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ECODESIGN

A few concepts and feedback

BeMed Business Club
Technical sheet
April 2024

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ECODESIGN

BeMed Business Club technical sheet - April 2024

With a view to combining scientific and industry expertise, the members of the BeMed Business Club studied an emblematic case of eco-design. The subject brought together concrete issues common to the various member companies of the working group (WG). The study was carried out between 2021 and 2022.
The aim of this technical sheet is to highlight the importance of eco-design in reducing the use of plastics, using a practical example. It incorporates feedback on the lessons learned during the ecodesign case study.

[Summary]

What is ecodesign? Definition and issues

An initial definition of ecodesign

Ecodesign is an approach that takes into account environmental impacts from the design and development of the product and integrates environmental aspects throughout its life cycle. It is legally defined in the 2018 standard XP X30-901[1]:

It is an approach that is both:

- preventive (reducing environmental impacts),
- trade-off (between quality of use and between economic and environmental costs),
- and comprehensive (multi-stage, multi-criteria and multi-actor approach)[2].

Why use ecodesign to reduce plastic pollution?

While plastics can be used to meet health, regulatory, industrial and economic challenges, they are not without negative effects. When plastic consumption increases, so does the environmental impact on ecosystems and health.
In order to curb plastic pollution, it is essential to act at source. Ecodesign can involve rethinking products by limiting the use of single-use plastic or plastic in general, but also improving the end-of-life of products that have become waste[3].

Define the scope of the study and the type of approach

There are two main types of ecodesign approach[4] :

- **Exhaustive ecodesign**: this involves an overall assessment of the product's entire life cycle and all its environmental impacts. The aim is to find design options that minimise/reduce the main environmental impacts.
- **Selective approaches**: This involves the search for options aimed at resolving one or more of the environmental impacts identified.

➡ *This is what was done in this case study, where the focus was on minimising plastic pollution..*

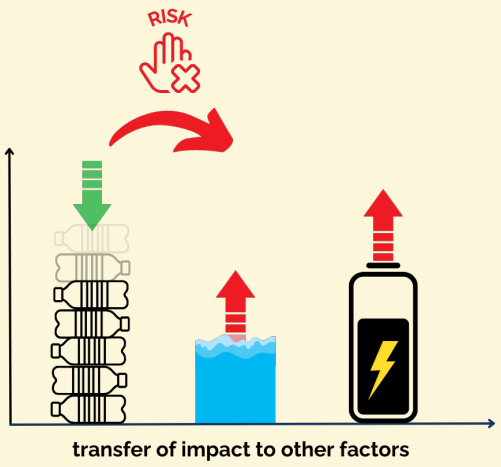
It should be noted that the transfer of impacts must be avoided when implementing these two approaches. The environmental gains achieved must not be at the expense of other environmental aspects.

Focus on the risk of impact transfer

Impact transfers occur when **an improvement in one category of environmental impact, at one stage of the life cycle, leads to an increase in the negative effects on another stage of the life cycle or on another category of environmental impact[5].** It is essential to take these risks into consideration to ensure the effectiveness of your eco-design approach.

➡ *Example of **shower caps** at the InterContinental Marseille - Hotel Dieu :*

As part of the **pilot project "Towards a 0 single-use plastic hotel"**, simplified life cycle analyses (LCA) highlighted the risks of transferring impacts on the replacement of single-use plastic shower caps (PUU) by a reusable alternative **due to the composition and washing of the reusable cap.**
For there to be an environmental gain and to avoid these transfers of impacts, the caps would have had to be used at least 250 times. This hypothesis was unlikely to be realised in the context of a hotel, which is why the alternative was discarded..



Four different levels of ecodesign and rethinking

Ecodesign can be divided into several levels of reflection and questioning. Thus, the following are considered to be ecodesign[6] :

- **Incremental improvement**, which aims to improve the environmental performance of elements/sub-parts of an existing product or service, without major changes to the product architecture or service management. This is the case, for example, when the mass or material of a component is optimised.

  ➡ *For example, switching from plastic brushes to wooden toothbrushes.*

- **Redesigning the product or service**, which does not aim to rethink a single aspect, but to review the product or the way in which the service is provided more broadly, or even to question the specifications with regard to the actual use of the product.

  ➡ *For example, as part of the pilot project at the InterContinental Marseille - Hotel Dieu, making certain welcome products available in rooms on request has meant rethinking the work of certain teams. While housekeeping teams were previously responsible for ensuring that the products were available, it is now the room service teams who are responsible for delivering them to customers who request them.*

- **Functional innovation,** which aims to create a new product concept (breakthrough innovation) or service. In this case, it is the way in which the product fulfils its function that is changed.

- **Product-service innovation**, which occurs when we move from selling the product to selling its use (the owner of the product is no longer its user).

Please note! It is important to take into account the entire life cycle and multiple environmental indicators to avoid transferring impacts.

▶ **Focus on the Collège BeMed case study:** single-use flexible multi-material sachets

A limited scope: reducing plastic pollution (while keeping in mind a global vision and without transferring impact).
We have focused our search for solutions on three issues, responding to the different levels of ecodesign :

- **Direction 1** : Keep the single-use sachet and reduce its environmental footprint. In this orientation, we were tackling the first level of eco-design. For example, we asked ourselves how to reduce the use of our object of study? How can we reduce losses along the life cycle? How can we optimise our packaging?

  ➡ *Example: improving the recyclability of packaging on production lines.*

- **Direction 2 :** Meeting needs without single-use packaging. In this orientation, it is the second level that has been explored: how can we fulfil the functionalities sought by reviewing the use of the product?

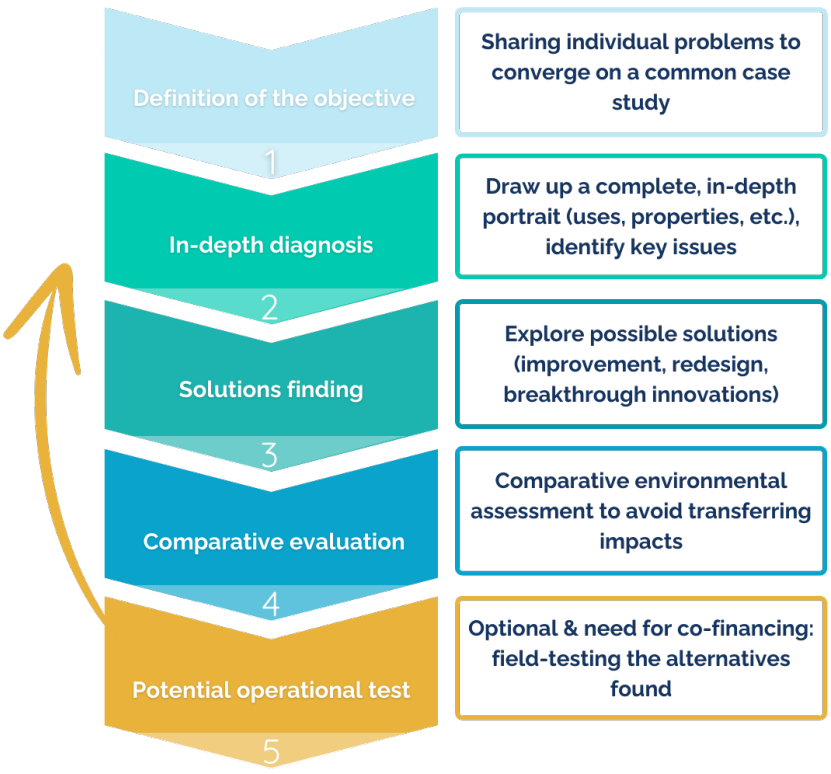
  ➡ *Example: do away with single-use samples in plastic packaging and offer customers qualitative experiences..*

Methodology

For our case study, we chose to apply the following methodology:

1) **Establish the framework for the ecodesign approach and define the object of study,** prioritising the product/packaging to be worked on.
2) **Carry out an in-depth diagnosis** by asking questions about the product's purpose, the technical characteristics of the product and packaging, the steps that led to this choice, and the reasons why ecodesign work is being carried out on this product. It is during this stage that a qualitative or, ideally, quantitative environmental analysis is carried out to identify the "environmental impact/life cycle phase" hotspots.
3) **Look for solutions based on the objectives set.** For example, in our case: do we want to reduce the amount of plastic used in the product? do we want to move towards fair packaging? do we want to question the model or the usefulness of the product? This phase encourages creativity and a deepening of the ideas that have emerged.
4) **Carry out a comparative environmental assessment** of the product studied and the solutions identified, to avoid transferring impacts.
5) **Carry out an operational test:** Once the solution has been found and the environmental assessment has been completed, it's time to carry out an operational test to benefit from feedback on the deployment of the solution.

Note that an ecodesign approach is a process of continuous improvement. Once we have reached the final stage, it is important to keep trying to improve it.



Schematic presentation of the methodology used in the "single-use plastic bag" case study.

Step 1 - Setting the framework for the ecodesign approach & defining the object of study

Before embarking on any approach, it is essential to set out the framework. An ecodesign approach is no exception to the rule. Two things therefore need to be defined: the object of study, and the methodology and approach to be followed.

Choosing the subject of study

Ecodesign is a time-consuming process, so it's essential to clearly identify the product or service to be studied. When you want to work on several products or services, it can be useful to **prioritise** them before embarking on the process. Here are a few examples of prioritisation criteria: a product that is emblematic of the company, changes in regulations, a problematic subject with considerable room for manoeuvre, etc.

This process is an opportunity to look at the product or service as a whole for the first time, and to obtain a clear and complete picture of the object of study. Here are some questions to ask yourself:

- **What constitutes the product or service?**
- **What are the use(s) and properties required of the product or service?**
- **What issues are you currently facing?**
- **What ecodesign steps, if any, have been taken in relation to it?**
- **Are any solutions already being tested?**
- **What is the company's ambition and room for manoeuvre?**

Defining the methodology

Once the object of study has been defined, it's time to lay the foundations of the methodology to be applied. To define the framework of your ecodesign approach, it's important to ask yourself a few questions:

- **Are you going to carry out a global or specific analysis?**
- **How ambitious are you going to be? Be ambitious, now is the time to define how you are going to reduce your environmental footprint as much as possible!**
- **What resources do you have at your disposal?**
- **Do you have a time limit? etc.**

The ecodesign approach covers several levels (see page 4). However, it is not necessarily wise to define "a priori" the level of ecodesign that will be implemented. The search for solutions phase should enable all levels to be explored (divergence phase), then the assessment of environmental benefits and technical and economic feasibility should enable the most relevant ecodesign guidelines to be selected and deployed as a priority.

Focus on the Collège BeMed case study: the small single-use multi-material sachet

The specifics of our case study: purpose and scope

The object of our study was **a small single-use multi-material sachet**, which the 4 companies taking part in the WG need in large quantities, and which must comply with food contact and barrier property standards. It fulfils a number of functions: it introduces people to a product, triggers the act of buying the product, makes it possible to consume it on the move and to have single doses.

Should we talk about "plastic" or "polymer"? This was one of the questions we asked ourselves when working on the small multi-material single-use sachet. We decided to talk in terms of polymers, bearing in mind that it's not just the product/packaging, but also the glues, additives, varnishes, paints, etc., all of which influence the biodegradability and impact of the plastic.

The specific characteristics of the packaging-product pair[7]

When considering a packaging change, **it' s important not to look at the packaging alone, but at the pairing it forms with the product it packages**. This is referred to as the product/packaging pair. The latter is characterized by specifying the different packaging elements, and for each of these elements, we need to know the materials used, as well as the unit weight and dimensions.

The aim of ecodesign is to find the best balance between protecting the product and reducing the environmental impact of the packaging, by finding the right packaging and avoiding over-quality.Translated with DeepL.com (free version)

Step 2 - Carrying out an in-depth diagnosis

Once the product or service that will be the object of the ecodesign approach has been defined and characterized, it's time to begin the in-depth diagnostic stage, which will focus on the functional and environmental technical characteristics (ESQCV Matrix, LCA, etc.) of the product or service, and on its life cycle. This is the time to discover all the facets of your product or service.

Why carry out an in-depth diagnosis?

This diagnosis allows us to examine the initial product, starting from all its characteristics and the reasons that led to the use of the product and its packaging. This diagnosis enables us to understand our product in all its dimensions, so that we can develop an effective and relevant product evolution.

The information gathered at this stage will be useful for drawing up specifications when looking for the most suitable alternative, as well as for identifying the problems encountered during the search.

How do you carry out an in-depth diagnosis?

Carrying out an in-depth diagnosis is an opportunity to question the targeted product or service, whether it's its composition, its uses or its raison d'être. In our case, we asked ourselves these three questions, specific to our object of study, the small multi-material single-use flexible sachet:

What is the product's purpose?	What are the packaging's technical features, and what steps led to this result?	Why do we want to work on the ecodesign of our product?
Several points stood out: recruiting new consumers and leading them to the act of buying, nomadism and the practicality of the "one dose" format.	The flexible sachet's content and mode of distribution subject it to numerous mechanical and barrier constraints. The sachet is also a communication tool for companies.	In the case of the flexible sachet, several objectives stood out: anticipating regulations, improving end-of-life, limiting the use of PUU, and limiting the use of plastic more generally.

In the case of packaging, it is key to understand **which functions are essential and which are superfluous**.
To identify priority functions, it may be useful to list and prioritize all packaging functions, or to use the MoSCoW method [8] for example.

M : *Must have this* : Identify the critical, non-negotiable points that need to be addressed as a priority.

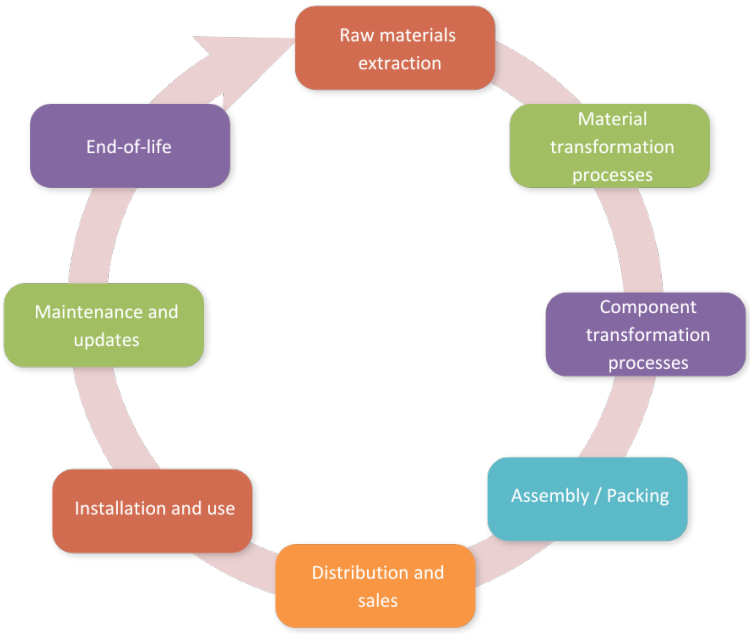
S : *Should have this if possible* : Identify value-added points that should be addressed wherever possible.

C : *Could have this it does not affect anything else* : Identify additional comfort requirements.

W : *Won't have this time but would like in the future* : Identify points not included in the project, but to be addressed later.

For the most important functions, we need **to determine the level of demand placed on the packaging and consider ways of lowering this level**. For example, would it not be possible to reduce oxygen and water protection requirements by reducing the use-by date?

Taking the life cycle into account



For an ecodesign approach to be complete, the entire life cycle of the product/service must be taken into consideration. For each stage of the product's life cycle, you need to ask questions about raw materials, production sites, use of water and pesticides, transport, etc. At each of these stages, the main sources of environmental impact will become apparent, and you'll be able to assess the environmental impact of your product.

At each of these stages, the main sources of environmental impact will appear, enabling you to understand the product's environmental impact.

Focus on identifying a product's purpose: adapting the 5 Whys method[9]

The 5 Whys method is traditionally used to quickly and easily identify the reasons for a problem. In our case, we have adapted the method to go back to the "deep" purpose of our object of study, starting not from a problem, but from the first reasons identified.

The method consists of asking the "why" question five times, remaining as factual as possible, avoiding deductions or suppositions, and limiting ourselves to controllable causes.

- **The first step is to identify the problem encountered.**

In our case: the use of single-use multi-material flexible sachet consumed in very large quantities and not being recyclable.

- **The second step is to ask "Why?**

Note that when faced with a problem, there are often multiple causes. You can therefore end up with a "cause tree" and for each cause identified, you can again ask why.

This method can help identify the reasons why the product or service is used.

Step 3 - Finding solutions

Now that the problems encountered have been identified, it's time to find ways of solving them. Different phases can be organized to find the most appropriate solutions.

- **Creativity and divergence phase**: during which the aim is to generate as many ideas as possible, without setting any limits.
- **Convergence and prioritization phase:** during which the number of ideas is reduced by prioritizing solutions via economic, technical and environmental criteria.
- **Phase of concretization:** during which the implementation of solutions is approached in a pragmatic way, this is the opportunity to tackle the operationalization of ideas.

A few tips for organizing the creativity phase

The creativity phase is an opportunity to bring together **a wide range of people with different perspectives on products or services** (e.g. marketing, technical, logistics, etc.) to cross-fertilize ideas. It's also an opportunity to bring in **outside experts** on certain technical points requiring clarification.
However, during this phase, it is important **to have safeguards or guardians of ambitions** to ensure that limits to creativity are not consciously or unconsciously set (e.g. compass p.11).

This creativity phase can be organized **around the life cycle of the product or service and the reduction of impacts at each phase of the life cycle, or around alternatives and model changes to the product or service**.

Prior to and/or at the end of the creativity phase, it may be useful to benchmark the solutions deployed by other companies to address the problem at hand. Note that doing this benchmark before or after the creativity phase has its advantages and disadvantages.

- Doing it beforehand means you don't have to spend time imagining ideas that already exist, so you can focus on the rest. However, this can be a hindrance to creativity.

- Doing it downstream of the creativity phase, may allow you to fill in the results with potential existing ideas that hadn't been mentioned, but you may have devoted energy to an already existing solution.

A few tips for the convergence phase

This stage is crucial, because after the creativity phase, many solutions are put on the table. Now it's time to prioritize the ideas so that the most relevant ones are clearly identified.

Please note that it is important to avoid impact transfer, from one impact category to another, or from one stage of the life cycle to another. For example, replacing the single-use, multi-material flexible sachet with an alternative that requires more water resources, or has a more energy-intensive production phase, is not a sustainable solution and would constitute a failure of the ecodesign approach.

A few tips for the implementation phase

For each possible solution, it's important to ensure that it's well detailed. You can set up "action sheets" grouping together several headings that will cover this entire phase:

- Description of the action in a few words
- Definition of the action's objectives
- Implementation of the action: the main stages, the scope of the test, the partners to be involved, the necessary equipment/logistics, communication, the referent for the test project, etc.
- Inticipating expected benefits and risks

Prepare the assessment: criteria to be evaluated, indicators set up, etc.

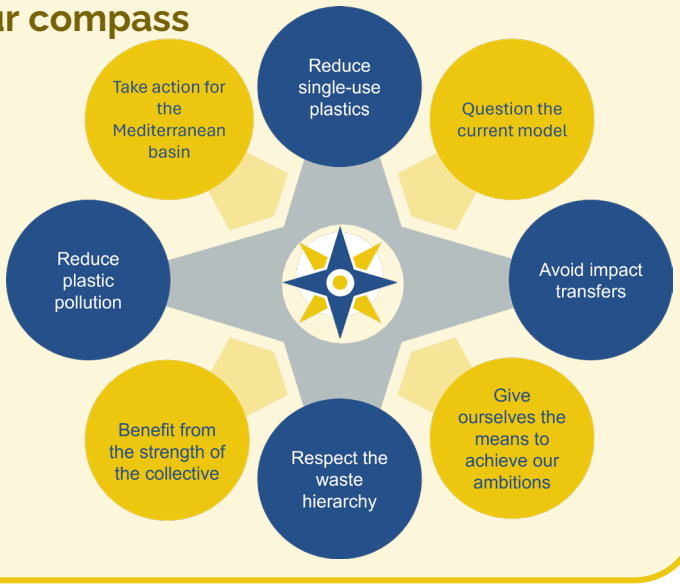
Focus on a collaborative workshop: the innovation sprint

An innovation sprint is a collaborative tool for generating solutions and ideas over a predefined period. For this type of workshop to be effective, you need to gather around the table a variety of profiles, from technical to marketing, so that points of view and ideas can be compared.

To organize such a workshop, you need to clearly define and detail the issues to be studied and list the various indicators to be assessed. Finally, you need to plan the next steps at the end of the workshop.

Keeping our course: zooming in on our compass

As part of our case study, we have set up a compass grouping together the 8 major principles we have set ourselves to achieve our three objectives: **(1) to reduce our plastic consumption wherever possible**, **(2) to go in search of the "right packaging"** and **(3) to question the model to reduce SUPs**. This compass ensures that we don't lose sight of them once we get going.



Step 4 - Carrying out an environmental assessment

Carrying out a comparative environmental assessment is an essential part of an ecodesign approach, in order to avoid transferring impacts and to ensure that alternatives or avenues for improvement are indeed beneficial from an overall environmental point of view. It must be carried out under the same conditions for the product or service, and for the alternative(s) studied.

The comparative environmental assessment takes place after the solution-finding phase of an ecodesign approach and helps to prioritize the solutions to be implemented. Depending on the level of ecodesign targeted by the solution and the desired degree of complexity, the assessments to be carried out will differ.

The preferred approach to environmental assessment is Life Cycle Assessment (LCA), in accordance with NF ISO 14040-14044, which is the most robust method from a scientific point of view, notably enabling the detection of transfers between impact categories and between life cycle stages. It can be more or less detailed, depending on the means and objectives of the study. The disadvantage of this approach is the effort and level of expertise required to implement it. Depending on the context, we can therefore call on alternative approaches described in the literature[10].

Step 5 - Putting solutions into practice

Finally, once the comparative environmental assessments have been carried out, it's time to implement the **best solutions** in order to test them in the field and gather customer feedback following their deployment.

This stage does not mark the end of the ecodesign process, however, as it is part of a **continuous improvement process** designed to reduce the environmental impact of products and services as much as possible. That's why it's a good idea to set aside some time to take a step back from the solutions deployed, so as not to miss out on a new potential improvement and start the process all over again.

Appendices

Contact

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Sources and resources

(1) Eco-design is the systematic integration of environmental aspects into the design and development of products (goods and services, systems), with the aim of reducing negative environmental impacts throughout their life cycle, for equivalent or better service rendered (Adapted from ISO 14006:2011). This field may concern the "design of a product, good or service, which takes into account, in order to reduce them, its negative effects on the environment during its life cycle, while striving to preserve its qualities or performances". This field also covers elements relating to eco-efficiency, products and processes. XP X30-901 - October 2018 (lien)

(2) "Ecoconception guide pratique d'une démarche responsable", CGPME, ADEME (lien)

(3) "Les bénéfices de l'écoconception pour les entreprises", ADEME (lien)

(4) "Ecoconception guide pratique d'une démarche responsable", CGPME, ADEME (lien)

(5) "Les principes de l'écoconception", Pôle éco-conception (lien)

(6) "Recommandations pour un diagnostic emballage", ADEME (lien)

(7) "La méthode MOSCOW pour définir les priorités d'un projet", ManagerGo! (lien)

(8) "Méthode des 5 pourquoi : Le guide pratique en 3 étapes", Everlaab (lien)

(9) "Panorama des outils d'évaluation et d'amélioration environnementale des produits", Pôle éco-conception (lien)

This fact sheet is based on contributions from Carole Charbuillet, Stéphane Bruzaud, Jean-Marc Meurville, Jean-François Ghiglione, Joachim Jusselme and others..