RESULTS
LIFE CYCLE ANALYSIS

ART PARIS
2021/2022

Karbone Prod.
L'art éco-responsable.

Solinnen
Solutions innovantes pour l'environnement

avec le soutien financier de l'ADEME

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

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AGENCE DE LA TRANSITION ÉCOLOGIQUE

CONTENTS

03 Introduction

04 The Art Paris context

05 The global context

06 The team

08 What is life cycle analysis?

09 Why do a life cycle analysis rather than calculating the carbon footprint?

10 The scope of the life cycle analysis.

13 Results of the 2021 life cycle analysis.

15 Comparison after implementing sustainable design principles.

19 Reuse of materials and end of life.

20 Comparative life cycle analysis results 2021/2022

21 Life cycle analysis comparison 2021/2022

22 Carbon footprint comparison 2021/2022

23 Conclusions

24 Appendix 2021/2022

26 Resources

RESULTS OF THE ART PARIS 2021/2022 LIFE CYCLE ANALYSIS

Introduction

Guillaume Piens, fair director, Art Paris.

« After a two-year-long health crisis, it was important that Art Paris made a commitment to the environment. To this end, we selected two artistic themes for the 2022 edition that addressed the questions of nature and the environment while also embarking upon a pioneering sustainable approach to organising the fair. Art Paris is the first art fair to have carried out a life cycle analysis, the results of which we have just published. This whole process made us more aware of our impact on the environment, both individually and as a company and did nothing but strengthen the creativity and motivation of our team and partners. Sustainable design is within everyone's reach when placed at the heart of a rigorous and holistic approach. I invite all those working in the arts to take advantage of the example we have set as a means of accelerating the cultural sector's much-needed ecological transition."

This groundbreaking study was carried out by **Karbone Prod** and **Solinnen**.

Its calculations take into account the so-called direct impacts (production, installation, set-up and take-down) of Art Paris 2022 compared to the 2021 edition.

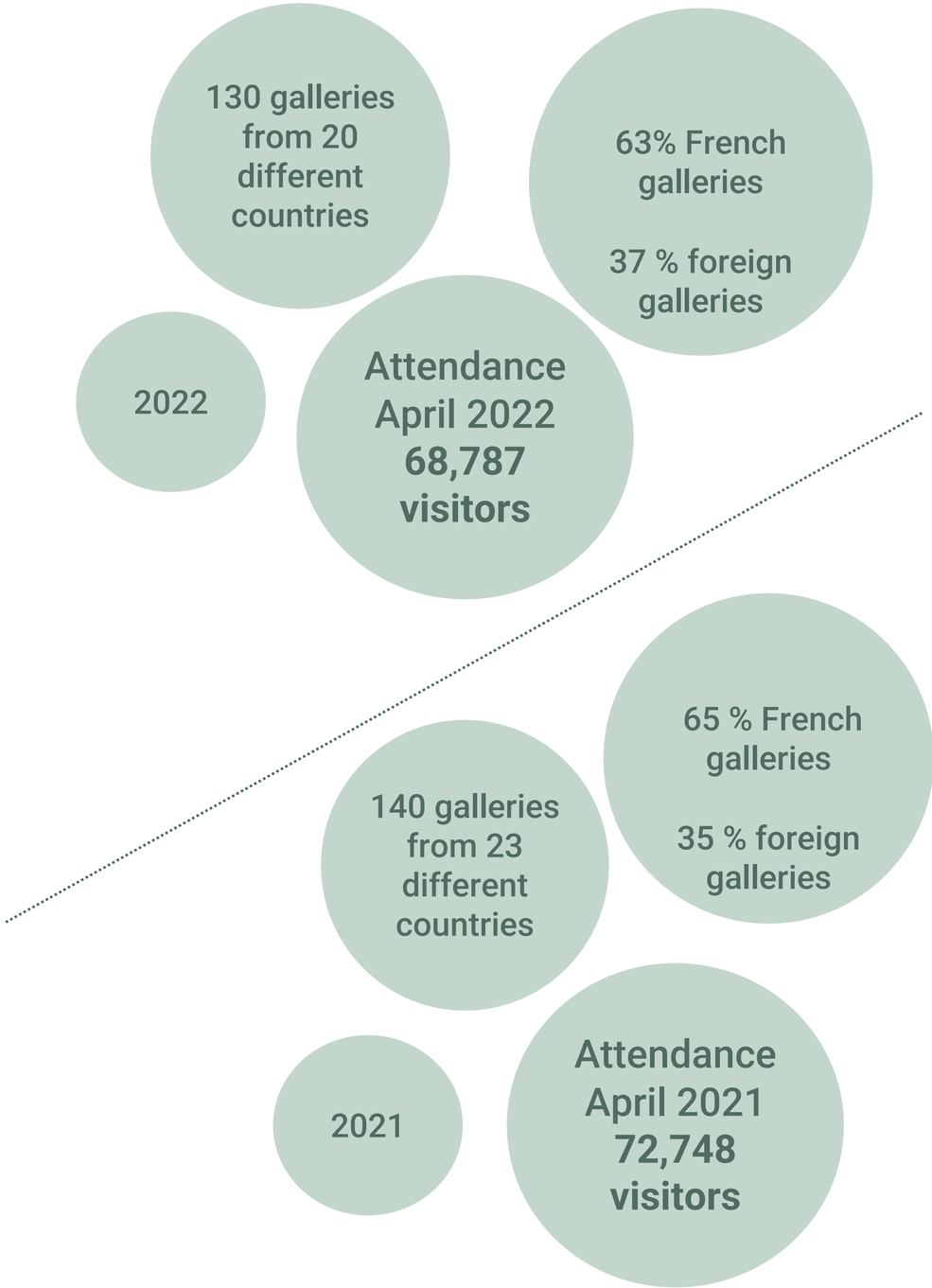
THE ART PARIS CONTEXT

Art Paris is a regional art fair that gives pride of place to proximity, drawing local visitors and favouring local transport solutions. In 2022 Art Paris, which is organised by France Conventions, committed to implementing a sustainable approach based on a life cycle analysis (LCA)* in what was a first for an art fair.

This pioneering initiative was entrusted to **Karbone Prod**, , founded by Fanny Legros, which joined forces with environmental consultants **Solinnen**.

It also received the support of the French environmental agency ADEME.

** Life cycle analysis (LCA) takes into account a multitude of criteria, listing and quantifying the materials and energy used throughout a product's entire lifetime. It analyses potential impacts from cradle to grave and interprets the results in accordance with its initial objectives.*

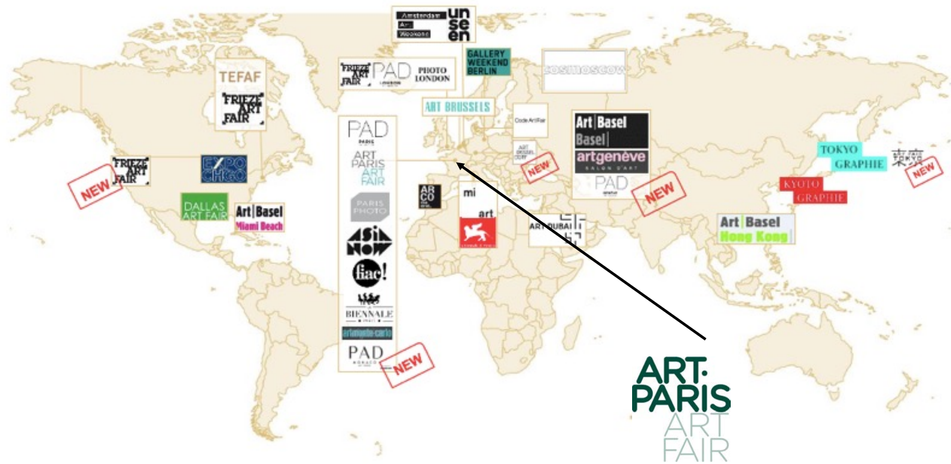


THE WORLD CONTEXT

All the warning signs were there: 2021 was the hottest year on record, as were each of the six previous years, proving, if any proof were needed, that global warming is accelerating.

As temperatures rise, rising sea levels threaten coastal areas, whereas air pollution simultaneously causes living conditions to deteriorate in many countries (India, China). Pollution is responsible for 9 million premature deaths per year and the question of biodiversity brings more bad news with increasing deforestation and the loss of marine biodiversity leading the way.

In answer to these challenges, European policymakers are working to develop new and stricter regulations that will be implemented from 2022, in particular in terms of the circular economy.



Today, sustainable design has proved its worth with a multi-criteria approach that makes it the most suitable means of complying with future environmental regulations and requirements. However, such an approach is almost unheard of in the arts industry.

Art Paris is the exception in that it has carried out the sector's first life cycle analysis, including a comparison between 2021 and 2022.

If trends in the building and digital sectors are anything to go by, in the near future art fairs will probably also be obliged to evaluate their environmental impact and commit to remaining below certain thresholds before they can take place.

In the long term, Art Paris's experience aims to contribute to implementing a sustainable design tool for the arts and culture industry: only by putting things in common and cooperating can major progress be made towards a successful ecological transition.

THE TEAM

Combining skills in several professions and across several sectors**, Karbone Prod**, implements new tools and services to provide advice, training and support to arts professionals. Mainly offering its services to arts professionals, it aims to encourage the creation of new mechanisms that will limit and reduce the environmental impact of the arts and culture sector.

Solinnen, has been at the cutting edge of environmental innovation since 2010 and can draw on 33 years' accumulated experience. It provides expertise and support in the environmental field to industrial and service sector clients in France, Europe and the rest of the world, as well as to public authorities.

Karbone Prod.
L' art éco-responsable.

Sustainable design and circular economy in the art market, digital tools, innovation.

Solinnen
Solutions innovantes pour l'environnement

Life cycle analysis, tools, frames of reference, standards, piloting research.

THE TEAM MEMBERS

GLOBAL PROJECT MANAGER
SUSTAINABLE DESIGN / CIRCULAR ECONOMY / LCA

With more than 15 years' experience in the field, Karbone Prod founder **Fanny Legros** helps the arts sector to reduce its environmental impact.

MARKETING MANAGER

SCIENTIFIC PARTNER
LCA ENGINEER / SOLINNEN

Philippe Osset holds an engineering diploma from Centrale Paris and has been contributing to the development of the life cycle analysis for 27 years. He has played a key role in the evolution of LCA methodology.

MARKETING MANAGER

SCIENTIFIC PARTNER
LCA ENGINEER / SOLINNEN

Aurore Philippe Delvigne is a life cycle analysis and sustainable design engineer at Solinnen.

SCIENTIFIC PARTNER
LCA ENGINEER / SOLINNEN

Charlie Brenot is a life cycle analysis and sustainable design engineer at Solinnen.

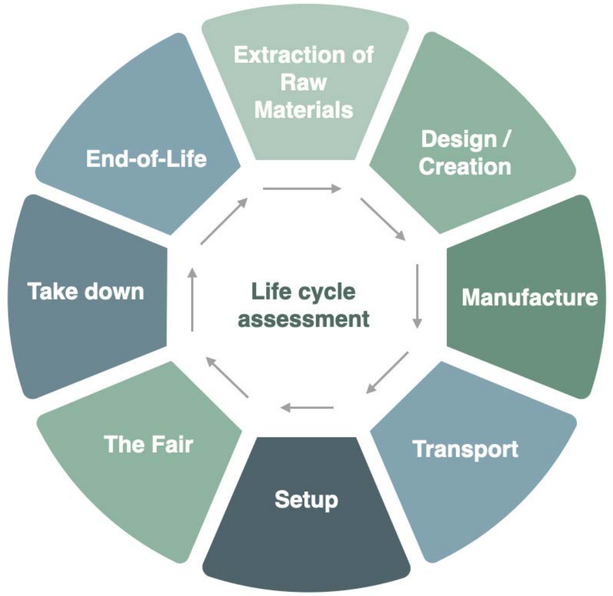
MARKETING MANAGER

WHAT IS LIFE CYCLE ANALYSIS?

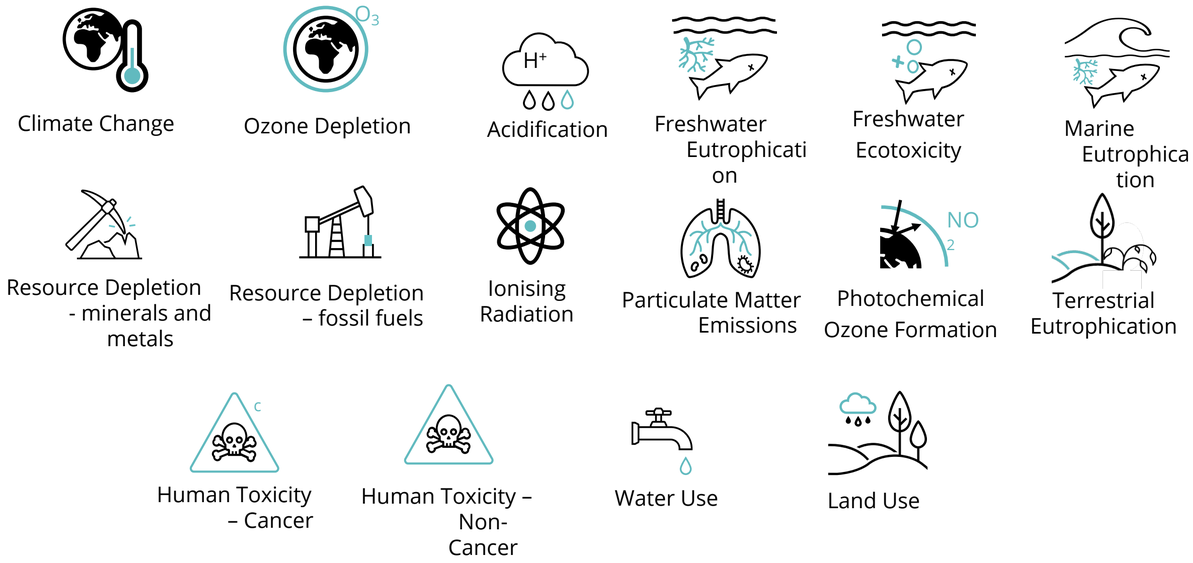
Life cycle analysis (LCA) is the most advanced methodology for measuring environmental impact. It considers a multitude of criteria in order to provide a quantifiable analysis of the effects goods and services have on the environment.

The LCA lists and quantifies the materials and energy used at every stage of a product/service's life cycle from cradle to grave. It evaluates the potential impacts and interprets the results in accordance with its initial objectives.

This method is based on the ISO 14040 series of standards, which guarantee that the method is defined and recognised internationally.



Art fair life cycle analysis diagram ©Karbone Prod

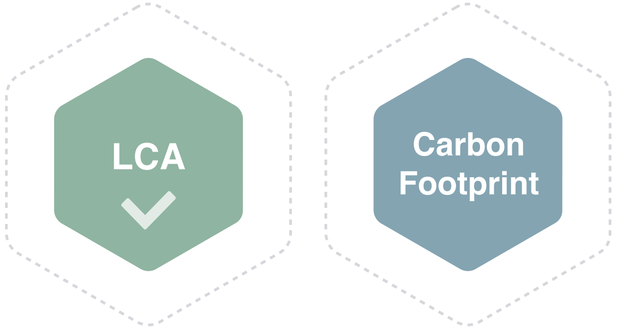


List of life cycle analysis impact categories

The methods for calculating environmental impacts selected for ART PARIS are those which are recommended as part of the European Commission's Product Environmental Footprint (PEF) methodology.

The PEF is tasked with seeking to reduce the environmental impacts of goods and services by providing a common way of measuring their environmental performance and thereby strengthening the position of environmentally friendly alternatives on the European market.

WHY DO A LIFE CYCLE ANALYSIS RATHER THAN CALCULATING THE CARBON FOOTPRINT?



Calculating a carbon footprint and carrying out a life cycle analysis are similar in their approach, but:

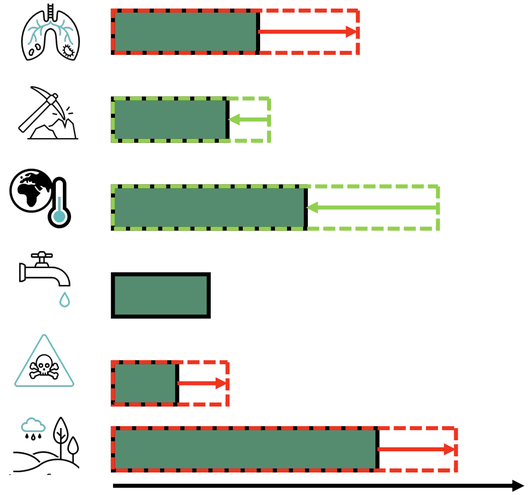
Carbon footprints only take into account the effect on climate change, in other words greenhouse gas emissions.

LCA calculates the carbon footprint in addition to other indicators that demonstrate environmental impact, such as resource depletion, land use, ocean acidification and human toxicity etc.

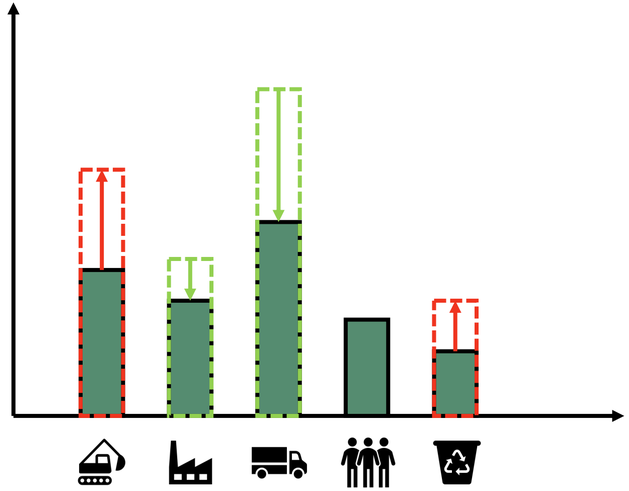
LCA is a way of avoiding hasty conclusions and above all the transfer of impacts.

"Common sense" does not always allow you to identify the main causes of environmental impact.

*Some so-called « **environmental** » solutions do not « **reduce** » global impacts as they are supposed to, sometimes **they transfer the impacts and even increase them.***



Impact transfer from one indicator to another



Impacts can be transferred on two levels** - in terms of environmental indicators and **life cycle stages .

THE SCOPE OF THE LIFE CYCLE ANALYSIS

How did we carry out the Art Paris life cycle analysis?

We started by meeting the teams and deciding whether or not the project was feasible. We tried to understand how Art Paris was organised and identify the stakeholders. This approach provided the foundations to the analysis.

We worked to define the aim and scope of the project and exchanged with the team to decide how we would carry out the assessment. It was decided that we would only look into the so-called direct impacts during the production, installation, set-up and take-down of Art Paris 2022 and compare the results to the 2021 edition.

At every stage, we identified, collected and calculated the energy needs and inputs, i.e. the materials and other equipment required to organise the event: the number of picture hanging systems, the quantities of carpeting, brushed cotton, woodwork and lighting fixtures, as well as the question of transport and the waste generated.

We obtained all the data from the fair's technical contractor Procept and from other service providers (GL events for the Temporary Grand Palais, the RMN etc).

Once we had collected all the data, we defined the functional unit*.

The functional unit of Art Paris is to host visitors and exhibitors over a 4-day period at the Temporary Grand Palais. Thanks to the study, it was possible to determine the cost to the environment of 1m2 stand space during Art Paris at the Temporary Grand Palais.

The calculations were carried out by the team at Solinnen using openLCA software. After the results of the 2021 analysis were presented to the Art Paris team, an action plan was put into place for the 2022 edition.

Karbone Prod implemented a sustainable design strategy for the 2022 edition that focused on the main areas of concern: the use of brushed cotton and carpeting, general waste and electricity consumption.

The same data collection process and calculation methodology was applied to the 2021 and 2022 editions of Art Paris in order to carry out a comparative survey. This document presents the results.

A supplementary LCA report is available on request.

** Functional unit: The functional unit refers to the product, service, or system whose impacts are being calculated as part of the life cycle analysis (LCA). In the same way as a consumer will consider the price per kilo when comparing the price of two different pieces of fruit, the functional unit provides a means of comparing the environmental impact of two products by using a common unit of measurement.*

MATERIAL FLOW ANALYSIS

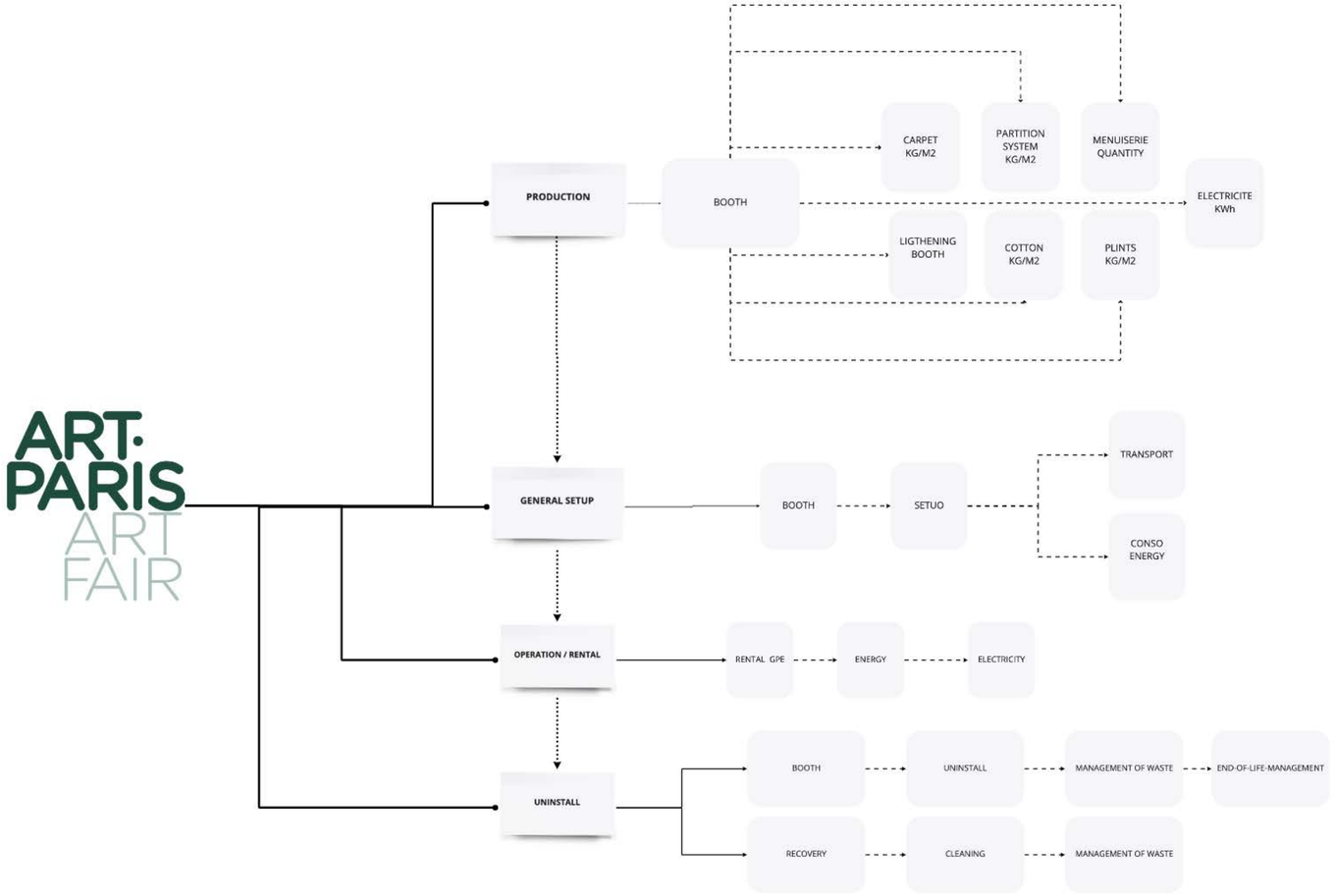


Diagram of incoming and outgoing flows Art Paris © Karbone Prod

Art Paris 2021: 9-12 September 2021 at the Temporary Grand Palais.
Total surface area: 8,444 m2
Stand surface area: 4,256 m2
Number of stands: 140

Art Paris 2022: 7-10 April 2022 at the Temporary Grand Palais.
Total surface area: 8,444 m2
Stand surface area: 5,821 m2
Number of stands: 130

Partition system
102 tonnes
Origin : Portugal
Reuse : 20x

Brushed cotton
3.04 tonnes
Origin : Asia
Reuse : 0 %

Carpeting
2.9 tonnes
Origin : Belgium
Reuse : 0 %

Woodwork
1.6 tonnes
Origin : Portugal
Reuse: 80 %

Skirting
2.21 tonnes
Origin : Scandinavia
Reuse : 0 %

Beams
12.8 tonnes
Origin : Scandinavia
Reuse : 2.5x

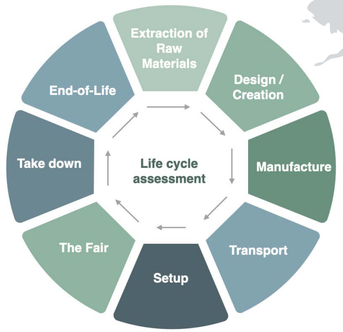
Residual Waste (RW)
25.1 tonnes

Lighting
1,535 HQI (metal halide) spotlights
Reuse : 98 %

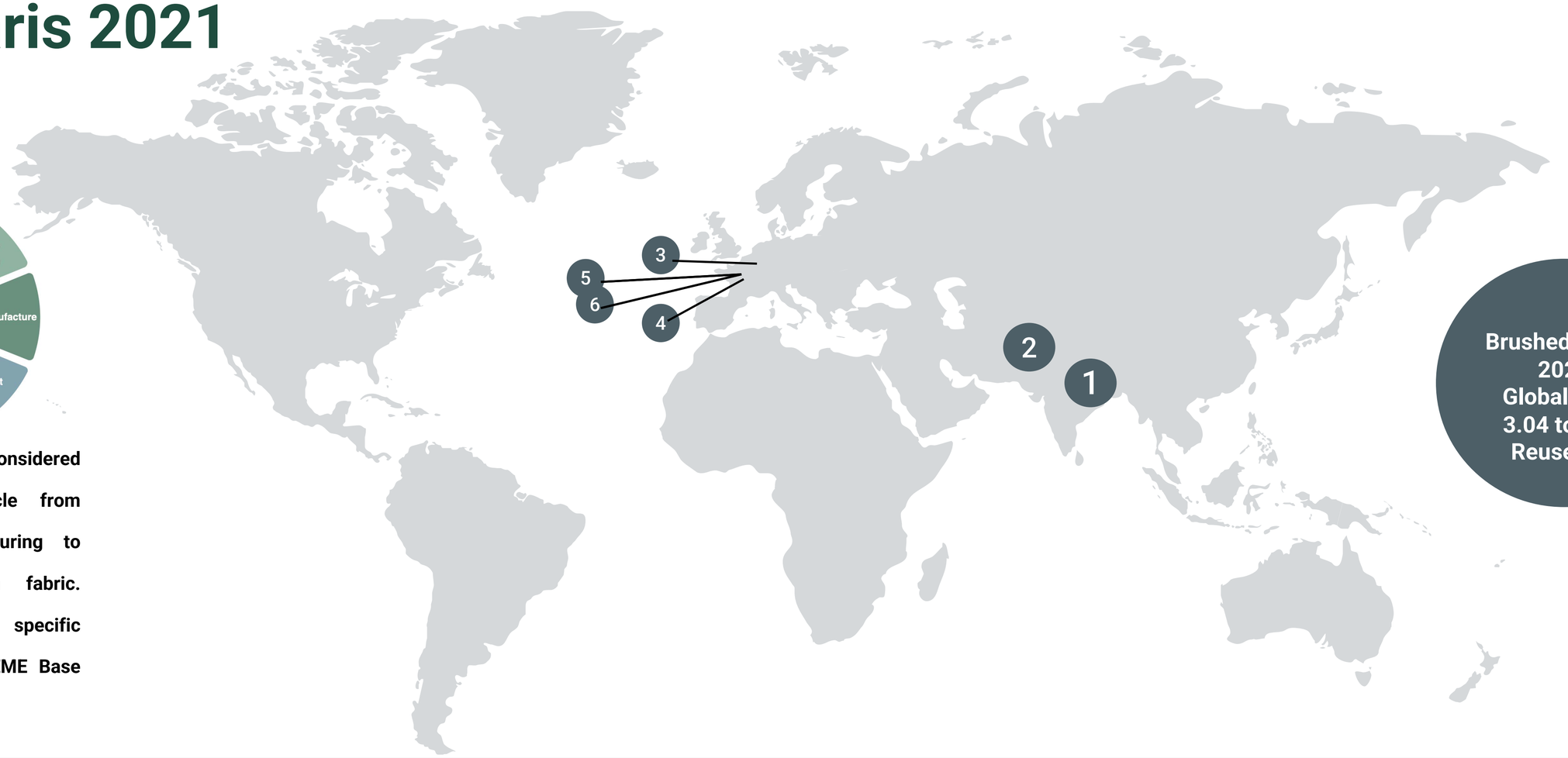
Energy
61,666 kWh
Origin : France

Material and energy consumption 2021

Production of brushed cotton used to cover picture hanging systems at Art Paris 2021



The life cycle analysis considered each step of the cycle from extraction and manufacturing to transporting the cotton fabric. Information came from specific databases (Ecoinvent, ADEME Base Impact).



Brushed cotton 2021
Global data: 3.04 tonnes
Reuse: 0%

1

Material extraction:
Production of cotton fibre.

INDIA

2

Textile manufacturing
Drying, scouring, bleaching and dyeing.

PAKISTAN

3

Spinning
Knitting fabric + fire retardant treatment.

FRANCE

4

Storage and sewing:
Cutting out material for the stands

FRANCE

5

Art Paris 2021 :
Set-up and take-down of stands at the Temporary Grand Palais

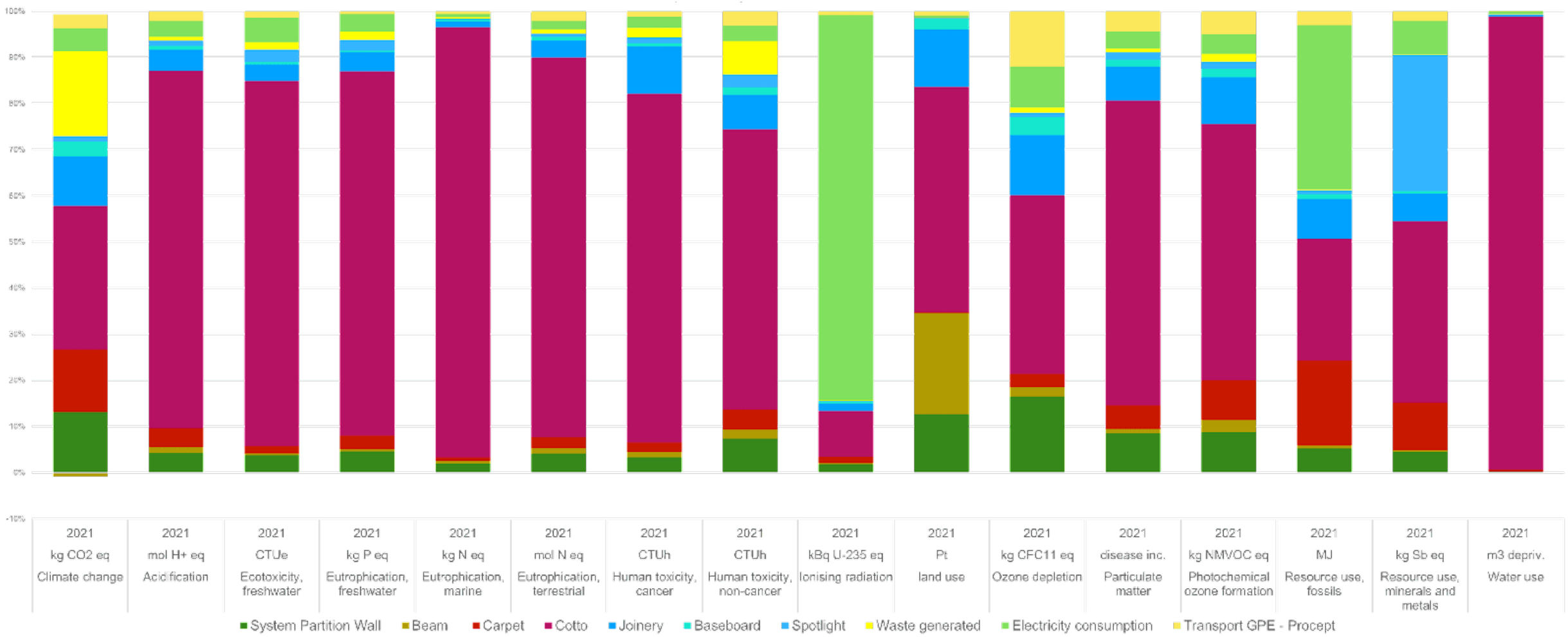
FRANCE

6

Cotton waste
In 2021, the cotton was thrown away after 5 days' use.

FRANCE

Results of the 2021 life cycle analysis



Results of the 2021 life cycle analysis

Climate change:
31% of the impact is related to the cotton that is used and then thrown away
14% of the impact is related to the carpeting that is used and then thrown away
18% of the impact is related to the waste created during the fair

Depletion of energy resources:
27 % of the impact is related to cotton
19 % of the impact is related to carpeting
35% of the impact is related to the fair's energy consumption (including lighting)

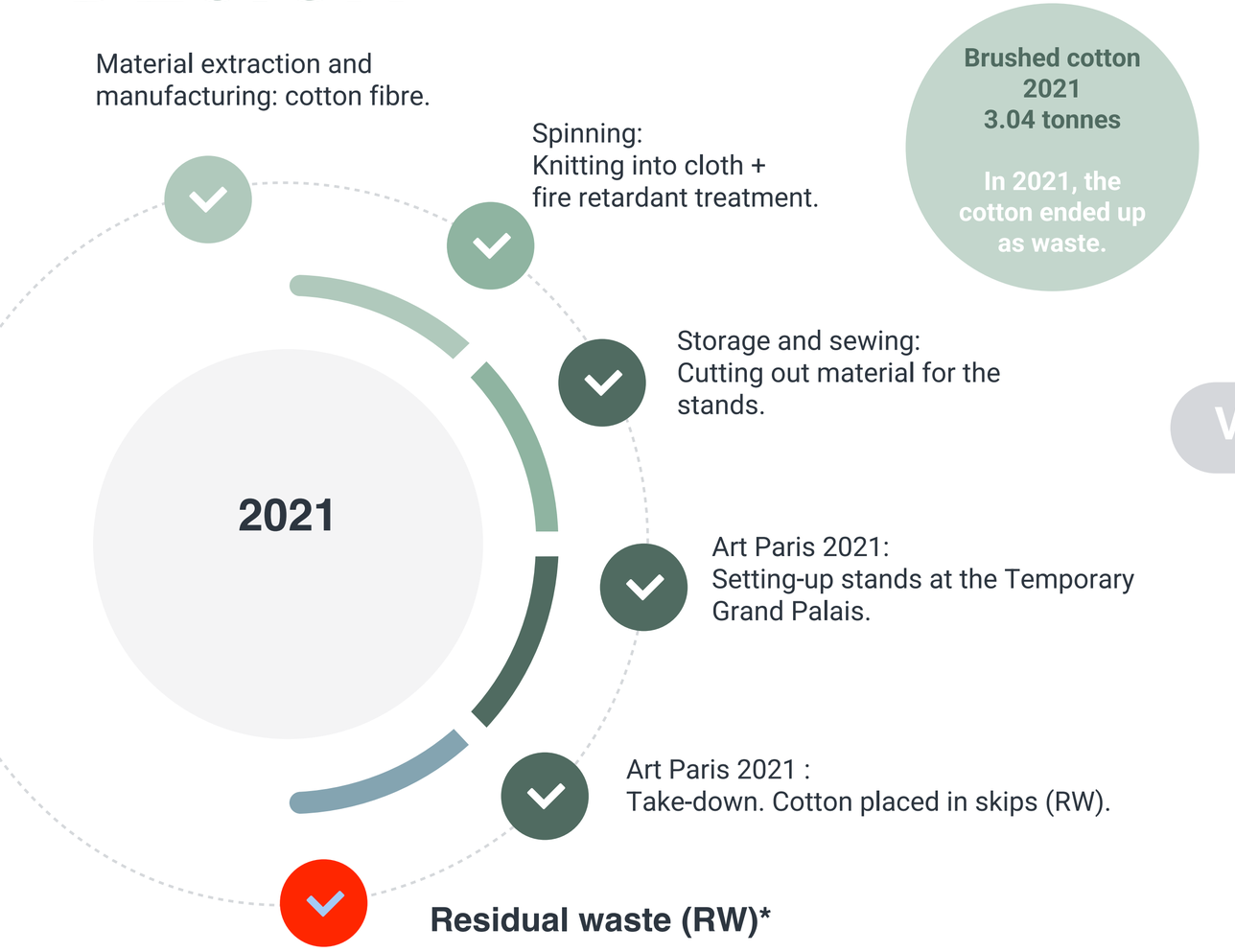
Depletion of mineral resources:
41% of the impact is related to cotton
11% of the impact is related to carpeting
31% of the impact is related to the spotlights

Land use:
49% of the impact is related to cotton
13% of the impact is related to partition systems
22% of the impact is related to the beams

The results of the 2021 life cycle analysis revealed that Art Paris's main environmental impacts are caused by:

SUSTAINABLE DESIGN

Comparison after implementing sustainable design principles: COTTON



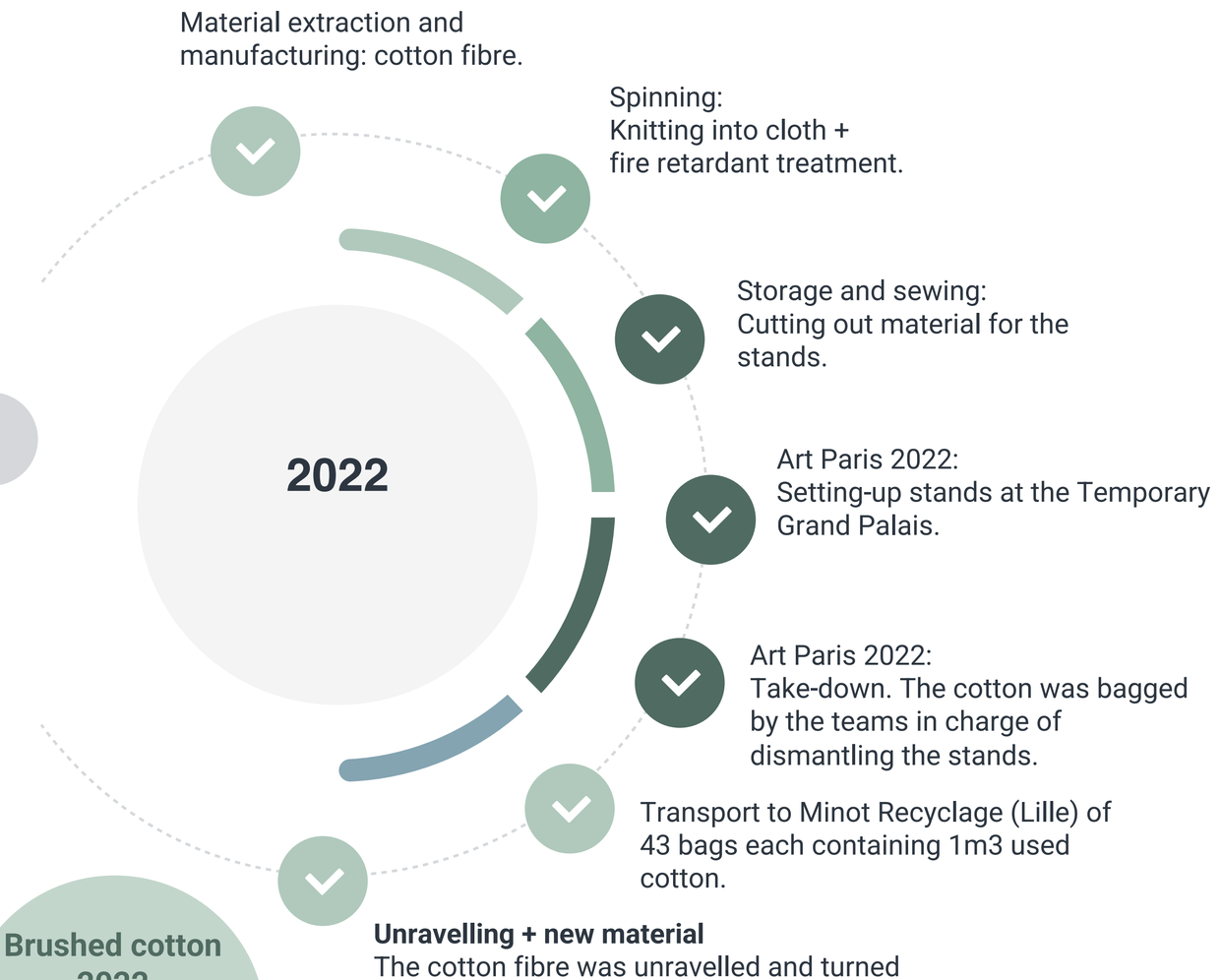
Brushed cotton 2021
3.04 tonnes

In 2021, the cotton ended up as waste.

*Residual waste (RW) is the term for all the non-hazardous industrial waste generated by the everyday activities of an establishment, i.e. waste that is not dangerous to man or the environment.

Waste

VS



Brushed cotton 2022
3.39 tonnes.
98% of the cotton was reused in 2022

Métisse®

Second life

Comparison after implementing sustainable design principles: CARPETING

Material extraction and manufacturing: carpeting.

Art Paris 2021:
Delivery and laying carpeting.

Carpeting 2021
2.9 tonnes
In 2021, all the carpeting ended up as waste.

Art Paris 2021:
The fair opens to the public

2021

Art Paris 2021:
Removal of carpeting which is placed in a skip.

Residual waste (RW)
Transport of waste to landfill.

VS

Material extraction and manufacturing: carpeting

Art Paris 2022 :
Delivery and laying carpeting.

2022

Art Paris 2022 :
The fair opens to the public

Art Paris 2022 :
Removal and rolling carpeting.

Transport : The carpeting is loaded onto a lorry and delivered to ArtStock.

Carpeting 2022
4.3 tonnes
99% of the carpeting was reused in 2022.

Reuse : The carpeting will be resold at a reduced price for organisations or people who have need of it.

Waste

Second life

Comparison after implementing sustainable design principles: WASTE

WASTE 2021
25.02 tonnes

2021

Art Paris 2021:
Setting up of the stands at the Grand Palais Ephémère: collection of unsorted rubbish by the GPE cleaning teams

Art Paris 2021:
Setting-up stands at the Temporary Grand Palais: the TGP cleaning team collects waste from bins (no sorting).

Art Paris 2021:
Take-down and putting waste (RW) into skips.

Residual waste (RW)

Transport of waste to landfill.

VS

2022

Art Paris 2022:
Waste sorting implemented
Cardboard, paper, plastic, glass and RW

Art Paris 2022: Set-up with waste sorting.

Art Paris 2022: The fair opens to the public with waste sorting.

Art Paris 2022:
Take-down with waste sorting + partnership with Plinth, an online platform for the reuse of exhibition materials and stand design elements.

WASTE 2022
13.62 tonnes

Plinth
L'art du réemploi

Comparison after implementing sustainable design principles: ELECTRICITY CONSUMPTION

Electricity consumption 2021

61,666 kWh

Art Paris 2021: Set-up of stands and installation of HQI (metal halide) lighting.

2021

Art Paris 2021: The fair opens to the public with heating and air conditioning.

Art Paris 2021: Take-down and collection of HQI lights from stands.

VS

Art Paris 2022: Set-up of stands and installation of LED lighting.

2022

Art Paris 2022: The fair opens to the public – no heating or air conditioning.

Art Paris 2022: Take-down and collection of LED lights from stands.

Electricity consumption 2022

38,691 kWh

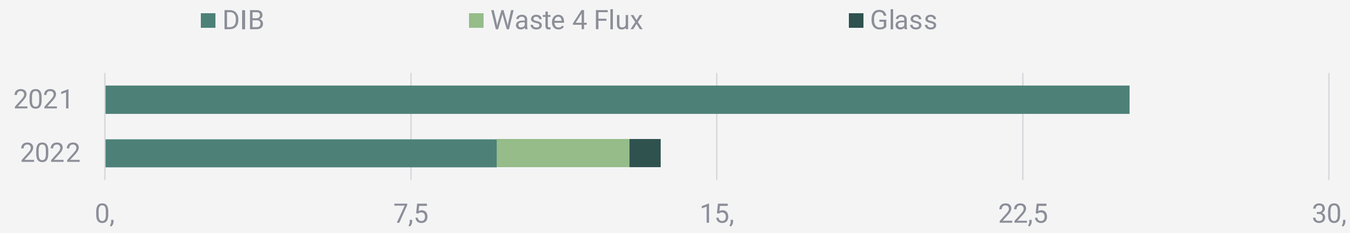
Art Paris 2021:
Stand surface area: 4,256 m2
Number of stands:140

Art Paris 2022:
Stand surface area: 5,821 m2
Number of stands:130

REUSE OF MATERIALS AND END OF LIFE

Waste 2021	Waste 2022
25.1 t	13.6 t

Waste reduction - 45.8%



REUSE ART PARIS 2022

Cotton	Carpeting	Skirting
3.7 t	4.4 t	4,8 t

Materials reused or recycled: 12t

ELECTRICITY CONSUMPTION

2021	2022
61,666 kWh	38,691 kWh

Reduction - 37,2 %

COMPARATIVE LIFE CYCLE ANALYSIS RESULTS 2021/2022

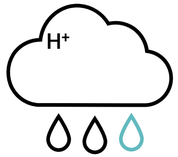
Life cycle analysis comparaison 2021 / 2022 (for 1m2 at the Temporary Grand Palais during Art Paris)

Climate Change (kg O2 eq)

- 40%

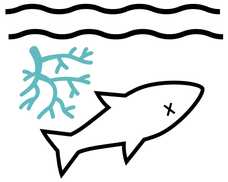
Ozone depletion
(kg CFC11 eq)

- 29%



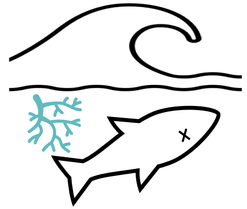
Acidification
(Mol H+ eq)

- 19%



Freshwater Eutrophication
(kg P eq)

- 20%



Marine Eutrophication
(kp N eq)

- 12%

Terrestrial Eutrophication
(mol N eq)

- 18%

Photochemical Ozone Formation
(kg NMVOC eq)

- 28%

Resource Depletion - minerals and metals–
(kg Sb eq)

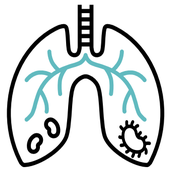
- 29%

Resource Depletion – fossil fuels
(MJ)

- 35%

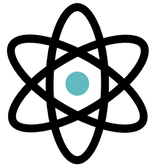
Water Depletion
(m3 depriv.)

- 11%



Particulate Matter Emissions
(disease inc.)

- 22%



Ionising Radiation
(kBq U-235 eq)

- 35%

Freshwater Ecotoxicity
(CTUe)

- 14%

Human Toxicity – Cancer
(CTUh)

- 24%

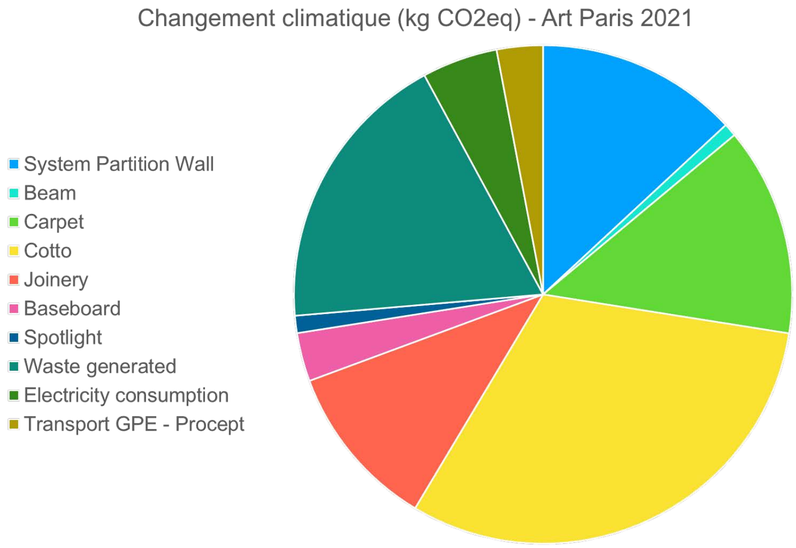
Human Toxicity –Non-Cancer
(CTUh)

- 25%

Land Use
(Pt)

- 26%

Environmental Impact - Art Paris 2021 (Carbon footprint)



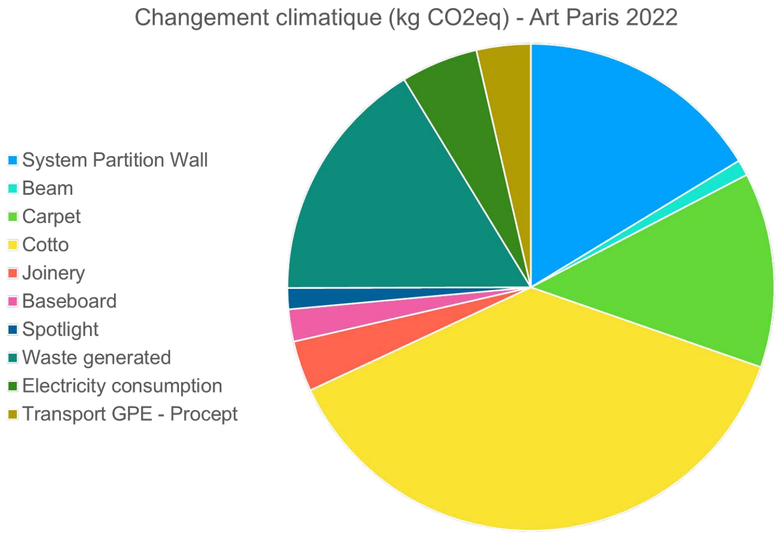
80,791 kgCO2eq

= 4,337 days' heating

= 3,482 pairs of cotton jeans

= 43,4360 km air travel
74 return flights between Paris and New York

Environmental Impact - Art Paris 2022 (Carbon footprint)



64,217 kgCO2eq

= 3,447 days' heating

= 2,768 pairs of cotton jeans

= 34,5237 km air travel
59 return flights between Paris and New York

Converted using: https://monconvertisseurco2.fr/

CONCLUSIONS

The results of the Art Paris life cycle analysis are extremely satisfying.

Between 2021 and 2022, the fair:

Reduced by almost half the quantity of waste produced with a decrease from 25.1 tonnes to 13.6 tonnes, in other words a **45.8% reduction.**

Decreased electricity consumption by 37.2% (61,666 kWh in 2021 compared to 38,691 kWh in 2022).

Reduced its carbon footprint: 80,791 KgCO2eq in 2021 compared to 64 217 KgCO2eq in 2022.

Thanks to the actions carried out throughout the year, **12 tonnes of materials were reused or recycled in 2022** rather than being thrown away as during previous editions.

Notably:

The brushed cotton used to cover the picture hanging systems at the fair, of which **3.7 tonnes were transformed into insulation to be used in the building industry by Minot recyclage (Lille)**.

Carpeting at the fair **(4.3 tonnes) was collected by ArtStock** to be sold at a reduced price to organisations or people who have need of it.

The process is well and truly underway today and this sustainable design-based approach to organising the fair will continue in 2023 and the following years. This survey has proved that sustainable design is widely accessible, including to arts professionals.

Karbone Prod would like to thank the Art Paris team, in particular Guillaume Piens, Valentine and Julien Lecêtre, Frederique Merer, Catherine Vauselle and Audrey Keita for their help and trust.

We would also like to thank all the partners in this project: Art of Change 21, RMN, GL events, Procept and Séquence éditions, as well as Solinnen and all its team.

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Appendix - 2021 / 2022 survey

BORDEREAU DE COLLECTE - France Conventions

N° 2022-04_15

Je soussigné.e :
responsable de la structure : France Conventions
Certifie se défaire, au profit de ArtStock, des éléments listés dans le tableau ci-dessous.

ArtStock **a pour mission principale d'accompagner les structures culturelles à revaloriser leur matériel inutilisé ou destiné à la filière déchets.**
A travers cette collecte, votre matériel mis au rebut est promis à une seconde vie ! Il sera trié par notre équipe de revalorisateurs, puis réparé si nécessaire, avant d'être remis dans la boucle.

Photo	Descriptif	Quantité	Poids unitaire kg	Poids total kg	Longueur (mm)	Largeur (mm)	Hauteur (mm)	Épais	Diamètre	Siglé O/N
	Palette de moquette	8	548	4384	4000	1000	1200			N
	bois médium / liteaux	6	800	4800	4000	1500	1500			N
	Palette de bâches banderoles	1	20	20	600	400	50			N
Date de réception		13/04/22								
				POIDS TOTAL KG			**9204,00**			

SIGNATURES
Responsable France Conventions :
Responsable ARTSTOCK : M. Yann DOMENGE-LAB
Fait le 16/05/2022
À Blajan

Route de la Tuilerie 31350 BLAJAN
contact@artstock-asso.fr
Tél : 05 61 88 74 25
Siret 510 525 454 00060 - APE 9002 Z

Z.I. Artois Flandres
1096 bvd de l'Est
62138 BILLY BERCLAU
Tél. 03 21 40 50 40
Fax 03 21 40 96 00
E-mail : contactmrt@nordnet.fr

R.C. Arras B 473 500 106
Siret 473 500 106 00025
NAF 3832 Z
N° T.V.A :FR 29 473 500 106

MINOT RECYCLAGE TEXTILE
Société par Actions Simplifiée au Capital de 1 054 274 €

France CONVENTION
55 Avenue Kleber

75116 PARIS

DL - 22-04-12

12.04.2022

ATTESTATION

Nous certifions, par la présente, que les tissus événementiels que nous avons reçu le 12/04/2022, référence France Convention , soit :

- Tissus Evènementiels 3760 kg

Sont, par le biais de l'effilochage, revalorisés dans notre industrie.

J'atteste que les vêtements ainsi reçus seront effilochés et ne seront pas remis sur le marché à l'état.

MINOT RECYCLAGE TEXTILE
Z.I. Artois Flandres
Zone C
62138 BILLY BERCLAU
Tél. : 03.21.40.50.40
Fax : 03.21.40.96.00

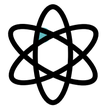
JEAN CHRISTOPHE MINOT

FEDEREC

Definitions of environmental impacts

Climate change: Influence on the evolution of global warming over the next 100 years (greenhouse effect - kg CO2 equivalent) Effects: Multiple and uncertain effects on physical, human and biological systems.

Ozone depletion: Deterioration of the stratospheric ozone layer (kg CFC-11 equivalent). Effects: reduced filtration of UVs (carcinogenic)



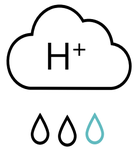
Ionisinig radiation : Quantification of the impact of ionising radiation on human health (kBq 235U equivalent). Effects on health of a compound compared to Uranium 235. Effects: vomiting, sterility, burns, cancer etc (depending on the duration and intensity of exposure).

Photochemical Ozone: Formation of ozone in the lower levels of the atmosphere (smog), caused by the action of the sun on various pollutants (NO2, COV - kg NMVOC equivalent. Effects: respiratory problems, irritations, impacts on flora (agriculture) and fauna.

Particulate Matter Emissions: A mixture of fine particles of different sizes (from 10 µm to less than 0,1 µm) capable of affecting human health (disease incidence). Effect of 1 kg particle emissions on a population's death rate. Effects: lung disease, increased risk of stroke, heart attacks etc.

Toxicity - non-cancer: Estimated increase in the rate of disease (except cancer) in connection with chemical substances (CTUh). Estimation of the number of cases of illness (except cancer) caused by 1kg of emitted substance.

Toxicity –cancer : Estimated increase in the rate of cancers in connection with chemical substances (CTUh). Estimation of the number of cases of cancer caused by 1kg of emitted substance in a given environment.



Acidification : The decline in soil and freshwater PH caused by an increase in hydrogen ions (H+). Acidifying power (H+ released / kg). Effects: acid rain, weakening of the flora, biodiversity loss, soil erosion.

Eutrophication (3 indicators): An abnormal accumulation of minerals and nutrients (fertiliser etc) in the soil, lakes, rivers, seas and oceans. Units: freshwater: (kg P equivalents) - soils, seas and oceans: (kg N equivalent). Effects: seaweed proliferation, deterioration of aquatic habitats, limiting available sunlight, biodiversity loss.

Ecotoxicity: Damage caused to freshwater ecosystems as a result of the presence of toxic molecules. Unit: CTUe (Comparative Toxic Units ecotoxicity), i.e. the proportion of species affected by the emission of 1 kg of toxic substance in a given volume of water.

Land use: Diminution and deterioration of fertile soil during its transformation (Pt). Soil quality indicator (fertility, carbon storage, erosion, etc.) occupied and/or transformed.

Water depletion: Consumption or displacement of liquid water (m3 deprivation) – Volume of water consumed measured against the pressure on local water resources.

Depletion of resources - energy: Consumption (MJ) of non-renewable energies.

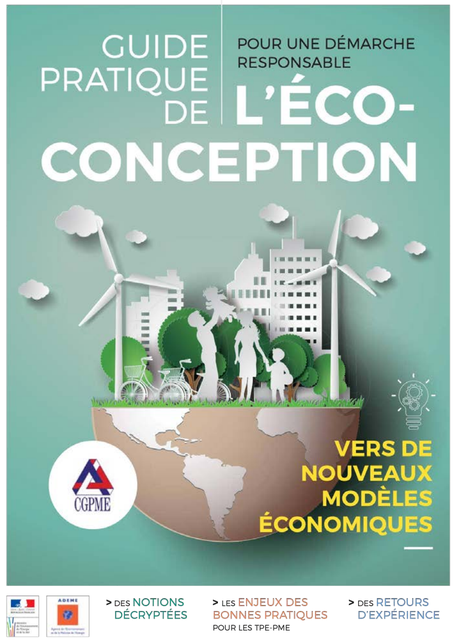
Depletion of resources – minerals: Diminution of the availability of non-renewable mineral resources (kg Sb equivalent). Incidence of the extraction of 1 kg of a given resource from existing stocks, compared to that of 1 kg of antimony.

Resources

List of sustainable design actions at Art Paris 2022 outside the scope of the LCA

https://www.artparis.com/fr/special_projects3

Recommended reading:



https://www.eco-conception.fr/static/une-demarche-deco-conception.html

Definitions

We can distinguish between two types of reuse:

Any operation by which substances, materials or products are used again for the same purpose as the one for which they were originally intended instead of being treated as waste.

Any operation by which substances, materials or products that have become waste are recycled to be used again, usually for a different purpose.