

Annex B

Products and Shortlisting Process

Appendix B1 Full list of 70 products considered for lifetime extension with criterion ranking

Product Category	Product name	Criterion 1: Is the scope to reduce the environmental impact of the product high? <i>Is it a product:</i> - which has inherently high material requirements? - containing precious metals (limited availability)? - comprising a significant proportion of high embodied energy? - with energy intense processing and assembly? - which has significant disposal impact? - with short use phase? AND - which has high volume sales? - which is identified as a high impact product in EIPRO (2004), AEAT (2008) public procurement and WRAP (2009) resource efficiency study?	Criterion 1: Ranking (HML) High - denotes high impact products. Is it a product or products with scope for significant environmental savings via lifetime extension	Criterion 2: Is it a product which already demonstrates scope for extended lifetime? <i>Is it a product:</i> - which a proportion of units are already viably reused, refurbished/ repaired or part of PSS/leasing? - which is typified by short and long lifetimes (eg different warranties offered)? - sold with service contracts? - which has parallel long lasting products (eg high quality alternatives)? - which is driven by fashion? Why is there any remaining scope for intervention? Reasons for market failure? Knowledge of end-users, barriers and change preferences? Is it possible to force change?	Criterion 2: Ranking (HML) High - denotes presence of practicable strategies/ market differentiation which extends product lifetime	Criterion 3: Is it a product for which there is sufficient environmental data/evidence to support action? <i>Is it a product:</i> - which is part of Defra's Roadmap work? - on which full ISO compliant LCAs have been carried out? - represented by EPDs? Is there data on the economic impacts of this product?	Criterion 3: Ranking (HML) High - Known data available, or feasible to estimate data Medium - Scope for data development/ acquisition Low - No or little potential for data collection	Criterion 4: Is it a product which has appropriate UK market engagement and penetration? <i>Is it a product:</i> - whose final assembly occurs near market – scope for remanufacturing/repair? - whose UK industry/trade bodies are engaged and motivated to make changes? - which makes up a significant proportion of main public and private procurement contracts? - which innovates quickly making intervention difficult? Identification of policy drivers already in place.	Criterion 4: Ranking (HML) High - denotes likelihood of stakeholder engagement.	Criterion 5: Is this a product which features highly in the public domain? Iconic product - products that frustrate the consumer with their short lifetime	Criterion 5: Ranking (HML) High denotes 'iconic' product examined in Brook Lyndhurst's parallel study on consumer behaviour
Textiles	Domestic carpet	- Carpets are a bulky product contributing to the waste stream, and if carpets are recycled, they are significantly downgraded. It is the disposal of carpets that is of immediate environmental concern. Defra's clothing roadmap extended its evidence review for maximising reuse and recycling to include carpets. - Textiles are cited as a priority product in all environmental impact studies with high embodied impacts. - Carpets are often disposed prior to end of life due to aesthetics, with remaining life, where consumer expectation for durability is high. - Domestic and commercial carpets make up approximately 25% (approx. 520,000 tonnes) of all textile consumption in the UK.	H	- Carpets are available in range of designs/materials each with varying lifetime. For instance, carpet durability is key in commercial applications, but carpet comfort (often of poorer durability) is key in domestic applications. - It is a product often to consumer on basis of lifetime, with warranty and aftercare arrangements available. - LCA studies have shown that production burdens are dominant over use phase impacts	H	- Range of 'flooring' life cycle studies have been performed. - Interface carpets have tool showing different lifetimes for carpets. - Economic data not available, but could be modelled.	M	- Many high quality brands are available and are trading on basis of product durability/ quality. - GB manufacturing base still exists. - Relatively few main players in market - Textile is a roadmap priority area. - EU Ecolabel requires indication on the product's potential life expectancy as range or average	M	Iconic product due to stylisticH obsolescence and also the fact that entire carpet has to be traditionally replaced when only part of it worn out	
Construction/ home	Carpet tile office flooring	- Office carpet tiles are a bulky product contributing to the waste stream, and if H carpets are recycled, they are significantly downgraded. It is the disposal of carpets that is of immediate environmental concern. Defra's clothing roadmap extended its evidence review for maximising reuse and recycling to include carpets. - Textiles are cited as a priority product in all environmental impact studies with high embodied impacts. - Carpets are often disposed prior to end of life due to aesthetics, with remaining life. - Domestic and commercial carpets make up approximately 25% (approx. 520,000 tonnes) of all textile consumption in the UK.	H	- Available in range of designs/materials each with varying lifetime. For instance, carpet durability is key in commercial applications, but carpet comfort (often of poorer durability) is key in domestic applications. - It is a product often with provided warranty. - There is growing use of carpet product service systems whereby tiles of carpets can be replaced as opposed to the entire carpet. - LCA studies have shown that production burdens are dominant over use phase impacts	H	- Range of 'flooring' life cycle studies have been performed. - Interface carpets have tool showing different lifetimes for carpets. - Economic data not available, but could be modelled.	M	- UK public procurement contracts include Crown Flooring Ltd and InterfaceFLOR. - EU Ecolabel standards have been determined for durability	H		M
EEE	Printer/scanner	- Home printers and scanners are a frequently replaced consumer product (dueM to design and service delivery problems), with waste volume implications. - They have intrinsic low materials cost, and are only an intermittently used EUP, which makes to justify environmentally from an overall life cycle perspective	H	- These are cheap products with high technological and economic obsolescence. - The product sector is experiencing growth - Short lifetime sometimes down to lack of proper care (e.g. pulling at paper jams and lack of dusting), cheapness of product relative to cartridge	H	- EUP Preparatory study - http://www.hp.com/target/epg/ecological-printing-solutions/carbon-footprint-calc.html . - Environmental product declarations. - No economic costing, but possible in theory	M	- Product sector is experiencing growth in line with home PC usage. - Likely to be sufficient representatives of companies to be interested in lifetimes work. - Intense competition may interest household names in engaging on durability/quality/cost issues	H	Semi-iconic product	M
EEE	Mobile phone	- Mobile phones are one of the two case studies chosen for the EU Integrated H Product Policy pilot studies. - Mobile phones contain precious metals and resource-intensive batteries that are creating an environmental concern when mobile phones are exported for disposal (and lost) or disposed of directly into the municipal waste stream. - Telephone and telefax equipment are included as priority product groups in all environmental impact studies.	H	- The mobile phone market is characterised at one end by rapid innovation/fashion, H and at the other by only basic functional requirements. - A significant proportion of the market already provides product leasing arrangements as part of the business model (offers supplier/manufacturer control over the product).	H	- EU IPP Pilot Project study (Vodafone investigating take-back schemes); Willems 2003	H	- There is significant sector engagement in the IPP Pilot Project for mobile phones including UK companies; - Mobile phone producers: Nokia, Motorola, Panasonic. - Component manufacturers: Epson, Intel, AMD, Spansion - Telecom Operators/Retailers: Telianer, France Telecom/Orange, Vodafone - Recyclers: Limicore - The environmental impact of mobile phone disposal has triggered an increase in the interest in take back schemes, which recycle or refurbish the phones. Equally, more companies are entering the market that will consumers to deposit old phones depending on the type and condition of the mobile.	H	Iconic product due to stylisticH and technological obsolescence and consumers' dependence on them	(BL)
Furniture	Sofa	- Sofas are a bulky waste item that is often disposed of before end-of-life due toM aesthetics with lifetime remaining. - Sofas may have a high embodied energy content due to the textile materials in the covering and filling, and the steel content depending on the material used for the main structure. - Textiles are cited in the WRAP and EIPRO environmental impact studies as a priority product group, and this could include sofa coverings. - Upholstery often wears out, or tires aesthetically before the furniture framework/springs. - Scope for design more durable covers in the first instance. Also for replacing the covers, avoiding majority embodied impacts of sofa production. Use of warranty	H	- There is a wide market variation in sofas provided as both durable, high quality product vs. low cost consumable. - Sofas are sold with warranties that vary considerably in length. - Some manufacturers offer after sale service - There is growing use of furniture reuse networks that collect sofas with remaining lifetime, but the availability and awareness of these networks varies considerably across locations. - Third sector networks are trialling the use of replacement covers to extend product lifetime	H	- No life cycle data on sofas were identified. - Some data from third sector and WRAP (Domestic furniture WRAP - draft reuse report with lifetimes). - Potential for sector engagement to collect data	M	- Use of warranty frequent within the product sector can be a selling point. - Multityork furniture, a UK based retailer, supplies replacement covers for their sofa range. - Suppliers/Others: Dataquest, Eurobit, Eurobrom, Federation of the Electronics Industry, IDC, IT Industry Council, Personal Computer Association, SITO, Taiwan Computer Association - Ecolabelled manufacturer: ASUS for their portable computers. - Limited UK manufacturing; Domestic and business application	H	Iconic household product	(BL)
EEE	Laptop personal computer	- Significant volumes of precious metals (such as gold and silver) are containedH in personal computers, particularly in the circuit boards. - The lifetime of each product component differs, with many still functioning at disposal. - Personal computers are key electronic and electrical waste that are of increasing environmental concern and legislated by the WEEE Directive. - Consumption of personal computers is increasing across the EU with laptops sales increasing at a very significant rate from a roughly estimated 6 million in 2000 to 31 million units in 2008 (review EUP preparatory study data on apparent consumption in the EU).	H	- Service agreements of up to 3 years can be purchased, and are sometimes included H in the price of a new personal computer. Monitors will frequently have warranties of up to 3 years. - Very few customers (according to an industry estimate of about 2%) choose to upgrade personal computers by replacing worn out or outdated components of the computer. - Computer retailers do sell refurbished personal computers. - EU Ecolabel establishes a requirement for the lifetime extension of the system unit, three year guarantee of parts, upgradeable memory chip, hard disk, CD and DVD drive. - EU Ecolabel is in process of being updated.	H	- Difficult to define 'typical' product - Eco label study for desktop computers carried out by Atlantic Consulting - EUP prep study for computers (desktop and laptop) - Kaakkilampi, et al 2007; Li et al (2004); Griese 2004; Trutman 2006	M	- Consultees in the Ecolabel study for PCs included a number of companies with head or regional offices in the UK: Primary: Apple, Compaq, Dell, Eurocommerce, HP, IBM, ICL, PC World (UK based), Siemens-Muxdorf, Sony, Toshiba, Secondary: Acer, ARS, AT&T, Digital, LG Electronics, Lucent, MCC, NEC, Panasonic, Texas Instruments, Vobis; - Suppliers/Others: Dataquest, Eurobit, Eurobrom, Federation of the Electronics Industry, IDC, IT Industry Council, Personal Computer Association, SITO, Taiwan Computer Association - Ecolabelled manufacturer: ASUS for their portable computers. - Limited UK manufacturing; Domestic and business application	H	Iconic product due to technological obsolescence and increasing dependence on them	(BL)
EEE	Washing machine	- The use of washing machines in households is in the top 35 highest impact product groups in the EIPRO study, and the use of household appliances is a priority product group in the WRAP resource efficiency study. - From ERM's work with the WRAP (2009) washing machine study, there is an argument that energy efficiency innovation is reducing or becoming static in washing machines. - Washing machines have relatively high primary material requirements. - Reducing the impact of clothes cleaning is part of the evidence review for Defra's clothing roadmap.	H	- Market differentiation/trading already exists (Bosch/Miele vs. others) on basis of quality/durability. In-built obsolescence in design (integrated drum) - Design life issues and servicing companies	H	- Washing machines are one of the most frequently cited products in the literature relating to extending product lifetime. - ERM 2010 study H for WRAP; EUP Prep Study (domestic and professional washing machines); Trutman and Rechberger 2006; Dewulf 2005; Defra WR0106; Hirschi et al 2003 (qualitative); Goedkoop et al 1999; EUP Preparatory study. Premature discard rates available in WRAP resource efficiency report cited from Cooper 2004 (Note: the discard rates do not refer to the functional lifetime remaining in the products).	H	- The most well-known manufacturers of domestic washing machines carrying out extensive work on reducing the environmental H impacts of their product lines include Electrolux and Miele, which are not UK based manufacturers. Hotpoint and Creda are based in the UK. - Electrolux is frequently cited in literature, and was also a stakeholder in the EUP prep study. - Miele has extensive product design system for sustainability and was heavily involved in development of WEEE Directive. http://www.miele-sustainability.com/en/sustainability/1016.ht and offer extended product warranties. AEG over upgrades of electronic componetry. ISE design for durability. - The MTP work - What IF? provides a good resource, which will not be immediately reviewed- EU Ecolabel in preparation	H	Iconic household product that features heavily in literature	(BL)
Textiles	T-shirt	- Textiles are cited as a priority product in EIPRO and WRAP study, with very H high embodied impacts (cotton and synthetic textile manufacture). - Product often disposed prior to end of life due to aesthetics, with remaining life.	H	- There is highly variable quality and durability of clothing available with growing rates H of poorer quality clothing entering the market from export regions such as South East Asia. - There is a rate of reuse and recycling, but poorer quality means small volumes are handled within the UK and textiles are significantly downgraded when recycled. - Higher quality cotton clothing does exist in the market, and could be quantified according to thread count. - Where products can be reused, a second-hand market exists.	H	- Product roadmap. Defra EV0421: case studies. - WRAP 2009 resource efficiency study: Hire of 'high end' clothing as use intensification - M&S return scheme for clothes and soft furnishings via Oxfam - Arunkundram 1998 - effect of reuse market on purchasing of new items (quantitative)	M	- Low grade products are very visible long-term unsustainable product/market failure. - There are a number of key UK retailers, but comparatively little manufacturing is carried out in the UK and textile manufacturing has a highly complex supply chain. - The Marks&Spencer and Oxfam programme continues to expand in scope, and the organisations have agreed to continue it indefinitely. - Product roadmap priority area. Vast and diverse sector. Dominated by high volume imports. Typified by UK wholesalers, retailer and small UK producers	L	Short lifetime of 'disposable' H fashion and also fast rate of stylistic obsolescence	(BL)
EEE	Small appliance - Toaster	- Toasters are generally disposed straight to the waste stream, and therefore M constitute a loss of ferrous and non ferrous material with high embodied carbon - As a frequently used household energy using appliance, toasters can be considered as part of the priority product category in the WRAP study.	M	- Market differentiation already exists for toasters: e.g. Dualit support for replacement H parts. - A toaster is made of only a few components, and can therefore be serviced with relative ease.	H	- http://www.dualit.com/support - LCA of toaster exists, product declarations. - No economic analysis identified, but possible in theory	M	- Dualit, a UK company, provides extended warranties on products and aftercare service. - Morphy Richards are present in UK market - DeLongi is another major European manufacturer.	H	Iconic product	(BL)
EEE	Photocopier	- Photocopiers have intrinsic low material costs with waste volume implications.M	M	- Remanufactured or refurbished photocopiers are the most commonly cited products H in the literature review as examples of successful PSS - Most photocopier manufacturers offer lease schemes for office machinery, and as such they are used until their end-of-life.	H	- EUP Preparatory study on imaging equipment. Centre for Remanufacturing and Reuse; HP; Sundin 2004 (qualitative); Kerr and Ryan 2003 - HP Renew Program http://www.hp.com/united-states/renew/why_buy_refurbished.html - Ricoh http://www.ricoh.com/environment/report/pdf2007/all.pdf - http://www.ricoh.com/environment/management/concept.html	M	- HP commissioned a LCA on remanufacturing toner cartridges. HP has an extensive programme of selling remanufactured IT H equipment and Ricoh prides itself in recycling 100% of its product range.	H	Semi-iconic product	M

Furniture	Fitted kitchen - kitchen units	- Kitchen units are commonly made of wood-based products, and the level of environmental impact is heavily influenced by the source of the wood. - Wood production is not listed as a priority product area in the environmental impact studies. - The embodied energy will be greater for kitchen units made from plastic, aluminium and steel material.	H	- Replacement of kitchen units is due to stylistic obsolescence more so than product wear. Upgrading, as opposed to replacing them, is relatively simple either through using replacement doors, or paint to prolong lifetime	H	- No evidence on kitchen furniture could be found in literature review. - Major difficulty would be defining the production cost associated with a typical fitted kitchen	L	- Kitchen and DIY sector make up considerable market in the UK. Kingfisher (B&Q) has been engaged in predecessor MTP and product strategy work. - Risk the sectors will not engage given financial significance of work.	L	Iconic product	H (BL)
EEE	Fridge/Freezer	- The majority of environmental impact of fridge/freezers occurs during use. - Continuously used product. - Use of refrigeration and freezing products are cited as high impact product area in EIPRO study - Since product impacts are dominated by use phase it is likely that any efficiency improvements in future could outweigh benefits of lifetime extension	L	- There is evidence that only a market exists for repaired/refurbished refrigerators and M freezers.	M	- EUP studies (domestic and commercial). Kiattipong et al 2007; Trutman 2006; Chul Kim 2005 (*)	H	- Electrolux frequently mentioned in literature and a stakeholder in two EUP prep study. See CECED (European Committee of Domestic Equipment Manufacturers). - Unclear whether there is a significant design and manufacturing base in the UK	M	Iconic product	H (BL)
EEE	Clothing iron	- This is an item frequently thrown into municipal waste stream with a high embodied energy from the steel content, and which the steel may not be retrieved.	M	- Carbon trust worked with Morphy Richards and found in use phase average life was 3.4 years, after which the filters clogged up. This was dependent on hardness of water in region - with obvious intervention measures being water softening and easy-to-change filters.	H	- Carbon trust - Morphy Richard work. - Previous life cycle studies on this subject and environmental product declaration. Product is relatively straightforward to model from life cycle perspective.	M	- The sector has already been engaged in life cycle work for some years, with a leading UK manufacturer, Morphy Richards.	H	Iconic household product or frustration with short lifetime if replaced every 3 years	H
Construction/ home	Kitchenware - Chopping board	- The embodied energy of chopping boards would depend heavily on the material used (e.g. glass, wood or plastic).	M	- Kitchenboards are available in robust and fragile designs that is particularly determined by the material used: glass, wood and plastic.	M	- No discussion was identified on chopping boards in the literature review. - It would be extremely difficult to determine the different lifetimes/wastage rates between chopping boards.	M	- Unknown source of manufacturer - Supplier/retailers would be key stakeholder	M	Semi-iconic product	M
Construction/ home	Kitchenware - Knives	- The level of embodied energy of knives would depend on alloy type and proportion of plastic or metal.	M	- Knives are available in durable (lifetime guaranteed) and disposable (no guarantee, propensity to sharpen). In addition handles are integrated or separated. - Knives typically provided without and without various guarantee. Actively sold in terms of lifetime. - Example where purchasing and personal maintenance behaviour (sharpening), can increase longevity	H	- Likely to be extremely difficult to determine the different lifetimes/wastage rates - No predecessor work on typical product definition, but should in theory, be relatively straight forward to model.	M	- Unknown manufacturers at low end of market but sold by few retailers. - Few players at upper end - market likely to engage.	H	Iconic product	H
Packaging	Milk - preservation of milk via UHT/HT/Packaging alternative	- Milk - preservation of milk via - Milk is in the top 35 high impact products listed in the EIPRO study, and dairy products are listed as a priority food product in the WRAP study. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 4% reduction in food waste by 2012, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Perishable stable product	H	- No data is available on different packaging systems. Focus area of WRAP work etc and area of ERM Tesco Carbon Footprinting	M	- Product roadmap priority area; Courtauld II likely to engage supermarkets at some level.	H	Iconic product	H
Packaging	Packaging of Vegetables/Fruit/ Meat	- Vegetables are in top 35 high impact products listed in the EIPRO study. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 4% reduction in food waste by 2012, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Perishable stable product	H	- No data is available on different packaging systems.	M	- Courtauld II likely to engage supermarkets at some level	H	Iconic product	H
EEE	Refrigerated display units	- Use of refrigeration and freezing products are cited as a high impact product area in EIPRO study, particularly due to the fact that they are constantly in use. - Recent research into commercial refrigeration has established that there are CFC losses. - Since use phase is so dominant, any innovation in the efficiency of the use phase would be likely to dominate the outcomes of the study. Moreover, since CFC is such a potent GHG this would also be likely to dominate.	L	- Refrigerated display units are being increasingly remanufactured. Retail sector has agreed to retrofit/replace stock to reduce reliance on CFC/HCFC.	M	- Centre for Remanufacturing and Reuse - http://www.chillingfacts.org.uk/ratings/tesco - EUP Preparation study; Market Transformation Programme case study: http://efficient-products.defra.gov.uk/cms/about-mtp-case-studies/ - Some data available but gross assumptions likely to be required	M	- Mixture of stated current retailer willingness and regulator pressure.	H	Semi-iconic product	M
EEE	Street lighting	- The use phase dominates by a very high majority the environmental impact of lighting. - Use of electric lamp bulbs and tubes is in the top 35 biggest impact product groups in the EIPRO study. - Since use phase is so dominant any innovation in the efficiency of the use phase would be likely to dominate the outcomes of the study	L	- Lamp bulbs are becoming increasingly divergent in terms of energy efficiency and lifetime hours. For instance, there is an interesting difference in energy efficiency and product lifetime between mercury bulbs vs halon energy efficient vs LED. - Likely that LED lighting will supersede existing in terms of efficiency. However, LED technology is still innovating with respect to energy efficiency	L	- EUP Preparation study; - Centre for Remanufacturing and Reuse - ERM confidential study on LED street lighting	H	- Product is sold in terms of design life. For list of stakeholders in EUP prep study see p. 16 http://www.sug4light.net/assets/pdffiles/Final_part1_2EUP_Domestic_Project_report_V10.pdf - In particular, OSRAM participated in EUP prep study for lighting http://www.osram-os.com/appos/showroom/index.php?finder_appl_id=17. - Retail and manufacturer already engaged in subject. Product which has EUP Directive lifetime specifications	H	Iconic product	H (BL)
EEE	TV	- The use phase of TVs and radios dominate their total environmental impact. - TVs have high levels of ferrous metal content and materials that are classified as hazardous waste.	M	- There is a relatively fast rate of technological obsolescence in the audio-visual market. - There is an established second-hand market for TVs and radios, but there are considerable rates of damage during transportation rendering them beyond repair. - A range of competing technologies are available, each with different functionality.	M	- EUP Preparatory study. - Weber (2004) http://www.eic.com.pl/layout/nec/pliki/Display%20Aug%2004.pdf. - Difficulty in defining typical product and contrast product given level of technology innovation. - EU Ecolabel establishes 2 year warranty for product, and 7 year supply of parts from the time production ceases - DEFRA preparatory work in the subjects by Dorothy Maxwell	M	- Product roadmap priority area. - UK manufacturing in South Wales (Sony, Philips, LG). The details of stakeholder responses are provided in the TV EUP prep study; private sector manufacturers included Sharp, Panasonic, Hitachi, Pioneer and Loewe - Ecolabelled TVs: Philips, Sony, Sharp and Samsung. EU ecolabel standards have been established for product category - Californian Regulation on Energy use implemented. http://www.energy.ca.gov/appliances/2009_tvregs/index.html - Commercial sensitivities over technologies may limit representivity of modelling	M	Iconic product	H
EEE	Industrial air conditioning/heating systems EIPRO study.	- Heating systems were identified as priority product areas in the AEA and EIPRO study.	H	- No evidence in literature review regarding the scope to extend product lifetime of industrial air conditioning and heating systems. Due to its cost and modular product design, it is likely that the systems are well-maintained.	M	- Data exists from MTP and EUP preparatory studies, but for specific designs.	L	- MTP engaged sector for its work	M	No, or little profile in public eye	L

EEE	Batteries	- Batteries contain toxic chemicals and metals that are of serious environmental concern. - More products are being designed that incorporate batteries, and as such the sale of batteries is increasing. - Rechargeable battery technology is improving. - Infrequently used product, some evidence of drop off of efficiency for rechargeable batteries over time	M	- Many studies have been carried out on the difference in environmental impact between disposable and rechargeable batteries. The latter is normally identified as the environmentally preferable option. - There is already market trend towards increasingly using rechargeable batteries.	M	- EUP Preparatory study; Parsons 2007; International Journal - ERM 2006; ERM Tesco - Data is available but great difficulties defining functional unit, drop off in efficiency, charger efficiency, consideration for energy mix in use and behavioural data.	M	- High unit sales, engagement process for batteries waste disposal directive	H	Iconic product	H
Furniture	Bed mattress	- Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture). - Bulky product containing steel and synthetics. A waste volume problem.	M	- Considerable differentiation already exists in market in terms of product lifetime and variation in products.	M	- Difficult to define 'typical' product, variable filling and size	L	- High unit sales; relatively few main players including UK manufacturers. - Durability standards have been set by EU Ecolabel relating to product performance, but not explicitly to lifetime	M	Iconic product	H (BL)
EEE	Camera	- Hazardous substances are found in digital cameras, and the production and processing of the film in film cameras have a significant environmental impact. - Digital cameras now dominate the market, and consumers frequently replace them before their actual product obsolescence.	M	- No evidence could be found regarding attempts to extend the product lifetime of cameras.	L	- It would be difficult to define a 'typical' product. - Bras et al (2006) LCA on various camera systems.	M	- Limited UK manufacturing. Market is typified functional innovation	L	Semi-iconic product	M (BL)
EEE	Camera - disposable	- The film and batteries in the camera are hazardous, and depending on whether the camera is designed for remanufacturing, the materials end up in landfill.	L	- Some disposable cameras can be remanufactured. For instance, Kodak has an extensive programme of collecting and remanufacturing their one-time use cameras.	M	- Sundin 2004 (could not draw conclusion based on available data).	L	- Novelty niche item. - Relatively low product sales. - No scope for extending lifetime in itself as product itself provides novelty type one off function - eg analogous to disposable party plates, Easter egg packaging etc	L	Iconic product	H
Automotive/transport	Car	- There is scope for reduction in environmental impact, since the use of a car is a key contributor to individual carbon footprints. - Cars have considerably relatively high embodied energy despite the life cycle GHG emissions being dominated by the use phase. - The problem is that recent and progressive reductions in vehicle weight and emission standards mean that use phase impacts of direct-fuelled cars are likely to improve, and this is dominant from a life cycle perspective	L	- The second-hand market for cars is significant, and generally cars are used until the point it becomes uneconomic to service. There is potentially more scope to replace/refurbish the engine of the car to extend its life even more. However, the cost may not be justifiable to a consumer since this is a prestige product. Moreover, foreseen innovation in vehicle design in terms of the exhaust emissions efficiency and electric car design (eg battery innovation) mean design innovation may negate extension of lifetime benefits in the foreseen future - The car scrappage scheme works against the model of extending product lifetime, and therefore there are many studies looking into its environmental merit. - For lifetime extension, small electric car offers most scope in future, as electricity production become less carbon intense, but user-phase burdens still likely to dominate	L	- Spitzley et al (2005) - Difficult to define 'typical' product	M	- Product roadmap priority area - Products with extended warranty. Kia (the car company) now offers 7 year warranty as standard and industry average is 3 years. http://www.kia.co.uk/New-Cars/7-year-warranty/Warranty-Comparison-Table.aspx . UK assembly plant and component manufacturers (Honda, Nissan, Toyota, Land Rover etc) http://ec.europa.eu/environment/ecolabel/ecolabelled_products/product_categories_en.htm	H	Iconic product	H
Construction/ home	CD/DVD	- CDs/DVDs are made of precious metals, and also aluminium giving them a very high embodied energy content.	M	- There are discs available in fragile and robust forms.	H	- No evidence could be found in literature review on CDs and DVDs.	L	- Is currently an important media product, but is likely to be obsolete imminently due to internet and memory storage improvements.	M	Iconic product	H
Construction/ home	Child/baby equipment	- These products have short product lifespans; are often of poor quality; and generally are not recyclable or refurbishable. - They contribute to bulky waste when final end-of-life is reached.	M	- Where products can be reused, a second-hand market exists.	M	- Difficult to define 'typical' product - Mont (2008) cites baby prams as a potential product service system. - UNEP study cites toy library case study.	L	- Vast and diverse sector, dominated by imports, with limited UK SME base	L	Iconic product	H
Textiles	Clothes - Coat	- Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture). - Product often disposed prior to end of life due to aesthetics, with remaining life. - Coats are infrequently replaced product.	L	- There is highly variable quality and durability of clothing available with growing rates of poorer quality clothing entering the market from export regions such as East Asia. - There is a very high rate of reuse and recycling, but poorer quality means small volumes are handled within the UK and textiles are significantly downgraded when recycled. - Where products can be reused, a well-established second-hand market exists.	H	- Product roadmap, Defra EV0421: case studies. - WRAP 2009 resource efficiency study: Hire of 'high end' clothing as use intensification - M&S return scheme for clothes and soft furnishings via Oxford - Arunkundram 1998 - effect of reuse market on purchasing of new items (quantitative) - Patagonia collects and recycles its own brand outdoor range. http://www.patagonia.com/web/eu/patagonia.go?asellid=9156	M	- Product roadmap priority area. Vast and diverse sector. Dominated by high volume imports. Typified by UK wholesalers, retailer and small UK producers	L	Semi-iconic product	M (BL)
Textiles	Clothes - Jumper	- There is variable quality and durability of products available in the sector. - Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture). - Product often disposed prior to end of life due to aesthetics, with remaining life.	H	- There is highly variable quality and durability of clothing available with growing rates of poorer quality clothing entering the market from export regions such as East Asia. - There is a very high rate of reuse and recycling, but poorer quality means small volumes are handled within the UK and textiles are significantly downgraded when recycled. - Where products can be reused, a well-established second-hand market exists.	H	- Product roadmap, Defra EV0421: case studies. - WRAP 2009 resource efficiency study: Hire of 'high end' clothing as use intensification - M&S return scheme for clothes and soft furnishings via Oxford - Arunkundram 1998 - effect of reuse market on purchasing of new items (quantitative)	M	- Product roadmap priority area. Vast and diverse sector. Dominated by high volume imports. Typified by UK wholesalers, retailer and small UK producers.	L	Semi-iconic product	M (BL)
Textiles	Clothes - Shirt	- There is variable quality and durability of products available in the sector. - Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture). - Product often disposed prior to end of life due to aesthetics, with remaining life.	H	- There is highly variable quality and durability of clothing available with growing rates of poorer quality clothing entering the market from export regions such as East Asia. - There is a very high rate of reuse and recycling, but poorer quality means small volumes are handled within the UK and textiles are significantly downgraded when recycled. - Where products can be reused, a well-established second-hand market exists.	H	- Product roadmap, Defra EV0421: case studies. - WRAP 2009 resource efficiency study: Hire of 'high end' clothing as use intensification - M&S return scheme for clothes and soft furnishings via Oxford - Arunkundram 1998 - effect of reuse market on purchasing of new items (quantitative)	M	- Product roadmap priority area. Vast and diverse sector. Dominated by high volume imports. Typified by UK wholesalers, retailer and small UK producers	L	Semi-iconic product	M (BL)

Textiles	Clothes - Suit	- Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture). - Product often disposed prior to end of life due to aesthetics, with remaining life. - Suits are infrequently replaced product.	L	- There is highly variable quality and durability of clothing available with growing rates of poorer quality clothing entering the market from export regions such as East Asia. - There is a very high rate of reuse and recycling, but poorer quality means small volumes are handled within the UK and textiles are significantly downgraded when recycled. - Where products can be reused, a well-established second-hand market exists.	H	- Product roadmap, Defra EV0421: case studies. - WRAP 2009 resource efficiency study: Hire of 'high end' clothing as use intensification - M&S return scheme for clothes and soft furnishings via Oxfam - Arunkundram 1998 - effect of resale market on purchasing of new items (quantitative)	M	- Product roadmap priority area. Vast and diverse sector. Dominated by high volume imports. Typified by UK wholesalers, retailer and small UK producers	L	Semi-iconic product	M (BL)
Construction/ home	Toothbrush	- Although toothbrushes are not immediately identified as having a high individual environmental impact, the product is plastic-based, packaged, are not practically able to be recycled, derives from fossil fuel and is very frequently replaced.	L	- Consumers are advised to replace toothbrushes as soon as the brushes wear down. This happens relatively quickly, so that toothbrushes are a frequently replaced item; they can't be recycled and the supporting structure of the product is still in working condition at disposal. - Industry work on replacement brush heads, more durable bristles exists. - Disinfection eg mouthwash to prevent gum disease to prevent their frequent discard.	M	- ERM studies with GSK. - Sensodyne example in van Nes 2003 doctoral dissertation 'Replacement of Durables'. - Not aware of any economic analysis available, but possible in theory	M	- Large pharmaceutical companies likely to be interested, and various redesigns solutions have already been proposed. - As a case study the product would offer an interesting trade off/constraint between dental hygiene guidance.	M	Iconic household product. Toothbrushes are arguably the consumer product	H
EEE	Cooker	- Cookers often have high embodied energy due to the significant steel content. Life cycle environmental impacts are dominated by the use phase.	M	- Cookers are sometimes salvaged for refurbishment or remanufacturing.	M	- No data or discussion on cookers was found in the literature review. - EUP study underway	L	- EUP study underway but at early stage of engagement. Kitchen longevity may limit lifetime, rather functional obsolescence. Aga is high end UK manufacturer	M	Semi-iconic product	M (BL)
Textiles	Curtains	- Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture). - Curtains are a bulky waste, and generally only the highest quality are reused.	M	- There is variable material quality. - Curtains are often discarded prematurely due to tiredness rather than function.	H	- M&S return scheme for clothes and soft furnishings via Oxfam: http://corporate.marksandspencer.com/investors/press_releases/planA/Oxfam_Clothes_Exchange	M	- The Marks&Spencer and Oxfam programme continues to expand in scope, and the organisations have agreed to continue it indefinitely. - The contractor for UK public procurement is Custom House Ltd. - Product roadmap priority area	M	Iconic product	H (BL)
Furniture	Cushions	- Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture).	M	- There is variable material quality. - Cushions are often discarded prematurely due to tiredness rather than function.	M	- M&S return scheme for clothes and soft furnishings via Oxfam: http://corporate.marksandspencer.com/investors/press_releases/planA/Oxfam_Clothes_Exchange	L	- Market differentiation between low cost and high cost items, covered or integrated will affect lifetime. Retailer would be main stakeholder	L	Iconic product	H (BL)
Food	Vegetables - preservation by refrigeration	- Vegetables are in top 35 high impact products listed in the EIPRO study. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 4% reduction in food waste by 2012, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Perishable stable product	H	- Fruit and veg stored in a bag in a fridge on average made food last longer - see WRAP (2008)	M	- Sainsbury's and Mack Multiple Division were part of the project team for the WRAP (2008) study	M	Semi-iconic product	M
Construction/ home	Detergent use	- Environmental impacts most commonly associated with detergent are toxicity and water use when the product is used.	M	- Scope is lacking in terms of ways to extend the lifetime of detergent. Reducing its environmental impact is more commonly associated with toxicity and concentration. - Less units have to be bought, so has product a longer lifetime in home	L	- ERM work on concentrated/concentrated products and different products	H	- Defra's study WR0113 conducted trials on selling concentrated liquids for the consumer to mix with water at home with Boots products which, in effect extend lifetime. UK pharmaceutical companies such as Unilever and P&G likely to engage in such work.	H	Iconic product	H
EEE	Dishwasher	- The use of household appliances is cited as a high impact product category in the EIPRO study. - The environmental impact of dishwashers is dominated by the use phase, and has significant disposal impacts as well.	M	- The majority of attention is paid to energy efficiency of dishwashers and water use, as opposed to ways of extending product lifetime.	L	- Truttman 2006; EUP prep studies for dishwasher	M	- Kitchen longevity may limit lifetime, rather functional obsolescence. Limited UK manufacturing base.	M	Semi-iconic product	M
EEE	DIY tool - electric power drill	- The composition of DIY tools are frequently dominated by steel and iron, so that they have high embodied energy. - Household tools and equipment are identified as a potential for product service systems in the WRAP study.	M	- DIY tools are used sporadically, and therefore consumers may be more willing to purchase poorer quality goods that will break easily. - There is a market for good quality DIY tools, as well as DIY hire (for larger tools) and also tool remanufacturing.	H	- Centre for Remanufacturing and Reuse - study on cutting tools - Defra WR0106 (Qualitative); WRAP 2009 (Qualitative); Mont 2004 (Qualitative) - Better quality tools last longer, and can even be used as replacement parts for other tools	H	- Limited UK manufacturing base; Leasing companies; third sector could engage; Risk DIY sector would not engage	M	Semi-iconic product	M
Construction/ home	DIY/Gardening tools - lawnmowers	- The composition of a lawnmower is dominated by steel and iron, so that it has high embodied energy. - It is a sporadically used product and its intensity of use differs between seasons and location. - Household tools and equipment are identified as a potential for product service systems in the WRAP study.	M	- Grass cutting can be purchased as a service, or the lawn mower itself can be hired. The level of market penetration for these services is unclear.	M	- Defra WR0106 (Qualitative); Mont 2004 (Qualitative)	L	- Limited UK manufacturing base; Leasing companies; third sector could engage; Risk DIY sector would not engage	M	Iconic product	H (BL)
EEE	Electric toothbrush	- Toothbrushes are not mentioned in the literature on priority products, but electric toothbrushes would be classified as an electrical and electronic waste. - Particularly, the rechargeable battery system contains toxic chemicals and metals, if frequently discarded	M	- The product is designed so that just the part that wears out and is replaced.	M	- No data could be found on electric toothbrushes in the literature review. Key uncertainty is how these products are used - to their functional death, or discarded early due to hygiene/aesthetics, integrated batteries, to lack of available replacement heads etc.	L	- Limited UK manufacturing base.	L	Iconic product	H (BL)
Automotive/ transport	Engine (domestic and industrial)	- Engines have high embodied energy given their high steel and aluminium content. - Engines can very commonly found in all sorts of domestic and industrial applications. Therefore, a system of extended product lifetime can be applied to a multitude of products.	H	- Engines in industrial applications are commonly repaired and refurbished - Wherever domestic appliances that contain engines are collected for recycling, the engine may be repaired and refurbished for second-hand goods. - Refurbishing/remanufacturing engines may lead to a decrease in efficiency compared to a new engine such that the environmental benefits of remanufacturing are negated.	H	- Difficult to define the 'typical' product. - Centre for reuse and remanufacturing 'Remanufacturing in the UK'; - Sundin 2004 (qualitative); - Smith, V. and Keeleian, G. 2004.	M	- Some UK manufacturing. Likely to be commercial sensitivity issues.	M	No, or little profile in public eye	L

Furniture	Garden furniture.	- The environmental impact of garden furniture is dominated by production.	M	- As products remain outside for their whole lifetime, material choice and durability is a key factor in extending product lifetime (e.g. plastic furniture will not rust or degrade). - There is some discussion on the potential to create product service systems for garden furniture, since they are used seasonally.	- EU IPP prep study on wooden teak garden chair has LCA data, could be modelled to show contrast between MDF.	M	- IPP pilot project on teak garden furniture: IKEA and Carrefour	M	Iconic product	H
Automotive/transport	Gearbox	- Gearboxes are composed of a large number of metal-based components, and it therefore has a high embodied energy content. - However, their environmental impacts are dominated by the use phase.	M	- A market for remanufacturing gearboxes does exist.	- Centre for Remanufacturing and Reuse gearbox study	M	- Some UK manufacturing. Likely to be commercial sensitivity issues.	M	No, or little profile in public eye	L
EEE	Motors - electric	- Induction motors are predominately made of metals with a high embodied energy content. Use phase impacts are significant	H	- Induction motors can be rewound to increase efficiency of older motors, but one study suggests due to efficiency gains in newer motors, it might be better to prematurely discard older ones.	- EuP study; Kiattitipong et al 2007; De Keulenaer (2006); MTP work	H	- Product roadmap priority area	H	No, or little profile in public eye	L
Construction/ home	Industrial processing equipment	- Industrial equipment has high embodied energy, but the use phase dominates its life cycle impacts.	M	- Due to the cost of industrial processing equipment, they are generally repaired, remanufactured and particular parts of recovered for use in newer equipment.	- Discussion on industrial equipment was not found in the literature review.	L	- Niche Market	L	Semi-iconic product	M
EEE	Kettles	- This is an item frequently thrown into municipal waste stream with a high embodied energy from the metal content (e.g. steel and aluminium), and which the metal may not be retrieved. - Use phase is dominant for product	M	- There may be a difference in lifetime between an electric kettle and a kettle used on the stove.	- No discussion was identified on kettles in the literature review.	L	- The sector has already been engaged in life cycle work for some years, with a leading UK designer/manufacturer, Morphy Richards.	L	Semi-iconic product	M (BL)
Furniture	Leisure equipment lease schemes	- The sports and recreational industry are identified as high impact product groups in the EIPRO and WRAP study.	H	- Rental schemes do exist for many pieces of sports and recreational equipment.	- Hirschi 2003 (ski rental)	L	- Potential stakeholders could be Mayor's Office for London (bike hire scheme), third sector organisations, Sustrans etc	M	Iconic product	H
EEE	Microwave	- Microwave ovens are made up of a number of hazardous components. Plastic and metal componentry	M	- No discussion of extending product lifetime of microwaves could be found in literature review.	- No data on microwave ovens could be located in initial literature review.	L	- Manufacturing base in UK. No evidence could be found regarding differentiation according to lifetime eg warranties etc	M	Semi-iconic product	M (BL)
EEE	MP3 player	- MP3 players contain precious metals and resource-intensive batteries that are an environmental concern when exported for recycling or disposed of directly into the municipal waste stream.	M	- The MP3 market is characterised at one end by rapid innovation/fashion, and at the other by only basic functional requirements.	- MP3 players would be a difficult to define a 'typical' product of, and the products are rapidly innovating.	L	- No or limited UK design or manufacturing base	L	Semi-iconic product	M (BL)
Furniture	Office chair	- Textiles form part of office chairs, and textiles are considered a high impact product in the EIPRO and WRAP study.	M	- Office furniture leasing schemes exist.	- No life cycle data is immediately available on office chairs.	L	- Blueline office furniture solutions offers the most potential for stakeholder engagement, especially as they offer full repair, recycling and refurbishment solutions. http://www.blueline.uk.com/furniture-repair-recycling-and-refurbishment.asp	M	Semi-iconic product	M
Food	Frozen fish - preservation by freezing	- Frozen fish are in top 35 high impact products listed in the EIPRO study. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 4% reduction in food waste by 2012, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Perishable product - Fresh, frozen, smoked etc	- No discussion or data analysis was found on freezing food in the literature review.	L	- Product roadmap priority area. Courtauld II likely to engage supermarkets at some level	M	Semi-iconic product	M
EEE	Phone	- Telecommunication equipment is considered a priority product area in the EIPRO and WRAP studies. - Use phase impacts have become dominant as wireless handsets now dominating market	M	- No immediately available discussion on extending the product lifetime of landline phones.	- No data was found on telephones in the literature review conducted.	L	- BT, Vodafone, Panasonic etc likely to be interested. - No evidence of product differentiation in markets - Leasing arrangements, no longer dominant in market	L	Semi-iconic product	M (BL)
Construction/ home	Lightbulb - domestic	- The use phase dominates the environmental impact of lighting. There is some public concern over the release of mercury from CFL bulbs, as most bulbs are disposed of in black sack waste. Lamp bulbs have high sales volumes with almost 1 billion lamps sold in the EU-27 in 2006. There has been a dramatic increase in the sale of CFL bulbs over the past decade. Use of electric lamp bulbs and tubes is in the top 35 biggest impact product groups in the EIPRO study. Since use phase is so dominant, any innovation in efficiency would be likely to outweigh life cycle benefits associated with production, manufacturing and disposal	M	- Lamp bulbs are becoming increasingly divergent in terms of their technology, energy efficiency and lifetime hours. For instance, there is an interesting difference in energy efficiency and product lifetime between mercury bulbs vs halon energy efficient vs LED each associated with different manufacturing and disposal burdens. Potential for significant environmental savings, product sold in terms of lifetime and function, iconic status good data availability (GE Tesco and mercury lamps). Recent shift towards increasing product lifetime has/is already occurring. Only a proportion of lighting stock have been replaced and opportunity existing to leapfrog to high efficiency, long lived LED bulbs. LED light bulb efficiency is likely to improve further, so danger of technological lock-in, if current LED bulbs are adopted wholesale	- EuP prep studies (domestic lighting and also office tube lighting available); Defra SPMT08_069 (very relevant); Product roadmap priority area - EuP study; Kiattitipong, W., et al 2007; http://www.admin.cam.ac.uk/news/dp2009012803 - OSRAM EPD for CFL lighting: http://www.osram.com/osram.com/About_Us/Society_and_the_Environment_-_Global_Care/Products_and_the_environment/Product_Life_Cycle/EPD/EPD_CFL/index.html . - ERM GE Tesco data; Life Cycle Costing on Compact fluorescent Vs tungsten filament light bulbs. - Navigant consulting (2009) work on energy efficient lamps for DEFRA. - Revision to EU Ecolabel in preparation	H	- Product roadmap priority area - There are no major UK manufacturers of light bulbs and tubes in the UK. The UK public procurement suppliers for electrical appliances, including lighting are Smith Brothers Ltd, WF Electrical and Wolsley UK Ltd. With the EU withdrawal of incandescent lighting and further work on market and legislative drivers to increase lighting efficiency, the sector is heavily engaged. There were a large number of stakeholders in the EuP preparatory study (a particularly significant manufacturer was OSRAM), but none of which were UK based companies. Product which has EUP Directive lifetime specifications	H	Iconic product due to level of H awareness-raising about energy efficient lighting and switching lights off. 'Visible' environmental impact.	
Food	Bread - use by date, rather than sell by date	- Dairy, vegetables. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 4% reduction in food waste by 2012, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Perishable staple product - Use of recent WRAP information on avoidable waste could be linked to carbon footprint embodied impacts to illustrate savings	- ERM to speak to WRAP about progress in this area/availability of quantitative behavioural data.	M	- WRAP work to date would ensure engagement in project	H	Semi-iconic product	M

Packaging	Bread - Packaging of	- Bread is in top 35 high impact products listed in the EIPRO study. Courtauld IIM - will introduce a carbon reduction target and will aim to achieve a 5% reduction target for packaging waste across the supply chain, so argument that scope for reduction is more limited by measures already in the pipeline. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 4% reduction in food waste by 2012, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Perishable staple product - Use of recent WRAP information on avoidable waste could be linked to carbon footprint embodied impacts to illustrate savings	H	- No data is available on different packaging systems.	M	- WRAP work to date would ensure engagement in project	H	Semi-iconic product	M
Packaging	Reusable packaging	- Packaging has a very short use phase with high waste volume implications. Packaging regulations already implemented. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 5% reduction target for packaging waste across the supply chain, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Return schemes exist for drinks packaging, and there is increasing interest in refillable packaging. - Reusable natural fibre-based bags are increasingly replacing the use of plastic bags. - Some retailers offer to collect bulky packaging for reuse and recycling (e.g. from flat pack furniture).	M	- ERM study on returnable packaging - Lighthouse work for Defra: http://randd.defra.gov.uk/Document.aspx?Document=WR0113_8684_FRP.pdf	L	- Packaging industry has effective lobby, capable of engaging at some level. Allegri detergent case study reported by UNEP. Ecover or Tesco might be willing to participate; Whole Foods Market use dispensers for many grocery items.	M	Iconic product	H
Textiles	Leather shoes	- Shoes come in variable quality and durability, and have high sales volumes. - Leather manufacture is a highly toxic process.	M	- Shoes may be disposed of before end-of-life, and shoes of higher quality are exported into an established second-hand market.	M	- 'Application of life cycle assessment to footwear' (1998). - http://www.springerlink.com/content/g1m7w0q02271051k/p=1d236578fd24519aedf2e1b4d3031c4&pi=0 ; Ecolabel	L	- Product roadmap priority area. - EU Ecolabel standards on durability have been set for occupational footwear only (not explicitly stated in terms of lifetime have been established)	M	Iconic product	H (BL)
Packaging	Shopping bags/ bin bags	- Plastic-based shopping and bin bags are generally of poor durability due to the nature of their use, and have a very short use phase. - When analysing the environmental impacts of waste disposal systems, plastic bags generally have a minimal contribution. - Packaging regulations already implemented and specific targeting of measures against retail shopping bags. Courtauld II - will introduce a carbon reduction target and will aim to achieve a 5% reduction target for packaging waste across the supply chain, so argument that scope for reduction is more limited by measures already in the pipeline.	M	- Plastic shopping bags are being increasingly replaced with reusable bags made of much stronger material. - Research is ongoing into reducing the impacts of bin bags (e.g. biodegradable plastic), and there are reusable bin bags available that are appropriate for dry waste.	H	- ERM, Environment Agency 2008 and The Guardian 2007	H	- Live issue and EA study already engaging key stakeholder	M	Iconic product	H
Furniture	Table lamp	- The use phase of table lamps dominate their life cycle impacts. - They generally have low intrinsic value in material composition, but this is dependent on the materials used. - Use of electric lamp bulbs and tubes is in the top 35 biggest impact product groups in the EIPRO study.	L	- No discussion was found on increasing the lifespan of table lamps in the literature review.	L	- No data could be identified on table lamps in the literature review. - A typical product would be difficult to define.	L	- Retailer would be point of contact. Difficult to engage manufacturers since are so diverse.	L	Semi-iconic product	M (BL)
Construction/ home	Toilets	- The environmental impacts of toilets are dominated by the heat adsorbed from the surrounding air into the water. - However, the production of durable ceramic toilets makes a comparatively noticeable contribution to total environmental impacts as well.	L	- Toilets are generally replaced during building refurbishment before they are beyond repair, and those of higher quality may be sold to a salvage yard for reuse.	M	- Defra's product roadmap for WCs	M	- Product roadmap priority area. Relatively few players in market would permit engagement.	M	Semi-iconic product	M
Automotive/ transport	Tyres	- The use phase of tyres dominate their lifecycle impacts, but there is still a considerable contribution from raw material extraction and production. - Tyres are banned from landfill, and are therefore either retreaded or recycled into rubber pellets for various downgraded uses.	M	- Tyres are available in robust and standard designs. - A market exists for remanufactured tyres.	H	- Data available for BLIC and Environment Agency studies. - Key data concern is how tyre type/tread effects vehicle fuel use and whether this relates to product longevity.	M	- Manufacturers in UK and Europe. Product differentiation already evident.	H	Semi-iconic product	M
EEE	Vacuum cleaner	- The use phase dominates vacuum cleaners, but is an example of where the broken components could be easily replaced. - The use of household appliances are included as priority products in WRAP and EIPRO study, and vacuum cleaners in particular are cited as a potential priority product in the AEAT study. - Since product is used infrequently, as opposed continuously, rated as medium impacting product	M	- Available in more durable, (repairable and maintainable) and more discardable designs - Vacuum cleaners break easily and loose suction (this could be a result of one key component such as the belt that could be easily replaced).	H	- Defra WR0106 - Data collected on PSS servicing which show some scope for environmental improvement - raw data not currently provided with report - EuP Preparation study - Since use phase is dominant, a key determinant will be loss of efficiency over time in product due to lack of maintenance - robust quantitative data on this likely be extremely difficult to source. - More durable designs may or may not be adequately maintained so efficiency could drop off, if design is not satisfactory	M	- Many are British designed and aftercare service is available with data from previous DEFRA work.	H	Iconic household product that tends to have a lifetime shorter than expected	H (BL)
Furniture	Wardrobe	- Most wardrobes are wood-based, and therefore the level of impact from manufacturing can vary considerably depending on its source.	M	- Wardrobes come in a wide range of designs. - Since such wide variation exists, not feasible to identify representative fragile and robust designs	M	- No discussion was found in the literature review on product lifetime of wardrobes. - A 'typical' product would be difficult to define.	L	- Bulky product dominated by flat pack overseas import by volume. High end manufacturers located overseas predominantly.	M	Iconic product	H (BL)
EEE	Tumble dryer	- The use of dryers in households is in the top 35 highest impact product groups in the EIPRO study, and the use of household appliances is a priority product group in the WRAP resource efficiency study. - Dryers have relatively high primary material requirements. - Reducing the impact of clothes cleaning is part of the evidence review for Defra's clothing roadmap.	H	- Market differentiation/trading already exists (Bosch vs others). - Difficulty is the use phase is extremely influential so any innovation with respect to efficiency, or any loss in efficiency over time is likely to lead to outcomes which are not favourable for extending lifetimes.	L	- EuP Preparation study	H	- The most well-known manufacturers of dryers carrying out extensive work on reducing the environmental impacts of their product lines include Electrolux and Miele, which are not UK based manufacturers. - The MTP work - What If? provides a good resource	M	Iconic household product that features heavily in literature	H (BL)

Construction/ home	Windows	<ul style="list-style-type: none"> - Windows are cited as a priority product in the AEA report. - The production and disposal impact depends on the material used, generally with wood based window frames having the smallest impact over the more resource intensive steel, aluminium and PVC based windows, but reduced longevity of wooden frame dependent on maintenance. - As an energy-related product, insulating capacity of window (window energy rating) dominates impacts from a life cycle perspective which is unrelated to product durability - Since use phase is dominant for impacts, any technology innovation eg internal glass coatings etc have potential to outweigh gains for product lifetime 	M	<ul style="list-style-type: none"> - Windows are a product with extended lifetime which people wish to keep in home - Available in range of materials and designs each with different longevity and guarantees - Established in product roadmap that circa 20% of windows in new builds are replaced almost immediately - Use of windows (ie their capacity to insulate is key with respect the life cycle impact) , any innovation in materials, coating may outweigh material savings of longer lived products. - Unknown relationship (lack of robust data) between product lifetime over time and effectiveness material frame type with respect to loss of seals. 	M	<ul style="list-style-type: none"> - Defra product roadmap scoping study for windows - Energy related product (ERP) under Ecodesign directive 	M	<ul style="list-style-type: none"> - Product roadmap priority area - no scope for lifetime extension in product roadmap study specifically identified - Bulky product, manufactured and assembled in UK 	M	Iconic product	H
Construction/ home	Wine glasses	<ul style="list-style-type: none"> - High-end glassware is cited in the WRAP study. 	M	<ul style="list-style-type: none"> - Wine glasses are available in robust and fragile designs that usually depends on the thickness of the glass. Could be modelled with relative ease if looked at in terms of increasing durability. Key question is relationship between thickness and robustness re breakage rates of which no information was available. 	L	<ul style="list-style-type: none"> - Some data is available in WRAP report, but it would difficult to identify the quantitative relationship between durability and extended lifetime. eg wastage rates for less durable products. 	L	<ul style="list-style-type: none"> - Potential collaborator could be IKEA, as they sell range of wine glassware (including the Rättvik thick wine glass). Also, IKEA is involved in the EU IPP Pilot Project for teak garden furniture (sustainable wood is their most important environmental policy). 	M	Iconic product	H
EEE	Boiler - domestic combi	<ul style="list-style-type: none"> - The MTP has measured water heating as accounting for 84% of total energy use in households. - Boilers lifetime was measured as 17 years in EuP prep study, and in the MTP What If programme, boilers were estimated to last about 13 years. - The lifecycle costs of boilers are dominated by the use phase, and the high alloy metal content means that a large proportion of unit will be recycled. - Approximately, 1.5 million boiler units are sold in the UK per year. - In view of the current scrappage scheme there is a need for research to inform the consumer on product lifetimes. - All environmental impact studies have identified water heating as a high impact product category. 	M	<ul style="list-style-type: none"> - The cost of a new boiler means that it is economically viable to repair/refurbish them a number of times before replacement, electronics are most susceptible component - Boilers are perhaps the single most important product which people wish to keep in home for an extended period. A maintenance aftercare service is already available, as are commercial servicing contracts. However, most warranties on new boilers are just 1 to 2 years. - Boiler efficiency is already regulated both in the UK and EU, which suggests that the industry could be in a position to respond to any regulations on product lifetime. - The MTP What If tool measures the lifetime of boilers as decreasing from 23.07 years in 1980 to 12.38 in 2020 (with a new lifetime standard deviation of around 3.9 years). - Heat exchanger has in built obsolescence, but enables high energy efficiency - Energy efficiency limits are near to their maximum, but there is a danger of technology shift to trigeneration and biomass boilers in future. 	M	<ul style="list-style-type: none"> - EuP Prep study - Market Transformation Programme case study http://efficient-products.defra.gov.uk/cms/about-mtp-case-studies/ - Scrappage scheme evidence base 	H	<ul style="list-style-type: none"> - There is a long history of engagement with sector. The UK change in building regulations for condensing boilers means that it is leading in the EU market. - GB and European manufacturers exist, such as those that were partly engaged in the EuP preparatory study on water heaters: Siemens, Honeywell, Thermowatt, Baxi (UK based company), Viessman. There is a boiler scrappage scheme available which ensure boost sales of new UK boilers and require consumer choice in the UK. - Improved water heating is key to helping meet UK sustainable public procurement targets, and has been identified as a priority product category in the AEA Technology (2008) study. 	H	Iconic product due to cost of replacement, running cost, maintaining and essentiality (BL) (is needs to be reliable).	H
Construction/ home	Sauce pans	<ul style="list-style-type: none"> - The embodied energy of saucepans is high, particularly for steel or iron based products. - Coated pans are less durable, and have low economic value, so will end up in the black sack waste stream. Therefore, the metal content may not be recovered. 	M	<ul style="list-style-type: none"> - There is a wide market variation where at one end of the spectrum are short lived consumables (coated pans), and at the other end are lifetime guarantees and intergenerational products (iron pans). - Le Cruset market the difference in lifetime between products, as it offers lifetime guarantees for its steel and iron pans, but 10 year for coated pans. Aga is also another well-known company that has different warranties for different products. 	H	<ul style="list-style-type: none"> - Difficulty will be in obtaining discard rates - warranties and what if? scenarios envisaged. - US army study: http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA402858 - http://www.green-pan.com/cookware/list.asp?Lid=9&pnv=4 - Relatively simple (materials rich) product sold with warranties which would enable effectiveness to be measured and to derive optimal lifetime/break even points. 	M	<ul style="list-style-type: none"> - Both Aga and Denby, a UK company, and Le Cruset, a Belgian company sell products of robust designs, and use their warranty schemes to market this quality. - There is also a Belgian company called Green Pan that markets the reduced environmental impact of its non-stick coated cookware, which is made from minerals instead of plastics with a steel handle. - Example of market which could be altered by imposition of a durability standard - UK public procurement contracts for light catering equipment include: Global Foodservice Equipment; W V Howe; Lockhart Catering Equipment; Nisbets; Reward Manufacturing. 	H	Iconic household product	H

Appendix B2 Top 9 products considered for lifetime extension with criterion ranking

Product Category	Product name	Criterion 1: Is the scope to reduce the environmental impact of the product high? Is it a product: •which has inherently high material requirements? •containing precious metals (limited availability)? •comprising a significant proportion of high embodied energy? •with energy intense processing and assembly? •which has significant disposal impact? •with short use phase? AND •which has high volume sales? •which is identified as a high impact product in EIPRO (2004), AEAT (2008) public procurement and WRAP (2009) resource efficiency study?	Criterion 1: Ranking (HML) High - denotes high impact products, or products with scope for environmental savings via lifetime extension	Criterion 2: Is it a product which already demonstrates scope for extended lifetime? Is it a product: •which a proportion of units are already viably reused, refurbished/repared or part of PSS/leasing? •which is typified by short and long lifetimes (eg different warranties offered)? •sold with service contracts? •which has parallel long lasting products (eg high quality alternatives)? •which is driven by fashion? Why is there any remaining scope for intervention? Reasons for market failure? Knowledge of end-users, barriers and change preferences? Is it possible to force change?	Criterion 2: Ranking (HML) High - denotes presence of practicable strategies/ market differentiation which extends product lifetime	Criterion 3: Is it a product for which there is sufficient environmental data/evidence to support action? Is it a product: •which is part of Defra's Roadmap work? •on which full ISO compliant LCAs have been carried out? •represented by EPDs? Is there data on the economic impacts of this product?	Criterion 3: Ranking (HML). High - Known data available, or feasible to estimate data Medium - Scope for data development/ acquisition Low - No or little potential for data collection	Criterion 4: Is it a product which has appropriate UK market engagement and penetration? Is it a product: •whose final assembly occurs near market - scope for remanufacturing/repair? •whose UK industry/trade bodies are engaged and motivated to make changes? •which makes up a significant proportion of main public and private procurement contracts? •which innovates quickly making intervention difficult? Identification of policy drivers already in place.	Criterion 4: Ranking (HML) High - denotes likelihood of stakeholder engagement.	Criterion 5: Is this a product which features highly in the public domain? Iconic product -products that frustrate the consumer with their short lifetime	Criterion 5: Ranking (HML) High denotes 'iconic' product 'BL' denotes a product examined in Brook Lyndhurst's parallel study on consumer behaviour
Furniture/Interiors	Domestic carpet	- Carpets are a bulky product contributing to the waste stream, and if carpets are recycled, they are significantly downgraded. - Defra's clothing roadmap extended its evidence review for maximising reuse and recycling to include carpets. - Textiles are cited as a priority product in all environmental impact studies with high embodied impacts. - Carpets are often disposed prior to end of life due to aesthetics, with remaining life, where consumer expectation for durability is high - Domestic and commercial carpets make up approximately 25% (approx. 520,000 tonnes) of all textile consumption in the UK.	H	- Carpets are available in range of designs/materials each with varying lifetime. For instance, carpet durability is key in commercial applications, but carpet comfort (often of poorer durability) is key in domestic applications. - It is a product often to consumer on basis of lifetime, with warranty and aftercare arrangements available. - LCA studies have shown that production burdens are dominant over use phase impacts	H	- Range of 'flooring' life cycle studies have been performed. - Interface carpets have tool showing different lifetimes for carpets. - Economic data not available, but could be modelled.	M	- Many high quality brands are available and are trading on basis of product durability/quality. - GB manufacturing base still exists. - Relatively few main players in market - Textile is a roadmap priority area. - EU ecolabel requires indication on the product's potential life expectancy as range or average	M	Iconic product due to stylistic obsolescence and also the fact that entire carpet has to be traditionally replaced when only part of it worn out	H (BL)
Construction	Carpet tile office flooring	- Office carpet tiles are a bulky product contributing to the waste stream, and if carpets are recycled, they are significantly downgraded. It is the disposal of carpets that is of immediate environmental concern. Defra's clothing roadmap extended its evidence review for maximising reuse and recycling to include carpets. - Textiles are cited as a priority product in all environmental impact studies with high embodied impacts. - Carpets are often disposed prior to end of life due to aesthetics, with remaining life. - Domestic and commercial carpets make up approximately 25% (approx. 520,000 tonnes) of all textile consumption in the UK. - An estimated 500,000 tonnes of Carpet waste ends up in landfill each year in the UK	H	- Available in range of designs/materials each with varying lifetime. For instance, carpet durability is key in commercial applications, but carpet comfort (often of poorer durability) is key in domestic applications. - It is a product often with provided warranty. - There is growing use of carpet product service systems whereby tiles of carpets can be replaced as opposed to the entire carpet. - LCA studies have shown that production burdens are dominant over use phase impacts	H	- Range of 'flooring' life cycle studies have been performed. - Interface carpets have tool showing different lifetimes for carpets. - Economic data not available, but could be modelled.	M	- UK public procurement contracts include Crown Flooring Ltd and InterfaceFLOOR. - EU Ecolabel standards have been determined for durability	H		M
EEE - ICT, photo and visual - large/medium-sized innovating appliances	Printer/scanner	- Home printers and scanners are a potentially frequently replaced consumer product (some are low cost and supplied with starter cartridges), with waste volume implications. - They have intrinsic low materials cost, and depending on their use are only an intermittently used EuP - Voluntary agreement in process, suggesting limits to fuser efficiency innovation	M	- Some are cheap products with technological and economic obsolescence. - The product sector is experiencing growth - Short lifetime sometimes down to lack of proper care (e.g. pulling at paper jams and lack of dusting), cheapness of product relative to cartridge	H	- EUP Preparatory study and voluntary agreement in progress, establishing energy efficiency standards - http://www.hp.com/large/ipg/ecological-printing-solutions/carbon-footprint-calc.html - Environmental product declarations. - Economic costing undertaken in Which?, complex but possible in theory since dependent on use	M	- Product sector is experiencing growth in line with home PC usage. - Likely to be sufficient representatives of companies to be interested in lifetimes work. - Intense competition may interest household names in engaging on durability/quality/cost issues	H	Semi-iconic product	M
EEE - ICT, photo and visual - small innovating appliances	Mobile phone	- Mobile phones contain precious metals and resource-intensive batteries that are creating an environmental concern when mobile phones are exported for disposal (and lost) or disposed of directly into the municipal waste stream. Production impacts have been shown to be high relative to use phase. - Telephone and telefax equipment are included as priority product groups in all environmental impact studies.	H	- The mobile phone market is characterised at one end by rapid innovation/fashion, and at the other by only basic functional requirements. - A significant proportion of the market already provides product leasing arrangements as part of the business model (offers supplier/manufacture control over the product).	H	- EU IPP Pilot Project study (Vodafone investigating take-back schemes); Willems 2003	H	- There is significant sector engagement in the IPP Pilot Project for mobile phones including UK companies; - Mobile phone producers: Nokia, Motorola, Panasonic. - Component manufacturers: Epson, Intel, AMD, Spansion - Telecom Operators/Retailers: Teliasonera, France Telecom/Orange, Vodafone - Recyclers: Umicore - The environmental impact of mobile phone disposal has triggered an increase in the interest in take back schemes, which recycle or refurbish the phones. Equally, more companies are entering the market that will consumers to deposit old phones depending on the type and condition of the mobile.	H	Iconic product due to stylistic and technological obsolescence and consumers' dependence on them	H (BL)

Furniture/Interiors	Sofa	- Sofas are a bulky waste item that is often disposed of before end-of-life due to aesthetics with lifetime remaining. '- Sofas may have a high embodied energy content due to the textile materials in the covering and filling, and the steel content depending on the material used for the main structure. '- Textiles are cited in the WRAP and EIPRO environmental impact studies as a priority product group, and this could include sofa coverings. '- Upholstery often wears out, or tires aesthetically before the furniture framework/springs. '- Scope for design more durable covers in the first instance. Also for replacing the covers, avoiding majority embodied impacts of sofa production. Use of warranty	H	- There is a wide market variation in sofas provided as both durable, high quality product vs. low cost consumable. '- Sofas are sold with warranties that vary considerably in length. '- Some manufacturers offer aftersale service. '- There is growing use of furniture reuse networks that collect sofas with remaining lifetime, but the availability and awareness of these networks varies considerably across locations. '- Third sector networks are trialling the use of replacement covers to extend product lifetime	H	- No life cycle data on sofas were identified. '- Some data from third sector and WRAP (Domestic furniture WRAP - draft reuse report with lifetimes). '- Potential for sector engagement to collect data	M	- Use of warranty frequent within the product sector can be a selling point. '- Multiyork furniture, a UK based retailer, supplies replacement covers for their sofa range. http://www.multiyork.co.uk/?PAGEID=32301 '- Blueline, another UK based retailer, supplies service agreements on office furniture, which could be useful if multiyork does not engage in this project. '- Parker Knoll and IKEA are also potential stakeholders. IKEA was involved in the IPP pilot project on teak garden furniture. '- EU Ecolabel durability standards are in preparation, spare parts must be made available 5 years after production and at end of life	H	Iconic household product	H (BL)
EEE - ICT, photo and visual - large/medium-sized innovating appliances	Laptop computer	- Significant volumes of precious metals (such as gold and silver) are contained in personal computers, particularly in the circuit boards. '- The lifetime of each product component differs, with many still functioning at disposal. '- Personal computers are key electronic and electrical waste that are of increasing environmental concern and legislated by the WEEE Directive. '- Consumption of personal computers is increasing across the EU with laptops sales increasing at a very significant rate from a roughly estimated 6 million in 2000 to 31 million units in 2008 (review EuP preparatory study data on apparent consumption in the EU).	H	- Service agreements of up to 3 years can be purchased, and are sometimes included in the price of a new personal computer. Monitors will frequently have warranties of up to 3 years. '- Very few customers (according to an industry estimate of about 2%) choose to upgrade personal computers by replacing worn out or outdated components of the computer. '- Computer retailers do sell refurbished personal computers. '- EU Ecolabel establishes a requirement for the lifetime extension of the system unit, three year guarantee of parts, upgradeable memory chip, hard disk, CD and DVD drive. '- EU Ecolabel is in process of being updated.	H	- Difficult to define 'typical' product '- Eco label study for desktop computers carried out by Atlantic Consulting '- EuP prep study for computers (desktop and laptop) '- Kiatkittipong, et al 2007; Li et al (2004); Griese 2004; Truttman 2006	M	- Consultees in the Ecolabel study for PCs included a number of companies with head or regional offices in the UK: Primary: Apple, Compaq, Dell, Eurocommerce, HP, IBM, ICL, PC World (UK based), Siemens-Mixdorf, Sony, Toshiba, Secondary: Acer, ARS, AT&T, Digital, LG Electronics, Lucent, MCC, NEC, Panasonic, Texas Instruments, Vobis; '- Suppliers/Others: Dataquest, Eurobit, Eurobrom, Federation of the Electronics Industry, IDC, IT Industry Council, Personal Computer Association, SITO, Taiwan Computer Association '- Ecolabelled manufacturer: ASUS for their portable computers. '- Limited UK manufacturing; Domestic and business application	H	Iconic product due to technological obsolescence and increasing dependence on them	H (BL)
EEE - Large energy-using appliances	Washing machine	- The use of washing machines in households is in the top 35 highest impact product groups in the EIPRO study, and the use of household appliances is a priority product group in the WRAP resource efficiency study. '- From ERM's work with the WRAP (2009) washing machine study, there is an argument that energy efficiency innovation is reducing in washing machines. '- Electricity production is foreseen to become cleaner in future, and hence use phase impacts may become less dominant '- Washing machines have relatively high primary material requirements. '- Reducing the impact of clothes cleaning is part of the evidence review for Defra's clothing roadmap.	H	- Market differentiation/trading already exists (Bosch/Miele vs. others) on basis of quality/durability. In-built obsolescence in design (integrated drum) '- Design life issues and servicing companies	H	- Washing machines are one of the most frequently cited products in the literature relating to extending product lifetime. '- ERM 2010 study for WRAP; EuP Prep Study (domestic and professional washing machines); Truttman and Rechberger 2006; Dewulf 2005; Defra WR0106; Hirschl et al 2003 (qualitative); Goedkepp et al 1999 '- EuP Preparatory study. Premature discard rates available in WRAP resource efficiency report cited from Cooper 2004 (Note: the discard rates do not refer to the functional lifetime remaining in the products).	H	- The most well-known manufacturers of domestic washing machines carrying out extensive work on reducing the environmental impacts of their product lines include Electrolux and Miele, which are not UK based manufacturers. Hotpoint and Creda are based in the UK. '- Electrolux is frequently cited in literature, and was also a stakeholder in the EuP prep study. '- Miele has extensive product design system for sustainability and was heavily involved in development of WEEE Directive. http://www.miele-sustainability.com/de/en/sustainability/1016 and offer extended product warranties. AEG over upgrades of electronic componentry. ISE design for durability '- The MTP work - What If? provides a good resource, which will not be immediately reviewed - EU Ecolabel in preparation	H	Iconic household product that features heavily in literature	H (BL)
Textiles - clothing	T-shirt	- Textiles are cited as a priority product in EIPRO and WRAP study, with very high embodied impacts (cotton and synthetic textile manufacture). '- Product often disposed prior to end of life due to aesthetics, with remaining life. '- Polycotton fabrics are more durable and dry more readily than cotton fabric	H	- There is highly variable quality and durability of clothing available with growing rates of poorer quality clothing entering the market from export regions such as South East Asia. '- There is a rate of reuse and recycling, but poorer quality means small volumes are handled within the UK and textiles are significantly downgraded when recycled. '- Higher quality cotton clothing does exist in the market, and could be quantified according to thread count. '- Where products can be reused, a second-hand market exists.	H	- Product roadmap, Defra EV0421: case studies. '- WRAP 2009 resource efficiency study: Hire of 'high end' clothing as use intensification. '- M&S return scheme for clothes and soft furnishings via Oxfam. '- Arunkundram 1998 - effect of resale market on purchasing of new items (quantitative)	M	- Low grade products are very visible long-term unsustainable product/market failure. '- There are a number of key UK retailers, but comparatively little manufacturing is carried out in the UK and textile manufacturing has a highly complex supply chain. '- The Marks & Spencer and Oxfam programme continues to expand in scope, and the organisations have agreed to continue it indefinitely. '- Product roadmap priority area. Vast and diverse sector. Dominated by high volume imports. Typified by UK wholesalers, retailer and small UK producers	L	Short lifetime of 'disposable' fashion and also fast rate of stylistic obsolescence	H (BL)
EEE - Small energy-using appliances	Toaster	- Toasters are generally disposed straight to the waste stream, and therefore constitute a loss of ferrous and non ferrous material with high embodied carbon '- As a frequently used household energy using appliance, toasters can be considered as part of the priority product category in the WRAP study. '- Replacement parts are available for prolonging lifetime	M	- Market differentiation already exists for toasters: e.g. Duallit support for replacement parts. '- A toaster is made of only a few components, and can therefore be serviced with relative ease.	H	- http://www.dualit.com/support '- LCA of toaster exists, product declarations. '- No economic analysis identified, but possible in theory	M	- Dualit, a UK company, provides extended warranties on products and aftercare service. '- Morphy Richards are present in UK market '- DeLongi is another major European manufacturer.	H	Iconic product	H (BL)