

dti

WEEE CONSULTATION

Part III: Partial regulatory impact
assessment for the WEEE regulations

JULY 2006

URN 06/1331

dti

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PARTIAL REGULATORY IMPACT ASSESSMENT (RIA) FOR THE DEPARTMENT OF TRADE AND INDUSTRY'S DRAFT STATUTORY INSTRUMENT – THE WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT REGULATIONS 2006 - TRANSPOSING DIRECTIVE 2002/96/EC¹ OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL ON WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE UK

EXECUTIVE SUMMARY

Objective

1. The Department of Trade and Industry's (DTI's) draft Statutory Instrument (SI), The Waste Electrical and Electronic Equipment Regulations 2006 (The WEEE Regulations), aim to transpose the European Waste Electrical and Electronic Equipment Directive (the 'WEEE' Directive) into UK law. The objective of the draft SI is to reduce the environmental impacts of Electrical and Electronic Equipment (EEE) in the UK, and particularly when EEE becomes waste (WEEE).

2. This partial RIA outlines the potential costs, benefits and risks to the UK as a result of the draft SI. Given the nature of the WEEE Directive, and in particular the range and number of products potentially affected, and the range and number of stakeholders potentially affected and the requirement to base estimates on relatively limited data and on a number of assumptions mean that the benefits and costs presented in this partial RIA can only be viewed as being indicative.

Background

3. The WEEE Directive requires member States to promote and facilitate the separate collection of WEEE within their territories, to ensure that separately collected WEEE is treated to a new set of standards, and to achieve re-use, recycling and recovery targets for components and materials from WEEE. It also aims at improving the environmental performance of all economic operators involved in the EEE market, and in particular, 'downstream' operators dealing with WEEE directly.

Rationale for Government Intervention

4. The rationale for Government intervention in relation to EEE and WEEE is market failure in terms of the negative externalities that can arise as a result of existing practices in relation to the production of EEE and the disposal of WEEE. Externalities occur when individuals impose costs on (or provide benefits for) others, but do not have an incentive to take these costs (or benefits) into account. Government intervention can change incentives and behaviour when externalities are present and this can lead to subsequent improvements in social welfare.

¹ And Directive 2003/108/EC amending the WEEE Directive.

Risk Assessment

5. The main risks to the environment, and human health and animal health from WEEE are the potential damage caused by WEEE when it is discarded and disposed of subsequently. The SI will help to alleviate the risks associated with WEEE.

Options

6. The UK has considered a number of options by which to implement the WEEE Directive. One of the main issues is how to get WEEE from those who use and then discard it (i.e. consumers/end-users), to producers, who are obligated to deal with it, and in this context whether each individual producer should physically handle WEEE, or be able to discharge an obligation by financial means. The options and means through which WEEE can be implemented are generally variants on the extent to which individual producers physically handle WEEE, or not.

Costs and Benefits

7. The costs and benefits of the draft SI will depend on the rate of separate collection of WEEE achieved in the UK, something that cannot be known in advance of the SI coming into force, and something that will vary from year to year. In addition, the composition, nature and volume of the WEEE arising will vary from year to year, both in terms of product types and in terms of the physical components and material constituents of these products.

Benefits

8. The WEEE Directive will bring benefits in a number of areas. These will principally be in terms of direct environmental benefits and benefits to human health and animal health, but there should also be benefits in terms of contributions to sustainable development and resource productivity in the UK more generally.

Costs

9. There are essentially three main additional activities the WEEE Directive requires to be undertaken on WEEE that has not been undertaken, or consistently undertaken, in the UK historically. These are separately collecting WEEE from other forms of waste; treating (i.e. de-polluting) WEEE prior to further processing; and re-using, recycling and recovering WEEE materials that it has not been 'economic' to recycle or re-use in the past.

Registration of Producers of EEE

10. The WEEE Directive requires the UK to draw up a register of producers of EEE. The Environment Agency estimates that registration fees for producers will be some £4 million per annum for an estimated 5750 producers, equating to an annual charge of £707 per producer. The Environment Agency also estimates that the approval of compliance schemes will cost some £365,000 for an estimated 30 schemes, equating to a charge per scheme of £12,174. These fees will be charged every three years as scheme approval will be granted for three years.

Equity and Fairness

11. The costs of the draft SI should not impact disproportionately on any particular businesses amongst those affected given that producers will incur the majority of costs in relation to their market presence and the weight, type and number of EEE products they put on the UK market.

Consultation with Small Business: The Small Firms Impact Test

12. The DTI has had significant contact with small firms representatives including the Federation of Small Business, the Forum of Private Business, and the Institute of Directors. They have fed in detailed comments about the possible impact of the WEEE Directive on SME's and have been suggesting ways to ensure that small businesses are not adversely affected.

Competition Assessment

13. A preliminary competition assessment suggests that the draft SI is unlikely to have a significant detrimental impact on competition in the markets affected by the regulation. Though the draft SI is significant, the markets it impacts on are diverse and dynamic and large in relation to the potential costs of the draft SI.

Enforcement and Sanctions

14. The Environment Agency (England and Wales), the Scottish Environment Protection Agency (Scotland), and the Environment and Heritage Service (Northern Ireland) are to enforce producer obligations.

Summary and Conclusions

16. Where valued, the costs of the draft SI principally relate to additional costs for the separate collection of WEEE, its treatment, and its recovery to levels not achieved previously in the UK. The estimates for the cost of treatment are one of the main drivers of total costs, but the estimates at the top of the range should be considered as 'worst case' estimates, because it is highly unlikely that all items of WEEE will require treatment by individual 'hand-stripping'.

17. The costs from the draft SI also need to be seen in the context of the size of the electrical and electronic market. In its Explanatory Memorandum, the European Commission estimated that the types of price changes that may result from the WEEE Directive would be in the region of 1-3 per cent price increases, and that these are "*..likely to diminish as economies of scale and innovation bring down the costs of separately collecting and treating WEEE.*"²

18. Where valued, the benefits of the draft SI principally relate to additional benefits in terms of reductions in the negative externalities from landfilling waste in the UK

² Explanatory Memorandum to WEEE and RoHS Directives, Page 26.

and in terms of climate change benefits, where the treatment and re-use and recovery of WEEE leads to reductions in carbon and CO2 emissions.

19. RIA Guidance suggests that a ten-year time-period is often used as a ‘typical’ period over which to assess the costs and benefits of a regulation. In this context the 2017 date used in Table 14 represents the estimated long-run, recurrent, net costs of the draft SI in the future. This is because by this date it is estimated that virtually all WEEE arising in the UK will be collected separately, treated and recycled.

Table 14: WEEE Implementation under the draft SI: Total WEEE – Household plus Non-Household WEEE (£ million pa)

	2007	2008	2009	2013	2017
Costs					
Household WEEE collection, treatment and recycling	26-38	49-95	53-99	75-176	94-206
Non-household WEEE collection, treatment and recycling	32-52	108-124	112-129	131-155	154-186
Information for users	17-20	17-20	17-20	17-20	17-20
Information for treatment facilities	6-8	6-8	6-8	6-8	6-8
Registration of producers and other information and reporting	5	5	5	5	5
Total Cost	86-123	185-252	193-261	234-364	276-425
Benefits					
<i>Household WEEE</i>					
Reduced resource use and externalities from landfill	4	15	16-17	27-28	32
Reduced CO2	1-5	4-15	4-16	6-25	8-30
<i>Non-household WEEE</i>					
Reduced resource use and externalities from landfill	6	13	14	19	22
Reduced CO2	2-8	5-18	5-19	7-22	9-27
Total Benefit	13-23	37-61	39-66	59-94	71-111
Net Cost	73-100	148-191	154-195	175-270	205-314
Present Value of Net Costs 2007-17	1,448-2,043				
Annualised Equivalent of Present Value of Net Costs 2007-17	161-227				
Present Value of Net Costs in 2017	140-215				

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PURPOSE AND INTENDED EFFECT OF MEASURE

(i) Objective

1. The Department of Trade and Industry's (DTI's) draft Statutory Instrument (SI), The Waste Electrical and Electronic Equipment Regulations 2006 (The WEEE Regulations), aim to transpose the European Waste Electrical and Electronic Equipment Directive (the 'WEEE' Directive) into UK law.⁴ The objective of the draft SI is to reduce the environmental impacts of Electrical and Electronic Equipment (EEE) in the UK, and particularly when EEE becomes waste (WEEE). Given the transboundary nature of these impacts, the draft SI is also intended to contribute to environmental protection at the European and global level more widely.

2. The main benefits of the draft SI will be in terms of:

- Reductions in the negative environmental impacts of EEE and WEEE both in volume terms and in terms of its potential hazardousness;
- Increased protection of human health and animal health from the potential negative impacts of WEEE;
- Positive contributions to sustainable development and resource productivity, more generally, through the re-use, recycling and recovery of WEEE.

3. The main costs of the draft SI will be in terms of:

- The marking of,⁵ and provision of information on EEE;
- Collection and transport costs from increased levels in the separate collection of WEEE;
- The specific treatment of WEEE following separate collection, and increased recycling and recovery of materials from WEEE following treatment.

4. This partial RIA outlines the potential costs, benefits and risks to the UK as a result of the draft SI. Given the nature of the WEEE Directive, and in particular the range and number of products potentially affected, and the range and number of stakeholders potentially affected and the requirement to base estimates on relatively

³ And Directive 2003/108/EC amending the WEEE Directive.

⁴ The Department of Environment, Food and Rural Affairs (DEFRA) is introducing its own Statutory Instrument in relation to the licensing and permitting of facilities to treat WEEE in the UK in the future. See Defra website.

⁵ In terms of putting certain information on EEE, for example, the crossed out wheeled-bin symbol.

limited data and on a number of assumptions mean that the benefits and costs presented in this partial RIA can only be viewed as being indicative.

(ii) Background

5. WEEE is a priority waste stream of the European Community,⁶ because of the estimated growing volume of WEEE, particularly in relation to other forms of municipal solid waste (MSW), and because of the potential hazardousness of WEEE following its disposal. This potential hazardousness can mean that WEEE can have a disproportionate negative impact on the environment, and on human health and animal health, in relation to the volume of waste discarded and disposed.

6. The WEEE Directive requires member States to promote and facilitate the separate collection of WEEE within their territories, to ensure that separately collected WEEE is treated to a new set of standards, and to achieve re-use, recycling and recovery targets⁷ for components and materials from WEEE. It also aims at improving the environmental performance of all economic operators involved in the EEE market, and in particular, 'downstream' operators dealing with WEEE directly.

7. The WEEE Directive applies to EEE falling under 10 categories,⁸ numbered 1 to 10 in Annex 1 of the Directive. These are:

- Category 1 - Large household appliances;
- Category 2 - Small household appliances;
- Category 3 - IT and Telecommunications (ITC) equipment;
- Category 4 - Consumer equipment;
- Category 5 - Lighting equipment;
- Category 6 - Electrical and electronic tools;⁹
- Category 7 - Toys, leisure and sports equipment;
- Category 8 - Medical devices;¹⁰
- Category 9 - Monitoring and control equipment;
- Category 10 - Automatic dispensers.

8. The WEEE Directive is an environmental Directive based on the principle of extended producer responsibility (EPR).¹¹ EPR seeks to expand the polluter pays

⁶ The Community programme of policy and action in relation to the environment and sustainable development ("Fifth Action Programme") contains an entire chapter dedicated to waste management issues, in which WEEE is mentioned as a 'target' area.

⁷ There is not a specific target for the re-use of whole appliances, though this is encouraged, where appropriate, by the Directive.

⁸ There is a specific exemption for EEE used solely for the military purposes and/or the protection of the national interest of member States'. EEE contained within equipment outside of the scope of the WEEE Directive is also exempt (e.g. car radios).

⁹ Excluding large-scale stationary industrial tools.

¹⁰ Excluding implanted and infected products.

¹¹ Extended Producer Responsibility (EPR) is defined by the OECD as "*...an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of*

principle (PPP), under the premise that as producers design and manufacture products they are best placed to facilitate effective re-use, recycling, recovery and disposal at 'end of life'.¹² Thus, and in general terms, the WEEE Directive makes producers of EEE¹³ responsible for financing the collection, treatment, and re-use, recycling, recovery and environmentally sound disposal of separately collected WEEE.

9. Given the fact that EEE for household use is not always sold directly to consumers by manufacturers, the WEEE Directive also places obligations on businesses selling EEE on a professional basis to consumers.

10. In general terms, the WEEE Directive requires distributors of EEE (often largely seen as retailers of EEE) to provide the infrastructure through which household users of EEE can return their equipment easily, and free of charge when they wish to discard it (so called 'free takeback').

11. The WEEE Directive also applies to so-called 'non-household' EEE and WEEE. 'Non-household' EEE and WEEE. This encompasses the business use of EEE and disposal of WEEE, but covers the use of EEE and disposal of WEEE from all non-household sources.

12. The WEEE Directive generally makes producers responsible for the collection of non-household WEEE. The responsibility for financing the treatment and recovery of non-household WEEE is either the responsibility of producers, or the responsibility of non-household users, depending on when the EEE was first put on the market and under what circumstances it is being disposed.

(iii) Rationale for Government Intervention

13. The rationale for Government intervention in relation to EEE and WEEE is market failure in terms of the negative externalities that can arise as a result of existing practices in relation to the production of EEE and the disposal of WEEE. Externalities occur when individuals impose costs on (or provide benefits for) others, but do not have an incentive to take these costs (or benefits) into account. Government intervention can change incentives and behaviour when externalities are present and this can lead to subsequent improvements in social welfare.

14. Current practices in relation to EEE and WEEE can produce unintended side-effects in terms of waste and pollution. When WEEE is disposed, this waste can have negative impacts on soil, air, and water quality which can lead to environmental degradation, and which can also have negative impacts on human health and animal health. The European Commission says "*..as more than 90 per cent of WEEE is*

a product's life cycle." See *Extended Producer Responsibility: A Guidance Manual for Governments*, OECD (2001).

¹² See, for example, Commission of the European Communities, *Proposal for a Directive of the European Parliament and of the Council on Waste Electrical and Electronic Equipment* (COM (2000) 347 final), and Commission of the European Communities, *Proposal for a Council Directive on End of Life Vehicles – Explanatory Memorandum* (COM (97) 358 final),

¹³ Producers are defined by the Directive in terms of those who manufacture and sell EEE under their own brand, resell EEE under their own brand, and import EEE on a professional basis.

*landfilled, incinerated or recovered without any pre-treatment, a large proportion of various pollutants found in the municipal waste stream comes from WEEE.”*¹⁴ The requirements in the WEEE Regulations for the treatment of WEEE prior to recycling and disposal should contribute to alleviating this problem. Subsequent improvements in the environment, in human health, and in animal health should lead to improvements in social welfare in the UK, and given the transboundary nature of pollution, contributes to improvements across Europe and overseas more widely.

15. In addition, and in terms of sustainable consumption and production, Government intervention in the area of EEE and WEEE could lead to an improvement in the levels of information available to UK stakeholders and help correct any myopic (or short-term) behaviour on the part of producers and consumers. This could lead to benefits in terms of a more sustainable use of resources and energy for this generation and for future generations.

CONSULTATION

i) within Government

16. The WEEE Directive, and its transposition into UK law, has been the subject of wide discussion within Government. The DTI has chaired an interdepartmental advisory group on implementation involving the Devolved Administrations and all relevant Departments and Agencies. The DTI has also established a WEEE Advisory Group (WAG) involving a range of stakeholders.

ii) Public Consultation

17. The WEEE Directive, and its transposition into UK law, has been the subject of three previous public consultations. The first was in August 2001, the second in March 2003, and the third in July 2004. These consultations elicited over 800 responses in total from stakeholders.

18. In addition there has been a separate consultation on environment agencies fees (May 2005) relating to the registration of obligated parties in the UK. This received 50 responses. The environment agencies have also consulted on draft guidance in relation to the future treatment of WEEE in the UK. This received over 30 responses.

(iii) Risk Assessment

19. The main risks to the environment, and human health and animal health from WEEE are the potential damage caused by WEEE when it is discarded and disposed of subsequently. The SI will help to alleviate the risks associated with WEEE.

20. A significant tonnage of WEEE is understood to be separately collected and re-used or recycled in the UK currently. In terms of WEEE arising from households this is largely in terms of large household appliances (such as fridges and washing

¹⁴ Explanatory Memorandum to the WEEE and RoHS Directives, European Commission (see Footnote 13).

machines), some consumer and IT equipment, and mobile phones, which are re-usable, or economic to recycle (as they have a significant metallic content). In terms of WEEE from non-household sources, or from professional use, this is generally considered to be in terms of large appliances, Information Technology and Communications (ITC) equipment,¹⁵ and automatic vending machines.

21. However, even in cases where WEEE is recycled currently, treatment prior to recycling does not take place generally. This means that the residues following recycling could be hazardous when disposed of. The exception to this is refrigeration equipment containing Ozone Depleting Substances (ODS), as ODS are required to be removed under the separate UK ODS Regulations prior to recovery or disposal. Also, from 16 July 2005, WEEE which is separately collected, and which contains cathode ray tubes (CRTs) and mercury in gas discharge lamps needs to be pre-treated prior to disposal under the Waste Acceptance Criteria (WAC) of the Landfill Directive.¹⁶

22. There is also the issue of the vast number of EEE items estimated to be discarded in the UK but not separately collected currently. As these will be co-disposed of with other forms of waste they will neither be pre-treated prior to disposal nor recycled or recovered to any significant extent, if at all. Some of this WEEE could also be hazardous when it is disposed.

23. The Commission's Explanatory Memorandum (EM) to the WEEE Directive¹⁷ estimated that in 1998, 6 million tonnes of WEEE was generated by the member States of the European Union. The EM also said that the volume of WEEE is expected to increase by 3-5 per cent per annum in the future across member States.

24. The EM explains that EEE contains a range of materials and substances of which *"..the most environmentally problematic..are heavy metals, such as mercury, lead, cadmium and chromium, halogenated substances, such as chlorofluorocarbons (CFCs), polychlorinated biphenyls (PCBs), polyvinyl chloride (PVC) and brominated flame retardants as well as asbestos and arsenic."* It also says that *"..as more than 90 per cent of WEEE is landfilled, incinerated or recovered without any pre-treatment, a large proportion of various pollutants found in the municipal waste stream comes from WEEE."* (EM, page 4) and subsequently *"..the environmental risks associated with the waste stream are not properly dealt with by current waste management practice."* (EM, page 7).

25. Implementation of the WEEE Directive in the UK should reduce the risks of harm to the environment, and human health and animal health from WEEE. Such hazards are influenced by waste volumes arising, emission rates (from this waste), population exposures (to these emissions), and response effects (to the exposures). Though the pathways through which WEEE can produce harm are complex, and make precise risk assessment difficult, the risks of harm from WEEE do exist.

¹⁵ Generally in larger volumes.

¹⁶ This also applies to ODS containing refrigeration equipment.

¹⁷ *Proposal for a Directive of the European Parliament and of the Council on waste electrical and electronic equipment*, Commission of the European Communities COM (2000) 347 final.

26. The Commission's EM to the WEEE Directive and a report for the Commission, *Heavy Metals in Waste*¹⁸, in 2002, outline the risks from a range of materials and substances, some of which have been, or are used in the production of EEE. These include:

- Lead. For the adult population the major exposure pathway is via food and water. For children, lead in dust and soil is also a major exposure pathway. Lead can result in a wide range of biological effects depending upon the level and duration of exposure, but the main concern is often considered in terms of the negative impact on the central nervous system. In terms of animal health, lead does not bio-accumulate in most organisms, but may accumulate in bones and can result in deformities.
- Mercury. Mercury is a volatile element, which may be transported over long distances by air. In terms of human exposure the main exposure pathways are via the inhalation of vapours and via ingestion in food. Mercury is toxic and possibly carcinogenic. In terms of animal health, mercury can have adverse impacts on the central nervous system and kidneys of birds and mammals, and negative impacts on the reproductive systems of fish.
- Cadmium. Cadmium tends to bio-accumulate. The major route through which humans are exposed is via food (through agricultural crops where cadmium is in soil). The main risk to human health is kidney damage. In terms of animal health, cadmium can produce a wide variety of negative effects on birds and mammals, similar to those seen in humans.
- Chromium. Hexavalent chromium (Cr(VI)) can have a wide range of adverse effects on humans ranging from irritation to cancer. In terms of animal health, Cr(VI) is toxic to micro-organisms and can accumulate in aquatic species.

27. The pre-treatment of WEEE prior to recycling or disposal, as a consequence of the draft SI, will reduce the risks of damage to the environment and human health and animal health from any hazardous substances in WEEE, such as those outlined above.

28. In addition, increased reuse, recycling and recovery of WEEE should contribute to tackling concerns surrounding resource productivity, and risks to sustainable development, in the UK and in this context is consistent with the UK Government's sustainable consumption and production agenda.¹⁹

OPTIONS

29. The WEEE Directive requires most of the obligations on producers and distributors of EEE to begin from 13 August 2005. The UK, like a number of other member States, has found the complex and wide-ranging nature of the WEEE Directive challenging. In December 2005 the DTI announced that the UK would

¹⁸ *Heavy Metals in Waste*, Final Report – European Commission DG Environment.E3, February 2002.

¹⁹ See, for example, *Taking it on – developing UK sustainable development strategy together*, at www.sustainable-development.gov.uk

delay implementation of the obligations on producers and distributors of EEE under the Directive. The aim of this announcement was to ensure that the UK established a robust and workable system for WEEE, which could achieve the environmental benefits of the Directive in a cost-effective manner, over both the short term and into the medium term.

30. The UK has considered a number of options by which to implement the WEEE Directive. One of the main issues is how to get WEEE from those who use and then discard it (i.e. consumers/end-users), to producers, who are obligated to deal with it, and in this context whether each individual producer should physically handle WEEE, or be able to discharge an obligation by financial means. The options and means through which WEEE can be implemented are generally variants on the extent to which individual producers physically handle WEEE, or not. The WEEE Directive allows certain flexibility for member States to achieve the requirements of the Directive.

31. In discussing options to implement the WEEE Directive in the UK it should be remembered that the most significant costs are likely to be in relation to the treatment and recycling of WEEE. These processes will largely be independent of how the separate collection of WEEE takes place on the ground. The following paragraphs discuss the main options that have been considered in WEEE implementation in the UK. These options are not necessarily mutually exclusive, and can be combined in various ways to provide ‘a package for implementation’.

Option (a) Mandatory In-store takeback of Household WEEE by each individual retailer: Regulation 29 and Regulation 30. The UK is not proposing to implement mandatory in-store takeback of WEEE by retailers of electrical equipment. Under the draft SI each distributor (e.g. retailer) of household EEE in the UK is not required to provide for the in-store takeback of WEEE from households. Rather, each retailer of household EEE is required to provide an alternative infrastructure for the takeback of WEEE *or* to provide in-store takeback. Such a system should provide a cost-effective means of achieving the separate collection target for household WEEE required by the Directive, given estimates of the potential costs of in-store takeback provided by the British Retail Consortium (BRC).²⁰ Imposing mandatory in-store takeback would likely add significantly to the costs of implementing the WEEE Directive in the UK. Given that it is not always obvious that consumers will shop to purchase new equipment whilst carrying old equipment to dispose of at the same time, it is not clear that any more WEEE would be separately collected under mandatory in-store takeback than by alternative means.

Option (b) Physical collection of Household WEEE by each individual producer. At one point, the leading option for implementation of the WEEE Directive in the UK for a number of producers, was the establishment of a national clearing house (NCH). This NCH would allocate the responsibility for physical collection of WEEE at the time that WEEE arose, and on a producer-by-producer basis. It was uncertain how much it would cost to establish and operate a NCH in the UK, though set-up costs would likely have been in the millions of pounds. In Germany, a NCH has been

²⁰ These cost estimates have ranged at various times from between £200 million to £500 million per annum.

established to allocate WEEE as it arises for collection to all producers. Anecdotal evidence suggests that the logistical and practical challenges involved in such a system are formidable. Under the current draft SI each individual producer of EEE in the UK is not required to physically collect household WEEE arising in the UK. Rather, a smaller number of producer compliance schemes will physically collect WEEE. Producer compliance schemes will be able to contract with collection facilities to physically access WEEE. Such a system should provide a relatively cost-effective means of achieving the treatment requirements and recovery targets of the Directive, given the potential economies of scale available in collecting, treating and recycling and recovering WEEE in larger volumes.

Option (c) Physical allocation system established by Government

In November 2005 the DTI had proposed to allocate to a small number of producers and producer compliance schemes the responsibility for collecting WEEE across collection facilities in the UK. Following this, the DTI was to establish a bulletin/notice board system similar to that used in the Landfill Allowance Trading Scheme (LATS) to enable producers to trade evidence of physically collected WEEE so all producers could meet their financial obligations in relation to WEEE. The process of allocating WEEE was expected to cost in the region of £50,000 (as a one-off cost), whilst the establishment of a LATS type system was expected to cost in the region of £250,000 (as a one-off cost). The current draft SI has no role for Government in allocating WEEE, and gives the Secretary of State for the DTI the power to appoint a person to run an 'exchange' to trade evidence.

Option (d) Producer obligation by total weight of household WEEE or by type of household WEEE arising: Regulation 18

The WEEE Directive allows member states to determine the financial obligations of producers with respect to WEEE arising as a whole, in tonnage terms. The draft SI, however, looks to relate financial obligations on producers in respect of WEEE to the type of equipment they produce. Whilst this should have little impact on the overall costs of treating and recycling WEEE it should provide a more equitable and fairer distribution of costs between producers, given that producers will only be responsible for WEEE which is of a similar type to EEE they produce.

Option (e) Introducing individual producer responsibility for new EEE put on the UK market

The Government supports the concept of extended producer responsibility which lies behind the WEEE Directive. The Government also recognises that individual producer responsibility (IPR) is the 'purest form' of producer responsibility, because it means that producers have a direct incentive to design their products for recycling.²¹ However, it is recognised by many producers and Government that the challenges of introducing IPR for EEE in the UK currently are formidable. The technology and accompanying infrastructure to sort WEEE arising by brand and to ensure only the brand owner collects it, is not developed sufficiently at present to enable cost-effective implementation of IPR for EEE. The Government is to use its WEEE Advisory Group (WAG) to inform it of how best it can move the UK to IPR for WEEE over the medium-term.

²¹ The Government has implemented the End-of-Life Vehicles (ELV) Directive in the UK via IPR, i.e. vehicle manufacturers being responsible for their own brand of vehicles when they reach the end of their life.

Option (f) Making producer compliance scheme membership compulsory for each producer: Regulation 9.

The draft SI proposes that each producer must join a producer compliance scheme to discharge his WEEE obligations. In November 2005, the DTI had proposed that compliance scheme membership should be optional, as it is under the UK's Packaging Waste Regulations. The environment agencies believe that registration of producers will be more effective if producers are required to join a scheme, because there would be a lower total number of separate applications requiring processing.

Option (g) Requiring exceptional arrangements for Non-Household WEEE: Regulation 19. The draft SI enables producers of non-household EEE in the UK to incorporate the obligations of the WEEE Directive into their current business practices, in the spirit of the WEEE Directive itself. Such a system should enable the requirements of the WEEE Directive with respect to non-household WEEE to be met with as little disruption to current business practices as possible.

Option (h) Extending the scope of the WEEE Directive in the UK: Regulations 5,6, and 7. The legal basis for the WEEE Directive enables the UK to extend the scope of the WEEE Directive to a greater range of products and equipment than outlined in the Directive itself. The draft SI does not extend the scope of the WEEE Directive in this way. This should help to maintain a level-playing field for UK businesses operating in the European Single Market.

Option (i) Introducing a mandatory 'visible fee' for WEEE: Regulation 36. A 'visible fee' for WEEE can be considered in terms of an explicit charge placed on new equipment to finance any costs from treating and recycling old equipment. The draft SI does not propose to introduce a mandatory visible fee on household EEE to finance arisings of household WEEE. The WEEE Directive itself refers to producers showing fees on a voluntary basis (Recital 20). Mandatory visible fee schemes can add costs to regulations, including: 'menu' costs, e.g. in terms of additional price labelling in catalogues, brochures and websites etc; enforcement and monitoring costs, for example, in terms of ensuring any fees are applied appropriately; administrative costs, for example, in terms of collecting and distributing any revenues from fees; and costs from incorrect fee levels- schemes that run visible fees whether they be in WEEE, or in end-of-life vehicles (ELVs) can accrue not insignificant surplus funds. Other member States who implement 'visible fees' usually have a central body to collect and administer the funds. Auto Recycling Nederland (ARN) do this for end-of-life vehicles in the Netherlands. The latest ARN Annual Report (2005) records annual 'general costs' at around 12 per cent of 'total costs'.

COSTS AND BENEFITS

32. The costs and benefits from the draft SI transposing the WEEE Directive are estimated in this partial RIA against 'business as usual', i.e. of the Directive not being transposed into UK law and current waste management practices in relation to WEEE in the UK continuing in the future.

33. As has been noted, there is a certain level of separate collection, treatment and recycling of WEEE taking place in the UK currently. However, this usually takes

place for specific equipment where there is value to be gained from either re-using components or whole appliances,²² or recycling metals from WEEE, or where there is a specific separate legal requirement to treat WEEE. However, where WEEE is treated and recycled in the UK currently, this is unlikely to be done to the full requirements of the WEEE Directive.

34. The costs and benefits of the draft SI will depend on the rate of separate collection of WEEE achieved in the UK, something that cannot be known in advance of the SI coming into force, and something that will vary from year to year. In addition, the composition, nature and volume of the WEEE arising will vary from year to year, both in terms of product types and in terms of the physical components and material constituents of these products.

35. On top of this, the costs of treatment and recovery are likely to vary over time as technology to treat WEEE develops, and as the costs of recycling, recovery and disposal change. To complicate this further, net costs will be influenced by the value of the metals and precious metals extracted from separately collected WEEE, and these will vary over time. There is a long-established and very active global market in secondary metals.

36. Further, there are a range of costs from the WEEE Directive falling on businesses in relation to the marking of EEE, the provision of information on EEE and WEEE, and the requirement to register as a producer of EEE. These costs will be influenced by the number of producers,²³ and the number and types of EEE they put on the UK market. These numbers cannot be known with certainty in advance of the SI coming into force.

37. In addition, the WEEE Directive, and so the DTI draft SI, applies to non-household WEEE as well as household WEEE in the UK. Whilst there is relatively little solid data on household WEEE in the UK, there is even less on non-household WEEE arising in the UK.

38. Thus, the estimates in this partial RIA can only be seen as being indicative.

39. The assumptions used in the partial RIA are as follows:

- Based on estimates from the Industry Council for Electronic Recycling (ICER) it is assumed that total household WEEE arisings in the UK will be in the region of 1.1 million tonnes in 2007.

²² There is an existing market for old EEE, particularly ITC equipment which is either re-used or recycled for the metals and precious metals. Also, the Voluntary and Community Sector (VCS) are actively involved in the re-use of whole appliances, principally in the area of large household appliances, where the refurbishment and re-sale of such appliances achieves a number of social and employment objectives.

²³ Which includes importers under the WEEE Directive.

- Based on ICER estimates we assume a certain percentage²⁴ of household WEEE arisings amongst the 10 categories of EEE in the WEEE Directive (see Paragraph 7).
- In 1998, ICER estimated non-household WEEE arising in the UK based on estimates of domestic retail sales and commercial sales of EEE. These ratios varied significantly across different categories of EEE, and related to units rather than weight.²⁵ There is also the problem of non-household WEEE ‘migrating’ to the household sector,²⁶ and non-household WEEE being sold as second-hand goods outside of the UK.²⁷ It is thus difficult to make an estimate of non-household WEEE arisings, but this partial RIA bases estimates on the 1998 ICER Report.
- Based on estimates outlined in the European Commission’s EM to the WEEE Directive the volume of WEEE arising in the UK is estimated to increase by 4 per cent per annum.
- Two separate collection scenarios for household WEEE are assumed. In these scenarios it is assumed that *all* large household appliances (Category 1 of the WEEE Directive) and *all* CRT monitors and fluorescent tubes, and mobile phones arising as waste are separately collected currently in the UK. We assume this because the evidence we have is that consumers generally do not dispose of large household appliances with other forms of waste. Also, the Waste Acceptance Criteria (WAC) of the Landfill Directive requires CRTs and fluorescent tubes to be pre-treated prior to disposal and this equipment is now classified as hazardous under the UK’s Hazardous Waste Regulations. For non-household WEEE it is assumed that large white goods (Category 1),²⁸ automatic vending machines (Category 10) and grey and brown goods (Category 3 and 4 equipment) are currently separately collected. Discussions with industry suggest that all automatic vending machines in the UK are separately collected at present when they arise as waste, and a significant proportion of ITC equipment is separately collected when these arise in sufficient volumes. Following implementation of the WEEE Directive in the UK it is assumed that all non-household WEEE is separately collected.
- Estimates from voluntary and charity organisations and industry suggest that for different items some 1-15 per cent of household WEEE may currently be re-used as whole appliances. We use the middle of this range to represent an average rate of re-

²⁴ The latest ICER Report provides estimates of household WEEE arisings across the 10 EEE categories of the WEEE Directive, with, for example, Category 1 EEE providing the largest amount in terms of weight. See www.icer.org.uk for more details.

²⁵ Estimates ranged from certain categories of EEE being solely supplied to households and certain categories of EEE being solely supplied to non-households.

²⁶ For example, by the donation, or sale, of equipment by businesses to their employees.

²⁷ It is believed that a proportion of EEE discarded by businesses is re-used in one form or another, whether this is by other businesses, charities or employees. Also, it is believed that a significant volume of business EEE is exported legitimately for re-use overseas and so will not arise as WEEE in the UK.

²⁸ As for household arisings of large appliances it is unlikely, given the size of the equipment, that non-households will dispose of this waste with other forms of waste.

use at present. Survey and anecdotal evidence suggests that the re-use of business WEEE as whole appliances may be around 14 per cent on average at present.²⁹ Following implementation of the WEEE Directive in the UK we assume that re-use of whole appliances of household WEEE rises to 15 per cent on average, and that the average re-use of non-household appliance rises to 20 per cent.

- Estimates for the costs of treating and recovering certain EEE, where available, are assumed to remain constant in real terms. However, the sections below on treatment and recovery, discuss how the costs of treatment and recovery may fall in real terms over the medium-term, due to such factors as technological developments, and ‘learning-by-doing’.

40. An outline of a framework to estimate costs and benefits of household WEEE used in this partial RIA is summarised in Table 1 below. Some costs and benefits will be transfers between UK stakeholders, as a consequence of the obligations on parties following the introduction of the SI. Some costs and benefits will be additional resource costs and benefits to stakeholders and so to the UK. An Annex to this partial RIA discusses these issues further. An outline of a framework for estimating the costs and benefits of non-household WEEE is outlined in Table 2. Costs and benefits from non-household WEEE will be similar in nature to household WEEE, but impacts may well be different amongst stakeholders, for example, refrigeration equipment covered by the ODS Regulations will already be dealt with by UK businesses.³⁰ Not all of the benefits of the WEEE Directive can be valued in monetary terms at this stage. Where monetary valuation is not undertaken this partial RIA indicates qualitative impacts.

Benefits

41. The WEEE Directive will bring benefits in a number of areas. These will principally be in terms of direct environmental benefits and benefits to human health and animal health, but there should also be benefits in terms of contributions to sustainable development and resource productivity in the UK more generally. In addition, there may be ‘knock-on’ benefits in terms of raising awareness of other forms of waste amongst consumers and other stakeholders in the UK, and in raising awareness of environmental issues more widely amongst a range of UK stakeholders.

i) Reductions in Resource use to dispose of WEEE and Reductions in negative externalities from disposal of WEEE in the UK

42. The separate collection, treatment and re-use, recycling and recovery of WEEE required by the draft SI will reduce the costs of disposing of WEEE arising compared to the base case of no SI. The value of these cost savings will depend on the volume and type of WEEE that is separately collected following the introduction of the SI and

²⁹ The Commercial and Industrial Waste Survey of the Environment Agency suggests that some 14 per cent of discarded equipment was re-used in 2002/03.

³⁰ In addition, Local Authorities may well be involved significantly less in the collection of non-household WEEE than household WEEE.

the disposal route that would have been followed in the absence of the SI, and its associated cost.

43. The WEEE Directive requires the UK to achieve a minimum of 4 kilogrammes per head per annum of separately collected household WEEE. It also requires materials and substances from this separately collected WEEE to be re-used, recycled or recovered over and above levels of recycling of WEEE that have occurred in the UK in the past.

44. The WEEE Directive implies 100 per cent separate collection of non-household WEEE. The 'Costs' section below outlines two scenarios for how much WEEE may be separately collected and recycled subsequently in the UK following introduction of the SI. These scenarios mean that a certain tonnage of WEEE will not be disposed of in the UK in the future.

45. The vast majority of WEEE that is disposed of in the UK currently is likely to be landfilled, rather than incinerated. Landfill costs (in terms of gate fees) vary across the UK, but *Materials Recycling Weekly* (MRW) are quoting an average cost of gate fee in the region of £25 per tonne, and it is this figure we use in this partial RIA. The Landfill Tax rose to £21 per tonne in April 2006, and is expected to rise to a medium-term target of £35 per tonne.

46. The resource cost to the UK of landfilling is the gate fee plus the element of the Landfill Tax that explicitly accounts for the negative externalities from landfill. In this partial RIA the benefit in terms of reducing negative externalities from landfilling WEEE is taken as the value of the Landfill Tax.

47. One industry estimate is that the costs of collecting municipal solid waste (MSW) from civic amenity (CA) sites is in the region of £10 per tonne, and the costs of collecting fridges and freezers is in the region of £30 per tonne. For non-household WEEE it is assumed that the majority of this waste, in terms of tonnages, is separately collected currently.

ii) Benefits from reductions in hazardous waste disposal

48. As outlined in the section 'Risk Assessment', EEE currently contains a level of potentially hazardous materials and substances. This means that the negative externality that WEEE can have on the UK environment may be greater than that from disposing of 'general' MSW, and in this context, the announced increases in the Landfill Tax may more accurately reflect the externalities from landfilling WEEE specifically.

Table 1: An Outline Framework to Estimate Costs and Benefits for Household WEEE

	Benefits	Costs
Producers of EEE	<p>Value of Metals from Categories 2-9 EEE when discarded and separately collected.</p> <p>Value of Metals from Category 1 EEE when discarded and separately collected.</p>	<p>Costs of collection, treatment and recovery of Category 1-9 EEE when discarded and separately collected.</p> <p>Costs of disposal of Category 1-9 EEE residual waste after recovery.</p> <p>Costs of marking EEE, and costs of provision of information on EEE and WEEE.</p>
Distributors of EEE	<p>Avoidance of ODS costs for Category 1 EEE, and avoidance of CRT costs for Category 3 and 4 EEE when collected on delivery.</p> <p>Avoidance of disposal costs of non-metals in separately collected Category 1, 3 and 4 EEE</p>	<p>Costs of take-back network or in-store takeback for WEEE.</p> <p>Loss of value of metals from Categories 1, 3 and 4 EEE when collected on delivery.</p> <p>Costs of provision of information on WEEE.</p>
Local Authorities	<p>Avoidance of collection and disposal costs of Category 1 EEE when discarded.</p> <p>Avoidance of ODS costs for Category 1 EEE, avoidance of CRT costs for Category 3 and 4 EEE, and avoidance of treatment costs for Category 5 EEE.</p> <p>Avoidance of collection and disposal costs of Category 2-9 EEE when discarded.</p>	<p>Loss of value of metals from Category 1 EEE when discarded.</p> <p>Loss of value of metals from CRTs and fluorescent tubes when discarded.</p>
External Environmental Impacts	<p>Reductions in resource use and externalities from disposal of EEE.</p> <p>Reductions in energy use and reduction in carbon emissions from re-use and recycling of secondary materials over primary production.</p> <p>Contributions to sustainable development and resource productivity.</p>	<p>Increased transport emissions from increased separate collection of WEEE.</p>

49. The WEEE Directive (via Article 6 and Annex II of the Directive) requires separately collected WEEE to be treated prior to further processing. Historically in the UK, WEEE has not generally been treated prior to dismantling, shredding and recycling, except where there has been an explicit regulatory requirement to do so, or where it has followed as a consequence of recycling WEEE for economic reasons.

50. The potential for hazardous substances to leach from landfill and contaminate soil and groundwater with consequent negative impacts on the environment and human

health and animal health is the main cause of the European Commission's concerns about the historic means of disposal of WEEE outlined in its Explanatory Memorandum to the WEEE Directive.

51. The DTI commissioned PriceWaterhouseCoopers (PWC)³¹ to update a 1999 report produced by Ecobalance UK.³² The potential benefits from the WEEE Directive from the reductions in hazards to the environment were considered in this report in terms of the following:

- the greenhouse effect;
- depletion of the ozone layer;
- air acidification;
- water eutrophication;
- CVCH – Air and Water
- depletion of non-renewable resources;

52. The PWC report says that “.. as in the initial study, the majority of the potential environmental impacts resulting from the introduction of the WEEE Directive are lower than under the current UK scenario.” Table 3 reproduces the results for the total volume of household WEEE considered in the PWC report

iii) Reductions in Energy use and Carbon and CO2 emissions

53. The reuse, recycling and recovery targets of the WEEE Directive mean that additional materials, over and above historic levels, will be reused, recycled or recovered as a consequence of the SI.

54. As the re-use, recycling and recovery of materials from WEEE will mean that the need for the production of new materials will be reduced, there will be a positive impact in terms of contributions to reductions of energy use and other resources, and reductions in emissions of carbon and CO2 from the commercial and industrial sector in the UK and from similar sectors overseas. The use of materials from WEEE for energy recovery should also contribute to reductions in CO2 emissions where these materials substitute for fossil fuels in energy production.³³

55. Reductions in CO2 will lead to a reduction in the damage cost of climate change. Current recommendations on applying monetary values to climate change impacts are derived from a Government Economic Service (GES) Working Paper recommended a range of £35 to £140 per tonne of carbon as an illustrative damage cost of carbon emissions in 2000, with a £1 per tonne real increase in this cost for subsequent

³¹ Ecobalance UK has been acquired by PriceWaterhouseCoopers. ‘*Environmental Life Cycle Assessment and Financial Life Cycle Analysis of the WEEE Directive and its implications for the UK*’ – Update of the WEEE Directive Study, PriceWaterhouseCoopers, 2002.

³² *Life cycle assessment and life cycle financial analysis of the proposal for a directive on waste from electrical and electronic equipment* – Ecobalance UK (1999)

³³ See, for example, *The Environmental Benefits of Recycling*, Waste and Resources Action Programme (WRAP), May 2006.

years.³⁴ This range for damage includes negative effects on agriculture and ecosystems, increased mortality from drought or flooding, wetland and dryland loss, and negative impacts from natural hazards.

Table 2: An Outline Framework to Estimate Costs and Benefits for Non-Household WEEE

	Benefits	Costs
Producers of EEE	<p>Value of Metals from Categories 2-9 EEE when discarded and separately collected.</p> <p>Value of Metals from Category 1 EEE when discarded and separately collected.</p>	<p>Costs of collection, treatment and recovery of Category 1-9 EEE when discarded and separately collected.</p> <p>Costs of disposal of Category 1-9 EEE residual waste after recovery.</p> <p>Costs of treatment and recycling of Category 10 EEE when discarded and separately collected.</p> <p>Costs of marking EEE. Costs of provision of information on EEE.</p>
Non-Household End users of EEE	<p>Avoidance of ODS costs for Category 1 EEE, and avoidance of CRT costs for Category 3 and 4 EEE, when 'historic' equipment is replaced on like for like basis, and for all new equipment.</p> <p>Avoidance of disposal costs of non-metals in separately collected Category 1, 3, 4 and 5 EEE when 'historic' equipment is replaced on like for like basis, and for all new equipment.</p>	<p>Loss of value of metals from Category 1 EEE when discarded under producer responsibility.</p> <p>Loss of value of metals from Categories 1, 3 and 4 EEE when discarded under producer responsibility.</p>
External Environmental Impacts	<p>Reductions in resource use and externalities from disposal of EEE.</p> <p>Reductions in energy use and reduction in carbon emissions from extraction and production of primary metals and materials.</p> <p>Contributions to sustainable development and resource productivity.</p>	

56. Table 3 quantifies CO2 emissions and the equivalent impact of other gases such as CFCs and methane in terms of CO2 from implementing the WEEE Directive in the UK. Table 3 suggests a significant reduction in greenhouse gas emissions from the WEEE Regulations compared to the current UK situation.

³⁴ *Estimating the Social Cost of Carbon Emissions*, Government Economic Service Working Paper 140, www.hm-treasury.gov.uk.

Table 3: Total Household WEEE Environmental Impact compared to current UK situation³⁵

Outputs/impacts	Unit	Current UK	WEEE directive	Current UK	WEEE Directive
Waste (hazardous)	kg	3.96E+07	4.52E+07	100%	114%
Waste (total)	kg	2.40E+08	1.53E+08	100%	64%
E Total Primary Energy	MJ	4.83E+09	2.85E+09	100%	59%
CML-Air Acidification	G eq. H+	8.73E+07	4.46E+07	100%	51%
CML-Eutrophication (water)	G eq. PO4	2.46E+06	3.37E+06	100%	137%
CVCH-Air	m3	1.26E+14	6.01E+13	100%	48%
CVCH-Water	litre	1.30E+10	1.37E+10	100%	106%
EB(R*Y)-Depletion of non renewable resources	yr-1	2.83E+08	3.52E+06	100%	1%
IPCC-Greenhouse effect (direct, 20 years)	kg eq. CO2	4.39E+09	3.80E+08	100%	9%
WMO-Depletion of the ozone layer (high)	G eq. CFC-11	6.45E+08	2.33E+07	100%	4%

57. However, since the PWC study was undertaken there has been a change in UK baseline emissions from WEEE because all refrigeration equipment is now separately collected and pre-treated prior to further processing under the UK's ODS Regulations. This means that the CFC coolant is now captured and is not emitted into the atmosphere.

58. In the "basket" of WEEE used to calculate the figures in Table 3, refrigeration made up 28 per cent of the tonnage, but due to the potency of CFCs, 94 per cent of the greenhouse gas impact. The UK is thus operating currently from a lower baseline than estimated in Table 3, but there are still climate change benefits from the WEEE Directive.

Table 4: Monetary Estimates of Climate Change Benefits of Additional Recovery of Household WEEE (£ million)

2006 prices	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Low Estimate	1	4	4	4	5	5	6	6	7	7	8
High Estimate	5	15	16	17	18	19	25	26	27	28	30

59. Assuming that for a tonne of mixed WEEE, the impact of refrigeration units is already close to levels that would have resulted from WEEE implementation,³⁶

³⁵ The PWC Report was a life cycle assessment (LCA) of the potential environmental impacts of the WEEE Directive in the UK. It compared the 'current' UK situation with what could occur following WEEE implementation in the UK based on assessment of a number of standardised environmental indicators. In Table 3 above, for example, the greenhouse gas effect is represented in CO2 equivalents in kilograms, so the 4.39E+09 figure represents some 4.4 million tonnes of CO2 equivalent, and 3.80E+08 represents some 380,000 tonnes of CO2 equivalent. In terms of water toxicity, the PWC Report says that "...the difference between both scenarios (current UK and WEEE Directive) is less than 6% and therefore not considered as significant." In terms of hazardous waste, the Report says "the difference...is explained by the characterisation of fridge foams as hazardous waste.." but "...the amount of hazardous waste generated by the WEEE directive scenario does not appear to be significant." In terms of water eutrophication, the Report says "...the results are completely dependent on fridges...however the figures remain low (less than 30 grams equivalent PO4 per tonne of fridges.)"

emissions of carbon per tonne of mixed WEEE would be around 0.59 tonnes for the current UK situation and around 0.35 tonnes after the SI comes into force. Tables 4 and 5 outline indicative estimates for potential climate change benefits from the draft SI for household WEEE and non-household WEEE respectively. These tables are based on the assumption that recovery targets are entirely met by recycling, with the material content products recycled in order economic value.³⁷

Table 5: Monetary Estimates of Climate Change Benefits of Additional Recovery of Non-Household WEEE (£ million)

<i>2006 prices</i>	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Low Estimate	2	5	5	6	6	7	7	7	8	8	9
High Estimate	8	18	19	19	20	21	22	23	24	26	27

iv) Revenue from metals recycled in WEEE

60. The increased separate collection of WEEE in the UK is likely to lead to additional metals being available for recycling over and above current disposal methods. Given that virtually all Category 1 and 10 EEE is thought to be currently separately collected, and there is a level of separate collection of CRTs, ITC equipment and mobile phones, it is difficult to estimate accurately the value of additional metals, but these will largely be the consequence of the increased separate collection of Categories 2-9 of EEE. We do not expect these additional metals to be of sufficient volume to have a material impact on the price of secondary metals.

61. Based on assumptions outlined in the ‘Costs’ section below regarding the achievement of the recovery targets of the WEEE Directive (Article 7 of the Directive) indicative figures for the value for metals from Categories 2-9 of EEE are estimated. The value of these metals is netted off the costs of achieving the recovery targets of the WEEE Directive to produce the net costs of recovering WEEE following implementation in the UK. These are presented in Table 13.

62. For household WEEE, the value of metals contained in Category 1 of EEE will be transferred from Local Authorities to Producers of EEE where Category 1 WEEE is currently dealt with by Local Authorities. Where Category 1 and/or Category 3 and 4 WEEE is dealt with currently by retailers through collection-on-delivery (CoD) services the value of metals contained in these will also be transferred to producers of EEE when the SI comes into force. The value of metals from Category 2-9 household EEE will be largely additional benefits to producers of EEE following increasing levels of separate collection of WEEE in the UK. For non-household WEEE, there will be benefits to producers of EEE from metals in WEEE not separately collected at

³⁶ Because of the impact of the Ozone Depleting Substances (ODS) Regulations, and its equivalence to requirements under the WEEE Directive.

³⁷ Emissions factors for the treatment of waste by material and treatment type were taken from Table 4.6 of ERM’s report to Defra “*The Impact of Energy from Waste and Recycling Policy on UK Greenhouse Gas Emissions*” (January 2006), available on Defra website.

present, and where non-household WEEE is separately collected at present there may be transfers of metals from end-users to producers of EEE.

v) Positive contributions to sustainable development and resource productivity

63. The reuse, recycling and recovery of materials from WEEE will contribute positively to the UK Government's policies on sustainable development and resource productivity. Greater levels of limited physical resources will be available for use because they will not be disposed of in landfill, and there will be less need to mine or produce primary/virgin materials. In addition, there should be reduced uses of energy use from recycling and re-using materials compared to the production of primary/virgin materials.

vi) Positive 'spillovers' to other forms of waste and environmental issues

64. Given that virtually every person in the UK comes into regular contact with, and usually owns at least one item of EEE, the draft SI transposing the WEEE Directive may well contribute to raising awareness in the UK in relation to other forms of household and business waste, such as, for example, packaging waste and spent batteries. In as much as increased awareness contributes positively to tackling waste issues and environmental issues more widely in the UK, the draft SI may bring additional positive 'spillover' benefits.

Costs

65. There are essentially three main additional activities the WEEE Directive requires to be undertaken on WEEE that has not been undertaken, or consistently undertaken, in the UK historically. These are separately collecting WEEE from other forms of waste; treating (i.e. de-polluting) WEEE prior to further processing; and re-using, recycling and recovering WEEE materials that it has not been 'economic' to recycle or re-use in the past.

66. In addition to these activities the WEEE Directive requires producers of EEE to undertake a number of activities in relation to EEE. These are principally in terms of marking EEE to facilitate its separate collection, and in providing information to the 'downstream' industry to facilitate its treatment and recycling and recovery. The WEEE Directive also requires distributors of EEE (e.g. retailers of EEE) to provide certain information to consumers of EEE.

Regulations 18, 19, 29, 30, and 35: Separate Collection of WEEE

67. The WEEE Directive does not require the separate collection of *all* WEEE arising within a member State. However, it requires member States to take steps to minimise the disposal of WEEE as unsorted municipal solid waste (MSW).

68. The WEEE Directive sets an explicit minimum target for the separate collection of household WEEE arising in a member State of 4 kilogrammes per head of population per annum, and an implicit target of 100 per cent separate collection of non-household WEEE arising in a member State. In terms of household WEEE the explicit target

means the UK needs to separately collect, as a minimum, around 240,000 tonnes of WEEE.³⁸

69. The latest report from ICER suggests that in the UK in 2003 some 1 million tonnes of household WEEE representing over 90 million units may have been discarded in the UK.

70. Based on estimates in the European Commission’s EM (for the WEEE Directive), that WEEE is growing at around 4 per cent per annum, and based on estimates given in the ICER Report for WEEE arising in different categories of the WEEE Directive, we can estimate potential total household WEEE arisings in the UK. These estimates are given in Table 6.

Table 6: An estimate of future household WEEE arisings in the UK (millions)

Millions	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Tonnes	1.1	1.14	1.19	1.24	1.29	1.34	1.39	1.45	1.51	1.57	1.63
Units	98.2	102.1	106.2	110.4	114.9	119.4	124.2	129.2	134.4	139.7	145.3

71. The figures in Table 6 do not mean that all household WEEE that arises in the UK will be separately collected. To estimate the amount of household WEEE that may be separately collected in the UK following transposition of the WEEE Directive a number of assumptions need to be made.

72. First we assume that *all* household Category 1 EEE is separately collected in the UK. This may not be an unrealistic assumption given that large household appliances are generally not disposed of with other forms of waste, and are separately collected via various means, including collection-on-delivery (CoD) by retailers when delivering new appliances, takeback to civic amenity (CA) sites by final holders, collection by Local Authorities via ‘bulky waste’ collection schemes, and collection and takeback by charities and voluntary organisations following donation by the final holder.³⁹

73. In addition, and following the introduction of the UK’s Landfill Regulations and Hazardous Waste Regulations we assume that *all* household CRT monitors and fluorescent tubes are separately collected at present. This leaves the other Categories of EEE in the WEEE Directive which may arise as household WEEE and which may be separately collected following the introduction of the SI.

74. The 2005 ICER Report focuses on household WEEE arisings. In 1998 ICER undertook a report on all EEE and WEEE in the UK. This report provided estimates of sales in EEE split between household and non-household sources. Using EEE sales as a proxy for WEEE and based on these splits of sales an estimate for non-household WEEE arisings can be made. These estimates are outlined in Table 7 below.

³⁸ Given a UK population of some 60 million.

³⁹ Even in the case where large domestic appliances are fly-tipped (for whatever reason) this equipment is often retrieved by a Local Authority or by a waste management company acting on its behalf. We do not expect fly-tipping of WEEE to increase in the future given the free takeback available to final holders under the SI, and given various measures the Government is pursuing to clampdown on the problem of fly-tipping generally.

75. There is a certain level of separate collection of WEEE currently taking place in the UK. WEEE containing a relatively large metallic content is more likely to be separately collected at present than WEEE dominated by non-metallic materials. In terms of household WEEE, it is unlikely that separate collection of WEEE outside of Category 1 equipment, CRT monitors, fluorescent tubes, and mobile phones takes place to any significant extent.⁴⁰ In terms of non-household WEEE it is unlikely that separate collection of WEEE outside of Categories 1,3,4, and 10 equipment takes place to any significant extent, though Categories 1,3,4, and 10 are thought to consist of the majority of equipment by tonnage.

76. To estimate the possible separate collection of household WEEE outside of Category 1 equipment (i.e. ‘non-white’ WEEE) following transposition of the WEEE Directive in the UK we use two scenarios:

Table 7: An estimate of future non-household WEEE arisings in the UK (millions)

Millions	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Tonnes	0.94	0.98	1.02	1.06	1.10	1.15	1.19	1.24	1.29	1.34	1.40
Units	79.6	82.8	86.1	89.6	93.2	96.9	100.8	104.8	109	113.3	117.9

- Scenario 1. By 2009, separate collection of household WEEE (outside of Category 1 equipment) in the UK increases to the same rates as that experienced in the Netherlands following the introduction of the NVMP system.⁴¹ One estimate for the additional collection costs for ‘non-white’ WEEE in the UK can be obtained by assuming that the level of separate collection achieved in the Netherlands following the introduction of the NVMP system and the ICT system will also be achieved in the UK once the WEEE Directive is implemented. We then assume separate collection increases in the future.

Table 8: Scenario 1 – Separate collection of household WEEE arisings

Category (in volume)	2007	2008-12	2013-17
1 (large household)	100%	100%	100%
2 and 5-9	2%	10%	20%
3 (ITC)	25%	55%	70%
4 (consumer equipment)	39%	58%	70%

- Scenario 2. One of the main aims of the WEEE Directive is to encourage the separate collection of WEEE so that it is not disposed of with Municipal Solid Waste (MSW). An alternative scenario is thus that after the first years of implementation, greater levels of all equipment are separately collected from MSW as behavioural changes become embedded. Scenario 2 can thus be viewed as a top of the range for separate collection compared to a lower-end estimate in Scenario 1.

⁴⁰ Though there is a level of separate collection of ITC equipment undertaken for reasons of re-use and capturing of precious metals, the majority of this is thought to be from non-household sources.

⁴¹ In the Netherlands, a Decree establishing rules for taking back and processing brown and white goods after use came into force on 1 June 1998. The Dutch Association for Domestic Appliances and the Association for Electronics Manufacturers set up a recovery system for white goods and small domestic appliances in January 1999. This is the NVMP scheme.

Table 9: Scenario 2 – Separate collection of household WEEE arisings

Category (in volume)	2007	2008-12	2013-17
1 (large household)	100%	100%	100%
2 and 5-9	2%	20%	50%
3 (ITC)	25%	70%	90%
4 (consumer equipment)	39%	70%	90%

77. In terms of non-household WEEE, it is assumed that all non-household WEEE will be separately collected following implementation of the WEEE Directive in the UK, given that it is believed that, in tonnage terms, the vast majority of such WEEE is separately collected at present.

78. There are two elements to the separate collection costs of household WEEE under the draft SI. First, there are the costs of establishing a national and ‘adequate’ network of ‘central collection facilities’ enabling final holders of household WEEE to discard their WEEE at no cost and without undue inconvenience in terms of, for example, distance travelled. Secondly, there are the costs of collecting this WEEE from ‘central collection facilities’ (so called Designated Collection Facilities (DCFs) under UK implementation) and transporting it to an authorised treatment facility (ATF) for treatment.

79. In terms of establishing a network of ‘central collection facilities’ the British Retail Consortium (BRC) has proposed a fund to upgrade all CA sites in the UK, and funds to maintain the infrastructure over the same period.

80. In terms of the separate collection from DCFs and delivery to ATFs, one estimate from UK industry suggests that on average it may cost in the region of £60 per tonne for large items of WEEE, and up to £120 per tonne for smaller items of WEEE. In tonnage terms, it is assumed that the vast majority of non-household WEEE is separately collected at present and thus additional costs in relation to the separate collection of non-household WEEE following WEEE implementation are centred around WEEE from the other categories. There should also be a reduction in the volume of municipal solid waste (MSW) collected by Local Authorities from households and commercial and industrial premises following increased levels of separation of WEEE from MSW. One industry estimate is that on average, kerbside collection of MSW costs in the region of £50 per tonne.

81. The two scenarios for separate collection coupled with the estimates for total WEEE arisings and collection costs imply the following estimates for the costs of separately collecting WEEE under Article 5 of the WEEE Directive. Though we estimate that the vast majority of non-household WEEE arising by tonnage is currently separately collected, there are additional separate collection costs relating to the collection of smaller items of WEEE if we assume all non-household WEEE is separately collected in the UK following implementation of the Directive in the UK. These separate collection costs are policy costs.

Table 10: Summary of Costs for Additional Separate Collection of WEEE in the UK (£ million pa)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>Household</i>											
Low	2	8	9	9	9	10	15	15	16	17	17
High	2	12	13	13	14	14	24	25	26	27	28
<i>Non-Household</i>	3	6	6	6	7	7	7	7	8	8	8
Total	5	14-18	15-19	15-19	16-21	17-21	22-31	22-32	24-34	25-35	25-36

Regulation 20: Treatment of WEEE

82. The WEEE Directive, and hence the DTI's draft SI, requires all separately collected WEEE to be treated prior to further processing.

83. DEFRA's WEEE permitting Regulations and the RIA accompanying these regulations consider the costs to business of being permitted as an Authorised Treatment Facility (ATF) to deal with WEEE in the UK in the future.⁴² Those costs are thus not considered in this partial RIA.

84. The Environment Agency (EA) has consulted upon, and produced, draft technical guidance on the treatment operations that need to be undertaken on separately collected WEEE in relation to the requirements set out in Annex II of the WEEE Directive.

85. The vast majority of the treatment to be undertaken on separately collected WEEE in the UK in the future is expected to be additional treatment over current practices, with the exception of the treatment of refrigerators containing ozone depleting substances (ODS) which are covered by the ODS Regulations. Industry estimates are that the costs of treating fridges and freezers to the standards of the ODS Regulations are currently in the region of £3 - £5 per unit.

86. In addition, the Waste Acceptance Criteria (WAC) of the Landfill Directive means that currently, cathode ray tubes (CRTs) and fluorescent tubes will need to be pre-treated prior to disposal if they are collected separately. Industry estimates are that for CRTs deposited at CA sites it will cost around £3 - £5 per unit to treat a CRT, and around 20-25 pence to treat a fluorescent tube.⁴³

87. There is also the issue of how WEEE is actually treated to the requirements of Annex II of the WEEE Directive, particularly, for example, whether it is 'fully' treated prior to shredding, or whether a level of treatment can take place post-shredding.

88. In the short term, labour costs may provide the majority of the variable cost element for treating most WEEE given that draining, dismantling and separating equipment will be largely a manual exercise. These costs are likely to vary considerably between different EEE products, as some are far more complex than

⁴² See Defra website.

⁴³ This figure is an industry estimate for the collection, treatment and recycling of fluorescent tubes.

others and thus will take more effort to be treated in accordance with the Directive's requirements. It is possible that through learning these costs could fall over time, and it is likely that technological developments will also lead to reductions in costs over time. One industry estimate (in response to a previous consultation) is that it may cost £2-£3 per unit to treat WEEE if this WEEE requires full manual treatment (so called 'hand-stripping' of items). The middle of this range is £2.50, and given that we do not expect each item of WEEE to require hand-stripping, this can be seen as a 'worst case', top-end cost estimate for treatment.

89. An alternative estimate can be based on estimates of the time taken to treat WEEE when it arises. In terms of Annex II of the WEEE Directive this includes, for example, the removal of capacitors, batteries, printed circuit boards, toner cartridges and external cables. Previous partial RIAs for the WEEE Directive have used estimates for the costs of treatment in terms of industry estimates for the costs of personal computers, adjusted according to the relative complexity of the WEEE involved. Such estimates equated to times in the range of 5 to 20 minutes per unit. To calculate an alternative estimate to the one outlined above we can use this as a lower-end estimate for treatment costs.

90. Thus if, for example, we assume it takes five minutes, on average, to treat WEEE items in Categories 1, 10, 3, 4, 2 and 8 to Annex II standards of the Directive, and slightly less time to treat WEEE in Categories 6 and 7, and less to treat WEEE in Category 9 – based on estimates of what may be needed to be undertaken for different items, then this provides an alternative estimate for the costs of treating WEEE.

91. However, it should be noted that there is much uncertainty surrounding the costs of treating WEEE to the standards of the Directive. This is not least because these costs will depend on what is separately collected and the composition of WEEE arising. The actual costs will also depend on the final text of the Treatment Guidance being produced by Defra and the environment agencies.

92. Over the medium-term it is likely that the cost per unit of treating WEEE could fall for a number of reasons, including: developments and innovation in treatment technologies; fewer refrigerators containing ODS, and fewer televisions with CRTs arising as waste; and as the impacts of the RoHS Directive affect WEEE.⁴⁴

93. In addition to the costs outlined above will be the costs associated with the treatment of non-household WEEE following introduction of the SI. There will thus be additional costs in terms of the treatment of non-household WEEE. Table 11 below provides a range of estimates for the costs of treatment of WEEE. These are policy costs.

⁴⁴ As the RoHS Directive restricts the use of hazardous substances in EEE, WEEE arising from new EEE should be less hazardous, and so require less treatment, than 'historic' WEEE.

Table 11: Summary of Estimates of Additional Treatment Costs of WEEE in the UK (£ million pa)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>Household</i>											
Low	14	36	40	41	45	48	57	60	64	68	73
High	25	77	80	83	86	90	145	151	157	163	170
<i>Non-Household</i>											
Low	21	81	85	88	92	95	99	103	107	112	116
High	39	90	94	98	103	108	113	119	125	131	137
Total	35-64	117-167	125-174	129-181	137-189	143-198	156-258	163-270	171-282	180-294	189-307

Regulation 21: Re-use, recycling and recovery of WEEE

94. The WEEE Directive requires the following re-use, recycling and recovery targets to be achieved for separately collected WEEE once it has been treated:

- Category 1 and 10 EEE – Recovery of 80 per cent by average weight per appliance, with minimum of 75 per cent reuse and recycling of components, materials, and substances.
- Category 3 and 4 EEE – Recovery of 75 per cent by average weight per appliance, with minimum of 65 per cent reuse and recycling of components, materials, and substances.
- Category 2, 5, 6, 7 and 9 EEE - Recovery of 70 per cent by average weight per appliance, with minimum of 50 per cent reuse and recycling of components, materials, and substances.
- Gas discharge lamps – Reuse and recycling of 80 per cent by weight of lamps.

95. The WEEE Directive, and so the draft SI, makes producers of EEE responsible for the financing of achieving these targets and also responsible for the environmentally sound disposal of the residual waste from WEEE following the achievement of the targets.

96. As has already been noted there is a certain level of re-use of whole appliances and components, and a certain level of recycling of metals from WEEE taking place in the UK currently.

97. To estimate the costs of achieving the targets of the Directive by weight of equipment a number of estimates and assumptions need to be used. This is because there is limited information on the full material composition of the range of equipment covered by the WEEE Directive. In addition, the costs of achieving the targets will vary over time, not only in terms of the costs of recycling, but also because the material composition of WEEE will change over time, as will the costs of soundly disposing of the residual waste.⁴⁵

⁴⁵ The Restriction of certain Hazardous Substances Directive (The 'RoHS' Directive), for example, restricts the use of lead, cadmium, mercury, hexavalent chromium and two brominated flame retardants

98. A significant volume of WEEE will contain metals in some proportion and in some form, and the recycling of such metals will bring revenue to producers of EEE, which will offset to some degree the costs of achieving the recycling and recovery targets of the Directive.

99. The non-metallic materials of WEEE consist of different plastics, rubbers, glass, foam and other materials. The exact proportion contained in WEEE will vary by category of EEE and will also vary within category.⁴⁶ Some estimates of the material composition of EEE are given in Table 12.

100. Given the limited information available on the exact material composition of different types of EEE a number of assumptions need to be made to estimate the cost of achieving the recycling and recovery targets of the Directive. In this partial RIA these are as follows:

- Category 1 EEE – the metals are assumed to be recycled at value, with ferrous metals as secondary steel, and non-ferrous metals as largely aluminium but also with copper. Data from *Materials Recycling Weekly* suggests that 5C steel and scrap steel prices have averaged around £39 per tonne over the past year, aluminium has averaged around £561 per tonne, and copper around £2,425 per tonne. Some industry estimates suggest that WEEE plastics recycling may cost in the region of £70-£100 per tonne, and WEEE glass recycling £50-£70 per tonne.⁴⁷ Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.
- Category 2 EEE - the value of metals recycled and the costs of recycling non-metals are assumed to be similar to those for Category 1 EEE. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.
- Category 3 EEE - the metals are assumed to be recycled at value, with ferrous metals as secondary steel, and non-ferrous metals as aluminium and copper. There is also a precious metal content in some Category 3 EEE consisting of gold, platinum, palladium, and silver in small amounts per weight of unit. Data from *Materials Recycling Weekly* suggests gold has averaged over the last twelve months, around £8.8 million per tonne, palladium around £1.6 million per tonne, and silver around £146,000 per tonne. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.

in the production of EEE put onto the European market from 1 July 2006. This Directive has been transposed into UK law by a separate DTI Statutory Instrument.

⁴⁶ For example the material composition of a washing machine is considerably different to that of refrigerator, even though both are within Category 1 of the WEEE Directive.

⁴⁷ PRN prices for plastics packaging have averaged around £43 per tonne over the last 12 months, while PRN prices for glass have averaged £19 per tonne. If PRN prices reflect the additional resources required to recycle over disposal then this implies plastics packaging recycling costs around £89 per tonne and glass packaging recycling costs around £65 per tonne.

- Category 4 EEE - the metals are assumed to be recycled at value, with ferrous metals as secondary steel, and non-ferrous metals as largely copper and aluminium. Precious metals are assumed to consist of gold, palladium and silver in relatively small amounts in some EEE. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.
- Category 5 EEE – Industry estimates that to collect, treat and recycle fluorescent tubes to the standards of the Directive will cost in the region of 20-25 pence per tube. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.
- Category 6 EEE - the vast majority of this Category of EEE is assumed to consist of plastics with cordless power tools (CPTs) containing nickel-cadmium (NiCd) batteries. The metals from NiCds are estimated to be worth around £965 per tonne. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.
- Category 7 EEE - the metals are assumed to be recycled at value,⁴⁸ with ferrous metals as secondary steel, and non-ferrous metals as largely aluminium and copper. Given the nature of this type of EEE, there is assumed to be a large element of plastics in equipment in this category, which will incur a cost to recycle. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.
- Category 9 EEE - the vast majority of this Category of EEE is assumed to consist of plastics with smoke alarms containing primary batteries. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.
- Category 10 EEE - the metals recycled value, and the costs of recycling non-metals are assumed to be similar to those for Category 1 EEE. Actual costs will depend on the value and grade of the metals and the type of plastics and glass and how they are recycled or recovered.

101. Table 13 provides a summary of estimated costs to achieve the recovery targets for separately collected WEEE as required by Article 7 of the WEEE Directive. These are policy costs. The difference between the estimated costs can be explained by the fact that the estimates in Table 13 are net costs of recycling, i.e. they are costs of achieving targets for separately collected WEEE minus the benefit of metals obtained from separately collected WEEE, following implementation. Because it is assumed that a greater proportion of non-household WEEE is separately collected currently in the UK compared to household WEEE (particularly in the ICT sector), the net costs from recycling household WEEE following implementation are less than that of non-household WEEE. This is because there is an additional volume of metals captured in household WEEE, which offsets to some extent the costs of achieving the Directive targets, whereas these metals are already captured in non-household WEEE.

⁴⁸ Though costs of reprocessing will be positive.

Table 12: Some Estimates of Material Composition of Various Items of EEE

Material composition (per cent)	Category 1 EEE	Category 2 EEE	Category 3 EEE	Category 4 EEE	DVD Player	CRT Monitor	CRT Monitor	Cell Phone	Cell Phone
ICER – 1998									
Ferrous metals	61	19	44	11					
Non-ferrous metals	7	1	1	1					
Plastics	9	48	30	31					
Glass	3	0	15	35					
Other	20	32	10	22					
Huisman – 2003							HDP User Group - 2003		HDP User Group - 2003
Ferrous metals					72	30	27	29	3
Non-ferrous metals					1	12	4	2	18
Plastics					18	27	17	44	58
Glass						25	39	6	
Other					5	6	13	19	21

Table 13: Net Costs of Additional Recycling to WEEE Directive Targets (£ million pa)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>Household</i>											
Low	2	3	3	3	4	4	3	3	3	3	3
High	4	6	6	6	6	7	7	7	7	7	8
<i>Non-Household</i>											
Low	7	21	21	22	23	24	25	26	27	28	29
High	10	28	29	30	32	33	34	36	37	39	40
Total	9-14	24-34	24-35	25-36	27-38	28-40	28-41	29-43	30-44	31-46	32-48

Regulation 14 and Regulation 15: Marking EEE

102. Article 10 of the WEEE Directive says that users of EEE in private households should be given information about the return and collection systems available to them, and their role in contributing to the re-use and recycling of WEEE. Regulations 14 and 15 of the draft SI transpose this Article.

103. The draft SI requires distributors of EEE to provide this information to consumers of EEE in the UK. It is difficult to provide an estimate for the costs of this provision of information given that the information could take a variety of forms. It also remains unclear how many distributors of EEE will be affected by this requirement.

104. Article 10 also says that producers should appropriately mark EEE (or where this is inappropriate, mark the packaging or paperwork that comes with the equipment) with a crossed-out wheeled bin symbol to discourage the co-disposal of WEEE. It also says that users should be given information on the meaning of this mark.

105. Costs for Regulations 14 and 15 are not straightforward to estimate. The Directive does not specify that products need to be marked via moulds. One industry estimate for the costs of producing a sticky label with the crossed-out wheeled bin symbol is that it would cost 5 pence per label. If this is applied to the ICER estimate of 162 million units of EEE estimated by ICER as being sold in the UK each year⁴⁹ the total cost would be in the region of £8 million per annum.

106. One industry estimate for the cost of production of a plastic mould with the crossed-out wheeled bin sign is £5,000. Industry estimates are that there are some 200,000 variations of consumer electronic products on the market at any one time. If the average life of an EEE product is 8-10 years then these estimates imply costs of £100 million - £125 million per annum for plastic moulds for marking EEE products.⁵⁰

107. However, it is highly unlikely that all EEE will be marked via a plastic mould. If we assume that large products are marked with a plastic mould and small products are marked with a label then based on estimates for total sales of non-white goods, labelling these would cost £7 million per annum. Further, if we assume that of the 200,000 product variations, 20,000 of these are in large appliances⁵¹ then producing moulds for these would cost £10 million - £13 million per annum. This gives an indicative estimate for the total costs of marking products in the range of £17 million - £20 million per annum. These can be seen as implementation costs.

Regulation 16 – Information on EEE for treatment facilities

108. Article 11 of the Directive says that producers of EEE shall provide reuse and treatment information for each type of new EEE they put on the market within one year after the equipment has been put on the market. This information is to be made available to re-use centres, and treatment and recycling facilities. Regulation 16 transposes this Article. Costs for this remain uncertain and are difficult to estimate with any great certainty.

109. Regulation 16 does not require manuals to be produced for treatment facilities. One industry estimate is that if the information were provided via two-A4 page leaflets, each leaflet would cost £100 to produce. If all information were provided to treatment facilities in this way costs are estimated in the range of £6 million - £8 million per annum.⁵² These can be seen as implementation costs.

110. If information were provided electronically via a CD-ROM system annual costs are likely to be significantly lower. Whilst setting-up such a system for WEEE will

⁴⁹ This figure is for 1998 and applies to EEE products in the 10 categories of the WEEE Directive.

⁵⁰ Calculated as £5,000 multiplied by 200,000 product variants divided by 8-10 years.

⁵¹ Product variations are likely to be much less wide ranging for large appliances than for smaller appliances.

⁵² Calculated as £100 multiplied by 200,000 product variations divided by 8-10 years for the average life of EEE multiplied by 3 to reflect the industry estimate that every 3 years all product variations are changed.

entail some not-insignificant investment costs, once established the running costs of such a system are likely to be relatively low. Electronic systems appear to be the preferred option for those who will dismantle and treat WEEE once the SI comes into force.

Regulation 17: Registration of Producers of EEE

111. The WEEE Directive requires the UK to draw up a register of producers of EEE. The UK Government and the Devolved Administrations consulted on proposed environment agencies' fees with respect to registration of producers in May 2005.

112. The Environment Agency now estimate that registration fees for producers will be some £4 million per annum for an estimated 5750 producers, equating to an annual charge of £707 per producer. The Environment Agency also estimates that the approval of compliance schemes will cost some £365,000 for an estimated 30 schemes, equating to a charge per scheme of £12,174. These fees will be charged every three years as scheme approval will be granted for three years.

Regulations 42-49: Accreditation of Reprocessors and Exporters

113. For the accreditation of reprocessors under the WEEE Regulations, the Environment Agency estimate costs in the region of £700,000 per annum for an estimated 350 reprocessors.

Regulation 21: Recovery

114. Defra are proposing to undertake work to establish protocols for WEEE to facilitate the achievement and reporting of the recycling and recovery targets of the WEEE Directive. In this context, protocols are essentially assumptions on material content based on shredder trials of representative arisings of WEEE. Defra estimate that establishing protocols will cost in the region of £170,000, as a one-off cost.

115. The costs related to information and reporting outlined above can be seen as implementation costs.

EQUITY AND FAIRNESS

116. The business sectors affected in the UK by the SI include:

- EEE Manufacturers – including Importers;
- EEE Distributors (e.g. Retailers);
- Businesses using EEE;
- Waste collection companies who deal with WEEE;
- Secondary metal merchants who deal with WEEE;
- Shredders who deal with WEEE;
- Recyclers and Reprocessors who deal with WEEE;
- Landfill operators

117. In addition, Charities and Voluntary Organisations who are involved with WEEE will also be affected, as will Local Authorities.

118. Given the wide-ranging nature of the WEEE Directive, and the fact that the scope of products affected by the WEEE Directive is not precisely defined, there remains uncertainty as to how many businesses will be affected, both directly and indirectly, by the requirements of the draft SI. Previous partial RIAs have used Office of National Statistics (ONS) Standard Industrial Classification (SIC) data to estimate the number of producers that may be affected by the WEEE Directive in the UK.

119. The benefits of the draft SI should be spread fairly evenly across different social and economic groups and different geographical regions in the UK. The environmental benefits should accrue across the whole of the UK.

120. The free takeback provision for final holders of WEEE should alleviate any incentive for final holders to fly-tip WEEE. The network of collection facilities in the UK will provide a collection infrastructure for WEEE and this should discourage WEEE fly-tipping. This will be of particular benefit in areas which have suffered disproportionately from such fly-tipping in the past.

121. The costs of the draft SI should not impact disproportionately on any particular businesses amongst those affected given that producers will incur the majority of costs in relation to their market presence and the weight, type and number of EEE products they put on the UK market.

CONSULTATION WITH SMALL BUSINESS: THE SMALL FIRMS IMPACT TEST

122. There are no exemptions for small businesses in the WEEE Directive and so none in the DTI's draft SI. However, the UK Government has been working to implement the WEEE Directive without imposing disproportionate costs on small businesses operating in the UK. The DTI has had significant contact with small firms representatives including the Federation of Small Business, the Forum of Private Business, and the Institute of Directors. They have fed in detailed comments about the possible impact of the WEEE Directive on SME's and have been suggesting ways to ensure that small businesses are not adversely affected.

123. In this context, the draft SI enables small retailers of EEE to discharge their distributor obligations under the WEEE Directive via providing alternative takeback services to in-store takeback.

124. For producers, the draft SI enables small producers of EEE to benefit from economies of scale in the collection and processing of WEEE by being able to join a compliance scheme to discharge their producer obligations, and via means other than having to physically collect WEEE when it arises. Any costs to small producers of EEE from the draft SI will be in proportion to their market presence in the UK.

125. Criteria will be included for the approval of producer compliance schemes to ensure that small businesses have full access to schemes and that they are not subjected to excessive costs.

126. Throughout implementation the DTI will continue to work with the Small Business Service (SBS) and small business representatives.

COMPETITION ASSESSMENT

127. Since 2002 a competition assessment has been a requirement of RIAs. This assessment has two parts – an initial Competition Filter, which in turn may lead to a more thorough competition assessment. The competition filter consists of 9 *yes/no* questions related to the markets potentially affected by a proposed regulation.⁵³ Five of these relate to the competitive process that exists, or may exist, in the market(s) affected, two relate to supply and demand factors in the market(s), and two relate to market outcomes.

128. Applying the competition filter to the draft SI for the WEEE Directive gives the following results:

- Questions 1 to 3 of the competition filter relate to market shares in the markets potentially affected by regulation. In terms of market structure, market share is an indicator of the existing level of competition in a market and of the risk that regulation could lead to detrimental effects on competition. Two *KeyNote* Reports provide some information on major businesses operating in the white goods and brown goods in the UK. Whilst there are some very large businesses operating in these markets, there appears to be a significant number of players, which has increased in recent times by, for example, large retailers increasingly selling their own brand of equipment.
- Questions 4 to 6 of the competition filter relate to the potential disproportionate impacts on costs for different firms in the markets affected by the proposed regulation. Detrimental impacts on competition could occur if the regulation results in disproportionate impacts on some businesses, or presents a barrier to entry for businesses, and so results in markets that are more concentrated and potentially less competitive. In terms of the draft SI the costs of financing the treatment, recycling and recovery of WEEE in the UK are in proportion to market presence. In essence this means that those who are benefiting most from the market in terms of sales will be financing a greater proportion of the costs under the draft SI. It is thus unlikely that the draft SI itself will lead to a change in market structure.
- Question 7 asks if the regulation will lead to higher operating costs for new or potential firms compared to existing firms. The answer to this is ‘no’ given that all firms are to finance the costs of the draft SI in relation to their market presence.
- Question 8 asks if the market is characterised by rapid technological change. The EEE market is characterised by rapid technological change, but one of the aims

⁵³ See *Guidelines for competition assessment: A guide for policy makers completing Regulatory Impact Assessments*, OFT 355 (February 2002).

of the WEEE Directive is to encourage ‘design for recycling’ to reduce the negative externalities that can result from WEEE.

- Question 9 asks if the regulation would restrict the ability of firms to choose the price, quality, range or location of their products. The draft SI is unlikely to restrict the ability of firms in this context.

129. In summary, the competition filter suggests that the draft SI is unlikely to have a significant detrimental impact on competition in the markets affected by the regulation. Though the draft SI is significant, the markets it impacts on are diverse and dynamic and large in relation to the potential costs of the draft SI.

ENFORCEMENT AND SANCTIONS

130. The Environment Agency (England and Wales), the Scottish Environment Protection Agency (Scotland), and the Environment and Heritage Service (Northern Ireland) are to enforce producer obligations. The draft SI contains a number of offences for which there are potential penalties and fines. Fines for offences vary according to the offence committed, but can be unlimited.

131. The DTI will appoint the enforcement body for the aspects of the SI where there is direct consumer interaction – i.e. signs and information provided by distributors, operation of take-back, and product markings, the costs of which have yet to be established.

MONITORING AND REVIEW

132. The DTI will monitor the impact and effectiveness of the SI with the help of the Devolved Administrations, the environment agencies and the WEEE Advisory Group (WAG). The DTI will undertake an evaluation of the SI to assess its effectiveness and how implementation should develop in the light of practice and experience.

SUMMARY AND CONCLUSIONS

133. This partial RIA outlines indicative estimates of the benefits and costs of the DTI’s draft SI to transpose the WEEE Directive in the UK. The numbers given in this partial RIA can only be seen as being indicative given the limited amount of data available and the range of assumptions that need to be made to enable estimates to be undertaken.

134. Estimates are made in relation to current practice in the UK with regard to EEE and WEEE in the UK. But even determining the base case is not straightforward given there is relatively little firm information on exactly how all EEE is dealt with when it arises as waste in the UK.

135. Where valued, the costs of the draft SI principally relate to additional costs for the separate collection of WEEE, its treatment, and its recovery to levels not achieved previously in the UK.

136. The estimates for the cost of treatment are one of the main drivers of total costs, but the estimates at the top of the range should be considered as ‘worst case’ estimates, because it is highly unlikely that all items of WEEE will require treatment by individual ‘hand-stripping’. In addition, it is expected that the costs of treating items of WEEE will fall over time for the following reasons: developments and innovations in treatment technologies and techniques; from ‘leaning-by-doing’; falls in the numbers of refrigeration equipment requiring ODS removal; falls in the numbers of CRT televisions as LCD and plasma screens become more widespread; and falls in ‘hazardous’ WEEE as the RoHS Directive begins to impact on WEEE.⁵⁴

137. The costs from the draft SI also need to be seen in the context of the size of the electrical and electronic market. The DTI Value Added Scoreboard 2005 provides estimates of value added for 2003/04 for the top 800 UK companies across a range of sectors. As an example of sectors which contain electrical and electronic equipment, the Scoreboard calculates value added in these sectors of some £13 billion.⁵⁵ In addition, it is possible that many producers will seek to pass on at least some of the costs of the WEEE Regulations to consumers, and this is what the European Commission expected for the WEEE Directive itself. In its Explanatory Memorandum, the European Commission estimated that the types of price changes that may result from the WEEE Directive would be in the region of 1-3 per cent price increases, and that these are “..likely to diminish as economies of scale and innovation bring down the costs of separately collecting and treating WEEE.”⁵⁶

138. Where valued, the benefits of the draft SI principally relate to additional benefits in terms of reductions in the negative externalities from landfilling waste in the UK and in terms of climate change benefits, where the treatment and re-use and recovery of WEEE leads to reductions in carbon and CO2 emissions.

139. Not all of the benefits of the draft SI can be valued in monetary terms at this stage. Given that virtually every person in the UK comes into contact with electrical and electronic equipment (EEE) on a daily basis, and the use of EEE continues to expand into all areas of life, implementation of the WEEE Directive is likely to have a positive impact in terms of promoting more sustainable consumption and production in the UK.

140. In addition, and given the widespread use of EEE in the UK, implementation of the WEEE Directive may have positive effects on raising awareness with regard to waste and recycling amongst consumers and businesses further. This could lead to positive impacts on other waste streams such as spent batteries, packaging waste, and on waste and recycling issues generally.

⁵⁴ The RoHS Directive restricts the use of certain hazardous substances in new electrical equipment from 1 July 2006. When this new equipment is discarded at end-of-life in the future it should require less treatment than ‘historic’ WEEE because it will contain less hazardous material and substances.

⁵⁵ Of the top 800 companies in the following sectors: electronic and electrical, household goods and textiles, IT hardware, and Personal care and household. In addition, the value added of the ‘general retailer’ sector is around £22 billion. Value added is a measure of wealth creation, which is sales less the costs of bought-in materials, components and services.

⁵⁶ Explanatory Memorandum to WEEE and RoHS Directives, Page 26.

141. RIA Guidance suggests that a ten-year time-period is often used as a ‘typical’ period over which to assess the costs and benefits of a regulation. In this context the 2017 date used in Table 14 represents the estimated long-run, recurrent, net costs of the draft SI in the future. This is because by this date it is estimated that virtually all WEEE arising in the UK will be collected separately, treated and recycled. The present value of this net cost is shown Table 14. The equivalent annualised costs of the total net present value of costs and benefits over the period 2007-17 is also shown in Table 14.⁵⁷ It should be remembered that there is much uncertainty surrounding these estimates given the range of factors involved and the lack of data available to make estimates.

142. Tables 14, 15 and 16 summarise estimates of the costs and benefits of implementing the WEEE Directive in the UK. Table 14 provides estimates of costs and benefits of the draft SI to transpose the WEEE Directive into UK law. Table 15 outlines estimates for a range of other options that do not form part of the draft SI. Table 16 breaks down cost estimates in terms of policy and implementation costs.

143. In terms of Table 15, and as outlined in the section on options there are a range of means by which WEEE can be physically allocated to producers and a range of means by which producers can discharge their financial obligations in relation to WEEE. These options run along a spectrum where at one extreme, producers can be obligated to physically collect WEEE arisings on an individual by individual basis, as and when WEEE arises, and at the other extreme, producers can be obligated just to finance WEEE arisings following collection by a third-party/parties. It is not straightforward to estimate the additional costs and benefits of all the options available. In a number of cases it is not clear that alternative options to the draft SI will result in significant additional benefits.

144. For example, if producers are obligated to collect WEEE arising on an individual by individual basis this present huge challenges in terms of logistics, can result in increased costs of transport, and can limit the scope to obtain economies of scale in the treatment and recycling of WEEE for the same volume of WEEE arising in a system which did not require individual by individual collection.

145. Also, and for example, a mandatory visible fee would bring its own costs in terms of administrative costs. We can proxy these potential costs from the costs incurred in collecting other mandatory taxes and fees. HM Revenue and Customs estimate that it costs them around 1 pence to collect every £ of tax in the UK.⁵⁸ The BBC calculates the costs of collecting the Licence Fee at some £152 million for a licence income of £2.9 billion.⁵⁹ If we use these figures as proxies for costs of administering a mandatory visible fee for WEEE this would imply a range of costs as shown in Table 15.

⁵⁷ The equivalent annual cost is the constant annual cost (or annuitised value) which is equivalent to (i.e. has the same present value as) a project’s actual costs.

⁵⁸ HM Customs and Revenue Annual Report, 2004/05.

⁵⁹ BBC Annual Report, 2004/05.

Table 14: WEEE Implementation under the draft SI: Total WEEE – Household plus Non-Household WEEE (£ million pa)

	2007	2008	2009	2013	2017
Costs					
Household WEEE collection, treatment and recycling	26-38	49-95	53-99	75-176	94-206
Non-household WEEE collection, treatment and recycling	32-52	108-124	112-129	131-155	154-186
Information for users	17-20	17-20	17-20	17-20	17-20
Information for treatment facilities	6-8	6-8	6-8	6-8	6-8
Registration of producers and other information and reporting	5	5	5	5	5
Total Cost	86-123	185-252	193-261	234-364	276-425
Benefits					
<i>Household WEEE</i>					
Reduced resource use and externalities from landfill	4	15	16-17	27-28	32
Reduced CO2	1-5	4-15	4-16	6-25	8-30
<i>Non-household WEEE</i>					
Reduced resource use and externalities from landfill	6	13	14	19	22
Reduced CO2	2-8	5-18	5-19	7-22	9-27
Total Benefit	13-23	37-61	39-66	59-94	71-111
Net Cost	73-100	148-191	154-195	175-270	205-314
Present Value of Net Costs 2007-17	1,448-2,043				
Annualised Equivalent of Present Value of Net Costs 2007-17	161-227				
Present Value of Net Costs in 2017	140-215				

146. In terms of Table 16, RIA Guidance suggests distinguishing costs of regulation between policy costs and implementation costs, as the later can be considered as a proxy for the ‘red-tape burden’ of policy. In relation to transposing European legislation this distinction is not always clear-cut. The WEEE Directive, for example, requires member States to register producers of electrical equipment and for these producers to mark electrical equipment. Neither of these requirements directly contributes to environmental protection, but the UK cannot avoid transposing these requirements of the WEEE Directive and so making these requirements part of the policy achieving transposition. In this context, all of the costs from the WEEE Directive can be seen as policy costs. However, if we assume policy costs relate to the direct costs of environmental protection and implementation costs relate to costs incurred to facilitate achievement of this ultimate objective, then we can make an estimate of policy versus implementation costs as outlined in Table 16.

Table 15: Additional Options for Implementation of WEEE Directive in UK not included in draft SI (£ million pa)

	2007	2008	2009	2013	2017
Costs					
(a) Mandatory In-Store Takeback	200-500	200-500	200-500	200-500	200-500
(b) National Clearing House	Several million pounds per annum				
(c) Allocation system estld. by Government	One-off costs in region of £0.3 million				
(d) Producer obligation by total weight of WEEE	Distributional impacts on producers rather than impacts on total costs				
(e) Individual Producer Responsibility	Technologically and administratively difficult at this time				
(f) Compulsory compliance scheme membership	Restricts compliance route, but should lead to lower registration fees				
(g) Exceptional arrangements for non-household WEEE	Adds costs with no obvious benefits				
(h) Extending scope	'Gold-plates' Directive				
(i) (a) Mandatory Visible Fee Collection ⁶⁰	0.2-1.9	0.5-6	0.5-6	0.4-3	
(b) Central body costs for 'visible fee' system	2-4	6-13	6-13	5-7	

Table 16: Breakdown of Estimated Costs of draft SI in terms of Policy and Implementation Costs (£ million pa)

	2007	2008	2009	2013	2017
Policy Costs (Costs of collecting, treating and recycling Household and Non-household WEEE)	58-90	157-219	165-228	206-331	247-392
Implementation Costs (Costs of registering producers; Costs of providing information and marking on EEE and WEEE; and Costs of monitoring and reporting on EEE and WEEE)	28-33	28-33	28-33	28-33	28-33

⁶⁰ Under the terms of the WEEE Directive a 'visible fee' can only be shown on new electrical equipment until 2011 for all equipment, and until 2013 for white goods. Estimate does not include costs of changing catalogues etc to show 'visible fee'.

ANNEX: DISTRIBUTIONAL IMPACTS OF WEEE DIRECTIVE

A1. As outlined in Tables 1 and 2 of the main text, some costs and benefits from the WEEE Directive will be transfers between stakeholders, rather than additional costs or benefits to the UK as a whole. This annex provides stylised estimates of both transfers and additional costs and benefits with respect to the following stakeholders: Producers of EEE, Local Authorities (LAs), Retailers of EEE, users of non-household EEE, on the external environment, and Central Government.

A2. Where a current activity is overtaken by 'producer responsibility' for WEEE, costs and benefits will be transferred between stakeholders in the UK. Principally, for household WEEE, these will be transfers from Local Authorities and retailers of EEE to producers of EEE. For non-household WEEE the costs and benefits will be transfers largely from users of non-household EEE to producers of non-household EEE.

A3. Where a new, or increased level, of activity follows from implementing the WEEE Directive, additional costs and/or benefits arising will largely fall on producers of EEE. There will also be some additional costs to retailers of EEE.

Producers of EEE

A4. The value of metals in WEEE that is currently obtained by LAs, retailers of EEE, and users of non-household EEE will be transferred to producers of EEE under 'producer responsibility' for WEEE. Producers will also receive the additional benefits of any metals following the increased separate collection of WEEE as a result of the WEEE Regulations.

A5. The treatment costs of ODS and CRT containing equipment will be transferred from LAs, retailers of EEE, and users of non-household EEE to producers of EEE. Producers will also incur any disposal costs following the recycling and recovery of WEEE.

A6. New activity resulting from the Regulations will include the cost of additional collection, treatment and recycling of WEEE, which will be borne by producers of EEE. They will also incur costs from Regulations 14-17, which relate to the marking of EEE, information and registration.

Local Authorities

A7. Local Authorities will lose the value of metals from WEEE, which will be transferred to producers of EEE. However, LAs will benefit from no longer being liable for ODS and CRT treatment costs and they will benefit from reduced disposal costs

Users of non-household WEEE

A8. These stakeholders will lose the value of metals in WEEE. However, like LAs, they will benefit from reduced ODS and CRT treatment costs, and a reduced landfill liability.

Retailers of EEE

A9. Currently, retailers benefit from the value of metals they receive when undertaking collection on delivery of WEEE. This benefit will be lost. Retailers will also be obliged to provide the infrastructure to enable consumers to separately collect their WEEE from other forms of waste. However, retailers will benefit from no longer being liable to treat and dispose of WEEE.

Environment

A10. All the external environmental impacts following WEEE implementation are an additional net benefit to the UK. There may be some additional transport emissions from the increased separate collection of household WEEE, but these will be outweighed by benefits in terms of reduced CO2 emissions, reductions in other negative externalities, and positive contributions to resource productivity and sustainable development.

Government

A11. The Exchequer will lose landfill tax revenue from reduced volumes of waste going into landfill.

A12. Table A1 below provide indicative estimates of the stylised outcome following WEEE implementation in the UK.

Table A1: Distribution of costs and benefits between stakeholders (£ million pa)

	2007	2008	2009	2013	2017
Producer of EEE					
Costs	109-153	252-330	262-342	319-463	374-540
Benefits	41-42	89-91	92-94	110-114	129-134
Net cost	68-111	163-239	170-248	209-349	245-406
Retailers of EEE					
Costs	11	7	7	8	9
Benefits	2	3	3	3	4
Net cost	9	4	4	5	5
Local Authorities					
Costs	20	41	42	49	58
Benefits	18-23	43-53	46-56	62-73	72-85
Net cost	2-(-)3	(-2-(-)12)	(-4-(-)14)	(-13-(-)24)	(-14-(-)27)
Users of non-household EEE					
Costs	20	41	42	50	58
Benefits	22	47	50	61	72
Net cost	(-2)	(-6)	(-8)	(-11)	(-14)
Government					
Costs	4	11-12	13-14	21-23	24-27
Benefits	0	0	0	0	0
Net cost	4	11-12	13-14	21-23	24-27
Environment					
Costs	0	0	0	0	0
Benefits	8-18	21-44	23-48	36-68	44-81
Net cost	(-8-(-)18)	(-21-(-)44)	(-23-(-)48)	(-36-(-)68)	(-44-(-)81)
Total net costs	73-100	148-191	154-195	175-270	205-314