flexiform

Product Carbon Footprint
&
**Environmental Impact Assessments**
2017


Crown
Commercial
Service
Supplier

# Contents



# 1 / DECLARATION

This is to declare that the product carbon footprint and environmental impact assessments of the following products have been calculated by Eco3 Design Ltd, on behalf of Flexiform Ltd, using OpenLCA software:

- Additions 2 1400 x 800 Table
- Freestor Accent Locker (6 compartment) 1332 x 800 x 475
- Freestor Lateral Side Filer (4 drawer) 1322 x 800 x 475
- Jot-up Height Adjustable Desk 1400 x 1650
- Pico 1400 x 800 Single Desk
- Solo 1400 x 800 Desk

Input data was supplied by Flexiform. Where input data was not available directly from Flexiform, data from the EcoInvent V3.3 LCIA data-sets was used. A review of these assessments was undertaken by Green Gain Ltd.

Neither Eco3 Design Ltd nor the Green Gain Ltd assumes any liability to any other party than the Client. And then only in accordance with any Agreement under which this work was carried out.

The carbon footprints and this report were prepared by:
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Signed:

Leigh Holloway
Director For and on behalf of Eco3 Design Ltd.

Report Version: V1 - Draft
Date: 28 Feb 2016

Prepared by:

In Partnership With:

# 2 / SUMMARY

## 2.1 Additions 2 Table (1400mm x 800mm)

PRODUCT NAME: Additions 2 1400 x 800 Table
PRODUCT WEIGHT: 37.1 kg
FUNCTIONAL UNIT: A single table, finished and ready to be delivered to a customer.

PRODUCT CARBON FOOTPRINT

The life cycle stages included in this carbon footprint of this product go from raw materials extraction up to the point where the product is ready to be delivered to a customer. This includes material extraction, processing and manufacture of components and sub-assemblies along with all related distribution and transport activities. It does not include use or end-of-life impacts.

CARBON FOOTPRINT (GWP100): 135Kg $CO_2e$

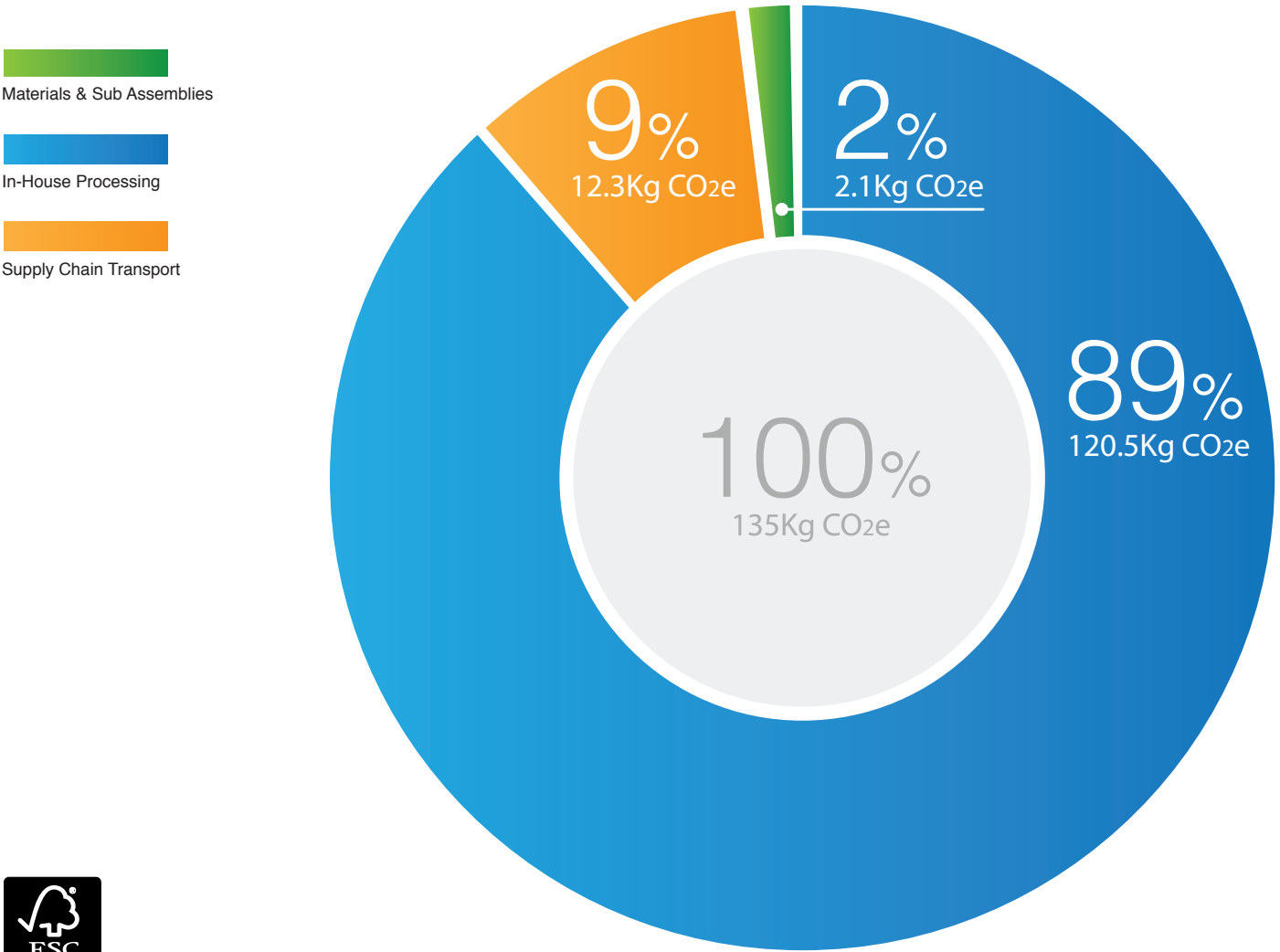



*Figure 1 – Results of Carbon Footprint of Additions 2 Table by life cycle stage/ process*

ADDITIONS 2 TABLES
A2 CHROME LEGS

## 2.2 Freestor Accent Locker - 6 Compartments

PRODUCT NAME: Freestor Accent Lockers - 6 Compartments (1332mm x 800mm x 475mm)
PRODUCT WEIGHT: 64.9kg
FUNCTIONAL UNIT: A single locker, finished and ready to be delivered to a customer

PRODUCT CARBON FOOTPRINT
The life cycle stages included in this carbon footprint of this product go from raw materials extraction up to the point where the product is ready to be delivered to a customer. This includes material extraction, processing and manufacture of components and sub-assemblies along with all related distribution and transport activities. It does not include use or end-of-life impacts.

CARBON FOOTPRINT (GWP100): 193Kg $CO_2e$

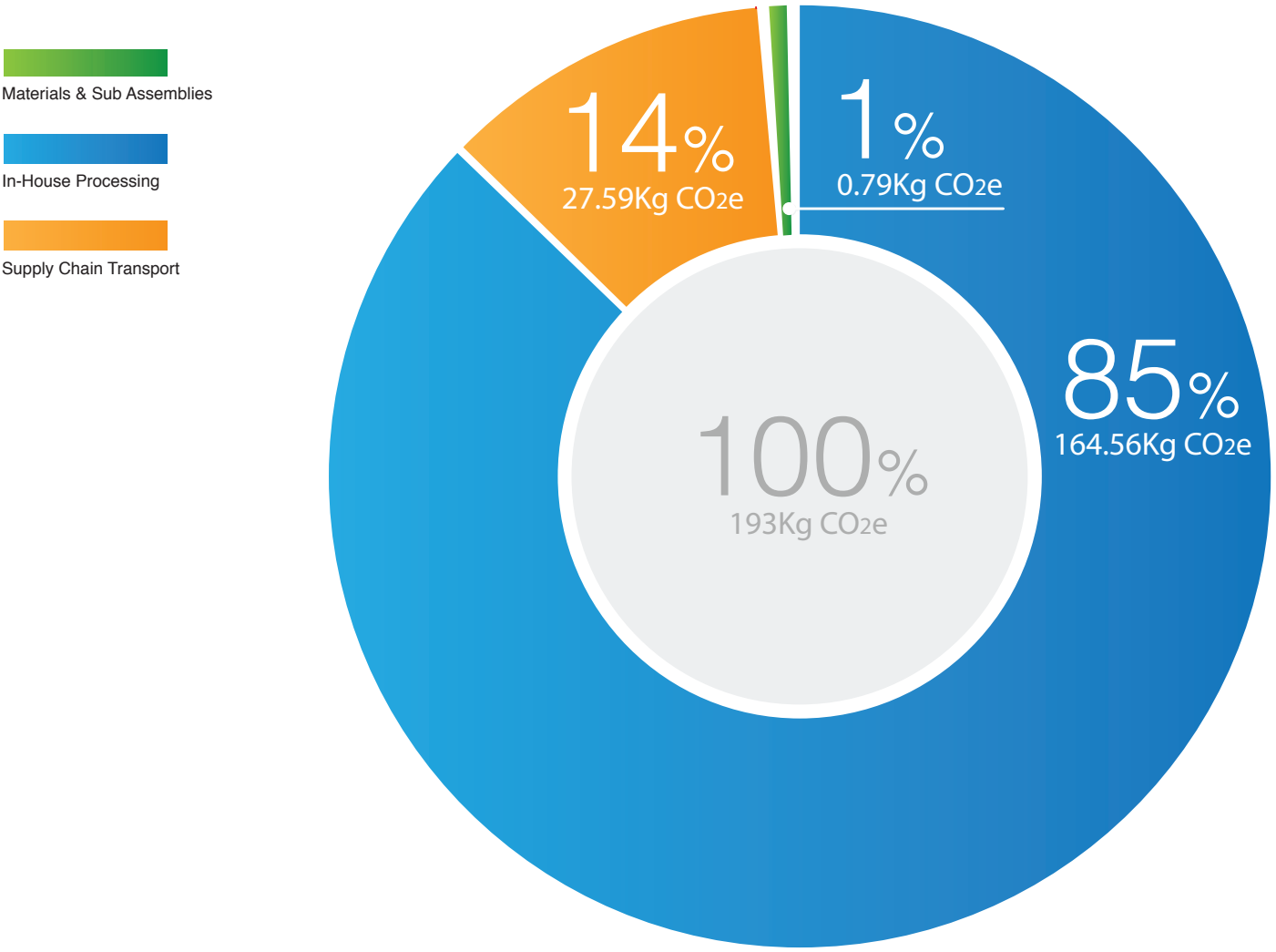



*Figure 2 – Results of Carbon Footprint of Freestor Accent Locker by life cycle stage / process*

FREESTOR ACCENT LOCKER RANGE
10 DOOR WITH COMBINATION LOCKS

## 2.3 Freestor Lateral Side Filer - 4 Drawers

PRODUCT NAME: Freestor Lateral Side Filer - 4 Drawer
(1322mm x 800mm x 475mm)
PRODUCT WEIGHT: 71kg
FUNCTIONAL UNIT: A single lateral side filer finished and ready to be delivered to a customer

PRODUCT CARBON FOOTPRINT

The life cycle stages included in this carbon footprint of this product go from raw materials extraction up to the point where the product is ready to be delivered to a customer. This includes material extraction, processing and manufacture of components and sub-assemblies along with all related distribution and transport activities. It does not include use or end-of-life impacts.

CARBON FOOTPRINT (GWP100): 201Kg $CO_2e$

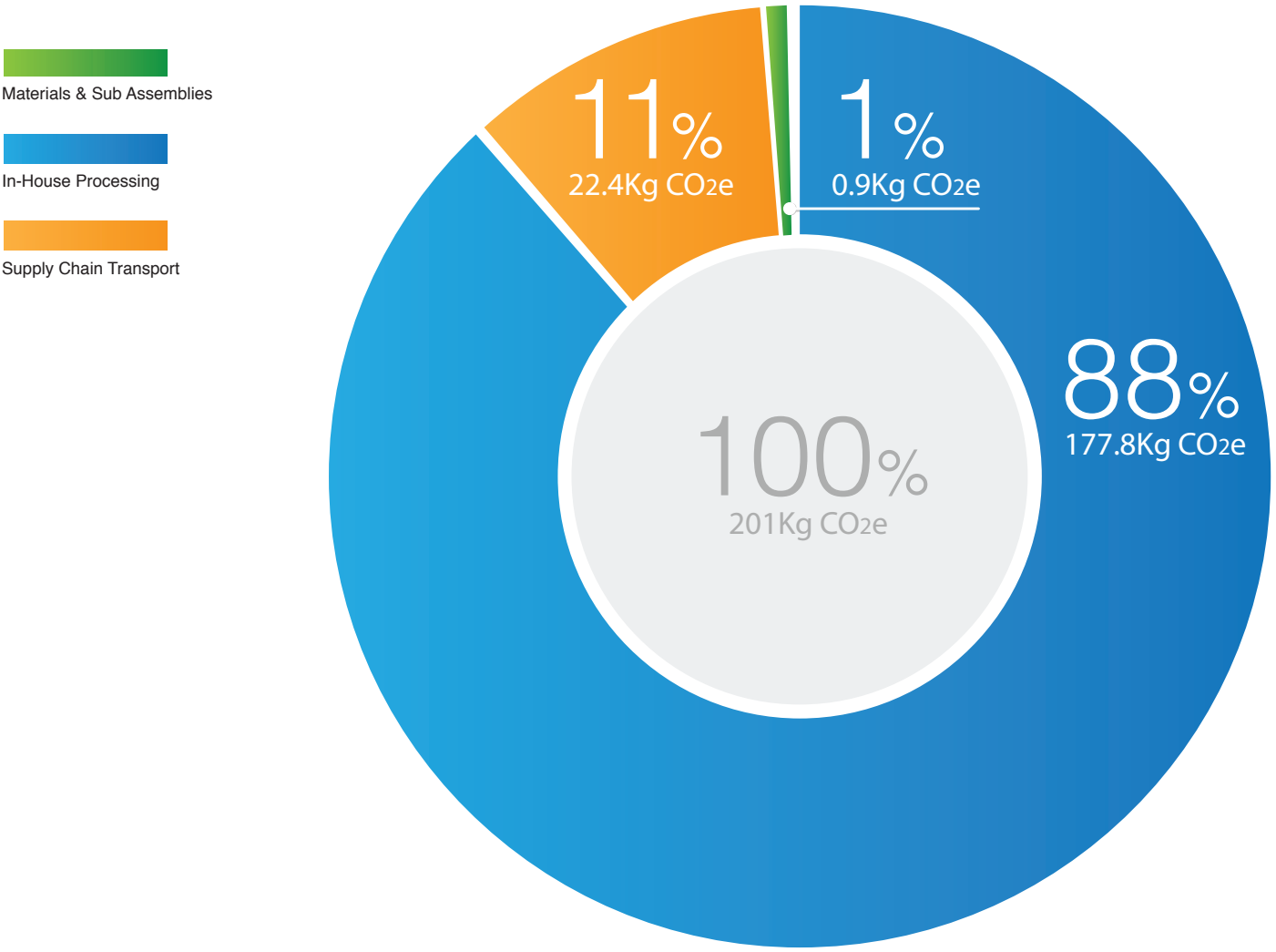
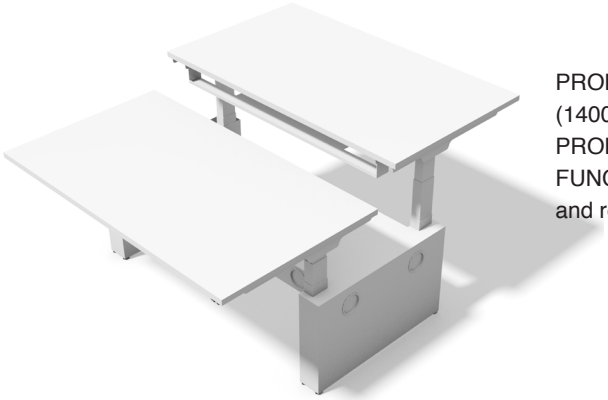



*Figure 3 – Results of Carbon Footprint of Freestor Lateral Side Filer by life cycle stage / process*

FREESTOR SIDE FILER
3 DRAWER UNIT

## 2.4 Jot-Up Height Adjustable Desk (1400mm x 1650mm)



PRODUCT NAME: Jot-Up Height Adjustable Desk (1400mm x 1650mm)
PRODUCT WEIGHT: 84.26kg
FUNCTIONAL UNIT: A single Jot-Up desk finished and ready to be delivered to a customer

PRODUCT CARBON FOOTPRINT

The life cycle stages included in this carbon footprint of this product go from raw materials extraction up to the point where the product is ready to be delivered to a customer. This includes material extraction, processing and manufacture of components and sub-assemblies along with all related distribution and transport activities. It does not include use or end-of-life impacts.

CARBON FOOTPRINT (GWP100): 200Kg $CO_2e$

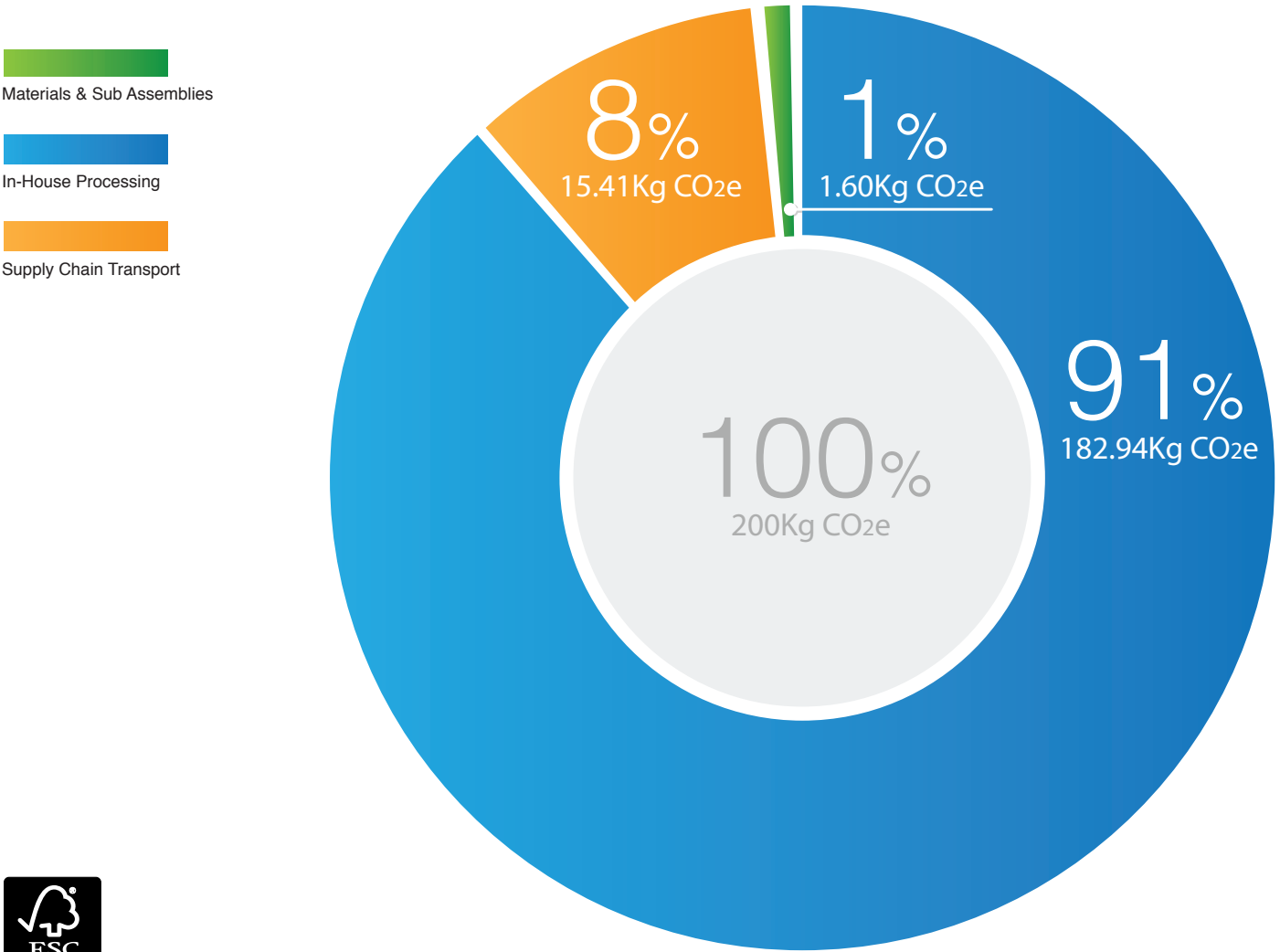



*Figure 4 – Results of Carbon Footprint of Jot-Up H/A desk by life cycle stage / process*

## 2.5 Pico Single Desk (1400mm x 800mm)

PRODUCT NAME: Pico Single Desk
(1400mm x 800mm)
PRODUCT WEIGHT: 46.8kg
FUNCTIONAL UNIT: A single Pico desk finished and ready to be delivered to a customer

PRODUCT CARBON FOOTPRINT

The life cycle stages included in this carbon footprint of this product go from raw materials extraction up to the point where the product is ready to be delivered to a customer. This includes material extraction, processing and manufacture of components and sub-assemblies along with all related distribution and transport activities. It does not include use or end-of-life impacts.

CARBON FOOTPRINT (GWP100): 80Kg $CO_2e$

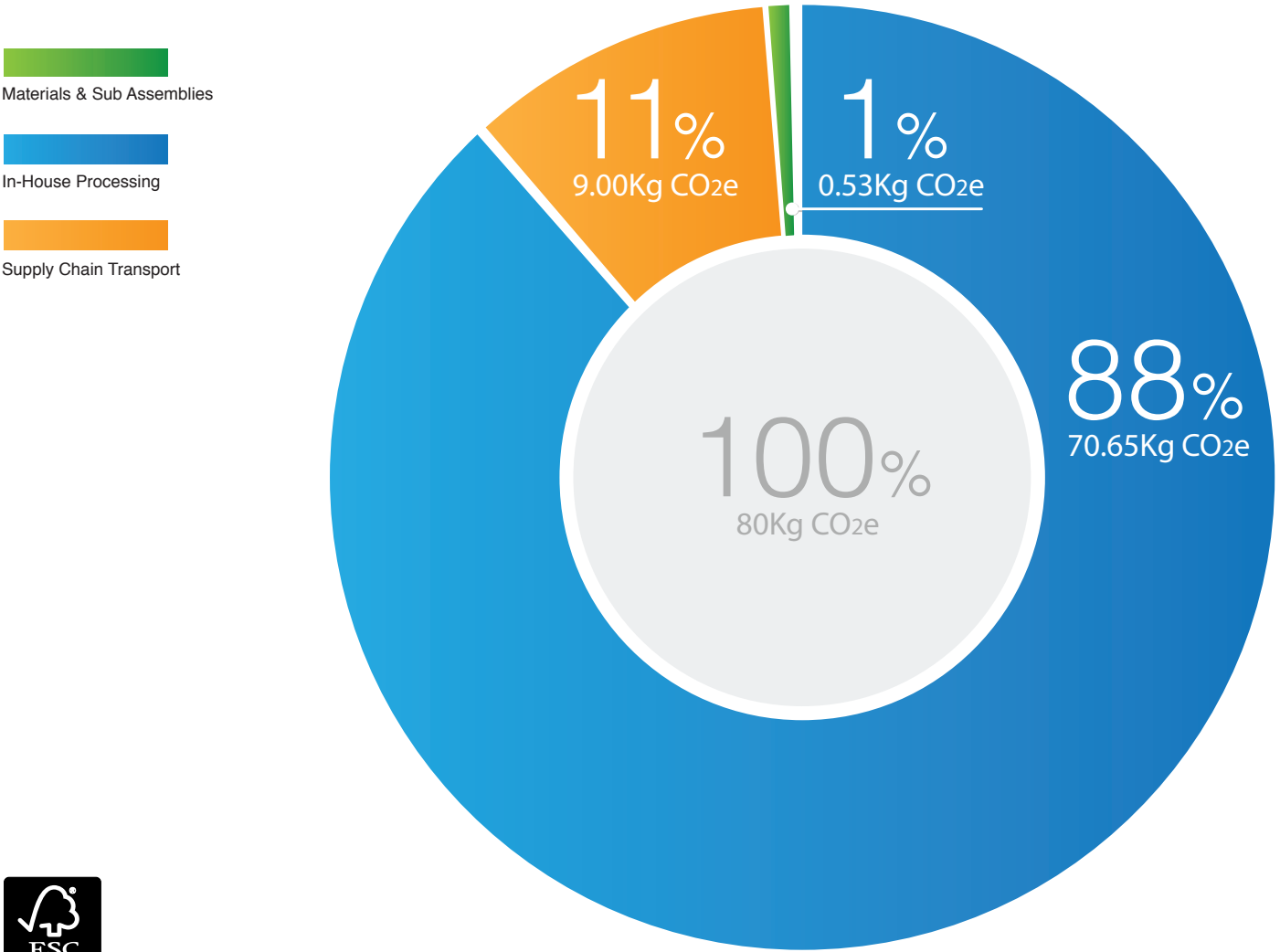



*Figure 5 – Results of Carbon Footprint of Pico Single Desk by life cycle stage / process*


PICO DESK TRIANGLE
SINGLE DESK

## 2.6 Solo Single Desk (1400mm x 800mm)

PRODUCT NAME: Solo Single Desk
(1400mm x 800mm)
PRODUCT WEIGHT: 34.7kg
FUNCTIONAL UNIT: A single Solo desk finished and ready to be delivered to a customer

PRODUCT CARBON FOOTPRINT

The life cycle stages included in this carbon footprint of this product go from raw materials extraction up to the point where the product is ready to be delivered to a customer. This includes material extraction, processing and manufacture of components and sub-assemblies along with all related distribution and transport activities. It does not include use or end-of-life impacts.

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CARBON FOOTPRINT (GWP100): 45Kg $CO_2e$

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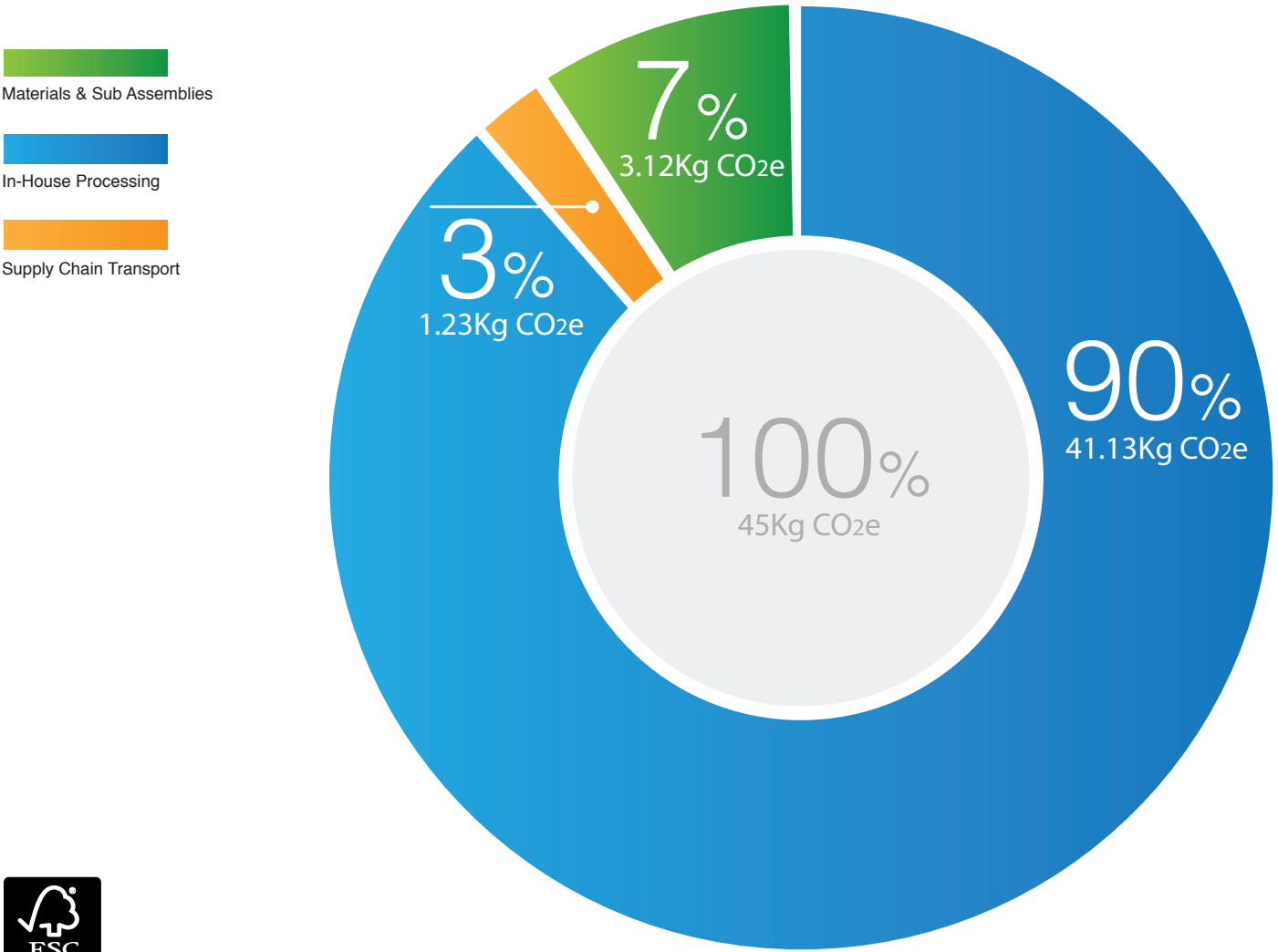


*Figure 5 – Results of Carbon Footprint of Solo Single Desk by life cycle stage / process*

# 2 / SUMMARY

## 2.7 Goal of the Study

The aim of this report is to assess the carbon footprint approach of six office furniture products made by Flexiform Ltd. The products are all standard items that can be ordered from Flexiform by any customer. By calculating the carbon footprint of each discrete material and component the overall impact of a product (based on the number of components used) can then be calculated.

## 2.8 Methodology and Tool

Using an open source LCA tool, OpenLCA , Eco3 Deign Ltd has conducted this study on the basis of the Life Cycle Assessment (LCA) Methodology. The headline impacts presented are related to climate change (CO2e GWP 100) .

LCA is a method used to quantify the total environmental impacts (sometimes called 'environmental footprint') of providing a product or service through all (or some) of its life cycle stages from extraction of raw materials through to final disposal. The general methodology used to conduct this study is in line with that described in the ISO14040:2006 and ISO14044:2006 standards.

## 2.9 Target Audience

The target audience of this report is both internal to Flexiform and external (potential customers). Therefore the information contained in this report has been summarised for external use. This may be presented to potential clients and it is anticipated that it may be used in their decision-making processes. It may also be used to help customers to understand the extent to which they might wish to remediate environmental impacts through activities such as carbon offsetting etc.

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www.openLCA.org
*CO2e is a quantity that describes, for a given mixture and amount of greenhouse gas, the amount of CO2 that would have the same global warming potential (GWP), when measured over a specified timescale (generally, 100 years).*

# 3/ METHODOLOGY

OpenLCA is a free and open software product that allows the modelling of life cycle systems. It has the ability to calculate environmental, social and economic indicators. It has an open architecture which allows the import and export of data. It allows the development of product life cycle models that encompass all life cycle stages. It can be used to assess a type of product or service, presents results in a number of formats and can use a range of datasets and impact assessment methodologies.

The model created for this report follows the principles of ISO14040:2006 and ISO14044:2006 standards. It should be noted that the final requirement of these standards is to subject this study to external review – this has not taken place in this case.An LCA approach consists of considering all the direct and indirect environmental effects that result from the realisation of a defined 'functional unit'. The phases that can be included in a life cycle assessment for a product are:

- Raw material extraction
- Manufacturing and processing
- Distribution
- Use
- Disposal (end-of-life)

Although the term 'life cycle assessment' is used to describe these studies it should be noted that not all life cycle stages have to be included. The ISO standards allow for certain life cycle stages to be omitted as long as the study makes it clear which have and haven't been included. This is set by defining the 'scope' of the study – see Section 5.

When completing an LCA study each life cycle stage is divided into a number of steps based on the different materials and processes utilised in these steps. Once all the steps have been identified they are brought together to form the 'system' which is within the scope of the LCA study.

An environmental balance is calculated by aggregating the flows of the different processes and calculating the overall net inputs and outputs of the system. The overall environmental burdens are calculated by assessing the elementary flows of the different processes within the system and aggregating the emissions values into common units – in this case CO2e for Global Warming Potential.

The impacts can then be presented for the whole life cycle (as defined by the study scope) and also the contribution of each stage to the overall result. In this way areas of larger environmental impact can be identified and measures identified that may reduce this impact. Using a life cycle approach can help to prevent making changes to a product or service system that reduce environmental impacts at one stage at the expense of increasing them in others.

# 4 / SCOPE OF THE STUDY

## 4.1 Functional Unit and Referance Flow

The functional unit is defined as the function fulfilled by the system or systems being studied. It is mandatory under the ISO LCA standards to define a functional unit as this makes for a fair and relevant study, and will allow fair comparisons between different systems, should this be required.

The functional unit should be defined with precision and be based on the utilisation of the products as well as the overall goal of the study. For the 6 products studied in this report the functional units are shown in Table 1.

| PRODUCT | FUNCTIONAL UNIT |
|---|---|
| Additions 2 Table 1400mm x 800mm | A single complete 1400mm x 800mm Additions Table. Total weight 37.1kg. Constructed with a range of raw materials and components supplied by numerous suppliers based in both the UK and abroad. Includes processing activities at Flexiform. |
| Freestor Accent Locker (6 compartment) | A single complete 6 compartment Freestor Accent Locker. Total weight 64.9kg. Constructed with a range of raw materials and components supplied by numerous suppliers based in both the UK and abroad. Includes processing activities at Flexiform. |
| Freestor Lateral Side Filer (4 drawer) | A single complete 4 drawer Freestor Lateral Side Filer. Total weight 71 kg. Constructed with a range of raw materials and components supplied by numerous suppliers based in both the UK and abroad. Includes processing activities at Flexiform. |
| Jot-up Height Adjustable Desk | A single complete Jot-up Height Adjustable Desk. Total weight 84.26kg. Constructed with a range of raw materials and components supplied by numerous suppliers based in both the UK and abroad. Includes processing activities at Flexiform. |
| Pico Single Desk 1400mm x 800mm | A single complete Pico 1400 x 800 Single Desk. Total weight 46.8kg. Constructed with a range of raw materials and components supplied by numerous suppliers based in both the UK and abroad. Includes processing activities at Flexiform. |
| Solo Single Desk 1400mm x 800mm | A single complete Solo 1400 x 800 Desk. Total weight 34.7kg. Constructed with a range of raw materials and components supplied by numerous suppliers based in both the UK and abroad. Includes processing activities at Flexiform. |

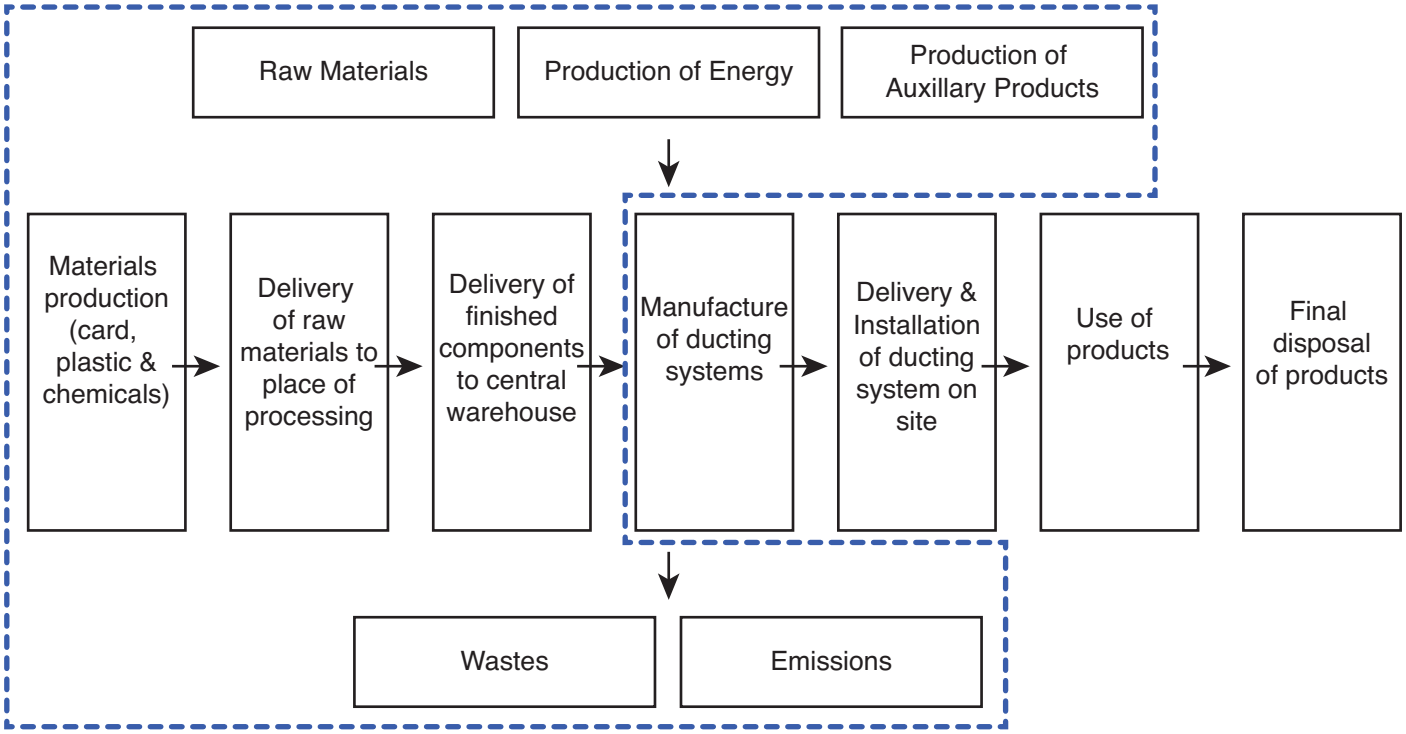
*Table 1 - Functional Units of Products Studied*

All results calculated in this report are displayed per functional unit.

## 4.2 Geographical Scope

The geogrpahical scope of this study is:
MANUFACTURING OF STEEL – considered to be supplied from the 'global' market. Stockholders and suppliers based in the UK.
MANUFACTURE OF PLASTIC MATERIALS – considered to be supplied from a European market. Stockholders and suppliers based in UK and Europe.
MANUFACTURE OF COATING MATERIALS – manufactured in the UK from materials and chemicals from European and Global Markets.
TRANSPORTATION AND DISTRIBUTION – Europe and UK
ENERGY AND RESOURCES USED IN PROCESSING IN THE UK – standard UK supplied grid electricity, mains gas and mains water.

## 4.3 Flow Diagram & System Boundaries




System Boundary used for this assessment.

*Figure 7 – Flow Diagram and System Boundary*

## 4.4 Included and Excluded Steps & Assumptions

The product life cycle is divided into elementary stages. Table 2 shows which are included in this study and which are excluded.

| STAGES INCLUDED IN THIS STUDY | STAGES EXCLUDED IN THIS STUDY |
|---|---|
| Raw materials used in manufacture<br>Processes to convert raw materials into useable materials – e.g. oil into polymers<br>Manufacture of finished components from raw materials<br>Distribution of sub-assemblies and materials to Flexiform<br>Manufacturing activities at Flexifom | Distribution of materials to place suppliers[3]<br>Transportation of products to customer's site<br>Installation of products on-site<br>Use of products<br>Removal and disposal of products at end of life |

Table 2 – Stages included in the Study

The ISO rules allow for life cycle stages to be excluded if the available data are too confusing, there is a lack of robustness in the datasets, or the particular life cycle stage has a very small effect on the overall life cycle impacts (usually less than 2%).

The use phase of these products will be 'benign' in terms of carbon footprint. Most use no energy at all and the only possible life cycle impact would be occasional cleaning. The Jot-up desk uses energy to adjust it but this is likely to be very low consumption over its entire life. The end of life impact of each product will vary depending on what happens to it when it is removed (and in some cases the location of the installation geographically). For this reason it is justified under the guidelines of the ISO standards for these stages to be excluded.
The results of the study make this clear.

## 4.5 Impact Category

The OpenLCA tool used for this study is a multi-criteria assessment tool covering a single environmental impacts category.

| IMPACT CATEGORY | UNIT |
|---|---|
| Climate change - CWP100 | Kg CO2 eq. |

Table 3 – Impact Category calculated in this Study

# 5/ DATA SOURCES

## 5.1 Data Sources

There are 2 types of data sources used in LCA studies: Primary data and secondary data.
- Primary data sources are those provided by producers of goods and operators of processes and services, as well as their associations.
- Secondary data sources either give access to primary data (possibly after re-modelling / changing the data) and to generic data e.g. National databases, consultants and research groups.

In this study the majority of the data used is secondary data. Primary data collection was used to assess the impacts of manufacturing operations at Flexifom.

The OpenLCA tool can utilise a range of databases and data sources. For this study the database of emissions factors used is EcoInvent database V3.3; the database contains over 10,000 Life Cycle Inventory (LCI) datasets in the areas of energy supply, agriculture, transport, biofuels and biomaterials, bulk and specialty chemicals, construction materials, packaging materials, basic and precious metals, metals processing, ICT and electronics, dairy, wood, and waste treatment.

EcoInvent V3.3 provides a comprehensive, transparent, international LCI database of secondary data sources. It is one of the foremost datasets in LCA and is utilised by many of the most widely used and highly regarded LCA tool and systems. Extensive documentation is available online at www.ecoinvent.org.

No other data sources are used in this study.

## 5.2 Assumptions

- All data and information provided by Flexiform is presumed to be correct and has not been independently checked.
- All energy used in processing is from standard mains grid supply (gas, electricity).
- All transportation is undertaken via road in vehicles with Euro6 standard engines.
- All transportation distances were calculated using mapping software and represent routes most likely to be used by transport companies.

# 6/ LIMITS OF THE STUDY

The impact assessment phase of this limited LCA study is aimed at evaluating the overall global warming potential impacts of 6 products based on a life cycle from extraction of raw materials to finished products being in stock and ready to be delivered to customers. The results of this study are only valid if they are used to represent this situation.

LCAs do not represent a complete picture of the environmental impact of a system as not all key categories of impacts are included. Results need to be considered carefully taking into account this information.

Any judgements that are based on the interpretation of the results of this study or comparing results with other products must bear in mind the limitations of this study as well as the scope and functional units (as defined).

Limitations of OpenLCA Tool – The quantitative reliability analysis is based on a quantitative judgement of the user and LCA practitioners. It is possible that two different users modelling the same 6 products could generate different results.

# 7/ GLOSSARY

CARBON FOOTPRINT - the total amount of greenhouse gases produced both directly and indirectly as a result of a defined activity, usually expressed in equivalent tons of carbon dioxide (CO2e).

CO2e - an abbreviation of ‘carbon dioxide equivalent’ and is the internationally recognised measure of greenhouse emissions.
Functional Unit - quantified description of a product system. The functional unit provides the reference to which all other data in the product systems are normalised.

IMPACT CATEGORY - environmental issues of concern. They describe the impacts caused by a product or system being analysed.

LIFE CYCLE - the whole life stages of a product or system. From extraction of raw materials through to the eventual disposal / end-of-life.

LIFE CYCLE ASSESSMENT (LCA) - a technique to assess environmental impacts associated with all the stages of a product’s (or system’s) life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.

MATERIALS - the raw materials used to make a product or consumed within a system.

PROCESSING / MANUFACTURING - stages through which a material or substance is put to change its physical shape and/or chemical makeup. Processing typically consumes energy and in some cases other resources such as water and other materials.

SCOPE - refers to the scope of an LCA. The scope of the study describes the most important methodological choices, and assumptions used to carry out the LCA as well as any omissions and limitations.

SYSTEM BOUNDARY - determines which unit processes to be included in the LCA study. Defining system boundaries is partly based on a subjective choice, made during the scope phase when the boundaries are initially set.

TRANSPORT – stages in a product’s life cycle where materials and resources (or the product itself) are moved from one place to another. This can include moving raw materials between processing plants, components between suppliers and finished products to different distribution points or customers and end-users.

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