worldsteel
ASSOCIATION

LIFE CYCLE ASSESSMENT IN THE STEEL INDUSTRY

worldsteel position paper

Introduction

Climate change and the sustainable use of natural resources are among the main challenges for society today. This puts them at the top of the political environmental agenda, where they are likely to remain for the foreseeable future.

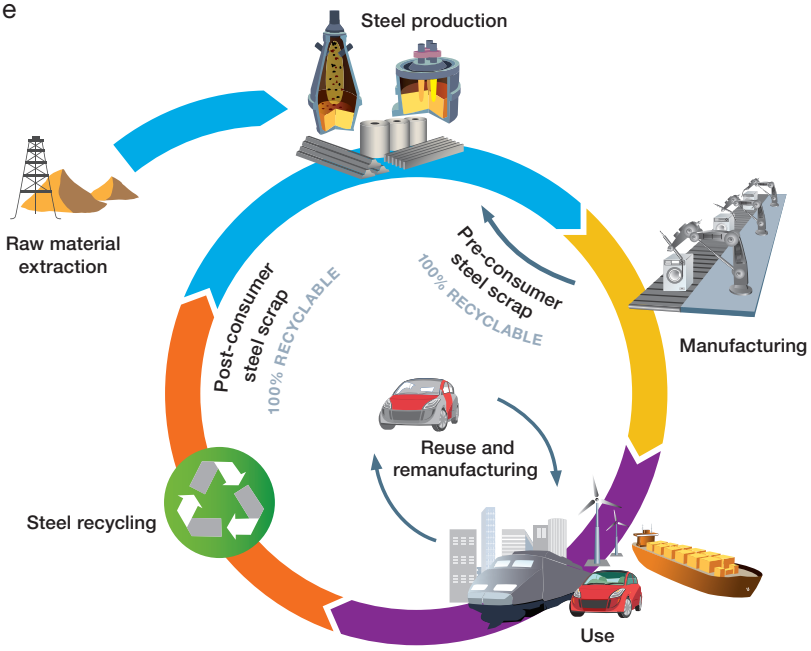
There is a realisation that product design and consumer behaviour can affect the overall environmental performance and efficiency of a product. Companies making the products are paying closer attention to manufacture, utilisation and end-of-life, which is an increasingly important factor for material specifiers.

Among the tools and methodologies available to evaluate the environmental, economic and social performance of materials and consumer products (including their impact on climate change and natural resources), life cycle assessment (LCA) provides a holistic approach that considers the potential impacts from all stages of manufacture, product use and end-of-life (reuse, recycling or disposal).

Key to this work is the recognition that a full life cycle approach is the best way to assess a product's impact on the environment. It is also, therefore, the best way to help society make informed decisions on the use of materials and their economic importance. Focusing solely on one aspect of a product's life, such as the material production, distorts the real picture because it might ignore increased impact during another life cycle phase, such as the use phase.

LCA, based on sound methodology and transparent reporting, is an important tool to assist with policy-making.

Steel's life cycle



Life Cycle Assessment

The procedures of LCA are part of the International Standards Organisation (ISO) 14040 series of standards. LCA takes into account the environmental impacts of the manufacturing processes of a product, the extraction of the raw materials used by these processes, the use and maintenance of the product by the consumer, its end–of-life (reuse, recycling or disposal) as well as the various methods of transport occurring between every link of the chain.

The use of LCA is becoming more widespread. There is an increasing number of national or regional databases which cover major industrial sectors. Many manufacturing organisations have LCA departments and there are more and more LCA software packages on the market. It is also a subject taught at universities.

LCA in worldsteel

As the global body for steel, worldsteel is in a unique position to provide the most consistent and accurate information about LCA in the steel industry.

Steel is a major constituent material for a wide range of market applications and products, such as in the automotive, construction and packaging sectors. At a very early stage, the steel industry recognised the need to develop a sound methodology to collect worldwide LCI data, to support the markets and customers. A thorough set of guidelines was developed for companies that carry out or use LCA, which recommended maintaining the highest standards in both the undertaking of LCA studies and their disclosure. This is to prevent the reduction of complex issues to simplistic and partial analysis, which is especially important when using LCA to compare alternative materials.

worldsteel has been collecting life cycle inventory data from its member companies worldwide since 1995, with the launch of the worldsteel life cycle inventory (LCI) methodology and study. The worldsteel methodology provides a common basis of measurement of environmental and efficiency performance around the world. The LCI data quantifies 'cradle to gate' inputs (resources use, energy) and outputs (environmental emissions) of steel production from:

- extraction of resources and use of recycled materials,
- production of steel products to the steelworks' gate and
- end-of-life recovery and recycling of steel.

This data is used worldwide in LCA studies, not only by industry, but also by universities (often commissioned by industry and governments to inform their decisions and policy-making) to ensure informed material selection decisions. The worldsteel programme helps to identify ways to improve the eco-efficiency of steelmaking.

The fourth worldsteel LCI data collection was completed in 2017. Its aims are:

- to provide up-to-date and consistent LCI data for steel products around the world,
- to increase the coverage of steelmaking sites within the new datasets and
- to determine global LCIs for additional steel products.

As the exercise is repeated and improved over time, the LCI framework can also be used as a powerful tool for measuring progress by the steel industry. Thirty-seven companies worldwide participated in the data collection exercise for the 2017 data release.

worldsteel's LCA methodology and LCI data help the industry to:

- provide information to our customers, as well as their customers
- understand the contribution of steel to the environmental performance of product systems in different applications
- support technology assessment (benchmarking, determination and prioritisation of environmental improvement programmes)
- carry out impact assessments to reduce the impacts of its own processes on the environment and to work closely with its customers to gain knowledge about the total impact of steel-using products on the environment, over their complete life cycle
- increase public knowledge of the life cycle environmental benefits of using steel in applications and where it can be effective in improving environmental performance.

LCA also plays a vital role in companies' environmental and greenhouse gas reporting requirements, marketing and sales support, and ensuring compliance with regulations and voluntary initiatives such as environmental product declarations.

Steel's global approach

The worldsteel LCA Expert Group was established in 1998. It undertakes a work programme to improve worldsteel's methodologies and to align them with other regional initiatives. The forum also aims to:

- collect and provide industry-wide LCI data for steel products,
- inform member companies about developments in LCA and related fields,
- provide information to customers and markets,
- demonstrate the benefits of steel by using LCA which could lead to environmental improvements and,
- promote good practice in the use of LCA.

The expert group engages all stakeholders in the LCA process, to make better use of LCA as a tool in inter-material competition and steel promotion.

The future

worldsteel has a clear mission to achieve the following objectives in the coming years:

- provide detailed information so that the environmental implications of the use of steel within different sectors can be quantified and understood as well as to support responses to environmental claims against steel.
- build the LCA Expert Group's position as the most authoritative source for steel LCI data and LCA methodology.
- advocate for LCA to be used to promote life cycle thinking, to support policy and decision-making.
- continue discussions and harmonisation with other industries, particularly the metals industry, to help improve the credibility of LCI data and LCA methodology, whilst ensuring that elements that truly reflect steel's positive position are maintained.
- provide our customers with accurate information as they analyse the environmental impacts of their products that contain steel.

LCI data and all related documents are available via worldsteel.org. If you are carrying out an LCA study, you can fill in the data request form at worldsteel.org.

Updated in September 2017

worldsteel
ASSOCIATION

World Steel Association

Rue Colonel Bourg 120
B-1140 Brussels
Belgium

T: +32 (0) 2 702 89 00
F: +32 (0) 2 702 88 99
E: steel@worldsteel.org

C413 Office Building
Beijing Lufthansa Center
50 Liangmaqiao Road
Chaoyang District
Beijing 100125
China

T: +86 10 6464 6733
F: +86 10 6468 0728
E: china@worldsteel.org

worldsteel.org