

## **DISCARDED HOUSEHOLD APPLIANCES - WHAT DESTINY?**

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### **Introduction**

The environmental impact of consumption has become a major concern within the developed world and policy makers are increasingly introducing legislation to make polluters pay for environmental damage. Producer responsibility legislation, making producers responsible for the treatment and recycling of products at the end of their lives, is one example of such an approach.

The proposed EU Directive on Waste Electrical and Electronic Equipment (WEEE) applies this approach to household appliances (Cooper, 2001).<sup>1</sup> It is anticipated that this legislation will be adopted in Summer 2002, in which case EU member states will have to transpose it into national legislation by the start of 2004.

This paper reports some key findings of the E-SCOPE<sup>2</sup> study on the purchase, use and disposal of household appliances in the UK. The principal objectives were to obtain quantitative information on product ownership, lifetime, use and disposal, improve understanding of consumer attitudes and behaviour, and identify the likely effectiveness of different approaches to Waste Electrical and Electronic Equipment.

The study was funded through a combination of private donations from project partners and landfill tax sponsorship. Project partners represented a broad range of stakeholders, each with an interest in the adoption of producer responsibility legislation in this sector.<sup>3</sup>

## **Methodology**

The research methods used involved face-to-face interviews to obtain essential quantitative data and focus groups to acquire the qualitative data necessary to understand householders' attitudes and behaviour more fully.

In a house-to-house survey, 802 households were selected for interview in over 180 locations across the UK during December 1998. Stratified quota sampling was used to ensure that this sample was demographically and statistically representative of the UK population as a whole. The questionnaire and protocol used was developed through a pilot survey of 30 households outside of the main sample.

Five focus groups were subsequently held, with householders of different socio-economic status and from urban and rural locations. Experienced facilitators were used for each group, using a survey protocol developed through pre-testing on a pilot group. The focus groups were conducted in 1999.

The key findings were subsequently published in a report aimed primarily at industry, government and non-governmental organisations (Cooper and Mayers, 2000).

## **Results**

### ***Appliance stocks and flows***

The survey found that, on average, UK households owned 25 electrical or electronic appliances. The product stock was relatively young, most appliances being under 10 years old and more than half under 5 years old. The stock of cookers, refrigerators and freezers, and home and garden tools contained the highest proportion of older products.

An important issue in the development of producer responsibility legislation has been the disposal of old products accumulated in storage within households. The proportion of appliances in storage was found to be low (less than 5% of all products) and over one half of households did not store any products. Focus group participants indicated that they stored items with the intention of future use or passing them on to their children.

The survey revealed around one in twenty appliances owned to be second-hand, in particular large kitchen appliances and televisions. Although over one half of households did not own any second-hand appliances, nearly one third owned between one and four, and almost one in ten households owned five or

more. The proportion of second-hand appliances owned was significantly higher amongst householders of lower socio-economic status.

The extent of repair work was investigated and the survey found that a substantial proportion of householders (38%) rarely or never got their products repaired. Younger people were significantly less likely to get products repaired. The main reasons cited were the cost of repairs (45%) and a low anticipated residual product life (13%). For example, one focus group participant commented: "I think that's the main problem these days; it costs so much to get these things repaired, you might as well throw it and buy a new one" (Charles, age 69, retired).

Repairable products are often discarded: a third of discarded products that were broken were described as 'in need of repair', while the other two thirds were considered 'broken beyond repair'. The focus groups revealed that some consumers would like to be able to undertake repairs themselves: "A lot of these products now, a certain part of them contains a sealed unit and once that has gone, that's it. Before you could take them to pieces and put them back again, but not now - once it's gone, it's gone" (Barry, age 61, unemployed).

The average age of appliances when discarded ranged from 4 to 12 years, depending on the type of product. Overall, one third of discarded appliances were reported as 'still functioning' (notably cookers, hi-fi and stereo, mobile phones and computers). As only around 24% of discarded appliances (by units) were intended for reuse, being donated or sold, it can be deduced that around one in ten still functioned but, even so, were discarded for recycling, incineration or landfill.

### ***Disposal routes***

It was estimated that at least 476,000 tonnes of appliances, totalling over 23 million units, were discarded annually in the UK between 1993 and 1998. Whereas large white goods constituted the greatest proportion of appliances discarded by mass (77%), small appliances make up the most significant proportion by number of units (37%). Over 60% of small work or personal care appliances were disposed of in dustbins, wheelie bins or rubbish sacks, effectively preventing reuse or recycling.

Thirteen different disposal routes were investigated, accounting for all but 3% of appliances discarded (by mass). Around 104,000 tonnes (22%) of discarded appliances were reused, two thirds of which was donated to family or friends with most of the remainder being sold. Appliances most frequently reused were computers, hi-fi and stereo, microwave ovens and video equipment.

Around 328,000 tonnes (69%) of discarded appliances were taken to civic amenity sites by householders, collected as 'bulky waste' by local authorities, or collected by retailers or recycling companies. Over 276,000 tonnes of this consisted of large white goods mainly destined for recycling. It is likely that much of the remaining 52,000 tonnes (mostly televisions, microwave ovens, home and garden tools, and vacuum cleaners) was incinerated or ended up in landfill.

The remaining 29,200 tonnes (6%) of discarded appliances were collected as 'ordinary waste' by local authorities (i.e. from dustbins, wheelie bins or rubbish sacks) or left in a skip at the owner's work-place or, illegally, on the nearest convenient skip or waste ground (the latter accounting for around 3,330 tonnes). These appliances are most likely to end up incinerated or in landfill.

Significant differences were found in the disposal routes used, according to the type of appliance, socio-economic group, car ownership and householder attitudes. For example, householders of higher socio-economic status (who were more likely to have access to their own means of transport and owned a higher number of newer appliances) discarded a greater proportion of their appliances by donations to family and friends, collection by retailers, or taking them to civic amenity sites. In contrast, those of lower socio-economic status disposed of a higher proportion of their appliances through municipal waste collections, in a skip at their work-place or, illegally, on the nearest convenient skip or waste ground.

Almost one quarter of discarded products were donated or sold privately for reuse. The fact that only around 5% of the current stock of products is second-hand suggests that such products do not have long residual lives. Focus group participants indicated that they obtained second-hand products when buying new was not possible due to economic constraints - for example, to give to children leaving home.

Discarded products not intended for reuse were most likely to be taken to civic amenity sites or collected as bulky waste by local authorities (53%, by mass). Just over one third was collected by retailers or recycling companies, with the remainder either collected as ordinary waste by local authorities or left on skips or waste ground.

### ***Consumer attitudes and behaviour***

Consumer and household attitudes and behaviour were studied using the quantitative data in conjunction with the focus group findings. Three principal areas of interest were addressed: product life spans, recycling and disposal services, and product resale and reuse.

Almost one half of householders (45%) were of the opinion that, in general, products do not last as long as they would like. Women were significantly more inclined than men to be dissatisfied with product life spans.

One focus group comment summed up the views of many: "I think things have changed, I think they are made more disposable these days...Things used to last a lot longer" (Margaret, age 56, unemployed). Another was equally critical: "I've only been married 15 years and I've been through three washing machines. And I have been told...each time they have come out to repair them, that they are not made to be used a lot" (Moira, age 38, company director).

Other participants, however, were less critical: "I don't think they ever last as long as you'd like... When you buy something, obviously you want to get the maximum amount of use out of it and whenever it goes wrong - even if it's after a good length of time - you always want it to last longer" (Roger, age 52, telecommunications engineer).

Householders considered a 'reasonable' life span for large appliances to be 10 to 13 years, depending on product type. However, over one third of householders thought that cookers, refrigerators and freezers should last at least 15 years. A reasonable life for small work or personal care appliances, mobile phones and toys was thought to be 6 years. Other types of products were expected to last 7 to 10 years.

Wet appliances, small work or personal care appliances, and vacuum cleaners were most frequently identified as products that householders would like to last longer. Products for which continual technological advancement is likely, such as telecommunications equipment, were identified less frequently.

Effective consumer choice requires appropriate product information. Almost three-quarters of householders said that having accurate information about the expected life span of products before making a purchase was 'extremely' or 'very' important. Over one half considered information on life spans currently available to be either 'inadequate' or 'barely adequate'.

The main disadvantages given to purchasing longer lasting products were concern that they would become 'out of date' after a few years, price, and repair and maintenance costs. Men and householders of higher socio-economic status were significantly more inclined to be concerned about products becoming out of date, whereas women and householders of lower socio-economic status were more concerned about cost. One focus group participant suggested that the type of product might also be a factor: "It probably depends on the total price of the item... If it was a hairdryer or something you might think, well, I can throw it away after a year if it's not up to it... but a TV, I think you would pay more for longer life span" (Pete, age 52, computer programmer).

Although participants were aware of product improvements, many were inclined to view technological advance as problematic, criticising the frequency with which new models are brought out and features regarded as unnecessary: "You get these extras on there which you are paying for and yet you don't use half of them" (Harold, age 68, retired sales supervisor).

Focus group participants expressed a range of opinions on the potential effectiveness of the various disposal arrangements for their appliances, which appeared to reflect regional differences. Some said that they did not always know what to recycle and mentioned obstacles to recycling small appliances. Others admitted that they did not care what happened to their waste.

There was common agreement on the need for information from producers, retailers, local authorities and recycling companies on how to dispose of appliances safely. Posters, leaflets, improved product labelling and telephone help-lines were all suggested as possible means of supplying such information.

Some householders saw a need for more convenient disposal services, such as collections outside of normal working hours.

Although householders appeared willing to dispose of appliances through retail outlets, they expected either economic compensation or increased convenience over other means of disposal. "If the shop where you bought your appliance from would take it in part exchange for a price of £10 or whatever...when they delivered the new one, then that would be a great service" (Malcolm, age 56, retired factory foreman).

Product reliability was seen as a major risk when purchasing second-hand: "I don't think I'd want to buy something that was somebody's cast-off. They've got rid of it for a reason; it's either out of date or there's something wrong with it" (Roger, age 52, telecommunications engineer). In general, householders expected second-hand items or 'new' products containing remanufactured parts to represent good value and have an acceptable warranty. Some would prefer to purchase second-hand appliances from a credible high street outlet.

## **Discussion**

The findings add to a small but growing body of research on producer responsibility legislation (e.g. Lifset, 1993; Vermeulen and Weterings, 1997; Mayers and France, 1999; Cooper, 2000) and the life span of appliances (e.g. Antonides, 1990; Cooper, 1994a, 1994b; van Hinte, 1997; Kostecky, 1998). They have implications for product design and development, the creation of improved collection, treatment, reuse and recycling services, and the preparation of appropriate producer responsibility legislation. These are considered in turn below.

### ***Product design and development***

The findings indicate a need to reconsider the future development and design of products and their use. There is an apparent desire among householders for longer lasting appliances (particularly wet appliances and small work or personal care appliances). People appeared to accept that products most subject to technological advance would have to be regularly replaced, although focus group results suggested that many were inclined to view this negatively.

In practice, consumers may be reluctant to purchase products designed for longer life spans because of concern that they become 'out of date' and cost. The life span of products is determined not only by their design life but also by the behaviour of consumers. Thus in order to optimise product life it is essential that consumer behaviour throughout the product life cycle is considered. The fact that many products that still function are discarded needs to be addressed through further research and public education.

There is a reluctance among consumers to have products repaired, for which the main explanation is cost. The potential for public policy and new private sector initiatives to encourage people to get products repaired needs to be further investigated.

Consumers expressed a desire for clearer information on the planned design life of products in order to assist their choices in the market. Some producers of premium brand white goods have already taken a lead and provide such information, which may give them a competitive advantage (Cooper, 1994b).

### ***Collection, treatment, reuse and recycling services***

The findings give insights into the potential for new resale, recycling and disposal services for unwanted appliances. New collection and recycling processes will be required to meet recycling targets in the WEEE legislation, particularly for smaller products (most of which are currently discarded in dustbins, wheelie bins or rubbish sacks) and brown goods such as televisions and video equipment (most of which are not currently recycled). Partnerships need to be established between stakeholders to develop the necessary infrastructure and processes most effectively.

The effectiveness of any new system will be determined by a combination of factors relating to the householder, the specific disposal service provided and the appliance type to be collected. The data suggests that product recovery ('take-back') schemes should not be set up on the basis of assumptions from anecdotal evidence: variations in the disposal behaviour and requirements of different householders are too great for generalisations to be reliable. For example, 'bring' schemes (in which households deliver items to collection points for disposal) are likely to have limited potential because people without their own means of transport are less able to use them. They may in particular fail to capture second-hand appliances discarded by householders of lower socio-economic status.

The focus group findings revealed that householders want disposal services offering convenient collection arrangements and financial incentives for returning products. Moreover, householders may only change their disposal behaviour if provided with easy to understand information that explains and justifies any new disposal arrangements. Specific regional differences in householder requirements were not addressed and need to be investigated through further research.

### ***Producer responsibility legislation***

Finally, the results should aid the development of effective national policy in response to the WEEE Directive. They confirm that the recycling and disposal of appliances is more complex than waste from 'consumables' such as newspapers, packaging and food or other organic material.

Appliances tend to pass in and out of use, following a 'cascade of use' through which they become financially, functionally and materially degraded. Many items are not disposed of by the original owners, as they are redistributed through reuse. One effect is that the collection of products through 'trade-ins' at retailers will not capture such waste and thus has limited potential.

Measures of both the weight and number of appliances discarded must be considered in order to take account not only of the waste implications but also

the wider environmental impacts of consumption. For example, more journeys are made by consumers per tonne of small appliances purchased than for the same weight of electric cookers.

Data on storage suggested that this is not as critical an issue as previously thought; one recent report cited an estimate of up to 30% of appliances in storage (ICER, 2000). More significant than storage is the fact that because appliance ownership has been increasing there is a growing stock of appliances that will eventually be discarded.

Reuse, an important part of the 'social economy' (Department of Trade and Industry, 1998, 1999), may in future be subject to targets as a result of the Directive. The extent of reuse revealed by the survey was considerable. Reuse can result in substantial environmental benefits if it replaces the manufacture of new products. However, in certain situations (as when people obtain appliances second-hand when buying new is not possible due to economic constraints), the effect is to increase the number of items in use as distinct from reducing the production of new appliances. Reuse is a complex process, the environmental benefits of which merit further investigation.

Finally, the research findings indicate that producers and consumers alike have a role in waste minimisation and effective waste management. Waste legislation needs to be drafted to provide an incentive mechanism that encourages manufacturers to make appliances that are designed for durability, ease of repair and recycling, while consumers see benefits from purchasing them.

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<sup>1</sup> Proposal for a Directive of the European Parliament and of the Council on Waste Electrical and Electronic Equipment, Proposal for a Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment, Commission of the European Communities, 13th June 2000.

<sup>2</sup> Electronics industry - Social Considerations Of Product End-of-life.

<sup>3</sup> The City and County of Cardiff, Cleanaway Limited, Dixons Stores Group, Domestic & General PLC, The Greenbank Trust, Hewlett-Packard Limited, Intex Computers Limited, Philips Electronics UK Limited, Save Waste and Prosper Limited, Sheffield Hallam University, University of Surrey, Urban Mines Limited.