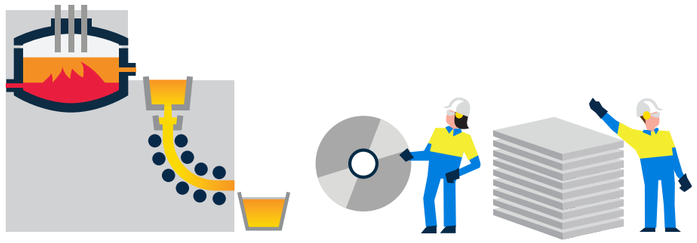
TATA STEEL

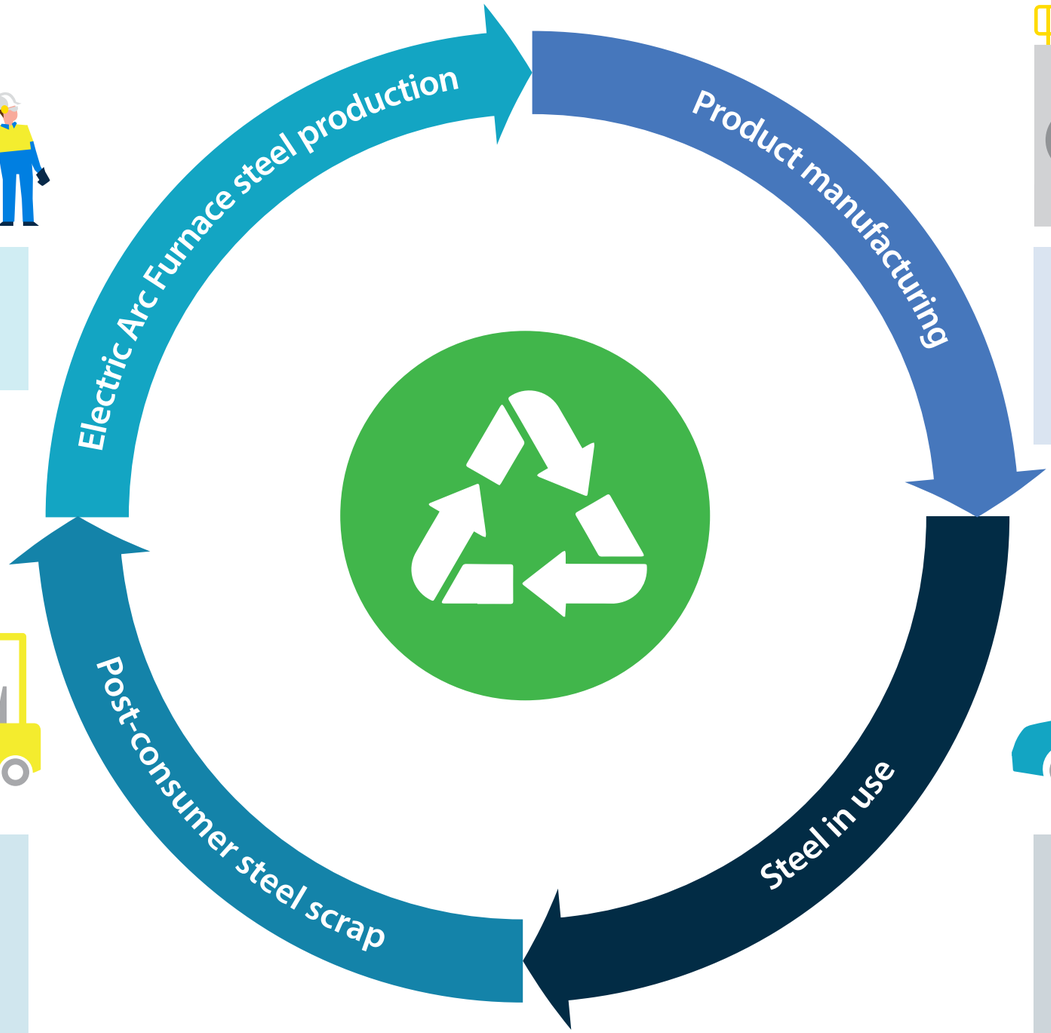
Electric arc furnace (EAF) steelmaking and the circular economy

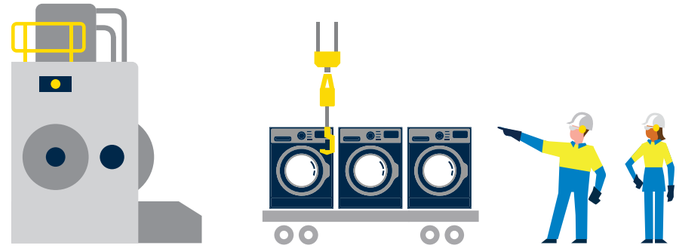


Through EAF steel production, new steel can be made with scrap steel. This significantly reduces energy use and the reliance on raw materials. Each item of recycled steel saves one and half times its weight in CO_2.

Steel's magnetic properties makes it easy to sort from waste, enabling high recovery rates and avoiding landfills. The UK has an abundance of steel scrap that can be used to make new steel. The sorting process also recovers other elements, such as copper, which can in turn contribute to circularity in their own supply chains.

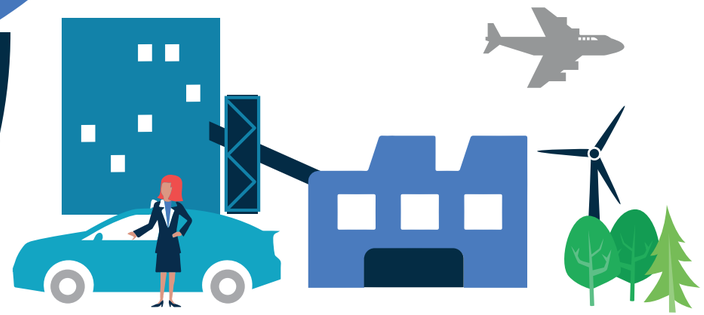
To enhance durability, steel is often coated in zinc. The EAF is not only excellent at recycling steel, but also very efficient in recovering zinc which is then returned to its own circular supply chain.





Once produced, recycled steel is readily used for cars, buildings, domestic appliances and thousands of other applications. Following production, leftover steel scrap can be used to make more new steel.

Each tonne of steel recycled saves over twice its weight in raw materials.



Steel is 100% recyclable, can be reused infinitely and will play a critical role at the heart of a future sustainable green economy.

Steel is vital in modern modular construction methods facilitating the reuse of components and Tata Steel UK is already playing a leading role in this area with many more solutions in development.

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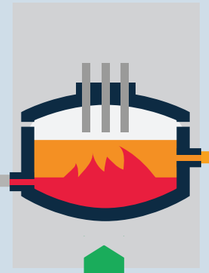
How electric arc furnace (EAF) steelmaking works

Scrap steel

Scrap is generated by consumers (for example food cans and aerosols) and manufacturers that process steel and make steel products. Scrap can be recycled infinitely. Additional iron may be added in the form of HBI* (Hot Briquetted Iron), Pig Iron or Direct Reduced Iron.

Electric arc furnace

An EAF melts scrap steel using a powerful electric arc generated between electrodes and the raw materials. Oxygen is blown into the furnace to purify the steel.

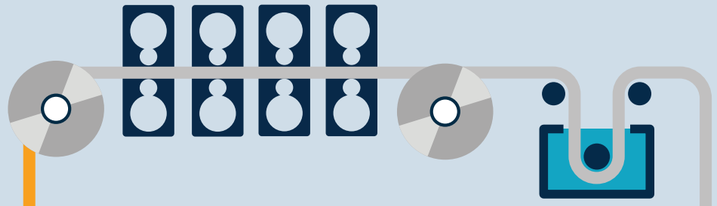


Refining

Impurities are removed through chemical reactions and degassing, to produce for example ultra low carbon steel grades used in formable steels.

Continuous casting

Transforms molten steel into solid rectangular slabs. The water-cooled mould forms a solidifying shell on its surface. This efficient process minimises impurities and improves mechanical properties.



Rolling and downstream processing

The hot slabs pass through a series of rollers. This mechanical pressure shapes and thins the steel, enhancing its strength and altering its dimensions. The process refines the steel's grain structure, boosting its mechanical properties. After this the steel can be pickled, cold-rolled, annealed, coated, painted, formed or made into tubes to suit customer end use applications

Energy

Energy is supplied principally in the form of electricity, which in the future could be supplied from 100% renewable sources including offshore wind.

Applications

EAF steel can be used in a very wide variety of end use applications including construction, automotive, household appliances, heavy vehicles, food packaging and much more.