, which makes it difficult and economically challenging to separate for high quality recycling. In using recycled plastics, manufacturers face some additional challenges. Manufacturers need a reliable supply, in the right quality to feed into its global supply chain at the point of production, which in the case of electronic product manufacturing, is most likely to be outside of the UK. The use of recycled feedstock also creates difficulties in complying with EU chemical substance regulations such as the EU's restriction of certain hazardous substances in electrical and electronic equipment Directive (RoHS) and the Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

# Policy Recommendation

**Provide consistent advice on the deletion of data on devices:** Ensure that there is consistent clear advice to consumers on the deletion of data from devices to encourage repair, reuse and recycling of the product.

## Developing secondary plastic supply chains

- Work within international fora to establish recovered plastics standards and supply chains.
- Conduct a study assessing which recycled plastics is best deployed where, prioritising single use plastics.
- Provide clarity on the interface of chemicals/products/waste policy in the UK.

## Section Three

### Repair

- Manufacturers use a range of tools to support customers with products in need of repair such as dedicated apps and helplines, YouTube videos for common problems, forums and networks of repair operations.
- To support the development of engineering skills in young people needed to support future repair activities, techUK along with other industry and academic partners are developing an apprenticeship standard for both domestic and commercial electrical, electronic product service and installation engineers.
- Third party repairs using unauthorised parts risks safety. Counterfeit products and parts, particularly batteries, leads and adapters present a particularly insidious threat to the consumer posing a risk of fire or serious electric shock.

There is emerging evidence that the appetite to repair of electronic equipment has had a renaissance in the UK in recent years. After an overall long-term decline in the market for repair, exports of ICT goods for repair grew by 9 per cent a year (to £0.9bn) between 2009-2014, imports rose by 2.8 per cent (to £0.7bn) and the UK repair sector currently employs 35,800 people.<sup>10</sup> New technologies such as 3D printing are also starting to be used more frequently in B2B applications, making simple repairs easier and cheaper (see [BAE Systems case study](#)). However, despite this growth, debates around repair have focused on “do it yourself” repairs: online tutorials, repair cafes and the small repair shop around the corner.

Manufacturers and NGOs involved in electrical safety have concerns about these repairs, which hinge on the large and growing number of counterfeit and substandard accessories and parts that have become easily available. Whilst there is a lack of data available to properly evidence the scale of the problem, some estimate that counterfeiting has grown by 10,000 per cent in the last two decades as manufacturing has become cheaper and the route to market easier.<sup>11</sup> A recent report by Europol and the European Union Intellectual Property Office highlighted that counterfeit goods in the EU “increasingly include spare parts or other elements used in combination of genuine products...such as replacement parts for mobile phones.”<sup>12</sup>

Counterfeit products, accessories and parts are more likely to have poor build quality, substandard components, missing safety features, dangerous deficiencies in design and not compliant with safety regulations. In the best case these are prone to failure, in the worst case they may cause fires or present a serious risk of electric shock. In a recent test, NGO Electrical Safety First found 90 per cent of fake or lookalike iPhone chargers put consumers at risk of lethal electric shock and fire.<sup>13</sup> Their research indicates that 2 per cent of people in the UK have knowingly bought a counterfeit product in the last year – over a million people. The true figure is likely to be much higher as many will have unwittingly bought counterfeit products. Often it is difficult to determine whether a product or component is counterfeit or not.

With ongoing calls for products to be easier to repair, a balance must be struck between the ease of repairing products, the cost for doing so, and product safety.

Typically the two main motivations for buying counterfeit parts and products is cost and convenience. For example, a legitimate manufacturer may retail a smart phone charger at £15-20, whilst a counterfeit version may be available for less than £1. Counterfeit parts may also be more quickly obtainable than legitimate ones. More must be done to educate consumers of the risk of these purchases. It is also important that this is considered carefully within the context of the repair debate.

Manufacturers themselves provide reliable and cost-efficient service solutions to a high reproducible quality. When a customer needs a repair, three options are typically available: the first point of call are helplines and online support, either through dedicated apps ([for example, see Samsung case study](#)) or via manufacturer's websites. If a product cannot be fixed remotely, it can be either dropped off at an authorised partner or retail store or can be sent in for repair at a centralised location.

To support cost-effective repair and remanufacturing, many tech companies have established central facilities in the UK (see [map of UK and examples](#)) or in mainland Europe. These are complemented by networks of authorised repair operators, either subcontracted or independent, manufactured certified, professionals who are supported by training, reviews and audits to ensure they have the skills required to carry out high quality and safe repairs of devices. techUK has worked with partners to develop the training needed to equip the next generation of engineers with the skills needed to support professional repair ([read more about HEEST here](#)).

More can be done to make repair more economical for both manufacturers and consumers. The “repair as produced” principle has been at the heart of the chemical restriction process under the EU RoHS Directive.<sup>14</sup> Unless there is a compelling reason for immediate substance bans, manufacturers should be allowed to use existing legacy spare parts to repair products already on the market to give manufacturers more confidence to retain spare parts.

We also believe the time is right for Government to explore more closely the economics of repair activities. There is a perception that repairs are expensive compared to the price of a new product. The economic benefits of efficient, high-speed manufacturing which have brought down the price of products substantially over recent decades has helped to shape this view. For repair, we cannot benefit from these economies of scale: it is more labour intensive than production and the storage of spare parts represent a cost that isn't reflected in the modern “just in time” manufacturing culture. A reduction in VAT on the labour for repair activities, as introduced by Sweden, could support repair by making it more economical to repair products through authorised routes out of warranty.

# Policy recommendations

## Place safety and quality at the heart of our flourishing professional after-service sector

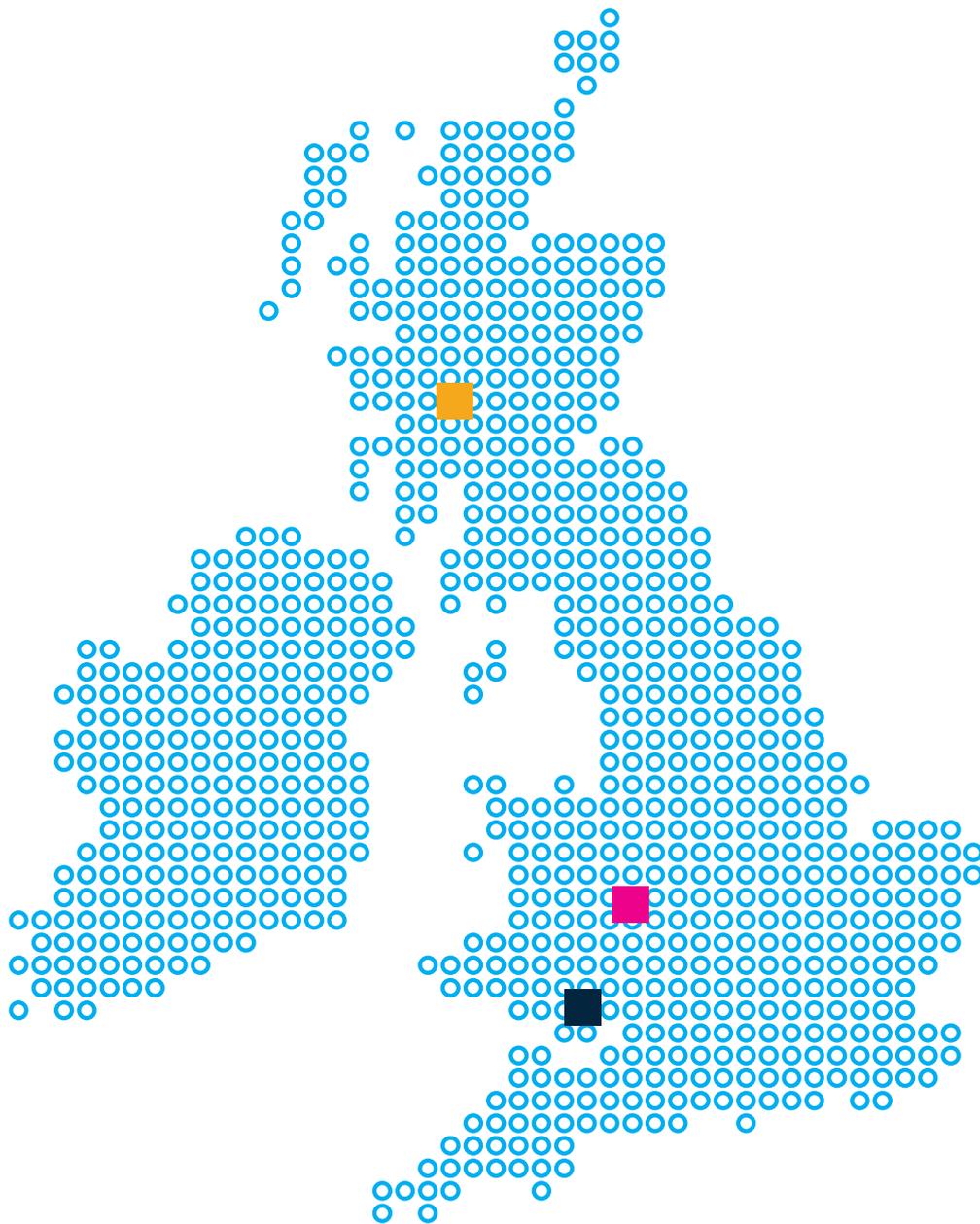
- Recognise the trusted status of the UK's network of authorised repair networks and refurbishment/remanufacturing facilities.
- Protect the intellectual property rights in the aftersales, maintenance and repair market, in particular with respect to license agreements and access to proprietary information.
- Educate the public on safety risks of unauthorised repairs carried out without the necessary training.

## Assess the economics of repair and conduct an assessment of the repair market

- Conduct a market assessment of the repair market and launch a call for evidence to better understand the economics of repair.
- Assess the case for introducing a VAT reduction on the repair labour activities.

**Research the use of 3D printing to generate simple spare parts:** Trial the use of 3D printing to generate simple spare parts for common faults in domestic appliances.

**Safeguard the “repaired as produced principle” for spare parts as recognised in EU RoHS:** The availability of spare parts for electronics is key to ensuring that repair, reuse and upgrades of equipment are carried out economically. Without this principle, equipment would either become prematurely obsolete, or at best, increase the cost of repair and upgrades.



**Sony UK Technology Centre,  
Pencoed, Bridgend, Wales**

Established in 2001, the Sony Customer Service Centre, based in Pencoed, South Wales, provides UK service and repair for customers and retailers for 5,000 products across 1,400 different Sony ranges. It offers fast repair turn-around time, three days from receipt to dispatch, at the highest quality standards, using the latest equipment and fully trained engineers, technicians and operators.

**Sony Interactive Entertainment  
Europe, (Infoteam) Telford,  
Shropshire**

Up to 4,000 consoles can be repaired a month at Infoteam's repair facilities in Shropshire. In addition to conducting warranty repairs, the company offers out of warranty repairs at affordable prices – consoles are designed so key parts can be removed for repair non-destructively. Information related to troubleshooting, such as releasing trapped discs, is provided in the instruction manual, via user friendly online self-help guides and also by the call centre, to enable users to fix problems with their own consoles and avoid the need for professional repair.

**HP Financial Services,  
Technology Renewal Centre,  
Erskine, Scotland**

HP Financial Services' 84,000ft Technology Renewal Centre in Scotland opened in 2011. The Erskine site reconditions used IT equipment - such as PCs, laptops and data servers from corporate clients from across EMEA to their original specification. Functional items are then sold back to both public and private sector organisations, while equipment no longer working are dismantled and recycled off-site. Erskine processes around 60,000 PCs and 100,000 Enterprise products per month and a virtual tour.

## Section Four

### Remanufacturing and Refurbishment

- Thousands of products are remanufactured or refurbished every year which involves assessing products, wiping data and software, restoring products using certified OEM parts, case buffering or repainting to “new” and repackaging. Business is conservatively valued at £190m in the UK and Ireland – but data collection is poor.
- Tech companies are developing sophisticated tools to determine how to derive most value from products at end of first life.
- The introduction of the General Data Protection Regulation means that data security at the end of life is under the spotlight with many advisers recommending that devices are destroyed at the end of life to mitigate data risks. It is important that balanced messaging which reflects the range of options available to businesses and individuals to remove data are clearly communicated.

Remanufacturing and refurbishment is a well-established way of creating value; indeed, these practices emerged in the nascent ICT hardware industry over 30 years ago. Thousands of products are remanufactured or refurbished every year which involves assessing products, wiping data and software, restoring products using certified parts, case buffering or repainting to “new” and repackaging.

However, it remains largely a B2B activity, where companies remanufacture products such as servers, printers, networking and communication products ([see Canon case study](#)). There are exceptions, for example Sky’s Q ([see Sky case study](#)). Refurbishment of devices like smartphones and laptops is a growing market, with companies like Sims Recycling Solutions repairing and refurbishing functional used IT products, such as laptops, PCs, flat-screen monitors and hand-held electronics, and selling them to new owners ([see Sims Recycling Solutions case study](#)).

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### What is refurbishment?

It is a process that makes a product available for reuse through part removal, upgrades and replacements, and testing. The warranty that is issued covers the entire product. For most tech companies, the refurbished product may not be brought to the latest OEM specification, or some smaller defects (such as a lower battery capacity) are not addressed as long as these do not have major impact on the use of the product. In these cases the products are ‘refurbished’ and bring the product back to at least production quality.

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### What is remanufacturing?

It is a process, primarily in B2B context, of returning a used, non-functional, discarded or traded-in product “to at least its original performance with a warranty that is equivalent, or better than, the newly manufactured product.”<sup>15</sup> The process requires detailed and comprehensive disassembly and reassembly resulting in a “like new” product, both cosmetically and functionally.<sup>16</sup> It may incorporate upgrades to reflect improvements that have occurred since the product was originally made.<sup>17</sup> Components used for remanufacturing may be either new or harvested.

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According to the Horizon2020 project ERN<sup>18</sup>, the ICT remanufacturing and refurbishment business in the UK and Ireland accounts for an annual turnover of £190 million a year – although this may be a conservative estimate as data capture on the scale of activities in the sector remains patchy. It is a global business and companies have invested in facilities across Europe. These dedicated facilities ensure optimal processes by allowing for economies of scale, access to qualified technicians and high-tech equipment. Increasingly sophisticated tools are being deployed to ensure companies can assess the most profitable way to handle products at the end of life delivering in turn substantial environmental benefits ([see Xerox case study](#)).

Barriers to further growth, particularly in B2C markets, include concerns about data security and misconceptions about product quality. WRAP’s research indicates that two thirds of customers are concerned about personal data on devices they have used and that 35 per cent of households have been discouraged from “disposing” of a device as a result.<sup>19</sup> More work needs to be done by industry to ensure that customers understand effective ways to protect data on devices they no longer use. Regulatory barriers include the cost and administration of obtaining licenses to ship products abroad for refurbishment and remanufacture.

## Policy recommendations

**Encourage remanufacturing, refurbishment and repair by easing waste regulatory burdens.** Ensure products destined for repair, refurbishment and remanufacturing are not considered waste when being repaired, refurbished or remanufactured within national boundaries and internationally.

**Create a specific custom code for used EEE sent for repair.** More reliable data on the flow of products in and out of the UK for repair would help policy makers to better assess this market and add legitimacy to this activity.

# Testimonies

## Design for valorisation

“ Industry-leading, progressive equipment manufacturers are engaging with reuse and recycling partners at an early stage to discuss designing for ease of parts replacement, design for reuse and designing products to enable high levels of material recovery and therefore value recovery. ”  
Sean Magann  
Managing Director, Sims Recycling Solutions.

## Apple: Ending reliance on mining

“ We’re challenging ourselves to one day end our reliance on mining altogether. To start, we’re encouraging more customers to recycle their old devices through Apple Renew. And we’re piloting innovative new recycling techniques, like our line of disassembly robots, so we can put reclaimed materials to better use in new products. It’s an ambitious goal that will require many years of collaboration across multiple Apple teams, our suppliers, and specialty recyclers - but our work is already under way.<sup>20</sup> ”

“ We at Electrical Safety First fully support the need for safety to be at the heart of the after-service sector. With more than 2 per cent of the UK public knowingly buying a counterfeit electrical product in the last year, it is paramount that consumers are made aware of the risks of unauthorised repairs and parts, and that more recognition is given to trusted authorised repair networks who offer professional but cost-effective solutions. ”  
Martyn Allen, Technical Director at Electrical Safety First

# Case studies

## SAP: Predictive Maintenance and Service

New tools that help industry assess the health of machines are increasingly being used to support predictive maintenance services. SAP's solution analyses large volumes of sensor data (such as temperature, vibration, or rotation speed) to detect malfunctions in machines, issuing alerts long before a machine breaks down allowing servicing to occur ahead of failure. The technology also supports transformational business models and new forms of billing.

## Material Efficiency Standards

Announced in the European Commission's Circular Economy Action Plan in 2017, work is underway by the European Standardisation Organisations on a suite of standards and technical reports that will for the first time define and set out test methodologies for a number of resource efficiency concepts including: durability, reparability, upgradability, reuse, ability to remanufacture, the recyclability and recoverability of components and materials; and, the proportion of recycled material content in a product. The work includes the development of a common methodology to declare the presence of critical raw materials in a product and the means to communicate the resource efficiency characteristics of a product. Once concluded, the standards will be used to set product specific requirements under eco-design regulations.

## Tackling ocean plastics

Dell is working to create the first global ocean-bound plastics supply chain. In a pilot project they began in the spring of 2017, they are processing 16,000 pounds (7.25 tonnes) of plastics from beaches, waterways and coastal areas and using them as part of a packaging system for the XPS 13 2-in-1 laptop. After collection, plastics are aggregated and sorted, refined and mixed with recycled HPDE plastics. The resulting mixture - which is 25 per cent ocean-bound plastics and 75 per cent recycled HPDE - is then moulded into packaging trays for Dell's XPS notebooks. These can then be recycled at the kerbside.

To help others, Dell has published a white paper on sourcing strategies and, in partnership with the Lonely Whale Foundation, convened an industry working group, NextWave, to expand the supply chain and commercial use cases for ocean-bound plastics in products. Since 2008, Dell has included post-consumer recycled plastics in its desktops, and as of January 2017, it reached its 2020 goal of using 50 million pounds, around 22,690 tonnes, of recycled materials in its products.

## Eliminating single-use plastics

Sky has pledged to eradicate all single-use plastics from its operations by 2020 all new Sky products will have packaging that is free of single-use plastic. Their efforts are on-target and by the end of 2017 all new products will be made without any single-use plastic. In addition, Sky will help its business partners and supply chain to transform their operations. It has also launched a £25 million Ocean Rescue Innovation Fund to support businesses and start-ups that are developing technology to eradicate single-use plastics and stop plastic from ending up in the ocean.

## Samsung using the Smart Tutor for remote repair and diagnosis

Samsung is continuously developing its customer support services to ensure customers get the most out of their products. Its new UK Doorstep fleet service makes repairing devices easy – customers simply call Samsung’s Customer Support Centre or book an appointment online and a fully equipped Doorstep Repair vehicle will come to their selected address and aim to complete the repair within just one hour. Using Samsung genuine parts and authorised trained engineers, the new service offers the same high standard of repair available through other Samsung channels, but with the greatest level of convenience possible. This new service adds to the existing Face to Face walk in support available to customers in over 30 high street Support Centres nationwide and the remote log in services that enables an engineer to digitally link to a customer’s television, mobile phone or tablet to diagnose an issue, or demonstrate how to make the most of a product remotely. Samsung is also enhancing the availability of its dedicated specialist In-Home Engineers team moving them to provide help to customers 7 days a week across the country.

## Printing spare parts at BAE Systems

Additive manufacturing, or 3D printing, forms the centrepiece of the New Product & Process Development Centre at BAE Systems, Samlesbury. The facility is home to a number of machines able to produce parts using a variety of different additive manufacturing techniques, which are beginning to inform the way the business manufactures aircraft part components, tooling, support equipment etc., whilst ensuring they are as efficient as possible. In 2017, this facility produced over 2100 parts which were used across the Air Sector ranging from tools and testing models used in wind tunnels through to non-structurally-critical component production which have been fitted to aircraft. The facility enables the Company to aim towards compressing lead-time and cost and positions them as a high-tech manufacturing operation that meets the challenges of their evolving product range and customer requirements.

## Repair skills for appliance and device engineers

The Household Electrical and Electronic Service Training (HEEST) Forum has launched an apprenticeship standard for electrical, electronic product service and installation engineers. The role covers the support, repair, installation and set-up of electrical and electronic products in both domestic and commercial properties.

It has been developed in response to the rapid expansion and the range of products requiring servicing and to improve the UK skills base in technology products.

HEEST is a forum supported by 5 trade associations (techUK, AMDEA, RETRA, CESA and Noise). It is also actively supported by many of the White Goods appliance brands and colleges that run courses in electrical and electronics training. [www.heestforum.co.uk](http://www.heestforum.co.uk)

## **Canon: reducing carbon emissions through remanufacturing**

Canon's EQ80 range features its portfolio of remanufactured office products. Typically, two thirds of carbon emissions over a product's lifecycle are associated with raw material extraction, the parts used by suppliers and by the use of the product itself. In its EQ80 range, Canon has been able to significantly reduce these emissions by promoting the efficient reuse of materials and parts.

End of contract machines are sent to its Giessen factory in Germany where they are disassembled and individual parts are cleaned and tested. The products are then rebuilt using available parts and, if necessary, new ones. Spare parts that can't be used are recycled or responsibly disposed of in line with relevant legislation. Once rebuilt, every product undergoes the same quality assurance procedures as newly manufactured devices. This process means that Canon has been able to reduce associated carbon emissions relating to these products' manufacturer by 80 per cent.

## **Sky's Circular Economic Business Model**

In 2016, Sky launched a new product 'Sky Q' along with a new business model. Sky Q provides a home network for fluid viewing on any screen alongside a spread of content and wireless 'mess' technology through the master set top box and multi room boxes. Sky has developed the product for durability supporting repair and refurbishment as well as easy extraction of key components for parts sales and finally recycling of unrepairable parts. The business model changed from equipment purchase to subscription of content with extra features and additional boxes increasing the subscription. Sky is ideally placed for this type of model as it has one of the largest fleets of engineers in the Country allowing Sky to deliver and collect products using reverse logistics, therefore returning equipment through the same route that it was supplied at significantly lower costs than using external couriers.

## **Sims Recycling Solutions: managing electronic products at the end of life in Dumfries**

The Company's Scottish 10,000 m2 site processes 2,000-5,000 electronic products per month. When a product arrives at the site data is securely erased and it undergoes test and inspection. Depending on the condition, it is either repaired or refurbished for resale; redeployed for remanufacturing or undergoes part harvesting and recycling back to raw materials.

The site is the operational centre for [www.mydigitaltech.com](http://www.mydigitaltech.com) which focuses on end user B2C sales of refurbished equipment. Second-hand electronic assets are also resold into B2B markets: retailers, brokers and direct business end users. A dedicated R&D hub is focused on continued innovation to prepare for the equipment of tomorrow. Collaboration with the University of Strathclyde is seeking to improve greenhouse gas footprint methodologies of the total lifecycle of products and raw material reuse. The site also runs several collaborations and partnerships with technology manufacturers ranging from advice on design for reuse, component harvesting and recyclability to take-back or returns operations.

## **Xerox: assessing the most profitable end-of-life routes**

Xerox takes on supply chain responsibility from materials used in devices all the way through to the end-of-life management of products. It has recently introduced a new system which calculates the value associated with sending a product through one of five processes: remanufacture; refurbishment; removal of parts for reuse; recycle; and direct to sales. The system selects the end of life route which will create the greatest value. It also uses current part and product inventory levels, along with the condition and service history of each return, to create a real time end-of-life inventory of spare parts and full products. Globally, the approach has helped Xerox to realise approximately £100 million in cost benefit and has saved over 52,000 tonnes of CO<sub>2</sub> equivalent in greenhouse gas emissions.

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