

METALS INSIGHT

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Beijing's visible hand: China's demand for iron ore and scrap through 2020

- China entering new era of environmental regulation
- Crude steel production trending to 800 million mt/year by 2020
- Higher scrap usage could displace 150 million mt of iron ore
- China's annual iron ore imports could drop below 1 billion mt

The Chinese central government's introduction of tougher environmental policies – including lower utilization rates over the 2017-2018 winter heating season – has brought new challenges of supply disruption and higher production costs. Ongoing production curtailments appear to be the “new normal” in China's steel industry. This is spurring the growth of new electric arc furnace (EAF) capacity, much of which is being brought on in

place of the traditional steelmaking route of blast furnaces (BFs) and basic oxygen furnaces (BOFs). S&P Global Platts forecasts a moderate decline in pig iron output between 2018 and 2020 as a result of steel scrap making inroads. It is calculated that approximately 50 million mt/year, or 5% of the iron ore import volume, could be displaced by scrap as China enters a new era of environmental regulation.

China's “blue-sky” campaign and the rise of scrap

Over the winter heating season of November 2017 to March 2018, China imposed production cuts on blast furnaces and sinter plants across “2+26” steel producing cities to keep emissions down at a time of high pollution. While the program was widely

[\(continued on page 2\)](#)

EDITORIAL COMMENT

When China launched its steel industry supply-side reform early 2016, announcing 150 million mt of steel capacity cuts over 5 years to slash pollution and trim overcapacity, observers were skeptical. Hiccups emerged: sudden capacity closures in a coal mining sector reform contributed to met coal prices tripling in 2016. China's abrupt debut onto the ferrous scrap export market in 2017 alarmed markets and depressed prices after the closure of 140 million mt capacity of illegal induction furnaces, over and above the official cuts. Clearly Beijing's environmental policies can have profound and rapid impact on markets worldwide. On the plus side, developments in China led to structural changes in global iron ore and met coal pricing, with annual benchmarks abandoned in favor of spot-market based indexation: enhancing price transparency and smoothing volatility amid hedging growth and emergence of exchange contracts.

The fact is the supply-side reforms have been more successful than many had imagined, and are en route to producing leaner and more competitive steel and coal industries. They are even ahead of schedule: in year 1 “zombie” uncompetitive mills were closed, followed by major m&a activity in year 2, with Baowu Steel created from two of China's biggest steelmakers. This leaves just 30 million mt capacity to be axed this year. As S&P Global Platts analysts here show, the move towards cleaner steel in China means a structural shift, as oxygen route capacity is substituted by scrap-using EAFs. As China generates more scrap from its consumer boom, it will use a higher proportion of scrap in steelmaking as it moves towards a more circular economy. This may lower imports of iron ore, at the same time increasing met coal imports amid curbs on domestic production.

Last year's surge in Chinese steel scrap exports, which reached 508,120 mt in September, is unlikely to be repeated: these slumped to 34,530 mt in March as stocks held at IFs are eaten through. China, the largest importer of recyclable materials, is now setting the pace for scrap-related environmental controls with its April announcement of import restrictions on 32 types of scrap including stainless steel, vessels, slag and auto bales by end-2019. This, “together with the very high quality thresholds in the Chinese scrap standards, will put great pressure on the scrap processing capacity of the global recycling industry outside China,” says international recycling association BIR. — [Diana Kinch and Alina Arnold](#)



Endless Strip Production line at Rizhao Iron & Steel: Chinese steel has become more cost and carbon-conscious. Photo courtesy of Rizhao Iron & Steel

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...from page 1

regarded to have helped lower pollution over the period, crude steel production actually increased. China produced 344 million mt of crude steel during the 2017-2018 winter period, which is 3% higher than the same period a year before when no restrictions were imposed. Furthermore, January-March output of 210 million mt was 5% higher than Q1 2017, and also the largest first quarter output on record. Platts estimates that full year crude steel production for 2018 will be at a similar level to 2017 at approximately 840 million mt.

Higher than expected steel output has been driven largely by robust domestic demand and subsequent strong steel mill margins. Mill profitability over the winter period averaged \$140/mt for rebar and \$130/mt for hot rolled coil, according to Platts data. Steelmakers responded to the strong economic incentive by lifting the ratio of scrap usage, which was in abundance in China due to the closure of induction furnace production. National data shows that pig iron output in Q1 fell to 174 million mt, down 1% year on year. On an annualized

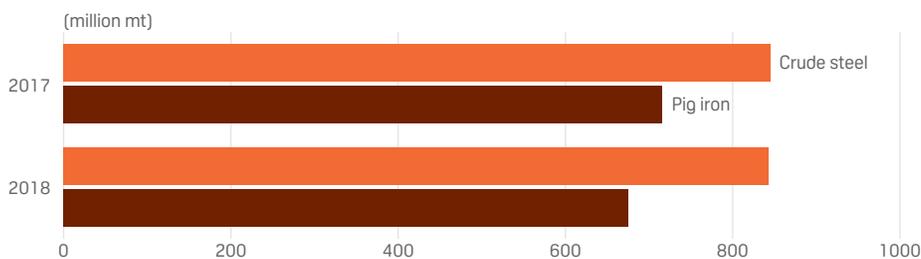
basis, Platts sees pig iron output dropping by 40 million mt, or 6%, to 675 million mt in 2018, from 715 million mt last year. Notwithstanding the decrease in pig iron output, crude steel production will stay at a similar level to last year, which indicates that scrap has continued to make inroads into the steelmaking process.

A look ahead: iron ore demand in 2020

Despite the macro uncertainties looking ahead to 2020, we believe iron ore demand will continue to be influenced by China's capacity swap (between BF/BOF and EAF) as well as its environmental policies. The former can impact the supply and demand equilibrium and steel mill margin, while the latter will likely decide the fate of EAF steelmaking in China.

The China Iron & Steel Association (CISA) stated during a recent conference that the strategic focus under the country's supply-side reform agenda will shift from capacity removal towards improving the quality and efficiencies of steelmaking (and industrial output in general). Over the past two years China is reported to have removed more than 115 million mt/year of steel capacity, putting the country on track to achieve

2018 IS FORECAST TO SEE A FLAT CRUDE STEEL OUTPUT, BUT PIG IRON OUTPUT IS ESTIMATED TO DECLINE UNDER ENVIRONMENTAL POLICIES



Source: S&P Global Platts, China National Bureau of Statistics

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the central government's target of 150 million mt/year by 2020. In terms of industry optimization and upgrading, China has approved the installation of nearly 150 million mt/year of new capacity since 2017, most of which is expected to be commissioned during 2018-2020. This will, in theory, be a zero-sum game as new capacities are meant to replace the equivalent amount of existing ones.

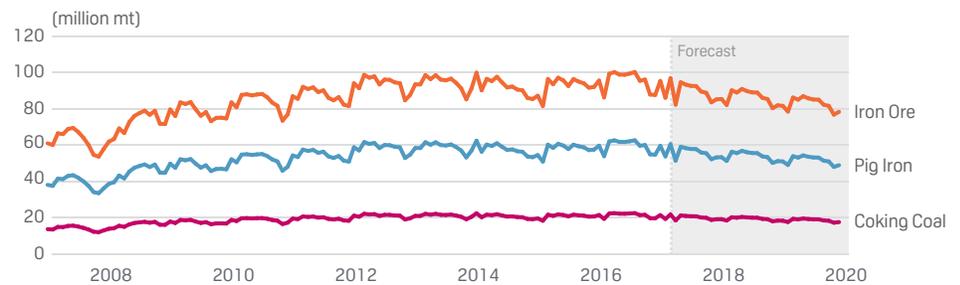
However, the reality seems to be a different story. A net increase in total capacity is possible if steelmakers disguise their intention to produce carbon steel by applying for a license to produce special steel. According to the Ministry of Industry and Information Technology's (MIIT) standard, a 100-mt BOF, which typically produces 1.3 million mt/year of carbon steel, can make only 1 million mt/year of special steel. Likewise, a standard EAF (100-mt) used to produce 1 million mt/year of carbon steel can make only 700,000 mt/year of special steel. Due to this loophole, steelmakers were able to acquire extra capacities during the process of capacity swaps.

A return to IFs?

Adding to a potential net increase in Chinese capacity has been a reported return to production of some unlicensed induction furnaces, once again incentivized by the strong steel margins on offer in the current market. However, a National Development and Reform Committee investigation, scheduled for May and June, could nip this development in the bud. Whether or not China's IFs will be wiped out remains to be seen, but any excess production from this illegal route could alter the supply and demand balance, posing a threat to steel mill margins in the future.

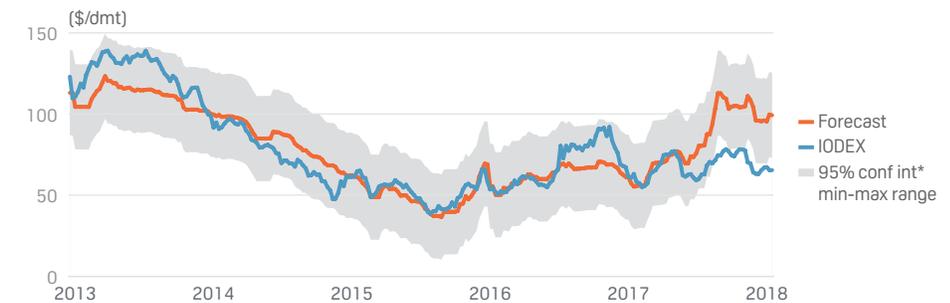
Platts forecasts that China's crude steel production will fall to around 800 million mt by 2020, a 5.5% decrease from 2017. Pig iron output will fall to 620 million mt, when the amount of scrap used in BOFs and EAFs is accounted for. According to China Association of Metalscrap Utilization (CAMU), total domestic production of scrap is forecast to reach 200 million mt by 2020. Subtracting CAMU's target of 200 million mt of scrap availability from estimated

CHINA'S PIG IRON OUTPUT TO DECREASE THROUGH 2020 AS SCRAP MAKES INROADS



Source: S&P Global Platts, China National Bureau of Statistics

IRON ORE CONTINUES TO TRADE BELOW THE SCRAP-DETERMINED FAIR VALUE



Note: 95% confidence interval equals to two standard deviations.
Source: S&P Global Platts

crude steel production of 800 million mt, we calculate 620 million mt of pig iron output for 2020. This is a reduction of 95 million mt from 2017 and some 87 million mt lower than in 2016 when China produced 707 million mt of pig iron. The outlook implies that some 95 million mt of hot metal could potentially be produced using scrap.

To facilitate a full switch, two important factors need to be considered. First, steel spreads need to remain strong, providing mills with ample economic incentives to value production. Second, the government will need to continue to restrict traditional steelmaking. The chart above showing pig iron output assumes that both conditions are met, suggesting a moderate decline estimated in monthly pig iron production (orange bars) through 2020.

Based on the "rule of thumb" that 1 mt of pig iron requires 1.6 mt of iron ore and 0.6 mt of coking coal, we estimate iron ore and coking coal demand at 993 million mt and 372 million mt respectively by 2020. This would mark a 13% decline in iron ore demand from 2017 levels. China could lose around 50 million mt/year of iron ore imports

between 2018 and 2020, equivalent to 5% of China's annual import volume.

What is behind the persisting price divergence of scrap and iron ore?

Chinese mills have shown they are cost-sensitive when it comes to the choice of feed materials. This can be seen in the flexible burden mix observed in 2017 when scrap usage in BOFs ranged from 8% to 20% in line with prices. Over the past five years, the price differential between domestic scrap and iron ore imports has averaged \$200/mt. However, since scrap prices began to rise steeply from October 2017, the differential increased to \$332/mt in late December, before dropping to around \$300/mt recently. Scrap prices have outpaced iron ore prices, making iron ore the most cost-effective raw material for mills.

In reality, the implied price convergence may not happen anytime soon, due to Beijing's supporting of EAFs, and hence the scrap price. Since the introduction of the government's environmental campaign, Chinese mills have produced more

crude steel using scrap despite the cost disadvantage to pig iron. The government-guided demand for scrap has been justified by a healthy steel mill margin. However, if there is a sharp fall in crude steel production due to mills' profitability dropping, the economic incentive to use scrap diminishes.

Demand scenarios

Barring any major changes to macro conditions and policy continuity, Platts expects a moderate decline in pig iron output between 2018 and 2020. However, before 2020 there is unlikely to be any big change in the trading dynamic. The chart below illustrates a range of iron ore demand forecasts (shaded).

The implication of a potential demand shift from iron ore to steel scrap could be far less evident on Chinese steelmakers than on iron ore producers. An implied reduction of 50 million mt of iron ore imports may represent just 5% of China's total imports, and less than 6% of Brazil and Australia's combined iron ore imports of 898 million mt in 2017. Given China's journey up the quality curve, the pressure is likely to be felt by lower grade iron ore producers. For example, China imported 25 million mt of largely lower grade material from India last year, along with material from non-traditional suppliers. Much of this is likely to go, but lower grade iron ore from Australia could also come under pressure.

The Australian Department of Industry forecasts iron ore trade will grow 6% to 1.6 billion mt by 2020. Brazil is estimated to lead the growth with a 14% increase in iron ore exports as Vale ramps up its S11D operation, followed by Australia which will grow by 8%. This means more high grade ore will be supplied from Brazil.

Chinese iron ore port stocks are estimated to be around 160 million mt

STEEL MILL MARGIN-DETERMINED SCENARIOS ON THE DEMAND OUTLOOK BY 2020

	<u>Base Case Price Scenario</u>	<u>High Price Case Scenario</u>
Steel mill margin is over \$80/mt	Crude steel production fell to 800 million mt/year	Crude steel output increased to 900 million mt/year
	Higher scrap usage displaces 150 million mt of iron ore	Iron ore import demand remains strong, above 1 billion mt
	Metallurgical coal demand is also reduced by 55 million mt	Met coal demand is little changed around 430 million mt
	Lower grade iron ore producers come under pressure	The effect of demand switch to scrap is negated
	<u>Low Price Case Scenario</u>	<u>Worst Case Price Scenario</u>
Steel mill margin is below \$80/mt	Crude steel production decreased to 700 million mt/year	Crude steel output dropped below 600 million mt/year
	Pig iron output drops by 190 million tons to 530 million tons	Implied pig iron output collapses to 430 million mt
	Increased scrap usage displaces 300 million mt of iron ore	Significant demand destruction of near 40% for iron ore
	Met coal loses 26% of the demand to 320 million mt	Demand for met coal also shrinks to 260 million mt

Source: S&P Global Platts

CRUDE STEEL OUTPUT-DETERMINED SCENARIOS ON THE IRON ORE DEMAND OUTLOOK



Source: S&P Global Platts, China National Bureau of Statistics

currently, much of which is understood to be lower grade ores. A slightly smaller, but far more efficient Chinese steel industry will want higher grade raw materials for both environmental and output optimization reasons. A structural shift is likely to take place, generating growing demand for scrap

and higher grade ores at the expense of lower grade material.

The international market will closely watch the changing dynamics of iron ore and scrap in the steelmaking process, as Beijing's visible hands continue to shape a greener future for the country. — *Jeffery Lu and Jing Zhang*