WEEE, WEEE, WEEE - FINDING ITS WAY BACK HOME?

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Abstract

Over the past decade the European Commission has been developing plans to address environmental problems caused by a growing volume of waste from electrical and electronic products. It has recently published a series of proposals for a draft Directive. Using a simple analytical framework this paper evaluates arguments for and against these proposals in the light of responses from stakeholder interest groups. It assesses the strong criticisms voiced by some industry representatives and the reservations of environmental and consumer organisations. The paper concludes that the proposed legislation, if refined and implemented effectively, would represent a highly significant advance in environmental policy, as waste-related environmental costs would be internalised into the price of electrical and electronic products. Sustainable product design would thereby be promoted.

1. Introduction

Waste generated from the disposal of household appliances has attracted considerable interest from European Commission policy analysts over the past decade. Millions of these electrical and electronic products are discarded in Europe each year. The volume of this waste stream amounts to around 6 million tonnes per annum in the European Union (EU), equivalent to each household generating, on average, 25-30kg per year (AEA Technology, 1997). Waste electrical and electronic equipment (WEEE) is expected by the European Commission to increase by 3%-5% per annum, thus doubling within 12 years. Many of the discarded products contain toxic substances such as lead, mercury, hexavalent chromium, cadmium and halogenated flame retardants.

In response, the Commission has drafted legislation to address these environmental problems. The proposed 'WEEE Directive' aims to prevent waste, to promote re-use, recycling and other forms of

recovery, and to minimise environmental risks and impacts associated with the treatment and disposal of discarded equipment.

This paper uses a simple analytical framework based on the three domains of environmental, economic and social sustainability to evaluate the current proposals (McLaren, Bullock and Yousuf, 1998). It identifies and assesses the responses of influential stakeholder interest groups, and seeks to explain the strength of criticism voiced by some industry representatives. Finally, it draws conclusions on whether the proposal represents a significant advance in environmental policy and is likely to be effective in practice. It has been prepared as part of a programme of research at Sheffield Hallam University on the environmental impact of household appliances.

2. The EU proposals

Origins

The origin of this policy initiative can be traced to the decision by the European Commission in 1991 to designate a series of 'priority waste streams' which it believed were in need of particular attention, among which was waste from electrical and electronic equipment. A Project Group on WEEE was established by the Commission in order to produce a strategic framework within which to make recommendations. However the Group had severe difficulty in reaching a consensus view during the eighteen-month period available and this was evident when its report was published in 1995 with a wide range of unresolved issues.

Meanwhile several EU member states, notably the Netherlands, Germany and Sweden, were developing national policy measures to deal with the electrical and electronic products waste stream. Experts warned that the EU needed to initiate its own policy in order to harmonise industry

requirements across member states (Welker and Geradin, 1996). If legislation was introduced in some member states but not others, as appeared increasingly likely, there would be serious implications for the operation of the single market.

During 1996 and 1997 the Council and European Parliament passed resolutions which required a follow-up to the priority waste streams programme. A further report was commissioned in order to increase the data and information available and identify possible options for improving the management of WEEE. This proved a rather more coherent study, although it, too, highlighted several potential problems (AEA Technology, 1997). Despite these outstanding concerns, a draft proposal for a Directive was published in April 1998, followed by a revised draft three months later and a third draft in July 1999.

Key measures

The key elements of the proposed legislation may be summarised as follows. Member states are to be required to ensure that collection systems are set up to enable discarded WEEE to be returned by private households, other organisations that normally use the municipal waste stream, and distributors (i.e. retailers, including rental companies). The collection service is to be free to private households, and when distributors supply new products to consumers they must allow 'similar' equipment to be returned free of charge. The collection facilities in these 'take back' systems must be readily accessible to the public, although population density is taken into account.

Producers (i.e. manufacturers and importers) are required to establish systems to provide for treatment and recovery (e.g. re-use, recycling, or energy from waste). Moreover, they are to bear the cost of collection, treatment, recovery and environmentally sound disposal of WEEE from private households.

Disaggregated data on waste generated in the EU is currently poor and member states are required to submit data on 'achieved rates of collection' from private households by 1 January 2004. They must also ensure that producers submit information on new products put on the market by the same date. It is intended that the Council and Parliament will, in due course, establish ‘compulsory targets’ for collection from 1 January 2006.

Member states must set up systems to ensure that producers meet minimum requirements for the recovery of certain categories of discarded equipment. The requirements for 1 January 2004 have been set at 90% for large household appliances and 70% for small household appliances, equipment with cathode rays (e.g. computer monitors and televisions), toys, and electrical and electronic tools. They are to be reviewed before 2006. The recovery requirements currently proposed are, of course, based on unknown collection totals. However it is anticipated that, overall, a minimum of 4kg of WEEE per inhabitant will be collected each year from private households.

Member states are also to promote the design and production of equipment that facilitates repair, upgrading, re-use, disassembly and recycling, and to encourage producers to increase their use of recycled and recyclable material. The collection and transport of WEEE is to be undertaken in such a way that components and whole appliances may subsequently be re-used or recycled. Similarly, treatment prior to recovery or landfilling, which is required, should allow for subsequent re-use or recycling, and all establishments undertaking treatment must be certified.

The use of dangerous substances is to be restricted. Member states are to ensure that, with certain exceptions, the use of lead, mercury, cadmium, hexavalent chromium and certain brominated flame retardants (PBBs and PBDEs) is phased out by 1 January 2004. They are also to encourage producers to minimise the use of such substances.

Finally, treatment facilities must be provided with the information necessary to identify components and materials, and households must be supplied with information about their role and the available collection systems.

3. A framework for policy analysis

In any analysis of proposed legislation an appropriate framework for studying the policy is necessary, the choice of policy instrument needs to be assessed, and the policy detail must be subjected to appraisal (Department of the Environment, 1991). Policy analysis is a complex process which involves a systematic investigation based on information gathered for and against each option (e.g. Carley, 1983). A simple analytical model is used in this paper which is based on the three domains of environmental, economic and social sustainability (see Table 1, below).

The environmental sustainability criterion requires that the policy should achieve the intended outcome of reducing the environmental impact of consumption and thus contribute to sustainable development. Evidence is needed that environmental benefits are likely to result from the measure that will exceed any negative impacts that also arise. The fact that environmental impacts may not be readily quantifiable can make this task of measuring costs and benefits difficult. It may also be necessary to form a judgement on the relative importance of different impacts (e.g. air emissions and waste volumes). Use of the precautionary principle is assumed.

As noted above, one purpose of policy analysis is to determine whether the proposed approach is the one most likely to achieve the stated objectives. Research in waste prevention and management does not have a strong academic tradition in the social sciences, with, perhaps, the exception of recycling. Even so, several different methodological approaches are available. The study of disposition behaviour is particularly relevant (e.g. Jacoby, Berning and Dietworst, 1977; Hanson,

1980; Harrell and McConocha, 1992), as is the behaviour of companies in end-of-life product management (Gertsakis, Morelli and Ryan, 1998; Kostecki, 1998). Another approach, associated with industrial ecology, is to focus on the impact of policy measures on the flow of materials and energy in the economy (Jackson, 1996; Ayres, 1996).

Economic sustainability, defined here as economic progress compatible with sustainable development (as distinct from economic policy stability), is the second element in the framework. Policy must contribute to the development of a more sustainable economy if it is to be effective. The basis for much environmental legislation is the need to correct market failure, as when individuals or companies avoid paying the full costs associated with consumption because these are 'externalised' and paid by society as a whole. For example, the cost of health care required because of pollution caused by the manufacture or use of products is (in general) paid collectively through taxation. Similarly, the cost of household waste collection and disposal is currently paid by local taxpayers regardless of their output of waste. One important criterion for assessing policy is thus the extent to which this kind of 'market failure' is corrected and externality effects reduced.

In addition, an evaluation is required of the likely economic cost of achieving the anticipated environmental benefits, the test of proportionality. This should be undertaken at an aggregate level in order to assess the macro-economic implications of the legislation, such as the cost to industry or the effect on employment. It is also needed at a more detailed level, broken down by each element of policy or product category, in order to ascertain whether the economic cost of each different part of the legislation is reasonable.

A third criterion is the social sustainability of policy or, more specifically, distributional equity. Environmental measures will not prove sustainable if they are implemented at the expense of social cohesion. Although there will inevitably be conflicts of interest when options exist for either public

sector or private sector activity (as, for example, with waste collection), an effective policy will minimise perceived injustice and improve compliance.

One means of addressing the likely social impact of policy is to explore the equity concerns of stakeholders such as producers, retailers and consumers. If stakeholders are satisfied, pro-active support and compliance are more likely, resulting in effective implementation. Such support is particularly important when legislation is based on market instruments which are designed to offer flexibility and promote active industry engagement.

The acceptability of policy to different stakeholder groups will be influenced by their sense of responsibility for the problem being addressed. This is an issue of considerable controversy in the context of waste. In European Union countries there is a trend towards applying the concept of 'producer responsibility', which is intended "to ensure that industry assumes an increased share of the responsibility for the wastes arising from its products" (Department of the Environment, 1995, p.13) based on the 'polluter pays' principle. Strongly advocated by environmental organisations, its proponents believe that it "generates powerful incentives for changing the environmental attributes of products" (Lifset, 1993, p.164). Its initial application can be traced back to German policy on packaging waste at the start of the 1990s. An alternative approach more often supported by industry representatives is that of ‘shared responsibility’, which places responsibility upon all stakeholders (e.g. Federation of the Electronics Industry, 1999). Analysis of social sustainability in the context of these contrasting approaches needs to embrace both ethical and practical considerations, and ideological assumptions about individual and collective roles in society should be understood and, ideally, made explicit.

It should not be assumed from the outset that policy intervention is valid. The value of using legislation as a tool for change, as distinct from a voluntary approach, needs to be assessed. In the United States, for example, voluntary approaches to WEEE have been strongly advocated (e.g.

Cotsworth, 1999). Public policy can have far reaching implications and carefully considered boundaries need to be drawn. For example, in the context of the proposed WEEE Directive there is not only an assumption that governments can play an effective role in the management of waste, but also that they are entitled to influence the type of products which people consume. Finally, the appropriate level at which to apply legislation must be considered, taking account of subsidiarity and single market implications.

(Table 1)

4. Assessing the proposed legislation

Stakeholder responses

The proposed WEEE Directive has been subject to very limited discussion in specialist and academic journals and negligible coverage in the national media. The assessment in this paper is based on evidence from two seminars held in Spring 1999, subsequent discussion with several key participants, and position papers produced by the main stakeholder interest groups. It also draws on the findings of a series of focus groups convened by ICER (the Industry Council for Electronic Equipment Recycling), an influential UK organisation in the debate (ICER, 1998). One of the seminars was organised by Euroforum, held in London and attended mainly by representatives of industry, while the second was organised by ANPED (The Northern Alliance for Sustainability), held in Soesterberg, Netherlands and attended mainly by non-governmental organisations.

The proposals have been subject to widespread criticism by industry representatives, but have been welcomed with only a few reservations by environmental and consumer organisations. Past drafts have been significantly amended and the latest proposals appear rather less onerous to industry.

Earlier versions included collection targets and had recovery requirements which covered more product categories and were, in some cases, higher. They also proposed that all halogenated flame retardants should be banned, and that plastics in new products should have a minimum 5% recycled content.

Most industry representatives accept that some kind of regulation on waste electrical and electronic equipment is an inevitable consequence of the need for policy harmonisation in the single market. However, while they support the stated objectives, many do not support the prescribed approach. They object in particular to being expected to take responsibility for waste collection, and to the requirement to phase out dangerous substances (e.g. Orgalime, 1999; FEI, 1999).

Industry representatives have made other criticisms which are discussed below, but at this point it is worth seeking to explain the strength of opposition. The most obvious reason is that the companies affected fear a loss of profitability if their costs increase, prices rise and consumer spending patterns consequently change. A second is that within much of industry there is an instinctive dislike of legislation as opposed to voluntary action. Third, and more directly in relation to waste, many manufacturers disagree with the producer responsibility principle, pointing to their dependence on consumer responses and the influence of retailers. A fourth explanation lies in the fact that many know relatively little about what happens to their products after they are sold, and maintaining a degree of responsibility for them throughout the product life cycle represents a major challenge to their organisational culture. Finally, there is a widely held belief that regulators do not appreciate the economic costs involved in complying with environmental legislation.

Environmental and consumer organisations, while generally supportive of the proposed Directive, want some aspects to be strengthened (European Environmental Bureau, 1999; Bureau Européen des Unions de Consommateurs (BEUC), 1999). They believe that it does not give enough emphasis

to waste prevention and re-use, and argue that the recovery requirements should be progressively strengthened and that additional dangerous substances should be banned.

An analysis of key criticisms

The European Commission's proposals have thus been subjected to a variety of criticisms. The remainder of this section presents a summary of the main concerns which have been expressed (Table 2) and analyses them within the framework of environmental, economic and social sustainability described above. In the final section conclusions are drawn and some recommendations made.

(Table 2)

The proposed measures have the potential to contribute substantially to environmental sustainability, reversing the upward trend in waste creation and improving waste management. The range of possible benefits include reduced landfill, raw material extraction, energy use, and toxic emissions and residues. Although transport impacts from the collection and recovery infrastructure could increase, the energy costs involved would be insignificant compared with the savings to be achieved from recycling (AEA Technology, 1997). Quantifying all of the environmental and health impacts is, however, difficult. Some potential benefits may be readily estimated, such as those resulting from the use of recycled rather than virgin material. Others, such as the reduced risk from dangerous substances, are less easily quantified.

The scale of the environmental benefits will be affected by the disposition behaviour of consumers. Consumers need to be motivated to respond appropriately. For example, they might choose to ignore the information which producers will be required to provide and discard their small appliances with other household waste. Equally, a crucial factor in determining the environmental benefits will

be the extent to which industry responds to the new demands of end-of-life product management by adopting the principles of sustainable product design in new product development. Thus the potential environmental benefits of the legislation are considerable but the outcome will depend on the influence of many external factors.

The second part of the analytical framework relates to the economic implications of the legislation. The correction of market failure in the form of environmental externalities is one of the key requirements of sustainable development. The transfer of financial responsibility from taxpayers (whose contributions to waste problems vary) to consumers (whose purchases ultimately create the waste) represents an important advance in environmental policy. The attempt to use the market to create a design feedback mechanism, though, is not wholly convincing. Ideally the market should reward producers who take a lead in sustainable product design. However the financial arrangements underpinning the system will not necessarily encourage 'direct producer responsibility' (i.e. producers taking responsibility for their own brands rather than sharing costs). Indeed there is a specific measure to prevent discrimination against pooled collection and recovery systems, even though these are less likely to result in brand separation and appropriate companies being rewarded for environmentally-sensitive design.

The extent to which the economic cost of the legislation will prove proportionate to the environmental benefits is hard to judge because the compliance costs faced by industry are strongly contested and the environmental benefits hard to quantify. On the basis of a series of pilot projects the Commission calculated that the cost of collection and recycling should amount to no more than 900m euro for all EU member states, implying price rises of no more than 3% (European Commission, 1999). By contrast, industry representatives have produced a far higher estimate of £2,500m for the UK alone (ENDS, 1998) and warned of prices rising by up to 8% (Mullner, 1999). Both sets of figures excluded the cost of phasing out dangerous substances and redesigning products. More research is needed in order to draw firm conclusions on this specific issue.

In analysing the proposed legislation in relation to the third domain, social sustainability, it is necessary to consider different opinions concerning with whom responsibility for waste rests. It has been argued that producers should take primary responsibility for the management of WEEE on the basis that it is they who largely determine the waste management implications of used products (Mayers and France, 1999). Moreover they will normally be able to pass on the costs to consumers. This neatly enshrines an ethical and practical justification. More controversially, it might be suggested that, as suppliers, the producers' responsibility for collecting waste from consumers is greater than that of municipal authorities, even though it may be practical for this task to be subcontracted to those same authorities. At the same time, it would be unfair if producers who respond to the legislation by setting up appropriate collection, treatment and recovery systems and designing products which cause less waste suffered any commercial disadvantage. There must be equity within stakeholder groups as well as between stakeholders.

Any policy designed to have a substantial effect on the distribution of costs in society is bound to attract controversy. Some producers are concerned that market conditions in their sector will prevent them from being able to pass on increased costs to consumers, who also bear a degree of responsibility. Whatever the extent to which such concern proves valid, the important point in the present context is that many producers perceive the proposals as lacking distributional equity. This problem may not be easily resolved, however, at least until more is known about the infrastructure costs and potential role of municipal authorities

Consumers in general do not appear to be face any major equity concerns. Although people in lower income groups are more vulnerable to increased prices, there is no independent evidence that prices will rise substantially. Indeed the legislation should offer an advantage to poorer consumers who normally cannot afford to purchase products designed for a lower environmental impact, as these should become relatively more affordable.

The final element in the analysis concerns the validity of policy intervention. There appears a general consensus among member states that instituting a policy on WEEE is appropriate. It is also accepted that European Union environmental policy should incorporate waste management within the wider context of an integrated product policy (SPRU / Ernst and Young, 1998). The proposals are more controversial in terms of the appropriate level of government. At a global level, the case made by United States interests that they are trade restrictive will be strongly contested by the Commission. A more reasonable concern is the uncertain role of municipal authorities in future waste collection. The flexibility in the current proposals threatens the aim of harmonised trading conditions within the single market as it allows for the possibility that collection costs will not be internalised in the price of products in all member states.

5. Conclusions, recommendations and prospects

The WEEE Directive could represent a highly significant advance in environmental policy, although current proposals need to be refined and the legislation must be implemented effectively. The foregoing analysis suggests that there are several uncertainties, partly because of the flexibility introduced in order to make the proposed legislation more widely acceptable. Some of these could be readily overcome through further research, while others may be clarified as producers develop their practical responses to the legislation. This need not matter. Policy specialists such as Lindblom criticise attempts to be highly prescriptive at the outset and argue that incrementalist decision making is preferable as it results in a better outcome (Hill, 1997).

The current proposals should be refined in two ways: they need to be strengthened in order to increase the pressure for movement up the waste management hierarchy (i.e. prevention, re-use,

recycling, energy recovery, landfill), and there needs to be improved clarity of intent in order to avoid loopholes. These are considered in turn.

First, additional incentives are needed in the legislation to promote waste prevention, such as a requirement for member states to publish waste prevention plans and to encourage longer lasting household appliances (Cooper, 1996). The proposals focus on re-use and recycling rather than increasing the life span of products, which would prevent waste and is an essential element of sustainable product design. Consumers need information on the design life of products in order to identify those likely to cause less waste, not merely information on collection and recovery (Cooper, 1994). There is in addition a strong case for restoring some of the stricter minimum requirements for recovery which were in earlier drafts. Evidence from Germany has suggested that "if you set industry tough challenges and targets, industry will respond with new inventions and new technology and generally greater efficiency" (Voûte, 1995, p.66). Recovery requirements should differentiate between re-use and recycling, in order to encourage refurbishment whenever appropriate.

Second, there remain several significant elements in the proposed legislation which need clarification. They include the exclusion of any explicit reference to historic waste, the less stringent financial arrangements for certain product categories, unresolved waste collection issues involving producers and municipal authorities, an unclear mechanism to reward producers who make the most effort to reduce the waste impact of their brands, and the different treatment of private households and organisations as 'last holders' of WEEE.

In addition to refining the current draft proposals, complementary measures should be introduced which would support the objectives of the Directive. Some suggestions are summarised below (Table 3).

(Table 3)

The basic objectives of the proposed legislation are accepted by the stakeholders. The implications are, however, potentially more profound than is sometimes acknowledged or recognised. Industry will be expected to manage product life cycle phases hitherto regarded as beyond 'core business'. This could result in manufacturers concluding that as they are responsible not only at the start of the product life cycle but also at the end, there is a logic, in terms of maintaining control, in retaining ownership throughout the cycle: in other words, leasing products rather than selling them. This represents a challenge to the model of personal ownership which lies at the heart of modern consumerism. Another example relates to the inclusion of small appliances within the scope of the legislation. This is justified on the basis that such products contain a relatively high proportion of dangerous substances, but their inclusion also broadens the influence of the legislation such that a far greater number of consumer decisions will be affected by it.

Any legislation needs to be implemented effectively in order to be successful. The commitment of individual member states will be critical. There will need to be incentives to ensure that the minimum recovery requirements established are met throughout the European Union. The type of infrastructure for collection and recovery must be carefully planned, as it will be an important determinant of costs and the impact on waste-related transport. There is also a need to determine whether to provide public funding for systems of disassembly, repair and refurbishment which invest in 'social labour' and local economic development, which would exploit the training and employment potential of the proposals.

The pace of progress of EU legislation is determined by many factors: perceived urgency, its complexity, the level of controversy within and between member states, and the extent of flexibility in the draft proposals. Delays have already occurred in progressing the Directive because of the need to gain maximum support within the European Union. Further delays are possible as United States interest groups argue that the European Union should wait for global solutions (ENDS, 1996;

Electronic Industries Alliance, 1999). Once the proposals are published as a draft Directive they must be accepted by the European Parliament and approved by the Council, a process likely to take two years. Member states are then allowed eighteen months in which to transpose the legislation, which suggests that it is unlikely to be in force before 2003. This suggests that member states will need to be pro-active in developing national policy if they are to meet the initial requirements of the Directive.

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Table 1: Analytical framework

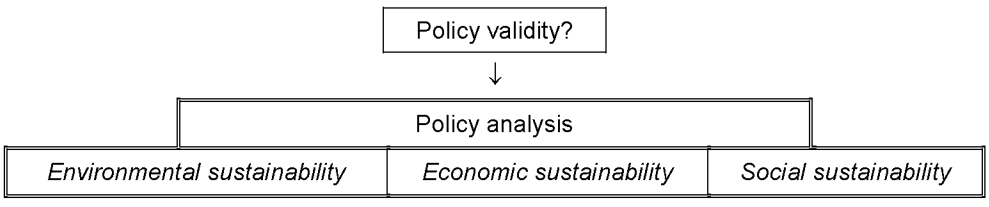

Table 2: Areas of controversy in the proposed WEEE Directive		
ENVIRONMENTAL	I.	SCOPE - Is the scope of products covered by the legislation, which includes small appliances, too broad?
	II.	TARGETS - Do the minimum recovery requirements have a proper basis? Are they too demanding, or do they need to be broadened to include more product categories and progressively increased?
	III.	DANGEROUS SUBSTANCES - Is the scientific evidence for banning substances convincing? Might the substitutes prove equally damaging? Should a wider range of dangerous substances be banned?
	IV.	MATERIAL AND ENERGY FLOWS - Has enough emphasis been put on waste prevention and re-use? Will the feedback effect on new product development created by producer responsibility be significant? How great will be the environmental impact of transport arising from the collection and recovery infrastructure?
ECONOMIC	V.	COMMERCIAL IMPACT - Will manufacturers' costs rise substantially, causing them to become less competitive? Are the overall costs involved proportionate to the environmental benefits?
	VI.	COMPETITION - Will different national practices in implementing the legislation create trade barriers within the European Union? Will companies trading from outside of the EU be unfairly disadvantaged?
SOCIAL	VII.	EQUITY - Is producer responsibility for waste collection justified? Should local authorities continue to play a major role? Do retailers face unrealistic responsibilities?
	VIII.	STAKEHOLDER ACCEPTABILITY - Will all stakeholders respond positively to the legislation once enacted?

Table 3: Selected measures to reinforce the WEEE Directive	
I.	ACCOUNTABILITY - Clear consequences for member states which fail to meet minimum recovery requirements. Independently verified national data on waste volumes and product life spans.
II.	DESIGN - Active support by member states to promote sustainable product design.
III.	RE-USE - Strategies to encourage the re-use of products and components.
IV.	RESEARCH - Further research into dangerous substances and their possible substitutes.
V.	INTEGRATED PRODUCT POLICY - Links to related measures such as eco-labelling and other forms of environmental product information.
VI.	FISCAL INCENTIVES - The introduction of quantity based user fees for all household waste. Ecological tax reform. Measures to promote the use of recyclate.