

ECODESIGN - ONE OF THE PILLARS OF THE CIRCULAR ECONOMY

Authors and date

- Submitted on: June 30th 2021
- Julie Orgelet - [DDemain](#) - LCA and digital responsibility consultant
- Frédéric Bordage, GreenIT.fr collective

DEFINITION

Ecodesign is an approach that aims to reduce the environmental impact of a product or service over its entire life cycle with a multi-criteria perspective from the design phase, while maintaining its functionality and performance.

HISTORY

Talking about ecodesign means moving from a curative approach to environmental issues (we solve problems once they have arisen: we seal cracks once we have had leaks) to a preventive approach (we anticipate and evaluate the potential environmental impacts of a practice upstream in order to find an optimum between service rendered and environmental impact).

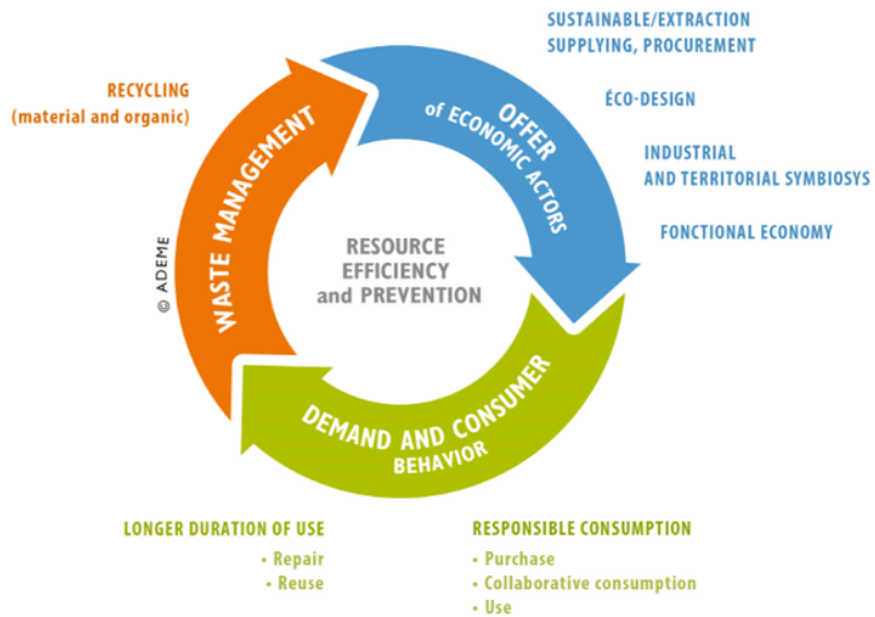
The end of the 1990s saw the development of quantitative evaluation methods for the environmental impacts of products with the development of LCA (Life Cycle Assessment). The early 2000s were marked by the concept of ecodesign, first through the ISO 14062:2002 standard and then through the deployment of the European Commission's Ecodesign Directive (2009/125/EC).

CONTEXT

In order to be truly effective, ecodesign must not be considered solely from a technical perspective, but must be reintegrated into a broader ecosystem, that of the circular economy. The circular economy is indeed composed of 7 pillars: eco-design, sustainable supply, industrial ecology, economy of functionality (EF) and responsible consumption and the extension of the duration of use and recycling.

Circular economy

3 areas, 7 pillars



Source: [ADEME](#)

APPROACH

Adopting an eco-design approach consists in integrating the environmental dimension as well as the technical dimension from the (re)design of a product or service. An eco-designed product is therefore a product that meets a need within a technical and economic perimeter acceptable to the company. It is a product resulting from a compromise accepted by the company that markets it.

In this context, we can identify different levels of eco-design:

Level 1 - Product improvement (goods or services)

Progressive environmental improvement of existing products, by working on one or more components, without major modification of the technology used. It may involve optimizing the product design process.

Level 2 - Product redesign

More in-depth and development time than level 1 to redesign the product. The concept of the product remains the same, it is a question of rethinking the architecture of the product, by developing or replacing certain parts by new ones.

Level 3 - Functional innovation

Creation of a new product concept or a new technology, changing the way the product's function is fulfilled. This is a breakthrough innovation.

Level 4 - Product/service system innovation

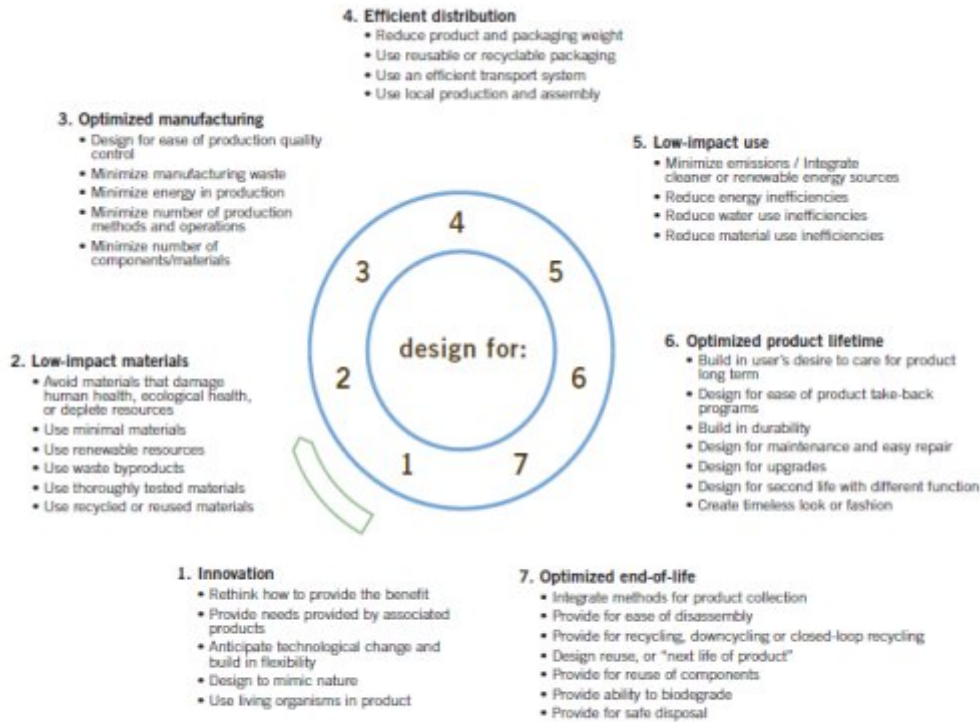
Proposing new organizations or new product/service systems. This level may require changes in the value chain, infrastructures or even a cultural change. The business model can be modified by moving, for example, from selling the product to selling a function as a service.

Level 1 to 4 - [Extrait du Guide de l'écoconception, Ademe](#)

TOOLS

Ecodesign tools are multiple and go from the checklist to the certified method such as the AFAQ Eco-conception label ¹. Among this panel we find for example:

- quantitative tools such as life cycle analysis
- qualitative tools such as:
 - checklists
 - practical guides
 - the wheel of ecodesign strategies formalized by Okala ²
 - the wheel of ecodesign of services proposed by the ecodesign cluster in its guide Ecodesign of Services ³



Modified from the original from Fin Sirenit, Technical University of Delft, PROMISE Manual 1994

Ecodesign strategies wheel (to be adapted to services) (Source: [pôle eco-conception](#))

AND WHAT ABOUT DIGITAL IN ALL THIS?

Ecodesign has been present in the electrical, electronic and digital equipment sector since the 2000s. Initially, it focused on end-of-life issues (in connection with the WEEE directive), and was then applied to the entire life cycle of products. Emblematic projects in this sector include Xerox printers, which were designed to be modular and sold according to a functionality economy model (charged per copy). But the ecodesign of digital services, part of GreenIT, appeared in the 2010s and has been booming since 2018.

Applied to digital, ecodesign aims to offer digital services with less impact on the environment throughout their life cycle. Thus it is about delivering services that run on a more frugal infrastructure and older terminals in order to limit their renewal by limiting the need for CPU, RAM, bandwidth and any other parameter that could be the cause of overconsumption.

In order to develop eco-design projects, various tools and guides exist (see [concept sheet "Measurement for ecodesign"](#)).

SOME EXAMPLES OF ECO-DESIGNED PRODUCTS

Preamble: The best product is the one we don't make

Ecodesign is to be used as a last resort when existing solutions are not satisfactory or no longer work.

The Neufbox Evolution ⁴

SFR has set up a complete ecodesign project, integrating all the phases of the product's life cycle:

- Manufacturing:
 - Reduction of raw material quantities
 - Miniaturization of components and reduction of their number
 - Reduction of the number of cables
- Distribution:
 - Reduction in packaging size and amount of plastic
 - Exclusion of air transport
- Usage:
 - Reduction of energy consumption
 - Addition of a button to turn off the box and disable the wifi visible and accessible
 - Addition of an eco mode
- End of life and reparability:
 - Increased lifespan by choosing more resistant materials
 - Facilitation of repair and reconditioning
 - Increased lightning resistance
 - Increased recyclability

The Fairphone ⁷⁸

FAirphone is a pioneer company in proposing a more ethical digital and in accordance with environmental issues. Their approach also integrates the entire life cycle:

- Manufacturing
 - Identification and choice of components from sustainable sources (no conflict minerals or child labor)
 - Proper remuneration of the entire value chain
 - Robust and modular design to facilitate sub-assembly changes

- Elimination of unnecessary accessories: charger, earphones... available only on request
- Distribution
 - Packaging only in cardboard
- Usage
 - Work on battery life
 - Update of the operating system to allow an increase of the life span
- End of life
 - Take back system for the old equipment
 - Increased demountability through the principle of modularity
 - Repairability index of 8.7
 - Official I-fixit tutorial available to repair yourself

Fairphone's offer can be made even more sustainable by a purchase according to the economy of functionality model which guarantees the repair and upgrade of smartphones, as proposed for example by the Commown ⁹ cooperative.

DELL's eco-design program¹⁰

Manufacturing - Reuse of materials from old DELL products - Use of recycled gold in motherboards - Use of recycled carbon fiber from aeronautics waste in laptops.

Usage

- Reduction of energy consumption for servers (-78% compared to 2012) and for laptops (-72% compared to 2012)

End of life

- Increased recyclability
- Provision of end-of-life services

It should be noted that some of these improvements are largely driven by regulations and market constraints. Indeed, the European Commission's EcoDesign Directive or ErP Directive (2019/125/EC) is behind the obligation of standby and off modes as well as the limitation of energy consumption. The next version of the directive will introduce constraints on recyclability and repairability (constraints on the availability of spare parts) and water consumption in particular.

EXAMPLES OF ECODESIGN OF DIGITAL SERVICES

Facebook Lite ⁵:

Facebook has developed a lite mobile version "Facebook lite" that meets ecodesign criteria:

Facebook Lite includes only the core Facebook features. Facebook Lite uses less data and takes up less space on your cell phone. Facebook Lite works on all networks, including 2G connections.

Facebook Lite installs faster and loads your screen faster."

Chalkboard Education ⁶:

Originally, this application is intended to allow young Ghanaians to access online courses. For this, it was necessary to deal with users who do not have the latest devices and for whom the internet connection remains expensive and unreliable. The solution is therefore a light application that works even offline.

CONCLUSION AND LIMITS OF ECODESIGN

Ecodesign is a holistic approach to continuous improvement that can be applied to all sectors of activity. It has therefore naturally been applied to the digital sector, which is omnipresent and whose environmental impacts are increasing.

Eco-design means reducing our impact on the environment for an equivalent service.

But beware of the rebound effects! Having an eco-designed application can, for example, encourage us to have more applications and thus to spend more time on our smartphones and equipment!

Ecodesign without adopting a sobriety posture is not a sustainable solution to the environmental crisis today. It would rather be a matter of eco-design within the planetary limits.

Moreover, it is necessary to broaden this notion to integrate social and societal aspects such as digital accessibility, respect for privacy, diversity, an "easy to read, easy to understand" approach, ethics, etc. It is then a question of responsible digital design.

BIBLIOGRAPHY

- Francois Xavier Ferrarri. L'histoire de l'éco-conception [online], 2021 [27/09/2021]
 - Episode 1 : L'histoire de l'éco-conception [1 / 3] : 1970, la génèse, available on [linkedin](#)
 - Episode 2 : histoire de l'éco-conception [2 / 3] : 1990-2000, la "French (eco)Touch", available on [linkedin](#)
 - Episode 3 : histoire de l'éco-conception [3 / 3] : 2021, de la nécessité d'une nouvelle conception du Monde, available on [linkedin](#)
- Christophe Abrassart. La naissance de l'éco-conception Actors, reasoning, steering issues and horizons of an industrial rationalization (1990-2010) [online]. Thesis, 2011. Available at [Hal](#) [27/09/2021]

- Les normes d'écoconception : Pour une transition de nos moyens de production et consommation, 05 juillet 2018. Available at avnir.org
- Guide pratique de l'écoconception - Vers de nouveaux modèles économiques, Ademe, 2016. Available at bourgogne-franche-comte.ademe.fr [27/09/2021]
- Hélène Teulon. Le guide de l'éco-innovation - Eco-design to gain competitiveness. Eyrolles, 2014.
- Le Guide éco-conception des services, 2020, pôle écoconception. Available at eco-conception.fr [27/09/2021]
- Site designs étiques, <https://designersethiques.org/> [27/09/2021]
- Baromètre Ecoconception 2020 - Pratiques et positionnement des entreprises françaises, ADEME, 2020. Available at librairie.ademe.fr [27/09/2021]
- Analyse des bénéfices économiques et financiers de l'écoconception pour les entreprises, ADEME, 2017. Available at librairie.ademe.fr [27/09/2021]

SOURCES

1. AFAQ Eco-conception, Afnor, <https://certification.afnor.org/environnement/afaq-eco-conception> ←
2. Okala practitioner site, Integrating Ecological Design, <https://www.okala.net/> ←
3. Eco-conception de service numérique - Note de synthèse, 2018, Pole ecoconception. Available at eco-conception.fr ←
4. SFR: Neuf box Evolution, eco-conception.fr, <https://www.eco-conception.fr/exemples/h/sfr-neuf-box-evolution.html> ←
5. Description of facebook lite in the help section of Facebook, https://fr-fr.facebook.com/help/127818775533783/?locale=en_GB&maybe_redirect_pol=true; ←
6. Une application qui sauve des vies... et change la nôtre, 24joursdeweb, 2019, <https://www.24joursdeweb.fr/2019/une-application-qui-sauve-des-vies-et-change-la-notre/> ←
7. Histoire du Fairphone. Available at www.fairphone.com ←
8. Life cycle assessment of the Fairphone 3. Available at www.fairphone.com ←
9. <https://commown.coop/> ←
10. DELL Technologies: Our 2020 Plan Achievements. Available at corporate.delltechnologies.com ←