

Shortfalls in Scrap Will Challenge the Steel Industry

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The global supply of carbon steel scrap is in a losing battle against demand growth. This crisis has been in the making for many years, and the pattern will continue unabated. According to an analysis by Boston Consulting Group (BSG), global scrap demand will increase at about a 3.3% compounded annual growth rate (CAGR) over the next eight years, while supply will rise at only about 3% CAGR.

A boost in demand will in part be the result of scrap increasingly becoming a material of choice for steel production, especially as industries attempt to reduce carbon emissions from their raw materials. By volume, scrap will account for 50% of the global iron content in steel by 2030, up from 35% today. By that point, annual scrap consumption in both China and the US will likely be 40% to 50% higher than today, much of it to make more steel. And these increases in domestic demand for scrap by major steel producing countries will reduce the global scrap trade by about 15%. By 2030, today's 9 million metric ton steel scrap surplus will become a 15 million metric ton deficit, further underscoring why neglecting the problem is not an option.

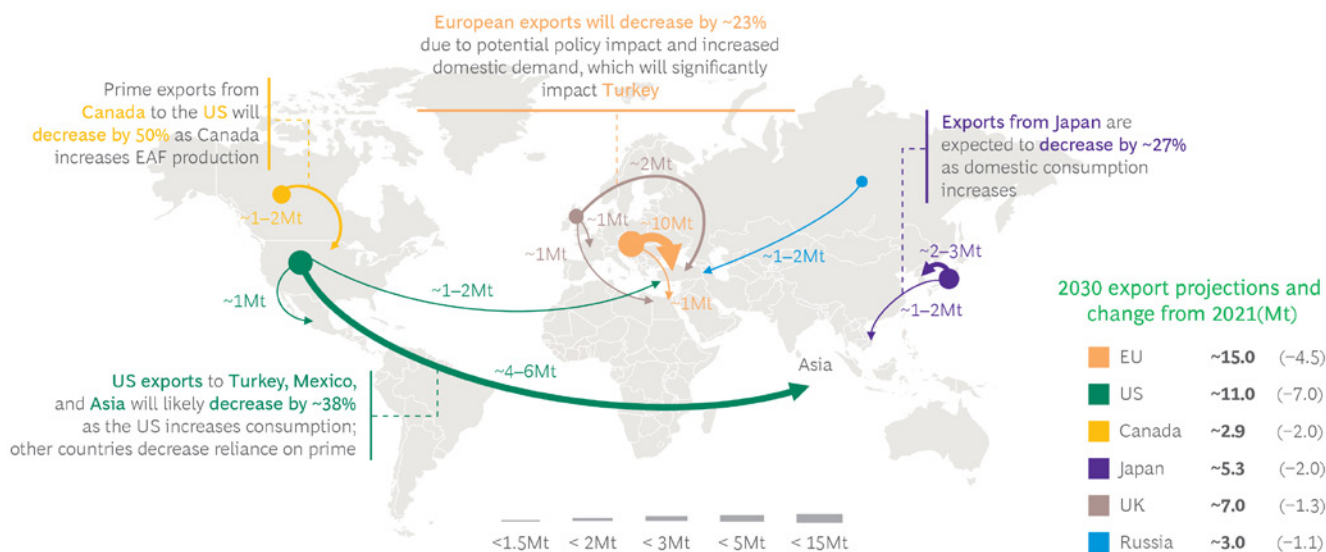
Such a drastic change in steel industry dynamics will greatly impact steel manufacturers and scrap metal providers—some a lot more than others—who must take steps to

prepare for the new landscape. To do this will require, first, a comprehensive assessment and understanding of regional steel scrap imbalances and availability now and into the future, and second, implementing strategies and technologies designed to secure supplies of scrap metal. The shortfall will also influence policymakers' decisions aimed at ensuring that the domestic steel industry is well supplied with raw materials to support economic growth at home while, when necessary, competing on a global scale.

Reasons for the looming supply/demand deficit

Mounting demand for scrap will primarily be driven by trends that have been accelerating over the past few decades. A key factor is the shift to electric arc furnace-based (EAF) steel-making, which uses recycled steel scrap (also called ferrous scrap), and away from the traditional blast furnace-basic

2030 Scrap trade projection (Mt)

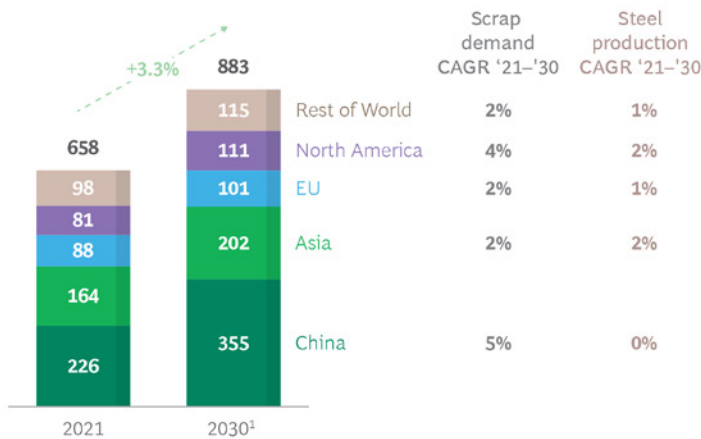


Sources: UN Comtrade Database, accessed August 2022; BIR Report 2022; expert interviews; BCG analysis.

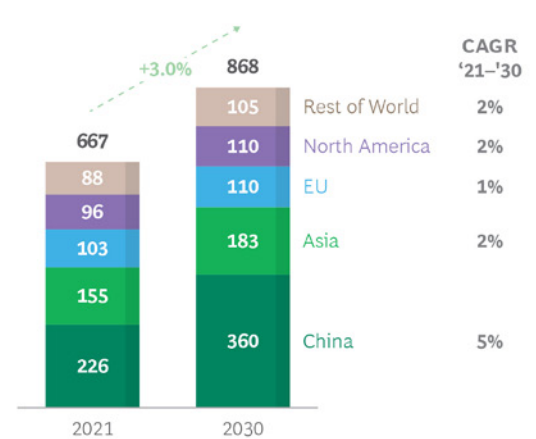
Note: Mt = million metric tons.

¹2021 estimate.

Global scrap demand forecast (Mt)



Global scrap supply forecast (Mt)



Sources: Global Steel Sector, March 2021, Credit Suisse; BIR report 2022; China Steel Association; HBIS; BCG analysis.

Note: Asia includes Middle East and does not include Turkey; EU does not include UK, Russia, and Turkey; UK, Russia, and Turkey are included in Rest of World. Mt = million metric tons.

¹Unconstrained scrap demand in 2030.

oxygen furnace (BOF) route of steelmaking. Moreover, some BOF steelmakers are increasing the amount of steel scrap, commonly known as the charge, in the latter part of their manufacturing processes as well. Overall, current and future EAF plants will over the next decade represent an increasing share of the global appetite for steel, especially for large, durable products, such as automobiles and appliances, and for new construction.

While EAF mini-mills have been around since the 1980s, they are becoming more attractive as they ramp up production of advanced high-strength steel using fewer carbon-heavy raw materials. Besides being more environmentally friendly, EAF steelmaking provides flexibility in planning and in making changes to production volume and manufacturing capacity. It is expected that, globally, EAF operations—currently about 29% of steelmaking capacity—could surpass 41% by 2030, especially as new EAF plants open in Europe and China.

The availability of shredded scrap in the short term will depend on how much metal can be recycled from end-of-life car bodies, industrial equipment, refrigerators, washing machines, and other large goods. The situation worsens in the medium term. As global economies slowed in the financial collapse of the late 2000s and again during the COVID-19 pandemic and its aftermath, fewer big products were made and sold, reducing the amount of heavy scrap in the pipeline now. And since it can take many years before new items are ready to be recycled, products made today or in the immediate future will not be useful for EAF steelmaking for anywhere from 15 to 50 years.

By contrast, prime scrap—essentially a cleaner by-product of manufacturing continuously recycled from factories and also known as pre-consumer or prompt scrap—is prized for high-quality applications and is easier to process with fewer CO₂ emissions. But its volume, too, is impacted by periods of economic volatility when manufacturing production falls substantially, generating less waste for reuse. The availability of

prime scrap will be hit hardest by the scrap supply and demand imbalance. A deficit of nearly 30 million metric tons is possible by 2030. The soaring demand for prime scrap will come from the increasing need for cleaner scrap to produce high-quality, flat-rolled sheets of steel suitable for many manufacturing and construction projects as well as the need for higher proportions of scrap charge in blast furnace operations.

Developing countries, such as India and China, have the added problem of nascent recycling infrastructure. In these regions, scrap collection logistics are underdeveloped, circular supply chains are in their infancy, and sorting equipment is at a premium, making scrap accumulation at scale difficult. In

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Key Takeaways

The global supply of carbon steel scrap is lagging demand growth. The shortage could significantly impact steel supplies and trade, ultimately affecting economic growth in both developed and developing nations. Private and public sector stakeholders should begin preparing for the shortfall by calculating the current availability of scrap and developing short- and long-range forecasts.

- By 2030, today's 9 million metric ton steel scrap surplus will become a 15 million metric ton deficit.
- Steel companies must focus on locking in consistent supplies, perhaps by acquiring scrap yards and improving their manufacturing capabilities with artificial and machine intelligence.
- Steel scrap processors can increase the supply through new recycling technologies and consolidation.
- Policymakers must explore strategies to address the impending shortage, such as by incentivizing scrap recycling through tax and fee breaks.

addition, the cost of moving scrap from recycling sites to steel mills is often prohibitive, making the operation unprofitable.

Shortfall will alter global scrap trade flows

Currently, about 17% of the world's annual scrap supply—about 110 million metric tons—is traded globally. (See Exhibit 2.) For instance, Turkey is reliant on the EU, the US, the UK, and Russia for its 25 million metric tons of primarily lower-grade scrap imports each year. In fact, the US is such a large supplier to Turkey that some Turkish steelmakers have established sourcing units in North America to secure the country's supply. The US, however, is running a shortage in prime scrap and turns to Canada to make up for it. Meanwhile, Japan exports its excess prime to Korea, Southeast Asia, and China.

As scrap availability tightens through the decade, we anticipate that trade in the raw material will moderate significantly, to around 93 million metric tons by 2030, as domestic consumption rises and countries reduce exports. In particular, the US and EU scrap flow will take a major hit; for instance, by 2030 prime scrap exports from Canada to the US will plunge

by 50% and European exports of this material will decrease by nearly one-quarter. Countries that import a higher percentage of their scrap needs will be meaningfully affected if they are unable to secure sufficient scrap of the required grades or ore-based metalics alternatives, such as pig iron, direct reduced iron (DRI), and hot briquetted iron (HBI). Certain high-growth markets, like India, remain particularly vulnerable. In that country, lagging scrap supplies will raise the cost of operating EAFs and threaten the decarbonization agenda unless significant efforts are made to build carbon steel scrap recycling infrastructure.

See the full study for these further thoughts:



- Preparing for the scrap market disruption
- Strategic choices are complex but necessary
- How other players might react

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