

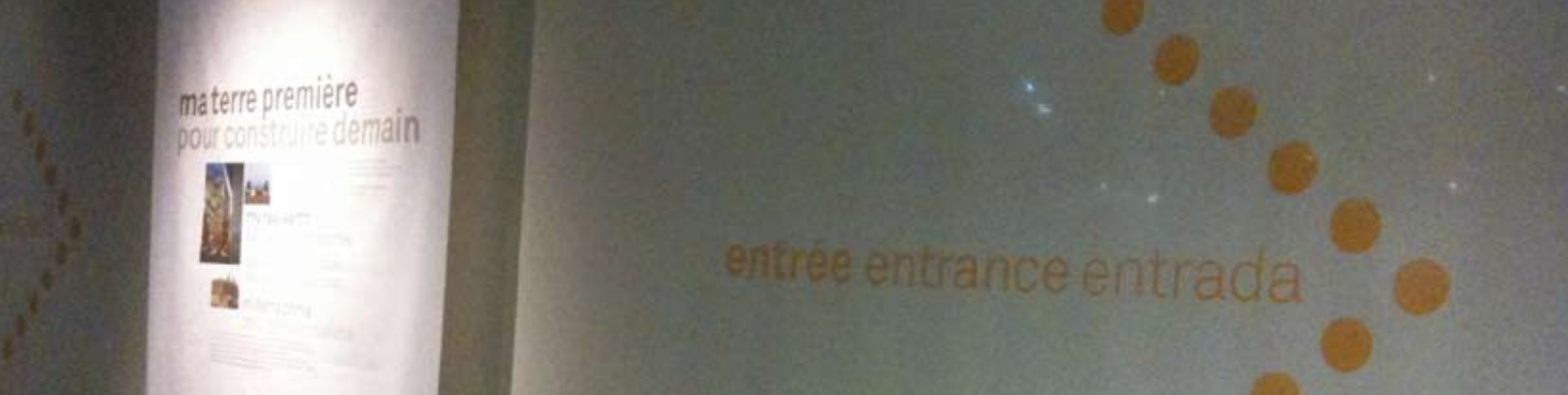


Exhibition Ecodesign Handbook

Made in collaboration
with Artemia
www.artemia.org

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Introduction

Sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.



The implications underpinning sustainable development are universal. The wholesale pollution of water, air and soils, the daily erosion of biodiversity, waste and energy concern us all and jeopardize the survival of our civilization, as it stands, that is. In order to meet those challenges, it is important to address all the components of our societies and their ecological, social and economic interactions.

“Eco-design”, whose goal is to reduce the “ecological footprint”^{**} resulting from the making of a product, focuses in on the environmental dimension of sustainable development. However, to be “eco-efficient”, it needs to incorporate a new global mindset in which the three dimensions of sustainable development are consistently interacting.

The world of exhibitions is now becoming aware that its daily activities can contribute to these major ecological disorders even though the record is not as obvious as in other more directly impacting industries. But the great construction site of the 21st century which involves reconciling our model with its natural environment cannot withstand any inconsistencies and partial solutions. Every sector of our economy must engage in crafting a two-tier plan of action, which includes reviewing its current practices and their ecological impact and then taking concrete measures in order to gradually but significantly reduce them.

As to the “ecological footprint” of an exhibition, it is tremendous when considering the entire production line from cradle to grave. Travels and CO2 involved, energy and materials used to design the devices and produce the materials which in turn will produce the museographic features, paints, prints, inks, papers, waste, incineration, landfill, recycling, etc.

But the windows of opportunity are on a par with those impacts. If each and every participant addresses the issues at stake and engages in various alternative solutions, exhibition professionals can embark on the eco-design path without compromising all the objectives that they must achieve in terms of creativity, esthetics and coordination of cultural projects.

^{**} The ecological footprint is an indicator which measures human pressure on nature. It is a tool that evaluates the productive area needed to meet its consumption and waste absorption needs” WWF.

SECTION

Phase-by-phase guidelines

The eco-design of an exhibition aims to reduce its impact on the environment at every step of its lifecycle while retaining its serviceability and complying with all the specific constraints of our lines of work (communication, esthetics, economic viability, security standards, etc.)

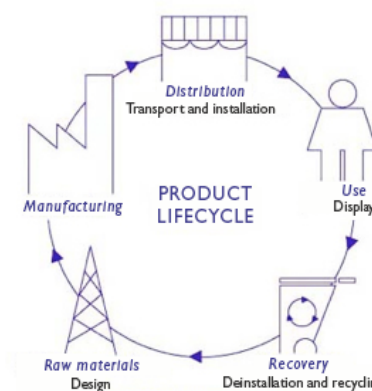


Fig. 1: Lifecycle of an exhibition. Based on the book by T.Kazazian, “Il y aura l’âge des choses légères”

This mainly involves suggesting avenues of improvement for reducing the overall “ecological footprint” of our exhibition projects.

The lifecycle approach is critical because each step and component impacts the environment and contains an optimization potential, ranging from the choice of the concept, media, materials and manufacturing processes as well as end-of-life recovery.

This approach offers a wider perspective on the potential of the product, its future, its end of life and the value that can be leveraged into the cycle of another product.

The environmental dimension must be incorporated from the start, just like the other criteria including cost, quality, technical feasibility, comfort and public expectations, esthetics and compliance with standards.

All these criteria must be considered in concert as sustainable development is “compromise science” and the trade-offs are common practice.

AN ECO-DESIGNED EXHIBITION = 3 MAIN PLAYERS

<p>The Contractor who sets goals and plays a key role through their involvement and will to incorporate sustainable development both on the design level – themes and media choices of the exhibition – and on the material level – construction of the exhibition.</p>	<p>The designers and project managers who take the goals into consideration, and thus must keep abreast of the goals and propose solutions in response.</p>	<p>The companies which put together the exhibition and must be able to meet the specific constraints of the technical specifications and deliver on environmental issues.</p>
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Accordingly, in-house monitoring as well as the training of and outreach to internal and external contributors prove critical.





1.1 Producing an ecodesigned exhibition phase by phase

Eco-design is a global process which must be addressed throughout the lifecycle of the exhibition.

At each stage, the project manager must ensure that the choices are defined, measurable, passed along and enforced. To do so, it is not only necessary to set goals but also to be able to formalize the most appropriate choices and measure their impact.

a) Design phase

► Evaluating the environmental profile of the exhibition and setting new goals to be reached using eco-design targets (section 2)

A target hierarchy can be defined as well as performance levels to be reached based on the “environmental profile” selected for the project. It is not necessary to address each target or aspect suggested but to make realistic choices related to the potential and specific features of each project. The weighting criteria and the prioritization of these are the two major factors which, from the start of the project, can help single out the eco-design options to be considered and pursued. Besides, choosing a technical solution does not necessarily solve the complex issue of the environmental impact and the choices are often multi-criteria.

The process

- Single out in advance the most critical impacts and stages of the lifecycle.
- Evaluate the pros and cons of the various perspectives and the margin for improvement
- Evaluate the investment and/or operation costs entailed by the various choices: invest more initially for greater economic and ecological advantages eventually.

The evaluation can be more or else comprehensive depending on the scale and complexity of the project. Specialized engineering firms can be hired to go over environmental performance.

The steps to take

► Designating a sustainable development coordinator in the project team

As mentioned in target T1.1, designating an eco-design coordinator in the project team is paramount to ensure that everyone's actions are run cohesively and secure overall consistency in terms of eco-design. Also, this can prevent duplication of effort and save time and efficiency to all.

► Planning the end of life of the exhibition early in the design phase

It is important to think ahead of the “post-exhibition” phase, that is, what will be reusable, reclaimable, changeable or recyclable. Along with a list of products and reclaimable features, the project managers of upcoming exhibitions should be kept informed with an eye to later reuse – through a common tool on the intranet including the characteristics of reusable modules, their location and availability dates.

► Ensuring that the eco-design clauses have been built into the various specifications, consultation records and contract documents

The goals set must be spelled out in the various specifications. The clauses related to sustainable development and eco-design must be mentioned in the contract documents, namely the consultations and the contracts. Target T1.4 breaks down this aspect and provides pre-written tools to incorporate into your specifications, eco-design consultation records and contracts (from design to deinstallation).

► Ensuring at each validation phase that providers' contributions are relevant to eco-design

The goal levels related to eco-design are delineated at every stage (draft, preliminary design, final design) in the various contract documents, and thus the intentions of and solutions advocated by the providers must be clearly identified and easy to evaluate.

► Informing the public about the choices and the process

As a minimum, accommodate a “generic” sign that mentions the process. This aspect can be enhanced depending on the environmental profile of the exhibition.

b) Construction phase

► Ensuring that the companies enforce the major environmental guidelines as well as those related to the project and defined through the targets

Evaluate thoroughly (using certificates, vouchers, in-person visits on the sites, etc) the implementation of the selected and commissioned eco-friendly solutions to avoid defects.

► Ensuring that the construction is running smoothly

To ensure consistency with the rest of the project, the installation sites must comply with the environmental rules including cleaning, waste sorting at the source, recycling, regulatory storage of dangerous waste such as certain paints, etc. Beforehand, those aspects will be mentioned in the agreements and contracts.

c) Operation phase

► Controlling the impacts during operation phase

- If appropriate, recover waste as the exhibition runs and offer visitors the opportunity to sort it while raising their awareness of this issue using small labels.
- Keep watch over energy consumption and attempt to reduce it by implementing energy-saving appliances (low power, release mechanism, etc).
- Fix before rebuild (to be figured into design phase): always prefer fixing over discarding. Handle maintenance of the modules optimally to make for optimal lifetime.

► List all the elements to be reclaimed and stored and update fellow project managers regularly to propose the listed elements

d) Deinstallation phase

► Ensure that what can be reclaimed (for other exhibitions or venues) will be properly taken down and adequately stored.

► Ensure that the companies enforce the general and specific environmental guidelines related to deinstallation.

► Ensure that the construction proceeds under the best conditions and that the deinstallation, dumping and recycling conditions proceed as defined in the technical specifications.

Confer with the relevant colleagues to list what is sorted and what is not and narrow down the traceability of the future of your waste. To do so, the companies that reclaim the scraps can be questioned about their disposal process such as landfill, incineration, recycling, resale, etc.

e) Recovery phase

► Evaluate performance using the “environmental sheet” featured in section 3.

In order to build a genuine dynamic and embrace of exhibition eco-design, the project manager will be requested to fill out the environmental sheet featured in section 3 below. All the rubrics must be filled out to enable continued improvement. The sheets completed by your colleagues will also serve as benchmarks because any question that arises in one project will probably arise again in a different project.

► Leverage feedback and update the monitoring system with the “update sheet” featured in section 3

Similarly, people from every line of business can write their questions, findings and pursuit of eco-designed solutions in the update sheet featured in section 3. The market for eco-friendly products is rapidly growing and this work will be essential to keep an updated and efficient handbook.





1.2 Evaluating the environmental profile of an exhibition

As mentioned above, sustainable development is compromise science, particularly in industries such as exhibitions where many more issues make the choices more complex.

To do eco-design is to first recognize that environmental impact is a choice criterion in the same way that the budget, esthetics or the coordination of cultural projects are. But the question is to figure out how to position this choice criterion in relation to the other criteria. The answer to this question is a political one and pertains to the institution's image and policy.

However, to help you delineate the “environmental profile” of a project, here is an evaluation tool that works equally for permanent, touring or temporary exhibitions. Whatever the typology of the exhibition, the profile definition is unchanged however different the technical responses might be.

Beforehand, one key criterion is obviously the theme of the exhibition. The exhibition-object is in and of itself a medium just like its contents. If the theme is about sustainable development and the environment, if the exhibition reaches out to citizens, it is essential that form is consistent with content. How to convince and engage the public if the medium itself contradicts the message? An exhibition on the environment (broadly speaking) must be designed and produced so that it meets a significant environmental profile.

Evaluation in percentage helps narrow down the scale of the environmental profile

Choice criteria	Question	Answer
1- Theme of the exhibition	Is the theme of the exhibition connected to sustainable development or can it be correlated with current issues?	Yes/No
2- Budget	Can alternative eco-friendly solutions be promoted even though they are more costly? If so, how costlier (%)	Yes/No x %
3- Esthetics/Creativity	Can alternative eco-friendly solutions be promoted even though they limit the creative potential? If so, can you assess to what extent in %	Yes/No x %
4- Technical feasibility	Can alternative eco-friendly solutions be promoted even though they make installation/maintenance/deinstallation more complex? If so, can you assess to what extent in %	Yes/No x %
Eco-design of the exhibition		4 “yes”: high. 3 “yes”: standard. 2 “yes” including criterion. 1: standard 2 or 1 “yes”: incidental.

Examples: for a future project I get 2 yeses including criterion 1, therefore I have a standard profile. If needed, I can raise the manufacturing budget by 5 % to promote alternative solutions.

Note: Criteria such as “comfort and public expectations” and compliance with security standards” are not part of the table because they are non-negotiable and priority issues. However, this does not mean that they should justify solutions contrary to eco-design.

SECTION 2

The eco-design targets of CSI exhibitions and how to reach them?

This section has two reading features. The running text gives you the necessary general information. If you want to go further, go to the features “Find out more”.

Contents

- Target 1:** Incorporating eco-design into the work method
- Target 2:** Lightness
- Target 3:** Reuse/ Optimization / Adaptability
- Target 4:** Eco-friendly choices for the materials and manufacturing and installation processes
- Target 5:** Comfort of the visit
- Target 6:** Energy management
- Target 7:** Low-pollution construction site and waste management
- Target 8:** Raising visitor awareness

Glossary of terms and acronyms used

- G.E.G:** Greenhouse effect gases causing the current climate changes (CO2, methane, etc.)
- H.Q.E:** The H.E.Q procedure concerns service-oriented buildings such as offices, public buildings, etc and breaks down the environmental quality of a building based on 14 targets, falling into 4 major rubrics including eco-construction, eco-management, comfort and health.
- E.M.S.:** Environmental management system, a term used in ISO standards.
- V.O.C.:** Volatile organic compounds (hydrocarbons, compounds made up of carbon and hydrogen) which is easily found in the atmosphere in gas form.
- 4 R rule:** waste management system standing for: Reduce/Reuse, Recycle/Recover.





Target 1 Incorporating eco-design into the work method

Implement throughout the project a management process which monitors that the eco-design and sustainable development goals of the exhibition are on track. This target depends directly on the environmental profile defined for the exhibition.

T1.1: Designating a coordinator or resource center within the project

→ *The project manager designates the eco-design coordinator.*

Eco-design is essentially cross-disciplinary and thus a person must be designated among the project team to handle the aspects relevant to eco-design. This designation should occur from the start of the project and must not run counter to the objective that everyone embraces the implications of sustainable development in the exhibition. In fact, it meets a glaring project management issue related to the very nature of eco-design, which must be addressed at an early stage and permanently to prevent duplication of effort and counterproductive effects. Efforts should be made to carry out eco-design measures in a coordinated fashion. For lack of those efforts, the goals set are likely to be compromised making the whole team's work more difficult.

T1.2: Pursuing a sustainable development policy in the design phase (travel, prints, etc)

Find out more: Depending on the environmental profile of the exhibition previously designated, the "eco-design coordinator" must have the appropriate skills. For the purposes of a technical exhibition with a "high" environmental profile, the CSI can hire an outside engineering firm.

→ *These measures will be initiated by the project's eco-design coordinator.*

To ensure that an exhibition is eco-designed, sustainable development must be figured in throughout its lifecycle. Accordingly, the design phase of the exhibition fits into its environmental record, which makes it necessary to adopt measures for reducing the project's ecological footprint from the drawing board. This involves several operations precautions relevant to:

- Travel (limit motor travel, promote distance work and alternative transportation),
- Materials consumption (limit paper prints, limit document size, resort to paper-free media).

Find out more: For more information about limiting the impact of your paper document output, check out the ADEME handbook on eco-communication available online at: <http://www.ademe.fr/Entreprises/Management-env/Approche-produit-eco-conception/Modules/eco-com/editer.htm>

T1.3: Incorporating eco-design issues across definition and programming survey documents.

→ *The project manager is responsible for incorporating these issues*

The "life" of an exhibition begins with the programming documents that define the theme, the objectives and the scope. To achieve breakthroughs with regard to eco-design, the environmental profile must be defined beforehand and all the processes to be implemented must be incorporated towards it.

Eco-design choices frequently involve a trade-off between various objectives such as financial vs. ecological, creative vs. ecological, functional vs. ecological. Thus, only formal integration of eco-design issues into the initial project, across the technical specifications, can guarantee the success of the project and a smoothly-running team.

T1.4: Incorporating eco-design issues across contract documents

The Exhibition Management/ CSI call in outside businesses at every stage of the design, construction and operation of the exhibitions. Thus, it has proven essential to at least reach out to providers, or even, if appropriate, encourage, supervise and compel them, depending on the scope of the goals that have been set.

In order to sustain competition in public bidding and ensure an adequate number of answers to your consultations, it is recommended to set up a three-step adjustable process. Of course, the environmental profile of the project will also assign priorities to one of the three stages mentioned below.

- Reach out (short term/ "incidental" environmental profile): First of all, it is essential to reach out to providers external to eco-design and the new CSI expectations in that area. Some industries have a head start on this while others are still largely unconcerned with it. It is thus necessary, as a minimum, to include an information item on "sustainable development" in all consultation documents and specifications.

Statement sample: "The EM/CSI cares about sustainable development and aims to host eco-design exhibitions. Providers are requested to indicate all the schemes that they can implement to achieve those objectives."

- Encourage (mid term/ "standard" environmental profile): In addition to the informative dimension, the Exhibition Management/CSI consultations can introduce incentives in order to empower the providers involved and monitor their introduction of eco-design targets throughout the project.

Find out more: It is highly recommended to circulate this handbook as well as to run free or fee-based trainings for the regular providers of the CSI.

This requires implementing clear and weighted choice criteria geared towards sustainable development. Just as the price and the references factor into your choice of providers for X percentage, eco-design must be unfailingly figured in as a choice criterion, by at least 10% of the assigned score.

Depending on the type of services provided, this evaluation can include: - Functioning of the organization, - A statement of intent that the provider is asked to write about their addressing of sustainable development issues in your project, - The labels and standards they may have received.

- Supervise/compel (long term/"high" environmental profile):

The completed process makes it necessary to offer providers a strict framework in order to control – in choosing contracting parties - the environmental profile of the project. This only seems possible for construction or product contracts (prints, materials supply, etc.) or standards/certifications (ISO 14001, Imprim'Vert, etc, see appendix list). This is intended to limit application opportunities only to businesses having those labels and certifications or using a specific product line (i.e target 4).

Finally, control systems during the service phase seem necessary to avoid any misuse. The payment scheduling system validates completion of the different phases and will help you integrate the implications of this handbook as a prerequisite for receiving the surveys/projects.

Find out more: This work must be performed in direct contact with the contracts department and the purchasing division in order to validate administrative compliance. Being knowledgeable about the industries and the definition of project environmental profiles will help you define which stage is best suited to each consultation.

T1.5: Updating section 3 and appendices following all the projects

In order to ensure relevance of the handbook over time, section 3 has an "environmental sheet" to be completed at the end of each project.

The appendices must also be updated as new products, materials, labels or standards are added to the current list.





The objectives are two-fold:

- Enable eco-design managers of concurrent/future projects to find answers to questions that have cropped up before without having to invest a great deal of time in them.
- Track the technical advances in terms of eco-design and enable an updating of the handbook as regulations, standards, labels and products change.

For cohesion and efficiency purposes, the eco-design coordinator will be requested to fill out this sheet and complete the appendices systematically at the end of each exhibition and incorporate them into the handbook as soon as possible.

Target 2 Lightness

Think “light” in design choices. Use materials sparingly for equivalent quality outcomes.

T.2.1: Building in lightness conceptually

The design of a “light” exhibition, that is, one that has a lower impact on the environment, involves a different way of thinking and operating. Building on a few suggestions from the book “Il y aura l’âge des choses légères”, to think light is – drawing on the way nature functions – to address:

- The notion of interdependence: what responses will any choice bring about? Am I confident of the implications of my choices? Did I figure all the facts in, economic, environmental and social?
- Optimum: figure out what is appropriately necessary. This is about necessity. Is this material or product actually necessary? The answer is not only ecological, it can be conceptual – the message conveyed matters –, esthetic
- Sheer esthetics can also be a choice criterion –, strategic, etc. What matters is to always ask the question of necessity and whether there is any less-impacting eco-friendly alternative.
- The time and cycle of objects and products: each has its own time frame, its own lifecycle. Addressing these time spans helps anticipate the ends of life.

T.2.2: Optimizing resort to materials

The most eco-friendly furniture, just like the least impacting material on our natural environment, is one that does not exist. Even eco-products harness the extraction of raw materials, chemicals and end-of-life management. In this light, to build in lightness is, first of all, to ask the question whether any material or product is necessary.

Also, limiting resort to matter can be achieved with ultimate outcomes of equivalent quality.

- In the case of furniture, for example, it is possible to :
- use thinner particle board panels,
 - not fill in chair rails,
 - limit maximum height,
 - encourage material-saving shapes.

This eco-friendly “design” thus helps save materials at the source (wood, for example) as well as the required energy to extract them and transport them to production locations. As the furniture reaches its “end-of-life”, substantial saving can again be obtained no matter if it is recycled, buried or incinerated.

T.2.3: Minimizing packaging

For semi-permanent or touring exhibitions alike, it is critical to consider packaging products/ furniture/materials in advance. This packaging fits into the transport and delivery of the product as well as its operation. Accordingly, early in the design phase, it is necessary to design products/furniture/materials that do not require any major packaging or wrapping or even can dispense with it altogether.

T.2.4: Leveraging the volumes to facilitate transport (touring exhibitions)

In the case of touring exhibitions, the environmental impact of the project includes GEG emissions caused by transport. Thus, the shape of the designed furniture or material must be worked out towards limiting the overall volume

of the exhibition and, in the process, the necessary volume to be transported. By designing modules that can fit together or overlap or by providing removable materials, you contribute to limiting the number of vehicles needed for the transport and weight of the overall project. Similarly, you can scale the volume of the packaged exhibition to the dimensions of the truck planned for transport by considering its capacity early in the design of the project.

→ *The carbon* footprint will be better for it.*

* Carbon footprint: Instrument measuring greenhouse effect gas emissions direct or caused by an activity (economic or other) or an area, developed by ADEME. The Carbon Footprint makes it easy to keep a “carbon record” in accordance with public rules (the methodology and emission factors handbooks can be downloaded on the ADEME website) and current standards (for example ISO 14064).

Target 3 Reuse/Optimization/Adaptability

Reducing the consumption of materials and energy by resorting less to new and disposable materials.

T.3.1: Optimized reuse of existing and recovered materials or features

Designing and building furniture materials requires considerable human and material energy as well as significant economic resources. Offering identical exhibitions built to a standard is not a valid option but resorting more to existing modules probably is.

This work includes several steps:

- 1-** Studying practices and planning the gradual transition from the disposable to the durable. The first step is to review, over a year for example, all the furniture needs of the designed and constructed exhibitions. This study will help give you an overview of your furniture needs and determine feasible recommendations in terms of reuse.
- 2-** The necessity to find appropriate storing locations and/or the management of a tight schedule. If you consider reusing the existing furniture in an optimal fashion, it will necessarily require creating suitable storing locations as well as computerized management of a strict use schedule. This will enable project managers and architects/scenographers to plan ahead of time the furniture that they might have and thus to determine their schedule and contracts accordingly. Once this work is completed – from the start of the project – it is necessary to check on available stocks and plan however much can be reclaimed or reused.

T.3.2: Designing multi-purpose and adaptable materials for multiple use

All the furniture needed during an exhibition and which cannot come from existing stocks should be designed in ways that it can incorporate reusable stocks and offer optimal scalability (base that can be “decked out”, basic shapes, etc.). Also, with a focus on later reuse, the storing dimension must be incorporated in order to limit the necessary surface as much as possible.

T.3.3: Incorporating the maintenance of materials early in the design process

The architects/ scenographers should be careful to design features that can be easily fixed preventing unwanted waste and the necessity to duplicate an entire module if only one part of it is damaged. The modules must be designed to ensure durability and optimal resistance (robust materials, lasting paints, possible optimization and adjustment etc.). In order to secure optimal functionality and a long lifetime to the new material, it is important to anticipate the possible reparations needed as well as its “end of life”. Likewise, the furniture and materials which do not require frequent treatment should be preferred (good paint adhesion and resistance, robustness, etc.)

T.3.4: Incorporating the end of life of the material early in its design

Finally, the “end of life” of the material should be considered while designing it. This end of life points to the central issue of waste. It is thus necessary to tap recyclable or non toxic materials should they be buried or incinerated. Also, the CSI could take positive and useful action towards sustainable development by handing over these used materials to other cultural institutions or for other use by fulfilling the legal requirements for these donations/handovers.





Target 4 Incorporating eco-friendly choices into manufacturing and assembly materials and processes

Knowing about eco-friendly materials, labels and standards in order to enable use across the lifecycle of the exhibition.

Note: The section below gives you the lowdown on the major products or materials that you are likely to use in your exhibitions. An appendix suggests a non exhaustive list of eco-friendly products/materials currently available as well as the standards and labels to know.

T4.1: Selecting materials with a low impact on the environment.

Those materials include:

- Renewable materials, - Recycled or recyclable materials, - Reusable materials, - Biodegradable or compostable materials, - Local products: transport reduction, - Energy-efficient products

The paints

Ecological impacts

“Traditional” paints are made from elements harmful to the environment and human health. They include:

- Solvents and co-solvents, - Cancer-causing products like phthalates, - Oil derivatives, - Heavy metals, - Volatile organic compounds akin to solvents which continue to diffuse long after being applied and directly impact human health.

A reference label

This notorious composition has in turn sparked a flurry of “green paints” which yet do not guarantee harmlessness (they still contain oil derivatives and metal salts). Only one label should be considered, the European label.

It guarantees:

- Low quantity of volatile organic compounds (VOC) and hydrocarbons, - Reduction of sulfur emissions, - Reduction of dangerous waste resulting from titanium dioxide, - Absence of heavy metals and dangerous substances, - User’s manual including advice on product preservation, waste management and tool cleaning, - Guarantee of minimum hiding power of paints and water resistance of varnishes.

Each requirement is correlated with goals such as VOC lower than 30g/l for wall paints. Those paints are quality-guaranteed. It is the most advanced label to date.

All the companies which retail labeled paints are listed in the appendix. Some brands are even taking it to the next level. Example included in the appendix.

The steps to take

The choice of a harmless paint is now central to any eco-design endeavor, both for the environmental impact of the exhibition and the health of technicians and visitors.

The EM/CSI has several technical and administrative solutions to tap into:

- Attempt to limit the use of paints in the scenography (limit painted surfaces, choose fast paints to avoid multi-layers, etc.), - Sign an annual contract including a purchase order in order to get harmless paints from one same supplier across the constructed exhibitions, - Implement specific clauses in supply contracts requiring the European label as a minimum.

Printing media and inks

Ecological impacts

Printing is a major source of environmental impact in any communication action (exhibition, publication, event organizing, etc.).

Several components come into play:

- The environmental quality of the materials (papers, tarpaulins, plastic, etc.), - The environmental quality of the inks used, - The printer’s techniques to limit the use of chemical substances, - The management of produced waste.

Regarding the inks, keep in mind that they consist of three core ingredients, pigments, solvents and additives. Thus, many chemical substances go into the inks and the more complex the colors the more harmful the ink (if the graphic designers use metal colors then heavy metals will go into the inks).

Regarding the media, there are myriad possibilities and environmental impacts. PVC should be avoided as much as possible due to its composition. For most other media (tarpaulins, Dibond, Duratrans, textiles, drop paper, etc.), the environmental data is not always consistent. However, several pilot initiatives are emerging and now offer eco-design products that are specifically exhibition-enabled. These are listed in the appendix.

A reference label

For several years now the printing and graphic design industry has followed through on its environmental commitments by creating a label in 1998: “Imprim’Vert. Three major standards and one commitment should be considered for eligibility for this now well recognized label:

Standard 1: wipe out in accordance to regulations –backed up by proof – the most toxic waste.

Standard 2: Secure storage of new dangerous liquids and liquid waste currently in use.

Standard 3: Non use of products labeled as “toxic” (skull and crossbones symbol)

Commitment: Commitment on the part of the company that has a front desk to pursue environmental outreach action on the choice and use of paper, for example by using posters.

The steps to take

Given the host of Imprim-Vert-labeled printers (list in the appendix for Ile de France), this clause can now be incorporated into printing contracts.

Also, you can go for so-called vegetal inks (which use solvents with renewable, non mineral and fossil vegetal oils) of UV inks. This is largely possible for paper prints. However, most large size exhibition media (plastic tarpaulins, for example) cannot easily use these. Only one company is set up to do this in France (see details in appendix).

As to the media, scenographers’ creativity operates across a wide range of them. As mentioned above – even though the market for eco-friendly alternatives is still in its infancy – some products turn out to be less toxic than others and a few interesting and serious initiatives are emerging. They are listed in the appendix to the target.

Finally, when recycling your tarpaulins and other printing media, know that it is possible to give them a new lease on life by:

- getting the printers involved, some of whom will reclaim and recycle them, - incorporating them into sorting and internal recovery channels should there be any, - handing them over to other cultural institutions if the content is appropriate, - giving them away to socially responsible organizations.





“Light “coverings: flooring

Ecological impacts

Like printing media, light coverings go into the exhibition design. Their esthetic or functional use varies depending on exhibitions. Again, plastic and PVC media should be avoided when pursuing an eco-design objective unless well identified recycling procedures or alternative products are available. In that respect, many initiatives are flourishing.

A reference label

There is no label common to the wide variety of products used: wall to wall carpet, linoleum, rubber, bamboo, etc. However, each product builds its own system of labels and standards listed in the appendix.

The steps to take

Also, it is important to address the necessity to use light media, optimize their use and ultimately resort to eco-friendly products for:

Carpets: In France, the UFTM (Union Française des Tapis et Moquettes) is engaging with the environmental carpet association (GUT – Germany) to address many eco-design targets in the manufacturing, use and end of life of carpets. The labels that are part of this process and the benefits of these products are listed in the appendix.

Linoleums: linoleum is a floor covering consisting of waterproof burlap dipped in linseed oil, wood flour or cork dust. Pigments are often added to obtain desired colors and patterns. Some processes are developing to limit their ecological footprint. They are listed in the appendix.

The other materials: When using fabrics or textiles, the materials used are paramount. Here it is important to use organic cotton (traditional cotton is responsible for the presence of most pesticides across the globe) or natural materials like hemp, bamboo, wool, linen, etc which offer – along with a satisfactory ecological footprint – new esthetic and creative opportunities. There are here many initiatives also, presented in the appendix.

Heavy building materials and furniture: wood and cardboard

Ecological impacts

When producing an exhibition, the EM/CSI can resort to building materials, for its furniture in particular (chair rails, showcases, etc). Three materials present advantages and disadvantages that should be known prior to designing this furniture to make informed eco-design choices: raw wood, particleboard and cardboard. These three materials have very variable ecological footprints and none separates itself as the right solution, what with the deforestation, the glues used and water consumption entailed. It is thus important to know these three materials well in order to use them in a timely and appropriate way.

Wood: wood is viewed as an eco-friendly material. It is natural and has been used for construction from time immemorial. But wood is anything but ecological unless it comes from durably managed forests. Each year, deforestation produces more CO₂ than all motor transport combined.

Labeling is thus central to any construction with an eco-friendly statement. There are two labels to this day. The FSC label is presented in the appendix.

Particleboard: particleboard is made from wood chips and glues mixed together. Thus, two elements go into it from an ecological point of view.

There are several categories and the quality varies depending on the number of layers and the techniques used. Certification systems for quality, water and fire resistance already exist (CTBH, M1, etc). The ecological advantage

of particleboard is that it can be made from cut wood fibers such as shavings and fragments. It is a spinoff from an old wood product or recovered waste from sawmills, for example. Conversely, the glues used are not harmless to the environment.

A few avenues are developing in the eco-design of particleboard panels. They are listed in the appendix.

Cardboard: cardboard furniture is cropping up in trade shows and arrangements of many “engagé” organization and corporate headquarters.

Unfortunately, being fireproof makes it no longer recyclable. And so most manufacturers are reluctant to go down this path for fear their endeavor might be made obsolete. A few companies, however, offer alternative products that deserve notice. They are listed in the appendix.

Cardboard has surprising robustness and adaptability qualities and thus it can be a worthwhile and innovative material for exhibition designs at the EM/CSI.

T4.2: Acting on the implementation processes

The implementation processes must focus on:

- the optimization of production techniques, - shorter transformation phases, in particular those involving high temperatures in the preparation process, - the design of installation and assembly processes that make for deinstallation suited to waste separation, - The use of clean technologies.

T4.3: Incorporating materials durability when designing them.

In light of the host of eco-friendly labels and alternatives, it is important to address the durability of any material early in its design phase.

- this early addressing can make for a rethink of the material itself (for example, cardboard furniture), - Recycling, recovery or reuse is impossible short of anticipation, - The EM/CSI largely depends on external resources and resorts to consultations and public procurement contracts. Once the contract is underway, it will be difficult to back-track to obtain a label or a specific product.

Those labels and alternatives must thus be mentioned from the start of the project based on the environmental profile of the exhibition (see 1.2).

For all these products and materials, there are labels and standards – regarding either the product or material in itself or the company that makes it – that should be known and promoted in any eco-design endeavor. All these standards and labels related to exhibitions are listed in the appendix.

Target 5 Comfort of the visit

Promoting a pleasant and healthy visit to visitors

T5.1: Optimizing the sound volume of showrooms

The sound volume of a public-receiving room must meet two goals: make the soundtracks played audible to most audiences and not exceed a certain threshold to prevent any ear damage to the visitors (deafness risk, tinnitus, etc).

The decibels are a logarithmic scale. The “bearable” limit is estimated at 60 decibels, which corresponds to the sound atmosphere of a department store at rush hour. Beyond this threshold, visitors discomfort may occur (100 decibels is the use of walkman at full volume). The “pleasant” threshold is estimated to range between 30 and 50 decibels.

For visitors with hearing problems, assistive listening devices can help.





T5.2: Limiting toxic fumes and indoor pollution

Pollution of indoor air has raised many concerns among health and environment professionals. V.O.C in particular can cause a number of health problems ranging from discomfort to the development of cancers.

Besides, electromagnetic radiations such as Wi-Fi waves are being scientifically examined.

In accordance with the precautionary principle laid down in our Constitution, toxic fumes and other radiations should be limited as much as possible in exhibition spaces. This requires in particular using harmless materials (especially paints, glues and coating) and limiting radiating devices. These measures involve visitors' health, young people in particular, but also CSI staff exposed more durably to these harmful effects.

T5.3: Reinforcing physical and intellectual exhibition accessibility to all

With a cross-disciplinary focus on sustainable development, it is important to address the diversity of audiences in order to make the exhibitions accessible to all.

This holds true for physical (amenities for disabled people for example but also families with strollers) as well as intellectual accessibility (providing various levels of information, etc.).

Target 6 Energy management

Keeping the energy consumption of exhibitions as low as possible

T6.1: Using low-power devices for lighting and multimedia

In line with the CSI's general policy on sustainable development, the EM plays a role in limiting energy consumption. First of all, it is possible to take saving measures within the premises of the EM and the practices of its teams (turning off devices, optimizing natural light in offices, etc.) As to the exhibition proper, a comprehensive eco-design procedure should be implemented across the energy-hungry systems (lighting, multimedia, etc.)

- Is this system really necessary?
- Are there any more energy-efficient products? (see appendix about the Energy Star label, energy labeling of electronic products, low power consumption)
- How can I keep energy consumption low all throughout the duration of the exhibition? (automatic switch-on around visitors and idle shutdown in their absence, limiting lighting or backlighting power, using "energy-saving modes"...)]

T6.2: Using renewable energies

Along the same lines, know that it is possible to tap alternative energies to operate the energy-hungry features of your exhibitions. Even if most avenues for action lie within the CSI, the EM can implement symbolic but meaningful action.

For example, if the theme is relevant, you can resort to the visitors' energy to operate certain multimedia devices (dynamos, etc). For some modules using little energy, small solar panels can be placed under the lights to operate them.

Finally, some products or suppliers are now able to inform you about the provenance of the energy they use. Be sure to ask them if appropriate and prefer those that tap clean energies (wind, solar, biomass, etc.)

Target 7 Low-pollution construction site and waste management

Reducing pollution on installation and deinstallation construction sites of exhibitions and ensuring optimal waste disposal

T7.1: Incorporating environmental management standards into installation/deinstallation construction sites.

The installation and deinstallation construction sites are key moments to evaluate and reduce the environmental impact of the project. Supervision and monitoring work is necessary in order to best limit the pollution entailed.

These are the issues to monitor:

- water consumption and toxic waste (set up used water collection systems, for example, rinsed paint bottles, etc.) and consumption reduction (high pressure, recovery, etc), - transport (limit motor trips and optimize both travel and vehicles), - storage and waste sorting. In line with a 4R policy (detailed above), the deinstallation construction site is the paramount phase for good waste management by thorough sorting.

T7.2: Limiting all the paper documents handed out/used during the exhibition.

In order to limit the overall volume of waste directly or indirectly produced by an exhibition, be sure to limit the volume of documents handed out to visitors or printed for the visit (flyer, leaflet).

If you have to resort to it, print on recycled paper with vegetable inks and place waste recycling containers at key spots of the exhibition.

T7.3: Implementing the 3R strategy for waste

Reducing waste at the source

The first step to take to perform waste eco-friendly management of an exhibition is to limit the production of waste early in the process. This is about lightness.

Is this material necessary? If it is, how can I reduce the materials needed for its making?

Reusing the produced media

Once it is produced, the material has already "consumed" much of its ecological impact. Thus, the more it is used, the smaller its environmental footprint eventually. This work is correlated with target 3 on reuse.

How can this material be adaptable and reusable for a future exhibition?

Recycling ultimate waste

If this material— after optimized reuse — has run its course, it should be incorporated into a well-identified recycling procedure. Even though waste management is handled at the level of the CSI, the EM needs to take action on the future of produced waste. As soon as the exhibition is deinstalled, it is necessary to sort the waste and enter into a contract with an accountable company.

Beyond environmental issues, this will bring you into line with the environment code: "each enterprise/administration is responsible for eliminating the waste it produces and/or has. It must ensure that their elimination complies with the regulations". Item L 541-2 from the environment code.

Note: that most of your waste does not fall into the category of "toxic waste" except for paints [].





Recovering waste appropriately

When the material has run its course at the EM/CSI for reasons other than age or malfunction, it is possible to plan on best recovering this “waste”.

For example, other cultural institutions have loan, donation and waste reuse systems as part of outreach programs which give a new lease on life to the material and bring into play the social and economic aspects of sustainable development.

Companies Bilum or Réversible, for plastic tarpaulins (target 4 and appendix, are examples of this process.

Target 8 Raising visitors’ awareness of sustainable development issues

Using the “outreach” potential of the medium to contribute to the education for sustainable development and leverage EM/CSI commitments.

T8.1: Through the messages conveyed

The exhibition is an amazing outreach medium that plays a key role in the education for sustainable development whose decade was ushered in by UNESCO in 2005.

In that respect, across the exhibitions curated by the EM/CSI and if the theme is relevant, it is important to engage all the opportunities on tap to send strong messages on sustainable development in its three dimensions, ecological responsibility, social solidarity, economic fairness, etc].

The curator of the exhibition can act as a catalyst for these messages and disseminate them appropriately across the various modules with a focus on sustainable development outreach.

T8.2: Through the clarity of eco-friendly choices in the design of the exhibition

The choices and achievements of the EM/CSI in the eco-design of its exhibitions deserve to be clear and visible to all kinds of “public” for various reasons:

- Visitors: it is one more way to raise awareness of eco-responsibility and a major vehicle for the CSI's positioning on this issue. Positive fallouts in terms of image are to be expected as social demand for sustainable development is surfacing.
- Public and private backers: all the partners of the exhibition will be able to evaluate the efforts made and get a first-hand sense of an eco-design process. Thus, the EM/CSI's expertise can become an argument and an additional guarantee.
- Employees and collaborators of the EM/CSI: in order to give meaning to action and make eco-design into a common and popular practice despite all the efforts involved, it is important to leverage the environmental gains achieved. It is an excellent way to unite the teams around one project and measure the outcomes.

Find out more: This clarity and visibility work can be performed in a very simple way (a sign at the entrance or exit of the exhibition presenting the devices used) or it can be more ambitious (carbon footprint of the exhibition, lifecycle analyses, quantification of gains in waste tons or CO2). This would require resorting to an engineering firm on the advice of the ADEME [02.41.20.43.13] and could be leveraged by a more qualitative device (interactive kiosk, etc).

SECTION 3

Leveraging the feedback

Environmental sheet to be completed after each exhibition
(by the eco-design coordinator)

Project definition

Title and theme of the exhibition	
Type of exhibition (permanent, temporary, touring, etc.)	
Name of eco-design coordinator	
Exhibition dates	
Environmental profile of the exhibition	

In-house addressing of eco-design: Outcome of the process

Solutions to target 1	
Solutions to target 2	
Solutions to target 3	
Solutions to target 4	
Solutions to target 5	
Solutions to target 6	
Solutions to target 7	
Solutions to target 8	
Outcome of solutions found in relation to initial objectives	
What difficulties did you encounter?	

Focus on the relationships with outside providers

Were eco-design issues incorporated into contracts?	
Were the providers selected for their ability to perform eco-design work?	
Did the providers find clear solutions in terms of eco-design?	
Did the construction work out in an optimal fashion?	
Was the eco-design aspect an enabling or undermining factor in the relationships with subcontractors?	

Environmental record of the project

Does the end result fit in with the initial environmental profile?	
In what ways was the eco-design process internally and externally leveraged?	
How was eco-design managed within the project group?	
What avenues for improvement can be formulated for the next project?	

⌚ If you have discovered eco-friendly products, materials, standards, labels or suppliers in the course of your project, please fill out the attached appendices also.

