

## Summary: Intervention & Options

Department /Agency: BERR	Title: Impact Assessment of Commission's Proposal to Recast Restriction on Hazardous Substances (RoHS) Directive	
Stage: <b>Initial</b>	Version: <b>One</b>	Date: <b>18 May 2009</b>
Related Publications: European Commission documents SEC(2008)2931, COM(2008)809/4. DTI 2006 Final RIAs on RoHS Directive and on WEEE Directive.		

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<http://www.berr.gov.uk>

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### What is the problem under consideration? Why is government intervention necessary?

The European Directive, the Restriction of the use of certain Hazardous Substances (RoHS) in electrical and electronic equipment (EEE) Directive, was adopted in 2003. Its main obligations, in terms of restricting the use of 6 hazardous substances in new EEE began on 1 July 2006. The RoHS Directive is an 'Internal Market' Directive and has the dual aim of protecting and promoting the European 'Internal Market' in EEE, and of correcting for negative externalities (in relation to human health, animal health, and the environment) from the use of hazardous substances in EEE.

### What are the policy objectives and the intended effects?

The policy objectives are to determine how best to re-cast the RoHS Directive to improve its effectiveness in terms of both benefits and costs. The Proposal to re-cast the Directive is a package of options to improve the workings of the Directive. The UK is involved in negotiations on the Proposal, and this IA contributes to this. The Commission has 2 main objectives. The first is to achieve "...better regulation..." as part of the Lisbon strategy for growth and jobs. The second is to conform with the RoHS Directive itself and to review certain aspects of the original Directive.

### What policy options have been considered? Please justify any preferred option.

The Commission's main proposals are for: the inclusion of medical devices and monitoring and control equipment within the scope of RoHS; changes to the exemptions procedure of RoHS; clarification of the scope of RoHS; and strengthening of the compliance and enforcement regime of RoHS. These proposals are compared to a 'business as usual' of not re-casting the RoHS Directive.

**When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects? Not clear at this stage. Draft recast Directive refers to "...before 2020".**

### Ministerial Sign-off For consultation stage Impact Assessments:

*I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.*

### Signed by the responsible Minister:

**Ian Pearson**

.....Date: 22 May 2009

## Summary: Analysis & Evidence

Policy Option: Commission's Proposal	Description: Inclusion of medical device and monitoring and control equipment in RoHS; changes to exemptions procedure; clarification of scope
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<b>COSTS</b>	<b>ANNUAL COSTS</b>		<b>Description and scale of key monetised costs by 'main affected groups'</b> UK manufacturers and component suppliers of electrical and electronic medical devices and monitoring and control equipment: Research and development (R&D) expenditure; Compliance cost expenditure; Capital and operating cost expenditure
	One-off (Transition)	Yrs	
	£ 0	11	
	Average Annual Cost (excluding one-off)		
	£ 45-92 million		<b>Total Cost (PV)</b> £ 401-829 million

**Other key non-monetised costs by 'main affected groups'** None

<b>BENEFITS</b>	<b>ANNUAL BENEFITS</b>		<b>Description and scale of key monetised benefits by 'main affected groups'</b> Benefits are difficult to monetise.
	One-off	Yrs	
	£ N/A	11	
	Average Annual Benefit (excluding one-off)		
	£ N/A		<b>Total Benefit (PV)</b> £ N/A

**Other key non-monetised benefits by 'main affected groups'** Reductions in human toxicity; Reductions in freshwater aquatic and sedimental toxicity; and reduction in terrestrial toxicity. Contribution to protection and promotion of Internal Market. Benefits from avoiding premature scrappage of equipment. Lower WEEE treatment costs.

**Key Assumptions/Sensitivities/Risks** One of main assumptions is the extent to which we think R&D costs have already been incurred by producers of Category 8 and 9 equipment to become RoHS compliant in anticipation of their equipment being included in the scope of ROHS. We also assume effective enforcement by the UK and also by other member States.

<b>Price Base</b>	<b>Time Period</b>	<b>Net Benefit Range (NPV)</b> £ N/A	<b>NET BENEFIT (NPV Best estimate)</b> £ N/A
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<b>What is the geographic coverage of the policy/option?</b>		UK		
<b>On what date will the policy be implemented?</b>		2010		
<b>Which organisation(s) will enforce the policy?</b>		NMO		
<b>What is the total annual cost of enforcement for these organisations?</b>		£ No additional		
<b>Does enforcement comply with Hampton principles?</b>		Yes		
<b>Will implementation go beyond minimum EU requirements?</b>		No		
<b>What is the value of the proposed offsetting measure per year?</b>		£ 0		
<b>What is the value of changes in greenhouse gas emissions?</b>		£ 0		
<b>Will the proposal have a significant impact on competition?</b>		No		
<b>Annual cost (£-£) per organisation (excluding one-off)</b>	Micro	Small	Medium	Large
<b>Are any of these organisations exempt?</b>	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices)

(Increase - Decrease)

**Increase**    £ 10-27k                      **Decrease**    £                      **Net Impact**    £ 10-27k

Key:

Annual costs and benefits: Constant Prices

(Net) Present Value

## Evidence Base (for summary sheets)

[Use this space (with a recommended maximum of 30 pages) to set out the evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Ensure that the information is organised in such a way as to explain clearly the summary information on the preceding pages of this form.]

### Purpose and intended effect

#### Objective

1. The European Commission's Proposal (COM(2008)809/4) to recast the Directive on the Restriction of the use of certain Hazardous Substances (RoHS) in new electrical and electronic equipment ('the RoHS Directive') has two main objectives.
2. The first is "*..to improve the Directive in terms of implementation, enforcement and coherence*", to achieve "*..better regulation..*" which is "*..an important element in the EU's Partnership for Growth and Jobs (Lisbon) strategy.*" (Page 2 of the Proposal).
3. The second is to conform with the RoHS Directive itself. Article 6 of the RoHS Directive calls for the Commission to review the Directive, with, in particular, reference to: the possible inclusion in the RoHS Directive of Category 8 (Medical devices) and Category 9 (Monitoring and control equipment) equipment of the Waste Electrical and Electronic Equipment (WEEE) Directive; and to consider adaptation of the list of substances restricted in the use of new electrical and electronic equipment (EEE) as presented in Article 4 of the current RoHS Directive.

#### Background

4. The RoHS Directive (Directive 2002/95/EC of the European Parliament and Council) was adopted on 27 January 2003 and came into force on the day of its publication in the Official Journal of the European Union on 13 February 2003. Member States had until 13 August 2004 to transpose the Directive into national legislation. The main prevention provision of the Directive (in terms of restricting the use of certain hazardous substances in new EEE) was to be implemented "*..from 1 July 2006.*" (Article 4.1 of the RoHS Directive).
5. The RoHS Directive is an Internal Market Directive based on Article 95 of the Treaty establishing the Community. It has two main aims. The first is to provide a European-wide legislative framework with respect to restrictions on the use of certain hazardous substances in new EEE, such they do not "*..create barriers to trade and distort competition..*" (Recital 1 of the RoHS Directive). The second aim is to "*..contribute to the protection of human health and the environmentally sound recovery and disposal of waste electrical and electronic equipment.*" (Recital 1 of the RoHS Directive).
6. The RoHS Directive restricts the use of six hazardous substances in new EEE that is put on the European market from 1 July 2006. The six substances are: lead, mercury, cadmium, hexavalent chromium, and two flame retardants - poly-brominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE).

7. The new EEE, to which the restrictions on the use of these substances apply, are those listed under a number of categories in the WEEE Directive. These categories are: Category 1 - Large household appliances; Category 2 - Small household appliances; Category 3 – IT and telecommunications equipment; Category 4 – Consumer equipment; Category 5 – Lighting equipment; Category 6 – Electrical and electronic tools; Category 7 – Toys, leisure and sports equipment; and Category 10 – Automatic dispensers. The RoHS Directive also applies to electric light bulbs, and luminaries in households.

8. The RoHS Directive explicitly excludes from its scope spare parts for the repair or re-use of EEE placed on the European market prior to 1 July 2006. This is to ensure the avoidance of premature obsolescence of this equipment.

9. As the RoHS Directive takes its scope from the WEEE Directive, it also implicitly excludes from its scope: large-scale stationary industrial tools; EEE intended to protect national security and/or for military purposes; EEE that is part of another piece of equipment not covered by the WEEE Directive; products where electricity is not the main power source; products where electrical and electronic components are not needed to fulfil the primary function; and batteries.

10. Article 5 of the RoHS Directive establishes a Committee procedure to amend the RoHS Directive, with specific reference to: establishing maximum concentration values (MCVs) for the hazardous substances restricted by the RoHS Directive; and exempting materials and components from these restrictions for technical, scientific, environmental, health and/or consumer safety reasons.

11. A number of Commission Decisions have resulted from this Committee procedure. These include: a Decision to allow up to 0.1% by weight in homogeneous materials of lead, mercury, hexavalent chromium; PBB; and PBDE; and up to 0.01% by weight of cadmium; and a number of Decisions exempting a range of specific applications of the restricted substances. There are currently 32 items listed in the RoHS Directive Annex as exemptions, with an additional 6 exemptions agreed but not yet published in the *Official Journal*.

12. The UK transposed the RoHS Directive into UK law by *The RoHS Regulations* (SI 2006 No.1463). These Regulations have since been updated and replaced by *The RoHS Regulations* of 2008 (SI 2009 No.37). Government Guidance Notes (URN 08/1061) support these Regulations.

13. The Secretary of State for Business, Enterprise and Regulatory Reform (BERR) is responsible for enforcing the UK's RoHS Regulations, and he has appointed the National Measurement Office (NMO), (formerly the National Weights and Measures Laboratory (NWML)) to act on his behalf in this capacity.

14. The UK's RoHS Regulations were supported by a full Regulatory Impact Assessment (RIA) when they were made in Parliament. This RIA (May 2006) was produced with the assistance of ERA Technology, commissioned by the Department of Trade and Industry ((DTI) now the Department for Business Enterprise and Regulatory Reform (BERR)) to help formulate estimates of the potential costs and benefits to the UK from implementing the RoHS Directive.

15. The RIA was unable to monetise the potential benefits from the UK's RoHS Regulations. Not only was it not possible to monetise the potential Internal Market benefits from the Regulations, but it was also not possible to monetise the potential environment and health benefits from the Regulations. This was because of very limited data and information being available on the specific trade barriers resulting from (the prior) existing, and unilateral, member State restrictions on hazardous substances in EEE, and because of very limited data and information on the harm or damage to the environment, human health, and animal health caused by the use of hazardous substances in EEE specifically.

16. The RIA did, however, explain the risks from using the hazardous substances that the RoHS Regulations restricted, and the possible reduction in these risks as a consequence of reduced use of these substances. Benefits were expressed qualitatively in terms of reductions in the risks of exposure leading to reductions in negative impacts on the environment, and on human health and animal health. Such benefits could occur at the production stage of EEE, and/or at the end-of life stage following recovery and/or disposal of WEEE. The RIA also noted the contribution the RoHS Regulations would make to maintaining and promoting the European Internal Market in EEE.

17. In terms of the costs of the RoHS Regulations, the RIA estimated that these would consist of research and development (R&D) costs, capital costs, additional operating expenditure, and administrative costs. The majority of the costs estimated were expected to be related to the restrictions on the use of lead.

18. Using a 'bottom up' estimate of costs being applied across an estimate of the possible number of businesses in the UK that could be affected by the RoHS Regulations the RIA estimated annualised equivalent costs of between £91 million - £170 million for the present value (2006 at the time) of total ten year costs of £700 million - £1300 million.

19. In the RIA, this 'bottom up' estimate was compared to a 'top down' estimate from industry that the RoHS Directive could cost UK businesses the equivalent of between 1 and 2 per cent of turnover. For an estimate of UK EEE sector turnover at the time, and based on the number of businesses that could be affected by the RoHS Regulations this implied costs in the range of £100 million - £200 million per annum over ten years.

## **Rationale for Government Intervention**

20. The main rationale for the Proposal to recast the RoHS Directive is to improve the workings of the RoHS Directive to achieve "*..better regulation..*" (Page 2 of the Proposal).

21. The ROHS Directive has the dual aim of promoting and protecting the Internal Market in electrical and electronic equipment (EEE), and of protecting the environment and human health and animal health with respect to EEE. The adoption by member States of diverging national standards and regulations in relation to hazardous substances in EEE can cause concern because these can form a barrier to trade – a so-called 'non-tariff trade barrier'. Removal of such non-tariff trade barriers (through harmonised requirements) can have positive impacts on efficiency, innovation, and subsequently, on growth. The negative externalities from the use of hazardous substances in EEE mean that the social costs of their use can exceed the private costs. This also provides a rationale for Government intervention.

## Consultation

22. The European Commission has undertaken two consultation exercises on the Proposal to recast the RoHS Directive and has also held a number of stakeholder workshops. In addition, it has commissioned its own research which has resulted in the following reports:

- *Review of Directive 2002/95/EC (RoHS) Categories 8 and 9 – Final Report*, ERA Technology (2006) – ‘the ERA Report’.
- *Study on RoHS and WEEE Directives Final Report*, Arcadis, Ecolas RPA (2008) – ‘the Arcadis Report’.
- *Study to support the Impact Assessment of the RoHS Review Final Report*, Bio Intelligence (2008) – ‘the Bio Report’.
- *Study on Hazardous Substances in Electrical and Electronic Equipment not regulated by the RoHS Directive*, Oko Institut e.V (2008) – ‘the Oko Report’

23. The UK Government published a consultation document on the Commission’s proposals to recast the RoHS Directive and the WEEE Directive on 7 April 2009. This consultation document “*..invites comments on the likely impact of the proposals on the UK, to enable the Government to take an informed view during the forthcoming negotiations on the Directives*” (Page 5).

24. In producing this Initial IA on the Commission’s proposals to re-cast the RoHS Directive, BERR has again commissioned ERA Technology to provide it with the relevant expertise to be able to formulate estimates of the potential costs and benefits of the Commission’s proposals to the UK.

## Options

25. The Commission’s Proposal to recast the RoHS Directive presents a number of options to achieve the objectives of improving the working of the RoHS Directive, and to satisfy the Directive’s own requirements for the Commission to look at possible amendments to the original text. These are presented as ‘a package’ which is reflected in the draft recast Directive itself. This Initial IA considers the additional costs and benefits of this package compared to a ‘business as usual’ case of not amending the current RoHS Directive.

26. The Commission’s Impact Assessment (IA) to support the Proposal outlines a number of issues with the RoHS Directive currently. The Proposal aims to address these. They include: uncertainty about which products fall within scope; divergent transpositions of RoHS across member States; divergent requirements across member States in respect of producers demonstrating compliance with RoHS, and member States’ enforcement of RoHS; perceived shortcomings in the exemptions procedure of RoHS; uncertainty with respect to spare parts; and the future status of Category 8 and 9 equipment with respect to the scope of RoHS. These are all discussed in the Costs and Benefits section below.

## Costs and Benefits

### *The current RoHS Directive - Costs*

27. The Commission's Impact Assessment says "*..there is little experience of actual compliance costs for industry..*" but gives an estimate of the costs of the current RoHS Directive in the range of 1-4 per cent of turnover for the products covered by RoHS, and says that recent surveys suggest a figure of 1.9 per cent of turnover. The Arcadis Report (Page 100) says that "*On average, the past cost impact of RoHS amounts to 1.9% of turnover of the companies in our sample.*" Arcadis also references a report by the Consumer Electronics Association (CEA) which says that "*..the total compliance cost for the industry on average amounts to 1.1% of industry revenue..*" These estimates are consistent with those presented in the final RIA produced by BERR (formally the Department of Trade and Industry (DTI)), and discussed above in paragraphs 17-19 of this IA which suggested that the costs of the original Directive to the UK could be in the region of 1-2 per cent of turnover or, at the time of writing (2006), £100 million-200 million per annum or, via an alternative estimate, equivalent to an annualised cost of some £91million-170 million per annum over ten years.

28. The Commission's IA outlines other costs from the current draft of the RoHS Directive which are not quantified in monetary terms. These include:

- The IA suggests that there is a high-level of non-compliance with the RoHS Directive, with many non-compliant products still being placed on the European market. It says that "*..first market surveillance campaigns show that in some cases (one MS) it can be as high as 44%.*" (Page 20). This figure may refer to the period immediately following the RoHS restrictions coming into force, and even here it is likely to have been the case that non-compliance related to one or two components in products that may contain 100 to over 1,000 components. Experience from the UK suggests that non-compliance, whilst being a challenge, does not amount to such a high percentage of EEE. The Arcadis Report says that for the UK "*Identifiable non-compliance..has been identified in less than 5% of points tested..*" (Page 14). The latest report from the UK's RoHS enforcement body says that "*..generally there have been high levels of compliance.*" (*Enforcement of the RoHS Regulations 2008*, National Weights and Measures Laboratory – 31 March 2009).
- The IA also suggests that there are currently excessive levels of exposure to hazardous substances by overseas dismantlers and recyclers and disposal operators involved in WEEE. However, if this WEEE is being transported from Europe illegally for dismantling, or disposal, it would appear that this activity would be more appropriately dealt with under the relevant European legislation aimed at preventing such practices. Moreover, effective enforcement of this legislation would lead to immediate benefits, if this type of illegal activity was reduced, whereas any benefits from re-casting RoHS would not be obtained for many years to come, and only after equipment becomes waste.

29. The Commission's IA says that the RoHS Directive has resulted in preventing significant quantities of the hazardous substances it restricts from *"..being disposed of and potentially released into the environment.."* (Page 11). Using figures from the Arcadis Report, the Commission's IA quotes numbers in the region of 89,800 tonnes of lead, 4,300 tonnes of cadmium, 537 tonnes of hexavalent chromium, 22 tonnes of mercury and 12,600 tonnes of the flame retardant Octa-BDE.

30. However, these figures are open to question. Arcadis say in their Report that they did not obtain data from electrical equipment manufacturers of the chemical composition of typical electrical products, and so used *"..the available literature.."* (Page 58) to estimate the volume of RoHS substances in EEE prior to RoHS. But some of the estimates for RoHS substances Arcadis present in Table 4.35 of their Report appear to show very high levels of substances for 'modern' equipment put on the market prior to RoHS being adopted (in 2003). For example, estimates of cadmium used in refrigerators and photocopiers look very high. The use of cadmium in pigments and stabilisers was banned by Directive 91/338/EC prior to RoHS, and its use as a braze alloy in refrigerators was also discontinued prior to RoHS. The quantities of lead in several of the product listed also appear high. For example, the figures for 716-1549 grammes of lead per photocopier do not appear consistent with the volumes of lead likely to be used in 'modern' photocopiers placed on the market just prior to RoHS being adopted in 2003. A Report by Van Holsteijn en Kemna (VHK) for the Commission (*Methodology Study Eco-design of Energy Using Products (2005)*), to provide supporting data for the Energy using Products (EuP) Directive, shows levels of hazardous substances used in pre-RoHS EEE at significantly lower levels than those quoted in the Arcadis Report.

31. Annual average world consumption of lead is in the region of some 6.5 million tonnes, of which around 0.5 per cent is estimated as being used in electronic soldering (some 32,500 tonnes). It has been estimated that around 20 per cent of the world's EEE is sold in Europe, and of this some 60 per cent is in the scope of the RoHS Directive. Lead is also used as a PVC stabiliser, and an estimate is that some 2 per cent of total lead is used in this application. Of this, it is also estimated that one-quarter of this is used specifically in EEE. Recycled lead will also be used in EEE, and to some extent this will complement the use of primary lead and to some extent it will substitute for this use. If we assume it adds 50 per cent to virgin use then all of the above would imply that the RoHS Directive has restricted the use of lead in EEE by about some 11,700 tonnes per annum and not the 89,800 tonnes quoted in the Arcadis Report.

32. In terms of cadmium, one of the main uses is in batteries (Nickel-Cadmium (Ni-Cd) batteries) which are outside of the scope of RoHS. Another main use is in plating, but this application largely applies to aircraft and military applications which are excluded from RoHS. Cadmium is also used in alloys, likely to be used in switch contacts, but these are currently exempt from RoHS. Work for the European Commission undertaken in 2002 (*Heavy Metals In Waste*, Feb 2002, COWI) suggested that 30-40 tonnes of cadmium were used for 'alloys' in the EU in 2000 (although this excludes EEE imported into the EU). However, a significant proportion of this total would have been used in applications outside of the scope of, or exempt from, RoHS. It is thus not clear that RoHS has had the significant impact on the use of cadmium to the extent outlined in the Commission's IA.

33. For mercury, the use of mercury in fluorescent tubes is exempt from the RoHS Directive, although the quantity of mercury used in this application has decreased significantly as lamps with lower mercury content have been developed. In addition, one of the other main uses is in thermostats which fall under Category 8 and 9 of the RoHS Directive and which are currently outside of scope. It is thus also not clear that RoHS has had a significant impact on the use of mercury. There is, however, other legislation (originating principally from the US) which has resulted in significant reductions in the use of mercury worldwide.

34. Whilst many manufacturers of EEE have phased out the use of hexavalent chromium (CrVI) passivation processes because of RoHS, not all of the CrVI used in such processes ends up being applied as a coat, and so estimates of volumes used in the production process may not represent estimates of volumes avoided in EEE from any restrictions. However, there is a potential benefit to workers and the environment from the phase out of processes using CrVI as a consequence of RoHS.

35. The main use of PBB is in high voltage transmission cable insulation which is outside of the scope of RoHS, and so the benefits from restricting PBB under RoHS are unclear. By 2004, there were only three commercial PBDEs being manufactured in the World. Two of these, octa-BDE and penta-BDE were banned by the Marketing and Use Directive (2003/11/EC) which predated the RoHS restrictions. A comprehensive risk assessment of Deca-BDE concluded that it posed no significant risks, although the assessment recommended further testing to be undertaken.

36. All of the above suggests that the benefits from RoHS in terms of the avoided use of certain hazardous materials and substances may be significantly less than suggested in 'The Arcadis Report' and presented in the Commission's IA.

37. The Commission's IA also outlines a number of other benefits from the current RoHS Directive which are not quantified. These include:

- The IA says that the RoHS Directive can reduce the risks of exposure to hazardous substances of workers producing EEE, of consumers when using EEE, and of those operating in the 'downstream' industry dismantling, treating, and recovering WEEE. However, workers producing EEE in Europe are protected to some degree already by a range of health and safety legislation in relation to exposure to hazardous substances. Such legislation is also likely to apply to those operating in the 'downstream' industry, treating and recovering WEEE. In addition, it is not clear, from research undertaken and risk assessments produced (including those produced for the Commission on PBDE's, hexavalent chromium, and cadmium), that consumers of EEE are exposed to any significant degree from hazardous substances contained in the EEE they purchase and use.
- The Commission's IA also mentions possible 'first mover advantage' from the RoHS Directive. While this is possible for the 'downstream' industry, it is not clear that manufacturers or producers of EEE within Europe will gain any such advantages given that the RoHS Directive applies to products placed on the European market irrespective of where they are produced. There is also a potential disadvantage to European producers competing in markets where the RoHS restrictions do not apply and where their competitors do not need to incur the costs of complying with the RoHS restrictions.

- The Commission's IA discusses the 'illegal trade' in WEEE in the sense that WEEE is exported for recycling or dumping overseas to lower standards/requirements than exist in Europe. This takes place presumably to avoid cost. The RoHS Directive is justified here on the grounds that because such trade takes place the restriction of certain hazardous substances will prevent exposure to those involved in dismantling WEEE outside of Europe. However, any 'illegal trade' in WEEE is contrary to the European Waste Framework Directive, and contrary to the European Shipments of Waste Regulations. This legislation is intended to minimise the risks of such 'illegal trade', and if there are significant levels of such activity it would appear more appropriate to examine, and reform if needed, this legislation (or at least the way it is enforced) to deal directly with the problem rather than to introduce, or amend, the RoHS Directive to deal with this problem, in effect, in an indirect manner.
- The Commission's IA says that hazardous substances are often used in EEE because they are "*..the cheapest technical solution..*", and that RoHS helps to overcome this, what can be termed, 'myopic behaviour'. However, it is not clear that this is always the case. There are specific properties of lead, cadmium, mercury and hexavalent chromium which by their nature make them the best technical solutions across a range of applications. For example, lead-based optical glass is more expensive than lead-free optical glass (because of the additional hygiene precautions which need to be taken when using lead in this application), and so is used only where its specific technical properties are needed.

## Sectors and groups affected

38. The draft recast RoHS Directive affects a wide range of EEE manufacturers, professional importers, component suppliers, product assemblers, and distributors/retailers of EEE. It also has an impact on the 'downstream' industry treating, recycling and disposing of WEEE.

39. The 2006 RIA for the original RoHS Directive suggested that based on Standard Industrial Classification (SIC) data some 3,750-7,500 UK businesses could be affected by the RoHS Directive. The main impacts of the draft recast Directive will be on manufacturers, professional importers, component suppliers, and product assemblers of Category 8 and Category 9 EEE.

40. SIC code 33.10 *Medical and surgical equipment and orthopaedic appliances* contains (for 2007) 955 VAT registered businesses of which almost two-thirds have less than ten employees. SIC Code 33.20 *Instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment* contains 1,820 businesses (2007), again with two-thirds employing less than ten people. SIC code 33.30 *Industrial process control equipment* contains 360 businesses (2007). This implies that inclusion of Category 8 and 9 equipment in the RoHS Directive could impact on some 3,135 UK manufacturers. However, not all of these businesses will be producing electrical and electronic equipment and so a figure in the region of 50 per cent of this total, or just over 1,500 may be a more reasonable estimate.

## **Benefits of Proposal**

41. The Commission's IA outlines a number of benefits from its Proposal to re-cast the RoHS Directive. The main benefits are discussed below.

### **Scope (Article 2, Annex I and Annex 2 of draft recast Directive)**

42. The RoHS Directive currently takes its scope from the WEEE Directive. The WEEE Directive has a legal basis of Article 175 of the Treaty establishing the Community which means that member States can go beyond its provisions in the interests of environmental protection. The fact that RoHS is an Article 95 Directive raises the potential conflict, following transposition by member States, of what products are covered by the WEEE Directive and what are covered by the RoHS Directive. The Commission's IA says that this results in "*continued environmental harm from products which are in practice treated as outside the Directive's scope..*" (Page 16). Conversely, manufacturers would be detrimentally affected if a member State were to incorrectly include their product in the scope of RoHS.

43. The Proposal to recast the RoHS Directive is to base the scope of a recast Directive on the text of the WEEE Directive. This is reflected in Article 2 of the draft recast Directive, in particular the reference to, and insertion in Annexes, of the product lists of the WEEE Directive (Annex 1A and 1B of the WEEE Directive). These lists would then "*..be binding..and can be amended through Committee procedure.*" (IA, Page 24)

44. Such a change to the RoHS Directive is expected to reduce uncertainty and so reduce compliance costs to businesses. However, the WEEE Directive lists themselves cause issues because Annex 1B of the WEEE Directive is an indicative list of products which refers to categories of products "*including..*" the products listed. They are thus not exclusive or exhaustive lists of products. Copying these lists into a new RoHS Directive does not in itself remove uncertainty surrounding scope, though it does provide a mechanism (via a European Technical Adaptation Committee (TAC)) to define whether a particular product is in or out of scope. There should be some benefits from reducing uncertainty with respect to scope here, but it is difficult to quantify any potential benefits at this stage. Any benefits will depend on the detail of exactly how the scope of RoHS will be more clearly defined in the future.

### **Spare Parts/ Repair as Produced Principle (Article 4.1 of draft recast Directive)**

45. Currently under the RoHS Directive spare parts for the repair of EEE that was first placed on the market prior to the RoHS Directive coming into effect (i.e. prior to 1 July 2006) are exempt from the RoHS Directive. This is to ensure that EEE which requires repair can be repaired and does not arise as waste prematurely.

46. The Commission's IA says that the current RoHS Directive does not define 'spare parts,' and to do so would reduce legal uncertainty and increase clarity. Yet the draft recast Directive does not define 'spare parts' and so it is not clear that there are any additional benefits in this area from the Proposal as drafted.

47. The Proposal does, however, introduce the 'Repair as produced principle' (Article 4 of the draft recast Directive). In the context of RoHS this means that EEE which benefits from an exemption to RoHS can be repaired with spare parts that are themselves not compliant with RoHS. This again is to ensure that waste is not produced prematurely, and will bring benefits, but these are difficult to quantify accurately. But, taking an example of a supercomputer, if this requires a replacement part covered by an exemption but this exemption has been deleted (because a manufacturer now has a substitute for new supercomputers), but this substitute cannot be retro-fitted to older equipment, then the 'Repair as produced principle' could save significant resources, and avoid premature obsolescence, in not requiring replacement of the whole existing supercomputer with a new one, costing potentially several millions of pounds. However, it is difficult to value the potential benefits here because they depend on exemptions being removed (and this in itself may not be desirable, or possible), and the type and volume of existing equipment affected subsequently.

### **Exemptions (Article 5 of draft recast Directive)**

48. The current RoHS Directive provides for a committee procedure to enable exemptions to the restrictions on hazardous substances to be granted for certain applications and materials. 32 exemptions have been included in the Annex of the RoHS Directive with a further six agreed more recently.

49. These exemptions need to be reviewed at least every four years, but are to remain as exemptions unless such a review positively recommends that the exemption is no longer warranted, or if an expiry date is set when the exemption is granted.

50. The Bio Report suggests that the exemptions procedure currently is "*..unstable..*" because there are increasing numbers of exemption requests, and the application for exemptions reduces the environmental benefit of the Directive and the incentive for industry to find substitutes.

51. However, it is not clear that this is necessarily the case. The number of exemption requests has decreased considerably in the last couple of years, and one exemption with a specified expiry date has expired as it was no longer needed. The current review of exemptions has recommended that at least 7 current exemptions are deleted and the scope of a number of others be limited.

52. Under the current Proposal, the draft recast Directive (Article 5) says that any exemptions granted under the new RoHS Directive "*..shall have a maximum validity period of four years and may be renewed.*" This means that under the Proposal the status of applications and materials granted exemptions will effectively be reversed, from the current situation where the exemption is to continue unless positively deleted, to the situation where the exemption will terminate unless positively extended. This change is expected "*..to stimulate substitution efforts..*". However, exemptions allow manufacturers the scope to produce products where no alternatives are available currently, and do encourage research into substitutes, which are used where they can be identified.

53. The Proposal also recommends the introduction of a 'substitution plan'. Such a plan is to be presented by manufacturers, or their trade associations, when they are seeking an exemption.

Presumably such a plan is also to be presented in support of any application to extend an exemption beyond four years, though this is not clear from the text of the Proposal.

54. The Bio Report suggests that requiring producers who apply for an exemption also to produce a 'substitution plan' *"..might alleviate the workload of those reviewing the exemption applications."* (Page 146). The idea here is that as it is believed that under the current exemptions procedure it is not always clear that the applicant has provided the complete and relevant information, clarification of what an applicant needs to provide should speed up the assessment of exemption requests. However, it is also possible that the applicant is simply unaware of possible alternatives that could be suitable.

55. The proposed substitution plan could be either "light" or "full" where the light version would cover a basic analysis of alternatives, and a full version would cover a comprehensive analysis of alternatives.

56. However, it is difficult to quantify the overall benefit from requiring producers to provide a substitution plan when they apply for an exemption. Applications will still need to be assessed on behalf of the Commission by technical experts, and this may need to be enhanced to evaluate substitution plans. There will still be a requirement for exemption requests to be 'turned around' as quickly as possible (particularly following assessment by consultants) to reduce uncertainty and enable industry to invest with confidence. The Arcadis Report (page V) notes that *"..the exemption process itself, often taking more than a year to complete, is considered to be a barrier to research and development for new innovations."* This is particularly the case where research and development is undertaken by Universities on behalf of businesses, which can often use students who are available for only one to three years, and so delays of over a year can disrupt such research, and add to costs and uncertainty.

57. Though review of the exemptions process is necessary and improvements in its operation are needed, it is not clear that a 'one size fits all' approach to exemptions is appropriate. For example, almost one-third of the current exemptions are unlikely to find technical solutions to replacement of the use of hazardous substances in the next 10-20 years. This is likely to also be the case for a range of applications for medical devices, if such equipment is bought into the scope of ROHS. However, there should be some benefits from greater clarity of what data is expected in the future with respect to exemption requests, but given that the details of any new system are not clear at present, it is difficult to quantify benefits in respect of this part of the Proposal.

#### **Substances (Article 4 and Annex IV of draft re-cast Directive)**

58. The Commission appointed *Oko Institut* to undertake research on the possible inclusion in the RoHS Directive of hazardous substances additional to those covered by the existing text. This research resulted in a report ('the Oko Report') which produced a list of substances which could possibly be bought inside the scope of RoHS.

59. However, the Commission's IA notes that *"the available data..do not allow to decide that for any of the ..candidate substances a ban under RoHS would bring more environmental, economic or social benefits than the respective costs it is likely to incur.."* (Page 64). The draft

of the recast Directive thus does not propose to include any additional substances to be covered by RoHS, and thus no additional benefits are expected here from the recast Directive.

### **Category 8 and 9 Equipment (Article 2, Annex I and Annex 2 of draft recast Directive)**

60. Medical devices (Category 8 equipment of the WEEE Directive), and Monitoring and Control Equipment (Category 9 of the WEEE Directive) are excluded from the scope of the RoHS Directive currently.

61. The Bio Report and the Commission's IA both say that Category 8 and 9 equipment were originally excluded from the RoHS Directive because of issues over their reliability if they had to employ lead-free solder. However, it is likely that these Categories of products were also excluded because they were generally not discarded in the same manner as other Categories of EEE.

62. There are high levels of re-use of Category 8 and 9 equipment in terms of whole products and in terms of components and parts. There is also an active second-hand market worldwide in these categories of equipment. Moreover, given the nature and size of this equipment when it is discarded it is either disposed of in an alternative manner to general waste (e.g. because it is infected or contaminated) or it enters a recycling process because of the volume of the metals that it contains. The exceptions to this are small consumer products such as smoke detectors and blood pressure monitors, but these contain relatively small amounts of hazardous substances. Thus even where Category 8 and 9 equipment contains hazardous substances they are unlikely to end up in landfill or be incinerated in any significant amount.

63. In terms of Category 8 and Category 9 products the Commission's IA says that "*..studies show that only 50% (medical devices) to 65% (control and monitoring instruments) are being separately collected (at the end of their life)..*" (Page 20).

64. However, the basis of these estimates is open to question. There is no firm data on how much Category 8 and 9 equipment reaches the end of its life in any particular year, as opposed to how much new equipment is put on the market for the first time each year. In addition, given that the majority of Category 8 and 9 equipment is unlikely to be discarded with other forms of waste at the end of its life, because of its specialised nature, and in the case of Category 8 because of its potential to be contaminated or infected, it could be argued that estimates of 50-65% separate collection appear low.

65. Further, it is likely to be the case that a proportion of Category 8 equipment in particular, and also some Category 9 equipment does not arise as waste in one of the 27 member States because it is exported as second-hand equipment to be used in a country outside of the Community. This means that it is not waste when it is exported, but rather exported as a used/second-hand piece of equipment, and in turn this means that the amount of waste Category 8 and 9 equipment arising in the Community will not be equal to the amount of new equipment in these categories that is placed on the market in any particular year.

66. In addition, Categories 8 and 9 are covered by the WEEE Directive in terms of the separate collection requirements of the WEEE Directive. Thus where they arise as waste they are

subject to the treatment requirements of the WEEE Directive which means the risks they pose to the environment following discard should be mitigated somewhat already. Category 9 equipment is also subject to the recovery targets of the WEEE Directive. Though Category 8 equipment is not subject to the recovery targets of the WEEE Directive, it is likely that following treatment such equipment may well enter a recycling process in any case where it contains reasonable, or significant, amounts of metals.

67. Discussions with the UK 'downstream' industry suggest that there is very little lead in shredder residue sent for disposal. Lead where it arises with other metals at the end of the shredding process is normally sent to heavy media separation plants, where various metals are segregated for sale for reprocessing. Lead is generally collected in mixed heavy metals loads (including such other metals as brass and copper), and these loads are in turn sent for refining.

68. All of this suggests that the majority of Category 8 and 9 equipment which arises as waste in the UK is unlikely to result in significant harm to the environment currently.

69. A report by ERA Technology for the Commission (*Review of Directive 2002/95/EC Categories 8 and 9*, (2006)) estimated that the amounts of the hazardous substances covered by RoHS used in the manufacture of Category 8 and 9 equipment in the EU were in the region of: 1400 tonnes of lead; 2.2 tonnes of cadmium; 0.03 tonnes of mercury; and 0.8 tonnes of hexavalent chromium per annum.

70. The Bio Report (page 41) estimates the amount of hazardous substances that could be saved from use through a range of different options for inclusion of Category 8 and 9 equipment within the scope of RoHS. For the option that is closest to the one presented in the draft recast Directive, the Bio Report implies that over ten years (from 2010 to 2020) inclusion of Category 8 and 9 equipment within RoHS could reduce lead use by some 20 per cent; Cadmium use by some 5 per cent; Mercury use by some 35 per cent; and Hexavalent Chromium use by some 60 per cent. In terms of tonnages this amounts to some 2800 tonnes of lead, 1.1 tonnes of cadmium, 105 kg of mercury, and 4.8 tonnes of hexavalent chromium not being used in EEE across the EU over a ten year period to 2020.

71. The ERA Report (2006) provides estimates of the reduction in the hazardous substances that could result from inclusion in RoHS of Category 8 and 9 equipment. These estimates take into account expected exemptions and voluntary substitutions. Using these estimates (Table 11, Page 71 of ERA Report) and the assumption that the UK uses Category 8 and 9 equipment in proportion to its share of EU GDP, would imply estimated benefits to the UK of a reduction in these hazardous substances in the region of some 650 tonnes of lead, 70 kilogrammes of cadmium, 12 kilogrammes of mercury, 900 kilogrammes of hexavalent chromium, and 12 tonnes of the flame-retardant deca PBDE over a ten year period to 2020.

72. The Bio Report presents some analysis of the potential negative impacts of the substances restricted by RoHS as they apply to the estimated volumes currently used in Category 8 and 9 equipment. These potential negative impacts, shown in Table 1 below, are for the EU and so benefits to the UK would be a percentage of these levels, though the 'normalised' impacts could be expected to be the same for the UK. These 'normalised' impacts are negative impacts generated by EU citizens in 'everyday activities', and when compared to these 'normalised impacts' Bio concludes that *"..the impacts of RoHS substances in Cat.8 and 9 equipment are extremely small."* (Page 49). For example, the Bio results suggest that including Category 8 and 9 equipment in RoHS will have a positive impact on reducing the potential for human

toxicity but that this positive impact represents a reduction of 1/3 of 1/1000 of 1 per cent from current levels of potential toxicity experienced by citizens in normal everyday activities.

**Table 1: Toxicity potential of ROHS restricted substances contained in Category 8 and 9 products 2010-2020 (Bio Report – page 45, page 49)**

Indicator	Unit	Scenario 1	Scenario 2	Normalised Scenario 1	Normalised Scenario 2
Human toxicity	Kg 1.4-DB eq	8.54E+06	3.31E+07	0.000009%	0.00033%
Freshwater aquatic ecotoxicity	Kg 1.4-DB eq	7.80E+05	3.07E+06	0.00012%	0.00046%
Freshwater sedimental ecotoxicity	Kg 1.4-DB eq	2.00E+06	7.88E+06	0.00029%	0.00115%
Terrestrial ecotoxicity	Kg 1.4-DB eq	5.49E+04	2.12E+05	0.0009%	0.00034%

### Placing on the market, monitoring and enforcement (Articles 7-17 of draft recast Directive)

73. Articles 7-17 of the draft recast RoHS Directive introduce product conformity assessment requirements and market surveillance mechanisms in line with the European “Marketing of Products” package (Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93; and Decision No. 768/2008/EC of the European Parliament and of the Council).

74. Under draft Articles 7-17, manufactures, their authorised representatives, professional importers and distributors of new EEE have obligations to ensure that new EEE they place on, or sell within, the European market conforms with the RoHS Directive, is CE marked to demonstrate such conformity, and is supported by relevant technical documentation, and information on the manufacturer.

75. BERR produced an IA to estimate the costs and benefits of the EU Regulation for accreditation and market surveillance (so called ‘RAMS’, or more formally the ‘New Legislative Framework’ (NLF)) which applies to all European ‘harmonising’ legislation, and implicitly includes the ROHS Directive in its scope. Any benefits to the UK accruing from Articles 7-17 of the draft recast RoHS Directive, with respect to the operation of the Internal Market in EEE have thus already been accounted for in the IA for RAMS.

76. Where increased market surveillance leads to increased levels of non-conforming products in terms of RoHS being removed from the market there will likely be some environmental benefit. There should also be a benefit to suppliers who would otherwise have been harmed by ‘unfair’ competition in relation to non-compliance. However, the UK already has a very active enforcement regime for RoHS which has contributed to achieving, estimated, quite high levels of compliance with RoHS in the UK.

77. The proposal to introduce harmonised standards in relation to the conformity assessment of EEE with respect to RoHS (Article 16 of the draft recast Directive) should give manufacturers greater confidence when assessing their products (when the standards are agreed). It should also give them greater confidence in relation to testing undertaken by the enforcement authorities as they should be using the same methods as the manufacturers themselves. Less unintended non-compliance (with the associated costs this involves) should result, but again it is difficult to quantify these benefits at this stage.

78. The inclusion of Category 8 and 9 equipment within the scope of the RoHS Directive should also contribute to protection of the Internal Market in such equipment. However, it is not clear to what extent diverging national practices in relation to the use of the 6 restricted substances in RoHS present barriers to trade at present, and thus it is difficult to quantify any benefits to the Internal market from the Proposal currently.

79. Table 2 provides a summary of the benefits to the UK of the Proposal.

**Table 2: Summary of Estimated Benefits of the Proposal**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Category 8 and 9 Equipment Inclusion</b> – Reduction in human toxicity, reduction in freshwater aquatic and sedimental toxicity, and reduction in terrestrial toxicity from reductions in use of hazardous substances.												
Contribution to protection and promotion of Internal Market.												
Reduction in use of Lead (tonnes)*						81	85	89	93	97	102	102
Reduction in use of Cadmium (tonnes)						0.01	0.01	0.01	0.01	0.01	0.01	0.01
Reduction in use of Hexavalent Chromium (CrVI) (tonnes)						0.13	0.13	0.13	0.13	0.13	0.13	0.13
Reduction in use of Mercury (tonnes)						0.002	0.002	0.002	0.002	0.002	0.002	0.002
Reduction in use of Deca PBDE						1.67	1.67	1.67	1.67	1.67	1.67	1.67
<b>Scope</b> – Reduction in uncertainty and potential savings on administrative and legal costs.												
<b>Repair as Produced Principle</b> – Potential savings from avoiding premature obsolescence of certain EEE.												
<b>Exemptions</b> – Potential environmental benefit from quicker take-up of substitutes.												
<b>Placing on the Market</b> – Less unintended non-compliance, subsequent lower administrative costs, and potential environmental benefits.												

\* Estimates for rising reductions in use of lead over time reflect predicted benefits of research to find substitutes for applications covered by expected exemptions.

## **Costs of the Proposal**

80. The Commission's IA outlines a number of costs from its Proposal to re-cast the RoHS Directive. The main costs are discussed below.

### **Exemptions (Article 5 of draft recast Directive)**

81. Under the current Proposal, the recast Directive says (in draft Article 5.2) that any exemptions granted under the new RoHS Directive “..shall have a maximum validity period of four years and may be renewed.”

82. This means that under the Proposal the status of applications and materials granted exemptions will effectively be reversed from the current situation where the exemption is to continue unless positively over-turned, to the situation where the exemption is not to continue unless renewal is agreed.

83. The Proposal also recommends the introduction of a ‘substitution plan’. Such a plan is to be presented by manufacturers when they are seeking an exemption, and presumably is also to be presented to prevent automatic expiration after four years (if exemption is granted in the first place).

84. The Bio Report gives estimates of the costs of a ‘light substitution plan’ in the region of 22,000 euro, and of a ‘full substitution plan’ in the region of 57,000 euro. The Bio Report concludes that either a light plan or full plan “..seem most promising..” (Page 155). The cost of such plans could have a disproportionate impact on small and medium-sized enterprises (SMEs), and where the exempt application uses only very small amounts of RoHS substances. For example, some of the exemptions required for Categories 8 and 9 equipment are estimated to use less than 1 gram of lead per year.

85. Annex VI of the draft recast RoHS Directive, lists 24 applications with respect to Category 8 and 9 equipment which could be granted exemptions if Category 8 and 9 equipment are bought within scope of the RoHS Directive. These exemptions are taken from the ERA Report undertaken for the Commission in 2006 (Table 71, page 242-244). Since the ERA Report, manufacturers have suggested that they may need another 30-40 exemptions. This is a consequence of further research being undertaken, and it is not surprising that manufacturers are finding the need for additional exemptions – the majority of the exemptions currently in the Annex of the RoHS Directive were only identified and requested after RoHS was adopted originally.

86. There are currently approximately 32 exemptions under the RoHS Directive each of which is assessed at least every 4 years. Including Category 8 and 9 equipment could raise this total to potentially some 80 exemptions. The cost for preparation of substitution plans for this level of exemptions could thus be €1.76 million or €4.56 million every four years. This would be shared between all manufacturers worldwide and the cost to the UK would be a proportion of this based on the proportion of UK manufacturers requiring exemptions. We estimate that UK manufacturer costs could be in the region of £100,000-300,000 once every four years, given that the EU is estimated to represent 40 per cent of the global Category 8 and 9 markets and if we assume UK is around one-sixth of this EU market in total. In addition to these costs there

will be administration, travel (for meetings) and consultant costs which could potentially double these figures.

### **Category 8 and 9 Equipment (Article 2, Annex I and Annex 2 of draft recast Directive)**

87. The complex nature of Category 8 and 9 equipment and the number of specific types, models and applications they perform often under relatively extreme, or important, conditions means that any re-design and re-build costs from RoHS type restrictions applied to these categories of equipment are likely to involve higher costs relatively than for products in more 'standard' product categories, such as large and small household appliances.

88. The Bio Report, quoting the earlier ERA Report for the Commission, says that *"failure of products in these categories can potentially have severe consequences including losses of life and serious environmental damage."* (Page 51). It is thus clear that many Category 8 products are important products in terms of health and safety. What is less obvious, is that Category 9 equipment is also important because as Bio correctly points out *"..other product groups, including medical devices are only as good as the testers (Category 9 products) verifying their performance."* (Page 54).

89. The Bio Report says that for Category 8 and 9 products *"..bringing these categories into scope will require significant substitution and redesign of a large number of products."* (Page 52). Thus the Report, echoes the ERA Report for the Commission (2006), when it says that these impacts can be mitigated somewhat by delaying the introduction of inclusion within scope to a future date.

90. Section 9.3 of the ERA Report (Pages 139-149) analyses the time period over which Category 8 and 9 equipment could be incorporated into RoHS given the necessity to undertake research and development, and the requirements to comply with other legislation (particularly for medical equipment) in terms of testing and trials to obtain approval before new equipment can be placed on the market.

91. The ERA Report concluded that between 6 and 7 years would be needed for Category 8 and 9 equipment to be incorporated into RoHS, in terms of technological and administrative requirements. It should be remembered that the ERA Report was not a cost-benefit analysis (CBA). ERA said that *"the longer period.. allows time for the additional requirements placed on medical equipment manufacturers which for technically complex products can be as much as 3 years or longer..(and)..a similar situation exists with any other safety critical Category 9 product."* (Page 141). An example of this timeline for Category 9 equipment compared to that for consumer equipment is outlined in Table 3 below.

**Table 3: Timescales for new model launch comparing ‘Test’ equipment with an example of consumer equipment**

<b>Phase</b>	<b>Test equipment</b>	<b>Mobile Phone</b>
Average time between launch of one model and its replacement	7 years	~ 6 months
Model development time	4-7 years	<1 year
Reliability testing time	4 years	0.7 years
Time required to obtain approvals	Up to 2 years	< 6 months
Time between start of research and launch	10-13 years	<2 years

92. The current Proposal for inclusion of Category 8 and 9 equipment within RoHS is outlined in the draft of Article 4.3 of the recast Directive. This gives the timeline for equipment to come into scope as follows: medical devices from 1 January 2014; monitoring and control instruments from 1 January 2014; In vitro diagnostic medical devices from 1 January 2016; and industrial monitoring and control instruments from 1 January 2017. Although ERA concluded in 2006 that it would be possible to include most EEE in categories 8 and 9 in scope of RoHS in 2012, during the last three years a number of manufacturers have undertaken further research and discovered that 2014 would be a more realistic date. In addition, the Bio Report estimated that the quantities of RoHS substances used for Categories 8 and 9 would be similar in 2014 as for 2012, and so the Commission’s Proposal uses the later date.

93. In terms of the changes to the Exemptions procedure outlined in the Proposal, the option that exemptions will automatically expire (unless renewed) after 4 years has specific implications for Category 8 and 9 equipment. Table 4 below outlines the timescales required to undertake research and development (R&D), reliability testing, and obtain approvals for new types of typical consumer equipment compared to typical medical devices. Under the current draft of the recast Directive an exemption will expire after 4 years unless its renewal is sought. To obtain such a renewal a manufacturer would need to apply some 18 months before the exemption is to end to ensure sufficient time for a request to be assessed, agreed at technical committee, and published in the Official Journal. This 4 year timescale should not be a significant problem for consumer equipment (as Table 4 shows), but for a typical medical device 4 years may be too short. Research to identify a substitute will take a significant period of time, and it is not unusual for research projects of this type to take more than 2 years. For Category 8 (and some Category 9) equipment there is the additional obligation to carry out reliability testing and also clinical trials to obtain approval for new equipment designs. The current proposal for a maximum 4 year exemption (unless renewed) thus appears unworkable for Category 8 and 9 products.

**Table 4: Timescale required for R&D and application for exemptions where no substitutes can be identified**

Time required	Typical consumer product	Typical medical device
R & D to identify alternative to exempt material	Can be about 3 months if a design change is possible (otherwise longer)	Likely to take >2 years to identify alternative material or design (although may be much longer, or may not be possible)
Reliability testing and validation	2 – 3 months or less	1.5 years typically
Gaining MDD* approvals	Not required	1 year (EU and RoW)
Deadline of application to renew exemption	18 months	18 months
Total time period	< 2 years	>6 years

\*Medical Devices Directives

94. In terms of the actual expenditure Category 8 and 9 equipment manufacturers would need to incur to comply with the RoHS Directive, this is expected to be largely in terms of research and development (R&D) to substitute the restricted substances. There are also expected to be costs in terms of additional operating costs from using substitutes to the restricted substances, and costs in terms of compliance with RoHS. There are not expected to be significant capital costs from the inclusion of Category 8 and 9 equipment in RoHS because most UK manufacturers of this equipment generally sub-contract out to third parties the assembly of printed circuit boards (PCBs) and specialist components. It is possible, however, that some UK sub-contractors will need to obtain new equipment suitable for lead-free processes and possibly also for chromate-free passivation treatments.

### Cost Estimates of the Proposal

95. In estimating the potential costs of the Proposal we follow the method used in the DTI's original RIA for the RoHS Directive and employ two estimates. One estimate can be viewed as a 'top-down approach' based on costs as a percentage of turnover of the relevant sectors affected, and the other can be seen as a 'bottom-up approach' based on estimates of the resources that may need to be employed to achieve the objectives of the Proposal.

96. Before turning to these estimates we can glean a possible cost to the UK from the Commission's own IA, based on work by Bio and reflected in their Report .

97. The Bio Report (Page 79-80) presents estimates of the size of the markets for Category 8 and Category 9 equipment based on estimates of total annual sales. Bio derives an estimate of the global market for medical devices covered by Category 8 of some 100 billion euro of sales. These estimates are based on estimates from COCIR (2007). We assume these sales estimates represent 2006 sales.

98. Bio further assume that the EU represents one-third of global sales and so estimates the EU market for medical devices potentially to be covered by a recast RoHS Directive as worth some 33 billion euro.

99. In terms of monitoring and control equipment (Category 9 equipment) Bio provide an estimate for global sales of industrial Category 9 test equipment of some 29 billion euro in 2005. Using an estimate that the EU represents 25 per cent of the World market, Bio provide a figure of some 7.2 billion euro as the size of the EU market for Category 9 equipment in terms of the value of sales.

100. Bio do not present an estimate of the size of the non-industrial Category 9 test equipment market for Europe, so any estimates produced using their estimates will be under-estimates of the total costs of including Category 9 equipment within ROHS, as non-industrial monitoring and control equipment are to come into the scope of RoHS in 2014 under the current draft recast RoHS Directive.

101. The Bio Report says that the 'European health care industry associations' estimate the additional costs as a consequence of including Category 8 equipment in the scope of ROHS in the range of 1-4 per cent of the value of the market.

102. Based on these estimates and a number of assumptions we can estimate a cost to UK manufacturers, in terms of turnover, from inclusion of Category 8 and 9 in RoHS. The additional assumptions are:

- i) We take the euro/£ exchange rate as an average for the year to date;
- ii) We assume the UK represents one-sixth of the EU market of Category 8 and 9 equipment, in line with the UK representing around one-sixth of EU GDP;
- iii) We assume that IVD medical devices represent some 9 per cent of total medical devices in line with the estimates given in the Bio Report but recognising that this is somewhat crude given that these estimates do not relate solely to EEE IVD equipment or medical devices;
- iv) We assume that sales figure estimates outlined in the Bio Report grew in line with general EU inflation to 2009.

103. Using the estimates in the Bio Report and the assumptions above, costs for the period 2010-2020 are estimated to have a present value in the region of £306 million - £1,160 million with an annualised equivalent cost of some £34 million - £129 million. The ongoing costs (i.e. the compliance costs in 2020) of bringing Category 8 and 9 equipment into the scope of RoHS have a present value of some £5 million - £8 million per annum.

#### **a) Top-down approach**

104. Under this approach we use PRODCOM data to estimate the value of sales of Category 8 and 9 equipment produced by UK manufacturers. We then apply an estimate of the potential costs of the Proposal as a percentage of this estimate of turnover.

105. We calculate total costs as made up of the following: Research and development (R&D) expenditure; Compliance cost expenditure; Approvals expenditure; and the costs of the proposals in relation to exemptions (these latter costs apply to all equipment as well as Category 8 and 9 equipment).

*i) R&D Expenditure*

106. PRODCOM figures for UK manufacturer sales are published annually and represent equipment manufactured in UK for sale in the UK, the rest of the EU, and elsewhere in the World. We use the PRODCOM categories to estimate the product types that could be covered by RoHS if Category 8 and 9 equipment are included in its scope. These estimates take into account the following:

- Some PRODCOM categories include non-electrical items such as syringes, etc. and so are outside the scope of RoHS. In addition, some categories consist of a range of products that include some which are electrical and so in scope and others which are non-electrical and so out of scope
- Some medical PRODCOM categories are for implanted medical devices which under the Proposal are not to be included in the scope of RoHS until at least further review.
- Some PRODCOM categories are for spare parts and consumables. Consumables are excluded from RoHS but spare parts will need to comply if used to repair or upgrade Category 8 and 9 equipment put on the market after the applicable RoHS deadline.
- Several PRODCOM categories applicable to monitoring and control instruments include equipment that may be used as components of other equipment (and so may already be in the scope of RoHS) or of large-scale stationary industrial tools (e.g. control valves) and so out of scope.
- It is not always possible to differentiate clearly consumer and industrial equipment from PRODCOM categories. Most Category 9 PRODCOM categories include only industrial monitoring and control instruments, but a few also include a proportion that are sold to consumers.

107. This all means that we cannot obtain a firm estimate of the size of UK industry affected by the Proposal in relation to Category 8 and 9 equipment. However, using the knowledge we have we can make an estimate of the value of the equipment that could be affected, and this is in the region of £5 billion of turnover for the UK. This figure represents some 45 per cent of the total turnover of the PRODCOM categories we considered.

108. In terms of the potential costs of the Proposal the Bio Report and the Commission's IA (based on industry estimates) both estimate this to be in the region of 1-4 per cent of industry turnover. As outlined earlier in this IA, estimates of the costs of RoHS for EEE outside of Category 8 and 9 equipment are for these to be in the region of 1-2 per cent of industry turnover.

109. Category 8 and 9 equipment is generally characterised as being more sophisticated and complex than other EEE, and so we could expect R&D costs for this type of equipment to be at least at the top of the range of estimates of costs for other EEE, i.e. in the region of 2 per cent of turnover.

110. However, estimates that R&D costs for Category 8 and 9 equipment could be on average 4 per cent of turnover, appear to be somewhat pessimistic (also in view of the extended period proposed before these categories would come into scope) and a figure for costs of something nearer 3 per cent may be a more reasonable top of the range estimate at this stage. This gives an estimate of the R&D costs of Category 8 and 9 equipment in the range of 2-3 per cent of turnover.

#### *ii) Compliance Costs*

111. In terms of ongoing compliance costs (in relation to, for example, information provision, assessment of materials declarations, chemical analysis, supplier audits, and compilation of technical files) we use an estimate of an annual 0.1-0.2 per cent of turnover (in line with industry estimates of current levels of expenditure for complying with RoHS) as being expended on complying with the RoHS Directive for Category 8 and 9 equipment once they are included in RoHS in accordance with the timetable of the draft of the recast Directive.

#### *iii) Approvals Expenditure*

112. Medical devices are regulated by three separate European Directives (these are the Medical Devices Directive, the In-Vitro Diagnostic Medical Devices Directive, and the Active Implanted Medical Devices Directive). These Directives place requirements on such equipment to reach certain 'essential requirements' (for example, in terms of safety and performance) before they can be placed on the European market.

113. Other countries outside of the EU have their own regulations, and approvals must be gained in these countries too as manufacturers do not produce one EU version and another for the rest of the world. Gaining approvals in the USA, Japan, China, Korea, etc can be expensive and take a number of years to achieve. One large UK manufacturer estimates that compliance with medical device legislation worldwide costs in the range of 0.1 - 0.2 per cent of its turnover per annum. It is not believed that all Category 8 equipment that would need to become RoHS compliant will need to obtain re-approval, but it is expected that a proportion will and so in this IA we use the figure at the bottom of this range to estimate costs of gaining approval for equipment re-designed to achieve RoHS compliance.

#### *iv) Exemptions expenditure*

114. We use the figures outlined in paragraph 85 above to estimate that UK manufacturer costs could be in the region of £100,000-300,000 once every four years under the current proposals in relation to the ROHS exemptions procedures.

115. All of this gives an estimate outlined in Table 5. Costs for the period 2010-2020 are estimated to have a present value in the region of £610 million-£922 million with an annualised equivalent cost of some £68 million-£102 million. The present value of the ongoing costs (i.e. the compliance costs in 2020) of bringing Category 8 and 9 equipment into the scope of RoHS have a present value of £4 million-£8 million per annum.

**b) Bottom-up approach**

116. Under this approach we use estimates, where we can, of the additional resources that may need to be employed as a consequence of the Commission’s Proposal.

117. We calculate total costs as made up of the following: Additional resources in terms of man-hours of Research and development (R&D) staff; Compliance cost expenditure; Approvals expenditure; additional capital expenditure; additional operating expenditure; and the costs of the proposals in relation to exemptions (these latter costs apply to all equipment as well as Category 8 and 9 equipment).

*i) R&D Expenditure*

118. For R&D we use an estimate based on the extent to which existing research and development staff may need to be diverted from current activities to undertake R&D on RoHS compliance for Category 8 and 9 equipment, or the extent to which new staff need to be employed to undertake such work.

**Table 5: Top Down Approach Estimate of Costs of Proposal (£ million)**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
R&D expenditure Category 8 and 9 equipment		106 - 159	106 - 159	106 - 159	106 - 159	82- 122	82- 122	79- 117				
Compliance costs Category 8 and 9 equipment						1-2	1-2	1-3	5- 11	5- 11	5- 11	5- 11
Approvals expenditure Category 8 and 9 equipment		1	1	1	1							
Exemptions expenditure				0.1- 0.3				0.1- 0.3				0.1- 0.3
Present Value (PV) of Total Costs	610 - 922											
Equivalent Annualised Cost of PV of Total Costs	68- 102											

119. Estimates based on data from Eucomed (*Eucomed* is a trade association representing some 4,500 designers, manufacturers and suppliers of medical technology in Europe) suggest that there are some 60,000 employees working in the UK on medical products. If we assume 1

per cent of these will be required to undertake research on the RoHS restrictions applicable to Category 8 equipment, and assuming that such researchers earn on average £40,000 per annum this enables an alternative estimate to be made of the potential R&D costs of Category 8 equipment.

120. It is not clear how many employees work in R&D on Category 9 equipment but based on PRODCOM data UK Category 9 equipment turnover is estimated to be three times that of Category 8 equipment and so the estimates we obtain above for Category 8 equipment are trebled to represent potential R&D costs for Category 9 equipment.

#### *ii) Compliance Costs*

121. In terms of ongoing compliance costs (in relation to, for example, information provision, assessment of materials declarations, supplier audits, etc) we again use an estimate of an annual 0.1-0.2 per cent of turnover (in line with industry estimates of current levels of expenditure for complying with RoHS) as being expended on complying with the RoHS Directive for Category 8 and 9 equipment once they are included in RoHS in accordance with the timetable of the draft of the recast Directive.

#### *iii) Capital expenditure*

122. It is estimated that there are around 150 sub-contractors of components and parts (in particular printed circuit boards (PCBs)) for EEE operating in the UK currently. Most of these will currently be operating lead-free facilities. However, a certain amount would need to invest in lead-free equipment to produce Category 8 and 9 components and parts if these categories of equipment were bought into the scope of RoHS.

123. If 5 per cent of sub-contractors need to purchase 1 wave soldering machine and 1 SMT reflow oven at a cost in the region of £25,000 and £30,000 respectively this would imply total costs in the region of £440,000. These costs could be expected to be incurred in 2010 and 2011 (and we assume they are split equally in each year) if Categories 8 and 9 equipment are bought into the scope of the RoHS Directive, as a switch to lead-free machines would be required to facilitate the necessary R&D to ensure compliance by the dates in the current draft of the recast Directive.

#### *iv) Operating expenditure*

124. Lead-free soldering involves higher rates of energy use than lead soldering, because of the properties of the substitutes used, which generally have higher melting points. Estimates for increases in energy consumption are of the order of 15 per cent, though some commentators suggest higher figures.

125. Based on estimates from the original 2006 UK RoHS RIA, we employ the following assumptions in this IA: we assume seven zone ovens use on average 13.9 kWh with tin-lead (SnPb) solder, and 16 kWh with lead-free solder, a difference of 2.1 kWh; we assume ovens operate 5 days per week, 16 hours per day, 49 weeks per year, and take a typical electricity price at present in the region of 12.12p/kWh; we also assume there are some 10,000 ovens in the UK.

126. Category 8 and 9 equipment is estimated to be around 2 per cent of all EEE by weight, but most EEE has only a very small weight content of printed circuit boards (PCBs). For EEE with a relatively high weight of PCBs, i.e. Category 3, 4, 8, and 9 EEE, Categories 8 and 9 represent some 5 per cent of this EEE by weight. Given this we thus estimate that Category 8 and 9 equipment uses some 5 per cent of the operating capacity of ovens in the UK.

127. The assumptions in the above paragraph lead to estimates of increases in operating expenditure in terms of energy costs in the region of £0.5 million per annum for Category 8 and 9 equipment to be produced with lead-free solder and thus be RoHS compliant.

128. In addition, the greater use of energy from lead-free soldering is also expected to lead to additional emissions of CO<sub>2</sub>, and these are estimated to be in the region of 2,750-5,500 tonnes of CO<sub>2</sub> per annum from 2014.

#### *v) Exemptions expenditure*

129. Again we use the figures outlined in paragraph 85 above to estimate that UK manufacturer costs could be in the region of £100,000-300,000 once every four years under the current proposals in relation to the ROHS exemptions procedures.

#### *vi) Approvals Expenditure*

130. We use the estimate as outlined in paragraphs 113-114 above, that additional expenditure on obtaining approval of ROHS compliant medical equipment will cost in the region of 0.1 per cent of turnover per annum.

131. All of this gives estimates outlined in Table 6 implying costs for the period 2010-2020 which have a present value in the region of £442 million - £623 million with an annualised equivalent cost of some £49 million - £69 million. The ongoing costs (i.e. the compliance costs in 2020) of bringing Category 8 and 9 equipment into the scope of RoHS have a present value of £4 million - £8 million per annum.

132. The Bio Report says that not to include Category 8 and 9 products in the RoHS Directive would be “..unfair..” to those who have already taken steps to comply with the Directive. In support of this it appears that a number of Category 8 and 9 UK producers would prefer that their equipment is included in RoHS on the grounds that they have already invested resources on conversion of their products, and so would be placed at a disadvantage to those who have not undertaken similar investment.

133. However, any costs that have been incurred in the expectation that these products would be introduced into the Directive are now ‘sunk’ costs, i.e. they are costs which cannot be recovered irrespective of whether these products are included in RoHS in the future or not. What is important is to determine whether the future costs and benefits from including these products in RoHS justify such an inclusion. It is difficult to determine what level of expenditure has already been undertaken by Category 8 and 9 manufacturers already complying with RoHS. We make an assumption that this may be in the region of 10 per cent of total expenditure that

would need to be undertaken, and so reduce the estimates of R&D costs produced via the two approaches by 10 per cent. In turn we reduce the benefits from the two approaches, this time by an assumed 5 per cent, to reflect the fact that some models being placed on the market will already be lead-free and so RoHS compliant. We discuss this further in the Conclusion.

### Substances (Article 4 and Annex IV of draft re-cast Directive)

134. As outlined in the Benefits section, the Commission appointed *Oko Institut* to undertake research on the possible inclusion in the RoHS Directive of hazardous substances additional to those covered by the existing text. This research resulted in a report ('the Oko Report') which produced a list of substances which could possibly be bought inside the scope of RoHS. However, the Commission's IA notes that "*the available data..do not allow to decide that for any of the ..candidate substances a ban under RoHS would bring more environmental, economic or social benefits than the respective costs it is likely to incur..*" (Page 64). The draft of the recast Directive thus does not propose to include any additional substances to be covered by RoHS, and thus no additional costs are expected here from the recast Directive.

**Table 6: Bottom up approach estimates of Costs of Proposal (£ million)**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
R&D expenditure Category 8 and 9 equipment		73-98	75-100	76-102	78-104	55-82	56-84	55-83				
Compliance costs Category 8 and 9 equipment						2-3	2-3	2-4	6-11	6-11	6-11	6-11
Capital expenditure Category 8 and 9 equipment		0.2	0.2									
Operating expenditure Category 8 and 9 equipment						0.5	0.5	0.5	0.5	0.5	0.5	0.5
Approvals expenditure Category 8 and 9 equipment		1	1	1	1							
Exemptions expenditure				0.1-0.3				0.1-0.3				0.1-0.3
Present Value (PV) of Total Costs	442 - 623											
Equivalent Annualised Cost of PV of Total Costs	49-69											

## **Placing on the market, monitoring and enforcement (Articles 7-17 of draft recast Directive)**

135. As outlined in the Benefits section, BERR undertook a separate IA on the possible costs and benefits to the UK of the EU Regulation for accreditation and market surveillance (so called 'RAMS' or more formerly the New Legislative Framework (NLF)) which applies to all European 'harmonising' legislation, and implicitly includes the RoHS Directive in its scope. Any costs to the UK accruing from Articles 7-17 of the draft recast RoHS Directive, with respect to the operation of the Internal Market in EEE have thus already been accounted for in the IA for RAMS.

### **Small Firms Impact Test**

136. The draft recast RoHS Directive could have a disproportionate impact on small and medium sized enterprises (SMEs) operating in the UK in two ways. First, the proposed changes to the exemptions procedure and the introduction of a 'substitution plan' could mean that SMEs incur disproportionate costs in terms of producing and submitting 'substitution plans'. Secondly, Category 8 and 9 equipment has many small specialist producers making niche and specialist equipment. It may thus be difficult for SMEs to 'piggy-back' on the research of large companies, and so achieving RoHS compliance for their products may involve them in disproportionate costs.

### **Competition assessment**

137. The RoHS Directive is an 'Internal Market' Directive with one of its aims being the protection and promotion of the European Internal Market in EEE. EEE production is characterised by a large number of businesses both domestically and internationally. Within the broad category of EEE there are also a large number of separate markets each of which can have quite different characteristics. Given this, and the fact that little or no information has come to light suggesting that the current RoHS Directive has had a detrimental impact on competition, the proposal to recast the Directive is not expected to have a detrimental impact on competition.

138. There may however be an issue in relation to UK manufacturers selling to non-EU countries where there are competitors who do not sell in the EU. Category 8 and 9 equipment is generally produced in relatively small numbers, and so it would be costly to produce more than one version of a model for the world market. For example, UK manufacturers will sell the same products in the EU, the USA and in Asia. Some US and Asian companies may however not sell their products in Europe and so will not need to produce RoHS compliant versions. When this situation arises it would place UK manufacturers at a competitive disadvantage in US and Asian markets.

## **Costs to Public Sector – Monitoring and Enforcement**

139. Given that Category 8 and 9 equipment represents a relatively small proportion of the total EEE market, and given that any additional activity in relation to market surveillance is already contained in the IA estimates for 'RAMS', it is not expected that the draft recast of the RoHS Directive will have a significant impact on the current levels of public sector costs in relation to monitoring and enforcing RoHS in the UK.

## **Summary and Conclusion**

140. This Initial IA estimates the potential costs and benefits to the UK from the European Commission's proposal to recast the RoHS Directive, which is reflected in the current draft of the recast Directive COM(2008)809/4.

141. The main benefits from the Commission's Proposal are expected to be in terms of reductions in human toxicity, reductions freshwater aquatic and sedimental ecotoxicity, and reductions in terrestrial ecotoxicity. These stem from reductions in the use of lead, cadmium, hexavalent chromium, and mercury from the proposed inclusion of Category 8 and 9 equipment within the scope of the ROHS Directive. There are also expected benefits in terms of reductions in administrative burdens and reductions in uncertainty and demonstrating compliance from greater clarification of the scope of RoHS, allowing EEE to be repaired as produced, and through being able to demonstrate compliance through harmonised standards.

142. The main costs from the Proposal relate to the possible inclusion of Category 8 and 9 equipment within the scope of the RoHS Directive. These costs are largely in terms of research and development (R&D) expenditure, but also include capital expenditure, and additional operating expenditure. In addition, there are expected to be costs from proposed changes to the 'exemptions procedure' of the RoHS Directive

143. The estimated benefits and costs from the Proposal are summarised in Table 7 below. Not all of the benefits can be quantified at this stage. In turn, the estimates of costs (like that for benefits) rely on a number of assumptions and can only be seen as being indicative at this stage. The Proposal as it stands should result in benefits in terms of environmental benefits (from reductions in potential toxicity to humans, animals and the environment from a reduction in the use of hazardous substances), and benefits in terms of reductions in the administrative and legal burdens of the RoHS Directive. There should also be benefits in terms of increased protection and promotion of the Internal Market in Category 8 and 9 equipment, though it is unclear the extent to which divergent national standards restrict trade for these type of products currently.

144. As was noted earlier, one of the main issues in estimating the potential costs and benefits of the Proposal is the extent to which R&D activity has already been undertaken by producers of Category 8 and 9 equipment in the belief that their equipment will be included in the scope of the RoHS Directive, because this is taken to be implied by the text of the original Directive.

145. It has proved difficult at this stage to determine with any precision the extent to which UK businesses have already undertaken R&D to become RoHS compliant, and the extent to which

new models of Category 8 and 9 equipment being put on the market are RoHS compliant already.

146. Some UK businesses have suggested that they have already undertaken the R&D to become RoHS compliant, hence their suggestion that not to include Category 8 and 9 equipment in RoHS would put them at a competitive disadvantage. But it remains unclear what proportion of businesses this is. It is also unclear what proportion of the estimated required total R&D this would represent, and it is also unclear what proportion of total models of equipment this would apply to.

147. What is clear from experience with the RoHS Directive to date is that businesses tend to under-estimate the level of work needed to become RoHS compliant. Most of this work is related to finding substitutes for lead, but there are also a range of issues in relation to ensuring compliance with the restrictions on the other hazardous substances required by RoHS. Where equipment can contain hundreds, if not thousands of components these issues are compounded, and even more so where producers obtain components and parts from third party suppliers.

148. From anecdotal evidence we have been able to glean, we estimate that the expenditure undertaken already by Category 8 and 9 equipment manufacturers to be RoHS compliant is in the region of some 10 per cent of the total that may be required. We thus reduce the cost estimates in Tables 5 and 6 (though not the compliance cost estimates) by 10 per cent to give the final results in Table 7.

149. Likewise we reduce the benefits of the Proposal because some Category 8 and 9 equipment is already compliant. We estimate this to apply to around 5 per cent of new models, and so reduce the benefit estimates of Table 5 and 6 by 5 per cent to give the final results in Table 7.

150. The estimates of costs employ a 'top down approach' and a 'bottom up approach'. However, because of a lack of data these approaches are not strictly independent, because we have to employ the same means of estimation for certain costs in both approaches. The estimates of costs are for these to be in the range of some £50 million - £100 million per annum over ten years between 2010 and 2020. On an estimate of the size of the turnover of UK businesses potentially affected by the Proposal this is equivalent to some 1-2 per cent of turnover per annum from 2010-2020. This is a figure compatible with that estimated by the DTI in 2006 for the sectors affected by the original RoHS Directive.

151. Though there are benefits from the Proposal this Initial IA suggests that it is not clear that the Commission's Proposal can be justified based on the current estimates of the size of the potential benefits and costs involved. These results appear to support some of the conclusions of the Commission's own research. The Bio Report says that "*environmental impact potentials of the hazardous substances in Category 8 and 9 products..contain many uncertainties..*" (Page 16), but the results from life-cycle assessment suggests that "*..the impacts of RoHS substances in Category 8 and 9 equipment are extremely small.*" (Page 49). The Arcadis Report (Executive Summary, Page VII) says that "*..the analysis showed that Category 8 and 9 products of the WEEE Directive..are at the limit regarding costs and benefits.*"

**Table 7: Summary of Estimate of Total Costs and Benefits of Commission’s Current Proposal to recast RoHS Directive (£ million)**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Costs</b>												
Top down estimate		97-143	97-143	97-143	97-143	75-113	75-113	73-110	5-11	5-11	5-11	5-11
Present Value (PV) of Top down estimate	551-829											
Equivalent Annualised Cost of PV of Top down estimate	61-92											
Bottom up estimate		68-90	69-91	70-93	71-95	52-78	53-78	52-79	6-12	6-12	6-12	6-12
Present Value (PV) of Bottom up estimate	401-564											
Equivalent Annualised Cost of PV of Bottom up estimate	45-63											
<b>Benefits</b>												
<b>Category 8 and 9 Equipment Inclusion</b> – Reduction in human toxicity, reduction in freshwater aquatic and sedimental toxicity, and reduction in terrestrial toxicity from reductions in use of hazardous substances.												
Contribution to protection and promotion of the Internal Market.												
Reduction in Lead tonnes						77	81	85	89	93	96	96
Reduction in Cadmium tonnes						0.01	0.01	0.01	0.01	0.01	0.01	0.01
Reduction in Hexavalent Chromium (tonnes)						0.13	0.13	0.13	0.13	0.13	0.13	0.13
Reduction in Mercury (tonnes)						0.002	0.002	0.002	0.002	0.002	0.002	0.002
Reduction in Deca PBDE						1.6	1.6	1.6	1.6	1.6	1.6	1.6
<b>Scope</b> – Reduction in uncertainty and potential savings on administrative and legal costs.												
<b>Repair as Produced Principle</b> – Potential savings from avoiding premature obsolescence of certain EEE.												
<b>Exemptions</b> – Potential environmental benefit from quicker take-up of substitutes.												
<b>Placing on the Market</b> – Less unintended non-compliance, subsequent lower administrative costs, and potential environmental benefits.												

## Specific Impact Tests: Checklist

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

**Ensure that the results of any tests that impact on the cost-benefit analysis are contained within the main evidence base; other results may be annexed.**

Type of testing undertaken	<i>Results in Evidence Base?</i>	<i>Results annexed?</i>
<b>Competition Assessment</b>	<b>Yes</b>	<b>No</b>
<b>Small Firms Impact Test</b>	<b>Yes</b>	<b>No</b>
<b>Legal Aid</b>	<b>No</b>	<b>Yes</b>
<b>Sustainable Development</b>	<b>Yes</b>	<b>No</b>
<b>Carbon Assessment</b>	<b>Yes</b>	<b>No</b>
<b>Other Environment</b>	<b>Yes</b>	<b>No</b>
<b>Health Impact Assessment</b>	<b>Yes</b>	<b>No</b>
<b>Race Equality</b>	<b>No</b>	<b>Yes</b>
<b>Disability Equality</b>	<b>No</b>	<b>Yes</b>
<b>Gender Equality</b>	<b>No</b>	<b>Yes</b>
<b>Human Rights</b>	<b>No</b>	<b>Yes</b>
<b>Rural Proofing</b>	<b>No</b>	<b>Yes</b>

## Annexes

### Legal Aid

It is not clear to what extent those who would be subject to the RoHS recast but are not subject to the Directive in its current form are eligible for any form of legal aid. More generally, whether there is any increase in the use of the courts as a result of the recast Directive will depend on how it is implemented in the UK, but it is most unlikely that any such increase would be more than nugatory.

### Carbon Impact Assessment

The recast Directive is expected to have a small negative carbon impact. Lead-free soldering generally requires greater energy use than lead-free soldering, and so the Proposal is expected to lead to a small increase in carbon emissions. This is quantified to be in the region of some 4,000 tonnes per annum when the restrictions on lead would come into effect.

### Race Equality Assessment

The policy behind the recast Directive is not relevant to the race equality duty.

### Disability Equality

The recast Directive is not expected to have any impact on disability equality.

### Gender Impact Assessment

The recast Directive is not expected to have any impact on gender equality.

### Human Rights

The recast Directive is not expected to impact on the rights and freedoms of individuals as set out in the Human Rights Act 1998.

### Rural Proofing

The recast Directive is not expected to have any specific impact on rural areas or circumstances.