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Delegations will find annexed the impact assessment on introducing a general scope in the RoHS Directive, as presented by the Danish delegation in the WPE meeting on 8 December 2009.

Danish Environmental Protection Agency

Impact assessment of introduction of a general scope of the RoHS Directive - selected aspects

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PREFACE

In the European Union, certain hazardous chemicals in electric and electronic equipment (EEE) are restricted by the Directive 2002/95/EC on the Restriction of certain Hazardous Substances in electrical and electronic equipment, the RoHS Directive (hereafter referred to as "the current RoHS Directive"). In December 2008 the European Commission made a proposal for a recast of the current directive (hereafter "the Commission's proposal"). The recast was made on the basis of previous experience with the current RoHS Directive and its function.

In their proposal (COM(2008) 809 final), the Commission has introduced a binding and exhaustive list of equipment which defines the scope of the Directive. The list is based on the list of product groups in Annex IA and IB of the current WEEE Directive.

The Commission's proposal is currently (2009) negotiated in the Council Working Party on Environment (WPE). During the negotiations Member States have expressed desire to change the description of the scope, going from the proposed binding list to a general definition of EEE.

The Danish Environmental Protection Agency has contracted with COWI A/S to supplement the existing assessment with the present assessment of changing the scope from the proposed binding list to a general definition of EEE.

The objectives of the study are:

- To identify groups of EEE not included in the binding list of the Commission's proposal;
- For selected groups of EEE, to assess particular difficulties bringing the EEE in compliance with RoHS;
- For the selected groups of EEE, to assess the potential reduced use of the substances restricted in the current RoHS Directive.
- For the selected EEE groups, to assess the socioeconomic impacts.

Due to the limited time available for the study, the assessment has primarily been based on existing literature.

The study has been guided by a Steering Group consisting of Dorte Lerche Bjerregård, Lissie Jørgensen and Anette Ejersted, the Danish Environmental Protection Agency, and Carsten Lassen and Jakob Maag, COWI A/S.

This report was prepared by Carsten Lassen (Project Manager), Jakob Maag and Ulla Kristine Brandt COWI A/S, Denmark. Legal backstopping was done by Helle Husum, COWI. The study was conducted during a period from August to October 2009.

Introduction of a binding list

In the proposal for the recast of the current RoHS Directive (COM(2008) 809 final) the European Commission has introduced two new annexes describing the scope of the Directive. The first annex describes the broad product categories and the second, amendable by comitology, provides binding product lists within each product category. Equipment on the binding and exhaustive lists would be covered by the Directive unless the equipment is included in other equipment which is out of the scope of the Directive cf. Article 2(3)b of the proposal. All equipment which is not specifically mentioned in the list of equipment is considered to be outside the scope of the Directive.

One of the objectives of this study is to identify groups of EEE not included in the binding list of the Commission's proposal. By the identification of the product groups it has been necessary to make some interpretations of the definition of EEE and some interpretations of which product groups are actually covered by the binding list. As regards the definition of EEE a very broad interpretation is applied here. All interpretations are subject to discussion and reflect the views of the authors only.

The consequences of introducing a binding list is that some products which in some Member States (here exemplified with Denmark) is considered to be within the scope of the national RoHS legislation will change status from being within the scope to being outside the scope. The study has identified 27 products groups that in Denmark would change status if the Commission's proposal, including its exhaustive list, is adopted. The products are mainly falling within the categories large and small household appliances, electrical and electronic tools and toys and leisure and sports equipment. It has on the basis of the present data not been possible to estimate the consequences of the change in terms of potential increased use of lead, cadmium, hexavalent chromium, mercury, PBDE and PBB (hereafter referred to as the RoHS substances).

Introducing a general scope

Introduction of a general scope, where the RoHS Directive covers all EEE, may have quite wide-reaching consequences and there may be a need for general exclusions for some product groups. Areas not addressed in this study are 1) equipment which is necessary for the protection of the essential interests of the security of Member States; 2) large-scale stationary industrial tools; 3) transport equipment, 4) aerospace applications; 5) equipment designed for "fixed installations"; and 6) equipment which is not intended to be placed on the market as a single functional or commercial unit.

The study focus on other "finished products" as they are defined by the European Commission in the FAQ on the current RoHS and WEEE Directives.

By introducing a general scope and a broad definition of EEE, a number of product groups would change status from being outside the scope of the RoHS legislation to being inside the scope. The study has identified more than 50 product groups, considered by the authors to fall within the scope of the 10 categories in Annex I of the Commission's proposal, which are not included in the binding list of the proposal's Annex II.

Compared to the current situation, the actual number of product groups changing status depends on the interpretation of the scope of the RoHS legislation, which differs among Member States. The study has identified up to 26 product groups, considered by the authors to fall within the scope of the 10 categories in Annex I, which by the introduction of a general scope and a broad definition of EEE would change status from falling outside the scope of the Danish RoHS legislation to falling inside, unless they would specifically be exempted.

In addition, by the introduction of a general scope and a broad definition of EEE, 24 product groups considered to fall outside the existing 10 categories in Annex I of the Commission's proposal would fall within the scope of the Directive. Some of the product groups like veterinary devices, other laboratory equipment and equipment for generation, transmission or conversion of electricity obviously fall within the current definition of EEE. Others, like furniture with EE components or clothing with EE components, are more in a grey area and may fall outside the scope if a more narrow definition of EEE is applied.

All in all, compared to the binding list of the Commission's proposal, the number of identified product groups that might change status is 77. For a number of the product groups it has, however, not been possible to interpret whether they are actually fall within the product groups mentioned in the binding list in Annex II of the Commission' proposal.

The potential reduced use of RoHS substances
The study has not been successful in meeting the objective of estimating the potential reduction of RoHS substances in the product groups concerned, by introducing a general scope. Due to the large number of diverse product groups, limited market data and limited information on the quantities of RoHS substances in the different product groups it has not been possible even to obtain a rough estimate of the quantities of RoHS substances. Establishing an estimate has further been complicated by the fact that for many grey area products many manufacturers have already phased out the RoHS substances to be on the safe side. For these product groups the introduction of a general scope would have very limited effect in reducing the RoHS substances, whereas the introduction of a binding list, by which these product groups would clearly fall outside the scope, may in fact lead to a reintroduction of the RoHS substances.

Relative assessment
For eight selected product categories (representing about 50 of the identified product groups) an assessment has been made of the consequences of introduction of a general scope. It has, however, not been intended to make a comprehensive assessment of all costs vs. benefits of including the different groups of EEE within the scope of the Directive. The Directive is based on the notion that the benefits of restricting the RoHS substances in the EEE within the scope at the least offset the socioeconomic costs. The present study therefore assess the EEE product groups outside the scope of the Commission's proposal relative to product groups within the scope, in order to evaluate, at a screening level, whether the costs could be expected to be relatively high or/and the benefits relatively small. Further it is assessed whether the turnover of the product groups is significant.

Questions
In order to assess this, the study has tried to answer the following questions:

- Is the content of RoHS substances significantly different from products within the scope?
- Are particular difficulties in the replacement of RoHS substances anticipated?
- Are the administrative costs vs. benefits expected to be significantly larger than for products within the scope?
- Are the supply chains overlapping the supply chains for products within the scope?
- Are the market volume and the quantities of RoHS substances significant?

As mentioned the quantities of RoHS substances have not been quantified, but it has been assessed whether the use of RoHS substances is (or has been) similar to product groups within the scope and the market volume is used to indicate whether the potential volumes of RoHS substances may be significant.

Assessment results
The results, summarized in Table 0.1, indicates that for most of the products the market volumes are significant. The overall turnover of European companies affected by RoHS is in the Commission's Impact Assessment estimated at approximately 392 billion €. The total turnover of the equipment in Table 0.1 is thus in the range of a few percent of the total turnover of EEE. The product groups in Table 0.1 are deemed to represent the major part, in terms of market volume, of the identified equipment.

Apart from a few specific applications there is no indication that it should be particularly difficult to replace the RoHS substances in the assessed products.

For veterinary equipment there may be a need for an extended transition period as for medical equipment. Some of the previous studies have identified some specific applications of RoHS substances in alarms of which one is already exempted. Photovoltaic cells based on CdTe would need an exemption assessment. Photovoltaic panels based on CdTe cells is mainly used in fixed installation, but depending on the delineation between "fixed installations" and "finished products" some application of photovoltaic panels of this type may be regarded "finished products".

For most of the assessed product groups the use of RoHS substances has been or is similar to product groups within the scope and it is not expected that the administrative costs will be relatively large when compared to the benefits. For two of the assessed categories the administrative costs vs. benefits is assessed potentially to be high for some product groups. For the category toys with EE components, the toys with electrical motors (and often also electronic parts) certainly falls within the definition of EE and the content of RoHS substances is assessed to be similar to products within the scope. Many toys without motors (the talking, but not walking doll) are in a grey area and do not fall within the definition if a narrow interpretation of the definition is applied. In much of this toys the EE parts takes up a limited portion of the products and the administrative costs of including these products is deemed to be relatively high. The same is the situation with furniture where furniture with actuators (e.g. elevation tables and chairs with movable parts) seems to fall within the definition of EEE, whereas cupboards with light are in a grey area and the administrative costs are assessed to be relatively high. A number of similar grey area product groups have been identified, but not assessed further. These include clothing and footwear with EE components, fun and joke equipment and ornaments with EE components, electric toilets and shower heads and mirrors with light.

Clearer definition of EEE if a general scope is introduced

The results indicate that for the finished products analysed in this study, if a general scope is introduced, a clearer definition of EEE may be needed. It may for some product groups be considered to exclude product groups with a very limited content of RoHS substances, but potentially many impacted market actors (e.g. some toys), from the scope of the Directive by introducing a clearer definition of EEE.

Table 0.1
Overall assessment results for selected product categories

Product category	Product group	Market characteristics	Content of RoHS substances	Particular difficulties in replacement of RoHS substances	Relatively large administrative costs vs. benefits	Market volume *1 (€ billion)
Veterinary equipment	A large number of products like electrosurgical, anesthesia equipment, infusion pumps, respiratory ventilators, ect.	Finished product: partly separated from medical equipment. EE components supply chain: probably same as for medical equipment	Similar to medical equipment	Same as for medical equipment - need for extended transition period	No	0.2-0.6
Furniture with EE components	Furniture with actuators (elevation tables, beds and chairs)	Market separate from EEE within the scope Market for EE components to some degree shared with EEE within the scope	EE parts similar to some electric tools Other parts different from other EEE. Probably some non-essential use of Cr(VI) and deca-BDE	No	No (manufacturers of EE components and finished products) Yes (manufacturers of non-EE parts of the furniture)	0.2-2.0 (EEE parts only)
	Furniture with integrated light	Market separate from EEE within the scope	Limited content in wires and light sources – EE parts takes up a small portion of the products	No	Yes	?
Equipment for generation, transmission or conversion of electricity	Portable generators	Market to some degree shared with EEE within the scope	Similar to products within the scope	No	No	0.3-0.6
	Photovoltaic cell for consumer applications	Market separate from EEE within the scope	Different from other EE equipment Cd in some CdTe cells	Cd in CdTe cells – mainly used in fixed installations	? The product is totally different from products within the scope - potential for negative environmental impact of inclusion	< 0.1
	Extension cords, transformers, battery chargers	Same as market for EEE within the scope	Similar to products within the scope	No	No	?
Tools used for mixing, vibrating, or similar processes	Tools used for mixing, vibrating, or similar processes	Market partly separate from EEE within the scope	Similar to tools for gardening activities and tools for spraying, spreading, dispersing liquid or gaseous substances.	No	No	0.5-1.5

Product category	Product group	Market characteristics	Content of RoHS substances	Particular difficulties in replacement of RoHS substances	Relatively large administrative costs vs. benefits	Market volume *1 (€ billion)
Toys with EE components	Toys with electrical motors	Market partly separate from EEE within the scope	Similar to some toys within the scope and some small household appliances	No	No	0.6-1.2
	Toys without electrical motors	Market partly separate from EEE within the scope	The EE components generally takes up a small portion of the products	No	Yes	?
Other laboratory equipment	Grinding equipment, mixers, extraction systems, laboratory ovens and centrifuges, ultrasonic cleaners, fume hoods, distillation equipment, heating equipment, etc.	Market partly separate from EEE within the scope	For most equipment similar to some tools and some household appliances within the scope - some specific application may exist, but has not been identified	Probably not - some specific application may exist, but has not been identified	No	?
Alarms	Burglar alarms marketed as finished products Fire alarms considered 100% fixed installations	Market separate from EEE within the scope	Some specific applications. Content of RoHS substances similar to products within the scope	Yes for some specific applications – one application covered by an existing exemption Need for extended transition period for at least one application	No	0.2-0.6
Large and small household appliances	A number of different large and small household appliances	For major product groups same as market for household appliances within the scope	For the major groups similar to household appliances within the scope	No	No	3-10

*1 The estimate on the market volume is very sensitive to de delimitation between “finished products” and “fixed installations”.

ABBREVIATIONS AND ACRONYMS

AC	Alternating current
BBP	Butyl benzyl phthalate
CdTe	Cadmium telluride (photovoltaic cells)
CE	No specific meaning [Declaration by a manufacturer that his product meets the requirements of the applicable European Directive(s)].
CECE	European Construction Equipment Industry
CIS	$CuInSe_2$ [photovoltaic cells]
CN	Combined Nomenclature
Cr(VI)	Hexavalent chromium
DBP	Di-n-butyl phthalate
Deca-BDE	Decabrominated diphenylether
DEHP	Di(2-ethylhexyl) phthalate
EE	Electrical and electronic
EEE	Electrical and electronic equipment
EMC	Electromagnetic compatibility
EPIA	European Photovoltaic Industry Association
EU27	Current EU with 27 Member States
FAQ	Frequently Asked Questions [here used for the European Commission's FAQ on the current WEEE and RoHS directives]
HBCDD	Hexabromocyclododecane
LED	Light emitting diode
PBB	Polybrominated biphenyls
PBDE	Polybrominated diphenylether
PET	Positron emission tomography [scanner]
PV	Photovoltaic
PVC	Polyvinylchloride
RoHS	Restriction of the use of certain hazardous substances [in electrical and electronic equipment = Directive 2002/95/EC]
RoHS substances	The substances restricted by the current directive: Lead, cadmium, hexavalent chromium, mercury, PBDE and PBB.
TIE	Toy Industries of Europe
U.S.A.	United States of America
UEA	European Furniture Manufacturers Federation
UPS	Uninterruptible power supply
USB	Universal Serial Bus [data communication bus]
WEEE	Waste electrical and electronic equipment

1. DELIMITATION OF THE STUDY

In the proposal for the recast of the RoHS Directive (COM(2008) 809 final, 2008) the European Commission has introduced two new annexes describing the scope of the Directive. Annex I describes the broad product categories while Annex II, amendable by comitology, provides a binding list of product falling within each category. All equipment which is not specifically mentioned in the list of equipment is considered to fall outside the scope of the Directive.

The Commission's proposal is currently (2009) negotiated in the Council Working Party on Environment (WPE). During the negotiations, Member States have expressed desire to change the description of the scope, going from the proposed binding list to a general definition of EEE.

The current study concerns selected aspects of changing the scope, and the objective of this chapter is to describe which aspects are covered by the study and which are not.

Extension of the scope of the Directive to cover all EEE is briefly discussed in the Impact Assessment prepared by the Commission (SEC2008) 2930, 2008) under "Options discarded at an early stage" in Annex III. It is stated that
"Extending the scope of RoHS to cover all EEE would have certainly been a far reaching amendment and did get support from several stakeholders (NGOs and Member States). Realizing it, would enhance the environmental effect of the Directive in the medium term and remove any uncertainty as to which equipment falls under the scope. However, the creation of the necessary negative list with exempted equipment (military equipment, aerospace applications, transport equipment, large stationary equipment) might lead to prolonged discussions, and most importantly, the investigation of the full impacts of such an option cannot take place within the time schedule of the present review".

Shifting from the approach introduced in the Commission's proposal, to a general scope with a list of exemptions, implies reconsiderations for the following groups of electrical and electronic equipment:

1. Equipment which is necessary for the protection of the essential interests of the security of Member States, including arms, munitions and war material intended for specifically military purposes.

2. Large-scale stationary industrial tools.

3. Equipment which is specifically designed as part of another type of equipment that does not fall within the scope of the product categories of Annex 1, and can fulfil its function only if it is part of that equipment. This includes:
   - Equipment designed for transport equipment
   - Equipment designed for aerospace applications
   - Equipment designed for "fixed installations"
   - Equipment designed for other types of equipment e.g. furniture or clothing.

4. Equipment which is not intended to be placed on the market as a single functional or commercial unit.

5. Equipment that falls within the scope of the of the product categories in Annex I, but is not included in the binding list of equipment in Annex II of the Commission's proposal.

The policy option of including large-scale stationary industrial tools was assessed in the study to support the Impact Assessment of the RoHS review (Abbayes *et al.,* 2008). According to the study report no information was found to estimate the total market of these tools or the specific content of lead, cadmium, hexavalent chromium, mercury, polybrominated diphenylethers (PBDE) and polybrominated biphenyls (PBB) (hereafter referred to as the RoHS substances) in the tools.

In the Commission's proposal "*equipment which is specifically designed as part of another type of equipment that does not fall within the scope of this Directive and can fulfill its function only if it is part of that equipment*" is defined as being outside the scope. The meaning of "another type of equipment" is not defined. The Commission's FAQ on the current RoHS and WEEE directives indicates that "another type of equipment" also includes "fixed installation". The definition of "fixed installation" vs. "finished products" is discussed further in the next chapter.

The policy option of inclusion of equipment used in "fixed installations" was assessed in the study to support the Impact Assessment of the RoHS review (Abbayes *et al.*, 2008). The study prepared a non-exhaustive list of installations that could be considered to be covered by the term "fixed installations" including industrial installations/plants, electrical installations in buildings, power transmission network and 24 other types of installations. In the study it was concluded that no reasonable estimation of the affected number of products was possible based on existing data, and the quantification of the impacts was thus not performed for this option.

Within the limits of this study it has not been possible to cover all aspects of shifting to a general scope. As indicated in the study to support the Impact Assessment of the RoHS review, e.g. an assessment of large-scale stationary industrial tools or "fixed installations" would imply extensive collection of new data.

Consequently, the current assessment focuses on the following groups of equipment:

1. Equipment that is considered to fall within the scope of the of the product categories in Annex I in the Commission's proposal, but is not included in the binding list of products in Annex II.

2. Equipment, considered by the authors to be outside the scope of all the categories in Annex I, but which can be considered "finished products" and which are not military equipment, a large scale stationary tool, designed as part of aerospace applications, transport equipment, and "fixed installations".

2. METHODOLOGY AND INTERPRETATIONS

2.1 Changing the scope

The current RoHS Directive defines its scope by referring to product categories listed in Annex IA of the WEEE Directive (2002/96/EC). In the WEEE Directive, products falling under each category are further listed in Annex IB, but the RoHS Directive does not specifically refer to this annex.

Binding list vs. existing implementation of the RoHS Directive

One of the reasons for recasting the RoHS directive is that the Member States have had a different view on which products are regulated by the RoHS Directive. Since the current directive only refers to Annex IA in the WEEE Directive, it has been unclear whether the lists in Annex IB of the same directive should be considered as examples of equipment falling under each category and further, in that case, different interpretations have been applied when extrapolating from the examples to products not mentioned in the list.

Regarding the list in Annex IB of the WEEE directive, the Commission explains in its FAQ (EC, 2006) that "*Since this list is non-exhaustive, Member States could in principle include other products in national legislation implementing the WEEE Directive, if they choose*.". The approach may work with the WEEE Directive, which implement article 175 (1) of the EC treaty which concern the protection of human health and the environment. The RoHS Directive is based on article 95 of the EC Treaty and concerns the establishment and functioning of the internal market. Different interpretation and enforcement in the Member States is however not compatible with the legal basis of the Directive.

In the FAQ (EC, 2006) the Commission states with reference to the WEEE Directive that "*At least the specific type of equipment quoted in Annex IB falls within the scope*.". This indicated that he list should not be considered exhaustive.

In order to make an interpretation of the reference in the current RoHS Directive to Annex IA in the WEEE directive, some Member States regard Annex IB in the WEEE directive as a list of examples and consider that all equipment that is obviously in line with the examples given in Annex IB falls within the scope of their national RoHS legislation.

The introduction of a binding list in the Commission's proposal, nearly identical to the example list in Annex IB of the WEEE Directive, consequently implies that in some Member States, equipment, which is currently considered to fall within the scope of the national legislation, would no longer be covered.

Member State example, Denmark

As an example, in Denmark all equipment that are obviously in line with the examples of Annex IB in the WEEE directive are considered to be within the scope of the categories of Annex IA in the WEEE Directive and thus within the scope of the current RoHS Directive. Popcorn machines and electric egg boilers are e.g. considered to be within the scope, because they are similar to listed equipment within Category 2 "Small household appliances" such as toasters and coffee machines. An electrical elevation bed may be considered within Category 1 "Large consumer equipment", but the bed is in its use very different from all listed products, and it is consequently considered to be outside the scope of the Danish legislation. For the category "Toys, leisure and sports equipment", Annex IB only list a very few examples, and it is difficult to judge whether an electric doll can be considered to be in line with electric trains and racing car sets, which are mentioned in the list. In the Danish interpretation, all toys specifically marketed as electric toys (e.g. as mentioned on the packaging) fall within the scope of the legislation.

In the preparation of Table 3.1 in Chapter 3, that lists products which are not specifically mentioned in Annex II of the Commission's proposal, we have indicated which of the products that are regarded by the Danish authorities to fall within the scope of the current national RoHS legislation. With the introduction of the binding list of the Commission's proposal these products would fall outside the scope of the legislation. In other Member States the current delineation between products within and outside the scope of the national legislation may be different.

Introducing a general scope
If a general scope is introduced all equipment that falls within the definition of EEE would fall within the scope, instead of only those EEE falling under certain product categories. Thereby a number of products currently out of the scope of the RoHS Directive would change status and fall within the scope.

2.2 Interpretation of the definitions and scope of the Commission's Proposal

By the identification of products in this study, some interpretations of the wording of the Commission's proposal have been necessary as the wording of the proposal at some points is ambiguous and open for different interpretations. The interpretations reflect the view of the authors only and the wording of the proposal may obviously be interpreted differently.

Definition of EEE

Both the current RoHS Directive and the Commission's proposal define that "EEE" means equipment which is dependent on electric current or electromagnetic fields in order to work properly. In the FAQ for the current RoHS and WEEE Directives (EC, 2006) the Commission defines that "dependent" means that electricity is the primary energy source. Equipment fuelled by petrol or gas would by this definition not be considered EEE even if it included EE components. Equipment, for which electrical energy is used only for support or control functions, is according to the FAQ not covered by the current RoHS Directive. As an example of such products is mentioned a teddy bear with battery where the electricity is not essential for the primary function of the product. The interpretation that electricity should be the primary energy source has no support in the actual text of the Directive.

Further, "To work properly" could be interpreted as working in accordance with the intended use of the product. If a bear with battery is marketed as a "talking bear", and the buyer pays extra for this feature, it cannot be considered to work properly without electricity, although it may still be used as a conventional teddy bear. In the identification of products not included in the binding list in the Commission's proposal Annex II, we have applied this wide definition of EEE as equipment with electrical or electronic components since electric current or electromagnetic fields are essential for the intended use of such products. We recognise that this definition is subject to discussion.

Another way of testing the “to work properly” part of the definition of EEE could be “the discard test”. In order to clarify whether an electric current or electromagnetic fields is necessary for the product to work properly, you may ask whether you would discard the product if the electrical part failed and could not be repaired.

In any case the interpretation of “to work properly” is somewhat subjective and there is a need for a clearer, more objective definition.

"Designed as part of another type of equipment"

By identifying equipment, that is not included in the binding list of the Commission’s proposal, it has been considered whether the products would be covered by the scope limitations in Article 2 of the Commission’s proposal. For some products the interpretation of the limitations is not clear-cut, and the interpretation applied in this report reflect the authors’ understanding.

The limitation in Article 2, 3(b) of the Commission’s Proposal begins (our underlining) "*Equipment which is specifically designed as part of another type of equipment….".* In the FAQ on the current RoHS Directives, the Commission's wording is slightly different: "…*Therefore, equipment that is specifically designed to be installed in airplane airplanes, boats and other transport equipment (including satellites) is considered to fall outside the scope of the RoHS Directive.".* It will here be assumed that equipment that is specifically designed to be installed in equipment out of the scope is covered by this exemption (otherwise the wording "marketed as part" would be more appropriate than "designed as part").

With the current RoHS Directive, different interpretations have been applied. The Commission has the above mentioned interpretation whereas e.g. in the Netherlands, only car radios and navigation systems built-in during a car’s production are exempted, in contrast to identical car radios installed elsewhere at a later date (Bogaert *et al*., 2008).

The difficulties in the interpretation may be illustrated by the fact that some of the equipment specifically mentioned in Annex II probably will fall outside the scope according to the limitation in Article 2, 3(b).

Examples of equipment in Annex II of the Commission’s proposal, the authors of this report consider fall outside the scope according to Article 2, 3(b) are:

- Computers for biking. A computer for biking is designed to be a part of a bike and can fulfil its function only if it is part of a bike, which is outside the scope.

- Heating regulators and thermostats. Heating regulators and thermostats are designed to be used in a heating system and can fulfil their function only if they are part of a heating system, which is apparently out of the scope.

- Monitoring and control instruments used in industrial installations (e.g. in control panels). Equipment build into control panels are part of the fixed installations and apparently out of the scope.

“Finished product” vs. fixed installation

It is not in the Commission’s proposal specifically indicated what the sentence "*designed as part of another type of equipment"* actually covers. The FAQ for the existing WEEE directive (EC, 2006) mention that “*If the “other type of equipment” is a fixed installation it will not fall under the scope of the WEEE Directive*” indicating that fixed installations should be considered other type of equipment. This interpretation will also be applied in this assessment.

In the FAQ, the commission distinguishes between "finished products" and "fixed installations":

- A "**finished product**" is any device or unit of equipment that has a direct function, its own enclosure and - if applicable - ports and connections intended for end users. “Direct function” is defined as any function of a component or a finished product which fulfils the intended use specified by the manufacturer in the instructions for use for an end-user.

- "**Fixed installation**" in the broadest sense is defined as "a combination of several equipment, systems, finished products and/or components (hereinafter called "parts") assembled and/or erected by an assembler/installer at a given place to operate together in an expected environment to perform a specific task, but not intended to be placed on the market as a single functional or commercial unit".

The study to support the impact assessment of the RoHS review (Abbayes *et al.*, 2008) provides as mentioned a list of fixed installations, which is assumed to exemplify the kind of installations covered by the term. Examples are industrial installations/plants, electrical installations in buildings and power transmission network.

This report focuses on the finished products as defined by the Commission above. For many product groups the delineation between “finished products” and “fixed installations” is, however, not clear-cut.

2.3 Interpretation of draft Annex II

Further, by identification of products relevant for this study, some interpretations of the wording of Annex II of the Commission’s proposal have been necessary.

Interpretation of "Including and "such as"

By the transfer of the product lists in Annex IB of the WEEE Directive to Annex II of the Commission’s proposal, the terms "including" and "such as" have been introduced.

The following interpretation of the wording of Annex II in the Commission's proposal has been applied here:

- The word "including" means that the succeeding list is considered binding and exhaustive. Equipment, not explicitly falling within the mentioned product groups, would fall outside the scope.

- The wording "such as" means that the listed product groups are examples only and that all equipment that may fall under the product group mentioned before "such as" and is in line with the examples in the list is within the scope.

In this understanding the wording:

"*2. Small household appliances, including*
Appliances for cleaning, such as vacuum cleaners, carpet sweepers"

means that all small household appliances used for cleaning are within the scope of Category 2 if these appliances are in line with vacuum cleaners and carpet sweepers mentioned in the list of examples.

Similarly, the wording

"*5. Lighting equipment, including*
Lighting or equipment for the purpose of spreading or controlling light such as…"

means that all equipment that falls under this description is within the scope, no matter if it is just included in the succeeding "such as" list. E.g. light emitting diode (LED) lamps would be within the scope although they are not mentioned in the list, because they are in line with the examples given and covered by the overall description "*equipment for the purpose of spreading or controlling light"*. Equipment, for which spreading light is a secondary purpose would be in a grey area. As an example, the main purpose of a handheld mirror with light would not to be to spread light, but to reflect the image of the person.

The "such as" list consist of examples to be used in the determination of whether a product falls within the product group. The Member States may have different interpretations when it comes to judgement whether or not a product is similar to the examples mentioned.

It should be noted that the rephrasing of the list from Annex IB from the WEEE Directive to the Annex II of the Commission's proposal introduces a more limited interpretation:

In the WEEE Directive three product groups are listed under Category 2 in Annex IB:

"*Vacuum cleaners*
Carpet sweepers
Other appliances for cleaning"

In the Commission's proposal this is rephrased into:

"*Appliances for cleaning, such as vacuum cleaners, carpet sweepers".*

By the rephrasing vacuum cleaners and carpet sweepers serves as examples. In contrast, in Annex IB it is worded as "other appliances for cleaning", which can be totally different types of appliances for cleaning than vacuum cleaners and carpet sweepers.

"Household appliances"

Literally read "household appliances" are appliance used in households, and coffee machines mentioned under "Small household appliances" would only cover small coffee machines intended for use in households and not large coffee machines used in institutions. However, in the FAQ (EC, 2006) the Commission defines that "*The RoHS Directive does not differentiate between households or professional EEE, so products for professional use are covered by the RoHS Directive.*" Based on this definition, in this study it is assumed that all equipment similar to household equipment, but used in institutions, offices, hotels, etc. falls within the two categories with household appliances.

"Large-scale stationary industrial tools"

The FAQ (EC, 2006) explain that "large-scale stationary industrial tools" are tools "*installed by professionals at a given place in an industrial machinery or in an industrial building to perform a specific task.*". It is not clearly defined what is meant by "industrial" and what could be considered large-scale stationary non-industrial tools. The FAQ mention that there is no general exemption for commercial catering equipment and that the criterion is not related to the size but to whether the equipment is fixed or not. In this study it is thus assumed that the term "industrial" is used in a broad sense and that the exemption cover virtually all large-scale stationary tools and also include such tools used in agriculture, institutions, garages, and artisanal workshops.

2.4 Delimitation of the assessment

Chapter 1 describes equipment that may be affected by introducing a general scope in the RoHS Directive, but not covered by this study. The following section further describes the groups of equipment covered by the study.

2.4.1 Equipment falling within the scope of the categories in Annex I

The first list in the next chapter (Table 3.1) includes a number of product groups which are considered by the authors to fall within the scope of the categories listed in Annex I of the Commission's proposal, but not specifically mentioned in Annex II. Some of the products are obviously within the scope of a specific category and may simply have been overseen by the preparation of Annex II. An example is an electric egg boiler, which has an application in line with the products listed within Category 2 "small household appliances". Others are grey area products, where it is more doubtful whether they fall within any of the categories. An example is an aquaria pump. Pumps may be included in Category 6 if it used as a tool, but a pump permanently installed in an aquarium or garden pool cannot be considered a tool. Further for some products it has been very difficult to determine whether they are actually covered by one of the product groups listed in Annex II.

2.4.2 Equipment falling outside the scope of the categories in Annex I

As mentioned in Chapter 1 the current study focus on finished products which are not military equipment, large-scale stationary industrial tools or designed as part of aerospace applications, transport equipment and "fixed installations".

Some of the finished products fall outside the categories in Annex I of the proposal.

Some of this equipment is very similar to equipment falling within the categories of Annex I or it is specifically used together with equipment within these categories. This includes:

- "Veterinary devices" is quite similar to the "medical devises" in Category 8.
- "Equipment for generation, transmission or conversion of electricity" is often used together with equipment within the scope. According to Art. 3, (a) of the Commission's proposal, EEE also means equipment for the generation and transfer of electric currents and fields, but in fact no such equipment is included in Annex II of the proposal.

- “Other laboratory equipment” is EEE used in laboratories, but not included in Category 9 as it is not monitoring or control instruments.

- "Consumables with EE components" are typically used together with equipment within the scope. Consumables without EE components (most consumables) fall outside the definition of EEE, and their status would not be affected by introducing a general scope, but consumables with EE components falls within the general definition of EEE and would consequently be affected.

Other equipment is different from any of the categories within Annex I. Examples are "Clothing and foot-wear with EE components" and "furniture with EE components". The proposal’s Annex II includes one similar broad group of products: “Sports equipment with EE components” in Category 7.

2.5 Assessment method

For selected product groups an assessment has been made of the consequences of introduction of a general scope.

Within the limits of the study it has not been possible to make a comprehensive assessment of all costs vs. benefits of including the different EEE product groups within the scope of the Directive. The Directive is based on the notion that the benefits of restricting the RoHS substances in the EEE product groups within the scope at the least offset the socioeconomic costs. The present study therefore assess the EEE product groups outside the scope of the Commission’s proposal relative to products groups within the scope, in order to evaluate, at a screening level, whether the costs could be expected to be relatively high or/and the benefits relatively small. Further it is assessed whether the turnover of the product groups is significant.

The assessment has mainly been based on existing literature, in particularly reports prepared for the implementation of the RoHS and WEEE directives, Eurostat statistics and to a limited extent direct contact to stakeholders. Due to the wide range of product groups and the limits of the study, consultation with stakeholders, e.g. trade organisations, has been limited and for this reason the assessment has relatively large uncertainties e.g. on the market estimate.

It was anticipated that the content of RoHS substances could be estimated on the basis of existing description of the content of RoHS substances in the different equipment categories, but due to the number and diversity of product groups not covered by Annex II of the Commission’s proposal, this approach turned out to generate estimates with so large uncertainties, that the estimations did not support any qualified discussion of the potential for reduced use of the RoHS substances.

Market volumes for the different product groups have been estimated on the basis of statistics (see section 0), existing market surveys or other relevant information. The estimates are in general quite uncertain and the volumes are indicated with an interval within which the author estimates the “true value” with 80% certainty can be found.

2.6 Data collection

2.6.1 Product groups

In order to identify equipment with EE components, which is not within the scope of Annex II of the Commission's proposal, the following activities have been undertaken:

- Visit to the following retail shops in Esbjerg and Århus, Denmark: Elgiganten, Krea, Magasin, Tiger, Silvan, Huset Støc-Bo.
- Internet search on the web sites of stores with all types of equipment with EE components.
- Going through the commodity groups in the Combined Nomenclature (CN) used in the EU for classification of goods and merchandise in the import and export statistics.
- Consulting the review of Categories 8 and 9 (Goodman, 2006) and a note from the RoHS Network on Grey Area Products of 17th September 2009.
- Analysis of the Category lists using the authors basic knowledge about equipment with EE components e.g. systematically going through processes used in the different trades in order to identify tools used for processes not included in Category 6. Examples of the tools are subsequently found by an Internet search.

2.6.2 Statistical data

For some of the product groups, covered by specific commodity codes (CN codes) in the Combined Nomenclature (CN) used for EU trade statistics, data on external trade of the product have been retrieved from Eurostat's database: "EU27 Trade Since 1995 By CN8" available at Eurostat's website. CN8 means that the commodity groups are represented by an 8-digit identification code (CN8 code). An example is CN 8509 4000 "*Domestic food grinders and mixers and fruit or vegetable juice extractors, with self-contained electric motor"*. Most of the EEE groups, however, are included in more aggregated product groups and it has for these groups not been possible to retrieve specific data on import or export.

Ideally the consumption within the EU27 can be estimated by the equation:

EU27 consumption =
EU27 production + extra-EU27 import ÷ extra-EU27 export.

The estimation method could be applied if production was reported using the same CN codes as the import and export. This is the situation in some Member States, but not at EU level. EU27 production is reported in Eurostat's Prodcom database which uses more aggregated commodity groups, and for the relevant product groups it is not possible to combine the production and the external trade data.

By adding the total intra-EU 27 import (all Member States' import from other Member States) with the extra-EU import (all Member States' import from countries outside the EU) it is possible to calculate the total import to all Member States. In order to estimate the total EU27 consumption the consumption in each Member State, which is based on domestic production, should be added. As EEE products are intensively traded internationally, domestic production in each Member State (as EU average) is probably less than 50% and the total consumption and the import figures consequently gives a quite good idea about the total consumption.

3. LISTS OF EQUIPMENT

Table 3.1 lists the identified product groups which are considered by the authors (using a broad definition of EEE) to fall within the scope of one of the categories listed in Annex I, but not included in Annex II of the Commission's proposal. There may be many views on where the different product groups fall, and this represent only the view of the authors.

Product groups, for which it is not clear to the authors whether they are already covered by the Commission's proposal, are marked in grey.

For some product groups links are provided to pictures of products within the group.

Further it is indicated to what extent the product groups are covered by specific CN codes that could be used for estimating the market volumes. It is a minority of the product groups that are covered by specific CN codes and this makes estimation of the total market volume of the listed products on the bases of the trade statistics impossible.

In Denmark, the introduction of the binding list of the Commission's proposal would imply that at least 27 product groups would change status from being within the scope to being outside the scope. These product groups are marked with a "✓" in Table 3.1.

Up to 26 product groups, within the scope of the 10 Categories in Annex I, would by the introduction of a general scope and a broad definition of EEE change status from being outside the scope of the Danish RoHS legislation to fall within the scope. These product groups are not marked with a "✓" in Table 3.1.

In total, 53 product groups were identified that are considered by the authors, to be within the scope of one of the categories listed in Annex I, but not included in Annex II of the Commission's proposal

For four categories: 3, 4, 5 and 8 the description of the product groups in Anne II is so all-embracing that it has not been possible to identify any products falling within the categories of Annex I which are not covered by the description in Annex II. These product categories represented about 38% of all WEEE arising in 2005 (Huisman *et al*., 2007). As an example the description "equipment for the purpose of spreading or controlling light" covers any lighting equipment on the market and any that may be developed in the future independent on the purpose of spreading the light.

Table 3.2 includes a list of finished products with EE components considered by the authors neither to fall within the scope of the Annex I categories, nor specifically be designed for military applications, large-scale stationary industrial tools, aerospace applications, transport equipment or "fixed installations". The products groups are not considered to be within the scope of the existing RoHS Directive and not within the scope of the existing Danish RoHS legislation.

By an introduction of a general scope and a broad definition of EEE these 24 products groups would fall within the scope of the Directive. Some of the product groups like veterinary devices, other laboratory equipment and equipment for generation, transmission or conversion of electricity obviously fall within the current definition of EEE. Other product groups like furniture with EE components or clothing with EE components are in the grey area and may fall outside the scope of the Directive if a more narrow definition of EEE is applied.

Using the "discard test" in fact only a few of the products would not be discarded or not be significantly downgraded if the electrical parts failed and could not be repaired: Clothing and footwear with EE components, cupboards with light, shower heads with light and makeup mirrors with light. These products would probably still be able to serve their main purpose without the EE component.

Some of the other products may still be used, but would be significantly downgraded e.g. elevation tables and beds or ornaments with EE components.

Table 3.1
List of product groups considered by the authors to fall within the categories in Annex I

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
1. Large household appliances	Awnings and sunblinds		http://viking-markiser.dk/con8.php4	✓	6306 1100, 6306 1200, 6306 1100 : Tarpaulins, awnings and sun-blinds
	Towel radiators	May be included in Category 1 under "electric heaters" but the "electric heaters" are mentioned as examples ("such as") under the product group "Large appliances for heating rooms, beds, seating furniture, such as…" These heaters consequently only include the three listed applications. Some of the heaters may be considered part of a fixed installation but smaller units are sold as finished products in line with other electric heating appliances.	http://www.midtjysk-vvs.dk/product.asp?product=4337	✓	Included in aggregated commodity group, probably: 85167970 Electro-thermic appliances, for domestic use (excl. …)
	Mirror heaters/mirrors with heating		http://www.elvvs.dk/articlelist.3390	✓	
	Electric water heaters		http://dk.ivt.se/products.asp?lngID=481&lngLangID=1	✓	85161011 Electric instantaneous water heaters 85161019 Electric water heaters (excl. instantaneous water heaters and immersion heaters)
	Centrifuges	May be considered included in "Clothes dryers". The Danish translation, however, use the wording "tørretumblere" which obviously does not include centrifuges	http://laundrysystems.electrolux.dk/node351.aspx?categoryid=59	✓	84211200 Centrifugal clothes-dryers
	Greenhouse heaters	Heaters for greenhouses and garden frames based on heating cables in the soil	http://herbngardens.com	✓	Included in aggregated commodity group
	Aquaria heaters	Aquaria heaters are in fact quite small, but are in their use most similar to products within this category		÷	Probably included in: 85161019 Electric water heaters (excl. instantaneous water heaters and immersion heaters)

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
	Power showers, whirlpools, saunas and similar equipment	The equipment range from power showers which is a stand alone appliance to whirlpools that may be considered part of a fixed installation. The delineation between a finished product and a fixed installation is not clear-cut.	http://www.victorianbathrooms4u.com/Showers.488/Electric+Showers.451/ABSTRACT.53/Shower-5187%7C/Aqua+G1000+Manual+Power+Shower+(5187).5187.html#	÷	Included in aggregated commodity group
	Gas cookers with digital clocks			÷	Included in aggregated commodity group
	Electric door openers			÷	Included in aggregated commodity group
	Electric window openers			✓	Included in aggregated commodity group
2. Small household appliances	Baking machines		http://www.bagemaskinen.dk/?gclid=CKTT8aTcqpwCFZ0U4wodv0dJlA	✓	Included in 73211900 Appliances for baking, frying, grilling and cooking and plate warmers, for domestic use, of iron or steel, for solid fuel or other source of energy (excl. liquid or gaseous fuel, and large cooking appliances)
	Electrical portable cooling boxes	May in principle be included under Category 1, but this category includes only "large cooling appliances". The wording indicates that small cooling appliances are not included	http://www.nordiskcampingudstyr.dk/shop/koelebokse-68c1.html	✓	Included in aggregated commodity group
	Immersion boilers and heaters		http://www.frederiksen.eu/da/produkter/_dk_fysik_varme_144/kalorimeter-varmeenergi/vnr/275020/	✓	85161091 Electric immersion heaters of a kind used for domestic purposes

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
	Rice boilers			✓	Included in aggregated commodity group
	Egg boilers			✓	Included in aggregated commodity group
	Deep fat boilers			✓	85167920 Electric deep fat fryers, for domestic use
	Electric kettles			✓	85161019 Electric water heaters (excl. instantaneous water heaters and immersion heaters)
	Popcorn machines			✓	Included in aggregated commodity group
	Electric pasta machines		http://www.galttech.com/research/household-DIY-tools/best-pasta-maker-machine.php	✓	Private use: Included in aggregated commodity group Professional use: 84381090 Machinery for the industrial preparation or manufacture of macaroni, spaghetti or similar products (excl. macaroni drying machines and dough rollers).
	Ice cream makers		http://www.coffeeitalia.co.uk/proddetail.php?prod=gicmg&gclid=CKuHyeDtvpwCFZMU4wodTAFloQ	✓	Probably included in 84186900 Refrigerating or freezing equipment (excl. refrigerating and freezing furniture)

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
	Food processors and dough-mixing machines		http://www.valdemarsro.dk/?p=1218	✓	85094000 Domestic food grinders and mixers and fruit or vegetable juice extractors, with self-contained electric motor
	Blenders and juice extractors			✓	
	Waffle irons			✓	Included in aggregated commodity group
	Fly traps	Fly trap both exist as small units for households and large units e.g. used in agriculture	http://www.chrisal.dk/insekter.htm	÷	Included in aggregated commodity group
	Distillation units	Small equipment for distillation in households	http://www.easystill.com/	✓	Included in 8419 40 00 Equipment for distillation or rectification
	Electric potato peeler		http://www.el-handel.dk/product.asp?product=2076	✓	Included in aggregated commodity group
	Electric lighter		http://www.tootoo.com/d-p11642227-BBQ_Kitchen_Gas_Electric_Lighter/	÷	96132010 Pocket lighters, gas fuelled, refillable, with electrical ignition system
	Electric blankets		http://www.cpsc.gov/cpscpub/prerel/prhtml03/03114.html	÷	Included in aggregated commodity group
	Electric foot baths		http://www.chem1.com/CQ/FootBathBunk.html	÷	Included in aggregated commodity group
	Shower heads with light	Equipment for the purpose of spreading light is included in Category 5, but this category is considered not to include equipment for which the light is a secondary purpose	http://www.coolstuff.dk/Lysende_brusehoved	÷	Included in aggregated commodity group
	Makeup mirrors with light			÷	Included in 70099200 Glass mirrors, framed (excl. ….)

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
3. IT and telecommunications equipment		USB memory sticks have been mentioned as outside the scope, but both USB sticks and tapes (for a tape recorder) are equipment for the storage of information and dependent on electric currents or electromagnetic fields in order to work properly (in order to communicate the information) – thereby they fall in this category. Radio Frequency Identification (RFID) chips have been mentioned as possibly outside the scope, but the chips must be considered equipment for the storage of information and dependent on electric currents or electromagnetic fields in order to work properly (in order to communicate the information) – thereby they fall in this category.			
4. Consumer equipment		General comment: In the interpretation of Category 4 it is assumed that the second "including" in the Commission's proposal is a mistake, otherwise the category should only cover "signals or other technologies for the distribution of sound and image than by telecommunications..".			
5. Lighting equipment		Different equipment with build-in light, where the light emission is not the primary property, is listed elsewhere. Solariums may be considered as being outside the scope, because the primary purpose is the tanning. However, the category includes all equipment for spreading light, irrespective of the purpose of spreading the light (illumination, tanning, disinfection, heating).			

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
6. Electrical and electronic tools (with the exception of large-scale stationary industrial tools)	Mixing machines used in construction industry and in industry	Mixing of concrete and mortar cannot be considered "similar processes" to the processes listed		✓	84743100 Concrete or mortar mixers (excl. those mounted on railway wagons or lorry chassis) 84743200 Machines for mixing mineral substances with bitumen [probably large-scale industrial tool]
	Concrete vibrators	Vibrating of wet concrete or surfaces cannot be considered "similar processes" to the processes listed	http://www.city-rentals.ca/rental_equipments.php?catId=4	✓	Included in aggregated commodity group
	Kilns	Examples are small kilns use for ceramics in households and institutions. Ovens used in laboratories included in "laboratory equipment" mentioned below.		÷	Included in aggregated commodity group
	Electric lifts	Lifts e.g. used in health care sector or pallet lifts	http://www.liftrite.dk/let1300.htm	÷	Included in 84281020 Lifts and skip hoists, electrically operated
	Electric car jacks		http://www.harald-nyborg.dk/merinfo.asp?varenr=5018&n=60100	÷	Large stationary types included in: 84254100 Built-in jacking systems of a type used in garages
	Electric wire rope winches		http://www.liftket.de/index.php3?WRW?lang=en	÷	4251100 Pulley tackle and hoists, powered by electric motor (other than skip hoists or hoists of a kind used for raising vehicles)

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
	Electrical binding machines	E.g. used in offices for binding reports	http://www.tegneogkontor.dk/shop/elektrisk-indb-maskine-3770p.html	÷	Included in 8440 Machines for bookbinding incl. book-sewing machines
	Electric ladders		http://www.atticconversioncentre.com.au/ladders.html	÷	Included in aggregated commodity group
7. Toys, leisure and sports equipment	Other toys with EE components	Examples are: - electric cash register - talking dolls, animals and robots - electric cars for driving - scooters with flashing light - electric space shuttle set - dancing cow - whistles with light -pens with light -books with light or sound		✓	Included in aggregated commodity groups
	Electronic greeting cards			÷	Included in aggregated commodity group
	Adult erotic toys with EE components			÷	Included in aggregated commodity group
	Fun and joke equipment with EE components	Examples are exploding matches, pen with electric shock, lighter with electric shock		÷	Included in aggregated commodity group
	Ornaments and fine arts with EE components	Examples are rotating angels or Christmas trees	http://www.treetopia.com/unique-artificial-christmas-trees-p/rotating-christmas-tree.htm	÷	Included in aggregated commodity group

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
	Other amusement machines including mobile amusement park equipment	It is not clear how much is covered by the term "coin slot machines". In the Danish version of the Commission's proposal it is translated to "møntautomat", meaning a "coin operated machine" which is rather under "automatic dispensers" than "Toys, leisure and sports equipment". "Coin slot machine" is often used as synonymous for gambling machines and is the same as "Geldspielautomaten", used the German translation. In Danish this corresponds to a "spilleautomat". If this is the meaning a number of other amusement machines e.g. "flipper machines" or electrical rocking toys (e.g. a Postman Pat car) are not included. The delineation between small amusement machines and fixed installations is not clear, as some large-scale equipment, resembling stationary equipment in amusement parks is actually mobile units. The wording "coin slot" would further exclude all equipment where other payment methods than inserting a coin are applied.		✓	9504 Articles for funfair, table or parlour games, including pintables, billiards, special tables for casino games and automatic bowling alley equipment
8. Medical devises		See Veterinary devices below A number of different devices used in medical centres, but not used for human beings are included in laboratory equipment mentioned above			

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
9. Monitoring and control instruments	All measuring, weighing or adjusting appliances used in offices, agriculture, artisanal workshops and institutions	Category 9 includes only appliances used in households, laboratories and industry. Equipment used in all other settings are not included		÷	Many different commodity groups - not specified on where the equipment is used
	Baby alarms	May alternatively fall between Category 3 and Category 4 as it is both equipment for recording and telecommunications		÷	Included in aggregated commodity group
	Closed-circuit Television(CCTV)	CCTV, used for video surveillance, is currently considered as being category 9 equipment in some countries (UK, Germany); whereas it is considered as being part of Category 4 equipment in other countries (Belgium, the Netherlands) (Bogaert *et al*., 2008). If CCTV is considered to be included in Category 9 "monitoring and control instruments" it is only in industrial setting. The main part of the surveillance equipment will thus be out of scope of the Directive. Alternatively, the equipment, like the baby alarms, may fall somewhere between Category 3 and Category 4. As category 4 includes consumer equipment it is not obvious that equipment used commercially falls within the category.		✓	Included in aggregated commodity group
	Fire alarms	The specific inclusion of "Smoke detectors" in the list indicates that detectors and alarms are not considered to be included in measuring	http://www.avotex.net/producten.htm#Autonoom%20brandalarm,%20Type%204	÷	8531 10 Burglar or fire alarms and similar apparatus

Category	Product group	Remarks	Product examples (as of the day accessed)	Within the scope of the Danish RoHS Regulation	CN codes
	Burglar alarms	appliances. Fire alarms and burglar alarms may be considered part of fixed installations, but some types of burglar are used as single units - just like smoke alarms.		÷	
	Water Flow Detectors	Detectors used for monitoring water flow in houses. In line with heating regulators and thermostats. May as well as heating regulators and thermostats be considered a part of fixed installations.		÷	Included in aggregated commodity group
10. Automatic dispensers	Payment terminals	Terminals for payment e.g. for parking do not dispense a product and may be considered not to fall within the category		÷	Included in aggregated commodity group

Table 3.2
List of product groups considered by the authors to fall outside the scope of the categories in Annex I, nor specifically be designed for military applications, transport equipment, aerospace applications, fixed installations or large-scale stationary industrial tools.

Category	Product group	Remarks	Product examples	Considered within the scope of the Danish RoHS Regulation	Commodity codes
Veterinary devices	Much of the equipment used for medical applications may be used for veterinary applications: vital sign monitors, defibrillators, electro surgical generators, infusion pumps, etc.	Category 8 includes equipment within the scope of 93/42/EEC and 98/79/EC. Both directives address equipment for human beings only. Some equipment used in veterinary clinics may be included in other products categories, but a range of products are not.	Examples can be found at http://www.dreveterinary.com	÷	Included in aggregated commodity groups - same commodity groups as medical devices
Other laboratory equipment	Such as, ultrasonic cleaners, mixers, ovens, fume hoods, distillation equipment, sterilisation equipment, heating equipment, etc.	It is a question whether this equipment would fall under category 6. Some equipment may be covered by some of the product groups under household appliances although not used in households. It is certainly not included in Category 9 as the equipment is not used for measuring and control.		÷	Partly covered by: 84192000 Medical, surgical or laboratory sterilizers 84211920 Centrifuges of a kind used in laboratories
Equipment for generation, transmission or conversion of electricity	Extension cords			÷	Included in aggregated commodity group
	Transformers	Transformers are sometime sold as separate units to be optionally used together with equipment falling within the categories in Annex I. An example is a transformer marketed for use with an I-pod, but usually not sold together with the I-pod		÷	Probably included in 8515 39 13 Transformers which is a broad group of transformers

Category	Product group	Remarks	Product examples	Considered within the scope of the Danish RoHS Regulation	Commodity codes
	Battery chargers			÷	8504 40 55 Accumulator chargers
	Portable generators	May be considered a tool for generation of electricity and consequently within the scope of Category 4. All mentioned tools are however used for shaping or changing materials and generation of electricity is a totally different application		÷	Specific codes included in 8502 Electric generating sets and rotary converters 8501 61 - 8501 64 Alternators
	UPS (uninterruptible power supply)	UPS units are used as back-up power supply. The major part of UPS units is relatively large and can be considered part of a fixed installation. Small units used for households, e.g. as power backup for a single computer, are marketed as finished products.	http://www.elitedgeelectronics.com/catalog/index.php?main_page=index&cPath=6_84	÷	
	Photovoltaic cells and panels	Examples are solar panels for producing electricity for a pump for a garden pond. Small solar panels may be integrated in different kind of equipment e.g. garden lamps or calculators, but are in these cases covered if the equipment falls within one of the existing categories. Large solar panels are considered to be part of fixed installations.		÷	Included in aggregated commodity group
Clothing and footwear with EE components	Caps with light	Clothing and footwear with EE components may be considered similar to the product group "Sports equipment with electric or electronic components" in Category 7.		÷	Included in aggregated commodity group
	T-shirts and other clothing with light		http://www.coolstuff.dk/WiFi_T-shirt	÷	Included in aggregated commodity group
	Shoes with light			÷	Included in aggregated commodity group

Category	Product group	Remarks	Product examples	Considered within the scope of the Danish RoHS Regulation	Commodity codes
Consumables with EE components	Cartridges for printers with EE components	May be considered a spare part for a printer, as the printer would not function without the cartridge, however, in the FAQ for the existing RoHS Directive (EC, 2006) the Commission consider ink cartridges to be out of the scope of the RoHS Directive Some cartridges have electronic components and are themselves dependent on an electric current in order to work properly		÷	Included in aggregated commodity group
	Consumables for measuring equipment such as electron capture detectors, electron multipliers, laser tubes, electrodes, valves and UV-lamps	Cartridges for printers (mentioned above) are according to Test & Measurement Coalition estimated to be 5,000 times greater in volume than all category 9 industrial consumables combined (TMC, 2009). An example of a consumable for measuring equipment that represent a significant quantity of mercury use is hanging drop electrodes used in polarography.		÷	Included in aggregated commodity group
Furniture with EE components	Airbeds with electrical pump			÷	6306 40 00 Airbeds
	Elevation tables			÷	Included in aggregated commodity group
	Elevation beds	Beds with electrical moveable parts not used in the medical sector. Hospital beds are considered medical devices.		÷	Included in aggregated commodity group
	Chairs with electric moveable parts	Includes chairs used in households. Chairs used in dental clinics may be considered medical devices		÷	Included in aggregated commodity group

Category	Product group	Remarks	Product examples	Considered within the scope of the Danish RoHS Regulation	Commodity codes
	Cupboard and other furniture with electric light	Cupboards e.g. in kitchens often have integrated light		÷	Included in aggregated commodity group
Other products with EE components	Microscopes and magnifying glass with light	Includes equipment for optical image processing including also equipment for reading f microfilms. The equipment does not fall within Category 4 as the equipment is not reproducing the images. Electron microscopes falls within Category 3		÷	9011 Compound optical microscopes, including those for photomicrography, cinephotomicrography or microprojection
	Key finders			÷	Included in aggregated commodity group
	Electronic keys			÷	Included in aggregated commodity group
	Incubators and incubation chambers	An example is incubators for hatching egg (includes a thermostat, but is not itself a thermostat)	http://www.eggincubators.co.uk/	÷	Partly covered by 8436 21 00 Poultry incubators and brooders
	Strongboxes and safes with electronic lock	Examples are safes in hotel rooms or baggage boxes in train stations – some may be considered part of fixed installations		÷	Included in 8303 00 Armoured or reinforced safes, strongboxes and doors and safe deposit lockers for strongrooms, cash or deed boxes and the like, of base metal
	Patient simulators	Cat. 8 “medical devices” includes devices to be used for human beings”. The patient simulator is not exactly used for human beings and may not be included.		÷	

4. ASSESSMENT

Within the limits of the study it has not been possible to make an assessment of all product groups. The following product categories were selected on the basis that they were expected to represent a significant market volume and a significant quantity of RoHS substances:

- Veterinary devices
- Furniture with EE components
- Equipment for generation, transmission or conversion of electricity
- Tools used for mixing or vibrating
- Toys with EE components
- Other laboratory equipment
- Alarms
- Large and small household appliances.

4.1 Veterinary devices

Veterinary devices are not specifically mentioned to be within the scope of the current RoHS and WEEE directives or the Commission's proposal. Category 8 includes only equipment within the scope of 93/42/EEC and 98/79/EC. Both directives address equipment for human beings only.

Some veterinary devices may fall within the scope of some of the other categories, e.g. some measuring equipment used in veterinary laboratories may fall within the scope of Category 9. However, much equipment would fall outside the scope of all 10 categories.

The impact of specifically including the veterinary devices in the Directive has not been assessed earlier. Neither the study to support the Impact Assessment (Abbayes *et al*., 2008) nor the Impact Assessment (SEC2008) 2930, 2008) address the question of including veterinary equipment in the scope of the Directive. The Review of Categories 8 and 9 mention veterinary equipment as a product group which status requires clarification (Goodman, 2006).

4.1.1 Products and RoHS substances

Veterinary surgical facilities seem to use EEE similar to the equipment used for medical applications apart from the large sophisticated medical equipment like PET scanners. Major suppliers in this field supply a range of equipment including vital sign monitors, defibrillators, electro surgical generators, infusion pumps, anaesthesia equipment and respiratory ventilators (see e.g. DRE Veterinary, 2009).

Measuring equipment used in veterinary laboratories falls within Category 9, whereas measuring equipment used in veterinary clinics and surgical facilities is not included in the Commission's proposal binding list as the binding list includes only equipment used in household, laboratories and industry. Some equipment may further fall within Category 6, tools and some equipment may fall under consumer equipment as it is equipment for the purpose of reproducing sound or images.

Examples of equipment considered not to fall under any of the current categories are:

- Electrosurgical generators (for application of high frequency electric current to biological tissue;
- Defibrillators (delivering a therapeutic dose of electrical energy);
- Autoclaves;
- Anaesthesia equipment;
- Infusion pumps;
- Respiratory ventilators;
- Monitoring and control instruments like clinical thermometers, endoscopes, vital signs monitors.

As medical equipment is considered a separate category because the equipment is unique and not falling under other categories the same is true for veterinary equipment.

Whereas the equipment may be used for applications analogous to the medical equipment, much equipment seems to be designed and marketed specifically for veterinary purposes. A market report on Veterinary Diagnostics & Equipment states that a number of firms simply recondition equipment meant for humans, but increasingly, equipment is developed intentionally with animals in mind, as companies have seen the potential of a relatively untapped market (PJB, 2006). The market report states that for veterinary applications, therapeutic devices (pacemakers, dialysis equipment and so on) are still few and far between. However, the manufacture and sale of diagnosis equipment for veterinary purposes is a significant, growing market.

In general, medical devices are produced in small numbers, are produced for long period of time without modifications or changes in design and have to be very reliable (Goodman, 2006). Manufacturers would typically replace Category 8 products with new models after 7-10 years. The same is probably true for veterinary devices which are produced in even smaller numbers than medical devices. It means that the time needed to modify the equipment to comply with RoHS can be very long.

No data has been available that indicate that veterinary devices differs significantly from similar medical devices as to the content of RoHS substances. Components, used for the manufacturing of veterinary devices, most probably are the same as used for medical devices.

As a first rough estimate, the content of RoHS substances in veterinary devices can be estimated on the basis of the knowledge on RoHS substances in medical devices.

The total amount of equipment within Category 8, medical devices, sold on the EU market in 2006 was estimated at about 30,000 tonnes corresponding to approximately 0.5% of the total EEE market (Goodman, 2006). The total RoHS substances in the equipment were estimated at 1,160 tonnes lead, 1.8 tonnes cadmium and about 20 kg mercury (Goodman, 2006). The total PBDE (mainly deca-BDE) in Category 8 and Category 9 equipment was estimated at less than 10 tonnes. More than 80% of the lead is used in lead shielding and lead counterweights in radiotherapy and nuclear (PET) scanning, whereas the other uses (main lead solders and optical glass) total about 300 tonnes. The consumption of lead in shielding and counterweight is probably very small for veterinary applications whereas the use for other purposes most likely is similar to the use in medical devices. The major part of the cadmium in medical devices is in scintillators in X-ray detectors, which probably also is used to some degree for veterinary applications. The major use of mercury is in switches which probably also are used in veterinary devices.

The inclusion of the medical devices in the scope of the RoHS directive most probably will have a spin-off effect on the veterinary devices with the result that the total content of RoHS substances in the veterinary devices in any case will be reduced over a time span of the next ten years.

4.1.2 Market

No European trade association for veterinary devices has been identified. According to a market report on Veterinary Diagnostics & Equipment from 2006, within the last decade a new veterinary devices and diagnostics industry has started to emerge (PJB, 2006). Although still a young industry it is an area of veterinary medicine that has considerable growth potential.

The market is according to the report an immature one (PJB, 2006). The global market is worth approximately 2 billion US$/year (~1.4 billion €/year) (PJB, 2006). The European market can based on this roughly be estimated at around 0.2-0.6 billion €/year. The global market is dominated by one large company, while the rest of the industry is scattered in mostly small and medium-sized firms. Some players are divisions of human medical device firms that have discovered veterinary applications for their products, often arising due to demand from customers (PJB, 2006). It is still mostly a developed world industry, with the vast majority of companies based in the US, Canada, Europe, Australia and Japan.

The veterinary technology sector is still small compared to the medical sector. Annual sales for the medical technology sector in Europe are according to the trade association Eucomed 72.6 billion €/year, which is equal to 33% of the world market share (Eucomed 2006). The world market is consequently about 220 billion €/year.

The turnover in the veterinary technology sector can consequently be estimated to be about 1% of the turnover of the medical technology sector. Medical equipment account for approximately 1% of the total weight of EEE sold in the EU (Goodman, 2006).

4.1.3 Impacts of inclusion of veterinary devices in the scope

Substitution of RoHS substances

Due to the long life cycles, small numbers sold, longer research, redesign, validation and testing periods, the compliance cost per product and its dependence on the enforcement date, for veterinary devices is higher than for other types of EEE.

Choosing the same implementation schedule as for the medical devices, very few existing products would probably need to be modified as they could be replaced by new RoHS compliant product designs at the time they were originally planned to be introduced on the market. Further, the inclusion of the medical devices in the scope of the RoHS Directive would mean that RoHS compliant components for this type of equipment will be made available. The price increases would therefore be minimal or zero, using the same rationale as used by Goodman (2006) for medical devices.

Administrative costs

As many of the manufacturers of equipment also manufacture medical equipment the training of staff and build up of procedures for RoHS compliance will take place as consequence of the inclusion of the medical devices. For a limited number of companies, specialised in veterinary equipment, inclusion of this product group in the scope will imply administrative costs of the same order of magnitude as for manufacturers and importers of medical devices.

The administrative costs to public authorities are considered to be similar to the costs associated with other EEE.

Environmental and health benefits

The environmental and health benefits of the inclusion of the veterinary equipment in the scope are estimated to be similar to the benefits of the inclusion of the medical equipment (per tonnes of equipment).

4.2 Furniture with ee components

Furniture has traditionally not been considered electric and electronic equipment and inclusion of furniture with EE components within the scope of the RoHS directive has not previously been assessed.

Some furniture with EE components, e.g. an elevation bed, can be considered to fall within the general definition of EEE as the bed is dependent on electric current in order to work properly. Without electricity an elevation bed can still be used for some purposes, but cannot change height, which is a basic property of an elevation bed. Cupboards with light may be considered to fall outside the definition of EEE as the cupboard is not dependent on the light for being a cupboard.

None of the ten categories in the Commission's proposal include furniture. The product group "large appliances for heating rooms, beds and seating furniture", included in Category 1, "Large household appliances", are the products coming closest to furniture with EE components. However, beds and chairs, themselves cannot in our understanding be considered "large household appliances".

Hospital beds that rely on electricity are covered by the Medical Devices Directive (93/42/EEC) and fall consequently within Category 8: Medical devices. Goodman (2006) mention hospital beds that are not dependent on electricity as a product whose status requires clarification, however such beds do not seem to be covered by the general definition of EEE.

4.2.1 Products and RoHS substances

The main groups of furniture with EE components are:

- Elevation tables, in particularly used in offices.
- Electric beds, used in private households and hospitals (the latter being medical devices).
- Elevation chairs, and other chairs with automatic moveable parts used both in private households, clinics and hospitals (the latter being medical devices).
- Cupboards and other furniture with integrated light – e.g. kitchen cupboards.

EE components in furniture with actuators - The furniture in the tree first groups is typically equipped with one or more actuators consisting of an electric motor, gear and a spindle, switches and wires. Further, much equipment has a control box with electronic components for electronic control e.g. by the use of a remote control. The control boxes may be equipped with display.

RoHS substances in the EE components of this type of furniture are expected to be or have been quite similar to the substances included in electrical tools with the similar components: An electric motor, wires and a control box (without rechargeable battery).

According to a world market leader in designing and manufacturing electric linear actuator systems for furniture, the vast majority of the company's products were compliant with the RoHS directive to start with, and after many months of focused work, all products are now RoHS compliant (Linak, 2009).

Manufacturers of electric motors and actuators for furniture seems typically (based on manufacturer's web-sites) also to produce equipment for other purposes of which some applications are within the scope of RoHS.

There is no indication of any particular difficulties in complying with RoHS for the EE parts.

EE components in furniture with light – Light sources may be build-in in cupboards and possibly also other types of furniture. According to the European Furniture Manufacturers Federation (EAU) furniture for kitchens, office furniture, bedroom furniture, dining room furniture and shop furniture systematically or occasionally use EE components; for the largest part it concerns built-in light (EAU, 2009). The components would be some wires, switches and sockets.

RoHS substances in other parts of furniture with EE parts – Some of the new substances suggested for inclusion in the RoHS Directive: DEHP, DBP and BBP may be included in some parts of flexible PVC (e.g. in wires of furniture with light and elevation chairs with artificial leather), adhesives and some paints, but no actual information on such uses has been identified.

Lead stabilisers are typically used in outdoor applications and in wires. Beside the possible use in wires, lead would not typically be used in furniture. Lead and cadmium pigments have traditionally been used in plastic parts of bright yellow and red colours, which are not typically used in furniture. Alternatives to any eventual use of lead and cadmium stabilisers or pigments are considered to be readily available.

Flame retardants, among these deca-BDE and one of the new substances suggested for inclusion in the RoHS Directive, hexabromocyclododecane (HBCDD), are used in textile back coating in upholstery and may be used in upholstered chairs with EE components for some markets e.g. furniture for airports and for home furniture in UK and Ireland which have stringent fire safety requirements. Traditionally HBCDD and deca-BDE as well as other flame retardants have been used for these markets, but no data is available to quantify the total use of deca-BDE (or HBCDD) for furniture with EE components. Alternatives based on phosphorus, nitrogen and zirconium compounds are available.

Replacement of hexavalent chromium in corrosion resistant coatings and deca-BDE (or HBCDD) in textile back coating would probably be the biggest challenges, but alternatives are available, like for other parts of EEE.

4.2.2 Market

Manufacturers of furniture are organised in European Furniture Manufacturers Federation, UEA (http://www.ueanet.com), European Furniture Industries Confederation, EFIC (http://www.efic.eu/) and Fedération Européene du Mobilier de Bureau, FEMB (http://www.femb.org/).

According to UEA there are over 100.000 companies producing furniture in the EU and 55-60% of all manufacturers would occasionally use EE components; mainly build-in light (UEA, 2009).

The number involved in production of furniture with other EE components than light is not known. In Denmark, representing about 3% of the furniture production in the EU (UEA, no date) some 25-30 manufacturers produce furniture with actuators while some 60-65 manufacturers produce furniture with built-in light (Danish Furniture, 2009). The percentage of manufacturers that occasionally use EE components in Denmark is estimated to be less than 50% (Danish Furniture, 2009).

The total turnover of furniture in the EU 15 was 80.8 billion € (UEA, no date). No quantitative data specifically for the market for furniture with EE parts have been available.

The external trade statistics contain no specific CN codes for furniture with EE or for actuators, neither does Prodcom. The electric motors used for this area is included in aggregated commodity codes for electric motors.

An indication of the market of the EE component can be obtained from the fact that a major manufacturer of actuators (of which a major part is for furniture) has a turnover of about 0.25 billion €. The EU market for the EE parts is probably in the range of 0.2-2 billion €. The actuators take up a minor part of the total price of the furniture and the EU market of furniture with EE components must be considerably bigger.

From the data available it is not possible to deduce any indication of the market volume for build-in light in furniture.

4.2.3 Impacts of inclusion of the products in the scope

Substitution of RoHS substances

The costs of substitution of RoHS substances are considered to be relatively small as RoHS compliant EE components would be available, and RoHS substances are only used in limited quantities in other parts of the furniture. The major costs are probably related to substitution of hexavalent chromium for corrosion resistant coating and deca-BDE for textile back coating.

Administrative costs

Furniture with actuators has in order to obtain CE label to comply with the Machine Directive (98/37/EC), the Low Voltage Directive (2006/95/EC) and the EMC-directive relating to electromagnetic compatibility. The CE label means that the items comply with the minimum standards for health and safety and have been tested in accordance with the European standards. All parts of the furniture with actuators have to comply with these directives, and the entire furniture has to be approved, and thus administrative procedures for some compliance control are already in place. Furniture with build-in light has not to comply with the Machine Directive and in general no approval procedures seem to be in place for this furniture.

Besides the manufacturers of the final furniture, manufacturers in the supply chain that could be affected of inclusion of the furniture in the scope are: manufacturers of steel parts, plastic parts, wooden parts and textiles for upholstered furniture.

Inclusion of the furniture with EE components in the scope will result in administrative costs to the manufacturers of the furniture and suppliers of furniture parts. For the manufacturers and suppliers of the EE parts for the furniture the extra administrative costs are estimated to be rather small as these manufacturers typically will have trained personnel and procedures for documentation of compliance. For manufacturers and suppliers of other parts, e.g. of tabletops and metal parts, it will be necessary to train personnel and build up procedures for compliance testing and documentation. These companies would typically not already have the administrative capacity for RoHS compliance.

The total number of companies that could be impacted will be highly dependent on whether all furniture with EE parts is considered to fall within the definition of EEE. As mentioned above according to UEA some 55,000-60,000 manufacturers could be affected if all furniture with build-in light is included. If only furniture with electro motors is included the number of manufacturer would be significantly lower, but the actual number is not known.

The position of the trade organisation UEA is that rendering the electrical material conform to the RoHS restrictions is the only way to progress (UEA 2009).

Environmental and health benefits

Besides the benefits of reducing the RoHS substances in the EE parts there might be benefits of reducing hexavalent chromium in surfaces of steel parts and some deca-BDE in chairs on some markets. For furniture with build-in light the administrative costs vs. benefits are considered to be relatively large as the furniture includes relatively small amount of wires, sockets and switches and a large number of manufacturers of furniture and furniture parts would have to build up procedures for RoHS compliance.

4.3 Equipment for generation, transmission or conversion of electricity

The definition of EEE in Article 3(a) of the Commission's proposal, also defines equipment for the generation and transfer of electric currents and fields as EEE, but in fact no such equipment is included in Annex II of the Commission's proposal. Equipment for generation, transmission or conversion of electricity falls outside the scope of all categories in Annex I.

Portable generators and EEE powered with photovoltaic (PV) cells have previously been assessed as part of the study to support the Commission's Impact Assessment (Abbayes *et al.*, 2008).

4.3.1 Products and RoHS substances

Most equipment for generation, transmission or conversion of electricity is used in fixed installation and large-scale stationary industrial tools and consequently outside the scope of this assessment.

Equipment marketed as finished products and not used in fixed installation and large-scale stationary industrial tools includes the following:

- Portable generators
- Battery chargers
- Extension cords
- Transformers
- Portable UPS units
- Photovoltic cells.

Portable generators – are used in households, agriculture, by artisans and in industry. The portable generators differ from generators in fixed installations in the way that they are in closed enclosures and equipped with connections intended for end users.

A portable generator has typically consisted of an internal combustion engine, AC alternator, starting and regulation controls, electric power outlet, safety devices and a starter (US CPSC, 2004). New portable types based on fuel cells, using e.g. methanol, has recently been introduced, but their market share is negligible.

Abbayes *et al.,* 2008 use the average content of RoHS substances in Category 6 tools as the best estimate for the content of RoHS substances in generators.

Battery chargers - includes small chargers for portable cells and chargers for large batteries. The battery charger consists typically of a small transformer, some electronics for regulation of the charging, a plug and eventually a wire. Lead may be used as stabiliser in PVC and in solders, and Cr(VI) may be used in metal surfaces. The substances do not differ from battery chargers provided with EEE or build into EEE within the scope of the Directive.

Extension cords - Some cords may be equipped with switches or electronic components e.g. for switching off all equipment connected to the cord when one part is switched off.

Extension cords may contain lead or cadmium in PVC stabilizers and pigments. If equipped with an electronic device it may further contain lead in solders. The content of RoHS substances does in general not differ from wires attached to the EEE.

Transformers – Includes the transformers of the type used for power supply for electrical and electronic appliances. Some transformers of this type may be regarded as spare parts as they are supplied with the equipment, for other equipment a transformer is optional because the power is otherwise supplied e.g. via and USB port of a computer. The transformers differ from transformers in fixed installations in the way that they are in closed enclosures and equipped with connections intended for end users.

Transformers used for power supply of EEE consist of the same parts as transformers supplied together with the equipment within the scope of the Directive. The transformers differ from transformers used in fixed installations in the way that they are in closed enclosures and equipped with connections intended for end users.

Portable UPS units - Uninterruptable power supply (UPS) units are used as back-up power supply. The majority of UPS units are relatively large and can be considered part of a fixed installation. Small units used for household, e.g. as power backup for a single computer, are marketed as finished products. They consist of a battery (outside the scope of RoHS) and some electronic components for power handling.

Photovoltaic cells - Photovoltaic cells (mainly solar cells) for consumer applications can be divided into two application areas: consumer power modules and indoor modules (Abbayes *et al.*, 2008). The indoor modules are typically build into different equipment like calculators, watches, etc. and would usually fall within the scope if the equipment, which they power, is falling within the scope. Consumer power modules can be used for powering different equipment like lighting or garden pumps and may be provided as separate unit. In the latter case they will be outside the scope of the ten categories. It may be difficult to distinguish between consumer power modules and the application areas designated "remote habitation" and "remote industrial" which are in a grey area between “finished products” and “fixed installations”.

The total market of photovoltaic cell technology can be divided into wafer based crystalline silicon technology and the newer thin film technology. There are different types of thin film photovoltaic modules of which the CdTe is the only containing RoHS substances. (Abbayes *et al.*, 2008 mention incorrectly that the CIS ($CuInSe_2$) modules also contain Cd). The amount of cadmium used in thin-film CdTe modules is about 5-10 g/m². CdTe took up 2.7% of the total PV market in 2006 (EPIA, 2007). The use of CdTe in photovoltaic modules are not included in the list of exemptions as the CdTe modules are generally not used for indoor modules, and other applications are currently outside the scope of the Directive.

To what extent CdTe modules are used for some consumer applications as finished products would probably depend on the exact delineation between fixed installations and finished products.

4.3.2 Market

Portable generators - In the U.S.A. manufacturers of portable generators also produced other types of outdoor equipment such as lawn movers and other garden equipment (US CPSC, 2004). This is probably also true in the EU. Based on Prodcom figures (European production statistics) the total European generator market amounts up to 10 billion €/year and probably more than 700,000 units whereas another source estimates the European market for small portable generators < 3kW at 380.000 units (Abbayes *et al*., 2008). The latter figure is used by Abbayes *et al*. (2008) to calculate the total amount of substances in generators annually put on the European market. If only generators with a capacity of <7,5 kVA are considered portable (although some portable may have more) the total number based on the Prodcom data in Abbayes *et al*. (2008) gives a total number of 310,000 units/year of a total value of about 0.3 billion €/year (about 1000 €/unit). This indicates that the market volume of the portable generators is likely in the range of 0.3-0.6 billion €/year while the market for large stationary generators in fixed installation are much larger.

In the U.S.A. the market in 2002 of light duty portable generators was 357,000; of these 203,000 were sold to home owners (US CPSC, 2004) demonstrating that home owners represent the major user category.

The market for new portable generators based on fuel cells is estimated currently to be negligible.

Battery chargers - Battery chargers sold separately are assumed to be manufactured by companies manufacturing similar components used in EEE. Battery chargers are covered by CN code 8504 4055 “Battery chargers (excl of a kind used with telecommunication apparatus, automatic data-processing machines and units thereof and polycrystalline semiconductor rectifiers”. The total import in 2008 was 91 million units, of a total weight 32,000 tonnes (0.35 kg/unit) and a value of 0.56 billion € (see Annex 1). The major part is imported from countries outside the EU. It is not clear how many of these are sold as separate units.

Extension cords, transformers and UPS units – Extension cords and transformers sold separately and small UPS units are assumed to be manufactured by the same companies that manufacture similar components used in the EEE. The products for these particular applications are not covered by specific CN codes or Prodcom codes and the market has not been investigated further.

Photovoltaic cells - The study to support the Commission's Impact Assessment reports that at the European level both consumer power and consumer indoor applications are estimated to represent less than 1% of the total photovoltaic market (Abbayes *et al*., 2008). The study does not include information on the value of the market, total tonnage or total content of RoHS substances. Photovoltaic cells and modules are typically manufactured by companies specialised in this field. The European Photovoltaic Industry Association (EPIA) has more than 200 members, representing about 95% of the European photovoltaic industry. Globally the photovoltaic industry had a turnover of 14 billion € in 2007 (JRC, 2008). European manufacturers represented about 28% of the manufacture but the EU represented a larger share of the end-market. Based on this it is roughly estimated that the European consumer photovoltaic market in 2006 was less than 0.1 billion €/year.

4.3.3 Impacts of inclusion of equipment for generation, transmission or conversion of electricity in the scope

Substitution of RoHS substances

Portable generators, UPS units and battery chargers, extension cords and transformers sold separately consists of components which are produced in large quantities for equipment within the scope and it is not expected that there should be particular difficulties in replacing the RoHS substances for these products.

CdTe cells has been mentioned as the most costs effective PV technology, but the cost/benefits of replacing the CdTe technology with other PV technologies has not been investigated.

Administrative costs

The supply chain is the same for these products as for products within the scope and it must be expected that manufacturers and importers already has procedures for RoHS compliance.

Photovoltaic cells – Photovoltaic cells constitute a separate market and inclusion within the scope would imply that manufacturers of the cells and in the supply chain would need to build up capacity and procedures for compliance. The products are so different from other EE products within the scope that it is not possible to compare to any product groups within the scope.

Environmental and health benefits

For portable generators Abbayes *et al.* (2008) assess that the total amount of hazardous substances being involved are potentially significant, and that the inclusion in the scope of the RoHS Directive seems appropriate in terms of environmentally burden. The same seems to be the case for the UPS units, battery chargers, extension cords and transformers, which not significantly differ from products within the scope.

Inclusion of the photovoltaic cells within the scope may potentially result in reduced use of cadmium unless the CdTe cells are exempted. For the photovoltaic cells in general and the CdTe cells in particular there is a trade off between possible positive impact of reduced use of RoHS substances, and a negative environmental impact if the prices of the cells increases, making the cells less competitive compared to electricity production based on fossil fuels. A more detailed analysis would be needed for assessing the potential negative impacts of the inclusion of the solar cells.

4.4 Tools used for mixing or vibrating

Category 6, electrical and electronic tools includes many different tools for processing of a material like cutting, sanding or drilling. The category also includes "similar processes". All the listed processes are processes where some of the material is removed, or the shape of the part, made of the material, is changed. At least two processes cannot be considered "similar processes": mixing and vibrating; processes by which a new material is formed.

Other processes not included are electroplating and binding, which are not further assessed, and there are likely other processes that cannot be considered "similar processes".

4.4.1 Products and RoHS substances

Portable electrical mixers are mainly used in the construction industry for mixing concrete or mortar. Portable electrical mixers are used by bricklayers and private persons and to some extent by concrete workers. In industrial settings, e.g. factories for production of precast concrete panels, large mixers and vibrators, that must be considered large-scale stationary industrial tools, are applied. Mixers used for mixing of asphalt are typically large and are here considered large-scale stationary industrial tools.

Electrical vibrators, for vibrating concrete, are used by concrete workers for compacting the concrete. Internal vibrators consist of a steel cylinder immersed into the concrete whereas external concrete vibrators attach, via a bracket or clamp system, to the concrete mould. Some models are powered by a combustion engine or by pneumatic power from a compressor. It is not clear whether compressors are included in the Commission's proposal binding list, but it is here assumed that they are covered by "other treatment of liquid of gaseous substances by other means" in Category 6.

The electrical part of the mixers typically consists of an electrical motor, wires and switches. The rest of the mixer is typically made of galvanised steel and some "rubber" wheels.

The electrical part of electric vibrators typically consists of an electromotor running at high revolutions per minute, wires and switches. The rest of the mixer is mainly made of steel, and plastic/rubber tubes and noses.

The RoHS substances that may be used in the mixer and vibrators are considered to be the same as used in other tools and there is no indication that replacement of RoHS substances should be particularly difficult.

4.4.2 Market

Concrete mixers and vibrators - The industry is in Europe represented by the Committee for the European Construction Equipment Industry CECE (http://www.cece-eu.org). The concrete equipment is represented by one of six sections within the organisation with about 120 members.

Concrete or mortar mixers (excl. those mounted on railway wagons or lorry chassis) are covered in the trade statistics by CN 84743100. Total import (from other Member States and countries outside the EU) in 2007 was 1.49 million units, of a total of 82,000 tonnes and a price of 403 million €. Based on this the weight of each unit should be 55 kg which is the weight of a typical small mixer used by private persons. The weight of mixers used by professionals is typically higher while the weight of small handheld mortar mixers is smaller. The actual consumption is somewhat higher as consumption of domestically produced equipment has to be added.

The trade statistics also include CN codes for machines for mixing mineral substances with bitumen and machinery for agglomeration, shaping and moulding of solid mineral, but this equipment is considered to fall under large-scale industrial tools.

Concrete vibrators - are covered by CN code 84671910 which includes concrete pneumatic vibrators, only, and no date is provided for this CN code in the statistics. Considering that much professional equipment is powered by other means than electricity, the market of electric vibrators is considered to be small compared to the market of concrete and mortar mixers.

Based on the available information the market of this equipment is roughly estimated at 0.5-1.5 billion €/year.

4.4.3 Impacts of inclusion of tools for mixing or vibrating in the scope

Substitution of RoHS substances

The impacts on manufacturers and users, of inclusion of this equipment, is considered to be quite similar to the impacts of inclusion other tools. The EE components used in the equipment is quite similar to components used in other tools (first of all electro motors) and no particular difficulties in replacing the RoHS substances are expected. The products have until now been considered to be within the scope of the national RoHS regulation in Denmark and possibly also in other Member States.

Administrative costs

For relative few companies, specialised in manufacturing of this equipment, inclusion of this product group in the scope will imply administrative costs of the same order of magnitude as for manufacturers and importers of other electrical tools.

A quick survey on the Internet shows that many concrete mixers are marketed as RoHS compliant, and many manufacturers and importers would probably consider this equipment to be within the scope today.

Environmental and health benefits

The environmental and health benefits of the inclusion of this equipment is estimated to be similar to the benefits of the inclusion of other tools like tools for gardening activities and tools for spraying, spreading, dispersing or other treatment of liquid or gaseous substances (e.g. high-pressure cleaners).

4.5 Toys with EE components

Toys are included in Category 7 "Toys, leisure and sports equipment" and Annex II of the Commission's proposal specifies that it includes electric trains or car racing sets, hand-held video game consoles, video games, computers for biking, diving, running, rowing, etc., sports equipment with EE components and coin slot machines. It means that many types of toys with EE components are not within the scope of Annex II of the Commission's proposal. In general, battery-powered toys are not within the scope.

The discussion regarding toys does both concern the questions about the definition of EEE and the questions about the scope for products falling within the definition of EEE. In the "Teddy bear example" in the FAQ (EC, 2006) the Commission defines that a teddy bear with a battery is not covered by the definition of EEE because the teddy bear can fulfil its basic function without the electric current. This interpretation could also apply to many other types of toys with batteries. However, as discussed in section 0, a broad definition of EEE has been applied here.

4.5.1 Products and RoHS substances

A range of products are not similar to products listed in Annex II, but are clearly dependent on an electric current to work properly. Examples are:

- Building sets e.g. combining programmable bricks with motors and sensors;
- Remote controlled cars, helicopters, boats, flights, etc.;
- Electric cars for driving (where the child is sitting in the car);
- Electric cash register;
- Electric space shuttle set;

Examples of products, which are more in the "teddy bear category" includes:

- Walking and/or talking dolls, animals and robots;
- Scooters with flashing light;
- Dancing cow;
- Whistles with light;
- Books with sound or light (not electronic books)
- Pens with light

EE components - EE components of the toy are mainly electrical motors, wires, printed circuit boards, switches and in the more advanced toys also different sensors. Toys with motors often include some electronic parts e.g. for remote control. The RoHS substances in the products are expected to be (have been) the same as used in toys within the scope of the Commission's proposal. Sensors, used in some sophisticated toys, however, may rather include components similar to components in some measuring and control equipment.

No data has been available for estimating the average content of RoHS substances in the toys. EE parts certainly take up a significant percentage of the weight of some of toys like remote controlled cars, whereas it only takes up a few percent of other toys like the talking doll.

Other parts - of the toy that may contain RoHS substances would typically be some painted steel parts, some plastic parts, and for dolls and teddy bears, some textiles.

These parts may include lead and cadmium pigments in plastic parts or hexavalent chromium in corrosion resistant coating but the use is deemed to be very small. According to a presentation by Toy Industries of Europe (TIE) the only RoHS substance, that concern toy, is lead in solder (TIE 2003).

All applications in both EE components and other parts are similar to applications in many products within the scope and the use of the RoHS substances is not considered essential.

According to major market actors in the Nordic toy industry there has been a great uncertainty on which products were "equipment for which electrical energy is used only for support or control functions". For the Nordic producers this has resulted in a principle of rather including too many products than taking the risk not complying with the Directive. It is estimated that the RoHS substances have been phased out in nearly 90 % of all electric toys for the Nordic Market (mainly produced outside the EU).

4.5.2 Market

According to the Toy Industries of Europe (TIE) the total production of toys and games in the European Union was nearly 5 billion € in 2007 (manufacturer's price) (TIE 2008). The EU has nearly 2,000 manufacturers working in the toy and games sectors. Import of toys and games to the European Union from other countries is approximately 11.6 billion €/year of which traditional toys account for 7.0 billion €/year and video games account for 4.617 billion €/year (TIE 2008). Asia is the leading supplier of toys representing 97.6% of the total import.

The retail market was overall (excluding video games) 14.2 billion € in the EU in 2007. Traditional toys accounted for 60% in 2007 compared to 75% in 2006 and video games accounted for 40% in 2007 compared to 25% in 2006.

According to a presentation of TIE from 2003 the average content of EE toys was 8% and all EE toys represented less than 1% of WEEE (TIE 2003).

A major part of the traditional toys are likely to be categorised within the following commodity groups:

- 9503.0079 Toys and models, incorporating a motor (excl. plastic, electric trains, scale model assembly kits, and toys representing animals, human or non-human creatures)

- 9503.0075 Plastic toys and models, incorporating a motor (excl. electric trains, scale model assembly kits, and toys representing animals, human or non-human creatures)

Electric trains have their own categories whereas racing sets (included in the Annex II of the Commission's proposal) would be included in one of these two CN codes. Scale model assembly kits and toys representing animals, human or non-human creature with motors are included in specific categories with similar products also without EE parts.

The intra EU27 and extra EU27 import within the two listed categories was in 2008 of 0.6 billion €. The marketed volume will be slightly higher, as the marketed toys based on domestic production in each Member State should be added. As indicated, scale model assembly kits and toys representing animals, human or non-human creatures with motor are not included. The total market of the toys with electrical motors is on this basis roughly estimated to be in the range of 0.6 – 1.2 billion €/year or 7-14% of the traditional toy market. Besides, some toys may include only a light source or a small electronic part. No data have been available for these product groups, but in terms of tonnage of EE components these products probably represent a small volume in comparison with the toys with motors.

4.5.3 Impacts of inclusion of toys in the scope

Substitution of RoHS substances
The costs of substitution of RoHS substances are considered to be small as RoHS compliant EE components are already available for many product categories. According to a leading market actor in the Nordic toy industry, RoHS substances are not used in other parts of the toys and more than 90 % of toys dependent on electric current or electromagnetic fields already excludes the RoHS substances. However, the situation may be different in other parts of the EU.

If a binding and exhaustive list of equipment specifically exclude these groups of toys from the scope of the Directive some manufacturers, that have out- phased the RoHS substances, may reintroduce them.

Administrative costs

Inclusion of the toys with EE parts in the scope will result in administrative costs to the manufacturers of the toys and suppliers of toy parts. Besides the manufacturers of the final toy, manufacturers in the supply chain, which could be affected of inclusion of the toys in the scope, include manufacturers of the EE parts, steel parts, plastic parts and textile parts. For the manufacturers and suppliers of the EE equipment for the toys, the extra administrative costs are estimated to be rather small as these manufacturers typically will have trained personnel and procedures for documentation of compliance.

For manufacturers and suppliers of other parts, e.g. the head of the dolls, it will be necessary to train personnel and build up procedures for compliance testing and documentation. These companies would probably not all have the administrative capacity for RoHS compliance in place.

Major manufacturers and importers of the final toys will probably already have procedures for compliance for some of the toys with electrical motors whereas many small manufacturers and importers may not. According to TIE, in 2003 in Europe, 80% of toy companies had less than 50 employees (TIE 2003). It means that inclusion of the scope may negatively impact the SMEs. For companies specialised in marketing electrical toys the administrative costs are not deemed to be different from companies marketing other EEE. The most impacted (in relation to the turnover of RoHS substances) will be companies with products on the borderline of the EEE definition where the EE components take up a small part of the products and products with EE components takes up a small part of the manufactured/imported products.

Environmental and health benefits
As RoHS substances seem in general not to be used for non-EE components the benefits of reducing the RoHS substances in the EE parts will be similar to the benefits of reducing the RoHS substances in other product groups within the scope like sports equipment with EE components.

4.6 Other laboratory equipment

Measuring, weighing or adjusting appliances for laboratories are included in the list of products in Category 9: "Monitoring and control equipment". However, much equipment used in laboratories is not used for measuring, weighing or adjusting. Much equipment used in laboratories is used to alter the properties of materials; grinders reduce particle size, ovens change temperature, various devices alter composition, shakers mix substances, etc. (Goodman, 2006).

Some of the equipment may be considered to fall within Category 6: electrical and electronic tools, but the equipment is not covered by the binding list of the Commission's proposal. Some equipment is quite similar in its function to equipment included in "small household appliances", but the actual equipment used is totally different.

4.6.1 Products and RoHS substances

In the Review of Category 8 and 9 products a number of products were listed that required clarification with respect to the scope (Goodman, 2006). The list included the following equipment used in laboratories:

- Equipment used to prepare samples for analysis such as grinding equipment, mixers, extraction systems, etc.
- Laboratory ovens and centrifuges.
- Other laboratory equipment such as ultrasonic cleaners, fume hoods, distillation equipment, and heating equipment.

Goodman (2006) reports that some laboratory equipment manufacturers have said that they would prefer that the status was clear and that all laboratory equipment fall in Category 9.

The reason for omitting Category 8 and 9 was concerns of the reliability of certain substitute materials in equipment essential for healthcare, consumer safety and equipment which should function with high precision and reliability. In this respect the other laboratory equipment addressed here is, however, is not different from other tools and appliances used for other purposes.

For most of the products the use of RoHS substances is assumed to be similar to the use in products within the categories of small household appliances and tools, but it has not been investigated whether RoHS substances are used for very specific applications in some of the equipment.

4.6.2 Market

Goodman (2006) mention that there is no trade organisation specifically for Category 9 equipment and none of those who submitted information for the study was able to provide data except for the Test and Measurement Coalition. Goodman (2006) does not provide any estimates on the market of other laboratory equipment.

Eurostat's external trade statistics contain data on two specific types of equipment used in laboratories:

- 8419 2000 Medical, surgical or laboratory sterilizers
- 8421 1920 Centrifuges of a kind used in laboratories

The total import (extra and intra EU 27) of the two product group in 2008 was 0.19 and 0.1 billion €/year, respectively (see Annex 1). The "medical, surgical or laboratory sterilizers" also includes medical equipment falling within Category 8. Based on the limited data it has not been possible to make an estimate on the total market for the laboratory equipment.

4.6.3 Impacts of inclusion of other laboratory equipment in the scope

Substitution of RoHS substances

Like medical and veterinary equipment the laboratory equipment is characterized by long life cycles and small numbers sold, but the equipment is in general not sophisticated equipment that needs extensive research for development. The compliance cost per product is not estimated to be significantly higher than for other types of EEE sold in small number and RoHS compliant EE components are probably already available for most product categories.

Administrative costs

The relative administrative costs are considered to be comparable with products within the scope and most manufacturers have probably already procedures for RoHS compliance in place.

Environmental and health benefits

The specific content of RoHS substances in the products is considered to have been similar to some household appliances or tools listed in Annex II of the proposal, and the environmental and health benefits of phasing out the substances can consequently be considered to be similar the product groups within the scope.

4.7 Alarms

Burglar (intrusion) alarms, fire alarms and similar apparatus falls within Category 9 "Monitoring and control instruments", but are not specifically mentioned in the binding list of Annex II of the Commission's proposal. The Annex specifically includes "Smoke detectors", which indicates that other detectors and alarms are not considered to be included.

In the review of Category 8 and 9 equipment Goodman (2006) includes "Burglar alarm systems installed in buildings" in the group of products whose scope requires clarification.

4.7.1 Products and RoHS substances

Fire alarms are usually interconnected systems with alarm panels, primary and secondary power supplies, initiating devices, notification devices and maybe building safety interfaces. Such fire alarms are here considered fixed installations with reference to the definition in the Commission's FAQ. Small single units fall under "smoke alarms" listed in Annex II of the Commission's proposal.

Burglar alarms range from single units installed in households to large integrated industrial alarm systems. Whereas the latter may be regarded a fixed installation, many alarms marketed both for households and for the professional market are marketed as finished single units, powered either by a battery or from the electricity supply. These systems are marketed as pre-packaged systems intended for do-it-yourself installation. Typically an installing company matches the control equipment with other suitable components (detectors, warning devices, etc) and installs a complete system – whether it be a domestic or commercial setting.

With the development of new products including wireless technologies the marked for burglar alarms have shifted towards more finished products (in its own enclosure and ports and connections intended for end users) and less fixed installations. According to an industry contact approximately 100 % of the alarms on the Danish marked for private consumers are finished products. The alarms sold to the industry are to the contrary approximately 50 % finished products and 50 % fixed installations due to the need for more advanced and larger installations for bigger buildings with specific security and safety needs. Replies from a number of contacted companies indicate that the private market, with equipment that can be regarded as finished products, is very small compared to the professional market.

Fire or burglar alarms may include specific components not found in other EEE. Gensch *et al*. (2007) evaluated lead alloys used in rocking armature capsules which are used for commercial and professional fire and security sounders designed for high power applications. The application is exempted by exemption 30 to the RoHS Directive. The application would probably only be relevant for equipment in fixed installation.

Goodman (2006) notes that security and safety equipment with X-ray sources, sold in fairly small number, may need additional time as these products include ionising radiation sources and are used in public places and therefore are subject to additional legislation requiring extensive testing to obtain approval. The application would probably only be relevant for equipment in fixed installations.

According to Goodman (2006) the association of European manufacturers and installers of fire and security systems, Euralarm had indicated that its members would be ready to change their products to comply with RoHS by 2010. According to Euralarm it is expected that full compliance (except where the very specific exemptions are valid) will have to be achieved from 2014 (Euralarm, 2009b).

Request to a number of providers of alarms in Denmark indicates that the RoHS substances have already been phased out in about 90% of the products. The remaining part is typically older product types.

According to Euralarm, in practice, with the exception of certain devices used in some detecting equipment (principally, but not exclusively, detectors for fire and smoke), RoHS substances have probably been phased out in all of the electronic components currently used in the manufacture of alarms and associated equipment (Euralarm, 2009b). It leaves only the soldering processes to be brought into line (Euralarm, 2009b).

4.7.2 Market

The market for fire and burglar alarms is mainly a separate market from other EEE although some burglar alarms may be sold on the EE retail market to private users.

The association of European manufacturers and installers of fire and security systems, Euralarm represents around 700 companies having a total turnover of approx. 3.5 billion Euro, i.e. approx. 70 % of the total European market (Euralarm, 2009). The turnover includes both the manufacturing and installation of the alarms.

Eurostat's external trade statistics contain data on two types of alarms:

- 8531 1030 "burglar or fire alarms and similar apparatus, for use in buildings".
- 8531 1095 "burglar or fire alarms and similar apparatus (excl. those for use in motor vehicles or buildings)".

To obtain an idea of the magnitude of the European marked for alarms, which are not part of a fixed installation, it is a possibility to look at the two commodity codes. However, burglar alarms which can be considered finished products probably take up a small part only.

The import (extra and intra EU 27) of burglar or fire alarms and similar apparatus (excl. those for use in motor vehicles or buildings) was about 0.4 billion € in the year 2008 according to Eurostat while the import (extra and intra EU 27) of burglar or fire alarms and similar apparatus, for use in buildings was 0.95 billion the same year.

As the CN codes includes both fire and burglar alarms and the majority of the products are for fixed installations it is very difficult on this basis to estimate the market volume for the burglar alarms that can be considered finished products. An estimation from two Danish security wholesalers is that the marked for alarms is approx. 80 - 85 % for businesses and 15 - 20 % for private consumers.

It will here roughly be estimated that the market for products that can be considered finished products is likely in the range of 0.2-0.6 €/year.

4.7.3 Impacts of inclusion of alarms in the scope

Substitution of RoHS substances
The costs of substitution of RoHS substances are considered to be small as RoHS compliant EE components are already available for most product categories.

Administrative costs

The relative administrative costs are considered to be comparable with products within the scope and most manufacturers seem to already have procedures for RoHS compliance in place.

Environmental and health benefits
As most products already are in compliance with the RoHS requirements the benefits of inclusion would also be small. It has not been investigated to what extent some manufacturers might reintroduce the RoHS substances if the products are explicitly outside the scope of the Directive.

4.8 Large and small household appliances

The study has identified a large number of products considered to fall within Category 1 and 2 of Annex I of the Commission's proposal which are not specifically mentioned in the binding list of Annex II.

4.8.1 Products and the RoHS substances

Products sharing the same market as EEE within the scope

A range of products are quite similar to products within the scope and are typically produced by manufacturers producing EEE within the scope:

- Towel radiators
- Electric water heaters
- Centrifuges
- Baking machines
- Electrical portable cooling boxes
- Immersion boilers and heaters
- Rice boilers

- Egg boilers
- Deep fat boilers
- Electric kettles
- Immersion heaters
- Popcorn machines
- Electric pasta machines
- Ice cream makers
- Food processors and dough-mixing machines
- Blenders and juice extractors
- Waffle irons
- Distillation units
- Electric potato peeler

The products have traditionally contained the RoHS substances in similar quantities as similar products within the scope. It is deemed that in none of the products the RoHS substances are used for particular applications, and many manufacturers have probably phased out the RoHS substances in these products simultaneously with the phasing out of the RoHS substances in products within the scope. Like some Member States, many manufacturers probably consider these products to be within the scope of the current Directive.

Appliances with partly separate market

A number of appliances are quite different from the listed products included in Category 1 and 2 and some of these products are likely manufactured by companies not manufacturing other EEE, because they rather manufacture similar products without EE components.

These products include:

- Awnings and sun-blinds
- Electric window openers
- Electric door openers
- Electric toilets
- Shower heads with light
- Makeup mirrors with light
- Mirror heaters/mirrors with heating
- Electric fly traps
- Greenhouse heaters
- Aquaria heaters

The products would typically include RoHS substances in components like electric motors, wires, sockets, plugs and heaters and the content of the RoHS substance would typically have been similar to the content of some household appliances listed in Annex II of the proposal. Only a few of the products contain electronic components e.g. in remote controls. Like other EEE the equipment may further contain RoHS substances in plastic parts and corrosion resistant surfaces. In none of the products (with a reservation for fly traps) the RoHS substances seems to be used for particular applications. As the manufacturers of many of the products do not manufacture EEE within the scope, they may not have started the process of substitution of the RoHS substances; however, most of the components used in the products (e.g. electrical motors) are probably produced by components manufacturers which have changed the entire product range to be RoHS compliant.

4.8.2 Market

As mentioned in the section above, most of the products are produced by manufacturers manufacturing household appliances within the scope of the RoHS directive. It has not been possible to identify a European trade association specifically organising manufacturers of household appliances, but associations exist in some Member States e.g. the U.K.

For some of the products, e.g. awnings and sun-blinds or electric toilets, the final products are manufactured and marketed by actors which are typically not dealing with household appliances, while the electrical components most probably is produced by manufacturers also producing components for other household appliances.

Statistical data are not available to estimate the market volume for all the product groups listed in the section above. Eurostat's external trade statistics contain data for the following CN codes:

- 6306 1100, 6306 1200, 6306 1100 : Tarpaulins, awnings and sunblinds
- 8421 1200: Centrifugal clothes-dryers
- 8509 4000: Domestic food grinders and mixers and fruit or vegetable juice extractors, with self-contained electric motor
- 8516 1011: Electric instantaneous water heaters
- 8516 1019: Electric water heaters (excl. instantaneous water heaters and immersion heaters)"
- 8516 1091: Electric immersion heaters of a kind used for domestic purposes
- 8516 7920: Electric deep fat fryers, for domestic use
- 9613 2010: Pocket lighters, gas fuelled, refillable, with electrical ignition system

Import data for these CN codes are shown in Annex 1. For 6306 1100 there is no data due to confidentiality.

The major group is "Domestic food grinders and mixers and fruit or vegetable juice extractors, with self-contained electric motor" with a total import of 0.94 billion €/year, representing nearly 50% of the total for the 10 CN codes. Products within this group can be found in a large part of all households. Of the groups with no data the same is probably true for electric kettles, whereas the use of the other product groups is estimated to be less widespread. As an example of the less widespread equipment, the total import of "electric deep fat fryers, for domestic use" was about 0.19 billion €/year.

The group "Tarpaulins, awnings and sunblinds" also includes products without a motor, and the total import for products with EE parts would consequently be lower than the indicated 0.25 billion €/year.

A part of the electric water heaters, with a total import of about 0.6 billion €/year, is probably used in fixed installation and finished products only account for a part of the total.

Most of the product groups listed is assumed to be used in relatively small quantities compared to "domestic food grinders and mixers and fruit or vegetable juice extractors". On this basis it is roughly estimated that the total market for the listed household appliances probably is in the range of 3-10 billion €/year.

4.8.3 Impacts of inclusion of large and small household appliances in the scope

Substitution of RoHS substances
The costs of substitution of RoHS substances are considered to be small as RoHS compliant EE components are already available for most product categories.

Administrative costs

The relative administrative costs are considered to be comparable with products within the scope and most manufacturers have probably already procedures for RoHS compliance in place.

Environmental and health benefits
The specific content of RoHS substances in the products is considered to have been similar to household appliances listed in Annex II of the proposal, and the environmental and health benefits of phasing out the substances consequently can be considered to be similar the benefits for household appliances within the scope.

As the RoHS substances probably already have been phased out in most products the benefits of inclusion in the RoHS Directive would also be small. It has not been investigated to what extent some manufacturers might reintroduce the RoHS substances if the products are explicitly outside the scope of the Directive.

4.9 Other finished products currently out of the scope

Besides the product groups assessed in the sections above, Table 3.1 and Table 3.2 include a number of products, which it has not been possible to address in detail within the limits of this study.

It is assumed that the assessed product groups represent the majority of the market volume of the listed product groups, but some of the product groups not assessed may in fact represent a significant turnover of RoHS substances.

Products groups obviously within the scope of the EEE definition

Some of the product groups not assessed obviously falls within the definition of EEE and the content of RoHS substances and compliance costs are not assumed to be different from product groups within the scope of the Directive.

This concern:

- Electric kilns and binding machines
- Electric lifts, car jacks, and wire rope winches
- All measuring, weighing or adjusting appliances used in offices, agriculture, artisanal workshops and institutions
- Payment terminals
- Consumables with EE components
- Key finders and electronic keys
- Incubators and incubation chambers

Grey area products

A number of products are grey area products in the sense that they may be covered by the general definition of EEE, but are not traditionally considered as being EEE. Depending on the understanding of the of the definition: ”EEE” means equipment which is dependent on electric currents or electromagnetic fields in order to work properly….” they may even not be considered to be covered by the definition.

Toys with EEE parts and furniture with EEE parts has been assessed, but it has, within the limits of this study, been possible to address all product groups.

Other product groups in with similar considerations are:

- Awnings and sun-blinds;
- Electric toilets;
- Shower heads and mirrors with light;
- Mirrow heaters/mirrows with heating;
- Electronic greeting cards, fun and joke equipment and ornaments with EE components;
- Clothing and footwear with EE components;
- Microscopes and magnifying glass with light;

Like for furniture and toys, the end-products are to a large extent produced by manufacturers which are not in the traditional EE sector, and the manufacturers/importers may today not have build up the capacity for RoHS compliance. Inclusion of these product groups could potentially affect a large number of manufacturers and importers and the administrative burden may be considered disproportional to the actual turn-over of EE components and RoHS substances with these products.

It has been suggested by some markets actors, for certain products, to require that only the EE components should be RoHS compliant as the EE components are typically produced by EE component manufacturers which also produce parts to EEE within the scope of RoHS. However, the legal aspects of this have not been investigated.

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ANNEX 1

DATA ON EU27 TRADE

Sterilizers and centrifuges 1000 Euro/year

CN code	CN description	EU27 extra import		EU27 intra import		Total import	
		2007	2008	2007	2008	2007	2008
8419 2000	Medical, surgical or laboratory sterilizers	53,039	54,919	142,066	130,230	195,106	185,149
8421 1920	Centrifuges of a kind used in laboratories	31,407	28,523	58,782	68,679	90,189	97,203
Total						285,295	282,351

Water heaters 1000 Euro/year

CN code	CN description	EU27 extra import		EU27 intra import		Total import	
		2007	2008	2007	2008	2007	2008
8516 1011	Electric instantaneous water heaters	31,111	27,808	74,820	71,171	105,931	98,978
8516 1019	Electric water heaters (excl. instantaneous water heaters and immersion heaters)	183,830	210,349	315,047	308,634	498,877	518,983
Total						604,808	617,961

Battery chargers 1000 Euro/year

CN code	CN description	EU27 extra import		EU27 intra import		Total import	
		2007	2008	2007	2008	2007	2008
8516 1011	Battery chargers (excl of a kind used with telecommunication apparatus, automatic data-processing machines and units thereof, and polycrystalline semiconductor rectifiers)	279,619	286,653	292,497	275,010	572,116	561,664

Concrete mixers 1000 Euro/year

CN code	CN description	EU27 extra import		EU27 intra import		Total import	
		2007	2008	2007	2008	2007	2008
8474 3100	Concrete or mortar mixers (excl those mounted on railway wagons or lorry chassis)	54.602	55.172	390.384	347.855	444.986	403.027

Toys 1000 Euro/year

CN code	CN description	EU27 extra import		EU27 intra import		Total import	
		2007	2008	2007	2008	2007	2008
9503 0075	Plastic toys and models, incorporating a motor (excl. electric trains, scale model assembly kits, and toys representing animals, human or non-human creatures)	426,562	417,622	124,306	109,349	550,868	526,971
9503 0079	Toys and models, incorporating a motor (excl. plastic, electric trains, scale model assembly kits, and toys representing animals, human or non-human creatures)	73,913	74,368	38,576	37,653	112,489	112,021
Total						663,357	638,992

Alarms 1000 Euro/year

CN code	CN description	EU27 extra import		EU27 intra import		Total import	
		2007	2008	2007	2008	2007	2008
8531 1030	burglar or fire alarms and similar apparatus, for use in buildings	259,929	251,044	637,538	702,083	897,467	953,127
8531 1095	Burglar or fire alarms and similar apparatus (excl. those for use in motor vehicles or buildings)	146,783	123,454	300,424	255,501	447,207	378,955
Total						1,344,674	1,332,082

Selected household appliances 1000 Euro/year

CN code	CN description	EU27 extra import		EU27 intra import		Total import	
		2007	2008	2007	2008	2007	2008
6306 1100	Tarpaulins, awnings and sunblinds of cotton (excl. flat covers of light fabric made up as tarpaulins)	...	...	...	...	...	...
6306 1200	Tarpaulins, awnings and sunblinds of synthetic fibres (excl. flat covers of light fabric made up as tarpaulins)	59,113	63,829	132,542	133,674	191,656	197,502
6306 1900	Tarpaulins, awnings and sunblinds of other textile materials (excl. cotton or synthetic fibres and flat covers of light fabric made up as tarpaulins)	17,729	19,368	37,327	35,538	55,056	54,905
8421 1200	Centrifugal clothes-dryers	3,522	2,435	37,995	26,462	41,517	28,897
8509 4000	Domestic food grinders and mixers and fruit or vegetable juice extractors, with self-contained electric motor	405,022	461,877	534,688	478,990	939,709	940,867
8516 1011	Electric instantaneous water heaters	31,674	27,807	74,779	72,595	106,452	100,402
8516 1019	Electric water heaters (excl. instantaneous water heaters and immersion heaters	183,835	211,271	314,905	319,036	498,740	530,307
8516 1091	Electric immersion heaters of a kind used for domestic purposes	...	...	...	...	...	...
8516 7920	Electric deep fat fryers, for domestic use	107,312	105,633	77,366	84,550	184,678	190,183
9613 2010	Pocket lighters, gas fuelled, refillable, with electrical ignition system	63,873	87,887	52,410	62,678	116,283	150,565
Total						2,134,092	2,193,628

... : no data in database due to confidentiality