Basic concepts on Ecodesign

Unit 2: Traditional design versus Ecodesign.

Carmen Fernández Fernández. c.fernandez@cetem.es

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.

2.1. Evolution of Ecodesign

"Sustainable development" is an expression that was firstly used in 1987 by the World Commission on Environment and Development, a commission within the framework of the United Nations.

Besides coining the expression, it's the first and most important definition was established: "form of development or progress that satisfy the needs of the present without compromising the ability of future generations to satisfy their own needs"[1].

The arrival of this new concept highlighted an important change in the conception of ideas that had been present until the sixties. Until then, Resources were considered inexhaustible. Likewise, there was no concern about the state of the atmospheric layer, water reserves, or whether our planet was capable of absorbing the enormous pollution load we were generating. Some actions were rarely taken in a preventive way only once damages were realized and verified.

However, it was in the seventies and eighties when society began to feel a greater sensitivity and consequently, the more developed countries began to legislate in these matters. Initially, this legislation was focused on limiting emissions of certain pollutants. It was in the 1980s when governments understood the need of implementing broader and stronger strategies, focused mainly on natural resources and their regulation, putting effective and far-reaching prevention measures on the table.

During the nineties, the first results of the new approach began to materialize and to be seen. The way to carry this out was through directives, which allowed the regulation of many activities, even leaving free way to each country to define them.

The first United Nations Conference on Environment and Development was held in Rio de Janeiro (Brazil) in 1992. In 2002, the World Summit on Sustainable Development was held in Johannesburg, South Africa, where a review of the commitments made in Rio 10 was made, along with an explicit recognition of sustainable development being much more than the resolution of an environmental problem, because many other factors of a different nature need to be into account. Factors that can be grouped into three major pillars: society, economy and environment.

2.1.1. The European Union and its environmental policy

At European level, the Single European Act (1986) incorporated environmental policy into the Treaty. In 1992, its scope of action was extended by the Treaty of the European Union, known worldwide as "Maastricht Treaty", and where the EEC is transformed into the EU, moving towards the process of community integration.

---

[1] World Commission of Environment and Development (1987). Our common future, Alianza Editorial.

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 2 of 9

Within the Treaty, there is a section specifying the achievement of key objectives for the Union, such as conservation, protection and improvement of the quality of the environment, human health protection, prudent and rational utilization of natural resources, and promotion of measures at international level to deal with regional or global environmental problems.

At this point, the EU launches an environmental action program, whose clear objective is to achieve the transformation of the growth model through the promotion of Sustainable Development.

This new approach clearly affects organizations and companies, as the program seeks to establish new relationships between agents involved in the process of developing products or services, deepening the concept of Corporate Social Responsibility. This concept becomes key and strategic to achieve long-awaited sustainable development.

Principles of Sustainable Development

- o **Principle of caution:** States must take measure prior to having evidences of the existence of environmental danger.
- o **Principle of preventive action:** community gives preference to prevention measures against damages, since they suppose reduced cost.
- o **Principle of correction in origin**: where it is specified that an ecological problem must be solved, primarily, in the place where it has happened, thus avoiding the possible export of environmental problems
- o **"Polluter pays" principle:** specifying that the polluter must bear the costs of prevention and elimination of pollution caused
- o **Principle of subsidiarity**: Higher level entities (international organization, State, etc.) are limited to measures that cannot be undertaken by entities from lower levels.

The Declaration of Principles for Sustainable Development of June 2005 claims that sustainable development must lead to the development of a democratic society that:

- o creates equal opportunities
- o fights against discrimination,
- o generates an eco-efficient economy,
- o breaks with the link between growth and environmental degradation
- o leads the international coordination towards a global process of sustainable development.

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 3 of 9

2.1.1.1. The General Public and their environmental awareness

While it is true that concern for the impact of human being on the environment is not new, the interest of designers in this matter is relatively recent.

The "green" decade was the eighties, known as the "green design" decade. However, this terminology is nowadays completely disused since it has been replaced by the term "Ecodesign".

In the second half of this decade, this green consciousness became fashionable, in part because of the popularity of the green political parties that managed to raise the environmental awareness of the general public.

But it was in the early nineties that design came up with a third wave of environmental ideas, with Ecodesign becoming a common trend in many European countries. Conferences and research on the subject were multiplied, with concepts such as "life cycle", "cradle to grave" and "industrial ecology".

Subsequently, a final push of environmental ideas reached the world of design, the concept of "sustainable design", proposing a constant intervention of designers in environmental matters.

All this led the 21st century started with a greater environmental awareness on the part of the designers. In the decade of 2000 there were the environmental catastrophes caused in the decade of 2000 multiplied the awareness of the general public. Such as the sinking of the Prestige oil tanker (Spain, November 2002) or the Greenpeace campaign in Copenhagen at a World Summit on Climate Change in 2009.

The 21st century has started with a greater environmental awareness on the part of designers. Although there is not a clear majority of aware designers yet, there are many them hoping to make Ecodesign a part of our lives.

### 2.1.2. Relationship between traditional design and Ecodesign

We understand Ecodesign as a design philosophy that claims the need to incorporate environmental criteria into the basic design requirements of a product, such as costs, utility, aesthetics, reliability, safety, etc.

Obviously, environmental requirements advocate consumption optimization, emissions, and all possible contamination during the life cycle of the product.

At this point, it should be clarified that Ecodesign does not address a substantial change in the traditional stages of the process of product design and development, but to provide a new point of view, considering aspects of sustainability as part of the key requirements.

Basically, the differences between the traditional design process and Ecodesign are presented in the following figure:

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 4 of 9
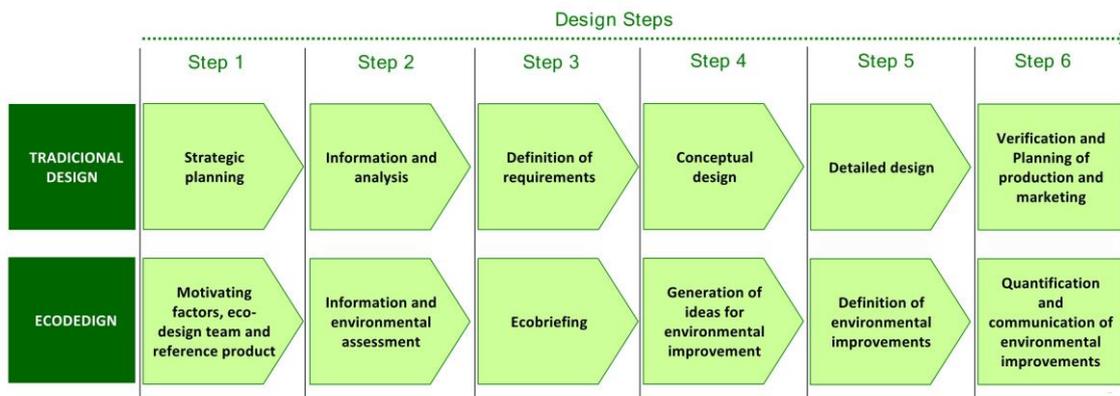
2.1.2.1. Step 1

2.1.2.1.1. Strategic planning

In a typical project of product design and development, strategic planning is the phase where the initial planning of the project is carried out, defining:

- Purpose of the design
- Need to satisfy
- Participants in the design and development process
- Project phases and schedules
- Etc.

2.1.2.1.2. Motivating factors, Ecodesign team and reference product

In addition to what is seen in the traditional design, Ecodesign proceeds to introduce a process that takes into account:

- **Motivating factors** for Ecodesign in the company: reasons why a company undertakes an Ecodesign process, clarifying two kinds of factors:
  - o **Internal factors**, which are those that come from the company, such as: increase the quality of the product, improve the image of the company, innovation, cost reduction, etc.
  - o **External factors,** which are those that come from external sources such as: legislation and regulations, market demand, response to competition, innovation of suppliers, etc.
- Composition of the **"Ecodesign team",** considering that environmental criteria will be applied. It is advisable to put together people from different departments, motivated by the fact that, in the process, aspects of a very diverse nature, such as commercial, production, logistics, etc., should be considered. Obviously, in addition to these profiles, it is recommended the participation of a technician

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 5 of 9

(that can be outsourced) with knowledge and experience in Ecodesign and environmental aspects.

- Selection of a **reference product**, which makes easier to measure and evaluate the improvement that has been made. The product will be the original (redesign) or the most similar existing (for the case of a brand-new product).

Tips for selecting a reference product:

- Interesting product by business or commercial strategy: emblematic and / or consolidated (thanks to its acceptance, by percentage of sales, the best known, etc.).

- New product of recent appearance: it may involve a more innovative product line, a new sales strategy, etc.

- More representative product: perfectly exemplifies the philosophy of the company, puts into practice the company's best-known solutions, allows you to export your improvements to other products, etc.

- Product with relevant environmental aspects: the one that is the furthest transported, the one of raw materials of more distant origin, the heaviest, the most toxic in its manufacture, the biggest generator of waste, etc.

- Best-selling product: it has the most impact on the income statement, an improvement has a very important impact, etc.

But, in addition, it is transcendental to take into account two key assumptions before selecting the reference product:

1. The **complexity** of the product, taking into account that, until having enough experience, products with a low quantity of components are preferred to facilitate their analysis and their proposals for improvement
2. The possibilities of **accepting improvements**, the product must allow changes (shape, structure, materials, manufacturing process, etc.)

2.1.2.2. Step 2

2.1.2.2.1. Information and analysis

Traditionally, in this phase we proceed to collect all the necessary information to carry out the project:

- Information about the company
- Definition of strengths and weaknesses (against competition)

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 6 of 9

- Offer
- User needs / wishes
- State of the art
- Normative
- Similar products / spare parts
- Etc.

2.1.2.2.2. Information and environmental assessment

Ecodesign, in addition, proceeds to collect all the environmental information (from both, the company and the product). With it, the corresponding environmental analysis will be carried out, which will serve to detect the stages of the Life Cycle with greater impact and those strategies that serve to carry out the improvement.

2.1.2.3. Step 3

2.1.2.3.1. Definition of requirements

In this phase, a document is carried out to establish the requirements of the product, indicating also which aspects are the most important to consider. This process is known as "Briefing" and provides information on: the context (company, trends, etc.); the product (functionalities, public, etc.); the objectives and constraints (technology, cost, regulations, etc.); the project (expected results); and deliverables (graphic documentation, models, prototypes, etc.)

2.1.2.3.2. Eco briefing

It is elaborated from the initial environmental analysis and focuses on the critical points, at environmental level, they must be minimized through Ecodesign, beside specifying in which stages of the life cycle are concentrated.

Provides information about:

- Internal environmental requirements
    o due to company policy
    o extracted from previous success stories
    o that improve the image of the product / company
    o derived from a previous process of innovation
    o suggested by workers
    o etc.
- External environmental requirements
    o legal restrictions or voluntary standards
    o as a reaction to actions taken by the competitors
    o induced by technological advances
    o etc.

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 7 of 9

2.1.2.4. Step 4

2.1.2.4.1. Conceptual design

Traditionally it is understood the conceptual design as the creative process where the alternatives or concepts of the future product are generated, being analysed with the objective to select the most promising and / or viable, that will be developed in the following phases of the process.

2.1.2.4.2. Generation of ideas of environmental improvement

In this case, the alternatives or concepts of the future product, also incorporate proposals for environmental improvements that arise from the application of the strategies that the Ecodesign proposes to us, induced by the previous phase of Eco briefing.

2.1.2.5. Step 5

2.1.2.5.1. Detailed design

Where specifications of the final product and, of course, its appearance are defined with all the necessary level of detail. During this phase, all necessary technical and graphic material is also developed.

2.1.2.5.2. Definition of environmental improvements

 Under this this transcendental phase, Ecodesign suggest defining in detail each and every one of the environmental improvements that are to be implemented.

2.1.2.6. Step 6

2.1.2.6.1. Verification and Planning of production and marketing

This verification proposes to check that all phases carried out in steps 4 and 5 meet the requirements set out in step 3.

Also, in this phase, the feasibility of manufacturing the developed design is analysed, taking into account all aspects: materials, machinery, manufacturing processes, transport, etc.

Regarding marketing, it is proposed to establish how the distribution and sale will take place, as well as what kind of promotion will be made and how it will be communicated to the stakeholders.

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 8 of 9

2.1.2.6.2. Quantification and communication of environmental improvements

Consequently, in this phase, the information and documentation of the new product (raw materials, consumption, impacts, generation of waste, etc.) will be quantified in order to re-perform the environmental assessment. The improvements obtained will be evaluated, deciding which of them are finally implemented.

Decision will be also taken about the development and use of possible means of accreditation and communication, such as eco-labels, environmental declarations, certifications, etc.

Basic concept on Ecodesign
Unit 2: Traditional design versus Ecodesign
Pag 9 of 9