

## CO<sub>2</sub> Footprint

### **Reducing energy consumption and CO<sub>2</sub> emissions during the steel manufacturing process**

In the context of steel products, a CO<sub>2</sub> footprint is a measure of the total amount of CO<sub>2</sub> emitted over the life cycle of the product. This includes emissions associated directly and indirectly with manufacture, use and end-of-life. This document primarily focuses on the CO<sub>2</sub> emissions associated with our steel manufacturing processes. However, when evaluating the CO<sub>2</sub> footprint of Tata Steel products it is also worth noting that we offer a number of products that help reduce emissions in the use phase. For example, our range of advanced high strength steels help to reduce vehicle weight and consequently emissions associated with fuel consumption. Steel also plays an important part in the circular economy and when a vehicle or building reaches the end of its useful life, the steel can be reused or recycled, which helps reduce the CO<sub>2</sub> footprint of the product as it avoids the need to manufacture new steel.

The company annually submits data on climate risks and low carbon opportunities to the Carbon Disclosure Project. This includes targets for CO<sub>2</sub> emission intensity; for example our aim is that our combined European steelmaking operations emit less than or equal to the average of the best 15% of sites (on a production volume basis) reporting to the World Steel Association.

Most of the energy usage and carbon emissions associated with the manufacture of our products occur at integrated steelworks. These are already very efficient and, although the opportunities for further emissions reductions are becoming progressively smaller, we continue to pursue them in a systematic manner. Each of our steelmaking sites has established a dedicated energy optimisation resource and this is augmented by a central Carbon Reduction Team, formed in 2008, that supports all our sites worldwide.

Some examples of recent improvements that are helping to reduce CO<sub>2</sub> emissions in Europe include:

- In April 2010, we commissioned a £60 million energy efficiency scheme at our Port Talbot BOS steelmaking facility in the UK. This collects BOS off-gases, which have a fuel content that is burnt to generate up to 15MW of power; 10% of the facility's total electricity needs. Overall, the scheme aimed to reduce CO<sub>2</sub> emissions from our steel manufacturing operations by 297,000 tonnes per year, in turn reducing the total carbon footprint of Tata Steel in Europe by 1%. Further benefits were realised in 2013 from an additional £55 million scheme to convert the heat content of the BOS gas into up to 10 MW of electrical power – enough to supply 20,000 homes.

- A comprehensive energy efficiency programme was completed between 2010 and 2015 at our IJmuiden site in the Netherlands, with the assistance of specialist consultants. The intensive programme realised its target of identifying €36 million of energy savings per year. The success of the programme led it to being extended to our UK sites in 2014, resourced with a mobile team of up to ten full-time engineers. This team works in close cooperation with people from all functions and departments, to identify and quantify opportunities, then provide support to accelerate their deployment. Success has continued, with over 10% cost-effective savings being identified on the consumption of electricity, natural gas and technical gases (O<sub>2</sub>, N<sub>2</sub>, Ar etc), thereby exceeding the programme target.
- As part of the UK Government's Electricity Demand Reduction (EDR) Pilot scheme, in 2015 Tata Steel replaced over 2,100 obsolete light fittings with high efficiency LED units in site-wide schemes at our Orb works at Newport, South Wales and at Stocksbridge works, Sheffield, South Yorkshire. The combined effect was reduce the UK national grid winter peak electricity demand by 675 kW or 26% of the total delivered across the UK in Phase 1 of the EDR Pilot scheme.
- Our IJmuiden site is taking a big step in solar power generation. Work is beginning in 2017 to build one of the world's largest solar energy projects of its kind. Working with Pure Energie, a sustainable energy developer, we will mount 80,000 solar panels on the factory roofs, an area equivalent to 40 football pitches. The solar project will have a 22 MW capacity and will generate enough energy to power about 7,000 homes.

Looking over the longer term, a step change in technology is needed to achieve significant reductions CO<sub>2</sub>. Tata Steel are a major partner in the ULCOS project, which is developing technologies that have the potential to reduce CO<sub>2</sub> emissions by 50% by 2050, including CCS and CCU (Carbon Capture and Use) As part of this project, a €20 million pilot HIsarna smelting reduction plant was built at our IJmuiden site, which has successfully completed four trial periods since 2011. This revolutionary cyclone converter-based ironmaking process avoids the need for pre-preparation of iron ore and coal, saving a considerable amount of energy and CO<sub>2</sub> emissions. The latest campaign started in September 2017 and has a target output of 8 tph (60 kt/y). It will run for at least 2 years, after which a scaled-up plant of 1 Mt/year can be considered. As well as duration testing of the process and the equipment, we will assess the opportunity to use this technology to recover zinc from zinc coated steel scrap, which would contribute enormously to the creation of a low carbon, circular economy.