



LIFE CYCLE ASSESSMENT

A FU⁺UREPLUS GUIDE

+ WHAT IS A LIFE CYCLE ASSESSMENT?

Traditionally, a Life Cycle Assessment (LCA) analyses the **environmental impact** at every stage of a product's **life cycle**. It follows the internationally recognised framework standardised by [ISO 14044:2006](#). Increasingly however, the positive (or negative) **social** and **economic impact** of products and materials are also being reviewed and considered as part of the LCA process.

Every part of a product's life cycle – from raw material extraction (“cradle”), manufacturing and processing, transportation, use and retail, to waste disposal (“grave”) – can have an environmental, economic or social impact in many different ways.

There are several different types of LCA. As a rule of thumb, the more detail you want, the more complete your LCA needs to be. In this guide, we will go through the **different types** of LCA and the **four phases** of completing an LCA, defined by the ISO standards 14040 and 14044.

+ THE 'WHY'

The objective of an LCA is to fully understand the potential impact of a consumer product or service, in order to ensure it is produced, processed and consumed in the most sustainable manner for society and the planet.

However, there are other benefits to carrying out an LCA, including:

- Compliance with regulations
- Identifying potential cost savings
- Identifying product design or strategic improvements
- The ability to communicate a competitive edge
- Risk management
- Supplier evaluation

LCAs are **time consuming** and **data intensive** and most commonly carried out with extensive third party support.

We suggest you align your aims with the appropriate type of LCA. Further details can be found in the next part of this guide.

+ CONCEPTUAL LCA

Sometimes referred to as “**Life Cycle Thinking**”, this is the **simplest form** of LCA, and is used at a basic level to make an assessment of a product’s impact based on a limited and often qualitative inventory.

- Suitable for helping decision makers identify which products have a competitive advantage in terms of lowest relative environmental, social or economic impact.
- Not suitable for marketing purposes or for public dissemination.
- Non-ISO and predominantly used for internal use.

+ SIMPLIFIED LCA

A simplified assessment that focuses on the most important impacts, and thoroughly assesses the reliability of the results, this type of LCA can be used for a **screening assessment** (i.e. covering the whole life cycle) and consists of three stages:

1. **Screening** – Identifying the parts of the system/life cycle that are either important or have data gaps;
2. **Simplifying** – The findings from the screening process are used to focus further work on the important parts of the system; and
3. **Assessing reliability** – Checking that simplifying does not significantly reduce the reliability of the overall result.

A simplified LCA is roughly based on ISO guidelines and uses a combination of primary and public data.

+ DETAILED LCA

A detailed, full process LCA requires **extensive data collection** (mostly primary data).

- Highly specific to the product in question.
- Fully follows the ISO standardised protocol.
- Common uses of detailed LCAs include seeking carbon offsets, to achieve compliance with product disclosure rules, or public marketing of results or product comparison.

+ EX-ANTE LCA

An ex-ante LCA is more applicable for emerging or innovative products. This type of LCA explores future outcomes for a product by assessing a range of possible scenarios that define the space in which the technology may operate.

+ THE 4 KEY STAGES OF AN LCA

Phase 1 – Defining the scope & goals

- **What you will be assessing?** Is it a product, process or service?
- **What system will you be assessing in?** For example, “cradle-to-gate” (from resource extraction to entering the factory) or “cradle-to-grave” (from resource extraction to end-of-life/disposal).
- **What won't you be assessing?** Set your boundaries.

Phase 2 – Life Cycle Inventory (LCI)

The **data collection phase** of your LCA, an LCI analysis looks at the **environmental, social and economic** inputs and outputs of your product.

For example, the emissions, energy requirements, water, or raw materials required in each process.

Phase 3 – Impact Assessment

Here, the impacts on the environment are calculated. In other words, **translating the data into impacts.**

Examples of **impact categories** include global warming potential (GWP), acidification and human toxicity.

Phase 4 – Interpretation

This phase is about asking: **what does all of this mean?**

The interpretation of an LCA should include:

- Identifying significant issues
- Assessing the study itself and how it went
- Conclusions, limitations and recommendations for future LCAs

+ LCA VS. EPD

An LCA can be used as part of an **Environmental Product Declaration (EPD)** - a report produced by an organisation or manufacturer to transparently demonstrate commitment to measuring and reducing the impact of its products and/or services.

An EPD must be verified by an approved independent verifier before being registered, and can be used as a record of environmental, social and economic performance of a product or service.

While an LCA report contains all input data needed to conduct the LCA (including potentially commercially sensitive information), the EPD only discloses the environmental profile of the product, meaning it is the EPD, rather than the full LCA, that is often publicly shared.



+ NEED MORE HELP?

We offer consultancy services if you are thinking of carrying out an LCA, or would like more comprehensive support, for example a consultation on integrating circular economy principles within your business.

Please let us know if you would like more information - we would be happy to provide a quote: team@future-plus.co.uk