Teck

Fact Sheet: Steelmaking Coal

Teck is the world's second largest seaborne exporter of steelmaking coal, also known as metallurgical coal or coking coal. Steelmaking coal is used in about 72% of global steel production.

Why is steelmaking coal needed?

Steel has an important role in today's society, including building infrastructure such as rail, bridges, hospitals and schools, and improving the quality of life for people around the world.

It is also required for everything from clean energy projects like wind or solar power, to transportation alternatives like rapid transit, buses and hybrid and electric vehicles—these are important building blocks as we transition to a low-carbon economy.

While some kinds of steel can be made by other processes, including through the use of scrap steel in electric arc furnaces, about 72% of global steel production relies on steelmaking coal. Certain higher grades of steel can only be made using steelmaking coal.

Global population growth, increased urbanization and a growing middle class will continue to drive long-term demand for steel and the steelmaking coal required to produce it.

Advances in reducing the climate impacts of steel production

We recognize that the use of steelmaking coal by our customers in the steelmaking process generates greenhouse gas emissions. We publicly disclose these emissions in our Sustainability Report, Annual Report, and Annual Information Form.

In response to climate change, the steel sector is taking action to reduce its carbon emissions in the steelmaking process and Teck supports these initiatives.

Teck is a member of the Canadian Carbonization Research Association and ResponsibleSteel™, two organizations that are taking leadership roles in reducing emissions from steel production.

This includes looking at investments in carbon capture, utilization and storage (CCUS) technologies that will reduce the emissions of coal-based steel production.

At Teck, we welcome and support the use of CCUS technology in the steel industry, as we believe it represents a practical solution for reducing carbon emissions in steel production.

Carbon capture, utilization and storage technologies (CCUS)

Carbon capture in steelmaking refers to retrofitting steel production plants with technology that allows concentrated carbon dioxide to be captured.

Once captured, the gas can be utilized in other industrial processes, such as producing fuels or as input into chemical production or stored at secure sites.

According to the International CCS Knowledge Centre[1], CCUS can capture 90% or more of CO_2 emissions from electricity generation and industrial processes, preventing it from entering the air.

[1] ccsknowledge.com/what-is-ccs/climate-change

How is steel made? Comparison of production processes

Steel is currently produced by two main methods, the blast furnace-basic oxygen furnace method, and electric arc furnace method.

Process	Approximate % of global production	Raw materials required	Considerations
Blast furnace-basic oxygen furnace (BF-BOF)	72%	• Iron ore (pellets, lump and fine ore), steel making coal and up to 30% recycled steel	• Generally electricity self-sufficient, with excess electricity sold back to the grid • Produces GHG emissions, which the steel making industry is working to minimize or capture • Produces all types and qualities of steel products
Electric arc furnace (EAF)	28%	• Electricity, up to 100% recycled steel (scrap steel) or other sources of iron units, such as direct reduced iron (DRI) and hot briquetted iron (HBI)	• Requires significant amounts of electricity, which is not always available from clean sources • Limited by amount of scrap steel available, as most steel products remain in use for decades • Cannot produce certain high grades of steel, due to use of recycled material

The current limitations of hydrogen-based steel

There are hydrogen-based steel making processes currently under research or being piloted, which show promise of having near zero emissions. However, it is expected that large-scale implementation of this technology will likely not replace the BF-BOF process for several decades. There are several reasons for this.

For hydrogen-based steel to be carbon-free, large quantities of carbon-free hydrogen will need to be readily available. According to a 2019 report from the International Energy Agency, moving to 100% hydrogen-based steel production would require 47-67 million tonnes of hydrogen per year[2]. Of the 70 million tonnes per year of hydrogen produced today, less than 1% is carbon-free[3].

Producing enough hydrogen to move to 100% hydrogen-based steel production would require more than 2,500 Terawatt hours of electricity, or about the combined electricity consumption of India, Japan and Korea[4]. Integrated steel plants, using the BF-BOF process, are electricity self-sufficient as electricity is produced during the coke-making process.

Based on current prices for hydrogen and steelmaking coal, the cost of producing a tonne of hydrogen-based steel is currently more than twice that of using steelmaking coal[5].

In addition to the costs and limitations of carbon-free hydrogen production, there is a limited availability of high-grade iron ore pellets, which are required for hydrogen-based steel production.

[2] International Energy Agency, 2019: The Future of Hydrogen
[3,4] Wood Mackenzie, 2020. Green hydrogen: metallurgical coal's kryptonite?
[5] Wood Mackenzie, 2020. How green can steel go?

Teck's commitment to responsible mining and reducing greenhouse gas emissions

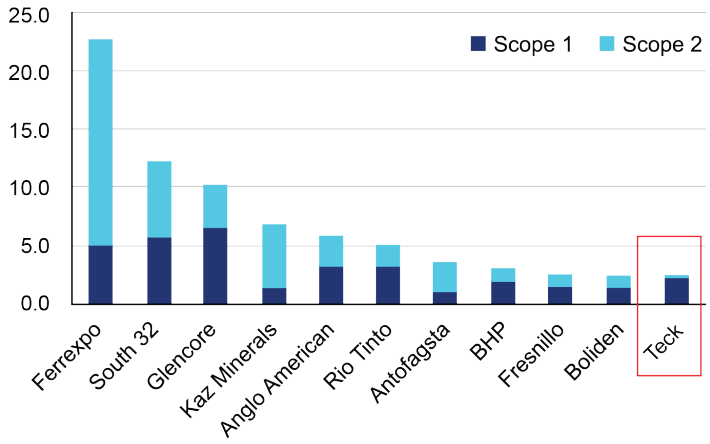
Teck's steelmaking coal has among the lowest carbon intensities in the world, making it attractive to producers who want to reduce emissions and are investing in carbon capture technologies. According to data from the International Council of Mining and Metals (ICMM), our steelmaking coal and copper production rank among the lowest for carbon intensity—a measure of carbon dioxide generated per unit of material produced—compared to the global mining industry. The intensity of Teck's scope 1 and scope 2 GHG emissions on a copper equivalent basis is amongst the lowest in the industry.

All of our Elk Valley operations are covered by carbon pricing, meaning that the cost of carbon is already factored into our cost structure, unlike many of our industry peers.

Our coal operations in B.C. source their electricity from the electricity grid, which derives 97% of its electricity from renewable, low carbon sources[6]. We have set a goal of our operations and activities being carbon neutral by 2050, and have set out a roadmap to achieve this goal.

[6] cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/bc-eng.html

Scope 1+2 emissions per copper equivalent ranking (all commodities)
(tCO_2e/t CuEq)



Source: Barclays Research, Teck

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