



Implementation of Legal Requirements for Energy Using Products (EuPs) in Lithuanian Industry: Problems and Possibilities

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Energy using products (EuPs) are of great concern, because of their proliferation in every-day activity and environmental impact through their life cycle. The greatest share of environmental impact is related to energy use in the usage stage. The new legal requirements implemented in the EU are intended for tackling the environmental impact of EuPs applying the life cycle approach. The aim of this paper is to present the legal requirements for EuPs and eco-design measures the manufacturing companies have to undertake in order to gain competitive advantage while implementing them at the production stage.

Key words: *Ecodesign, EuP, Implementing Measures, Lithuanian industry.*

1. Introduction

In July 2005 the EuP Directive or Ecodesign Directive (European Union 2005) was adopted. A major goal of the Directive is to improve energy efficiency of energy using products (EuPs) and thereby contribute to the efforts to reach the European targets for climate protection. The Directive, however, not only regards energy aspects but rather aims at an overall reduction in a negative environmental impact of the products under consideration. Finally, the Directive wants to help harmonize the European single market for EuPs. Taking into consideration that the design of a product has a fundamental impact on the environmental performance of a complex product, the requirements established under the EuP Directive are based upon an analysis of the environmental impact along the entire life cycle of the product. The scope of the EuP Directive covers all products and product groups depending on energy input - electricity and other energy sources like gas or oil - for their intended use. Parts dependent on energy input and intended to be incorporated into a EuP covered by the Directive are included as well. Excluded are any means of transport. Since detailed requirements are not a matter of the Directive, implementation of the national law basically transfers the EuP-Directive one-to-one into national law. Nevertheless, in the national law the authorities in charge have to be

defined and the process of market surveillance needs to be clarified.

The purpose of the EuP Directive is to help producers and manufacturers of EuPs meet European Union (EU) targets for reducing greenhouse gas emissions and adverse environmental impacts of these products. The Directive outlines the general eco-design requirements that EuPs must meet before they can be placed on the European market. The aim is to improve the environmental performance of EuPs throughout their life cycle. In principle, the Directive covers any product which depends on, generates, transfers or measures energy. The focus of the Directive is on the product design process, since this stage has the greatest influence over the resources that are used within the product itself, in its packaging and during its operating lifetime.

The Directive includes criteria for the selection of the product groups to be addressed for the establishment of requirements for the environmental performance. Environmental impact and the improvement potential are taken into consideration of the product groups with the market volume of minimum 200,000 devices per year (of the entire product group within the European market). The EU-Commission appoints the product groups to the so called working plan under reconciliation with the

Member States and under involvement of market stakeholders and other interested parties.

To analyze the preparedness of Lithuanian industry for the new EuP requirements, research in Lithuanian enterprises which produce EuPs (tertiary sector lighting products, personal computers, TV sets, boilers, standby-mode products, simple set-top boxes, external power supplies) was carried out. The basic goal of the research was to evaluate the potential and experience of product development, innovation implementation and eco-design application. The main research field was environmental performance data and general market information; level of companies innovativeness, product development experience, current fulfilling of Directive 2005/32/EC legal requirements (for a particular product group).

2. System of EuP Implementing Measures (IMs), main requirements

The EuP Directive is a framework Directive, having its main objective to set guidelines how to improve energy efficiency within the EU region and obligate producers to reduce emissions of greenhouse gases related to the Kyoto Protocol and the goals of the European Climate Change Programme. The EuP Directive has the aim to promote sustainable development through free movement of EuPs, environmental protection and increased security of energy supply. Preparation of the EuP Directive was based on an aim to define more consistent guidelines for what environmental requirements are set for the design of EuPs. It has been estimated that energy-using equipment consumes approximately 30 percent of primary energy within the EU, and its share of carbon dioxide emissions that end up in the atmosphere is about 40 percent (Commission of the European Communities 2003b, 5). As product design can have a preventive influence on negative environmental impacts, it has been regarded necessary to set more specific eco-design goals.

The most innovative manufacturers of EuPs have already integrated environmental aspects into their product design, but a lot of high-energy using products are still being placed on the market that requires improvement in terms of their environmental performance. (Kautto et al. 2006).

The EuP Directive covers all EuPs / product groups (all means of transport are excluded), having significant volume of sales and trade over Europe (>200,000 units/annum), which have an impact on the environment and have a high potential for improvement in the mean of their environmental impact. Considering these factors, the time priorities for certain products are set. The EuP Directive focuses on all eco-design aspects across the life-cycle of the product and aims to cut-out low performing products from the market. (Garrett 2007).

While the EuP Directive itself is just a framework, it makes specific provisions for product category called implementing measures (IMs). Each IM acts as an individual legal obligation (standard) for manufacturers providing the necessary conformity assessment regimen for a particular product category. An implementing measure (IM) determines the minimum requirements for product or product group [W. Wimmer et. al. Product innovation through ecodesign]. IM has an advantage of establishing minimum standards to cut-out low performing products on the market. All IMs should help ensure a level playing field because the eco-design requirement applies to all producers. (Garrett 2007). IMs are mandatory requirements in form of regulations which come into force without further implementation into national laws. Figure 1 illustrates the whole process of the EuP Directive. It is obvious that the focus of attention is on IMs. The main organization responsible for IM is the European Commission. The top of Figure 1 demonstrates all the process, actors and tools needed for adoption of IMs, the bottom of Figure 1 illustrates implementation of IM. Both parts are coherent. Industry is involved in both parts and has a great opportunity to make influence on the process of adoption, making a point on any questions for appropriate organizations (e.g. Consultation Forum). In the case the IM has been already adopted, the manufacturer of EuP should focus on the main parts of IM implementation (bottom of the Figure) in the company. It is the task for producers to get to know the tools and actions needed to comply with the requirements. More innovative companies are already familiar with the eco-design concept, and they will not have many problems when implementing the EuP requirements, conversely these companies will have a great opportunity to achieve a competitive advantage through eco-design. It is true to say that EuP Directive is not only the question of compliance. The compliance is an essential condition to remain in the EU market: all energy using products, which have their IMs, have to be marked with "CE" sign as a prerequisite of the EuP Directive compliance. It is also the motive force for innovative companies to design more environmental friendly products. A full integration of environmental issues into the product development process gives possibility to achieve a competitive advantage through eco-design. [W. Wimmer et. al. Product innovation through ecodesign]. The application of IM will be described further.

The product groups of interest are defined in the working plan (every three years a new working plan is defined: 2005-2008; 2009-2011). According to the working plans currently there are set 25 product groups. Preparatory studies for each appointed product group are done to create the basis for developing appropriate requirements for IM.

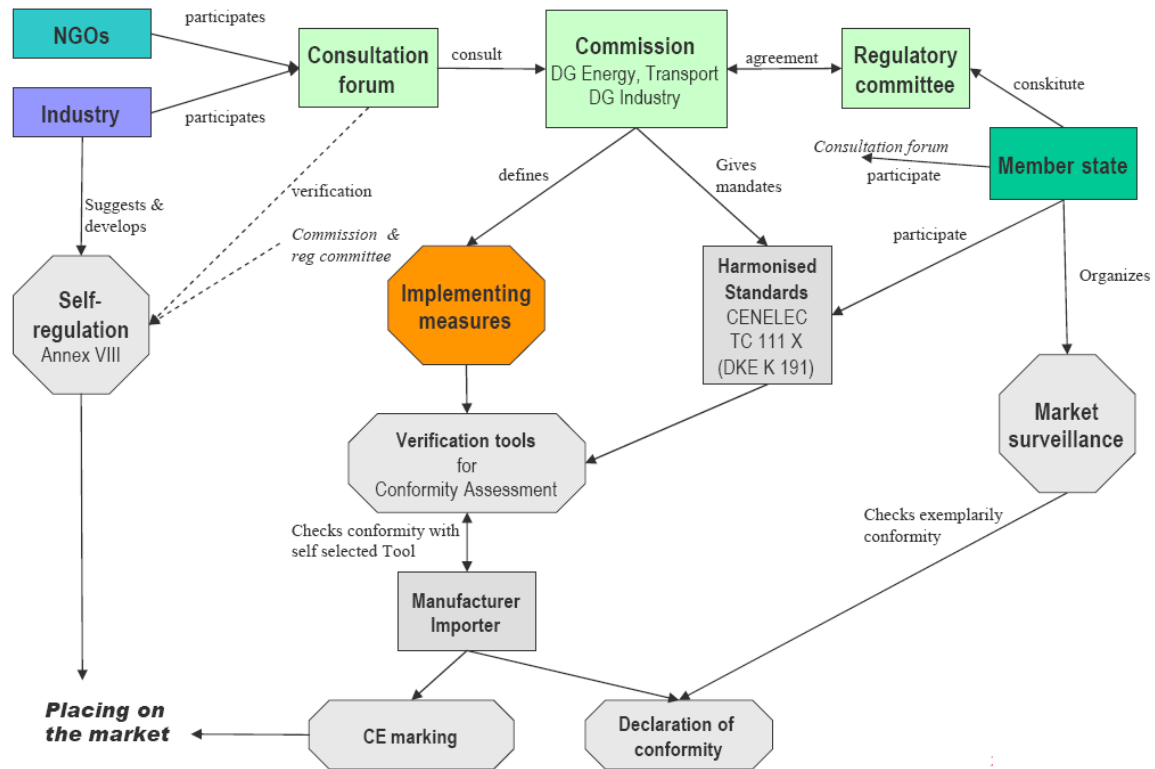


Fig. 1. Process structure of the EuP Directive [Jepsen, D., Reintjes, N. (2008)]

Preparatory studies have to follow a common structure and methodology elaborated and described in Methodology Study on Eco-design of Energy Using Products (Final Report) finalized in 2005 (Van Holsteijn en Kemna BV for European Commission, 2005). The methodology covers main environmental, economical and social aspects of the products' (product groups') lifecycle. Preparatory studies of each product group consist of eight principal parts:

1. Product definition, standards and legislation
2. Economics and Markets
3. Consumer analysis and local infrastructure
4. Technical analysis of existing products
5. Definition of base case
6. Technical analysis of best available technology
7. Improvement potential
8. Policy, impact and sensitivity analyses

Preparatory studies are a wide range and explicit analysis made by competent organizations which arrange a large amount of data from all stakeholders and related institutions, including environmental, economical and social survey.

IMs are adopted through a "comitology procedure":

- European Commission makes a study work plan for the preparatory study, consulting the Consultation Forum. When the preparatory study is completed, the Commission formulates a proposal (working document) taking into account the findings and recommendations.
- The proposal (working document) from the Commission is communicated to experts, stakeholders and the Member States. These parties meet in the Eco-design Consultation

Forum to discuss the proposal. Based on the Consultation Forum and the impact assessments, the Commission formulates a draft regulation.

- Draft regulation is submitted to the Eco-design Regulatory Committee, which is composed of one representative from each EU Member State.
- After the proposed regulation is adopted by the Regulatory Committee (the voting power of each Member State is weighted based largely on each state's population) it is sent to the European Parliament for scrutiny. It is also notified to the World Trade Organisation.
- The regulation is formally adopted by the Commission and published in the Official Journal (OJ) of the European Union before it enters into force. The most likely legal form of the implementation is "regulation", which means that it takes a direct legal effect in all Member States.

An Eco-design approach is based on life cycle thinking. Implementation of eco-design tools in a producing company requires financial, knowledge and time resources. An assumption could be made that it is one of the main limiting factors for small and medium sized enterprises when implementing the innovations based on eco-design principles. That is why the EU and other markets were overloaded by energy inefficient, nondurable and hazardous EuPs. The EuP Directive has a great role: to reduce the environmental impact of EuPs, influencing every producer of EuP. IMs set basic limits (mandatory minimum requirements) for energy and resources use. The EuP Directive also stimulates the EEE industry for innovative development. IM is a base for

new regulations, but it also can be valuable for manufacturers as a knowledge source about the situation of the particular product market, consumer behavior and best available technologies or best available products, as a benchmark.

To sum it up, the IM and the regulations based on it, are not just a new regulation, but a real tool for improving environmental performance of EuP through the whole life cycle. There is no need for producers to perform a deep LCA analysis of the current product. Producers have a great opportunity to appeal to the measures delivered in the preparatory studies and IM, assuring the quality and environmental performance of their products.

According to the analysis, which shows a great importance of such Directive for the environment and the EU market competitive ability, there are some suggestions from the EU Commission to widen the scope of EuP, incorporating all energy related products (ErP) (Proposal for a Directive). The Commission proposed (2008.07.16) to amend only the scope of the Ecodesign Directive, in order to extend it to a wider range of products. An energy-related product is defined as “any good having an impact on energy consumption during use”. There is commitment to extend the scope of the Directive beyond energy related products by 2012 (Summary of

the informal Trialogue on Ecodesign on 18 March 2009). Energy-related products include all EuPs, plus energy-saving products such as windows and some water-using domestic devices, which can reduce water consumption and therefore the amount of energy needed to heat water (Commission Staff Working Document (2008);). In the proposal of the Ecodesign Directive it is suggested to include construction products and detergents in the enumeration of energy-related products. It is underlined that current methodology, used to define implementing measures for EuPs would have to be adapted to non-energy-related products. The trend in legislation shows that the eco-design methodology is going to become an umbrella methodology for design of the entire products in the EU. The resulting comprehensive Ecodesign framework Directive will also be an essential building block for an integrated sustainable environmental product policy, as complemented by initiatives on labelling and incentives relating to public procurement and taxation (Jepsen, D., Reintjes, N. (2008)). Meantime there is a starting point of the EuP Directive, when the very first IMs are implemented. The adoption of the first IMs in industry could make the perfect base for further development of the Ecodesign Directive and implementation of Ecodesign methodology.

Table 1. Significant information for producers according to the general content of IMs

Content of implementing measures	Significant information for producer
1. Definitions of types of EuPs to be covered;	Producers get informed if the product they produce is in the scope of particular IM
2. Eco-design requirements;	It is the main part of IM, where the requirements (limits) on energy, resources use, or any essential changes in construction of the product are defined. That is the important information for designers and technologists.
3. Eco-design parameters, referred to Annex I Part 1	There are defined significant environmental aspects of the particular product and possible criteria of improvement.
4. Requirements for installation;	The producer has to inform the consumers about the appropriate installation of particular EuP. There are defined basic requirements for installation for producers.
5. Measurement standards and/or measurement methods to be used;	That is the main measures to be used for evaluating the current situation of the product and the effectiveness of improvement tools used - whether it makes the product fit the eco-design requirements presented above.
6. Details for conformity assessment;	After the requirements of EuP IM are applied, the conformity with the Directive should be demonstrated via the Declaration of Conformity and an associated technical file demonstrating fulfilment of the IM and the CE Marking. Conformity assessment regimen of each IM covers minimum energy performance standards and environmental regulations by product category.
7. Requirements for information to be provided by manufacturers	Manufacturers are updated on the information they have to provide (to whom and what about)
8. Transitional period	The period of time given for producers to sell their old-design products and to implement new eco-design measures in the process of design.
9. Date for evaluation and possible revision.	Considering the technological change and increase in an improvement potential, the eco-design requirements could be upgraded. Therefore, there is a scheduled date for evaluation and possible revision when any changes could be made.

There are adopted five IMs as Commission Regulations (CR) (referred to data of 30.04.09):

1. Standby and off-mode losses, CR (EC) No 1275/2008;
2. Simple set-top boxes, CR (EC) No 107/2009;
3. Non-directional household lamps, CR (EC) No 244/2009;

4. Tertiary sector lighting products, CR (EC) No 245/2009;

5. External power supplies, CR (EC) No 278/2009.
- There are few draft IMs, which could be adopted in the near future (period of three months), for the following groups of EuP:
- Consumer electronics: television;

- Consumer electronics: television energy label;
- Electric motors;
- Circulators;
- Household refrigerating appliances;
- Household refrigerating appliances energy label;
- Washing machines;
- Washing machines energy label.

After the publication of IM (Regulation) in the EU OJ, there is a transitional period for producers to redesign and produce the products that fit the requirements of IM.

Producers have to hurry in order to fit the requirements of new regulations (IM). EuP process is complex and fast progressing with short deadlines

(Jepsen, D., Reintjes, N. (2008)), that is why it is advisable for producers to act on the spur of the moment to prepare for the existent and future IMs. Electrical and electric equipment manufacturers should track the likely regulatory requirements. As the EuP Directive has a framework form referred to the wide range to reduce environmental impact of EuP, the IMs are definite regulations. The standard content of every IM (Table 1) shows that producers have a possibility to find out all necessary information straight from the IM.

The EuP Directive provides for the Member States to carry out market surveillance and to create a point of contact for customer and interested parties.

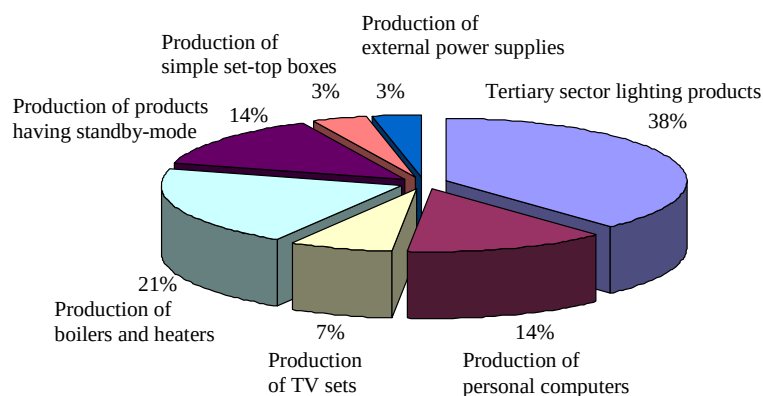


Fig.2. Amount of manufactured or imported products in Lithuanian industry

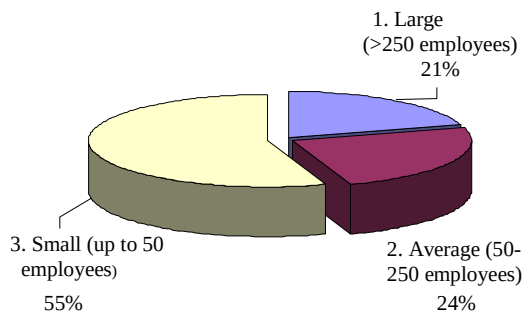


Fig. 3. Distribution of enterprises by number of employees

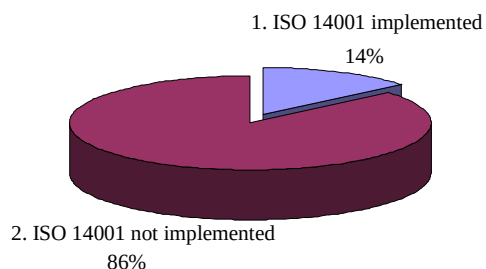


Fig. 4. Distribution of enterprises by implementation of environmental management system

3. Analysis of experience, trends of innovations and eco-design application to development of reviewed products group in Lithuanian industry

Research was based on collected and analyzed information obtained from Lithuanian enterprises producing energy using products (tertiary sector lighting products, personal computers, TV sets, boilers, standby-mode products, simple set-top boxes, external power supplies). Basic goal of the research was to evaluate the potential and experience of product development, innovation implementation and eco-design application to companies. The main research field was environmental performance data and general market information; level of companies innovativeness, product development experience, current fulfilling of Directive 2005/32/EC legal requirements (for a particular product group).

Research was made on the background of statistical data analysis. Qualitative and quantitative research methods were applied. With a view to identify the product development, innovativeness and application of an eco-design potential of defined sectors, a standardized type of the anonymous questionnaire survey method was applied. Questionnaires were distributed among managers and constructors of EuPs. In the analysis process of quantitative data, descriptive statistics was used.

Table 2. Analysis of EuP development in selected sectors

A) How can company influence product development process?	Pct. %
1. Little, company does not carry on product development	10%
2. Average, product development is influenced by consumers	59%
3. Significant, products are developed inside the company	31%
B) What are the internal drivers for product development?	
1. No need to change products	45%
2. Need to change product slightly, according functionality, reliability, durability and maintenance.	52%
3. Need of eco-design application to change product substantially and to develop product-service systems.	3%
C) What is consumer's interest in eco-design?	
1. Low – consumers are not interested in eco-design	28%
2. Average – consumers are partly interested in eco design	62%
3. High – consumers are interested in eco design and higher environmental performance of products	10%
D) Are environmental aspects of the product development process involved in the companies' policy and strategy?	
1. No	3%
2. Yes, in long term policy	83%
3. Yes, in short term policy	14%
E) Are there any specific environmental legal requirements for the selected product?	
1. No	17%
2. No, but in the nearest future specific legal requirements will be regulated by legal requirements.	21%
3. Yes	62%
F) Do you have a need to redesign a product?	
1. No	0%
2. Yes, there is a need for small changes	17%
3. Yes, there are significant changes, related to the product functionality, marketing and technologies.	83%
G) What is the approach to eco-design of competing companies?	
1. Competitors are not interested in eco-design of their products	24%
2. Some competitors use eco-design to improve their products	66%
3. Many of the competitors use eco-design	10%
H) Is there a need to reduce the prices of products?	
1. No	3%
2. Yes, in long term period	83%
3. Yes, in short time period	14%
I) Do you feel pressure from consumers to reduce the environmental impact of the products?	
1. No	28%
2. Not significant	66%
3. Yes	7%
J) Which category product is referred to?	
1. Raw material	0%
2. Component for the other product	10%
3. Final product for consumption	90%
K) Is the product classified as a complex product? (according to material and technological aspects, specific legal requirements, standards)	
1. Simple product	0%
2. Average complexity (many materials, components)	76%
3. Very complicated (great number of materials used)	24%
L) Are there any plans to modify products and use eco-design tools in the near future?	
1. No	24%
2. No, but in long time perspective there are plans	59%
3. Yes, this is the right time for product redesign	17%
M) What is the impact of the company on the process of packaging development?	
1. Small, company can not impact the process of packaging development	7%
2. Average, the process of packaging development is mostly affected by customer	59%
3. Big, company develops packaging itself.	34%
N) What is the impact of company in the raw materials supply chain?	
1. Little, company can not impact raw materials supply chain	3%
2. Average, raw material supply is coordinated by external company, but the supply system is agreed on with the company	72%
3. Great, company is responsible for transportation and supply of raw materials.	24%
O) What is the impact of company on product distribution?	
1. Little, company can not influence product distribution	17%
2. Average, distribution process is coordinated by external company, but distribution system is agreed upon	62%
3. Big, company is responsible for product distribution	21%

Questionnaire research participants were 45 Lithuanian companies producing EuPs (producers of tertiary sector lighting products, personal computers, TV sets, boilers, standby-mode products, simple set-top boxes, external power supplies).

In the first part of the study, general information about the companies, data on volume of production and market size of selected sectors was analyzed.

The biggest part of respondents (38%) is represented by producers or importers of Tertiary sector lighting products. A big segment of

respondents are from Lithuanian boilers and heaters producing companies (21%), personal computers (14%) and standby-mode products (14%) producers or importers.

More than a half of respondents represent small and medium enterprises (55%) and only 14% of EuP producers have implemented environmental management system (ISO 14001).

In the second part of the questionnaire the research information about product development in the companies was analyzed (Table 2). Evaluation of the obtained data gives a possibility to summarize that the biggest part of Lithuanian EuP producers are in the centre of direct impact product development process. The primary aspect in product development is customer requirements. Slightly more than a half of respondents (52%) have stated that their products need some modification to increase products environmental performance, but 45% of Lithuanian EuP producers do not see any need in making changes in product development on purpose to elevate environmental performance of their EuP. Most of respondents (83%) develop their products on purpose to improve products functionality, marketing and implement new technologies. The vast majority (62%) of respondents have stated that customers are slightly interested in environmental performance of products, and minimization of negative products impact on the environment in the product development phase is in the long term policy and strategy of 83% of respondent companies.

The questioned companies have stated that market and consumers pressure to reach environmental performance of products is felt slightly (66%) – only from some social orders. As to the answer to the question about the plans to implement tools of eco-design in companies product development processes in the future, 59% of respondents have given negative answer, but it has been mentioned that legal requirements (as Directive 2005/32/EC) will drive companies to search for proper tools for environmental product development. Majority (62%) of products from the analyzed companies have specific environmental or legal requirements. More than a half of respondents (66%) have said that competitors (similar sector companies) apply tools of eco-design to product creation and development processes. Investigation into the company's direct impact on separate product development and creation elements and information from respondents allow to state that the major part of companies (59%) can influence development of packaging, because the main factor of packaging development is customer requirements. Majority of responded companies (72%) only partially can influence selection of raw materials and distribution. Logistics and distribution of products to the market can be influenced by the companies also partially (62%) and it is related to the existing logistic system and external distribution service in the country. The vast majority of respondents (79%) have stated that communication and cooperation processes among

product developers, producers and consumers are favourable, companies are open for innovative decisions, environmental performance increasing in product development will be simply implemented by existing product development patterns.

4. Implementation of EuP requirements – action plan for producers of particular groups of EuP in Lithuanian industry

There is quite a long time period between the concept, design process and the mass production, marketing of a particular EuP. The major impact of EuP IMs requirements will be on the design function and on procurement function of final product manufacturers, which in turn will impact their supply chains.

Under IMs the manufacturers, as main stakeholders influencing the environmental performance of EuP, will have the following functions-obligations:

- Designing the product in compliance with eco-design requirements,
- Carrying out conformity assessment – generally by self assessment,
- Affixing the CE mark and issuing an EC Declaration of Conformity.

According to the mentioned obligations, the compliance process and implementation of new requirements for EuP in Lithuanian EuP industry should be directed to the similar action fields. First of all, manufacturers have to prepare to the compliance with the EuP requirements in managing all the processes of design, supply and information flows. Early actions have to be taken, and the action plan could be as a base management tool of the whole implementation process.

25 product groups are defined like priority groups for the analysis and eco-design measures. Each manufacturer has to pay attention to a particular product group, relevant to the company. For this reason, there is no sense to exclude one of IM or product groups as a most significant one for scientific analysis. However, some product groups affect a wide scope of products, for example, group 6 addresses standby and off-mode losses of electrically powered devices, and group 7 tackles battery charges and external power supplies. IMs of the mentioned product groups are called horizontal IM. The horizontal IMs cover all the EuPs which have the function of stand-by and off-mode, or have an external power supplier as the component of the product. The IM, which covers only a specific product, is called vertical IM. The principle of horizontal IM preference is applied, if the product is in the scope of both vertical (i.e. product specific) and horizontal IM, then the product has to comply with both horizontal and vertical IMs. The requirements for vertical IM could be more stringent than for the horizontal measures, but not on the contrary. That is one of the reasons why the case of horizontal IM for standby and off-mode losses is taken in this paper as

an example to describe the suggested action plan for manufacturers. The unique aspect of standby/off mode is that it does not include a special product area, but embraces a number of product groups. The fact that this IM is the first one adopted shows the significance of standby and off-mode losses. It is estimated in preparatory studies that 3.7 billion installed products had standby/off mode in 2005, leading to electricity consumption in standby/off – mode of 47 TWh in the EU-25, corresponding to 19 Mt of CO₂ emissions. It is expected 49 TWh to be used in 2020 – the annual amount of electricity energy used in Greece. Eco-design requirements, set for IM, will lead to a reduction in approximately 35 TWh of electricity per year by 2020 in the EU. Additional energy savings are expected in the other parts of the world because some equipment categories are produced for the world market to identical specifications. (Knowledge Transfer Network. 2008; Commission Regulation (EC) No 1275/2008)

In accordance with the analysis of different preparatory studies and IMs, an action plan for manufacturers could be suggested, which incorporates all the most significant actions the manufacturers have to proceed:

- Identification of relevant IM for a certain product: manufacturers have to identify how they are related to the EuP Directive, which requirements (IM) are relevant. It is possible that both vertical and horizontal IMs could be relevant to a certain product (for instance, TV: stand-by and TV IM, plus I of simple set top boxes). It is advisable for EuP manufacturers to track the likely regulatory requirements being developed by preparatory studies so that they can:
 - Assess the level of business disruption and cost which may arise from the coming regulatory requirements and how this will affect the company's ability to gain/maintain CE marking for its products;
 - Minimize the business costs and risk by taking an early action to build the proposed Eco-design requirements into all new product designs and design reviews of existing products.
- Assessment of the product technical and environmental performance:
 - Manufacturers should assess the current power consumption (standby and off-mode) of their equipment, and identify the most appropriate design options that will achieve the power consumption restrictions. To have eco-profile of the product, its technical and environmental assessment should be done. Life cycle thinking approach is essential when evaluating the product i.e. the basic information about material and energy flows could be the base of improvements, applying eco-design measures.
- The second step - manufacturers should then develop a plan how they will implement these design options to comply with power consumption and other restrictions by the deadline dates.
- Assessment of suppliers and supply chain management:
 - Eco-design and other regulatory requirements make not only a direct influence on the activity of manufacturers of a certain product, but under this influence there occurs the supply chain including manufacturers of materials and components used in the production of end-product. Therefore, the supply chain management is an essential and very important step in considering improvement options of the product. When specifying any innovative decisions (demand for new materials or components) at a design concept stage, designers must consider whether they can be sourced effectively from their existing suppliers or whether they need to identify new suppliers where they will source new components. Manufacturers will also need to ensure that any new components or materials they use to achieve the required energy consumption limits must comply with the RoHS materials restrictions. Manufacturers will also need to monitor the implementation of any future materials restrictions (review of RoHs or implementation of REACH Regulations).
- Design expertise in the company, demand for additional design efforts:
 - Manufacturers should consider whether they have the necessary design expertise to implement the design changes that will be required to comply with the restrictions. For instance, according IM of energy losses in stand-by mode, fitting hard-off switches should not present too much of a problem except in ensuring that they are suitably located. However, adoption of the other design options will require specialized circuit design expertise which may not currently be available in-house. When manufacturers do not have experience, they should consider how to obtain specialized design options and knowledge.
- Keep trace of emerging technologies, which could be useful tools in compliance with EuP requirements:
 - The EuP Directive prompts innovative decisions to employ the examples (tools, technologies) of best practice. There is a widespread use of the Best Available Technologies (BAT) in EU industry, likewise of the best available products when implementing the EuP requirements. Therefore, manufacturers are stimulated to

look for new innovative eco-design options used in industry. Interchange of information among companies could be beneficial for the manufacturing industry of the EU in general..

- Integration of EuP requirements into all possible fields: company management (including environmental management), supply chain management; compliance with other legal requirements and integration into internal design process as additional design aspect: Eco-design cannot be carried out in isolation. It has to be integrated into the overall design and development process and any design measures must be reviewed for potential conflict with other design drivers such as function, performance, EMC and product safety. For example, changes in construction material and platings (for example, metal to plastic and vice versa) can affect shielding or grounding performance and safety isolation. Changes of materials, layouts, components and assembly techniques in chips and board level can affect RF performance.
- Conformity assessment against the IM will be based on self-assessment, thereby avoiding the manufacturers costs associated to certification from a third party and hence substantially reducing compliance costs. (Papadoyannakis, M. (2006)). As the EuP Directive is a New Approach Directive, manufacturers or those responsible for compliance such as importers/retailers can demonstrate compliance using one of the two following issues:
 - Internal Design control: Manufacturers will be required to prepare a technical file or dossier containing a record of the design measures introduced, any harmonized standards used and any measurement or test data.
 - Full Quality Assurance - an alternative option to manage products – it is an approach embracing process and quality controls. This can be used by the companies whose management system is along the lines of EMAS or ISO 14001.

In both cases, manufacturers are to perform an assessment of the EuP model throughout its life cycle based upon realistic assumptions about normal conditions and purposes of use, and then establish the EuP ecological profile. As it was mentioned before, the ecological profile of EuP is the base for improvement and also evaluation of environmental improvement.
- CE marking and declaration: lastly, the manufacturer can sign the EU Declaration of Conformity with the IM and affix CE marking to the product. As it is likely that these products are already CE marked under product safety and EMC legislation, then the manufacturer must integrate the new EcoDesign requirements into his CE marking regime without impinging on

them other requirements. In this way, the level of additional costs of production and maintenance of conformity documentation will depend on the degree the companies have already integrated their environmental considerations into their every day business to. For an increasing number of companies which will have already done it before an IM is adopted, the cost will be minimal. (Papadoyannakis, M. (2006))

Products bearing the CE marking are presumed to comply with the requirements for the applicable IM. EuPs which have been awarded the Eco-label are presumed to comply with the corresponding IM (if the Eco-label meets the requirements), at the moment the EU Flower is the kind of eco-label corresponding to the EuP requirements. On a case by case basis, the Commission may decide that other eco-labels provide presumption on conformity as well.

The action plan described above is intended for producers to comply with the eco-design requirements. Producers are advised to take early actions to prepare for compliance. The action plan is the foundation in every manufacturing company, and it is suggested to take some efforts to incorporate new actions essential for compliance with the EuP Directive. Despite an explicit action plan, manufacturers are likely to face new problems common to the companies, which have had no practice in eco-design activities before. Many of practical issues associated with implementing eco-design involve resolution of design conflicts and management of eco-design information. Eco-design decisions often require the action from dispersed locations within a company and across its supply chains. Elements of the product design are often sub contracted and the design of purchased systems and assemblies may heavily influence the overall environmental impact of the end product. This distribution of design influence represents a considerable information management challenge. It is obvious that it is not only an internal issue of the company. There could be useful various web-based and IT tools at this case. Such tools are important to manage information and knowledge flows as much inside the company as outside it.

The EuP Directive is an expansive piece of environmental legislation, and manufacturers will meet new challenges to comply with the eco-design requirements. For this reason manufacturers have to prepare for the new regulation appropriately, accordingly to the environmental awareness of the company. Innovative companies are supposed to have fewer problems when achieving the required limits, and they have the possibility to gain some benefit in the competition among rivals. Small and medium sized enterprises have also all the opportunities to reach the sufficient level of competitiveness if the action plan for implementation of eco-design tools is chosen properly. Much more - companies could gain other benefits beyond compliance: cost savings,

competitive advantages, marketing benefits, green image, ecological labelling.

5. Conclusions

1. The EuP Directive has a great potential for the improvement of environmental performance of EuPs from the life cycle point of view. It is anticipated that thanks to this Directive, eco-design methodology is going to become an integral part of design of entire products in the EU, making the competitive advantage for producers of the EU market and increasing environmental performance of goods all over the world, considering the products are made for the world market.
2. Compliance with EuP is an essential condition to remain in the EU market. Producers have to take early actions to prepare for the compliance before a particular relevant IM is implemented. Proof of this action lies in the following factors: EuP process is complex and fast progressing; the time period from design to mass production and marketing of a particular product is quite long; implementation of EuP requirements influence all the supply chain and the actors involved; it is the challenge to manage all the processes of the design, supply and information flow.
3. The proposed action plan could help the companies implement the necessary changes in design timely. Therefore, EuP implementation is not a discrete activity, far more it is the integration of environmental aspects into the activity of the company. It is recommended to integrate some actions into the existent action plan of the company.
4. The companies which have not practised eco-design before could face some problems concerning resolution of design conflicts and management of eco-design information. It is supposed that innovative companies will have fewer problems in achieving the required limits. Nevertheless, small and medium sized enterprises could also have all possibilities to reach the sufficient level of requirements and to gain competitive advantages, if the action plan for implementation of eco-design tools is prepared and pursued.
5. The EuP Directive should be conceived by producers not as an obstacle, but as an opportunity to gain a competitive advantage producing more environmental friendly products. The Directive itself jointly with the IMs is a supporting measure for implementing eco-design improvements.

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Energiją vartojančius gaminius (EVG) reglamentuojančių teisės aktų įgyvendinimas Lietuvos pramonėje: problemos ir galimybės

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Remiantis Integruotos gaminio politikos principu, Europos Sąjunga 2005 m. liepos 6 d. priėmė Europos Parlamento ir Tarybos direktyvą 2005/32/EB, nustatančią ekologinio projektavimo reikalavimų energiją vartojantiems gaminiams nustatymo sistemą. Direktyva siekiama pagerinti gaminio aplinkosaugines savybes per visą jo būvio ciklą, sistemaiškai integruojant aplinkos apsaugos aspektus anksčiausiame gaminio kūrimo etape. Direktyva yra taikoma visiems energiją vartojantiems gaminiams, neįskaitant transporto priemonių. Direktyvos reikalavimai yra sukonkretinti įgyvendinimo priemonėse, kurios nustatomos atskiroms gaminių grupėms. Pirmosios įgyvendinimo priemonės yra sudarytos tiems gaminiams, kurie turi reikšmingą poveikį aplinkai (daro didžiausią poveikį klimato kaitai), į vidaus rinką išleidžiami dideliais kiekiais, turi aukštą pagerinimo potencialą. Ekologinio projektavimo įgyvendinimo priemonių priėmimo procesas trunka daugiau nei metus – nuo atskirų gaminių grupių studijų, kuriose analizuojamos gaminių grupės techninės savybės, atliekama būvio ciklo analizė, nustatanti reikšmingus aplinkos apsaugos aspektus ir pagerinimo rodiklius. Atsižvelgiant į tai, kad projektavimo etape iki 80 % galima sumažinti gaminio poveikį aplinkai, viso būvio ciklo metu direktyvos 2005/32/EB sklandus įgyvendinimas teiks reikšmingą aplinkosauginę naudą ir prisidės prie subalansuotos pramonės plėtros. Tinkamai įgyvendinus direktyvos reikalavimus, Lietuvos pramonės įmonės turės galimybę užtikrinti konkurencingumą ir laisvą prekių judėjimą ES rinkoje. Publikacijoje atlikto tyrimo (analizuojant Lietuvos pramonės įmonių, gaminančių energiją vartojančius gaminius) tikslas – užtikrinti, kad gamintojai turėtų pakankamai informacijos apie direktyvą ir jos įgyvendinimo priemonių reikalavimus ir gebėtų juos taikyti gaminių kūrimo (projektavimo) procese. Atlikta 2005/32/EB direktyvos įgyvendinimo priemonių ir Lietuvos pramonės situacijos analizė padės tobulinti direktyvos diegimą Lietuvoje ir užtikrinti jos veiksmingumą.