Basic concepts on Ecodesign

Unit 1: Introduction to Ecodesign

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With this unit, the student will be able to:

- Understand the general concepts of Ecodesign
- Know the benefits of Ecodesign in the social and economic concepts.

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1.1 General concepts of Ecodesign

The current society, for years, is showing a growing conscience and a commitment with sustainability. The number of consumers who demonstrate greater responsibility towards a sustainable consumption of products and resources increases every day.

Consequently, this kind of consumer seeks his/her sense of environmental sustainability to be reciprocal with the brands behind the products/services he/she acquire, demanding greater commitment and responsibility.

At this point, it is easy to understand that companies, especially manufacturing companies, need to demonstrate their respect and commitment to the environment and natural resources, strengthening their whole product life cycle with actions that demonstrate such commitment.

Regarding these kind of activities, the most outstanding action is Ecodesign, which has become the main methodology that can be used by companies to make their products more sustainable and eco-friendly.

We can define Ecodesign as a "systematic incorporation of environmental aspects into product design, with the aim to reduce its impact through its entire life cycle".

For any manufacturing industry, Ecodesign claims the need of incorporating environmental and sustainability criteria into the basic requirements of product design, such as costs, function, utility, aesthetics, reliability, safety, etc.

These environmental criteria range from the struggle to minimize all consumptions and resources to the reduction of emissions and pollutants throughout the product life cycle, not only during its manufacturing process, but until the end of its useful life.

But, what does life cycle mean? in short, all the stages which the product gets through, from the purchase of raw materials that will form part of it, or its generation from natural resources, until the moment of its final dispose. Consequently, this cycle covers form the raw materials to the final disposal, through the intermediary stages of manufacture, packaging, logistics and distribution, sale, maintenance and even, re-use.

Companies which decide, within their business strategy, to incorporate Ecodesign in their product developing process, not only demonstrate their environmental sensitivity, but also increase their competitiveness, having better products, better designs, better manufactured and with a clear distinction factor.

Those companies promoting Ecodesign a sustainable development, must demonstrate that a suitable balance between economic, environmental and social growth has been achieved that contributes to sustainability:

- **At economic level:** demonstrating that a rational use of resources is being carried out, especially during key stages of the value chain (supply, manufacturing, transport and waste management)

- **At environmental level**: demonstrating that the type and origin of raw materials, the energy consumed for its manufacture, the pollution caused and all those aspects that could affect the environment have been deeply taken into consideration.
- **At social level:** demonstrating that the company maintains and strengthens its corporate social responsibility, being part of an elite of companies which demonstrate to ensure the welfare of their workers and their affected labour groups (partners, employees, etc.).

Therefore, Ecodesign takes part as a key tool to achieve the desired sustainable development.

From a "key business factor" perspective, design is an increasingly important factor of competitiveness for companies. The current competition, globalization and the high knowledge of the customer, have transformed a society which, is increasingly demanding differentiated products, not only showing a well-balanced quality-cost, but also a demonstrable respect to the environment. This is the reason why companies must consider environment, at an operational and, especially strategic level, as a key factor. Therefore, the first step of Ecodesign is to integrate the environmental factor into the overall activity of product design and its manufacture.

There are lots of definitions of Ecodesign, such as the one previously mentioned and others, like for example "action that considers environmental impacts at all stages of the design and development process, to achieve products that generate the as less environmental impact as possible through its entire life cycle" [1].

This is why we can summarize Ecodesign as a great agent that clearly seeks to prevent any potential contamination associated to a product through all stages which it passes (conception, manufacture, use and disposal).

However, it should be clear that Ecodesign not only seeks to ensure that design is respectful with the environment, but also aims to implement a global environment concept, ensuring that it is considered in a systematic way by complying with the requirements of a pre-established system, which causes the maximum involvement of the company through the integration of a methodology based on identification, control and continuous improvement of all the environmental aspects of its manufactured products.

[1] EN ISO 14006:2011. Environmental management systems. Directives for the incorporation of Ecodesign.

1.1.1 Life Cycle concept

We define “life cycle” as a “set of consecutive and interrelated stages of a product system, from the purchase of raw materials, or its generation from natural resources, to their final disposal” [2].

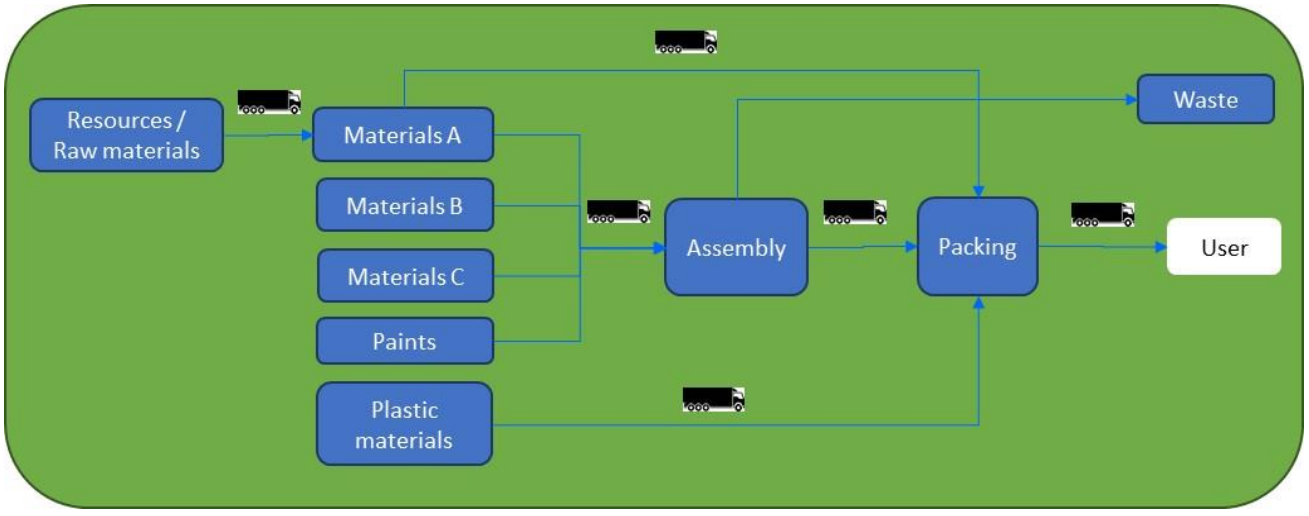
Therefore, this evidences the way this concept includes all stages of design, development and manufacturing, until the product no longer has utility / function.

Under this perspective, Ecodesign takes into account: raw materials, development and manufacturing, packaging, distribution, sale, use, maintenance required, reuse (if applicable), and disposal.

Therefore, Ecodesign, following this whole life cycle approach, promotes the identification of all processes inputs (raw materials and energy), and outputs (emissions and wastes), with the clear objective of reducing the possible environmental impact.

1.1.2 Product System

We define product system as a “set of unitary processes with elementary flows and product flows, which performs one or more defined functions, and serves as a model for the product life cycle[2]”



1.1.3 Functional Unit

We define functional unit as “quantified performance of a product system for use as referent unit”[2].

[2] EN ISO 14050:2010. Environmental management. Vocabulary

Therefore, functional unit is the product system that will be taken as a reference, defining the exact qualities of the product and the stages of the life cycle that are going to be considered.

For instance, in the case of a furniture piece, the unit should be defined by choosing the most representative size and finish of said piece. Regarding the stages of life cycle, it would include raw materials, the manufacturing process and the distribution to the final customer, however, use and disposal (which depend on the customer) would be excluded.

1.1.4 Environmental aspect, environmental impact

We define **environmental aspect** as an "any element of the activities, products or services from an organization that can interact with the environment" [3].

We define **environmental impact** as "any change in the environment, whether good or bad, as a result (totally or partially) of environmental aspect"[2].

Therefore, while aspect is each input and output of the product system, impacts are each one consequence that these aspect cause in the environment.

The way each aspect can lead to one or several impacts can be easily understood, since aspects are, precisely, the origin of the impacts.

Examples of environmental aspects	Materials consumed
	Energy consumed
	Water consumed
	Wastes generated
	Emissions emitted
	Noise generated
	Smells generated

Examples of environmental impacts	Decrease in available natural resources
	Water contamination
	Soil contamination
	Global warming
	Ozone layer thickness reduction

1.2 Benefits of Ecodesign

When Ecodesign is applied and implemented in the company, the manufactured products show to be more respectful and to have a greater environmental awareness, while they are still fulfilling the function for which they have been created and,

[3] UNE-EN ISO 14001:2015. Environmental management systems. Requirements with guidance for use

especially, without the need to have higher prices than in the past (prior to the implementation of the new strategy).

Which means that companies should know that implementing Ecodesign in their product development process will help to increase their competitiveness, to have better designed products (possibly at a lower cost) and to differentiate themselves from the competition through a "green image" which has more and more social impact.

Therefore, taking the decision to implement Ecodesign not only does not have disadvantages, but also offers great advantages over competitors:

1.2.1 Environmental benefits

Thanks to a consequent lower impact of the developed products and to a bigger and better fulfillment of the environmental legislation.

1.2.2 Economics benefits

Motivated by:

- Optimization of the resources used for the development of manufactured products, both raw materials and energy consumption (electricity, water, etc.)
- Optimization of the own production factors, reducing the transformation processes, movements, times, etc., causing all of them less environmental impact
- Reducing the impact of transport at the industrial activity, resulting in lower fuel consumption and therefore lower emissions.

All this also produces cost savings.

1.2.3 Social benefits

Thanks to a better image of the company against stakeholders and markets. Better response of the company to the needs of a society with a growing ecological sensitivity.

1.2.4 Benefits for a biggest market share

Motivated mainly by an increase in sales thanks to the opening to new markets and new business niches, especially those with a greater environmental awareness.

Possibility of certifications demonstrating the environmental commitment and a strategy towards sustainable development. Possibility of obtaining recognition by the

customer of the "eco" character of their products (identification with ecolabels or other mechanisms)

"Eco publicity" and "green publicity", which captures the attention of society, marking a clear differentiation with the rest of the competitors.

1.3 Ecodesign barriers

Having analyzed the implementation of Ecodesign into the business strategy, it is also important to detail some possible difficulties that may arise during decision making and during implementation.

These kinds of difficulties can be solved through the participation of experts and changes in mentality towards a more innovative character, considering:

- Lack of experts in environmental issues.
- Understanding the hiring of experts as a cost, without taking into account the great benefits to be obtained in the medium term
- Difficulty to access information
    - Dealing with aspects that the company is not used to
    - There is a lack of trust from the suppliers to provide such information
- Lack of training regarding environmental aspects
- Economic cost of access to certain commercial information and documentation
- Low innovative character, which makes it difficult to implement such actions until there is no legislative requirement or by market demands.