



Sustainable
steel

Indicators 2020 and
steel applications

Steel industry materiality assessment



During the most recent materiality assessment of the steel industry, it was identified that a number of areas including ‘Product applications’ need to be further addressed in our communications.

This publication features key information on the topic with a focus on three steel product applications: automotive, construction and packaging.

Innovative and advanced steels are extensively used in these applications. The pyramid infographic on the next page illustrates the steel industry’s goals and actions for these sectors along with interesting facts and information.

Steel markets and applications

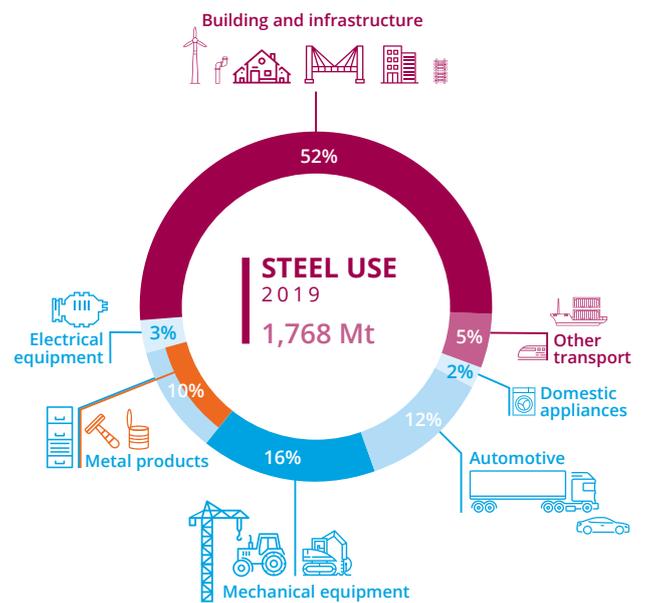
Steel plays a critical role in virtually every aspect of our lives. The rails, vehicles and ships that make up our modern transport systems use steel. Steel provides the supporting structure as well as connections, roofs, walls, windows, doors and rails for the buildings where we work, learn and live. It protects and delivers our water and food supply. Steel is ideal for hygiene medical devices and is vital in technologies that generate and transmit energy.

Steel is vital in our lives and our society simply because

no other material has the same unique combination of strength, formability and versatility.

New generations of steel continue to be developed that enable steel users to implement more durable, lightweight, safe and carbon-lean designs, enabling them to be more sustainable.

Steel applications can help us to meet challenges such as climate change, poverty, population growth, water distribution and renewable energy generation.



Life cycle thinking: key to every aspect of sustainability

To understand the environmental performance of a product, its entire life cycle needs to be considered. A life cycle assessment (LCA) of a steel product looks at resource and energy consumption and emissions to air, water and land. This is assessed from the raw material extraction stage to its end-of-life stage, including reuse and recycling.

worldsteel provides global and regional LCI data for 17 steel products, from hot rolled coil to plate, rebar, sections and coated steels. This data enables product designers to make informed material choices. worldsteel’s buildLCA and autoLCA tools help

determine the environmental performance of steel in the construction and automotive sectors compared to alternative materials.

An LCA approach must be considered for the development of appropriate legislation to ensure that the true environmental impact of products is assessed correctly and consistently, avoiding unintended consequences.

Construction, automotive and packaging are examples of just three market sectors where life cycle thinking is being incorporated into regulations and standards, but a more widespread application is crucial.

The LCI data quantifies ‘cradle to gate’ inputs (resources, energy) and outputs (environmental emissions) of steel production from:



the extraction of resources and use of recycled materials,



production of steel products to the steelworks’ gate,



reuse and remanufacturing, and



end-of-life recovery and recycling of steel.

AUTOMOTIVE

CONSTRUCTION

PACKAGING

AROUND THE WORLD



1 billion cars are currently in use on earth

Electric vehicles, autonomous cars, and car sharing are the key future mobility trends

The first electric car was invented nearly **200 years ago**

The average car contains **over 30,000 unique parts**

A typical passenger vehicle emits **about 4.6 metric tonnes of CO₂** per year



Nearly **70% of the global population** will live in cities by 2050

Buildings account for about **30% of final energy use** and more than **55% of global electricity consumption**

In 2019, the total number of **buildings over 200 metres high was 1,603**

The number of **LEED-certified projects** in the United States rose from 296 certifications in 2006 to over 67,200 in 2018



More than **25% of all food** produced globally for human consumption is **lost or wasted**

Containers and packaging make up **one third of global waste**

Most common packaging materials are **paper, plastic, aluminum, glass and steel**

Today more than **70% of global soft drinks** are sold in PET bottles

OUR COMMITMENT



Provide steel solutions that meet the automotive industry's needs and challenges in a sustainable and environmentally responsible way



Provide steel solutions that enable more energy-efficient and carbon neutral buildings



Provide steel products that enable the packaging industry and its value chain to be more sustainable and cost effective

OUR ACTIONS



Develop high performing steel solutions to **reduce weight while maintaining safety levels**



Continue a legacy of steel innovation that **addresses the evolving demands of vehicle design and manufacture**



Demonstrate applications that will **shape the future of sustainable mobility** through steel innovation



Promote the use of **autoLCA**



Rethink and reinvent the use of steel in construction via our **Zero Energy Building initiative**



Collaborate with other construction materials to provide optimal solutions



Proactive communications with the value chain of the construction industry



Promote the use of **buildLCA**



Continue to develop **steel grades** that are **thinner but stronger**



Develop further **technologies** that can meet the needs for **flexible design and shape**



Demonstrate **benefits of steel packaging solutions** in an unequivocal and engaging way

THE STEEL INDUSTRY



New grades of **Advanced High-Strength Steels (AHSS)** can reduce total vehicle weight by 8-10% compared to conventional steel

Today vehicle body structures can contain **more than 50% AHSS**

Electric steel is an essential material in the construction of generators and motors for electric vehicles

Lightweighting, safety, battery protection and cost reduction are the main reasons for automakers to select steel for the body of electric cars

The future of steel is expected to enable even lighter yet stronger vehicle structural designs, thereby **further minimizing a vehicle's carbon footprint** from a life cycle perspective



Global steel demand for construction is expected to **rise by 2.1% every year** for the next 15 years

Steel offers the highest strength-to-weight ratio of any building material

Use of Advanced High-Strength Steel enables **high rise buildings to be built with 50% less steel**

Steel buildings are increasingly designed to be reused. **CO₂ emissions savings from reusing steel within buildings** are estimated at 1 to 1.5 kg CO₂ /kg steel



Steel is the **most recycled material** in the world. **82.5% of steel packaging** is currently **recycled in the EU**

A **recycled steel can be back on the shelf as a new can within 60 days**

Each steel can recycled **saves about 1.5 times its weight in CO₂**

The weight of steel cans has been **reduced on average by 33%** in the last 20 years

Steel packaging is an unrivalled solution for **shelf life, transport, storage, use and recycling**

Sustainability performance of the steel industry

The World Steel Association has been reporting on the sustainability performance of the global steel industry since 2004. Steel companies report up to 8 sustainability indicators every year via worldsteel's sustainability indicators data collection project.

In 2020, 104 steel companies and associations contributed to the data collection. Crude steel produced by companies who reported on one or more indicators for fiscal year 2019 was 1.1 billion tonnes, representing 59% of global crude steel production.

	Indicator	Unit	2017	2018	2019	
Environmental Performance	1	CO ₂ intensity	tonnes CO ₂ / tonne crude steel cast	1.84	1.81	1.83
	2	Energy intensity	GJ / tonne crude steel cast	19.85	19.54	19.84
	3	Material efficiency	% of materials converted to products and co-products	96.49	96.33	97.49
	4	Environmental management systems	% of employees and contractors working in registered production facilities	96.55	97.08	97.15
Social Performance	5	Lost time injury frequency rate	injuries / million hours worked	0.97	0.84	0.83
	6	Employee training	training days / employee	6.26	6.36	6.89
Economic Performance	7	Investment in new processes and products	% of revenue	5.76	6.10	7.07
	8	Economic value distributed	% of revenue	95.36	93.84	98.02

Steel Sustainability Champions

Sustainability is a core business requirement, vital to a company's continuing license to operate. An ethical and socially responsible approach can act as a competitive advantage for forward-thinking steel companies.

worldsteel member companies who are leading the way to create a truly sustainable steel industry and society

and who clearly demonstrate their commitment to sustainable development and the circular economy are recognised annually as Steel Sustainability Champions.

The 2019 Steel Sustainability Champions are:



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Tata Steel Limited



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