4 ASSESSMENT OF THE FEASIBILITY OF EXTENDING THE ECODESIGN DIRECTIVE TO NON-ENERGY RELATED PRODUCTS

4.1 Introduction

A distinct part of the evaluation study is the assessment of the feasibility of extending the Directive to non-energy products and means of transport. The goal of this task is neither to identify eco-design requirements for specific non-energy related products nor to develop a priority list of products to be examined in possible future preparatory studies in the form of a Working Plan. The aim is simply to examine the appropriateness of using the Ecodesign Directive beyond the current coverage of ErPs to include non-energy related products.

More specifically, this part of the study addresses the following key questions:

1. Which broad categories of non-energy related products should be given priority in terms of developing an eco-design policy tool to fulfil the policy objectives concerning sustainable production and consumption
2. Whether an EU Directive setting eco-design requirements is the appropriate policy tool to fulfil the policy objectives of SCP/SIP for non-energy related products when assessing alternative instruments (existing or not)
3. Whether the current provisions and mechanisms of the Ecodesign Directive are adequate in the case of non-energy related products
4. If not, what should be the necessary changes and how feasible are they?

The final outcome of the exercise will be:

1. An assessment of the appropriateness of the Ecodesign Directive as a policy tool to improve the environmental impact of different categories of non-energy related products in the context of the EU SDP/SCP policy objectives against possible alternatives (this could mean no action, use of existing or new energy labelling, other form/type of legislation including a separate Directive)
2. Identification of product groups where the use of the Ecodesign Directive is appropriate
3. Identification of possible inadequate/problematic provisions and mechanisms of the Directive in a situation where it was extended to cover non-energy related products and recommendations on the necessary changes.

4.2 Methodology

Task 4 of the study is based on the conduct of 5 case studies on selected non-energy related products with substantial environmental impact improvement potential. The intention of the study has been to select one product from each of the broad product groups defined in the terms of reference:

1. agricultural products (e.g. food and beverages including packaging)
2. consumer products (e.g. textiles, clothing and footwear, non-ErP household products including cleaning products, kitchenware,
3. industrial products (e.g. products used in industrial processes e.g. chemicals, non-energy using machinery)
4. housing products (i.e. products used in house construction including do-it yourself products, paints and varnishes, floor coverings,)

5. means of transport (e.g. vehicle cars and tractors)

Each case study assesses the appropriateness and feasibility of setting eco-design requirements using the Ecodesign Directive for the specific product examined. On the basis of the conclusions from the case studies, conclusions for the broader product groups will also be drawn.

The overall work in this area is based on the following 4 steps:

1. Identification of non-energy products and selection of five representative products for case studies
2. Conducting the 5 case studies and analysis of other input in relation to the overall questions
3. Use of the findings from the case studies and input from stakeholders to support conclusions for the broader product groups examined
4. Identifying minimum criteria and key considerations for including non-energy related products in the Directive and making recommendations for changes to the Directive

At this stage the first two steps have been completed. The first step involved the submission and approval by the Steering Committee of the final list of products on June 15 2011 and it was followed by the conduct of the case studies that included desk research and interviews with key stakeholders. The first draft of the five case studies is presented in this First Findings Report (see Annex C) as the basis for discussions and feedback from the Steering Committee and stakeholders in the coming period.

In the following sections we present the work completed so far, summarising the findings from the five case studies, providing some initial conclusions and presenting considerations concerning the implications for the broader product groups examined. We also describe the work to be conducted in relation to steps 3 and 4.

4.3 Step 1 - Identification of non-energy related products and selection of five case studies

The scope of this exercise extends to all categories of products not covered by the 1st Working Plan 2009-2001 for Energy Using Products and the currently developed 2nd Working Plan 2012-2014 for Energy related products[174], currently being developed. The PRODCOM database serves as the initial reference point. On the basis of the analysis conducted for the 2nd Working Plan (by VHK) a total of 975 Energy-Related Product categories –at the 8-digit level - were identified[175]. In addition, other means of transport and some EuPs that were not included in the initial list of VHK for the 2nd Working Plan have been excluded from the initial list. PRODCOM codes covering installation, maintenance and repair services or of mining activities have also been excluded as they did not directly refer to products. This left a total of 2669 codes for classification into the 5 broad product groups.

The grouping is presented in Table 4.1 below. In the case of agricultural products, we have included in the product group agricultural chemicals (fertilisers, pesticides) and the relevant packaging products used (paper, plastic, cans). The consumer, housing and industrial product subgroups defined are rather broad and are based on general product functions that may need to be further refined. There are a few cases that could be classified under more than one category. Means of transport includes not only vehicles, aircrafts, ships or trains but also parts and components used in transport vehicles and systems.

[174] http://www.ecodesign-wp2.eu/
[175] Task 1-2 report, http://www.ecodesign-wp2.eu/downloads/2011-02-18_Task1-2_Main-report.pdf

Table 4.1 – Grouping of PRODCOM codes under broad product categories – non-energy related products

Product group/subgroup	Number of PRODCOM codes
Agricultural products	
Food products (Animal and vegetable products, prepared foodstuff, beverages, alcohol drinks etc)	384
Pesticides, herbicides and other chemicals used in agriculture	23
Food packaging (plastic, cardboard, etc.)	25
Consumer products	
Cleaning and detergents	20
Clothing and footwear	181
Furniture	31
Table/kitchen ware	31
Personal care	29
Other products used in households	34
Household textiles	45
Paper products (sanitary products, books, notebooks, envelopes etc.)	52
Hand tools	59
Medical products	29
Other consumer products (e.g. sports equipment, music instruments, lenses)	119
Housing/Construction	
Wood products (including coverings)	37
Other (non wood) coverings	4
Ceramic and plastic toilets, sinks, doors etc.	34
Paints, varnishes and other construction materials	28
Industrial products	
Chemical substances used in industrial processes	485
Textiles (yarns, fabrics and related processes)	135
Tools	23
Paper products (sheets of paper, cardboards etc.)	63
Various types of equipment	29
Other (metal, plastic and other products used as components in industrial processes)	537
Means of transport	
Air, sea and land means of transport (including parts)	211
Other non classified	**4**
Total	**2669**
Mining	39
Services (installation, repair and maintenance of products, means of transport etc.)	81
ErPs/EuPs	975
Part of ErPs/EuPs (not included in WP1/WP2)	94
Other means of transport (expected to be included in WP2)	53
Total PRODCOM	**3902**

This exercise revealed what is already a frequent conclusion in relation to the use of the PRODCOM database in the context of the Ecodesign Directive. A common problem is the sector-orientation of the PRODCOM database and its inability to fit in with functional product descriptions. This has already been evident in the first attempt to group PRODCOM codes by product group. Furthermore, despite the rather detailed description provided it is not always clear whether products are directed towards consumer or industrial use (e.g. cleaners of surfaces, adhesives). Furthermore, in relation to the actual data on sales

volume, the data provided for the great majority of non-ErPs are provided in units of weight (kgs) or volumes (lts or m^3) which makes it difficult to assess whether they exceed the indicative number of 200,000 units provided for in the Ecodesign Directive. While in certain cases it may be possible to use average/typical weights of units to estimate the number of units sold (e.g. in the case of juices, perfumes, drinks), the majority of products circulate in the market in a wide range of sizes and weights and no realistic estimates are possible.

Thus, rather than using PRODCOM, an alternative top-down approach was followed based on the identification of product categories covered by existing eco-labels and further informed by existing work by the Joint Research Centre in the context of the Sustainable Production and Consumption project[176] (IPTS) and the basket of product indicators in an ongoing study by the IES. There are certain benefits from such an approach. Firstly, the eco-labels tend to refer to functional product groups recognised by industry. Secondly, they focus on products with a significant environmental impact and a significant volume of sales and trade. Thirdly, many eco-labels are developed on the basis of a Life Cycle Assessment that covers all important environmental impacts. Such analysis can be particularly helpful as a starting point for the analysis in the case studies.

Following an initial review of the existing eco-labels in Europe we focused on four eco-label schemes from which we developed a list of non-energy related products. These included the European Ecolabel, the Nordic Ecolabel (Nordic Swan), the German Blaue Engel and the Dutch Milieukeur. For all products covered, supporting studies have been developed that define the product groups and provide information on the main environmental impacts of a typical product, the phase (production, use, disposal) where the main environmental impacts take place and, in some cases, the improvement potential.

The use of eco-labels did not cover all 5 product groups as the focus is primarily on the category of consumer and housing products. For the broader purpose, the EIPRO study report[177] by IPTS analysing the environmental impacts of a wide range of products consumed in the EU-25 was particularly helpful. The study examined a broad range of environmental impacts very much in line with those considered in the MEEuP methodology for the Ecodesign. Products were classified according to the COICOP classification[178] and ranked according to their overall environmental impact weighted by their level of their use by households in the EU-25. The study covered all five product groups. Moreover, the IMPRO[179] studies on meat and dairy products, vehicles and housing that examine the environment improvement potential of these three categories are also particularly relevant and will be further utilised.

List of products

On the basis of the information collected, an initial list of 38 product categories was created (see Annex 1). These products were covered by eco-labels or were identified as having important environmental impacts in the EIPRO study. Following an initial screening of the available information an initial pre-selection of 18 products was made based on the availability of LCA information. These products were examined further in order to support the selection of the 5 products for case studies on the basis of the information provided by the EIPRO study (focusing on the importance and type of environmental aspects), data on volumes of

[176] http://susproc.jrc.ec.europa.eu/
[177] IPTS/ESTO (2006), Environmental Impact of Products (EIPRO) - Analysis of the life cycle environmental impacts related to the final consumption of the EU-25, http://ec.europa.eu/environment/ipp/pdf/eipro_report.pdf
[178] Classification of Individual Consumption According to Purpose: Classifies individuals' consumption expenditure
[179] IPTS, Environmental improvement of products, http://susproc.jrc.ec.europa.eu/activities/IPP/impro.html

production and trade[180]. Furthermore, important input at this stage was provided by the technical experts who will be responsible for the LCA analysis included in the case studies. The criteria used included:

- A significant level of sales and significant environmental impacts (mainly based on the conclusions of the EIPRO study)
- Availability of supporting LCA information (from existing eco-label schemes) and other sources.
- A certain level of variation in terms of the environmental impacts (type and phase of impact)

The Table in Annex B summarises the information collected on the 18 products.

On the basis of the discussion with our technical experts and the feedback from the Commission, the following short list was selected:

6. Agricultural products: Sausages and other prepared products
7. Consumer products: Clothing
8. Housing products: Floor coverings
9. Consumer/housing/industrial: All purpose cleaners and hand dish wash detergents
10. Means of transport: Passenger cars

The following paragraphs provide a justification for this selection.

In the case of **agricultural products (food),** meat and dairy products are among the top product categories in terms of environmental impact (EIPRO study). From this group sausages and other prepared meat products appear to be an appropriate group for further examination since they combine high sales volumes, high levels of impact across a number of environmental aspects (sausages have among the highest impact per Euro of consumption in a number of environmental aspects) and a relatively high level of processing and standardisation in comparison to other food products. Arguably, other products (ice creams, prepared meals, canned drinks) could also fulfil these requirements but processed meat products were selected on the basis of the availability of LCA information from the IMPRO study.

In relation to **consumer products**, on the basis of the EIPRO study and the existing Ecolabel documents clothing and footwear, furniture, bed mattresses, all purpose cleaners, soaps and shampoos were initially identified as product categories with high sales volumes, a broad range of environmental impacts and a substantial level of LCA information available. Following the feedback from stakeholders, it was considered appropriate that two types of consumer products should be selected, one representing durable and the other non-durable goods. Clothing was selected following the advice of the Steering Group as a more typical durable consumer good while all purpose cleaners and hand dish wash detergents were selected as non-durable goods that are also used – possibly in relatively different ways – in industrial processes and representing the large group of chemical products. This allowed us to cover **the industrial product group** without increasing the number of case studies.

In the case of **housing products**, paints and varnishes and floor coverings (hard and soft) were identified in the EIPRO study as having significant levels of environmental impact at different stages of the life cycle. Floor coverings were selected following the advice of the Steering Committee as chemical products were already covered by the cleaners.

Finally, in the case of **means of transport**, passenger vehicles are identified in EIPRO and other studies as having the main impacts for almost all environmental aspects. Furthermore, together with the IMPRO study

[180] When provided data from the Ecolabel studies were used. Furthermore, in most cases, an identification of the relevant PRODCOM 8–digit categories and the corresponding Combined Nomenclature (CN8) product categories were used when available/applicable.

it provides substantial levels of information both on environmental impacts and improvement potential that can be used to support the case studies' analysis.

4.4 Step 2 – Case studies and analysis of stakeholder feedback

In this section we present the methodology used in the case studies and summarise the key findings from them. The individual case studies are presented in detail in Annex C.

4.4.1 Methodology

The case studies of the 5 representative products assess the appropriateness and feasibility of using the Ecodesign Directive and its structures and mechanisms to develop Ecodesign requirements in relation to each specific product category. As mentioned by a number of stakeholders, non-energy related products tend to concentrate their impacts in the production or the disposal phase and this is not well served by the MEEuP methodology. Furthermore, there is a need to achieve a balance between multiple significant potential environmental impacts – in contrast to the EuPs where energy during the use phase is the dominant issue. This may pose constraints on the development of generally accepted generic or specific requirements.

The case studies combined a technical analysis of the environmental impact and improvement potential(, on the basis of a life cycle assessment of the selected product),, with a policy analysis. The latter examined the feasibility of developing Ecodesign criteria to achieve sustainable consumption and production objectives against alternative policy options. Each case study will include the following steps:

1. **Economic and Market Analysis**: The Eurostat PRODCOM database has already been used as a starting point for sales and trade level data for the specific products. However, where available, other market data from industry associations and, if necessary market research reports, will be reviewed and used to assess stock data and market trends. Information on consumers and producers behaviour in relation to all phases of the products life (production, use, and end-of-life) will be collected when applicable.
2. **Life Cycle Analysis** - On the basis of existing information and published studies a Life Cycle Analysis of the covered products was used to provide an assessment of the environmental impact for a standard product category. The analysis aimed to cover all categories of environmental impact stated in the Directive and examined all phases of the life-cycle of the products. When possible, the analysis went beyond this in order to cover environmental aspects identified in the draft ILCD guidelines developed by the Institute of Environment and Sustainability[181]. On the basis of this analysis, we examined how the MEEuP method would have worked if used, identifying which important issues would probably be missed, and which would perhaps be distorted. In each case study, we attempted also to assess (in quantitative or qualitative terms) the magnitude of the possible distortion as a result of the use of MEEuP in relation to the selected LCA method.

   The main output was the comparison of the results from use of the MEEuP and particularly the EcoReport tool against an LCA analysis adapted to the specific product. This led to an assessment of the potential use of the MEEuP and identification of problematic areas or omissions in the case of non-energy related products.

[181] The general environmental impact in the ILCD handbook are: Resource depletion, Human toxicity, Ecotoxicity, Climate change, Ozone depletion, , Acidification, Photochemical ozone formation, Particulate matter/respiratory inorganics, Eutrophication, Land use, Ionizing radiation

The main conclusions of the life cycle analysis for each product will be presented during the 2nd stakeholder meeting. The objective will be to ensure the highest level of transparency, to receive additional information if available and to verify the results of the analysis.

3. **Review of the applicable EU and national legislation,** relevant European and other standards and other policy tools, with a view to assessing the extent that the identified environmental impacts of the specific product are covered by legislation. The objective is to identify areas of synergy or possible overlaps with Ecodesign requirements. It was based on desk research and, where possible, interviews with key stakeholders (e.g. European associations) to help develop a complete picture.
4. **Policy Analysis**: On the basis of these three steps, for each of the five products a qualitative assessment of the appropriateness of using the Ecodesign Directive as a policy tool was compared against possible alternative options that included:

- no action (i.e. reliance on existing legislation)
- promotion of self-regulation (e.g. voluntary agreements)
- information provision tools (e.g. voluntary or mandatory labelling)
- fiscal instruments (e.g. financial incentives, taxes, public procurement)

The definition of the alternative policy options was made on the basis of the existing policy framework and what appeared to be realistic options at this stage. The assessment was based on a number of key evaluation criteria that included:

- the expected effectiveness of the different instruments in bringing environmental improvements and achieving the SCP/SIP objectives
- the possible costs to industry, consumers and the administrative and other costs related to the implementation of the tool (efficiency)
- the feasibility of implementation of the specific policy choice
- the positive/negative impact on the Ecodesign Directive for ErPs

The assessment was qualitative – where quantitative information was used, where available – comparing the main scenario of the policy option of the extension of the Ecodesign Directive and the development of Implementing Measures to cover the specific product category against the alternatives. A number of information sources were used and interviews with the key stakeholders (industry associations) were organised on the basis of questionnaire (see Annex D).

The technical and policy analyses in each case study were brought together to draw conclusions on the appropriateness and feasibility of extending the Directive to cover the specific product category, indicate the key considerations, the issues that can possibly arise but also referring to the key conclusions that may apply beyond the specific product category.

4.4.2 General analysis on the appropriateness of the MEEuP methodology for non-ErPs

One of the key features of the process of development of Implementing Measures for energy using products within the context of the Ecodesign Directive, is the use of the MEEuP methodology and specifically the use of the EcoReport tool that is the basis of Tasks 4-7[182] of the MEEuP methodology.

[182] The Commission's MEEuP methodology divides the study of a product into eight individual tasks. These include: Product definition (Task 1), Economic and market analysis (Task 2), Consumer behaviour (Task 3), Technical analysis of

Extension of the Directive 4

As already discussed in Section 3.4.2 of the Report, the MEEuP methodology is currently extended to the Methodology for Ecodesign of Energy-related Products (MEErP).[183]

In this section we provide an analysis of the appropriateness of the MEEuP methodology for non-ErPs on the basis of a comparison with the guidelines of the ILCD handbook issued by the Joint Research Centre and the experience from trying to follow the MEEuP methodology for the 5 products examined in the case studies. The purpose of this chapter is to flag issues that could raise concerns from stakeholders in value chains covered by the ErP Directive.

The MEEuP follows the Annex I of the Ecodesign Directive and other EU Environmental Policies. It considers the following environmental aspects:

- Energy Consumption
- Water Consumption
- Material Consumption
- Waste Generation
- Hazardous waste Generation
- Emissions to air
- Emissions to water

The environmental aspects "emission to soil" is covered by the waste aspects and anticipated pollution through physical effects such as noise, vibration, radiation or electromagnetic fields which are specific to a product may also be considered, but no specific methodology is described.

On the basis of the review of the MEEuP methodology and considering the ISO 14040 guidelines for LCA, including both the rules for data collection and the methods for life cycle impact assessment (LCIA), we identified areas where problems may arise, if the existing MEEuP methodology is applied to a broader range of products. The first part provides a general description on the general principles while the second focuses on the possible limitations that may have to be addressed.

Chapter three of the MEEuP methodology[184] describes the methodological issues with data collection. They are discussed briefly in the following paragraphs:

System boundaries

The MEEuP methodology refers to ISO14040 standard and does not provide further guidance. This could pose a problem since the ISO standard leaves a lot of room for interpretation. Since the report was written, new publications provide more guidelines and specific rules that are also compatible with ISO14040/44. The most important are the following:

- ILCD handbook, developed and published by the JRC in ISPRA
- The GHG protocol standard for products, developed by WBCSD/WRI

For energy using products the system boundary issues are relatively simple to solve, even with the current guidelines. But for agriculture related materials and products, more guidance is needed. The MEEuP

existing products (Task 4), Assessment of base cases (Task 5), BAT and BNAT analysis (Task 6), Improvement potential (Task 7) and Scenario, policy, impact and sensitivity analysis (Task 8)

[183] See ongoing Study on the update of the MEEuP methodology: www.meerp.eu

[184] http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/methodology/index_en.htm

methodology would have to be updated considering the ILCD handbook rules and other guidelines, if appropriate

Allocation of impacts

The MEEuP methodology follows a relatively simple approach, which is not often used in LCA for allocating impacts to different outputs. In essence, it advocates that each time a process has more than one output, the main output should be selected and all impacts allocated to it, without giving credits for any by-products. The report also eliminates the frequently used allocation method based on a physical causality (mass or energy content) or a social economic causality (often interpreted as economic value). This means that the share of the environmental load associated with one of the byproducts depends on the mass, energy content or economic value of that by-product.

While this approach eliminates ambiguity in the case of ErPs, there are important problems when this approach is applied to other sectors, especially in the agricultural sectors where multiple allocations often occur. This will also be illustrated in the case study for leather jackets and sausages (a cow produces, milk, meat and leather). These multiple outputs need to be allocated in some way. Industry and other stakeholders will most likely need further guidance on this point.

Recycling

The recycling discussion has always been problematic in LCA, and this is also evident in the MEEuP methodology. The main problem is how to determine and allocate the credits from recycling and energy recovery from incineration. The MEEuP methodology provides a pragmatic set of descriptive calculation rules, but these are typically based on the energy related products sector and are linked to the WEEE Directive. For other sectors, the WEEE approach is less relevant, and the fixed calculation rules used[185] cover so far the relevant ErP materials. Industry and other stakeholders will most likely need further guidance on this point.

Functional unit

Where design or product alternatives must be compared, it is important to define a functional unit. Usually this is based on a function provided by the products, like the cleaning of a certain surface, the use of a car over 100 kilometers, etc. The text on functional units can be used for a wide range of products, although the table with examples should have a broader scope to cover other product types.

Conclusions regarding data collection

In general the MEEuP data collection methodologies would have to be revised as they have been designed to cover energy related products and have gaps in the case of non-energy related products. While the ILCD handbook would be one possible reference, this would miss the more pragmatic "calculation rule approach" of the MEEuP report. The GHG protocol guidance is more practice oriented, and could also provide a good reference.

Limitations of the MEEuP environmental aspect approach for non-ErP.

Since the MEEuP methodology was developed following Annex I of the Ecodesign Directive, the ILCD guidance on impact assessment methodologies has been published providing criteria to judge the quality

[185] Recycling credits are given depending on what should in theory happen in the market. So recycling of plastics based on 75% thermal recycling (displacement of oil) is assumed on the basis of the WEEE Directive requirements. If there is a closed loop recycling of plastics then there is a credit of 75% for all plastics used. For recycling of metals compliance with the requirement under the WEEE Directive is also assumed, so 85% recycling rate for all metals is assumed. This is possible for the MEEuP because the WEEE sets targets for recycling of electric and electronic products.

and appropriateness of impact assessment methods[186]. In the sections that follow we will use the ILCD guidelines to assess the approach used by the MEEuP methodology.

Climate Change (GWP) and Ozone Layer Depletion

Most impact assessment methods use the IPCC equivalent factors for GHG emissions and the WMO equivalence factors for Ozone depleting substances (based on Montreal/London Protocol). There is general agreement that these authoritative sources should be used for LCA. In the case of the MEEuP GHG factors would have to be updated to the 2007 figures. This is done in the update of the MEEuP to the MEErP methodology.

However, while the MEEuP approach is in line with the accepted methods, more guidance is needed on how to assess carbon uptake by plants, and assessing (or incorporating) GHG emissions from direct and indirect land-use. GHG emissions from land use changes can have very significant impacts for biomaterials and biofuels. These additional specifications would be needed in the case of products like processed meat and other food products or for clothing.

Photochemical ozone formation and Particulate matter

In the MEEuP methodology these two impacts are covered as separate impact categories, which is not uncommon in LCA methods. The ozone forming substances are simply added up, without any differentiation between fate[187] and effect. Although this is not an uncommon approach in older LCIA methods, it does not fulfill the criteria in the ILCD evaluation. However, despite the incompatibility with the ILCD requirements, the analysis performed in the case of the 5 case studies did not suggest any major problems due to the limitations of the method.

For particulate matter the modeling used is very simple with no real consideration of the relevant environmental mechanism. In the update of the MEEuP to the MEErP methodology characterization factors for particulate matters are introduced.

In the MEEuP report, toxicity is not a category in itself but considered through the emissions to water and air of metals (in particular substances covered by RoHS Directive Hg, Cd, Cr and Pb), persistent organic pollutants (POP) and polycyclic aromatic hydrocarbons (PAH).

The ILCD criteria require a fate and exposure step in the case of toxic pollutants, which is missing in the MEEuP method as only the toxicity of the substance is taken into account. This means that there are two substances with an equal toxicity, but with very different environmental residence times and exposure efficiency will be judged as equally serious, even if there are in practice differences in fate and exposure factors of many orders of magnitude. In the case of the implementation of the MEErP for ErPs this shortcoming is not as critical, since the toxicity scope is most often limited to metals, which all have a long lifetime even though still different exposure efficiencies and other characteristics. In the case that the scope is broadened to non-energy related products, important problems may arise such as usage of pesticides in agricultural production, toxic organic substances emission in the processing of textiles, cars or from end-of -life processes. All the above would have to be incorporated in a revision of the MEErP.

[186] http://lct.jrc.ec.europa.eu/pdf-directory/ILCD-Handbook-LCIA-Framework-requirements-online-12March2010.pdf

[187] The fate step determines what happens with a substance after it is released in to the environment, for instance how long it takes before it is removed from the atmosphere. The fate step is an important element in international agreements like the greenhouse gas protocol, where an important differentiation is made between greenhouse gasses with different environmental lifetimes. Also in the Montreal protocol and legislation on toxic substances, like pesticides and particulate matter this plays an important role.

The ILCD final recommendations suggest applying the USEtox framework that is a model developed under SETAC/UNEP guidance[188]. In case that the USEtox framework is used in the case of the MEErP methodology the coverage of toxic factors will become very wide.

Acidification

The scope (coverage of substances) of the MEEuP approach is similar to other LCA methods, but as in the case of toxicity related impacts, the fate step is not considered in contrast to the ILCD guidelines.. The limitation causes some problems in assessing emissions from fossil fuel combustion, and from agricultural production.

Eutrophication

In the MEEuP the eutrophication impact are based on the nutrient (nitrogen and phosphorus) content and the emission of organic compounds (BOD, COD). The scope is similar to other methods but, again, no fate is considered. One of the issues to investigate further is the presence of EU or third country legislations addressing fate.

The other issue is that the MEEuP does not differentiate between freshwater and marine water as suggested in ILCD guidance. Emissions of nitrate generally do not create any problem in freshwater, but are relevant in marine water, while phosphate emissions impact fresh water and not marine water systems. This difference can be important when assessing agricultural systems, and in some chemical products that contain phosphorus.

Land use

The land-use impact category reflects the environmental damage when natural land is converted for other applications, like agriculture, mining, forestry, urban application etc. It also covers land occupation since keeping land occupied means that it cannot be restored to natural conditions. Land-use is a very important factor when dealing with agricultural production, as is evident in the case study for textiles (cotton and wool, the case study for meat products, and for some flooring products.

In the Ecodesign Directive for energy-related products, land-use is not considered, but in the MEErP methodology it is advised to assess it on an ad hoc basis , for example in the case of biofuels. It is assumed that otherwise it would only be relevant for mining where emissions of solid waste could be an adequate indicator. However, in the case of textiles (cotton production) or food products (crop production or livestock breeding) this could be an important issue that will have to be considered[189]. Guidance on assessing land conversion and indirect land-use change should be added to the MEErP methodology. For instance the production of soy for cattle feed can cause destruction of habitats (Land conversion).

Water

MEErP methodology does addresses the issue of water scarcity in a rather simple way by adding all processing water used as total water use. It does not distinguish water use in water scarce and water abundant areas. It is also not very clear how processing water is defined and in agricultural systems processing water can have many different meanings (e.g. irrigation with surface water and ground water). The issue of water use is already addressed in the preparatory of washing machines and dishwashers but it is considered that industry and other stakeholders will most likely need further guidance on this point in the case of non-ErPs.

[188] See www.usetox.org

[189] While it is relatively simple to stipulate to only report the square meters of land occupied times the length of occupation. This would make it much easier to cover agricultural systems.

Waste

The waste impact category is a somewhat unusual category that is included in the MEErP methodology. The ILCD handbook does not consider this as a separate impact category since in the LCA methodology waste is "translated" as emissions to air, water and soil plus land occupation. The use of waste and hazardous waste categories in the MEErP methodology provides a pragmatic shortcut and the distinction between toxic and general waste is also relevant. However, for non-energy related products there is a need to provide further guidance, especially for waste in the agricultural sector and products like wood paper or concrete.

Resource depletion

The MEEuP methodology had a limited scope in the case of the impact of resource depletion. Only the use of energy, water and materials – in line with the Ecodesign Directive – are taken into account while the depletion of scarce minerals is neglected. This can be an important shortcoming of the methodology for a number of products. The update of the MEEuP methodology has therefore taken into account 14 raw materials identified critical at EU level.

Overall observations on the use of the MEErP methodology on environmental aspects

The MEErP methodology is based on a policy approach to environmental aspects which is based on Annex I of the Ecodesign Directive. It is more pragmatic and hands-on than more common LCIA methodologies. From a purely scientific point of view the method could be improved to bring it line with proposed ILCD method. However, if a more pragmatic approach is adopted, certain key issues would still have to be addressed for non ErPs. On the basis of the analysis provided these include:

1. The lack of a fate step in several impact categories. Fate is an important aspect in assessing the impact of emissions, as it distinguishes between substances with a short or a long lifetime and substances with different exposure routes. It is an essential step in the IPPC and WMO methods that are at the basis of GHG and Ozone layer policies and legislation, and in legislation on toxic substances etc. Without a fate step misrepresentations of the importance of emissions can become a serious issue of concern with stakeholders
2. The limited range of substances covered in the toxicity assessment: although this may work well with non-ErPs, there may be problem with for instance the assessment of pesticides in agricultural production chains.
3. The lack of guidance when addressing land-use: Land use is mentioned as an important aspect in the MEEuP report, but no guidance is given, and this could again be problematic when assessing bio-based products.
4. The lack of a treatment of mineral depletion issues although it is expected that under the review of the MEErP there will a revision that is expected to include additional raw materials.

4.4.3 Summary of the case studies

In this section we summarise the main aspects and conclusions of the 5 case studies. The full text of the case studies is presented in detail in Appendix C.

Sausages and processed meat products

This study focused on sausages and processed meat products as representative of the broader category of food products. According to the Food and Agriculture Organisation[190] the sausages and processed meat products fall under one of the following categories:

- Fresh processed meat products (e.g. hamburgers, fried sausages, kebab)
- Cured meat pieces (raw cured beef, raw ham, cooked beef, cooked ham, bacon)
- Raw cooked meat products (Frankfurter type sausages, mortadella, lyoner)
- Pre-cooked cooked meat products (liver sausage, corned beef, pate, corned beef)
- Raw-fermented sausages (salami)
- Dried meat products (meat flosses, dried meat strips)

The total size of the processed meat EU market in 2010 was around 13 million tonnes with a total volume of €66.3 billion. The EU is a net importer of processed meat the lion share of which is processed poultry. In contrast, the EU is a net exporter of sausages. There are around 14,000 firms active in the sector. While there are four large manufacturers that control around 16% of the market in the 9 larger EU countries, most meat processing companies are small or medium sized and often family-owned focusing on the local or national markets[191].

According to the EIPRO study[192], food and drink products represent around 20-30% of the total impact for most environmental impacts categories. Within the product group, sausages and processed meat products represent the third most important category with a share of around 10% in almost all environmental impact categories.

No study addressing the full life cycle of sausages and processed meat products was identified. On the basis of different sources of information the following conclusions can be made:

- The raw materials production phase (feedstuff and livestock breeding) represents the stage with the most important impacts in the product life cycle of sausages and processed meat products. It is the main source of greenhouse gas emissions and the prime contributor to resources depletion and acidification and eutrophication.
- Energy use is more or less equally distributed across different stages of the life cycle including the production phase, distribution/retail and the use phase. Consumer habits in terms of efficient cooking (e.g. the use of a lid when heating water) and the use of the energy efficient freezers and ovens can critically affect the overall amount of energy used.
- Solid waste from packaging and food waste resulting from the use phase is also a rather important issue.

[190] http://www.fao.org/docrep/010/ai407e/AI407E09.htm
[191] In the food industry in general 86% of the firms have less than 20 employees. (Competitiveness report)
[192] ec.europa.eu/environment/ipp/pdf/eipro_report.pdf

Table 4.2 - Important aspects in the sausages life cycle

Relevant impact categories	Most important phases
Land-use	Livestock breeding
Energy use	Livestock breeding, Production and Use
Water use	Livestock breeding, Production and Use
Climate change	Livestock breeding
Eutrophication	Livestock breeding
Acidification	Livestock breeding
Waste	Use and manufacturing

The review of the policy framework suggests that only some parts of the relevant environmental impacts are covered by relevant regulation or other policy tools. Existing regulation covers the manufacturing processes and the related impacts (mainly emissions) and indirectly the use phase. The policy framework appears less comprehensive in the key life cycle stage, crop and livestock production. However, this stage is the least likely to be affected by product specific requirements. There are also gaps in relation to the information provision to consumers that contribute to reducing impacts during the use phase could help develop products with lower overall environmental impacts.

On the basis of the information presented the development of Ecodesign requirements were difficult to envisage. Still, the following requirements in the context of the Ecodesign were considered:

- Minimum requirement in relation to the use of meat organically produced (or other relevant type of label that is linked with reduced environmental impact in the livestock breeding phase)
- Set requirements on the amount (e.g. weight of packaging/product) and recyclability of packaging material used while taking into consideration the issue of product safety
- Minimum requirements in relation to the amount of energy or water consumption per product

Alternative options examined included a business as usual scenario (existing regulations and programmes related to environmental impact of production processes and developments on a voluntary basis towards the provision of additional information to consumers), mandatory labelling in relation to certain key environmental impacts such as energy use or greenhouse emissions, a voluntary agreement focusing on packaging waste and possibly other issues such as energy and water use throughout the product lifecycle. Financial tools such as grants for investments in technologies and processes used in agricultural production and meat processing were also considered.

The analysis indicated quite clearly that the use of Ecodesign requirement for sausages and processed meat products does not appear as to be the most effective, nor the most efficient, approach to address the important environmental impacts. Ecodesign requirements on the product cannot be expected to have an impact on the environmental issues related to the key life cycle stage which is livestock breeding. Furthermore, it is questionable as to how such requirement would be set and monitored at a practical level. The development of process oriented regulations and policy measures focusing on the separate life cycle stages – and primarily the livestock production phase – appears, on the basis of this first analysis, a much more promising approach.

Clothing

This case study examines the feasibility of developing eco-design requirements in the context of the Ecodesign Directives for products that fall under the category of clothing and textiles. In contrast to most energy using products, these products have a greater impact on the environment in the production phase

compared than into the use phase. The case study represented in this chapter will concern consumer durable products. For the purposes of the study, the product scope covers leather jackets and cotton jeans.

The European textiles and leather sector, which also includes clothing and leather production, employs over two million people in 177,000 enterprises, mainly small and medium-sized enterprises (SMEs), and has a turnover of more than €200 billion. Industry representatives from the apparel industry, the fashion industry, and the leather tannery sectors have been consulted; however, due to the diverse nature of the clothing industry, the range of producers, and the high volume of imports from outside of the EU, reliable estimates for of the major variables relating to cotton jeans and leather jackets do not exist.

There has been significant restructuring in the industry due as a result of the reduction of trade barriers. This has seen European production move into higher value-added luxury goods production. This process of globalisation has been driven by retailers that are able to source materials from anywhere in the world. For leather, industry stakeholders estimate that at a global level, shoes constitute the most significant users of leather in the apparel industry. COTANCE estimates that clothing represents 10-15 percent of the entire leather sector's turn-over (approximately € 7 billion). Most leather is exported for manufacturing and is then re-imported as finished goods. This is due to the high costs of labour in Europe. High-end production (approximately five percent) remains in Europe. Similar numbers are not available for cotton jeans.

The LCA analysis performed for this case study highlighted the most relevant impact categories and the stage in the lifecycle that had the greatest impact on the environment. The analysis also examined the extent to which the MEEuP approach would take these relevant impact categories into account

Table 4.3 – LCA analysis of floor covering and implication from the use of the MEEuP methodology

	Most relevant impact categories	**Most relevant Life cycle stage(s)**	**Implications of using the MEEuP**
Jeans	Water consumption Aquatic eco-toxicity Energy use Human toxicity Solid waste	Agriculture - Cultivation cotton Use - Washing - Disposal	➢ Land use not considered ➢ Water use not well accounted i.e. irrigation water in scarce areas and heated water during use phase ➢ Toxicity does not include pesticides ➢ Allocation is not addressed
Leather jacket	Energy use Waste Land use	Production - Tanning process - Fertilizer	➢ Land use is not considered ➢ Allocation is not addressed ➢ Toxicity does not address pesticides

Overall, the MEEuP has **shortcomings** when dealing with natural fibres. This is an aspect that should be addressed if the scope of the Directive is extended. However, it is expected to work reasonably well with synthetic fibres, which were not considered in this case study. The main concerns related to the MEEuP include Abiotic depletion, Acidification and Eutrophication. Water and Land use are relevant to these two types of material, since cotton and cattle demand land use in the beginning of the production chain, and since MEEuP does not address land use, it is a potential issue. Another major shortcoming of the MEEuP method that would need addressing is how it deals with **allocation issues**. This is especially relevant for the leather jacket case, as leather is a by-product of the meat and dairy industries. There is no clear guidance on how to allocate the environmental impacts amongst different products. For this reason, the leather

industry argues that the pre-tannery phases of the lifecycle should be removed from the analysis, and that any assessment of the impact of the leather goods industry should start at the point where the raw hide is converted into leather.

On the basis of the analysis provided, a number of areas for improvement potential for leather jackets and cotton jeans can be identified. **Potential improvements for jeans** could include the use of organic cotton, which reduces the environmental impact since it forbids the utilization of chemicals (fertilizers, pesticides, defoliants), and therefore prevents toxic substances from being spread in waters and soils. Reducing the frequency of washing reduces the environmental impact since it allows for a decrease in washing powder consumption and the utilization of washing machines and irons, which consumes a considerable amount of energy. Energy use through washing could be addressed by using washing machines belonging to a low energy class, and washing at low temperatures reduces the environmental impact. Extending the life cycle of jeans i.e. to give away or sell one's jeans increases the number of days which they will be used, though this option is difficult to incorporate into an eco-design standard.

Potential improvements for leather jackets could include a reduction in the amount of chromium emissions from the tannery, both in tannery solid wastes and in the waste waters. And waste from the production process in general is a major issue. It could also include reducing the maximum amount of mineral fertilisers used in agriculture (e.g. criteria for 'organic agriculture'). The management of organic fertilisers should be controlled, as ammonia emissions coming from this source are a main impact generator.

Alternative policy options were examined, including a business as usual scenario, voluntary agreements, the use of mandatory labelling, and financial instruments. Clothing is a very broad category within consumer durable products, and the variation in the production of different types of clothing has been illustrated in this case study with two representative goods, namely a pair of cotton jeans and a leather jacket. An eco-design related regulation would need to focus on materials or inputs rather than on functions. The regulations will also need to be set for specific material types and not set according to functions of each product (i.e. a regulation on 'pants' will be less feasible than a regulation on the types of materials used to create the pants). Leather is a by-product while cotton is a purpose-grown product. Thus, the allocation process and the system boundaries of the lifecycle are fundamentally different. This is opposed to synthetic textiles, where production process is entirely under the control of the producer.

An eco-design approach is potentially problematic because of the difficulties associated with isolating the production of clothing from production of materials to other sectors, especially inputs in the pre-production phases (i.e., the impacts of agriculture and the meat industry). The most significant impacts tend to be related to the pre-design phases of the product, particularly related to land-use. Regulations to the design of products are expected to have low to medium impacts, and the creation of an LCA approach that effectively accounts for impacts outside the system boundaries will be subject to political feasibility issues.

Due to the heterogeneity of the industry, the diverse range of actors, the high incidence of counterfeiting, and the unique properties of each type of apparel, any Directive concerning the processes causing greatest environmental impact will need to be flexible while being closely monitored. Compliance costs of adjusting production processes or input could be high for producers, especially at the lower end of the market where margins tend to be low. Moreover, in the case of a price increase, consumers can easily substitute regulated products for similar products that do not come under the regulation. Furthermore, the high incidence of counterfeiting and the globalised supply chain generate a need to develop effective market surveillance.

The aggregate costs associated with compliance and enforcement of ecodesign requirements in this product category are high, while design aspects of the products can be expected to have a low to medium effect on environmental sustainability as the most significant impacts occur in the pre-production phase.

All-purpose cleaners and hand dish wash detergents

The third case study focused on all-purpose cleaners (hard surface cleaners), sanitary cleaners, window cleaners and hand dishwashing detergents. While this represents a broad product group with variations among the different sub-groups, they are typically comprised of chemical ingredients such as surfactants (surface active agents) that perform the main cleaning function, together with colorants, preservatives, oxidizing, alkaline and other Volatile Organic Compounds (VOCs). Fragrances and dyes are also added to improve the user experience.

The total value for the household market for all-purpose cleaners in 2009 was close to €5.2 billion, with the industrial and institutional sector representing an additional €2.4 billion. On the basis of PRODCOM data for the whole detergents market we can estimate that the total volume of all-purpose cleaners and detergents sold in Europe was around 3.5-4.5 million tonnes. All-purpose cleaners are most typically sold in liquid form (including sprays) but they may also be sold as wipes which represent a smaller part of the market (10%).

The cleaners and detergents sector is characterised by a rather low level of concentration with 4 large multinational companies controlling no more than 50% of the total EU market while, around 130-140 manufacturers represent around 80-90% of it.

On the basis of information from an LCA study the main environmental impacts for all purpose cleaners take place primarily in the use phase although in the case of wipe based products the production and packaging stage tends to contribute more. The analysis did not indicate that certain environmental aspects are clearly dominant. An important finding is that consumer behaviour (amount and temperature of water used) is key in terms of the impacts of the all surface cleaners and hand dish wash detergents. A change of water temperature from 41.5C to 12C can lead to a reduction in energy consumption of up to 50% and has impact on climate, air acidification, photochemical smog and even human toxicity.

Table 4.4 – Most important life cycle stages per environmental impact

Impact category	Raw materials	Production	Distribution	Use	End of life
Total waste					Wipes
Water usage		Wipes			
Energy usage		Wipes			
Climate change		Wipes			
Acidification					
Ozone depletion					
Photochemical smog					
Human toxicity					
Aquatic toxicity		Wipes			
Eutrophication		Wipes			

Examining the use of the MEEuP methodology in the case of cleaners and detergents we conclude that issues related to human and aquatic toxicity would not be taken into account in a proper way without changes to the current MEEuP methodology and that water use in the use phase would not have been accounted for..

The review of the existing policy framework indicated that the issues of toxicity are already within the scope of existing EU regulation. In contrast, issues of resource depletion (materials, water, energy) and

climate change are at this point addressed primarily by voluntary mechanisms (Ecolabel, Charter for Sustainable Cleaning of AISE) that focus on the products'design or the information provision to improve consumer habits.

On the basis of the analysis made, the Ecodesign based regulation could focus on the some of the following aspects:

- Human toxicity and eco-toxicity of detergents related to the production, distribution and use phase;
- The energy use related to the production, distribution (transport) and the use phases (hot water use);
- Resources depletion in relation to the production of detergents (fossil fuels) and the use phase (water use);
- The level of waste related to the use and end of life phases (packaging).

Alternative policy options examined were a business as usual scenario including the existing voluntary agreement, the use of mandatory labelling, a voluntary agreement in the context of the Ecodesign Directive, financial tools in the forms of public procurement and the promotion of multi-stakeholder agreements at an EU level.

The conclusion of the initial analysis is that the development of Ecodesign requirements would be possible for the specific product category of products and specific sets of requirements should be possible to set and enforce. However, in contrast to the case of EuPs, the critical aspect of consumer behaviour that plays a key role on the environmental impact is more difficult to influence and control. As an alternative, the integration of the existing voluntary agreement of industry (AISE) within the context of the Ecodesign could provide a similarly effective, and possibly less costly – from the administrative costs aspect - option.

On the basis of some preliminary analysis it is also considered that the above conclusions should apply to a broader group of chemical products (other cleaning products, soaps, polishes and waxes, paints and varnishes). Other chemicals such as fertilisers, lubricants or pharmaceuticals are much less pertinent.

Floor coverings

This case study focused on floor coverings, which was chosen to represent the broader category of housing products. It should be noted that the industry generally divides itself into hard coverings (HFC) and soft coverings (SFC). Ceramic tiles are an example of HFC while the others are SFC coverings: Ceramic Tiles, Linoleum, Wood, Vinyl, and Carpet (Nylon and Wool).

There is a sizable European industry in each of the product groups within the study, as demonstrated in the table below. The concentration of companies within the flooring industry varies widely depending on the product. Within some product categories, such as carpets, the industry composition is characterized by a few large industrial producers complemented by many small producers. Other product categories such as resilient flooring-- which is composed of several sub-categories-- is characterized by a relatively low number of producers. The sector is also characterized by an increasingly international scale, a shift to sustainability, and a number of industry and public initiatives focused on the building and construction sector.

Table 4.5 - Value of soft floor covering (2006 data)

Product Family	*Value of European Industry*		Production Volume
	Million €	*% on floor covering total (EU 25)*	
Hard Floor Covering			
Ceramic tiles	**1, 000**	**--**	**--**
Soft Floor Covering			
Carpets	**5, 541**	**36**	**1, 125 Mm^2**
Wood floorings	**2, 748**	**17**	**143 Mm^2**

Product Family	*Value of European Industry*		Production Volume
	Million €	*% on floor covering total (EU 25)*	
PVC coverings	**1, 700**	**9**	**337 Mm^2**
Linoleum coverings	**394**	**2**	**43 Mm^2**
Laminates[193]	**5, 375**	**34**	**25 Mm^3**

The LCA analysis performed for this case study highlighted the most relevant impact categories and the stage in the lifecycle that had the greatest impact on the environment. The analysis also examined the extent to which the MEEuP approach would take these relevant impact categories into account. The results are summarized in Table 4.6 below.

Table 4.6 – LCA analysis of floor covering and implication from the use of the MEEuP methodology

	Most relevant impact categories	**Most relevant Life cycle stage(s)**	**Implications of using the MEEuP**
Ceramic tile	Climate change Human toxicity Acidification	Production - Preparation of the body - Fusion of the frit(ceramic tile component) - Firing of the glazed body	➢ Toxicity only limited to metals and does not include a fate and exposure step
Wood	Energy consumption Photo-oxidant formation	Production - Kiln drying Use - Solvents - Fixing/laying	➢ No guidance on biogenic carbon uptake. ➢ Fate and exposure step is missing for VOC's. ➢ Land use not included.
Vinyl	Climate change Energy consumption	Production - Vinyl End-of-life - incineration	➢ No energy reclamation at the end-of-life
Linoleum	Eco-toxicity Acidification Photo-oxidant formation	Raw materials - Cultivation of linseed	➢ Land use not included. ➢ Water use not well addressed. ➢ Toxicity only limited to metals and does not address pesticide use. No guidance on biogenic carbon uptake.
Wool	Land use Climate change	Raw materials - Production of wool	➢ No guidance on how to allocate environmental impacts amongst different products. i.e. wool is a by-product

[193] Data referred to the entire EU production of laminates, not only for floor coverings.

	Most relevant impact categories	Most relevant Life cycle stage(s)	Implications of using the MEEuP
Nylon	Fossil fuel depletion Climate change	Raw materials - Production of Nylon	➢ Insufficient data

Overall, the analysis indicates that the MEEuP methodology without any revisions would not account for the increasing use of postconsumer products. Moreover, waste and water use aspects are not well reflected, and this is a significant shortcoming especially for hard floor coverings considering that the impacts related to maintenance and cleaning are considered to be significant. Finally, the human toxicity and eco-toxicity do not appear to be addressed by the approach, in spite of their relevance to the sector.

The problems are even more significant for bio-based products, such as linoleum, wood and wool. Land use impacts would be lost using the MEEuP method. This includes indirect land use change as well as loss of biodiversity. The MEEuP method does not provide guidance on how to deal with CO2 emissions (climate change) as a result of land use change. This is particularly relevant for wood, which is a carbon sink until it is incinerated. Impacts related to the use of pesticides would not be accounted for since toxicity in the MEEuP method focuses primarily on metals. At a larger level, a significant shortcoming in the MEEuP method is how it deals with allocation issues, especially in the case of byproducts. There is no clear guidance on how to allocate the environmental impacts amongst different products.

Based on the analysis of the lifecycle, potential regulations could focus on the following aspects:

- Standards to promote the use of sustainably-sourced materials
- Standards to minimize the material input and amount of waste in the production process
- Materials requirements in the case of processed or manufactured flooring
- Installation standards to reduce the toxicity and other impacts of fasteners and sealants
- Indoor air quality standards, including limiting formaldehyde emissions and volatile organic compounds (VOC)
- Maintenance standards regarding cleaning detergents and solvents, and extended product durability
- End-of-life requirements including reuse and enhanced recyclability

Alternative approaches were examined in light of the potential improvements to the product category, including a baseline 'business as usual' scenario, mandatory labelling, voluntary agreements, and the use of financial instruments. The analysis led to the conclusion that bio-based products are not appropriate candidates for a single regulation under an Ecodesign approach as each of the materials used have significantly different sets of impact categories. Rather, the regulations would need to be tailored to the inputs and not to the function of the product.

While there is some scope in general to apply an Ecodesign Directive to many housing products, those that are primarily based on bio-based materials are linked to impacts that occur outside the individual product design and would thus be better addressed by instruments that apply standards at a systems level.

Passenger cars

Extension of the Directive 4

Passenger cars have been selected to represent the mode of transport sector in the study. The product scope focused on vehicles designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat that represents category M1 under Directive 2007/46/EC [194].

The total number of registrations of new passenger cars in 2010 was 13,360,599. The EU has a positive trade balance in the case of passenger cars, that in 2008 was close to net exports of 2.8 million net exports of units (3 million imports against 5.8 million exports) and in 2009 it was around 1.2 million units (2.3 million imports against 3.5 million exports)[195]. The total car fleet in EU23 (excluding Bulgaria, Romania, Malta and Cyprus) in 2008 was close 223 million cars with an average car age of 8.2 years[196] [197].

The passenger cars market is rather concentrated with the four larger manufacturers representing more than 50% of the total market and ten controlling close to 94% of the EU passenger cars market. Furthermore, a key element of the sector is the advanced level of supply chain linkages between brand manufacturers/assemblers of cars and the more than 8,000 suppliers of components and equipment in Europe and (more so) around the world.

The transport sector, and passenger cars in particular, have a substantial contribution to almost all environmental aspects with the possible exception of eutrophication. The analysis indicates that the use phase of the car (tank to wheel) is the key contributor to most environmental aspects followed by raw material extraction and the production stage.

Table 4.7: Impacts of car along the different phase of the life cycle (synthesis from studies) – Highlighted cells indicate high relative share in total impact

Impact categories	Contribution of car fleet to env. impacts (EU-25)	Raw materials	Production		Use Phase		End of life
			Car[198]	Spare Parts	Well to Tank	Tank to Wheel	
Resource depletion	15,4%					-	-
Global warming	15%						
Ozone depletion	10,3%						
Photochemical smog	16,6%						
Acidification	10,3%						
Eutrophication	4,8%						
PM 2.5	n.d.						
Primary energy	n.d.						
Bulk waste	n.d.						
Human toxicity	20,7%						
Eco-toxicity	11,6%						

[194] Relevant ISO standards: AA Saloon ISO Standard 3833-1977, term No 3.1.1.1, but including also vehicles with more than four side windows. AB Hatchback Saloon (AA) with a hatch at the rear end of the vehicle. AC Station wagon ISO Standard 3833-1977, term No 3.1.1.4 (estate car) AD Coupé ISO Standard 3833-1977, term No 3.1.1.5 AE Convertible ISO Standard 3833-1977, term No 3.1.1.6

[195] http://www.acea.be/images/uploads/files/20100518_2010_KEY_FIGURES_5_Trade.pdf

[196] http://www.acea.be/images/uploads/files/20100427_EU_Motor_Vehicles_in_Use_2008.pdf

[197] The life cycle studies use a life cycle of 10-12 years.

[198] Includes both raw material extraction and car assembly.

Examining the possible use of the MEEuP methodology in the case of passenger cars, we identified the following as main limitations: the current inability to cater for issues related to mineral resource depletion, acidification, eutrophication and toxicity aspects. Overall, as there are substantial similarities between cars and energy using products, the methodology would not have important problems to identify the key issues.

On the basis of the life cycle analysis conducted, the following types of requirements within the context of an Ecodesign based Implementing Measure were considered:

- reduction of the weight of cars
- type of tyres used (green tyres) and the use of tyre pressure monitoring systems;
- Requirement on the fuel efficiency of cars' engine and transmission systems;
- Requirement for the ability to run of high level of biofuels;
- Requirement for the level of recycled and recyclable materials used in cars;
- Requirement on the efficiency level of air-conditioning systems in cars;
- Requirement on the use of systems to guide driver behaviour

The review of the existing policy framework indicates that most of the above aspects are already covered by existing legislative measures and that the development of additional requirements will not bring much added value unless it replaces and tightens all the relevant existing regulation. The business as usual scenario seems to be able to achieve most of the important environmental improvements. Any additional aspects not currently covered by policy tools (such as the weight of cars) could be regulated in the future with a separate regulation but also possibly under Ecodesign.

The above conclusions are expected to apply in similar ways to commercial vehicles and vans, motorcycles, trucks, agriculture machinery and rail vehicles and less so on shipping (speed boats, cruisers, ships) or airplanes. However, some of the products in the first group are not covered by legislation at the same level. Further analysis following the verification of the conclusion presented in this study shall help assess if the development of Ecodesign requirements is possible for these other categories of products.

4.4.4 Feedback from stakeholders on the extension of the Directive

Besides the analysis of the appropriateness of the Ecodesign Directive for non-energy related products and means of transport, the study considered the views of stakeholders on the decision to extend the Directive. As part of the first stakeholder survey conducted by CSES, stakeholders were asked to provide their view of the appropriateness of an extension to non-energy related products and means of transport. The analysis of the responses indicates that there is no unanimous view on this topic and different categories of stakeholders have rather diverging views. The industry representatives tend to be against the extension of the Directive for non-ErPs although this is not as clear in the case of Means of transport. Other stakeholders tend to be in favour in general but the picture is still far from clear. We should also note that the responses to the survey need to be treated with caution. They represent only a part of the actors potentially affected since there were very few representatives of manufacturers of non-energy related products.

Table 4.8 – Do you consider it appropriate to extend the Directive to cover non-energy related products and modes of transport?

		EU/ national industry association	Individual manufacturer	Environment/ consumer group	MSs authority/ agency	Ecodesign expert	Total
Non-ErPs	**Yes**	3	6	**2**	4	**5**	20
	No	**19**	**7**	1	4	1	**32**
	No opinion	6	0	0	3	0	9
		28	13	3	11	6	61
Means of transport	**Yes**	5	**7**	0	**5**	**5**	**22**
	No	**12**	2	1	2	0	17
	No opinion	11	5	**2**	**3**	1	22
		28	14	3	11	6	61

Source: CSES survey

More relevant are the comments provided by stakeholders during the survey and the interview programme. The following points summarise the feedback received and the main arguments made in relation to the extension of the Ecodesign Directive. While there is a group that questions the appropriateness of setting any Ecodesign requirements on non-energy related products, the great majority focused on the practical issues related to the implementation of such an extension and the possible negative impacts that it could have on the existing Directive. The following summarise the views expressed:

- Any extension of the Ecodesign is considered premature for a large number of stakeholders. As suggested, there is not enough experience at this stage on the actual effectiveness and efficiency of the implementation of the existing Directive to justify its extension.
- An extension at this stage has the risk of negatively affecting the implementation of the current ErP Directive. A number of stakeholders refer to a possible loss of momentum and further delays to a process that is already rather long and resource intensive with an important backlog of Implementing Measures.
- A separate Regulation or Directive focusing on non-Energy related products is seen by some as a more appropriate approach since the aspects to be regulated and the requirements to be set are very different from that of EuPs and the current methodology is not appropriate
- Beyond energy use, the main area where the Ecodesign Directive is expected to have an important role is the material use and efficiency. However, a few stakeholders point to the need for clear political goals to be developed first before using the Ecodesign approach.
- The representatives of the construction products industry rather unanimously oppose the extension of the Ecodesign to this category of products on the basis that they are already covered by the Construction products Directive
- In the case of non-energy related products, a common view is that impacts associated with the production phase and the relevant processes used are already regulated through the IPPC Directive and other production related instruments. There is a danger of creating overlaps among different regulations.

- There are rather diverging views as to the appropriateness of extending to means of transport. On the one hand stakeholders refer to the important contribution to air emissions and overall energy use while, on the other, it is pointed out that many issues are already covered by other relevant legislation.
- From the cost side, a few stakeholders refer to the possible additional administrative costs for Member States authorities. An extension to non-energy related products is expected to require the involvement of additional national authorities and pose even greater requirements on the market surveillance authorities.

The above points have been taken into consideration in the analysis of the case studies and will also be considered in the subsequent steps of this area of work. It is also important to verify the validity of some of these statements at the next Stakeholder Meeting.

4.4.5 Emerging findings from the analysis

On the basis of the analysis conducted so far there seems to be rather limited support for an extension of the Directive at this stage.

From the technical point of view significant changes to the current MEEuP methodology, or possibly the development of different methodologies, would be needed to establish an appropriate methodology for non-energy related products. This is something that can be undertaken within the scope of the Directive and it could probably take place in parallel to developments on the ErP. This is not, therefore, in itself an objection to an extension of the Directive.

However, for certain categories of products like food products, clothing or other products with limited processing there are strong doubts about the extent to which product design can affect the key environmental impacts associated with these products and how much eco-design requirements can actually bring the desired results. Process related regulations focusing on the initial stages of the life cycle are likely to be more effective. In contrast, for other groups of products - means of transport, certain categories of chemicals or housing products - there appears to be greater scope for the use of eco-design requirements, although there is still a question of whether this should be done within the context of the Ecodesign Directive or alternatively using a different legislative framework.

Moreover, there are important concerns that have been raised of a practical kind. Unless additional resources are found for Ecodesign policy development and implementation, a possible extension could work against the operation of the existing Directive by diverting resources and interest from a process that is still under way with a number of efficiency issues still unresolved. The Directive itself envisaged that an assessment of the operation of existing provisions was necessary before any extension was considered and given that there are still many issues with the operation of the current Directive, including the critical step of ensuring effective compliance, a wide ranging extension might be considered to be premature. Extension to additional product categories, appears to be a more sensible route.

We should note here that by itself the extension of the Directive to a new category of products does not create additional work if it is not accompanied with a specific timetable. It would simply provide the context for the development of eco-design requirements at some point in the future. However, such a development would create the risk that in the meantime alternative legislation would not be promoted and industry would be left in a state of uncertainty that would inhibit rather than promote the development of products with better environmental performance.

These initial conclusions will be further elaborated and possibly revised on the basis of the feedback from the Commission services and stakeholders.

4.5 Remaining steps

4.5.1 Step 3- Identification of products for an extended scope

On the basis of the analysis from the 5 case studies the evaluation team will assess the feasibility of developing Ecodesign requirements for the broader product groups.

This part of the analysis will involve:

- Ranking of the product categories inside each product group in terms of market sales and environmental impacts. The results of the EIPRO study and the analysis of the BIO IS[199] and, if available, the IPTS[200] are expected to serve as a key source of information complemented by desk research to identify other relevant sources of information.
- Identification of the specific characteristics of the products that may differentiate them from the products in the case studies (e.g. different weight of life cycle stages, presence of specific regulations, degree of influence of product design on environmental impacts).
- On the basis of the conclusions of the case studies assess the feasibility appropriateness of developing Ecodesign requirements for each of the product categories examined. Again the input from the BIO IS study can serve as starting point in this exercise complemented by discussion with stakeholders.
- Develop a final list of product categories assessing the appropriateness, feasibility and level of priority for developing Ecodesign requirements.
- The final list will also be presented during the third stakeholder meeting to validate the results.

4.5.2 Step 4 - Conclusions on the appropriateness of extending the Directive and proposal for the necessary modifications to the Directive

In Step 4 we will draw broader conclusions on the appropriateness of extending the Directive to one or more categories of non-energy related products or means of transport against alternative policy tools. More specifically the analysis will provide answers to the following key questions

5. Which broad categories of non-energy related products should be given priority in terms of developing an Ecodesign policy tool to fulfil the policy objectives concerning sustainable production and consumption
6. Whether an EU Directive setting Ecodesign requirements is the appropriate policy tool to fulfil the policy objectives of SCP/SIP for non-energy related products when assessing alternative instruments

On the basis of the analysis and the input from stakeholders, CSES will develop recommendations for necessary changes to the current provisions and mechanisms of the Directive. A key consideration will be to ensure any negative impact on the effectiveness and efficiency of the Directive for the EuPs and the ErPs products currently covered. Thus, any recommendations will be in line with the conclusions and recommendations of the remaining part of the evaluation study.

4.6 Next steps - Expected role of stakeholders at this stage

The immediate steps following the submission of the First Findings Report include:

- Changes/corrections on the basis of the feedback provided by the Commission Services and possible additional feedback from key stakeholders

[199] BIO IS (2010), Technical support to identify product categories with significant environmental impact and with potential for improvement by making use of Ecodesign measures- Final Report - April 2010
[200] Project run by TNO-BIO on behalf of the JRC-IPTS, Future application of product policy in EU

- Presentation of the case studies and the initial conclusions during the second stakeholder meeting and making additional changes if necessary
- Developing an initial list of product categories under each product and making the analysis as described in Step 3. An initial list may be presented during the second stakeholder meeting for first comments
- Complete steps 3 and 4 as part of the work for the draft Final Report

5 EMERGING CONCLUSIONS

Although still very provisional, the following are the main first findings of the evaluation, so far:

- The lack of available data combined with the recent implementation of the Directive limits the strength of any conclusions that can be drawn on the overall assessment of the effectiveness of the Directive
- Energy efficiency measures introduced across the European Union are contributing to stabilizing electricity consumption. A combination of labelling, minimum efficiency standards and voluntary agreements, together with national policies and incentives, have flattened energy and electricity consumption in recent years. For the first time since 1990, final electricity consumption decreased in 2007 in EU households from 806.52 TWh in 2006 to 800.72 TWh.
- In a five-year comparison (2005-2010), average energy consumption in Europe has fallen by 7%, despite the fact that there has been an increase in demand for even bigger appliances and advanced features, such as no-frost technology for fridges or larger television screens.
- A key question driving the evaluation is whether the Ecodesign Directive moved the European economy towards achieving the 20/20/20 climate/energy targets. While it is extremely difficult to disentangle the effects of the Ecodesign Directive from other measures and the main effects are yet to be felt, the estimated savings from the first 11 Regulations in force up to July 2009 is expected to be up to 347TWh/yr by 2020, representing some 12% of the final electricity consumption in EU-27.
- The feedback from stakeholders indicates that it is still too early to assess the effect of the Directive on economic aspects such as production costs, prices or profit margins for firms. On prices, it has not been possible to collect broadly-based evidence. Data on the evolution of the producer and consumer price indices provide some evidence. Over the period 2002-2010 there was a clear downward trend in the total prices of household appliances (electrical or otherwise), in contrast to the evolution of the global index.
- The stimulation of innovation expected from the Directive appears to have been constrained by various elements in the implementing procedures, including the use of the least life cycle cost (LLCC) principle and the long delays in the development of the requirements for certain products. The failure to make widespread use of advanced benchmarks, for instance in public procurement, has also blunted the stimulus to greater innovation.
- In terms of coherence with other related EU legislation, the approach adopted so far has largely been for Implementing Measures to make direct reference to the requirements of the RoHS and the WEEE Directives with the addition of certain information requirements. Generally, this appears to have worked well, but it is an area for continuing and active consideration. There appears to be effective synergy with the Energy Labelling regime, not least because of the common responsibility for both areas on the part of many of the stakeholders.
- The procedures of the Directive appear to work well, with certain particular qualifications referred to below, and the involvement of stakeholders is widely supported. It has been pointed out that any revision of the Directive might put these arrangements in jeopardy, since procedures would be different for a revised Directive adopted under provisions of the Lisbon Treaty. The gains would need to outweigh the disadvantages of losing established processes that work well.
- So far, the Directive has had most impact on energy efficiency. The provisions of the Directive relating to a broader range of environmental impacts have yet to be utilised

Emerging conclusions 4

- Many have expressed doubts about the instruments and approach of the Directive being suitable for a wide range of environmental objectives, but most concede that they could accommodate emissions during the use phase, resource/material efficiency and toxicity and the doubts expressed need to be followed up with identification of the nature of the difficulties envisaged.
- The MEEuP methodology is a useful tool, but needs to be improved in a number of specific areas and involve more expertise on the products under consideration in each Preparatory Study.
- The delays in following up the identification of product groups in the Working Plan through to Regulations are undermining the credibility and effectiveness of the Directive and in particular are discouraging anticipatory action. Clear timetables need to be announced and adhered to.
- There is a definite capacity problem, particularly in relation to the number of Commission desk officers responsible for developing Implementing Measures.
- Poor market surveillance and enforcement is an additional and significant threat to the credibility and effectiveness of the Directive. It must be improved. Co-operation between Member States, with the active support of the Commission, can make the system much more effective, even (broadly) within existing resources.
- Over the longer term, the evaluation team would comment that it is important to improve the information available about market surveillance of products covered by the Directive. Under Article 3, Member States are required to keep the Commission informed about the results of the market surveillance. Where appropriate, the Commission is allowed to pass on such information to the other Member States. Currently, no information of this kind has been identified, though it is understood that some Member States are in the process of drawing up reports. As the number of products subject to surveillance grows, the effective monitoring of surveillance activity will become increasingly important. Monitoring of surveillance activity will not only help to characterise the nature and extent of problems in compliance and thus help to get these problems addressed, it will also suggest ways in which co-operation can be improved and the efficiency of the whole surveillance system enhanced.
- While this could probably require a change in the text of the Directive the Commission should consider the adoption of requirements similar to those that apply in the United States or Australia that require the registration in a database of all new models entering the market. Over the longer terms it will also provide important inputs into the evidence base for policy development in this area.
- Provisional estimates of the cost to the Commission of implementing the Directive over the period up to the current year are at € 24.6 million, including the costs involved in the Directive's initial adoption. This is a relatively modest cost. The costs to the Member States for the period 2006-2011 are estimated are around € 86.6 million - an average of just under € 3.2 million per Member State. The total cost per year to both Commission and Member States - on average over the five year period - is around € 19 million.
- Costs over the next five years depend to a large degree on the extent to which needed additional resources can be devoted to the development of Implementing Measures and market surveillance by the Commission and the Member States.
- Estimates of the ex post costs to businesses, business associations and NGOs are relatively sketchy at the moment and are likely to remain so. Broad assumptions will have to be made about the cost of these inputs.
- Savings resulting from the Directive are expected to reach a total of €127 billion in 2020, or €90 billion in the case that prices remain at 2005 levels. Data currently available do not allow for a straightforward assessment of the cost- effectiveness of the Directive or a comparison with other similar policy

measures, but it is clear that the anticipated energy and cost savings arising from the Directive are of a different order from the costs involved.

- The impact on the Directive on SMEs is likely to increase considerably as the focus moves on from mass-produced products. There are measures to be taken to make the procedures more SME-friendly.
- Given the lack of precision relating both to the benefits of the Directive and its costs, it is not possible to draw an overall conclusion on its 'efficiency'. Only a broad statement is possible, such as that the expected benefits of the Directive considerably outweigh the costs involved.
- In general, the existing system is straining to meet the objectives of the Directive as it now stands. There is little scope for extending the Directive, without significant extra resources and doing so in the absence of extra resources may even undermine the effectiveness of current measures.
- In relation to the analysis of a possible extension of the Directive to non-energy related products, there seems to be rather limited support, from stakeholders for the extension of the Directive at this stage.
- From the technical point of view, for most categories of product there appears to be significant limitations in the current MEEuP methodology. Extension would require the development of a new approach or possibly different methodologies for different categories of product.
- Furthermore, for certain categories like food products, clothing or other products with limited processing, there are strong doubts about the extent to which eco-design requirements can actually bring the desired results.

6 NEXT STEPS

The following key actions will take place after the submission of the First Findings Report:

- Finalisation of the First Findings progress Report on the basis of comments from the Commission services
- Organisation of the second stakeholder meeting (planned to take place on October 5th)
- Further research and analysis of the basis of the feedback from stakeholders
- Development and submission of Draft Final Report
- Organisation of the third stakeholder meeting

6.1 Finalise First Findings Report

On the basis of comments from the Commission services CSES will make any necessary changes and additions to the report. The report (or the relevant sections) will be made available to stakeholders two weeks prior to the stakeholder meeting aiming to provide a basis for discussions.

6.2 Organisation of the second stakeholder meeting

The stakeholder meeting is expected to take place in Brussels on 5th October May 2011. CSES will prepare a draft agenda following the finalisation of the First Findings Report. Stakeholders will be invited to participate and, if interested, to make a presentation during one of the sessions of the meeting.

For the second stakeholder meeting the Commission services need to extent the invitation to a broader audience that will also cover stakeholders covering the non-energy-related products sectors. CSES will maintain close cooperation with the Commission services for the identification of the stakeholders and the organisation of the meeting.

6.3 Draft Final Report

On the basis of the feedback received during the second stakeholder meeting CSES will work towards the draft final report. Additional research may need to be undertaken to fill in any gaps identified.

In relation to the date of the submission of the draft final report we consider that it will be necessary to postpone the initial deadline (October 7) for a period of two more weeks (October 21) days to allow time to integrate the comments from the stakeholder meeting and for any additional research work if necessary.

We do not consider that this extension will affect the overall timetable of the study.

6.4 Third stakeholder meeting

On the basis of the draft final report, and following feedback from the Commission Services, a third stakeholder meeting will be organised towards the second half of November to present the final conclusions of the study. The additional feedback received will be used for the development of the final report expected to be submitted by December 9 2011.

6.5 Proposed timetable for the remaining period of the study

Milestone	Date
Publication of First Findings Report	10 September
2nd stakeholder meeting	5 October
Draft final report	21 October
3rd stakeholder meeting	2nd half of November (date to be determined)
Final report	9 December