



# Energy-using Products (EuP) Directive & Business Implications

Asia Eco-Design Electronics

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## What is the EuP Directive?

- The EuP Directive was published in the European Union official journal on the 22<sup>nd</sup> July 2005.
- Member States are supposed to transpose into national law by the **11<sup>th</sup> August 2007**
- It is based on Article 95 so the requirements are the SAME for all member states (MS). **Unclear if implementing measures will be Article 95.**
- It creates a Framework for the integration of various environmental aspects, such as energy efficiency, hazardous substances, water consumption or noise emissions, into the design of Energy-using-Products (EuPs).



## Why Legislate the Design Process?

- It is estimated over 80% of all product-related environmental impacts are determined during the product design phase.
- The EuP Directive states in the introduction:  
*'Action should be taken during the design phase of EuPs since it appears that the pollution caused during a product's life cycle is determined at that stage, and most of the costs involved are committed then.'*
- Energy-using-Products (EuPs) account for a large proportion of the consumption of natural resources and energy of the EU.



## Background

- Initially there were 2 pieces of legislation in preparation:
  - Framework Directive on impact on the environment of electrical and electronic equipment (EEE), which was based on Life Cycle Thinking (LCT) , allowing the manufacturer to find the optimal balance between economic, social, technical and environmental requirements when designing his products.
  - Framework Directive on energy efficiency for end use equipment (EER), aimed to help commitments under the Kyoto protocol on combating climate change. The aim of this proposal was to set specific requirements for energy consumption of products targeted in so-called "implementing measures".
- On the 1<sup>st</sup> August 2003, the two draft Directives were combined to become the EuP Directive. It tries to combine the original principle of Life Cycle Thinking (LCT) with the setting of more specific requirements in the EER.



## Who Will it Affect?

- A product that uses electricity, fossil fuels or renewable energy sources during its *use* stage of the life cycle.
- A product used for generation, transfer or measurement of energy.
- Parts dependent on energy input supplied to end-users as individual parts and can be assessed for environmental performance.
- Component and sub-assembly manufacturers may - under the *implementing legislation* - have to supply material composition and energy/material consumption data to the EuP producer. *Unclear how this will be enforced!*



## Who is Exempt?

- It does not apply to *transportation vehicles for people or goods*. e.g. cars, trucks, ships, aeroplanes and rail.
- It is not clear whether the above includes *agricultural and construction equipment* that can move.
- *Defence equipment* is not exempt.



## What is a Framework Directive?

- The Framework sets a template for legislation on specific product groups.
- The specific product groups will follow the parts of the template that are applicable to those groups.
- The Framework will allow the rapid implementation of legislation on products under the scope of the EuP in a standardised manner.
- The EuP Directive will not directly create legal obligations and requirements for manufacturers. This will happen only when the *implementing measures* are adopted.



## What are Implementing Measures?

- These can either be self regulation by an industry or legislation.
- Self regulation will have to demonstrate it is effective.
- EuPs will be targeted if they meet the following criteria:
  - *Sales in the EU greater than 200,000/year (total market)*
  - *Have a significant environmental impact as set out in EU decision 1600/2002/EC*
  - *Have significant potential for improvement*
- Products in most of the WEEE categories are likely to be targeted as nearly all of them meet the above requirements.



## Self Regulation Requirements

- Open to all countries for participation in preparation and implementation.
- Must provide positive improvements to the eco performance of EuPs.
- Must represent a large majority of the industry for the relevant sector.
- Must have clear measurable objectives, including time span and use of scientific data to develop the indicators.
- Transparent: stakeholders including EU states, NGOs, industry, and consumer associations must have access to interim and final reports.
- Good monitoring system with independent inspectors.
- Should be cost effective, especially with regards to monitoring.
- Consistent with economic/social dimensions of sustainable development.
- Compatible with external factors e.g. market pressures, taxes etc.



## Who Will be Hit First?

- Products identified as having a high potential for cost-effective reduction of greenhouse gas emissions. These are:
  - *Heating and water heating equipment*
  - *Electric motor systems*
  - *Lighting*
  - *Domestic appliances*
  - *Office equipment*
  - *Consumer electronics*
  - *Heating ventilating air conditioning system (HVAC)*
- A separate *implementation measure reducing stand-by energy use* for a range of products not yet specified.

## Research 1

- EuP methodology study was published by VHK (November 2005)
- Studies have been commissioned by DG TREN & DG ENV (March 2006)
  - *Boilers and combi-boilers (gas/oil/electric) [21 months, 400k]*
  - *Water heaters (gas/oil/electric) [21 months, 400k]*
  - *Personal computers (desktops and laptops) and computer monitors [16 months, 250k]*
  - *Imaging equipment: copiers, faxes, printers, scanners, multifunctional devices [21 months, 350k]*
  - *Consumer electronics: televisions [16 months, 250k]*
  - *Standby and off-mode losses of EuPs [16 months, 300k]*
  - *Battery chargers and external power supplies [11 months, 150k]*
  - *Office lighting [16 months, 250k]*
  - *Public street lighting [11 months, 150k]*
  - *Residential room conditioning appliances (air conditioning and ventilation [21 months, 350k]*

## Research 2

- Studies have been commissioned by DG TREN & DG ENV (March 2006) - continued
  - *Electric motors 1-150 KW, water pumps (commercial buildings, drinking water, food, agriculture), circulators in buildings, ventilation fans (non-residential) [21 months, 400k]*
  - *Commercial refrigerators and freezers, including chillers, display cabinets and vending machines [21 months, 350k]*
  - *Domestic refrigerators and freezers [16 months, 150k] \* April*
  - *Domestic dishwashers and washing machines [16 months, 250k] \* April*



<b>Category</b>	<b>Timetable</b>
Street lighting	Jan 2007
Battery chargers, etc	Jan 2007
Personal computers, etc	July 2007
Consumer electronics: TVs	July 2007
Standby, etc	July 2007
Office lighting	July 2007
Domestic refridgerator, etc	July/Aug 2007
Domestic dishwashers, etc	July/Aug 2007
Imaging equipment, etc	Dec 2007
Water heaters, etc	Dec 2007
Boliers, etc	Dec 2007
Residential room conditioning appliances	Dec 2007
Electric motors, etc	Dec 2007
Commercial refridgerators, etc	Dec 2007

*Note: assumes projects started in March 2006*



## **Working Plan**

- The EC will introduce implementing measures after consultation for the highlighted products.
- In parallel a 3 year working plan will be produced before the 6th July 2007 setting out a list of product groups to be given priority for the adoption of implementing measures.
- The plan will be periodically updated.



## Marketing Implications

- Companies will have to satisfy requirements before their products can be put on the market.
- This will be done by *CE marking with a declaration of conformity* issued by the manufacturer or representative.
- Checks on compliance will be required by Member States (MS), with samples of products subjected to compliance checks.
- MS must provide a means for other interested parties to submit observations on non-compliance of products.
- Manufacturers will have to re-call any non-compliant product from the market. MS must state the grounds on which non-compliance is based.



## CE Marking

- All EuPs covered by an *implementing measure* will require to have a *technical file* to demonstrate conformance.
- The *technical file* will cover the both the '*generic*' and '*specific*' *eco-design requirements*.
- MS will assume an EuP bearing a CE marking conforms to any *implementing measure* on that EuP.

## Generic Eco-design Requirements

- Looks at the whole *ecological profile* with no specific limit values on a particular environmental aspect.
- Must carry out an *environmental assessment of a representative model* looking at inputs/outputs as measurable quantities that occur throughout the life cycle.
- Priority to be given to what can be most influenced by product design.
- Manufacturers to use this assessment to improve environmental performance during product design against benchmarks set by the EC.
- Design should be a balance between different environmental aspects and other requirements in safety, health, quality, performance, manufacturability, marketability and costs, whilst complying with relevant legislation

## Implementation Measures for Generic Eco-design

- EC will submit them to a committee to be formed.
- It will specify *significant environmental aspects* within the measure.
- It will as appropriate identify:
  - Relevant *eco-design parameters* from the full list.
  - The *information supply requirements* from the full list
  - The *requirements for the manufacturer* from the full list.



## Generic Eco-design Parameters

- The following lifecycle phases, where they relate to product design will be looked at:
  - Raw material selection and use
  - Manufacturing
  - Packaging, transport and distribution
  - Installation and maintenance
  - Use
  - 'End of life' (e.g. end of its first use – reuse- recycling - until final disposal.)



## Generic Eco-design Assessment of Environmental Aspects

- Each phase assessed where relevant for:
  - Consumption of materials, energy, water etc.
  - Anticipated emissions to air, water, or soil
  - Anticipated pollution through noise, vibration, radiation, electromagnetic fields etc.
  - Expected generation of waste material
  - Possibilities for reuse, recycling and material recovery taking into account 2002/96/EC (WEEE directive)

## Generic Eco-design Improvement Parameters

- Where appropriate the following should be used to evaluate the potential eco-design improvements that can be made to previous list:
  - Product weight and volume
  - Recycled material content and incorporation of used components
  - Consumption of energy, water etc through the lifecycle
  - Use of hazardous substances (As per Directives 67/548/EEC, 2002/95/EC, and 76/769/EEC)
  - Quantity and nature of consumables needed for use and maintenance
  - Ease of reuse and recycling (number of materials/components, disassembly time, complexity of tools, component standardisation etc)
  - Incorporation of used components
  - Avoidance of technical solutions detrimental to reuse or recycling
  - Extension of lifetime (modularity, upgradeability, guarantees etc)
  - Amount of hazardous and non-hazardous waste generated.
  - Emissions to air, water and soil of hazardous substances, gases etc.

## Generic Eco-design Information Supply Requirements

- To be supplied by the manufacturer if specified under the *implementation measures* because they influence the way the EuP is handled, used or recycled by parties other than the manufacturer:
  - Product design information relating to the manufacturing process of the EuP.
  - Information to be given to consumers on significant environmental characteristics and performance of the EuP so they can make comparisons.
  - Information to consumers on how to install the EuP in order to minimise environmental impact and ensure optimal life-expectancy.
  - Information to consumers on return of the EuP at 'end of life', upgradeability and period of availability of spare parts.
  - Information to treatment centres on disassembly, recycling or end-of-life disposal of the EuP.
- The above to take in to account obligations under WEEE (2002/96/EC)



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## Generic Eco-design Manufacturer Requirements

- Addressing the environmental aspects identified in the *implementing measure* as capable of being substantially influenced by product design by performing an assessment of the EuP model throughout its life cycle.
- Based on the above an *ecological profile* is to be produced.
- The above will be used to evaluate different product design solutions and meet environmental performance benchmarks which will be identified in the *implementation measure* by the EC.
- Choice of product design will be a balance between different environmental aspects, health, safety, technical functional requirements, quality, performance and economic aspects whilst complying with legislation.



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## Ecological Profile

- All EuPs covered by an *implementing measure* will require a *documented ecological profile*.
- It is a description with physical measurable values of the inputs and outputs as outlined in the *implementing measure*.
- It can include, for example, material content, energy, emissions and waste for those parts of the life cycle which have a *significant environmental impact*.
- The *implementing measure* may require the *ecological profile* to be made available to consumers along with the benefits of eco-design.



## Specific Eco-design Requirements

- These are set target values that must be met by the EuP as set out by the *implementation measure*.
- EC will carry out technical, environmental and economic analysis on representative EuPs and identify technical options for improving the environmental performance.
- From the above specific requirements will be formulated.
- The date of entry will take into account of the time normally required to re-design an EuP.



## Conformity Assessment

- Every new product covered by the *implementation measure* must have a *conformity assessment* carried out on it prior to market launch.
- Manufacturers can choose between *internal design control* or *environmental management system* to control the assessment.
- The *conformity assessment* must be documented and available for inspection.
- For manufacturers not established in the EU, it is the responsibility of the *person putting the EuP onto the EU market* to ensure the requirements are met.
- A '*CE*' marking will be used as a *declaration of conformity* to the implementing legislation.

## Internal Design Control

- A *documentation file* for each product must be produced containing:
  - Product description and intended use.
  - Results of environmental studies used to determine product design solutions.
  - Ecological profile of the product if required by the implementing measure.
  - Product design elements relating to environmental design aspects.
  - List of appropriate standards and documents.
  - Information on the environmental design aspects of the product that has to be supplied to consumers, treatment facilities, etc.
  - Results of measurements to show requirements have been met.
- The manufacturer must ensure the product is manufactured in compliance with the above design specification.

## Environment Management System

- Manufacturers must implement the following environmental management system elements:
  - Policy
  - Planning
  - Implementation and documentation
  - Checking and corrective action

## Environment Management System: Policy

- Demonstrate conformity
- Framework for setting and reviewing environmental objectives.
- Documented with written procedures/work instructions.
  - List of documents to show conformity
  - Environmental performance objectives, organisational structure, responsibilities, allocation of resources.
  - Checks/tests after manufacture to verify product performance against set objectives.
  - Documentation control and ensuring documents are up to date.
  - Method of verifying the implementation and effectiveness of the different elements of the management system.

## Environment Management System: Planning

- Manufacturer will establish and maintain:
  - Procedures for establishing the ecological profile of the EuP
  - Environmental product performance objectives and indicators.
  - A programme plan to meet the objectives

## Environment Management System: Implementation and Documentation

- Management system documentation to cover:
  - Responsibilities and authorities.
  - Product design control and verification techniques implemented.
  - Processes and systematic measures used in product design
  - Core environmental elements of the management system and procedures for documentation control.
- EuP documentation will specify:
  - General description of the EuP and intended use.
  - Results of studies and/or references to case studies used in evaluating, and determining product design solutions.
  - Ecological profile if required by the implementation measure.
  - Results of measurements and EuP conformity.
  - Establish specifications.
  - Copy of the information that has to be supplied on the product design aspects.

## Environment Management System: Checking and Corrective Action

- Manufacturer must take all measures to ensure compliance with the product design specification and requirements of the implementing measures.
- Maintain procedures to investigate and respond to non-conformities. Implement any changes in the documented procedures resulting from the corrective action.
- A full internal audit of the environmental elements of the management system is to be carried out at least once in every 3 years.



## **SMEs**

- EC shall take into account initiatives to help SMEs integrate environmental aspects including energy efficiency into their product designs.
- MS will be required to strengthen support networks for SMEs to adopt environmental sound approaches in design.
- Studies by the EC in preparing implementation measures will be easily available to SMEs
- Guidelines and other specialised documentation will be available to SMEs



## **Components and Sub-assemblies**

- Implementation measures may require suppliers of components and sub-assemblies to supply information to manufacturers of EuPs.
- This would result in suppliers having to provide relevant information on:
  - Material composition
  - Consumption of energy, materials and other resources.

## Issues of Concern

- Very few SMEs currently have the in-house skills needed to meet the requirements.
- The EC is considering providing simple tools for SMEs for them to use to meet requirements.
- There will be an acute shortage of people with the required skills.
- Lack of good data is currently a huge concern and will continue to be so in the foreseeable future.
- The supply base for components is almost all outside of the European Union (EU). How will requirements on component manufacturers be enforced?
- Controlling conformance and testing of companies with no presence in the EU will be a huge task for importers.

## ETMUEL (1998-2000): Lessons Learnt 1

- Large companies: potential for fragmented approaches
- Supply chains: long-term strategy
- Need for awareness raising
- Need for simple tools
- Must be commercially focused
- Lack pressure (customers and legislation)
- WEEE Directive
  - lack of awareness
  - 'wait and see'
  - perceived to be a long way off!

## ETMUEL (1998-2000): Lessons Learnt 2

- ‘Experience’ of phasing from previous Directives (rightly or wrongly)
  - Directive overload
  - ‘3 months after WEEE’ scenario
- Lack of information and knowledge
- Lack of time
- Importance of organisational and technological aspects of eco-design

## ETMUEL (1998-2000): Lessons Learnt 3

- Design engineers not educated in environmental issues
- Need to have access to *appropriate* environmental expertise
- Need to balance ‘correct (scientific) solution’ versus ‘business solutions’
- Lack of information on environmental-impacts of materials e.g. suppliers provide function
- Need for benchmarking

## ETMUEL (1998-2000): Lessons Learnt 4

- Appropriateness of media for use of tools
  - paper
  - diskette
  - web e.g. 30 employee company, MD had the only PC with internet access

## Strategy

- Corporate
- Business
- Functional
- Group
- Solution



## **ZBIA™ Model**

- Z ero
- B asic
- I ntermediate
- A dvanced



## **Seven-stage model**

- Eco-design ignorance
- Eco-design starter
- Green R&D
- Technical integration
- Semi eco-design integration
- Total eco-design integration
- Green strategism

## Barriers 1

### Business case

- Lack of customer/market demand
- Lack of perceived short term benefit
- Perceived costs, effort

### Market changes and pressures

- Time pressures, shortening 'time to market'
- Structural changes: manufacturing to service
- Long, complex supply chains
- Dispersal of design decisions, influence and relationships
- Small firms in the chain

## Barriers 2

### Organisational/cultural

- Lack of senior/middle management commitment
- Organisational and individual inertia
- Silo effect
- Poor communications
- Fear of compromising product quality/production efficiency

### Understanding

- Lack of awareness/skills

### Practical

- Lack of *appropriate* tools/information/measures

## Starting eco-design

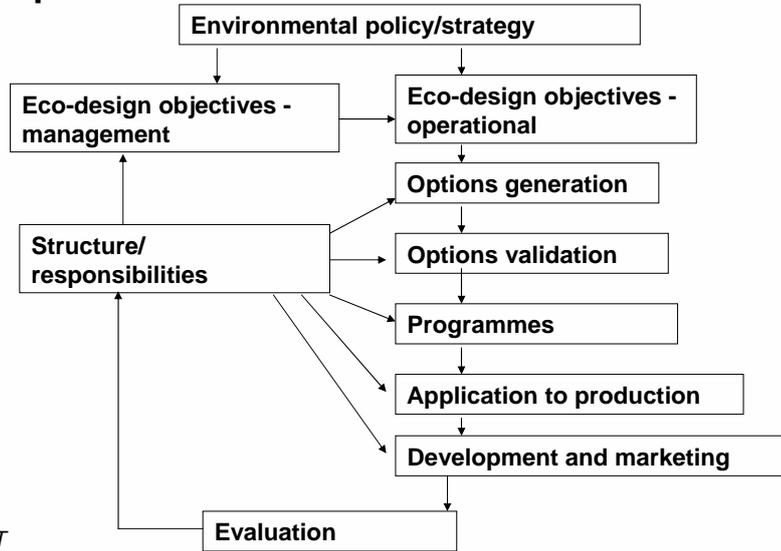
1. Get management commitment
2. Decide about approach (top-down/bottom up)
3. Assemble a team, plan the project, decide about responsibilities
4. Decide on pilot project

## Planning, management and control

- Policy
- Objectives
- Metrics
- Strategy
- Tactics
- Programmes
- Responsibilities
- Budgets



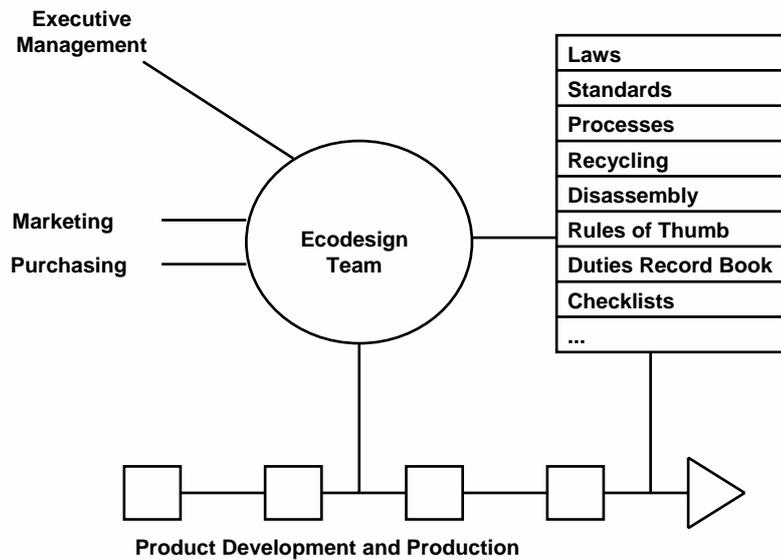
## Eco-design process



Source: Han Brezet, DUT

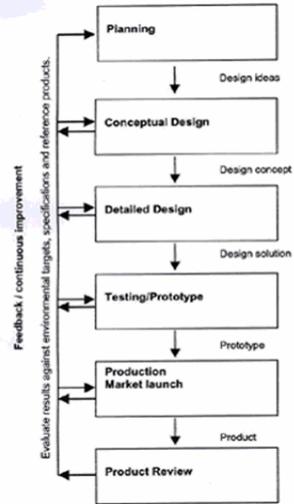


## Eco-design is teamwork

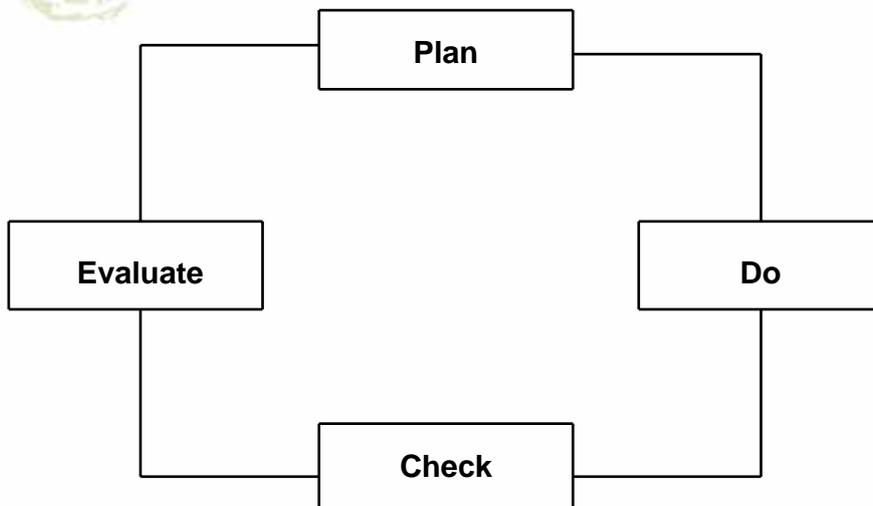


## ISO TR 14062: integration of environmental considerations into product development and design

- Strategic issues
- Management
- Product strategies
- Product development process



## POEM



## Ecodesign-Process and Tools (schematic)

<p>1. Planning, Product/Project Specification</p> <ul style="list-style-type: none"> <li>• Marketing tools</li> <li>• LCA, MIPS, or CBD analyses. Checklists for environmental strength/weakness analysis</li> </ul>
<p>2. Concept Design</p> <ul style="list-style-type: none"> <li>• Creativity techniques, Eco-Innovation methods</li> <li>• Decision matrix, Portfolio-or Spider diagrams for comparison and selection of ideas</li> </ul>
<p>3. Detailed Design</p> <ul style="list-style-type: none"> <li>• Design guides and handbooks, checklists, Rules of Thumb, LIDS-Wheel, House of (environmental) Quality, Cost assessment tools</li> </ul>
<p>4. Testing/Final Evaluation before Market Launch</p> <ul style="list-style-type: none"> <li>• Normal testing tools environmental strength and weakness analyses tools (see phase 1)</li> </ul>
<p>5. Market Launch</p> <ul style="list-style-type: none"> <li>• (Eco-) Marketing tools</li> <li>• Green Communication Tools, Eco-labelling</li> </ul>
<p>6. Product Review/Process Review</p> <ul style="list-style-type: none"> <li>• Marketing tools, Checklists und Spider diagrams as Controlling tools</li> </ul>

## Endnotes

- Product-related environmental compliance v innovation
- Need to address the organisational dimensions *especially* line management motivation
  - pressure from senior management
  - company-wide dialogue
  - making business case
  - part of job description
  - rewards and incentives



## Websites:

- Workshop slides, and links on the EuP:
  - [www.cfsd.org.uk/seeba](http://www.cfsd.org.uk/seeba)
- EuP Directive 2005/32/EC
  - [http://europa.eu.int/eur-lex/lex/LexUriServ/site/en/oj/2005/l\\_191/l\\_19120050722en00290058.pdf](http://europa.eu.int/eur-lex/lex/LexUriServ/site/en/oj/2005/l_191/l_19120050722en00290058.pdf)
- ENDS Environment Daily: Environmental legislation updates
  - <http://www.environmentdaily.com/mydaily/>



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