

Chinese steel exporting armada returns as an incredible threat to its offshore competitors

Since 2018, briefly interrupted during 2020 by the onset of the Covid pandemic, the global steel industry has been living out a “dream” scenario of high steel prices and unprecedented profitability. Over the past twelve months, and the last nine months especially, it has become apparent that the “dream-like” conditions were in fact a temporary artificially-fueled aberration. The global steel industry’s structure is once again in the midst of profound change as Chinese domestic steel demand has entered a significant downward phase, this time seemingly for good.

Just as it became evident to the Chinese mills in early-2015 that they were probably facing years of significant oversupply, they launched a steel product export offensive that lasted more than two years. At that time, unwittingly, they drove their hot-rolled band export price to a level well below the marginal cost of the median-cost producer. In fact, by December 2015 the Chinese export price at about \$265 per tonne, FOB the port of export, was about \$70 per tonne, or 15%, below the median mill’s marginal cost when taking into account the cost of delivering the steel to the port of export. Reflecting their aggressive posture, exports in the latter months of 2015 rose to a 120 million tonne annual rate versus only about 50-60 million tonnes a few years earlier.

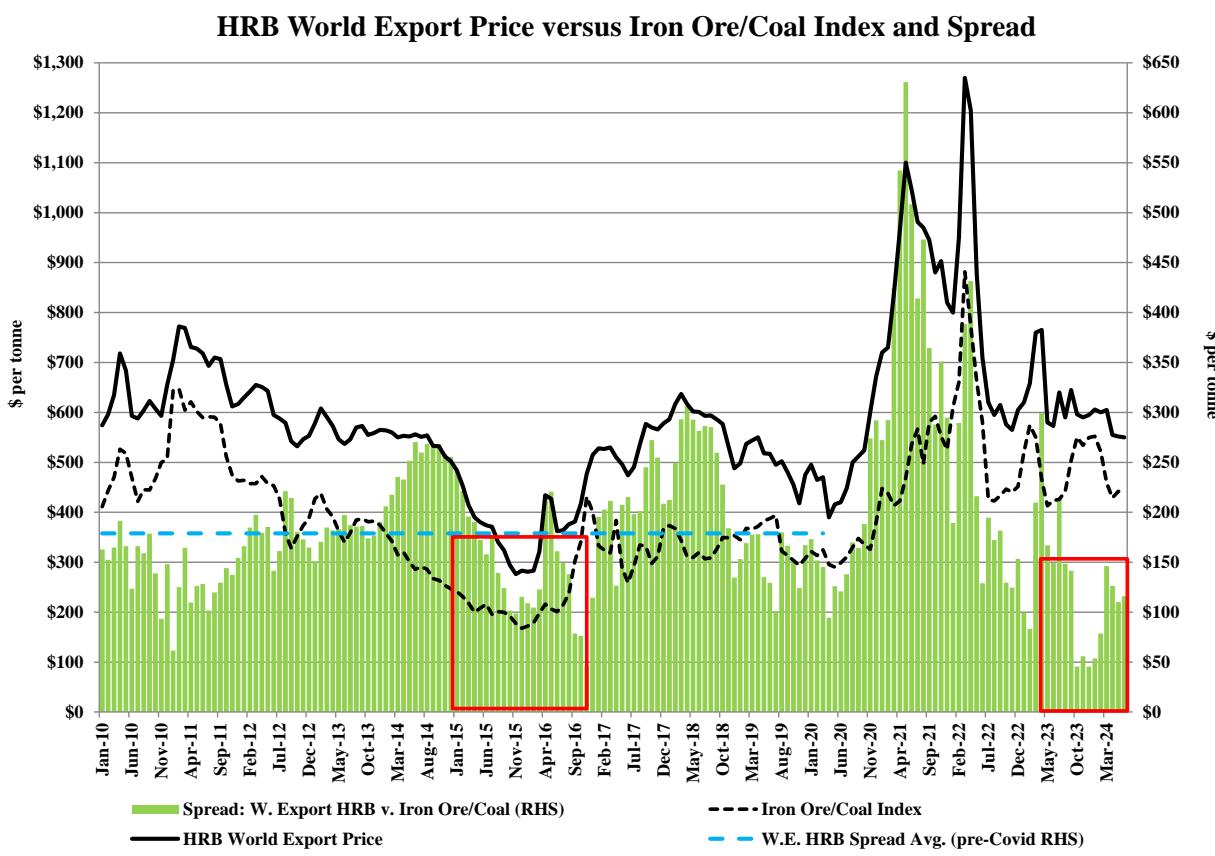
The Chinese “steel exporting armada,” as it was then called by WSD, became an unprecedented threat to steel mills in virtually all countries outside of China – that is, except those with only minor steel production and steel-using entities that benefit greatly from the low Chinese prices. In response to this threat, a number of the non-Chinese steel mills dramatically cut their prices to compete directly with the Chinese in order to prevent a further loss of market share. These price cuts led to a condition of “financial calamity” for many steel mills in China and elsewhere. Consequently, because they were being destroyed by the Chinese mills (they claimed the Chinese mills were “not playing by the rules”), many steel mills rushed to their governments to set in place import constraints on offshore steel entering their home markets. Based on an array of trade actions in key importing markets the world over, plus eventual actions to “rationalize capacity” in China, the industry found its footing by 2017-2018 as the world export price rebounded to an average figure of \$558 per tonne from \$376 per tonne during 2015-16.

Following a year of relative stability in 2019, in mid-2020 China introduced a series of policies aimed at reducing activity in the property sector and, in effect, signaled the end of its steel demand growth era by announcing formal production “limits.” The subsequent reckoning, from the viewpoint of the non-Chinese steel mills, was merely postponed by the Covid and

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Russia/Ukraine war-induced dislocations in global supply chains that led to an unprecedented boom in global steel prices from late-2020 through mid-2023.

As of late-2023 and to date in 2024, a new reality has beset the steel marketplace characterized by a toxic combination of a) ultra-high Chinese steel growth exports as domestic demand declines and steel output remains elevated; b) poor steel demand in the world ex-China/India amidst rising inflation and reduced Fixed Asset Investment spending; and c) correspondingly lower global steel prices and razor-thin margins, especially for export-oriented mills. As a result, many in the steel industry are feeling depressed about the months and possibly years that lie ahead. In fact, from the viewpoint of profitability, the conditions in the past twelve months have actually been as bad, if not worse than 2015-2016. Consider:



- During 2015-16, the World Export price of HRB averaged about \$376 per tonne, with the prices of iron ore (62% Fe Del'd to China), coking coal (FOB Australia) and steel scrap (80/20HM Del'd to Turkey) averaging \$56, \$115 and \$236 per tonne, respectively. On this basis, the “Spread” between the price and key steelmaker’s raw materials averaged \$146 per tonne.
- During 2018-19, the World Export price of HRB averaged about \$539 per tonne, with the prices of iron ore (62% Fe Del'd to China), coking coal (FOB Australia) and steel scrap (80/20HM Del'd to Turkey) averaging \$81, \$192 and \$311 per tonne, respectively. On this basis, the “Spread” between the price and key steelmaker’s raw materials averaged \$201 per tonne.

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- During 2021-22, the World Export price of HRB averaged about \$847 per tonne, with the prices of iron ore (62% Fe Del'd to China), coking coal (FOB Australia) and steel scrap (80/20HM Del'd to Turkey) averaging \$139, \$293 and \$448 per tonne, respectively. On this basis, the “Spread” between the price and key steelmaker’s raw materials averaged \$324 per tonne.
- From mid-2023 to June-2024, the World Export price of HRB averaged about \$571 per tonne, with the prices of iron ore (62% Fe Del'd to China), coking coal (FOB Australia) and steel scrap (80/20HM Del'd to Turkey) averaging \$118, \$288 and \$385 per tonne, respectively. On this basis, the “Spread” between the price and key steelmaker’s raw materials averaged \$87 per tonne.

About the only good news from this perspective, despite nearly 40% lower profits on average, on the World Export market the past twelve months compared to 2015-16, is that the “Age of Protectionism” that was borne out of the prior calamity appears to be working reasonably well in favor of mills with home markets where pricing is well above international levels. Looking ahead, there is no doubt something has to give as the current price/cost condition is likely unsustainable for those heavily reliant on export sales – in other words, a new wave of trade protectionism is likely to kick in, with early evidence of this already observed in Brazil, Turkey, the EU and other regions.

Adding fuel to the fire, an all-out “trade war” appears to be brewing between China and the major Advanced World economies over EVs (electric vehicles) and other high-end manufactured goods exports from China that threaten to undermine manufacturing and other sectors in the USA, EU, Japan, S. Korea and elsewhere. Within the span of a few weeks, both the USA and the EU announced massive import tariffs on Chinese EVs amounting to 100% and 10-48%, respectively.

While antidepressants, such as Prozac, may help one cope with these newfound realities, any improvement in the medium and long-term pricing and profitability situation on the international steel market will require some form of “traditional Chinese medicine” that will need to include one or more of these “drugs”: a) further supply-side restructuring; b) some form of new export controls; and c) additional stimulus to prop up demand, at least in the short term.

On this basis, WSD sees two diverging scenarios for the World Export price through the end of 2024 and for 2025, predicated on several key factors:

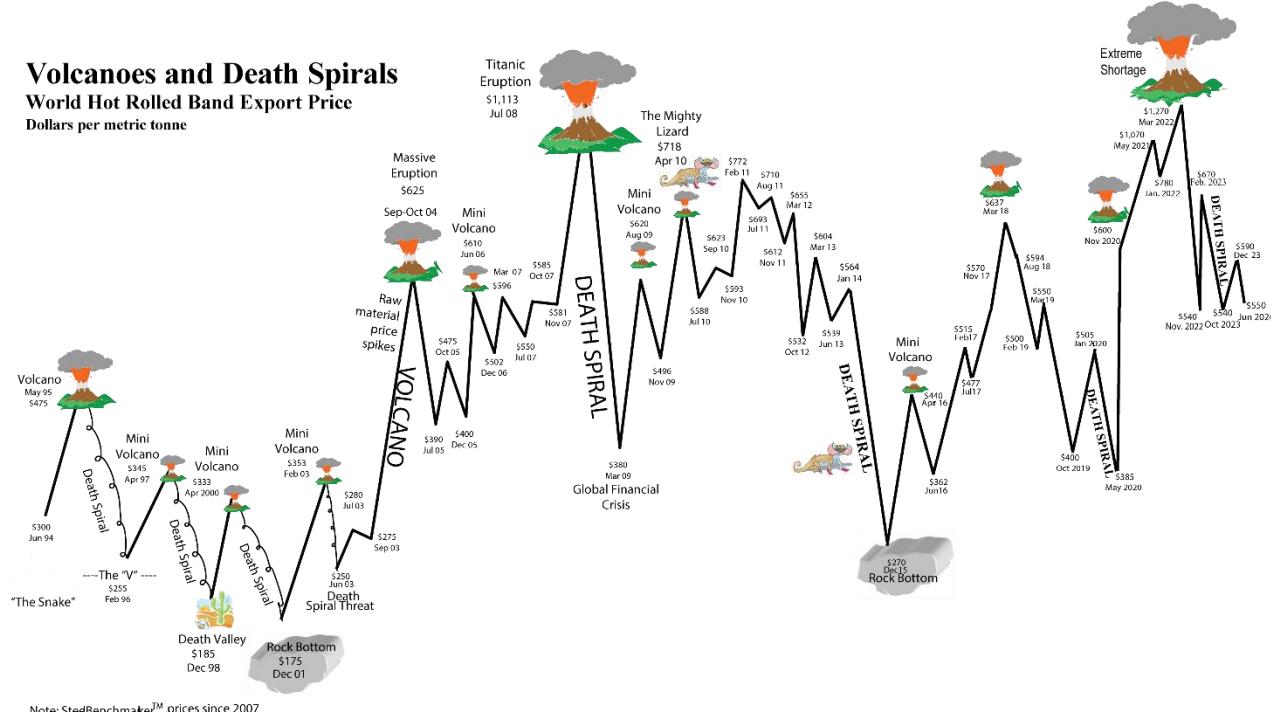
Scenario I: “China Administers [Some] Medicine” – Odds 55%

The hot-rolled band export price, FOB the port of export, at about \$540 per tonne (~\$520-530 per tonne for the Chinese steel mills and \$530-550 per tonne for a number of the larger international steelmakers) in early-June bottoms out in the \$500-520 per tonne range by early-July. Assuming the international price of iron ore comes down to about \$95 per tonne or lower by then (from ~\$105 at present), and the price of coking coal, FOB Australian ports, remains near current levels of about \$260 per tonne, this HRB price would barely avoid “Death Spiral” territory, reflecting a “Bad Times” environment instead. The latter largely describes the situation at present from the viewpoint of the median-cost producers outside of China, whose

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production cost of hot-rolled band at about \$605 per tonne as of May, including overhead and about \$25 per tonne in freight expense to deliver and load the product at a nearby port, is about \$55 per tonne below the prevailing price.

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Having bottomed-out by mid-summer, the HRB price in this scenario rallies to about \$570-590 per tonne by September to early-October assuming the following:

- Chinese authorities announce concrete and specific measures with respect to crude steel production limits for 2024 sometime in July/August or sooner. To date, the late-May announcement of the “*Action Plan for Energy Conservation and Carbon Reduction for 2024-2025*” by the State Council and the subsequent “*Special Action Plan for Energy Conservation and Carbon Reduction in the Steel Industry*” that followed on June 7 by the NDRC have provided little in the way of specific clarity for production reduction targets and implementation thereof.

The most common interpretation of these recent announcements among WSD contacts in China has been an expectation that crude steel output this year will perhaps be “*limited to about 20 million tonnes below 2023 levels, with further specific guidance to come.*”

- Chinese steel exports, up about 25% through the first five months of 2024 to an annualized rate of 107 million tonnes (with the May figure at 113 million), gradually decline to about 90-95 million tonnes by late-summer. In part, this reduction may be facilitated by an increasing “vigilance” on the part of Chinese authorities to reduce VAT payment avoidance that has been prevalent for some time among the smaller/privately-held Chinese mills. WSD contacts report that, in the past two weeks, they have

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observed a substantial reduction in offerings of this type of material for export, albeit the “jury is still out” as to whether this condition will take hold on a more permanent basis.

- Another potential driver for a reduction in Chinese steel exports would be a combination of concrete and effective output cuts and some modest improvement in Chinese domestic steel demand come the “busy” fall construction season during September-October.

WSD estimates Chinese apparent steel consumption is down about 8.5% through the first five months of 2024 compared to the same period last year; a production “cap” at 20 million tonnes below 2023 levels combined with net exports of about 99 million tonnes would result in a ~2.0% ASC decline for the year, implying a significant sequential improvement in steel demand going forward. (*Note: more on the Chinese steel demand outlook in the China section of this report*)



Source: IISB, SteelHome, WSD estimates

- Steel demand in the World Ex-China improves during the second half of this year, especially as the Indian economy “Takes off” now that the election is over and a new government has been formed with incumbent Prime Minister Modi still at the helm:
 - WSD estimates that apparent steel consumption ex-China was up about 5.1% or 48 million tonnes annualized during the first calendar quarter of this year compared to the same period last year, with the growth rate slowing to about 2.1% or 29 million tonnes annualized during the second quarter on an estimated basis.

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Excluding India, the growth figures are 3.9% and 0.3%, respectively, during the first two calendar quarters. Slowing demand in the world ex-China/India during the second quarter – one that traditionally represents “peak” industrial, construction and other steel-intensive activity – is especially troubling and likely reflects the impact of persistent inflation on a number of economies, among other factors.

- Apparent steel demand in India is estimated to have risen 12.9% and 13.9% during the first two calendar quarters of this year, respectively, despite the broader perception that economic and steel-related activity was slowed, especially during April-May as the election took place over a 6-week period and government spending was greatly reduced (as is mandatory by election law in the country).

While some view the recent election results, whereby Mr. Modi’s party (the BJP) lost its majority in the parliament, as a sign of potential weakening of India’s economic outlook (on the belief that a coalition government, rather than an outright majority, will slow reforms and reduce funding for infrastructure – the key upside driver for steel demand the past few years), WSD is of the opinion that this will not have a significant impact on steel demand during the second half of this year and next, with steel demand likely rising another 8-10% or more.

- The prices of key steelmakers’ raw materials increase or remain flat to slightly down in some cases, on balance *adding* to the cost pressure for the typical export-oriented producer of hot-rolled band thereby pushing-up the cost “floor” and supporting higher prices:
 - The price of premium coking coal, FOB Australian ports, rises to about \$275 per tonne or more by late-summer from about \$260 per tonne at present (having already risen about \$17 per tonne since the end of May) as Indian producers seek to add to their inventories and steel output in the world ex-China as a whole remains on a modest upward y/y growth trajectory.
 - A key reason why coking coal prices may be relatively “capped” on the upside this year compared to prior years (when prices surged to \$350 per tonne or higher) is the significant increase in ultra-low-priced exports of coke from China and Indonesia, with the latter set to rise by as much as 5 million tonnes this year and perhaps another 5 million tonnes in 2025 based on expected capacity additions. China’s coke exports are up about 25% to 3.3 million tonnes year to date through April, including an 84% increase in exports to Japan, a 167% increase to Vietnam and a 27% increase to Malaysia, among others. This surge in coke exports comes at the expense of coke production (and corresponding coking coal demand) in a number of countries ex-China according to WSD contacts.

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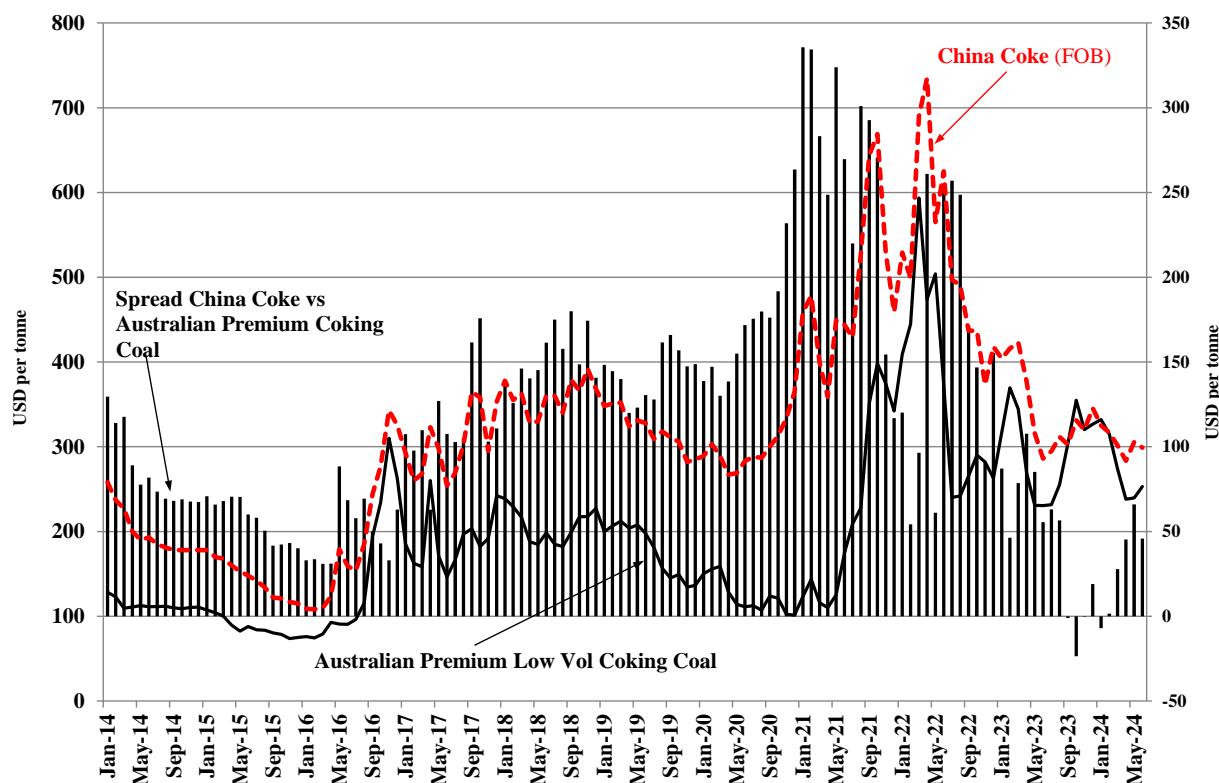
China Coke Export by Country in April 2024

(metric tonnes)

Country	Quantity for Apr 2024	Quantity for Apr 2023	Y/Y %Change	Accumulative Volume in Jan-Apr 2024	Accumulative Volume in Jan-Apr 2023	Y/Y %Change
Total	929,002	719,105	29.19%	3,334,666	2,684,254	24.23%
Indonesia	180,941	91,897	96.90%	918,039	783,981	17.10%
India	116,978	164,701	-28.98%	407,767	420,585	-3.05%
Malaysia	56,525	137,171	-58.79%	400,685	315,301	27.08%
Japan	79,890	63,604	25.61%	322,110	175,525	83.51%
Brazil	110,112	0	-	197,980	175,525	-
Vietnam	53,509	18,967	182.12%	164,464	61,703	166.54%
Mexico	49,600	124,353	-60.11%	157,271	124,353	26.47%
Belgium	88,000	0	-	143,000	54,789	-
Australia	72,770	16,829	332.41%	111,448	59,393	87.65%
Oman	47,800	112	42578.57%	74,145	8,996	724.20%

Source: SteelHome, WSD Estimates

Australian Coking Coal FOB vs China Coke FOB

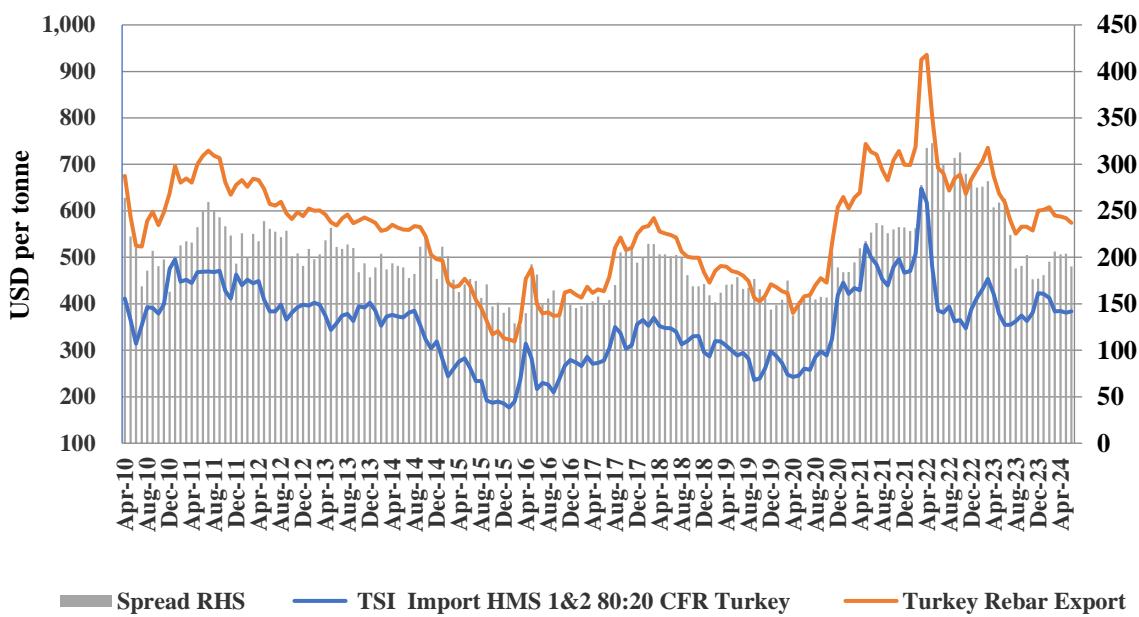


Source: S&P Global, Steelhome, Thomson Reuters,
Metal Experts, WSD Estimates

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- The price of 80/20 steel scrap delivered to Turkey, always a “wild card,” could rise once Turkey’s sheet mills begin receiving more orders from European buyers for their products – a phenomenon largely expected to unfold now that the EU has modified its quota system for imports of HRC and other products from “other countries.” This new system has effectively cut the ability of Vietnamese, Japanese and Taiwanese mills to supply the EU market by 50% or more on a volume basis, creating a huge opportunity for Turkey’s producers to capture market share, albeit at prices that are likely to be higher on average (*more on this topic in the EU section of this report*).

Turkey Rebar Export Price vs Turkey 80/20 Scrap and Spread



Source: SBB, WSD Estimates

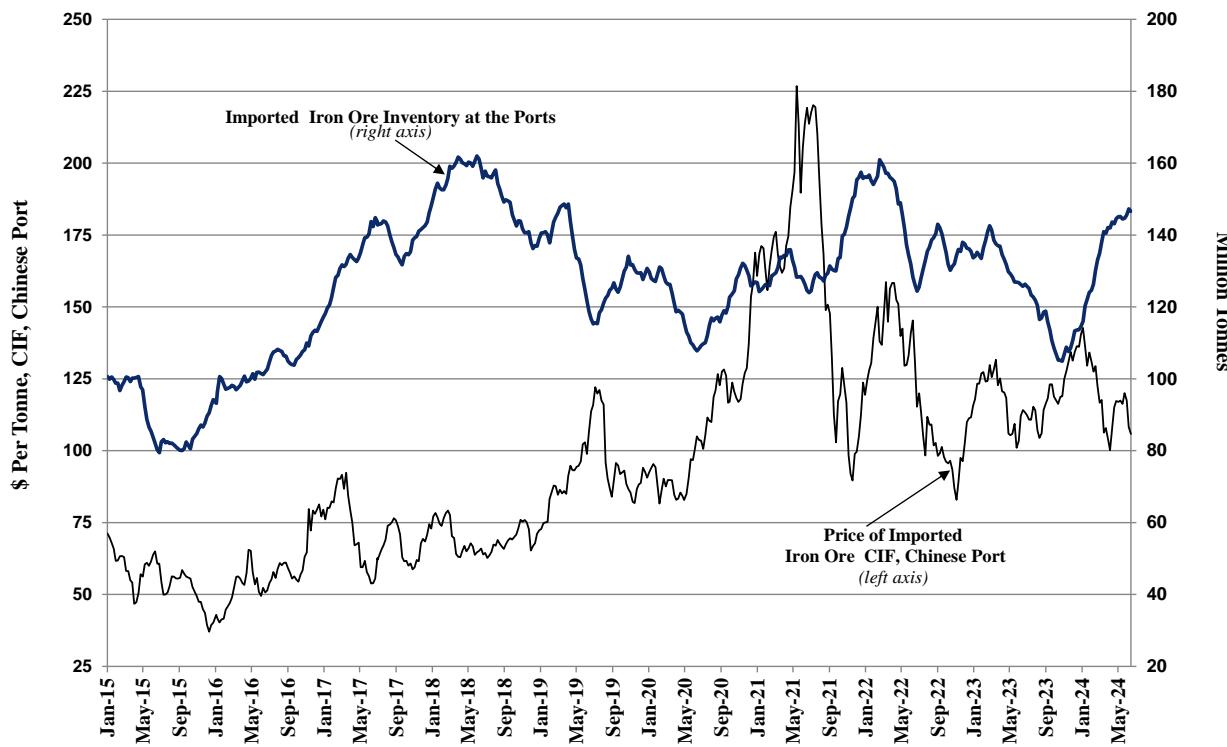
- The price of 62% sinter feed iron ore, delivered to Northern China ports, remains in the \$100-105 per tonne range from July through October before rising to perhaps \$110-115 per tonne during late-2024 on seasonal restocking demand in China. The price has fallen from about \$120 per tonne during the last week of May to \$104 per tonne at present and could go lower yet in the weeks ahead to perhaps \$90-100 per tonne.

The recent decline has been driven by a combination of factors, including: a) rising inventories at Chinese ports, up about 16.6% to 146.6 million tonnes during the second week of June from a low of 104.9 million tonnes in October 2023 (*China’s imports of iron ore have risen 7.2% y/y through April, meanwhile pig iron output has declined 4.3% during the same period*); b) still lower crude steel output on a y/y basis and increasingly disappointing steel demand conditions as the peak spring/summer construction season winds down; and c) the aforementioned recent announcements about potential steel production curbs

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that emphasized “*Vigorously promoting the recycling of scrap steel and supporting the development of electric furnace steelmaking.*” The latter has especially impacted sentiment with respect to the future prices of iron ore, granted the tangible impact on iron ore demand as a result of these policies may not be felt for many months and likely years in WSD’s opinion.

Imported Iron Ore CIF Price and Imported Ore Inventory at Main Chinese Ports



Source: SteelHome, MySteel, TSI, Reuters

On balance, granted at least one – the production cuts – or several of these factors materialize, WSD remains somewhat optimistic regarding the outlook for the export price of hot-rolled band through the end of this year. On the same basis, the outlook for 2025 remains “up in the air” pending the outcome of the ongoing battle against inflation that has been prolonged well into 2024, delaying widely-anticipated interest rate cuts by major western Central Banks (although the EU recently announced its first reduction of 0.25%, only a few days later it reported higher than expected inflation figures, suggesting future cuts could be postponed or their scale reduced). In the U.S., the Federal Reserve has indicated that there will be at most one rate cut in 2024, and that the policy would get more aggressive in 2025 with the expectation of at least three rate cuts. As WSD sees it, the outlook for 2025 is eerily similar to this year:

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- Steel demand ex-China will continue its gradual recovery, with India, Southeast Asia, the Middle East and the EU poised to see robust to moderate growth, while Developed Asia and the USA could remain relatively stagnant as inflationary pressure for the latter and increased competition from China for the former cap steel demand growth at low levels.

Numerical Realities: World ex-China					
	Net Trade	Production	Production %	ASC	ASC %
	mt	mt	y/y	mt	y/y
2014	-86.3	847		933	
2015	-108.3	816	-3.7%	924	-1.0%
2016	-105.2	819	0.4%	924	0.0%
2017	-67.7	857	4.6%	925	0.1%
2018	-61.2	877	2.3%	938	1.5%
2019	-56.6	870	-0.8%	927	-1.2%
2020	-36.4	795	-8.6%	832	-10.3%
2021	-44.6	908	14.2%	953	14.5%
2022	-55.2	847	-6.7%	902	-5.3%
2023	-88.6	855	1.0%	944	4.6%
2024F	-96.5	890	4.1%	987	4.5%
2023Q1	-75.4	857	-4.7%	933	-0.2%
2023Q2	-96.5	876	0.4%	973	3.0%
2023Q3	-91.8	840	3.0%	932	6.5%
2023Q4	<u>-90.5</u>	848	<u>5.6%</u>	<u>938</u>	<u>0.5%</u>
2024Q1	-101.6	879	2.5%	981	5.1%
2024Q2	-107.2	894	2.1%	1002	2.9%
2024Q3	-91.8	886	5.4%	978	4.9%
2024Q4	-84.6	892	<u>5.3%</u>	<u>977</u>	<u>4.1%</u>
<u>2024 Forecast Scenarios</u>					
Low	-83.0	870	1.7%	953	1.0%
Mid	-96.3	890	4.1%	987	4.5%
High	-93.0	900	5.2%	993	5.2%
*Change in apparent steel consumption and change in net exports from China.					
Source: WSA, Steelhome, WSD Estimates, Steelbenchmarker					

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- Chinese steel demand is likely to continue its slow downward trajectory, declining perhaps another 1-3% in 2025 versus 2024. The sentiment of gradual decline in demand now permeates mainstream thinking in China based on WSD's recent visit to the country. Chinese policymakers appear content to "under-stimulate" any recovery in the critical-for-steel property sector, so long as overall GDP growth targets are met via the relatively new (since 2021) policy emphasis on export-oriented high-end manufacturing growth.

Some economists believe that China will have no choice but to implement policies that boost domestic consumption and "reflate" the property sector once the manufacturing export-oriented growth model runs out of steam, perhaps by the end of 2025. Increasing pressure on consumers ex-China due to persistently high inflation, rising unemployment, and increased trade protectionism (in the USA and the EU, with others following) could force Chinese policymakers to pivot in the not-so-distant future.

Should the latter begin to unfold over the course of 2025, WSD is not convinced that Chinese steel demand (and corresponding overproduction / high export dynamics) would meaningfully subside as any improvement in steel demand via the property sector is likely to be offset by lower steel demand from manufacturing investment. Furthermore, should Chinese policymakers decide to turn to household consumption as a means of achieving GDP growth targets, a reduced emphasis on both infrastructure and manufacturing investment could actually heap downside pressure on steel demand further exacerbating current dynamics.

World Steel Dynamics' Crude Steel Forecast
(million metric tonnes)

	2010	2015	2019	2020	2021	2022	Year				2023	Year
Advanced Countries	452	448	447	392	442	411	100	102	99	98	399	
Japan	109.6	105.1	99.3	83.2	96.3	89.2	21.6	22.2	21.6	21.6	87.0	
South Korea	58.9	69.7	71.4	66.8	70.4	65.8	16.7	17.0	16.8	16.3	66.7	
Western Europe	144.3	137.8	130.6	114.3	132.4	119.7	29.1	29.3	26.5	26.4	111.3	
United States	80.5	78.8	87.9	72.7	85.8	80.6	19.48	20.41	20.70	20.10	80.7	
Small Cap. Adv.	58.9	56.8	57.8	55.1	56.8	54.7	13.4	13.2	13.2	13.5	53.3	
China*	660	869	993	1,054	1,031	1016	257	274	259	231	1,021	
Developing World ex-China	340	368	2139	399	466	437	111	116	113	116	456	
Africa	7.8	6.6	5.9	4.1	5.2	5.2	1.3	1.5	1.5	1.3	5.6	
Brazil	32.9	33.3	32.2	31.0	36.2	34.0	7.8	8.2	8.1	7.9	31.9	
CIS	108.5	101.6	100.6	102.0	105.6	85.8	21.5	22.5	22.6	22.1	88.7	
Eastern Europe	14.4	15.0	16.1	14.0	18.3	17.1	4.0	4.0	4.0	3.5	15.5	
Developing Asia	21.2	23.8	46.7	38.6	57.5	50.3	13.4	12.5	11.4	11.3	48.6	
India	68.3	89.0	111.2	99.6	118.2	125.4	34.0	35.0	35.2	36.0	140.3	
Latin America	28.8	30.3	28.6	25.0	29.0	28.4	6.9	6.6	7.3	6.6	27.4	
Turkey	29.1	31.5	33.8	35.8	40.4	35.1	7.4	8.5	8.5	9.2	33.6	
MENA	28.8	36.5	53.9	48.9	55.7	61.6	14.8	17.6	14.5	18.0	64.8	
World Total	1,452	1,685	5,664	1,845	1,939	1,856	469	492	471	444	1,876	
World Ex-China	792	816	2586	791	908	847	211	218	212	214	855	
World ex-China and India	724	727	2475	691	790	722	177	183	177	178	715	

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World Steel Dynamics' Crude Steel Forecast - continued

(million metric tonnes)

	2024e				2025	2030	2035e	2024 v 2023	2025 v 2024
	Q1	Q2	Q3	Q4	Year				
Advanced Countries	100	101	100	101	402	409	408	398	0.7%
Japan	21.4	21.9	21.9	21.8	87.0	87.5	78.1	75.7	0.0%
South Korea	16.1	16.2	16.1	16.7	65.1	65.8	60.3	56.5	-2.4%
Western Europe	29.0	29.6	28.7	28.5	115.7	118.6	123.9	120.4	4.0%
United States	19.9	19.9	20.1	20.6	80.6	83.4	84.1	85.3	-0.1%
Small Cap. Adv.	13.4	13.2	13.2	13.5	53.5	53.7	61.4	60.3	0.3%
China*	243	260	257	240	1,001	986	899	872	-2.0%
Developing World ex-China	119	120	119	121	479	498	605	713	5.0%
Africa	1.4	1.5	1.5	1.3	5.8	6.2	7.6	10.4	2.7%
Brazil	8.3	7.9	8.1	8.0	32.3	32.8	36.8	38.9	1.4%
CIS	21.9	22.2	22.5	22.1	88.7	87.4	80.2	77.3	0.0%
Eastern Europe	4.1	4.1	4.1	3.6	15.7	15.8	19.1	18.1	1.5%
Developing Asia	14.0	13.0	12.2	12.3	51.4	54.9	92.0	121.5	5.9%
India	37.2	37.3	38.0	39.3	151.7	163.1	196.3	256.9	8.2%
Latin America	6.6	6.7	7.4	6.7	27.4	27.9	36.6	38.5	-0.1%
Turkey	9.5	9.2	9.1	9.6	37.4	38.5	48.7	54.4	11.2%
MENA	16.3	18.1	15.8	18.5	68.7	71.8	88.0	97.2	6.0%
World Total	462	481	476	463	1,882	1,893	1,913	1,983	0.3%
World Ex-China	219	221	219	223	881	907	1013	1111	3.0%
World ex-China and India	182	183	181	183	729	744	817	854	2.0%

Source: WSD Estimates, WSA

*Includes WSD's estimates for induction furnace production

Daily Benchmark Prices *, China

(dollars per metric tonne)

Ex-works	May-24				Jun-24						
	28th	29th	30th	31st	3rd	4th	5th	6th	7th	11th	12th
Hot-rolled band (5mm thick x 1200-1500mm wide)	446	445	447	445	442	441	440	440	441	438	438
Cold-rolled coil (0.7mm x 1200-1500mm wide)	514	513	514	513	511	510	509	509	509	506	507
Rebar #5 ** (16mm in diameter)	435	433	435	432	428	426	424	423	423	419	418
Standard plate (24mm x 2400mm x 6000mm)	453	453	454	453	451	450	449	449	449	447	447
Scrap (incl VAT) (6 - 10mm thickness)	402	401	402	401	400	398	397	395	395	395	393
Exchange rate (RMB per US \$)	7.2451	7.2489	7.2318	7.2415	7.2458	7.2457	7.2476	7.2441	7.2475	7.2530	7.2380

* Ex-works (the same as FOB mill), \$ per metric tonne. Hot-rolled band is the first product off the hot strip mill.

Source: www.steelhome.cn

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WSD Steel Price Rollercoaster

World Steel Dynamics' Steel Price "Rollercoaster"

(as of June 13, 2024)

Product/Price	2015 2016 2017 2018 2019 2020 2021 2022 2023 2024										Forecast			
	Apr 2024	May 2024	Jun 2024	Q2 Bad Times	Q3 Bad Times	Q4 Bad Times	2024	2025	Q1 Good Times	45%				
Hot-rolled band (mt)														
World export market (FOB)*	370	382	530	580	498	487	905	788	616	555	550	550	552	545
China export (FOB)**	302	344	506	563	489	490	855	676	582	519	530	528	526	535
USA (ex-works)*	512	580	685	916	677	647	1,740	1,150	978	920	855	805	860	863
European Union (ex-works)*	419	460	603	659	527	1,140	951	752	690	680	689	686	720	775
China (ex-works)**	301	353	474	523	465	468	698	564	485	442	446	438	442	455
China REBAR (ex-works)**	297	313	479	528	480	457	655	551	469	423	434	419	425	445
Turkey export REBAR	406	391	472	533	450	448	685	724	622	588	585	573	582	580
HRB Operating Cost median-cost mill														
China (ex-works)	374	398	456	484	494	502	502	649	600	544	576	-	-	-
All but China (ex-works)	384	404	472	490	490	478	478	652	592	585	580	-	-	-
Steel Production (mt) / (annualized)														
China	804	808	832	927	996	1,053	1,032	1,018	1019	1045	-	-	-	-
All but China	816	819	860	880	871	776	879	832	831	849	-	-	-	-
Semi-Finished Products														
Slab (FOB Brazil)	326	303	448	530	433	438	821	664	651	610	590	605	575	610
Raw materials														
Iron Ore sinter feed (to China)**	55	57	69	68	93	111	156	121	119	117	114	109	113	100
Chinese iron ore (Hebei province)	76	86	94	95	109	119	180	140	138	126	133	129	115	130
Pellet premium**	31	31	45	58	29	29	60	72	45	43	43	43	35	35
Coking coal spot (FOB Australia)**	87	142	189	205	178	125	234	352	300	252	237	256	248	275
Coking coal (Shanxi province)##	93	128	182	208	198	156	320	345	269	218	252	243	238	265
Pig Iron N. Brazil FOB##	256	253	358	385	332	332	528	605	462	453	463	460	315	465
Met. Coke (FOB China)##	144	193	303	350	323	289	465	478	345	275	313	300	296	350

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World Steel Dynamics' Steel Price "Rollercoaster" (continued)

(as of June 13, 2024) (USD per tonne)

Product/Price	2015 2016 2017 2018 2019 2020 2021										2022 2023 Apr 2024 May 2024 Jun 2024				2024 2025 Forecast			
											Bad Times		Q3 Bad Times		Q4 Fair Times		Q1 Good Times	
Steel scrap (lt)											Bad Times		Q2		Q3		Q4	
USA #1 HM (to mill)*	212	204	273	325	254	242	433	374	354	325	315	305	315	308	308	375	385	
USA shredded (to mill)*	236	229	296	354	282	277	473	467	434	415	405	385	402	380	380	365	435	
USA prime (to mill)*	239	238	358	396	303	302	590	524	472	420	420	380	407	383	383	395	445	
80/20 HM to Turkey**	236	236	301	336	286	293	459	437	395	382	383	384	383	385	385	425	475	
iron ore + coking coal cost (ex-China)	204	256	318	331	346	327	497	548	498	451	433	442	442	445	445	483	469	
iron ore + coking coal cost (China)	209	243	311	333	364	355	575	541	470	421	446	430	432	436	436	470	455	
80/20 premium (discount) vs IO + CC cost	32	-20	-17	6	-60	-34	-38	-111	-103	-69	-50	-58	-59	-60	-60	-58	-44	
Spreads																		
World export HRB less Iron Ore/Coal Cost	166	126	212	250	152	160	408	240	118	104	117	108	110	110	110	112	141	
China HRB (ex-works) less Iron Ore/Coal Cost	92	110	163	190	101	113	123	23	15	21	0	8	10	19	19	10	45	
China HRB (export) less Iron Ore/Coal Cost	93	101	195	230	125	135	280	135	112	98	84	98	93	99	99	105	130	
USA HRB vs USA Shredded Scrap	276	351	389	562	395	370	1,267	683	544	505	450	420	458	458	458	513	494	
USA HRB vs World Export HRB	142	198	155	336	179	160	835	362	362	365	305	255	308	308	308	318	353	
EU HRB less Iron Ore/Coal Cost	215	204	285	329	181	200	643	404	254	239	247	247	244	244	244	275	314	
EU HRB less World Export HRB	49	78	73	79	29	40	235	163	136	135	130	139	135	135	135	175	321	
Turkey Export REBAR less 80/20 HM to Turkey	170	155	171	197	164	155	226	287	227	206	202	189	199	199	199	195	180	
USA HRB less Slab (FOB)	186	277	237	386	244	209	919	486	327	305	245	215	255	255	255	288	205	
USA HRB vs China HRB	211	227	211	393	212	179	1,042	586	493	478	409	367	418	418	418	468	338	
USA HRB vs Europe HRB	93	120	82	257	150	120	600	199	226	230	175	116	174	174	174	143	424	
Brazilian Pig Iron vs Prime Scrap	17	15	0	-11	29	30	-62	81	-10	33	43	83	53	53	53	-80	134	
Met Coke vs Coking Coal FOB Australia	22	-6	38	63	74	114	137	-15	-75	-78	-19	-58	-52	-52	-60	20	5	
Other																-70	-60	
10 year Treasury Note interest rate	2.09	2.43	2.33	2.92	2.08	0.83	1.43	3.05	3.97	4.64	4.46	4.33	-	-	-	-	-	
RMB per U.S. dollar	6.29	6.65	6.73	6.64	6.90	6.89	6.45	6.76	7.05	7.24	7.22	7.24	-	-	-	-	-	
U.S. Dollar per Euro	1.103	1.103	1.139	1.178	1.117	1.148	1.188	1.051	1.081	1.065	1.08	1.09	-	-	-	-	-	
Brent Crude oil price per barrel	54	57	56	65	65	43	71	97	84	87	84	78	-	-	-	-	-	

Sources:

*SteelBenchmark **S&P Global #SteelHome ##MetaNote: These forecasts are speculative and are not to be used for transactions

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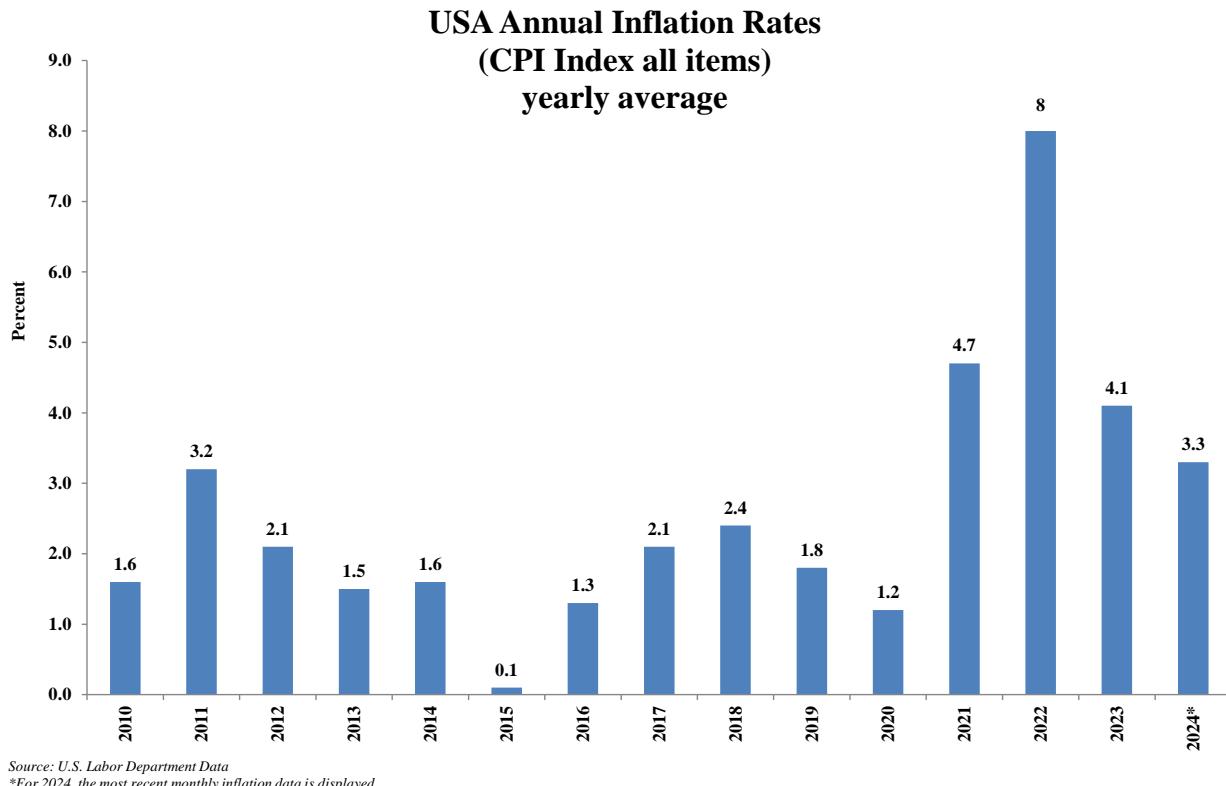
Scenario II: “Prozac Is Not Enough” – Odds 45%

In this scenario, an altogether depressing one in WSD’s view, factors supporting the hot-rolled band export price at or near current levels, as well as those that could push the price up as forecast in the first Scenario, do not come to pass. In fact, a confluence of largely negative developments takes hold, pushing down the price into “Death Spiral” territory of \$470-500 per tonne by summer’s end. Granted “Death Spirals” typically last only a few months, the repeat of a prolonged condition akin to 2015-16 cannot be ruled out assuming:

- Chinese steel demand continues to languish through the remainder of the year with little or no additional policy support to boost infrastructure or property-related activity. While this would be a hugely negative outcome for the export price of HRB – on the assumption that stagnant demand would continue to incentivize high exports – this scenario could turn catastrophic in the absence of concrete policy aimed at reducing steel output. In other words, a “No Action” stance on the part of Chinese policymakers with respect to steel demand, production and exports could spell doom for the global steel sector by effectively replicating the 2015-16-like downward spiral via a surge in Chinese export of steel products priced \$50-100+ per tonne below marginal production cost.
- Steel demand in India disappoints during the second half of this year, perhaps rising only about 6-8% versus the 12%+ growth seen during the past two years and up until the recent election. The impact of this on global HRB prices would be two-fold:
 - One: India could temporarily become a significant next exporter given the substantial capacity additions underway. A competition between India and China to simultaneously export their way out of excess supply would no doubt be catastrophic for international steel markets.
 - Two: Given its role in setting the international price of coking coal, disappointing steel demand and lower than expected production could temporarily depress coking coal prices, perhaps to a figure in the \$180-220 per tonne range. Many in the coking coal business believe that to be near the production cost of the marginal high-cost producers in the market, with a sustained decline in the price below this range likely to induce a significant reduction in supply.
- Surging energy prices, with some early signs recently emerging, dampen any potential upside for economic and steel demand recovery in the EU come this fall. Recent increases in the futures prices of electricity and natural gas reflect concerns about future supply of piped natural gas that continues to flow to the EU from Russia (granted it’s a small fraction of the pre-war volume), interruptions in supply between Norway and the UK, and reduced supply and higher prices of imported LNG. Any further instability in the Middle East that causes a spike in global oil prices would have massive negative repercussions for steel demand in most markets, especially India, the EU and Asia ex-China.

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- High inflation finally “catches up” to the seemingly invincible economy of the USA, pushing economic activity and unemployment into negative territory by the end of the year. Higher for longer benchmark interest rates would dampen steel demand in one of the largest and most attractive steel import markets globally. The knock-on effects of this condition on Developing World growth would likely be significant via financial market instability, among other factors.



Under this scenario, the prices of steelmakers raw materials could reach lows not seen since the initial onset of the Covid pandemic:

- The price of iron ore, delivered to China, could decline to \$80-90 per tonne by late-summer and remain in the \$90-100 per tonne range through the remainder of the year
- Coking coal prices could test the limits of marginal-cost supply, as already mentioned, perhaps falling sustainably below \$200 per tonne for the first time since mid-2021.
- Scrap prices, which have not breached the \$300 per tonne threshold for 80/20 Heavy Melting grades, delivered to Turkey, since 2020 could potentially test this “floor” once again.

The good news with respect to this Scenario, as WSD sees it, and the reason we do not place greater than 50% odds on it, is that all or even several of these factors are unlikely to transpire at

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once. Nevertheless, it is not until 2026-27 that we would expect good news and improved profitability for the steel industry should a number of these factors come to pass. Much like 2015-2016, export-oriented steel companies' financial stress in many cases will be so substantial in 2025 that a sizable number of steel plants will be downsized and/or eliminated. Most steel companies won't be able to sustain excess capacity on a ready-to-operate basis because of the shortage of capital. Already on the way oncoming HRB capacity in Algeria, Malaysia, Vietnam and elsewhere will further exacerbate these stresses (and is likely to do so under either scenario we've laid out). On the flip side, steel companies paying market prices for steelmakers' raw materials will be cost competitive perhaps well into 2027 because the sizable oversupply of these materials will be so extended. Global demand for steelmakers' raw materials will be lackluster in the years ahead if Chinese steel demand falls back even further than we expect.

Looking ahead beyond the near-term one to two years, WSD sees a number of factors continuing to impact steelmakers' viability and profitability in the decade ahead:

- Steel's Technological Revolution will likely accelerate in the next five years. New technologies will be needed to address the decarbonization goals set forth by the industry, especially in the Advanced Economies where explicit regulation and policy frameworks are being actively put in place. The consequence of this will be both a blessing and a curse from the point of steelmakers in these markets.
 - A "blessing" because the installed capacity could in many cases provide cost savings (such as DRI replacing BF in locations with relatively cheap natural gas, such as the USA and Canada) and permit product quality enhancements. We expect investments in new technologies that: use non-coking coal intensive processes to support directly-reduced iron and/or steelmaking operations; permit better and thinner flat products to be produced via the thin-slab casting route; enable continued huge strides in the development of advanced/ultra-high strength steels for automotive and other applications; and permit low capacity steel mills to produce rebar and other commodity long products.
 - The Technological Revolution is not working to the favor of two groups:
 - 1) Workers. The ongoing technological revolution, spurred by the information revolution, is dramatically reducing the manhour content needed to provide services and manufacturing products, including the cost of delivering manufactured products in the marketplace. Hence, gains in employment are well lagging compared to the rise in output. This phenomenon will continue to pose challenges for both Developed economies looking to sustain employment – granted the reality of shrinking demographics could make this more of a "blessing" there – and Developing ones seeking to boost employment, such as India and Vietnam, among others.
 - 2) Developing World countries. It has become more attractive to build a new factory in Advanced Countries, especially the United States, than in the Developing World due to reduced country risk, increasing government subsidies, favorable trade policies, the fewer manhours needed to produce the

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manufactured product, localized sourcing, low energy prices (especially in the United States) and the huge size of the market for both commodity-type and high-end products.

- Another “curse” has to do with the massive CAPEX requirement for “decarbonizing” existing steel plants, especially in the Advanced World. In many cases, these investments come with little immediate economic payback, or ROI, when viewed through the lens of shareholders and investors. Escalating construction and equipment costs, combined with little observed price “premium” to date for producing green[er] steel products – the latter concept yet to be well defined and agreed globally – leaves many steel companies between a proverbial “rock and a hard place.” Should global steel markets get mired in a “Bad” to “Fair Times” profitability environment in the next few years, it would not surprise WSD to see a broader policy rollback or delay with respect to decarbonization in the EU and other leading markets. The latest European Commission election results could perhaps be viewed as an early-warning sign of these developments.

Chinese Steel Situation – “Living on a Prayer”

For those not familiar with the mid-1980’s iconic ballad by the American rock band Bon Jovi, its lyrics start out as follows:

*“Once upon a time, not so long ago
Tommy used to work on the docks, union's been on strike
He's down on his luck, it's tough, so tough
Gina works the diner all day, working for her man
She brings home her pay, for love, mmm, for love*

*She says, "We've gotta hold on to what we've got
It doesn't make a difference if we make it or not
We've got each other and that's a lot for love
We'll give it a shot*

*Whoa, we're half way there
Whoa oh, livin' on a prayer
Take my hand, we'll make it, I swear
Whoa oh, livin' on a prayer”*

While the analogy may not be perfect, WSD believes it’s good enough to describe the overall sentiment of the Chinese steel market at present. Whilst everyone is “working hard,” “it’s tough, so tough” given the weak demand environment and simultaneous pressure to maintain steel output and corresponding employment. And while Chinese steel mills certainly “got each other” the reality of the dynamic is that of cut-throat competition, not “for love,” prioritizing market share over profits in the short term. So, the market carries on, “living on a prayer” that some combination of improving demand, lower costs and government policy support will bailout the industry from what appear to be years of future oversupply and poor profitability conditions that threaten to spill over into the rest of the world.

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These feelings of despair have been recently exacerbated as the domestic price of hot-rolled band declined to about \$438 per tonne, excluding VAT, from a recent high of \$453 per tonne in mid-May. From an overall demand and production perspective, the following statistics illustrate the broadly challenging environment year to date in 2024:

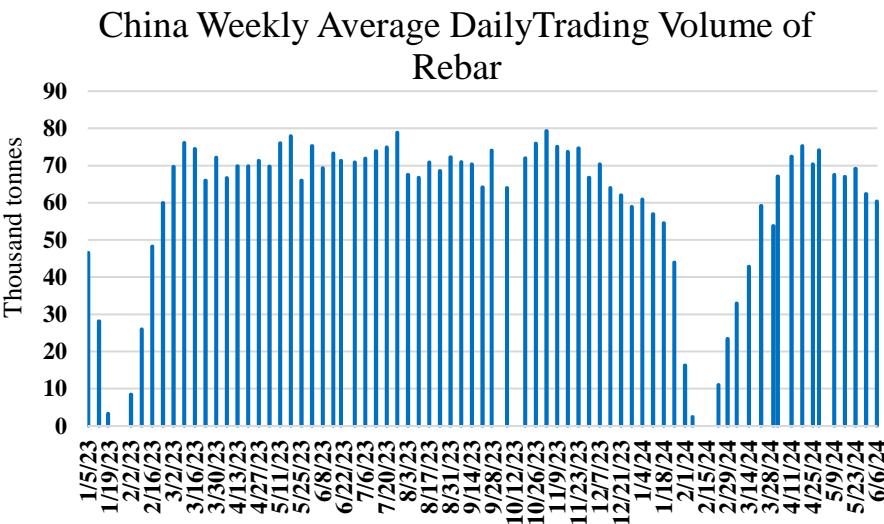


- Crude steel output in the first four months is down about 3% on an official basis (assuming the Jan-Feb reported figures, and the re-stated “base” figures from early-2023 are accurate). Taking into account the presumed over-reporting of steel output in early-2024 (and corresponding under-reporting during late-2023), WSD estimates crude steel output to be down about 6.1% during the first four months. Based on 10-day reported statistics, crude steel output is down about 5.6% during the last 10-day period of May on a year to year basis.
- Steel exports, on a crude steel-adjusted basis, are up about 29.8% year to year during the first four months of 2024 to 38.4 million tonnes, and up about 25.4% through May to 48.8 million tonnes based on preliminary data
 - Steel imports are up about 21% through April to 3.71 million tonnes and up ~12% through May to 4.40 million tonnes
- Hence, China’s apparent steel consumption is down about 9.4% during the first four months of this year (assuming “adjusted” crude steel output for late-’23 to early-’24) and down ~8.6% through May based on estimated production/trade data and the same crude steel output adjustments.

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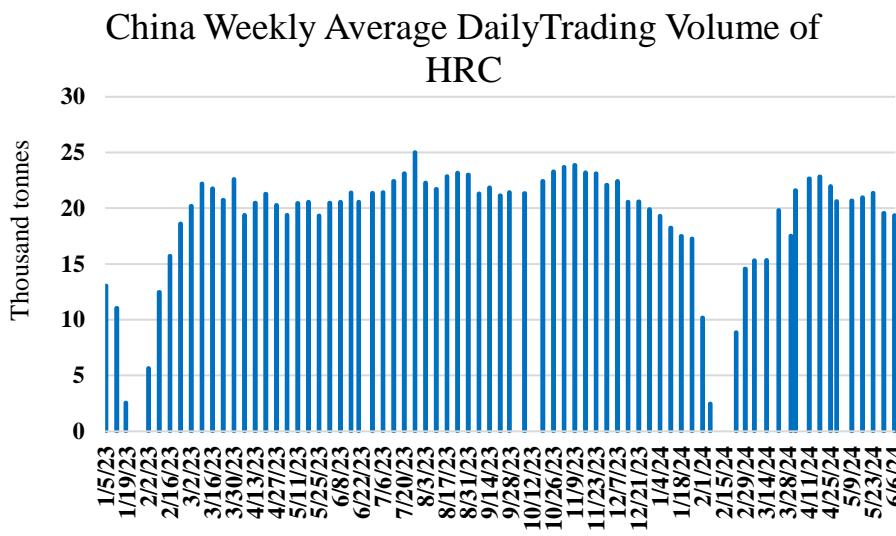
On an immediate basis, the market doldrums are further corroborated by a variety of high-frequency indicators:

- The daily trading volume of rebar – perhaps the best proxy for real-time demand trends in the construction sector – was about 20% lower during the first week of June versus the corresponding week one year prior. On a trend basis, the past four weeks have been down about 12%, on average, versus the prior year.



Source: SteelHome,

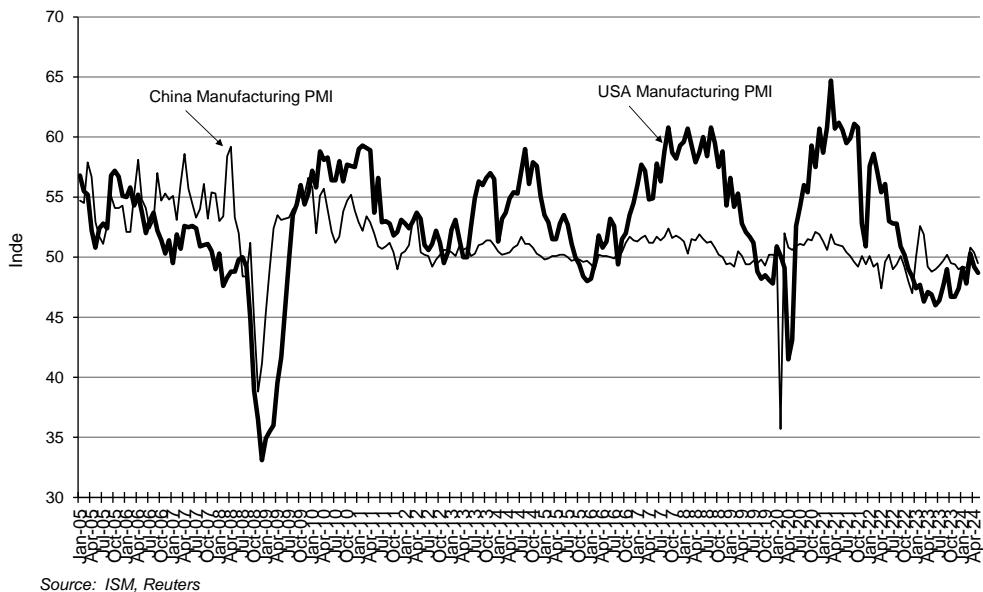
- The daily trading volume of HRC was about 5.5% lower during the first week of June versus the corresponding week one year prior. On a trend basis, HRC trading volumes were actually up about 6%, on average, during the prior eight consecutive weeks. Given the greater tie-in for flat-rolled products, with HRC as a proxy, to manufacturing activity, it is interesting to observe that the most recent down week of trading coincided with the surprising first sub-50 reading of the NBS manufacturing PMI – reported at 49.5 for May.



Source: SteelHome,

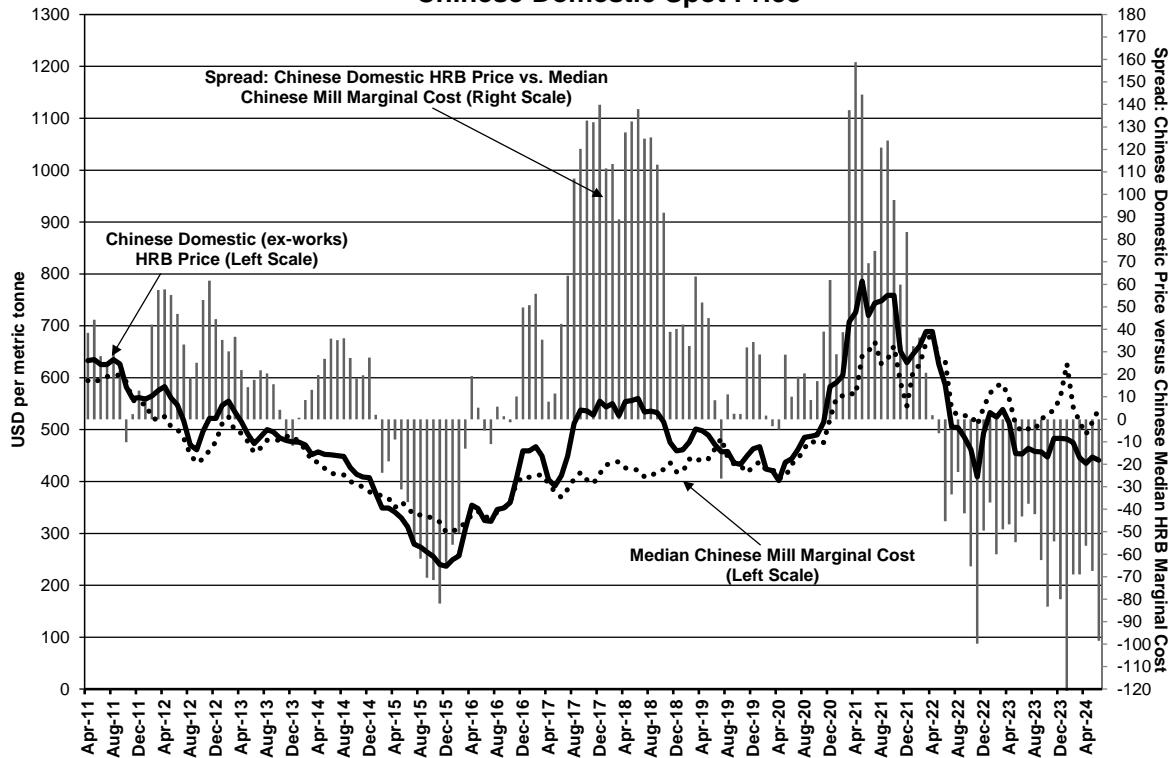
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USA vs. China Manufacturing PMI



From a profitability perspective, Chinese HRC producers continue to post losses based on our World Cost Curve data, with the marginal cost, including overhead, of the median-cost producer in May at about \$514 per tonne, roughly \$67 per tonne higher than the average price of \$447 per tonne, excluding VAT. Granted the prices of iron ore and Chinese domestic coking coal have come down about \$10 and \$12 per tonne, respectively in early-June compared to May, the corresponding reduction in cost of about \$26 per tonne to \$488 per tonne still represents a loss of about \$50 per tonne compared to the current HRB price of \$438 per tonne.

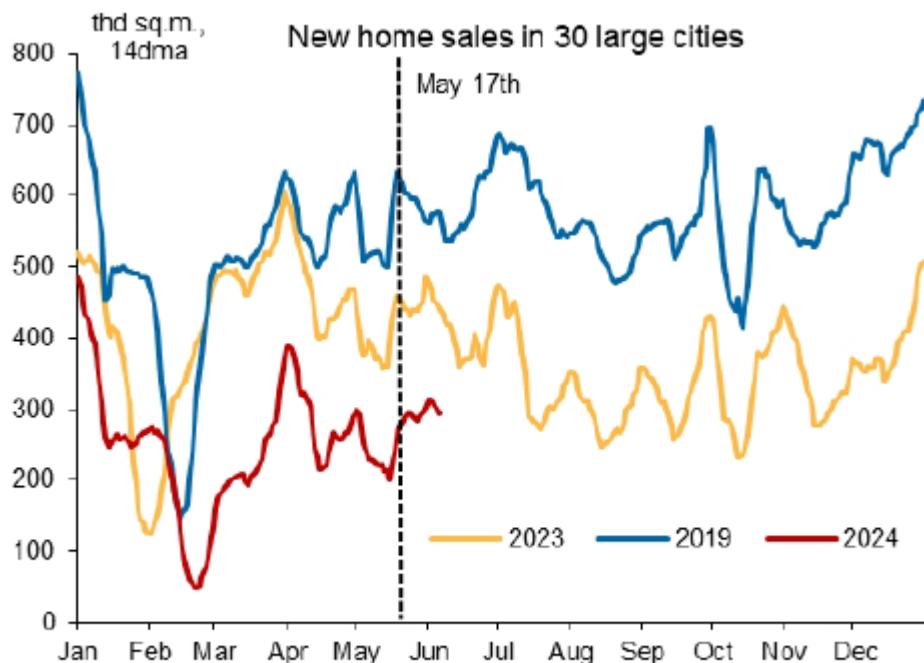
Median Chinese Mill HRB Marginal Cost versus Chinese Domestic Spot Price



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The brutal reality from the Chinese steel demand perspective is that measures aimed at relieving the stress in the property market, namely the recently announced program whereby local governments and SOEs will be purchasing unsold homes and land from distressed property developers – effectively making the government a “buyer of last resort” – are simply not enough to boost steel demand, with the latter mostly a function of new starts rather than sales of existing homes and apartments.

- Interestingly, even this radical action appears to have been met with a lukewarm response as new home sales declined 35% y/y from mid-May through early-June compared to a 41% y/y decline during the first half of May.

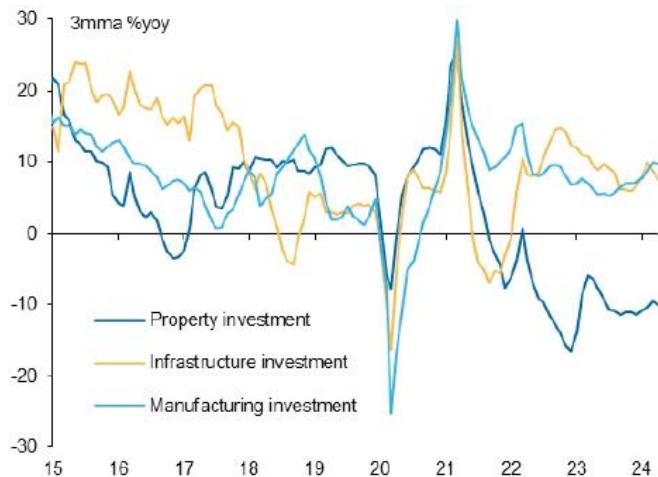


Source: WIND, Macquarie Macro Strategy

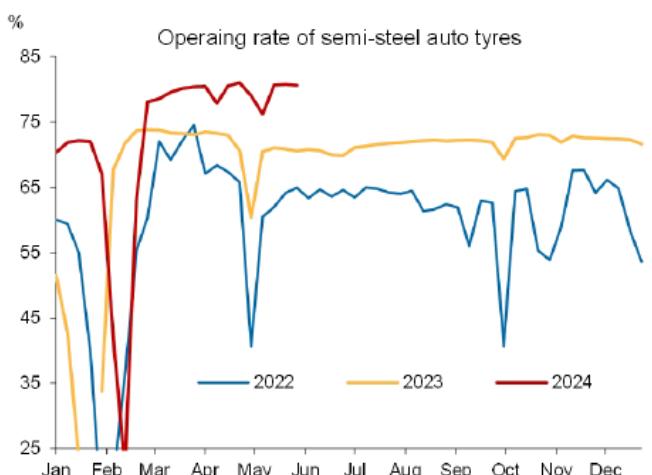
On the flip side, it is equally apparent that the substantial growth in manufacturing investment and activity cannot replicate the steel intensity of construction and, therefore, may never be able to fully offset the decline in steel demand. Consider:

- Manufacturing investment grew 9.3% y/y in April and 10.3% in March. This compares to overall FAI growth of only 3.6% in April and 4.7% in March. To suggest that manufacturing is leading the charge in Chinese economic growth would be an understatement at present
 - Industrial production is especially robust, up nearly 7% y/y in April, with automobile production up 15% (+39% y/y for EVs) and automobile exports up 32% y/y.

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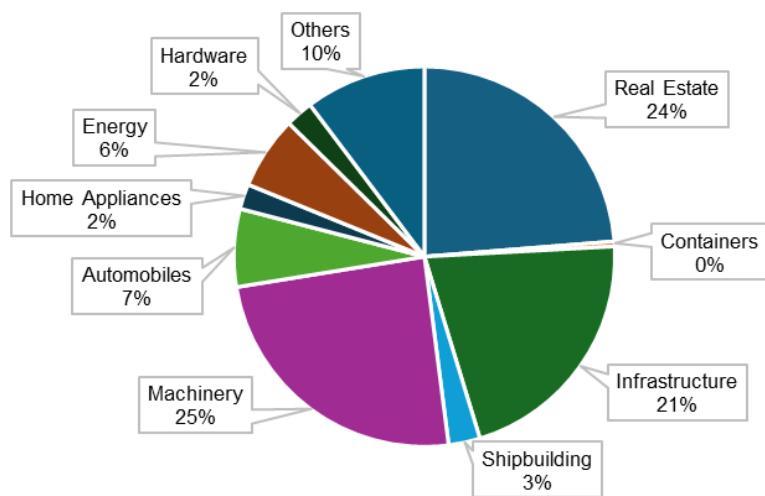


Source: NBS, WIND, Macquarie Macro Strategy

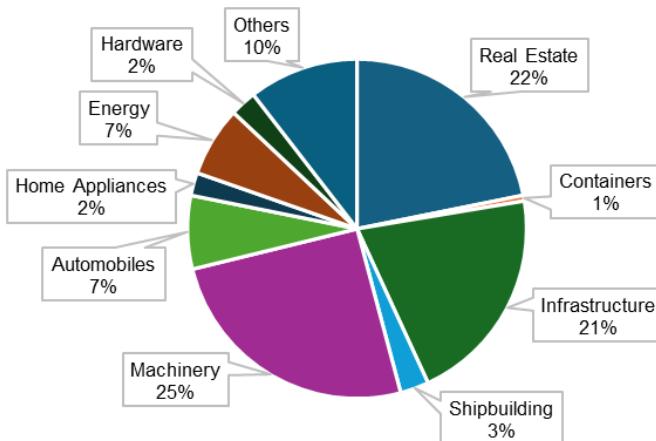


Source: WIND, Macquarie Macro Strategy

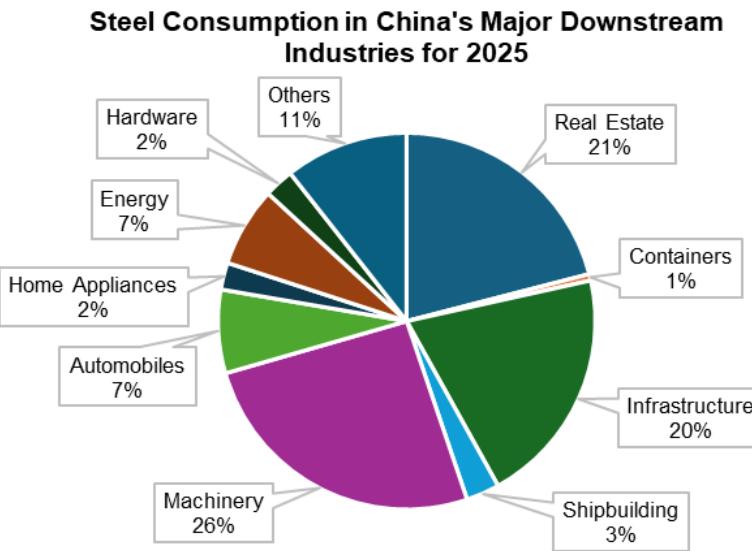
Steel Consumption in China's Major Downstream Industries for 2023



Steel Consumption in China's Major Downstream Industries for 2024



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Source: SteelHome

SteelHome Forecast of Steel Consumption in China's Major Downstream Industries for 2024-2025 (MT)

Year	Real Estate	Infrastructure	Machinery	Automobiles	Shipbuilding	Home Appliances	Hardware	Containers	Energy	Others	Total
2022	261	187	246	57	20	17	19	6	52	96	960
2023	222	198	229	62	25	20	22	4	58	96	936
2024e	200	190	232	64	25	20	23	5	61	96	916
2025e	190	185	233	65	26	21	23	5	62	96	906

Looking ahead in the immediate term 4-8 weeks, WSD does not anticipate a reversal in the overall negative steel demand trend considering the seasonal demand “peak” is already in the rearview mirror with little to show for it. Hence, we anticipate the combination of negative sentiment and lower iron ore prices to drag down the price of domestic HRC by at least another \$10-20 per tonne by late-summer.

That being said, WSD is moderately optimistic that some combination of steel output cuts, additional stimulus measures – perhaps as soon as the 3rd Plenum economic policy meeting in early-July – and the lagging effect of increased long-term bond issuance during mid-May (when a 1 trillion RMB program was announced in an effort to support infrastructure spending and overall credit growth) will improve the supply/demand balance in the Chinese domestic market come early-fall “peak” construction season through year-end. If so, the domestic HRC price will rebound from a summer low of about \$420 per tonne to perhaps \$450-470 per tonne, depending on the voracity of the demand improvement and the clarity of the production restrictions, if any, with a corresponding positive impact on steel exports – from the viewpoint of non-Chinese steel mills. (Please see accompanying exhibit)

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Numerical Realities: China

	Net Trade	Production	Production %	ASC	ASC %
	mt	mt	y/y		y/y
2014	86.3	883		796	
2015	108.3	869	-1.6%	761	-4.5%
2016	105.2	873	0.4%	767	0.9%
2017	67.7	862	-1.2%	794	3.5%
2018	61.2	928	7.6%	866	9.1%
2019	56.6	993	7.0%	936	8.1%
2020	36.4	1,054	6.2%	1,018	8.7%
2021	44.6	1,031	-2.2%	986	-3.1%
2022	55.2	1,016	-1.4%	961	-2.6%
2023	88.6	1,021	0.4%	932	-3.0%
2024F	96.5	1,010	-1.1%	914	-2.0%
2023Q1	75.4	1,043	3.2%	968	-0.9%
2023Q2	96.5	1,098	-2.9%	1,002	-5.5%
2023Q3	91.8	1,029	2.8%	937	-0.4%
2023Q4	90.5	915	-1.0%	824	4.0%
2024Q1	101.6	973	-6.7%	872	-9.9%
2024Q2	107.2	1,052	-4.3%	944	-5.7%
2024Q3	91.8	1,048	1.9%	957	2.1%
2024Q4	84.6	957	4.6%	872	5.8%
2024 Forecast Scenarios					
Low	83.0	1,000	-2.1%	917	-1.7%
Mid	96.3	1,010	-1.1%	914	-2.0%
High	93.0	1,020	-0.1%	927	-0.6%

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Status of Ultra-Low Emission Transformation in China's Steel Industry

Province/City	Total Process Ultra-Low Emission		Partial Process Ultra-Low Emission		Total	
	Number of Steel Mills	Production Capacity (MT)	Number of Steel Mills	Production Capacity (MT)	Number of Steel Mills	Production Capacity (MT)
Tianjin	4	14.65	-	-	4	14.65
Hebei	37	149	6	15.24	43	164.24
Shanxi	5	28.75	-	-	5	28.75
Inner Mongolia	-	-	1	17.5	1	17.5
Liaoning	-	-	3	15.2	3	15.2
Shanghai	1	17.72	-	-	1	17.72
Jiangsu	19	93.2	10	19.54	29	112.74
Zhejiang	-	-	7	12.95	7	12.95
Anhui	2	20.1	4	7.93	6	28.03
Fujian	-	-	3	11.5	3	11.5
Jiangxi	-	-	1	3.2	1	3.2
Shandong	14	65.94	-	-	14	65.94
Henan	3	3.5	3	8.4	6	11.9
Hubei	2	19.91	1	3.58	3	23.49
Guangdong	2	18.73	1	2.4	3	21.13
Guangxi	-	-	2	16.08	2	16.08
Chongqing	-	-	1	8.4	1	8.4
Sichuan	1	4	-	-	1	4
Shaanxi	2	8.2	1	3	3	11.2
Xinjiang	-	-	1	6.3	1	6.3
Total	92	443.69	45	151.22	137	594.9

Source: SteelHome

China's Efficiency Standards and 2025 Capacity Targets for Iron and Steel Processes

Process	Standard	Energy Consumption (Standard Coal KG per Ton of Steel)	Capacity Ratio for 2020	Capacity Ratio Target for 2025
Blast Furnace	Standard	≤361	4%	30%
	Benchmark	≤435	66%	70%
Converter	Standard	≤-30	6%	30%
	Benchmark	≤-10	64%	70%
Electric Furnace, 30t-50t	Standard	67		30%
	Benchmark	86		70%
Electric Furnace, >50t	Standard	61		30%
	Benchmark	72		70%

Source from CISA, SteelHome

WORLDSTEELDYNAMICS

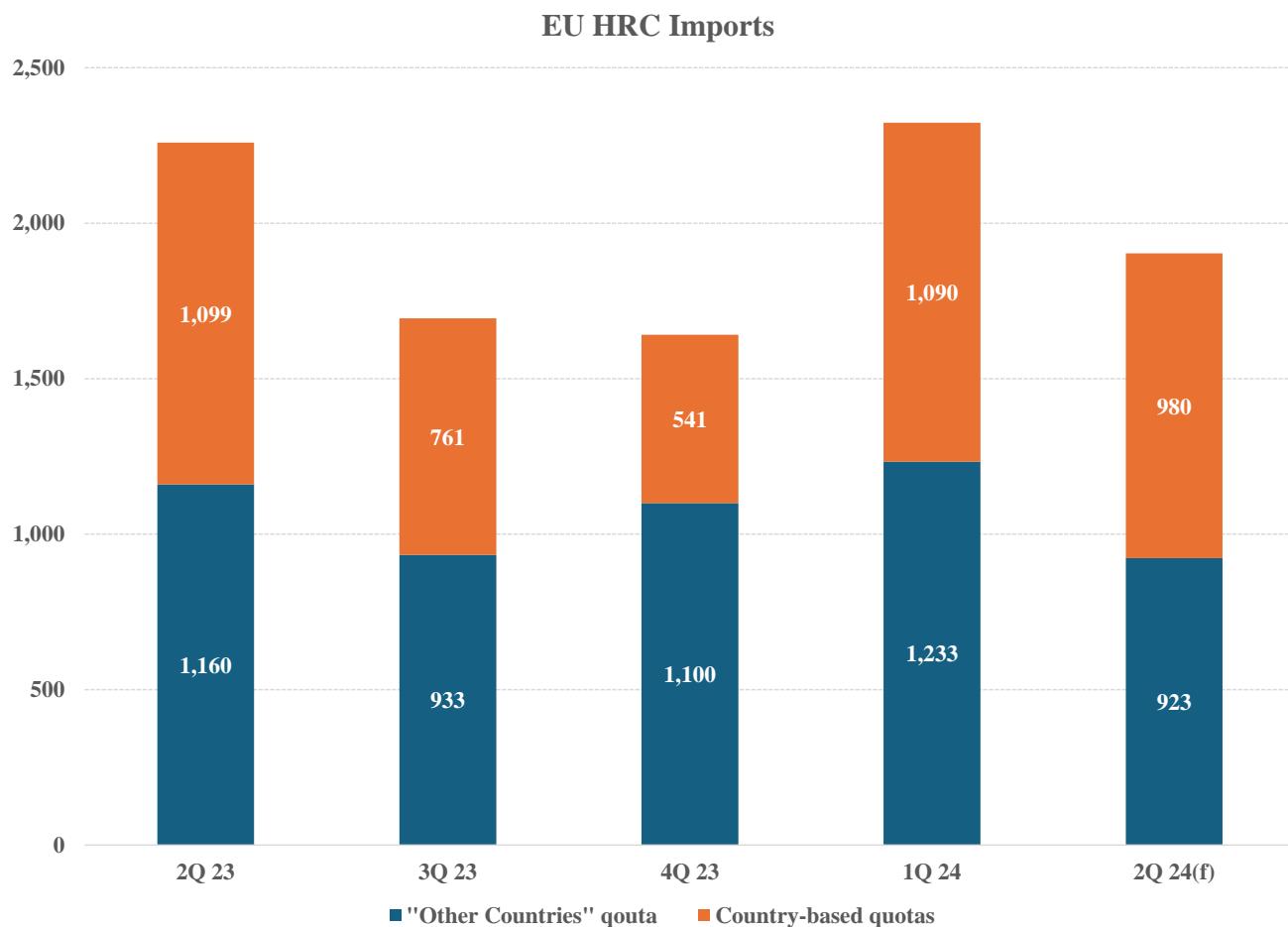
European Market – A Prayer Answered

On May 31st the EU extended safeguard measures on steel imports for another two years, until the end of June 2026, that included two key new features:

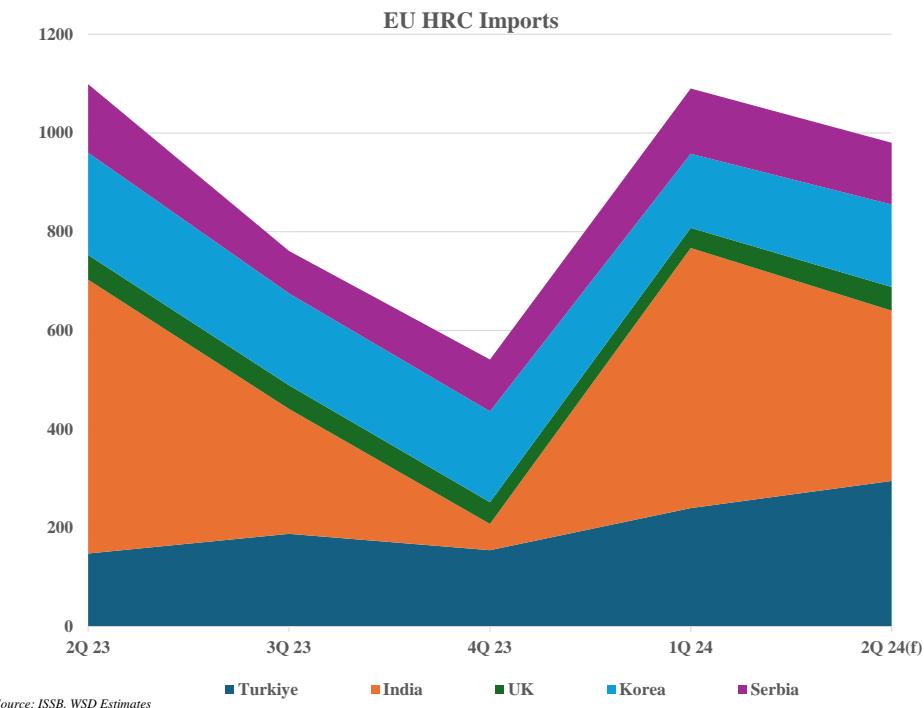
- A decrease in the annual “liberalization rate” from 4% to 1% - this represents the annual percentage increase in the quota volume, to be adjusted in July. At present, the Q1 2024 quota for HRC under “Other Countries” amounts to ~923K tonnes; therefore, come July of this year the figure will rise by 1% (instead of 4% under the prior system) to ~932K tonnes.
- A new limit on the share of single country imports within “other countries” quotas to 15% for HRC and Wire Rod. In other words, going forward no individual country can be responsible for importing more than 15% of the 932K tonnes total.

The real-world impact of this change is significant, in WSD’s view, but perhaps not as positive as some are hoping. Taking Q1 of this year as an example:

- Total HRC imports into the EU amounted to ~2.3 million tonnes (nearly 10 million tonnes annualized).

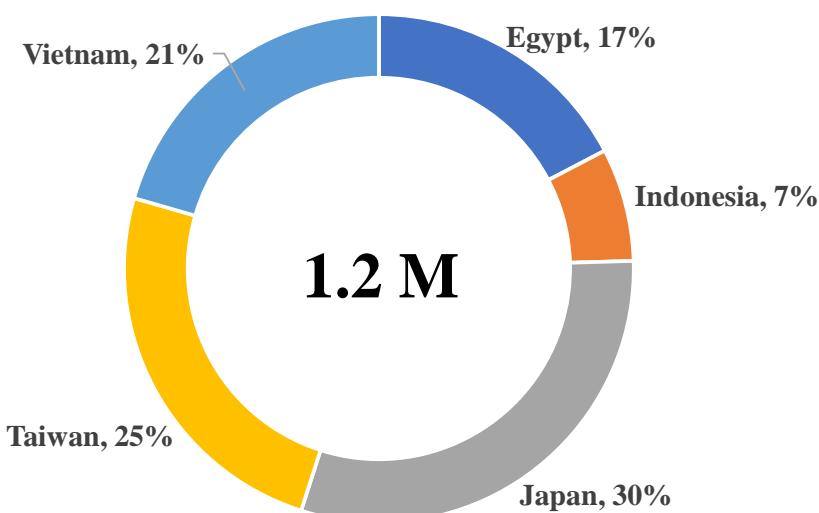


WORLDSTEEL DYNAMICS



- Of this amount, approximately 1.2 million tonnes were imported by “other countries” that were subject to the ~923K tonne quota. Since the quota was exceeded by nearly 30%, an ~8% duty was therefore imposed on the entire 1.2 million tonnes.

Q1 2024 EU Imports of HR Coil and Plate under the “other countries” quota



Source: WSD Estimates

WORLDSTEELDYNAMICS

- The remaining ~1.1 million tonnes were imported from countries subject to individual country-level quotas, such as Turkey, UK, India, S. Korea and Serbia. Many of these quotas were not fully utilized and many were fractionally utilized. Little to no duties were paid on these volumes.
- Looking ahead, the impact of the new rules from a volume perspective can be estimated as follows:
 - Taking Japan as an example, 30% share of the “old” 926K tonne quota (which was actually exceeded) would have amounted to about 277K tonnes. Under the new rules, this figure would be cut in half to 15% of 932K tonnes, or 140K tonnes.
 - Assuming actual shares for each of the five countries responsible for “other countries” imports during Q1 2024 against the quota of 923K tonnes (and not the 1.2 million tonnes that well exceeded the quota), the new limits would “free up” about 224k tonnes per quarter – or about 900k tonnes annualized – in market share for some combination of domestic EU mills and imports from Turkey and others under the individual country quotas. Considering the actual level of imports from these countries well exceeded the existing quota, the market share “gain” potential goes up to 2.1 million tonnes annualized.

EU "Other Countries" HRC Quota System Impact

	Q1 Actual Share	Q1 Actual Volume (A)	Q1 Volume Up to Quota (B)	Capped Share	Capped Volume (C)	C - A	C - B
Japan	30%	370	277	15%	140	-230	-137
Taiwan	25%	308	231	15%	140	-168	-91
Vietnam	21%	259	194	15%	140	-119	-54
Egypt	17%	210	157	15%	140	-70	-17
Indonesia	<u>7%</u>	<u>86</u>	<u>65</u>	<u>15%</u>	<u>140</u>	<u>53</u>	<u>75</u>
Total	923	1233	923	932	699	-534	-224

Source: ISSB, WSD Estimates

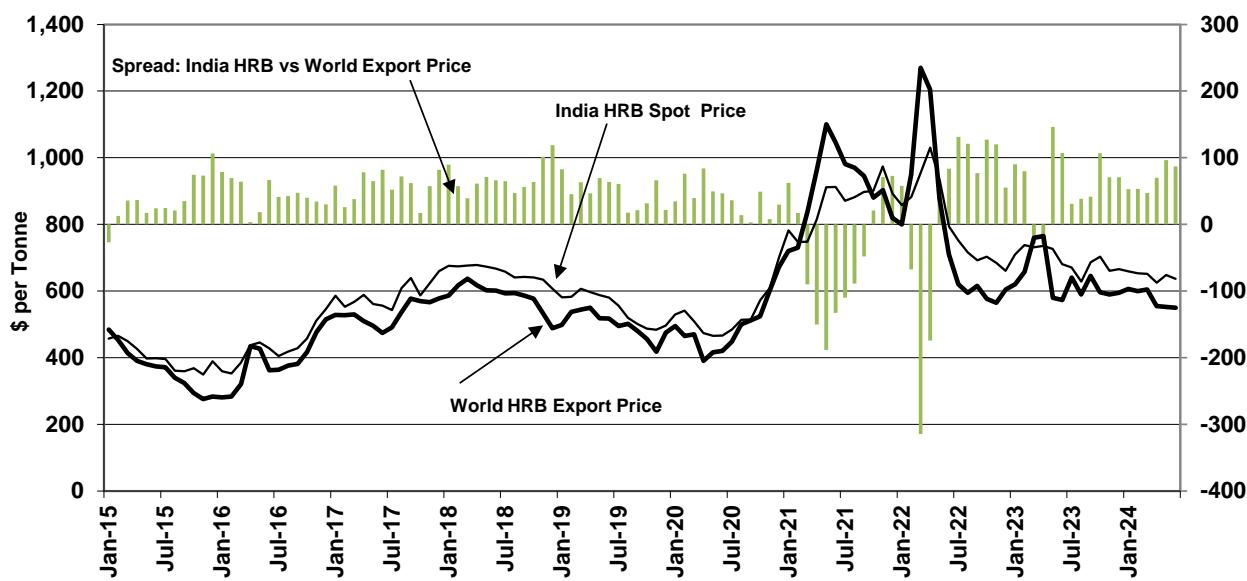
On balance, WSD believes the new system is a mild positive from the perspective of EU mills, but it's far from panacea:

- On the one hand, imports from Taiwan, Japan, Vietnam and Egypt may be reduced. Granted Vietnamese, Japanese and Taiwanese producers have been ultra-competitive as of late (often matching ultra-low Chinese FOB prices), and Egyptian mills often possess a cost advantage via energy and labor, a reduction in these volumes could be beneficial.
- A further positive presumes that the bulk of decline in imports from the above group is replaced with imports from Turkey, whose steelmakers have higher costs and have been quoting relatively higher prices the past few years.

WORLDSTEELDYNAMICS

- On the flip side, a major shift in volumes toward the individual country importers, with a huge surge in imports from India, for example, cannot be ruled out. The good news is that Indian producers tend to export at higher prices given the relatively healthy pricing environment in their rapidly growing domestic market. As such, any export surge may be a temporary aberration – the Indian domestic market was slower than usual during Q2 of this year during the election season – there is no guarantee that future Indian offers will be greatly reduced. Indian producers tend to be low-cost, Chinese exports to India continue to pressure the domestic market, and oncoming capacity could exceed demand growth at times going forward.

India, World Export Hot-Rolled Band Spot Prices and Spread



Source: WSD PriceTracker, SBB & SteelBenchmark™

- Other lower-cost suppliers from the Middle East, including the oncoming Tosyali ultra-low-cost 2 million tonnes per year HRC facility as well as oncoming capacity in Malaysia and elsewhere could bring newfound and highly competitive offers to EU buyers.

For the time being, the announcement has already brought a positive turn for EU domestic prices, with the recent low price of about €620-630 per tonne seeing a modest uptick with offers at €630-650 per tonne (*Note: The Southern and Northern EU prices have essentially converged at present, a sign of ultra-competitive conditions*). Nevertheless, the current price range is well down from the recent brief peak of about €780 per tonne in February of this year. The good news, from the mills' point of view, is that profitability at current prices has remained adequate when compared to the recent highs and lows, with the "spread" of about \$272 per tonne over raw materials and energy in line with the pre-Covid average figure of \$262 per tonne.

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EU Price Waterfall Analysis

\$/Metric Tonne

	2018-2019 Avg	2021 Peak *	Dec 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Apr 2024	May 2024	June 2024	Q3 '24E
Iron Ore	\$82	\$233	\$113	\$126	\$115	\$111	\$128	\$123	\$106	\$114	\$105	\$100
Coking Coal	\$192	\$125	\$258	\$352	\$255	\$273	\$334	\$309	\$252	\$237	\$256	\$275
Scrap	\$312	\$525	\$387	\$430	\$398	\$366	\$389	\$407	\$382	\$383	\$384	\$385
"Blended" RM Cost	\$292	\$488	\$386	\$468	\$388	\$390	\$456	\$435	\$371	\$373	\$372	\$377
<i>RM Cost Impact</i>		\$197	\$94	\$176	\$96	\$98	\$164	\$143	\$80	\$82	\$81	\$86
Natural Gas **	\$24.1	\$44	\$135	\$63	\$42	\$39	\$48	\$33	\$35	\$37	\$41	\$41
Electricity **	\$10.6	\$15	\$46	\$23	\$17	\$17	\$15	\$14	\$11	\$12	\$13	\$13
<i>Energy Cost Impact ***</i>		\$13	\$73	\$26	\$12	\$11	\$14	\$6	\$5	\$7	\$10	\$10
EU Price	\$588	\$1,450	\$704	\$850	\$818	\$687	\$687	\$802	\$690	\$680	\$689	\$720
Spread: HRB Price less RM/Energy	\$262	\$914	\$210	\$322	\$384	\$251	\$183	\$327	\$279	\$265	\$272	\$298

*Reflects roughly simultaneous peak price periods for iron ore, scrap and HR Prices; note energy costs

**The displayed values for NG and Electricity are at "full value" assuming change in respective spot prices

The decline in prices dating back to the turn of the year is largely attributable to two factors:

- Underlying demand continued to weaken especially during Q1, down about 4% year to +year. While WSD estimates Q2 real demand improved, to perhaps flat on a year to year basis, the second factor came into play by then, specifically...

EU Activity in Steel Consuming Sectors

(March '24 % seasonally and calendar adjusted)

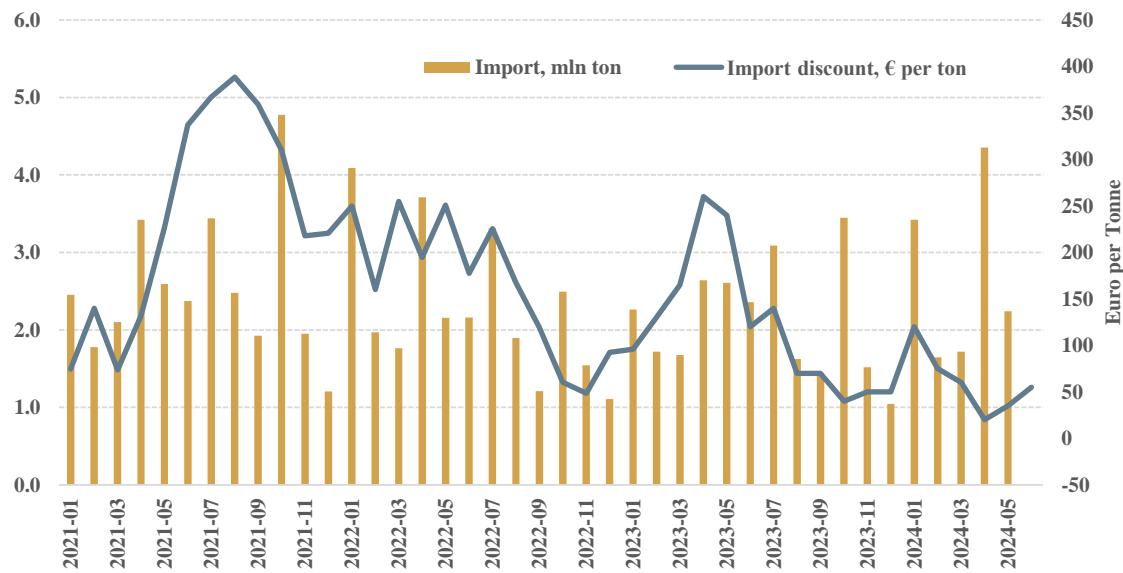
	to Feb 2024	to Mar 2023	to Mar 2022	to Mar 2021
Fabricated metal products	-0.7%	-3.8%	-5.9%	-4.3%
Electrical equipment	-0.7%	-9.6%	-4.4%	-3.9%
Domestic appliances	0.2%	-3.9%	-13.5%	-17.5%
Machinery and equipment	-1.6%	-6.3%	-2.9%	0.5%
Automotive	-0.5%	-6.4%	24.8%	-0.7%
Other transport	1.4%	6.6%	17.1%	25.4%
Construction of buildings	-2.6%	-5.4%	-7.3%	-2.1%
Civil engineering works	-0.8%	3.1%	4.7%	8.6%
Total	-1.4%	-4.5%	0.7%	-0.5%

Source: Eurostat

- ...Imports spiked dramatically and predictably, especially during the second calendar quarter, as the spread between domestic EU and import prices surged during Q1 2024 incentivizing increased offshore purchases that ultimately arrived en masse during Q2.

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EU Flat-rolled Import “Arbitrage”



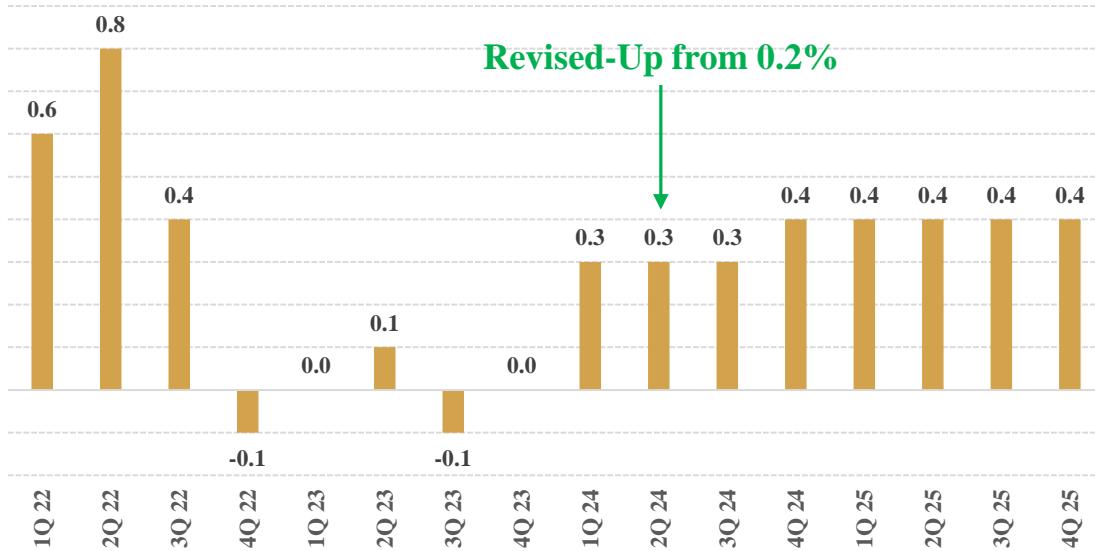
Source: WSD Estimates

Looking ahead, WSD expects a number of factors, besides the modest upside from the updated TRQ system, to work mostly in favor of improving EU domestic prices:

- Underlying steel demand is expected to improve going forward, as evidenced by a slew of indicators, including:
 - GDP and industrial output are forecast, both in the near-term quarters and in the next few years, to be broadly positive. Of particular note are expectations of industrial production growth exceeding the overall pace of GDP growth – something that has not been the case in the EU for many years preceding Covid.

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Eurozone real GDP growth % q/q

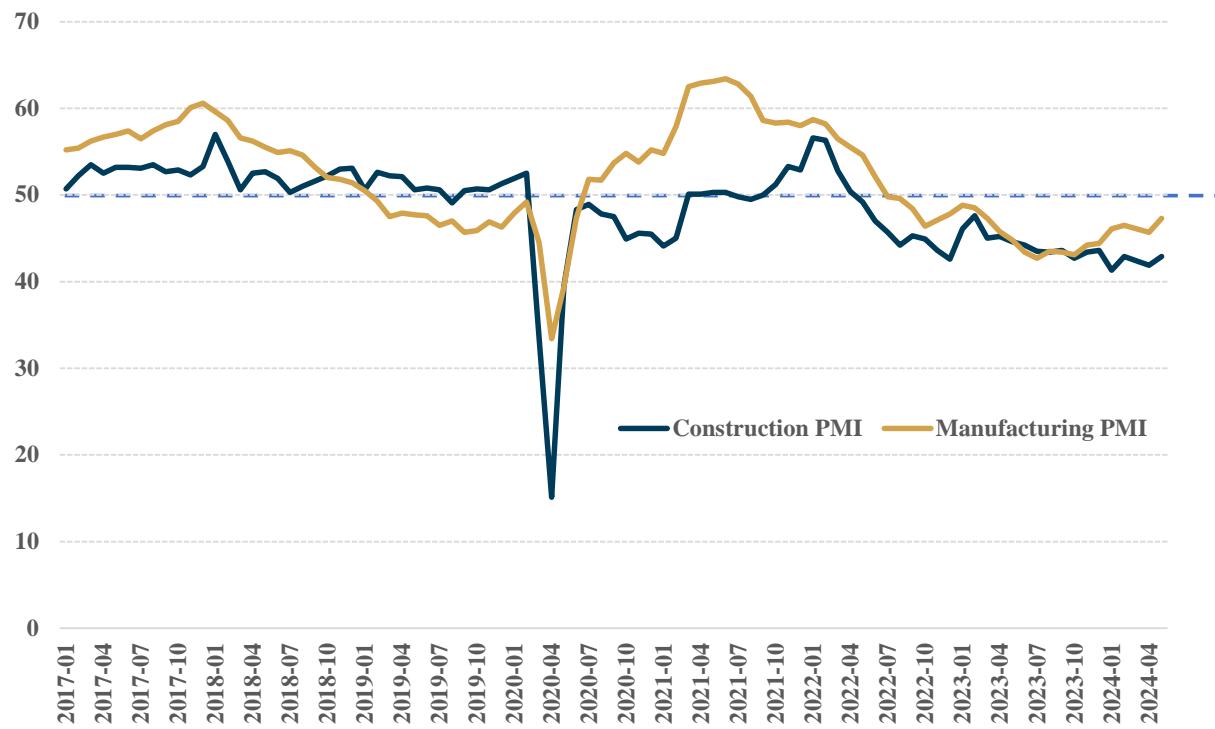


	2022	2023	2024	2025	2026
GDP - %	3.4	0.4	0.7	1.3	1.5
Industrial prod'n %	2.3	-2.4	-0.8	2.5	2.3
HICP - %	8.4	5.5	2.4	2.0	2.0

Source: Eurostat, EIKON

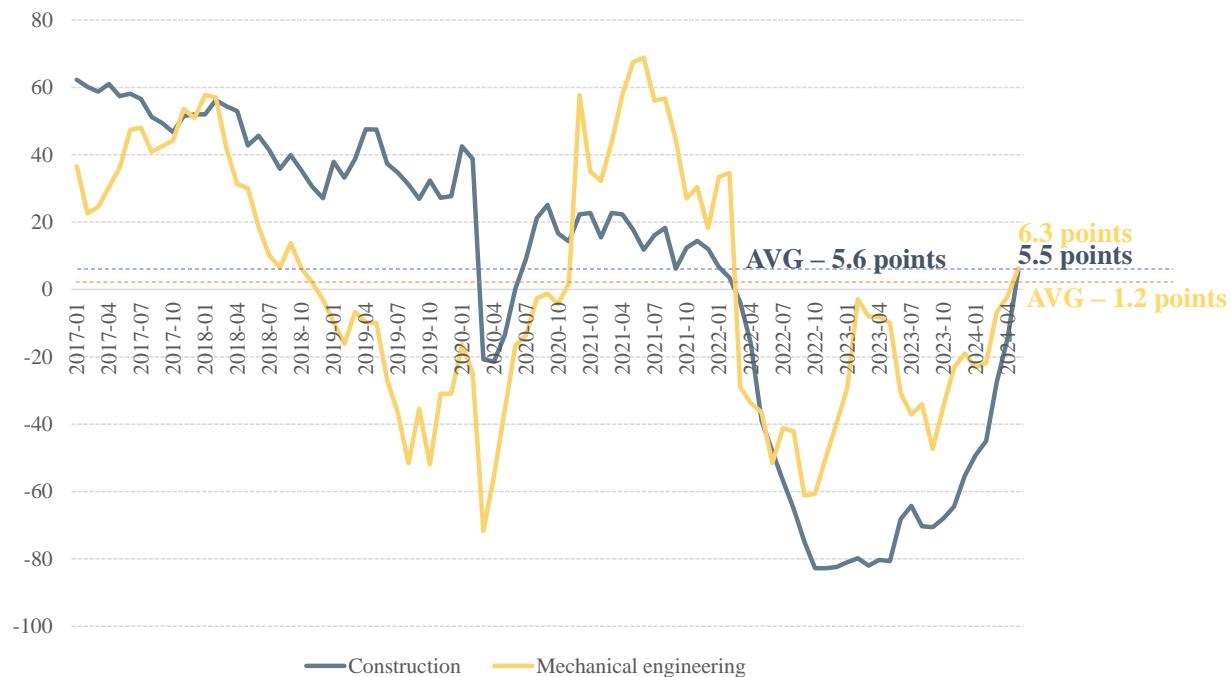
- Eurozone PMIs show gradual sentiment improvement, with the manufacturing PMI rising sharply in May by 1.6 points to 47.3 – the highest figure since February of 2023. The output subcomponent of PMI is particularly encouraging, rising 2.0 points to 49.3, which is on the verge of expansionary territory.
- Germany, whose highly steel-intensive economy has been particularly weak since early-2022, is showing signs of coming out of its slump, with sentiment indicators for both Construction and Mechanical Engineering entering positive territory and even surpassing recent 7-yr averages (the latter including the “ups and downs” of pre and post-Covid dynamics).

WORLD STEEL DYNAMICS



Source: S&P

Economic expectations in German steel consuming industries

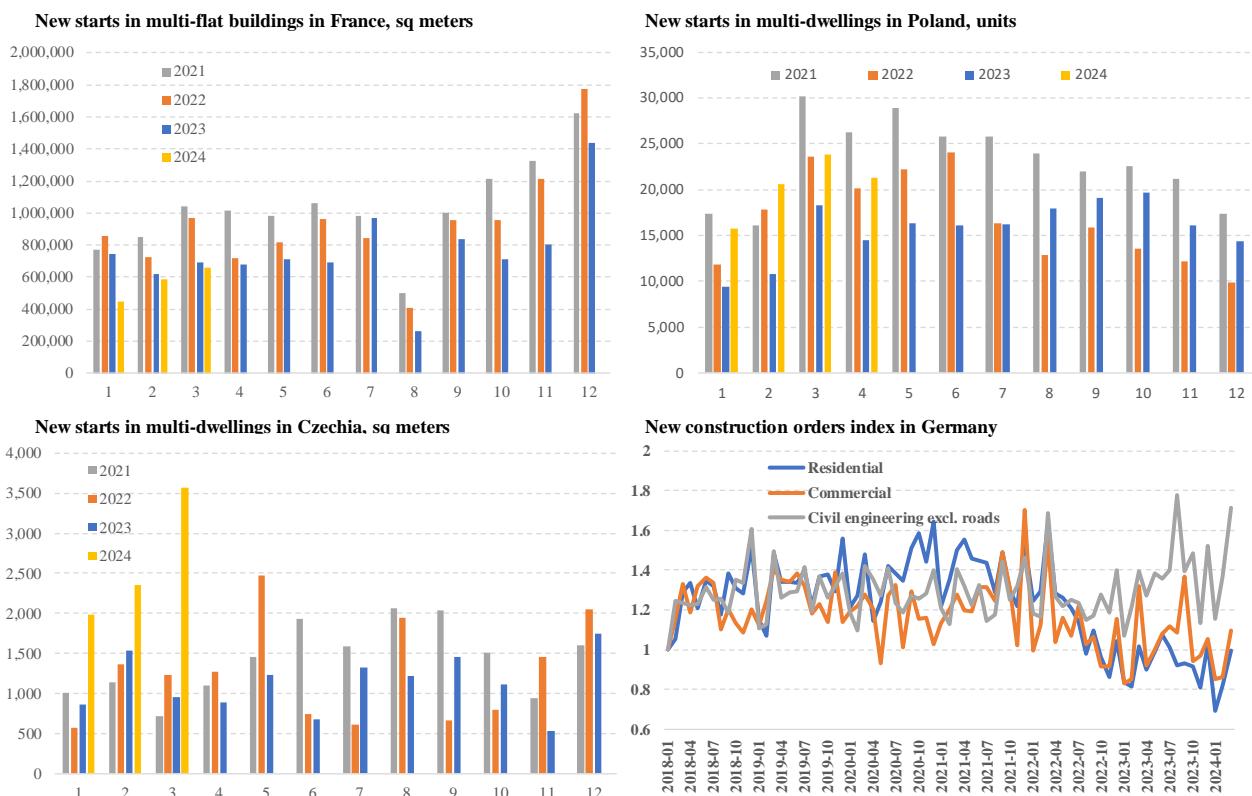


Source: ZEW

WORLDSTEELDYNAMICS

- Housing new starts are on the rise in a slew of major EU markets, including an 11% rise during the first four months of 2024 in Poland; 135% y/y increase during Q1 in Czech Republic; and a surge in new residential orders in Germany - +18% m/m in February and another +23% m/m in March.

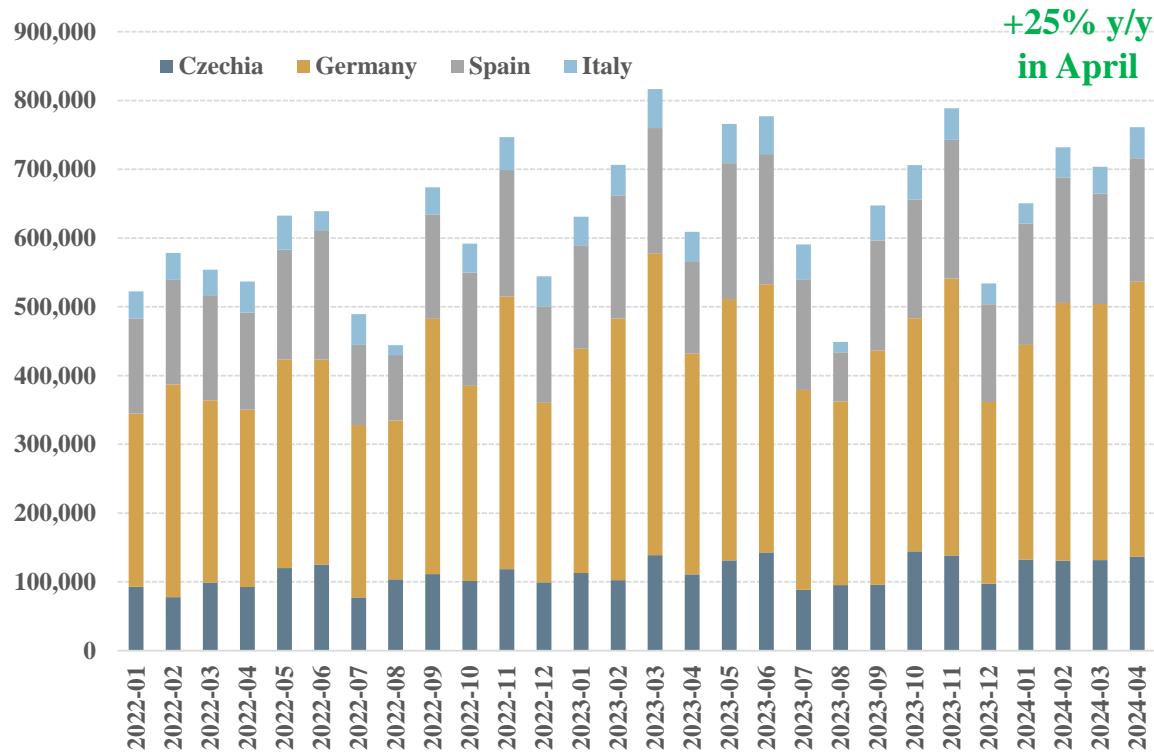
Not all the news is positive on the housing front, however, as multi-family new starts, the most steel intensive segment of residential construction, declined 19% in France y/y in Q1 of this year on the heels of a 17% decline y/y in 2023.



- EU automobile output, previously expected to be flat year over year in 2024, is on track for about 2.5-3% growth according to industry experts. The first four months of the year posted roughly 3.1% growth. Consumer appetite remains robust, with new orders for automobiles rising by 6% in Germany during the first four months of this year.

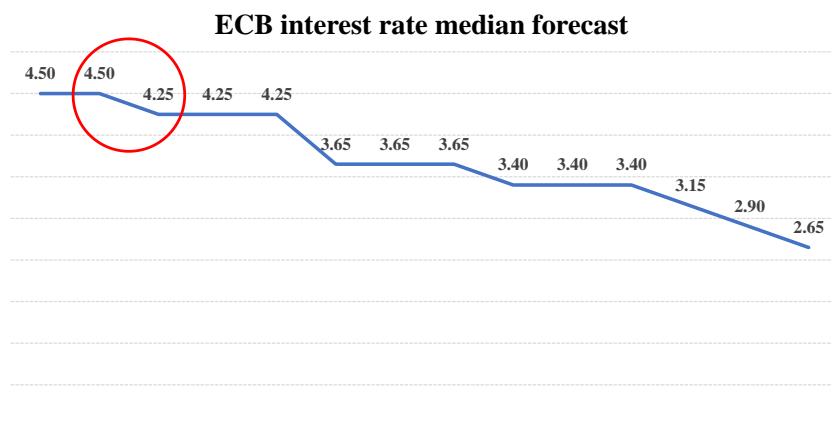
WORLDSTEELDYNAMICS

EU Passenger Vehicle production



Source: VDA, Autosap, ANFAC, Anfia

- On the downside, several factors could undermine the recovery in EU underlying steel demand, including:
 - Inflation is far from “defeated” in the EU, with a recent resurgence in Energy and Services (labor) components responsible for a surprising increase in overall inflation to 2.6% y/y in May versus an expected decline to 2.5%. This figure was reported just days after the ECB announced its first long-anticipated interest rate cut, raising questions about the voracity of future ones.



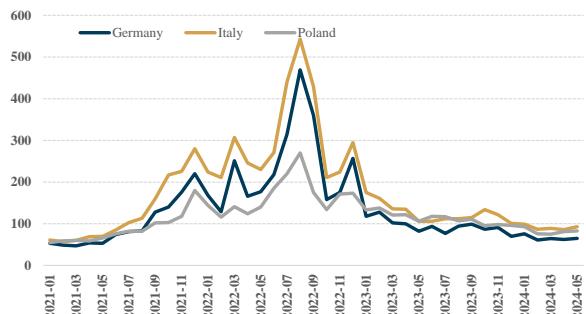
Apr 24 May 24 June 24 July 24 Aug 24 Sep 24 Oct 24 Nov 24 Dec 24 Jan 25 Feb 25 Mar 25 2Q 25 3Q 25
Source: ECB professional forecaster survey, April 2024

WORLD STEEL DYNAMICS

- Energy price uncertainty is back in the fore, with multiple concerns about possible sanctions against LNG supply from Russia, a potential stoppage of pipeline supplies from Russia beginning later this year, risks of disruptions in Norway gas fields, and Russian attacks on Ukrainian gas storage facilities.

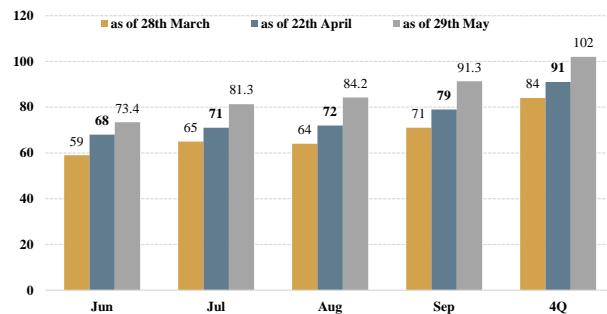
Should energy prices surge in earnest, it may not necessarily spell doom for EU mills as the rising costs should translate into higher prices, especially assuming the new import quotas are favorable to them all other factors equal.

Day-ahead Wholesale Electricity prices
(base, € per MWh)

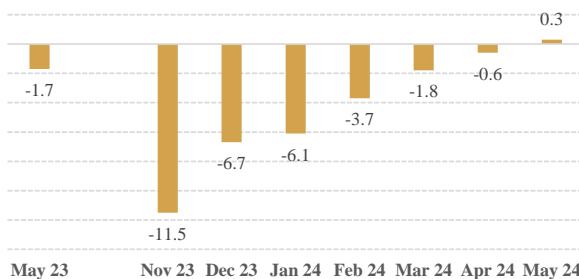


Source: EIKON

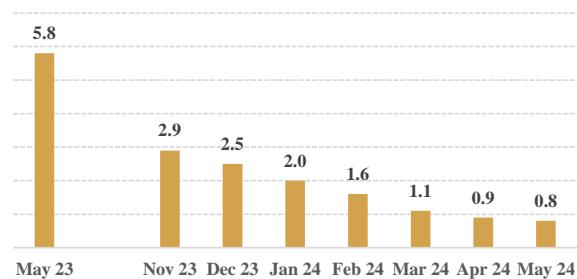
Electricity forward curve changes in Germany
(base, € per MWh)



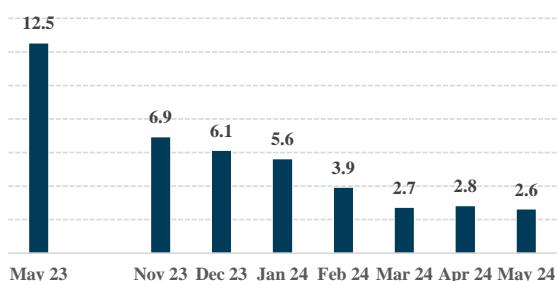
Energy, % y/y



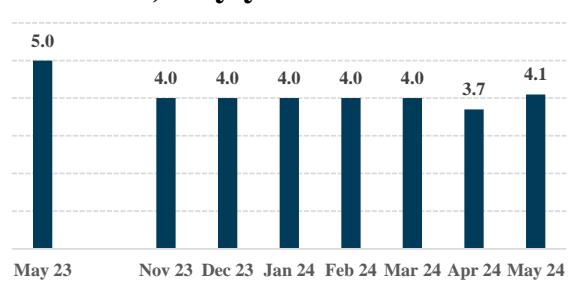
Industrial goods, % y/y



Food and beverages, % y/y



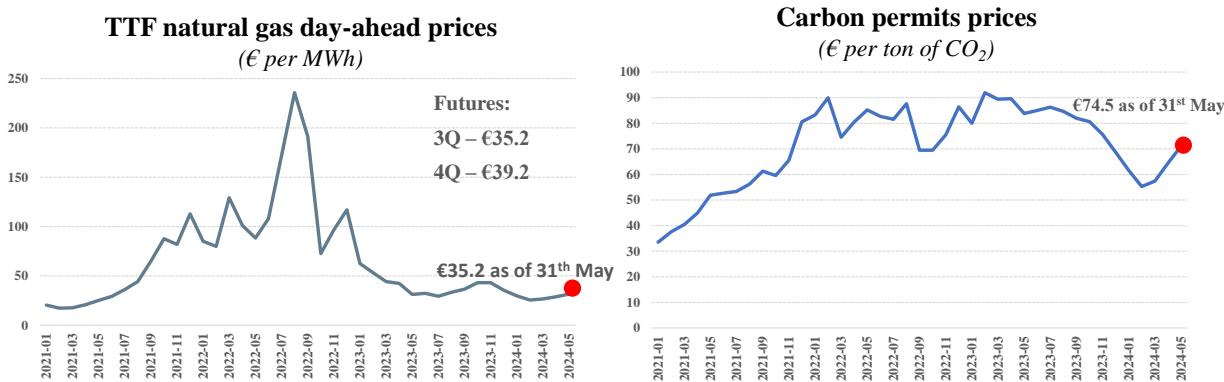
Services, % y/y



Source: ECB

WORLDSTEELDYNAMICS

- Although it is not necessarily a negative, the price of carbon permits increased by 10% in May, given its high correlation with natural gas prices and the fact that the price of permits equalizes the competitiveness of coal and gas power generation. However, WSD contacts report that while low margins on steel sales and expensive permits encourage steelmakers to reduce output, a higher price of CO₂ likely allows mills to make good profits on the sale of permits – with the price at €75 per ton of CO₂, steelmakers can earn upwards of €140 per tonne of unproduced steel, as some plants cover 100% of their emissions with free allocations.



As WSD sees it, the outlook for EU HRC prices is largely to the upside with the key matter of timing; specifically, whether sufficient time remains in the weeks ahead for the mills to push through €20-40 per tonne in price increases before the July/August holiday season disrupts demand and slows order intake.

Given the prevailing weak sentiment on the export markets at present and likely sufficient inventories given the surge in Q2 imports, WSD thinks a meaningful price rally is likely to be postponed until late-summer to early-September. By then, additional production cutbacks by EU mills and a reduction in inventories would lay the groundwork for the EU price to rise an additional €40-60 per tonne granted demand conditions are no worse than at present and international steel prices avoid the “Prozac” scenario outlined earlier in the report.

EU Apparent v. Real Steel Consumption and Inventory Change

	2018	2019	2020	2021	2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	2024
Real consumption (mln tonnes)	159.5	158.4	143.9	149.7	156.9	40.4	40.2	38.3	40.7	159.5	38.4	40.2	37.8	40.4	156.8
<i>Real consumption, % y/y unadjusted</i>					4.8%	7.2%	2.2%	-1.1%	-1.3%	1.7%	-4.9%	0.0%	-1.2%	-0.7%	-1.7%
Crude Steel Production (mln tonnes)	160.4	152.2	132.2	152.8	136.7	33.2	33.2	29.7	30.0	126.2	33.3	34.2	34.9	35.5	138.0
<i>Crude Steel Production, y/y</i>	-0.5%	-5.1%	-13.2%	15.6%	-10.5%	-9.7%	-11.6%	-5.0%	-3.3%	-7.7%	0.3%	3.0%	17.5%	18.3%	9.4%
Apparent steel consumption (mln tonnes)	164.4	151.7	133.8	162.5	145.8	34.0	36.1	31.8	31.5	133.5	35.9	37.7	36.9	37.5	148.0
<i>Apparent Consumption, y/y</i>	2.8%	-7.7%	-11.8%	21.5%	-10.3%	-14.6%	-12.4%	-4.2%	0.0%	-8.5%	5.5%	4.3%	16.2%	18.9%	10.9%
- Production (finished)	149.2	141.5	122.9	142.1	127.1	30.9	30.9	27.7	27.9	117.3	31.0	31.8	32.5	33.0	128.3
- Rerolling (finished)	7.4	7.3	5.6	6.3	6.1	1.3	1.6	1.6	1.3	5.8	1.5	1.5	1.5	1.3	5.8
- Export (excl. semis)	22.4	23.7	17.5	16.4	14.8	3.8	4.0	3.6	3.6	15.0	3.0	3.4	3.4	3.5	13.3
- Import (excl. semis)	30.3	26.6	22.7	30.5	27.4	5.7	7.6	6.1	6.0	25.4	6.4	7.8	6.3	6.7	27.2
Apparent Consumption, q/q						7.8%	6.2%	-12.1%	-0.7%		13.8%	5.0%	-2.1%	1.6%	
Implied Inventory Change	4.9	-6.6	-10.1	12.8	-11.1	-6.4	-4.0	-6.5	-9.1	-26.0	-2.5	-2.5	-0.9	-2.9	-8.8
Import share, %	22.9%	22.3%	21.2%	22.7%	23.0%	20.4%	25.5%	24.3%	23.0%	23.3%	22.0%	24.7%	21.1%	21.3%	22.3%
Crude steel output (Monthly)	13.4	12.7	11.0	12.7	11.4	11.1	11.1	9.9	10.0	10.5	11.1	11.4	11.6	11.8	11.5

Source: WSA, Eurostat, ISSB, WSD Estimates

WORLDSTEELDYNAMICS

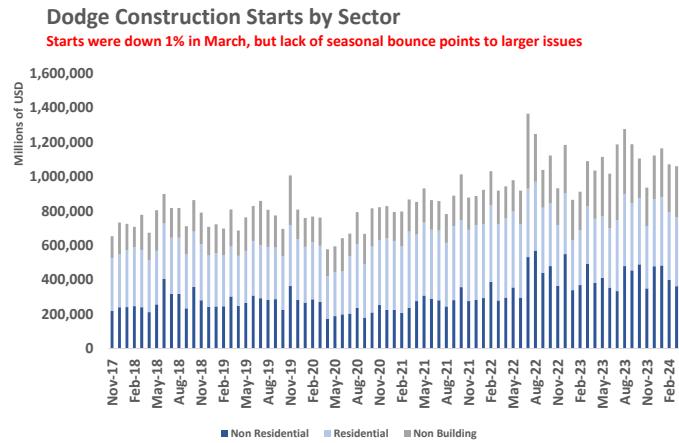
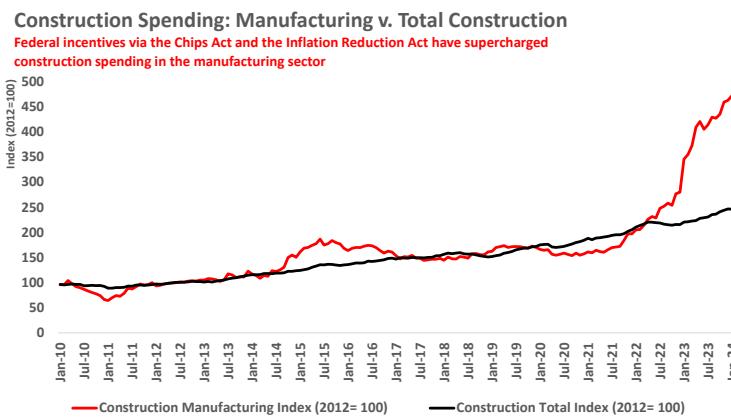
USA Situation – Entering the Summer at a Crossroad

The pricing situation and overall market condition in the USA continued to deteriorate the past month since the price of HRB peaked-out at about \$1,150 per tonne (\$1,050 per net ton) in January, with the current price at about \$800 per tonne (\$725 per net ton) and declining. A variety of factors have conspired to drive down the price the past few months, and new factors are emerging that point to additional downside in the near term, to perhaps as low as \$715 per tonne (~\$650 per net ton) in the weeks ahead.

The reasons for the recent decline are fairly obvious to WSD upon examination of market fundamentals to date:

- Underlying demand indicators year-to-date have been reasonably strong; hence, demand cannot be entirely blamed for the deterioration in pricing when looking back, granted signs of weakness are emerging in several sectors:
 - Construction activity, easily the biggest single contributor to WSD's proprietary system, remains relatively healthy, up about 11% overall during Q1 despite a slowdown in the multi-family segment.

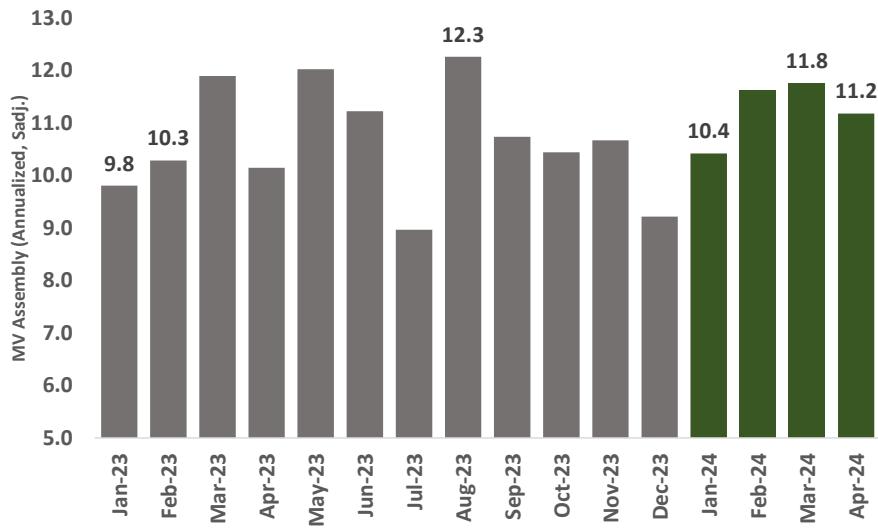
However, warning signs are emerging in construction when looking ahead, with increased delinquencies and still-high interest rates potentially dragging down demand in the remainder of 2024.



- Automotive tells a similar story of robust YTD growth with assemblies coming in about 7% higher during the first four months of 2024 (with the auto component of industrial output up 4.7% on the same basis, inclusive of the entire supply chain) compared to the same period last year; however, anecdotal evidence suggests that consumer appetite is slowing as dealers report higher inventories and thinner margins on sales. The automotive industrial sub-component was merely flat y/y in April.

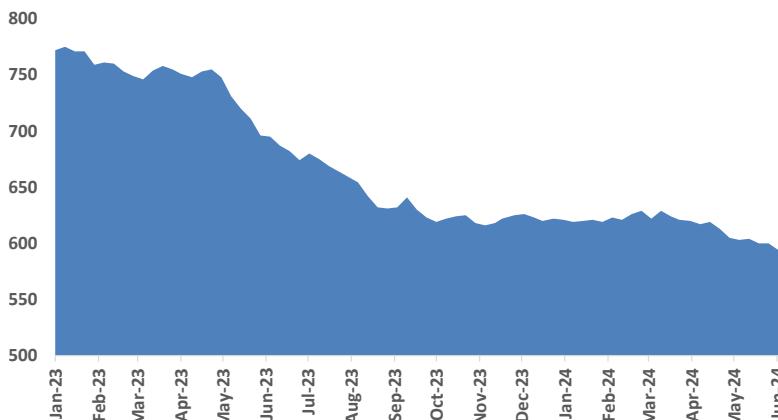
WORLDSTEELDYNAMICS

Automotive's Strong Start is Cooling

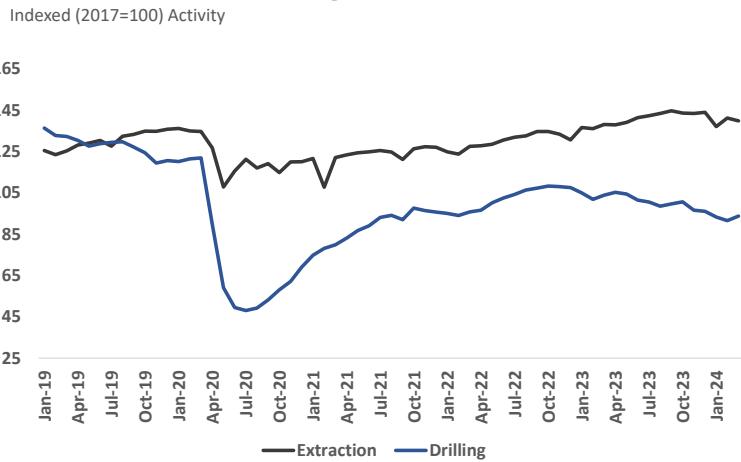


- Oil and gas related steel activity has largely disappointed. USA rig counts held steady from October 2023 through April 2024; however, in recent weeks, rig counts have fallen off to 594 from an average of 620 during the prior 7 months. Current rig count is down 14% versus the first week of June 2024, and the average rig count this year is down 17% versus the same period in 2023.

Baker Hughes US Rig Count



USA Oil Extraction v. Drilling

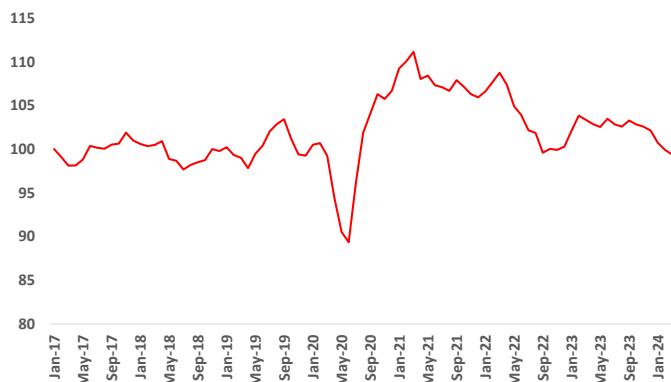


- The overall durable goods segment is mixed, with emerging signs of weakness. During the first quarter of 2024, consumption of durable goods was down 4.1%. Based on the Federal Reserve's industrial production figures, production of durable goods remained up 2.0% during the first 4 months and was down 0.1% in April. Similarly, the durable manufacturing segment, which was up 0.2% during the first 4 months of the year, was down 0.6% in April. In WSD's view, this negative trend is a sign that manufacturers are adjusting to a lower demand environment in the coming quarters. In part driven by strong single family home build rates, steel demand for appliances rose in late 2023. In recent months, as

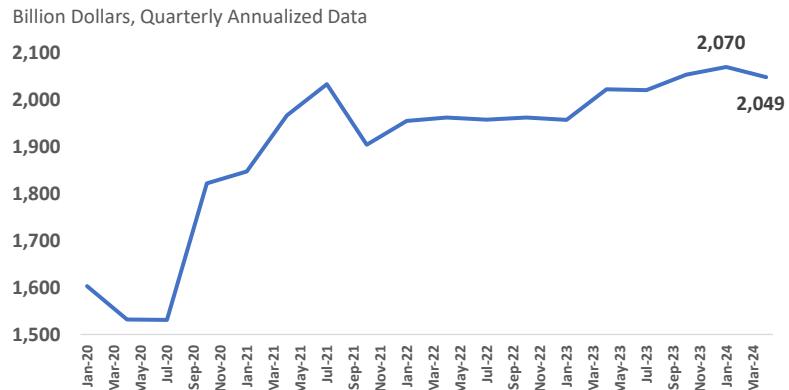
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consumer demand for durable goods has waned, production of appliances has declined 3% y/y.

Industrial Production Activity: Appliances



U.S. Consumption of Durable Goods



USA Steel Demand Indicator Monitor System

May 2024 Report Momentum Overview

	Index	April 2024	April 2023	Change Year-Over-Year	Near Term Momentum	Year/Year Momentum
CES: Short Lead Time Capital Goods						
Defense	1.0%	128	115	11.1%	0.4%	11.1%
Rail Infrastructure	2.0%	68	69	-0.7%	0.0%	-2.5%
Business Equipment	4.0%	96	96	-0.4%	0.0%	-1.0%
Heavy Truck	5.0%	118	104	13.0%	3.1%	9.4%
Drilling and Oil Wells	5.5%	92	104	-11.2%	-1.5%	-10.7%
Durable Manufacturing	10.0%	101	101	0.5%	0.1%	0.5%
Fabricated Metals	11.0%	99	100	-0.1%	0.2%	-0.6%
Machinery	11.0%	99	103	-4.5%	-0.3%	-4.5%
<i>Total</i>	<i>49.5%</i>	<i>49.3</i>	<i>49.7</i>	<i>-0.4%</i>	<i>0.1%</i>	<i>-1.2%</i>
CEL: Long Lead Time Capital Goods						
Ship Building	0.5%	105	112	-5.7%	-0.2%	-8.2%
Electric and Gas Utilities	4.0%	104	104	0.3%	-0.1%	1.0%
Non Residential Construction	23.0%	161	143	12.9%	0.1%	16.7%
<i>Total</i>	<i>27.5%</i>	<i>41.8</i>	<i>37.6</i>	<i>3.0%</i>	<i>0.1%</i>	<i>14.0%</i>
CDIDX: Consumer Goods						
Appliances	3.0%	99	103	-3.3%	0.0%	2.0%
Residential Construction	4.0%	164	156	5.7%	-0.1%	4.6%
Total Motor Vehicles Assembly	16.0%	103	96	6.9%	3.4%	5.6%
<i>Total</i>	<i>23.0%</i>	<i>26.0</i>	<i>24.7</i>	<i>1.2%</i>	<i>2.3%</i>	<i>5.0%</i>
Total		117.2	112.0		3.8%	4.4%

Source: Federal Reserve Economic Data, WSD Estimates

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- The bigger issue when it comes to pricing, however, has been the supply side of the equation:
 - A company-by-company breakdown of USA steel shipments shows that shipments were down 0.6% during Q1 2024. Steel sheet imports increased 8.5%, and net sheet imports were up 9.9% versus a year prior. Apparent Steel Consumption was estimated at 57.5 million tons, up 0.1% versus Q1 2023. Entering the year, steel inventories were seemingly sufficient; inventories were likely boosted in March amid the brief bottoming of HRC prices.
 - Reflecting weak global steel demand outside of the USA and a substantial spread between USA HRC prices and the World Export price, sheet imports have risen significantly in Q2 2024. WSD expects sheet imports to be up 15.5% q/q.

Meanwhile, based on weekly crude steel indicators through the first two months of the quarter, WSD modeled mill shipments up 0.6% q/q in Q2 2024.

Given flat (at best) underlying steel demand during Q2 2024, the USA market entered a period of oversupply with the market surplus increasing to 2.7 million tons annualized versus 0.6 million tons during Q1 2024.

USA Sheet Market Supply-Demand Balance

	Q1 2023		Q1 2024			Q2 2024		
	Shipments	Annualized	Shipments	Annualized	Change Y/Y %	Shipments	Annualized	Change q/q %
U.S. Steel Integrated	2,278	9,137	2,049	8,219	-10.1%	2,061	8,268	
Big River	659	2,643	568	2,278	-13.8%	571	2,292	
Steel Dynamics	1,930	7,740	1,993	7,994	3.3%	2,005	8,042	
Cleveland Cliffs	3,268	13,108	3,152	12,643	-3.5%	3,171	12,718	
Nucor	2,384	9,562	2,517	10,096	5.6%	2,532	10,156	
AMNS Calvert	1,200	4,813	1,200	4,813	0.0%	1,207	4,842	
SSAB	525	2,105	482	1,932	-8.2%	485	1,944	
JSW- Ohio Operation	198	796	276	1,105	38.9%	277	1,112	
NSBS*	600	2,407	733	2,940	22.1%	737	2,958	
Total	13,042	52,312	12,969	52,020	-0.6%	13,047	52,332	
Estimated Total USA Sheet**	13,377	53,653	13,302	53,354	-0.6%	13,382	53,674	0.6%
Imports Sheet	2,392	9,596	2,596	10,414	8.5%	3,000	12,033	15.5%
Slab Imports	1,154	4,629	1,128	4,525	-2.2%	1,128	4,525	0.0%
Exports Sheet	1,447	5,805	1,557	6,247	7.6%	1,557	6,247	0.0%
Net Sheet Imports		3,791		4,167	9.9%		5,786	38.9%
Apparent Consumption		57,444		57,521	0.1%		59,460	
Yielded Apparent Consumption***		54,572		54,645			56,487	3.4%
Avg HRC Lead Time		6.50		5.90			4.75	
Implied Demand	Tons	Annualized	Tons	Annualized	Change Y/Y %	Tons	Annualized	Change Y/Y %
Auto	2,982	11,959	3,149	12,632	5.6%	3,209	12,869	1.9%
Construction	4,697	18,839	4,728	18,965	0.7%	4,743	19,025	0.3%
Oil and Gas	1,212	4,862	1,110	4,452	-8.4%	1,082	4,341	-2.5%
Appliance & Manufactured Goods	2,034	8,157	2,013	8,075	-1.0%	1,931	7,745	-4.1%
Other	2,503	10,039	2,475	9,929	-1.1%	2,457	9,855	-0.8%
Total	13,427	53,857	13,476	54,054	0.4%	10,965	53,835	-0.4%
Apparent vs. Real Demand	714		591				2,651	

*NSBS Figures are approximated based on half yearly operational results.

**Companies above account for +98% of USA HSM Capacity

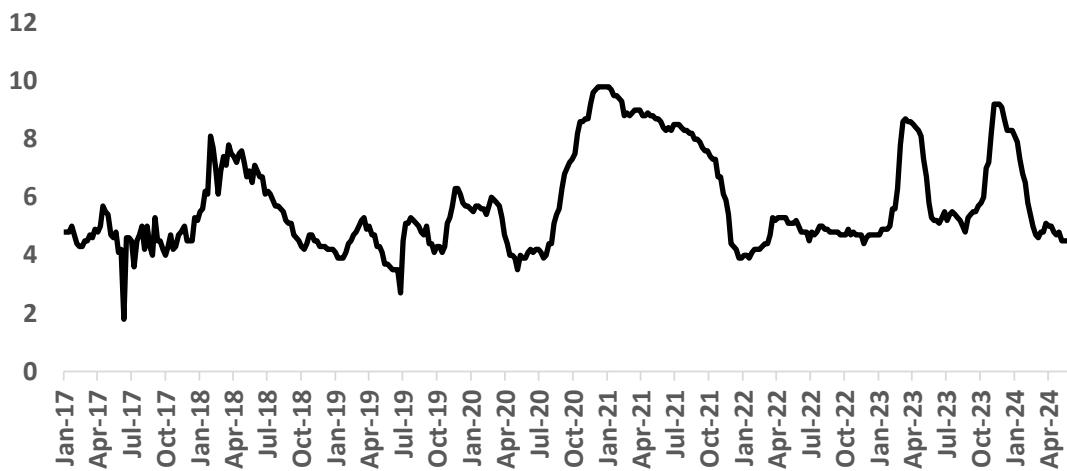
*** Yielded figure reflects further processing at service centers

- As import volumes have increased, mill lead times have fallen to an average of 4.5 weeks in late May. Lead times are currently at their lowest levels since November 2022. It is likely not a coincidence that sheet imports are also at their highest levels since November 2022.

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USA HRC Lead Times: Weeks

Stuck at multi-year low



WSD's contacts indicate that, while there have been no major announcements of significant mill cutbacks, there are early signs of reduced utilization rates. Looking ahead to Q3 2024, WSD has depicted a potential 2.0% decline in mill sheet shipments.

USA Sheet Market Supply-Demand Balance

	Q2 2024		Q3 2024		Change q/q %
	Shipments	Annualized	Shipments	Annualized	
U.S. Steel Integrated	2,061	8,268	2,020	8,102	
Big River	571	2,292	560	2,246	
Steel Dynamics	2,005	8,042	1,965	7,881	
Cleveland Cliffs	3,171	12,718	3,107	12,464	
Nucor	2,532	10,156	2,481	9,953	
AMNS Calvert	1,207	4,842	1,183	4,745	
SSAB	485	1,944	475	1,905	
JSW- Ohio Operation	277	1,112	272	1,090	
NSBS*	737	2,958	723	2,899	
Total	13,047	52,332	12,786	51,285	
Estimated Total USA Sheet*	13,382	53,674	13,114	52,600	-2.0%
Imports Sheet	3,000	12,033	2,150	8,530	-29.1%
Slab Imports	1,128	4,525	1,100	4,364	-3.6%
Exports Sheet	1,557	6,247	1,500	5,951	-4.7%
Net Sheet Imports		5,786		2,579	-55.4%
Apparent Consumption		59,460		55,179	
Yielded Apparent Consumption**		56,487		52,420	-7.2%
Avg HRC Lead Time		4.75			
Implied Demand	Tons	Annualized	Tons	Annualized	Change Y/Y %
Auto	3,209	12,869	3,007	12,062	-6.3%
Construction	4,743	19,025	5,025	20,156	5.9%
Oil and Gas	1,082	4,341	1,086	4,356	0.4%
Appliance & Manufactured Goods	1,931	7,745	1,861	7,466	-3.6%
Other	2,457	9,855	2,438	9,781	-0.8%
Total	10,965	53,835	10,980	53,821	0.0%
Apparent vs. Real Demand		2,651		-1,401	

*NSBS Figures are approximated based on half yearly operational results.

**Companies above account for +98% of USA HSM Capacity

*** Yielded figure reflects further processing at service centers

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Looking ahead, the current state of excess supply, ample inventories, and a reduced spread versus the World Export price are expected to diminish import volumes in the coming months.

- The spread between USA HRC and World Export HRC has declined from an average of \$450/ton from November-February to \$280/ton in March-May. On that basis, WSD estimates a decline in steel imports of 29% q/q based on a combination of spread dynamics and historic trends.

Based on the scenario outlined above, WSD estimates that the sheet market could be undersupplied by 1.4 million tons annualized during 3Q 2024, assuming no further deterioration in underlying demand. The latter, unfortunately, is looking more and more like a risk going forward. Nevertheless, WSD expects that inventories will be pared back over the course of Q3. Depending on the scale of mill utilization cutbacks, lead times can begin to extend rapidly as buyers return to the market late-summer to early-fall whilst import volumes are more limited. Granted Big River Steel-II is expected to begin operations during 2H 2024, adding ~3mtpy of capacity into the market; however, given current market conditions, the ramp-up will likely be slow.

USA HRC prices are clearly on the verge of taking another loop on the pricing rollercoaster. Absent a decline in demand conditions, prices could rebound to \$850 per ton by mid-September. A positive change in economic sentiment (i.e. solid evidence of an interest rate cut) could add an additional upside of \$50-75 per ton later this summer. However, should a full-blown buyers' "chill" beset the market as demand decelerates in the next two months, the price could bottom-out in the \$630-670 per net ton range in late-July to early-August. Thereafter, a more modest rally is likely to still unfold to perhaps \$725-750 per ton assuming mills cut back output sufficiently during the summer months and buyers begin to perceive that the price has reached "bargain basement" levels still seek to replenish inventories in September-October, albeit to a modest degree.

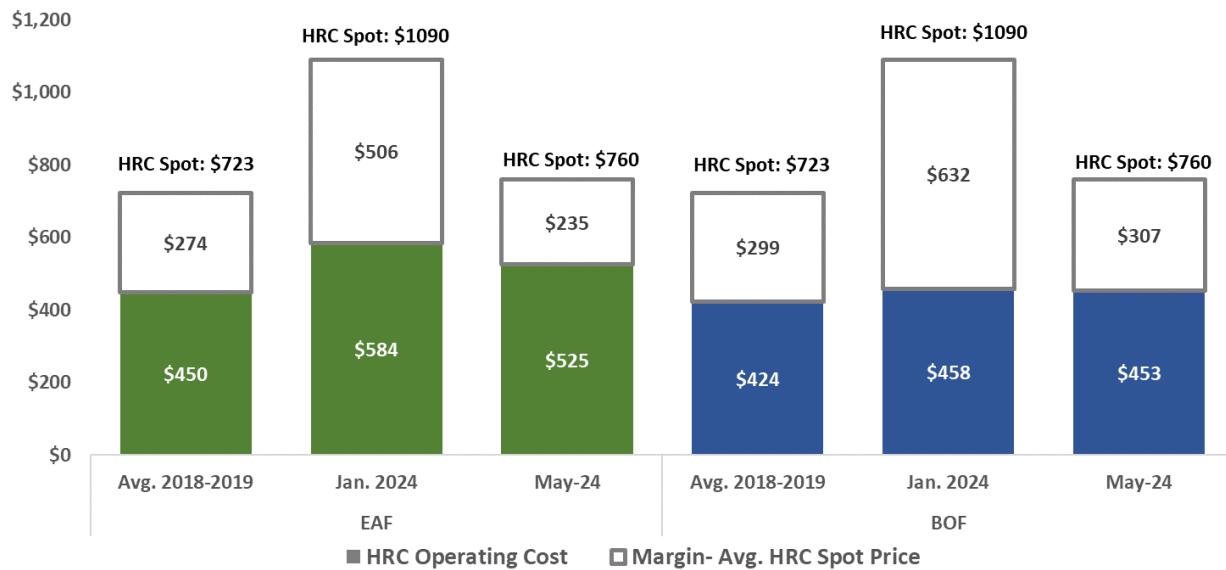
As things stand at present, domestic sheet mill profits are well down from recent highs:

- Production costs for Integrated producers have been relatively stable; however, as the price has declined from peak levels in December-January, margins have declined by ~\$270/t versus January.
- Based on WSD World Cost Curve estimates, the cost to produce HRC via the EAF has declined by \$60/t. Mini mill margins have declined by \$270/t since January. With spot prices in June down another \$50/t versus May, the decline in price has outpaced the reduction in cost via a \$15-30/ton decline in scrap prices, i.e. further margin compression.

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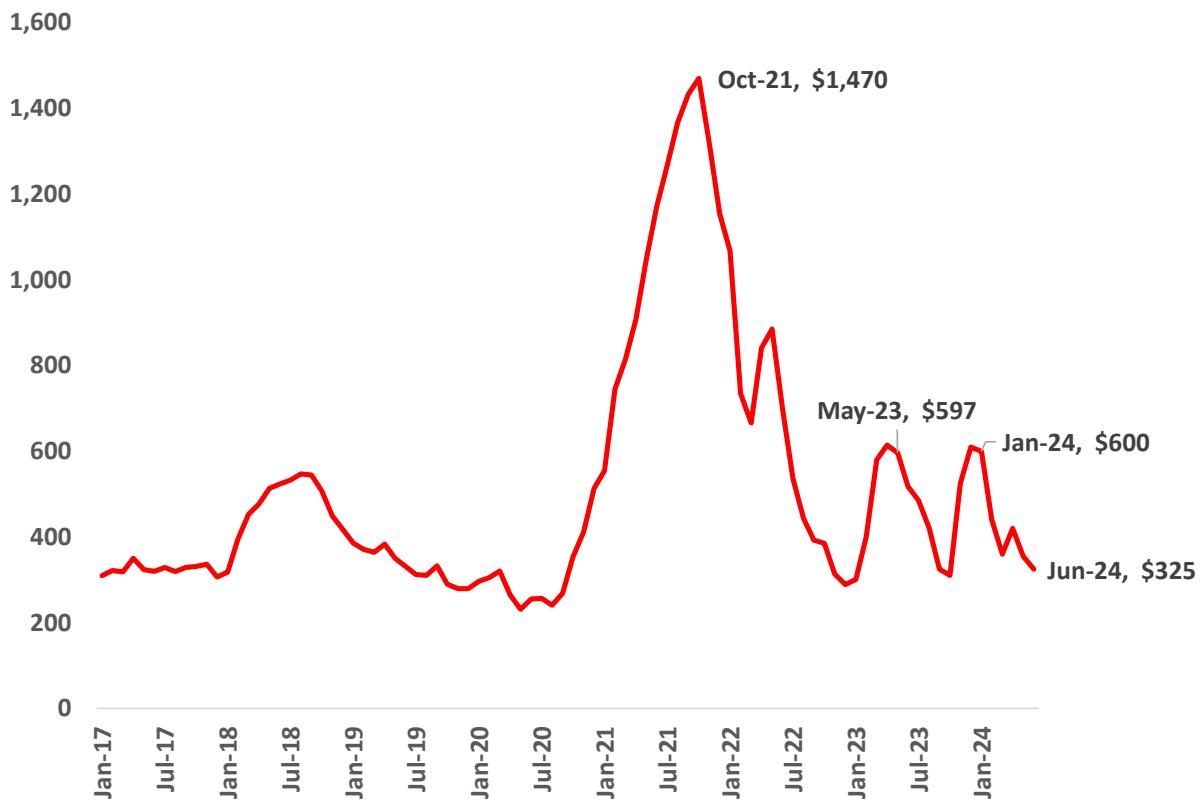
Sheet Mill Profitability: EAF v. BOF Cost (excl. Overhead) versus Spot Price

World Cost Curve average USA EAF and BOF producer, assuming 90% mill utilization



USA Metal Margin (\$USD, net ton)

Margin improvement has quickly retreated as HRC prices have fallen back quicker than raw material costs



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Indian Steel: The Tigers are Out of the Cage

(Note: WSD does not seek to offer any judgment on the attractiveness of Indian steel equities, either collectively or individually.)

The re-election of Narendra Modi, India's enigmatic Prime Minister, may have come with a disappointingly-thin margin of victory from the viewpoint of investors hoping to see the economy maintain and accelerate its rapid growth of the post-Covid era. However, as WSD sees it, this "disappointment" is unlikely to dampen the enthusiasm of India's "Steel Tigers" whose appetite for growth has been as voracious as ever in the past decade and appears poised to remain so at least through the remainder of this one.

More than twelve years ago, as WSD conducted its last "tour" of India, we posed the question: "Is India the next China?" when it comes to prodigious steel demand growth. In response, we stated that:

"We think that the answer is both a "No" and a "Yes" for reasons as complex as the country itself:

- *Among the key reasons why the answer may be "No" is WSD's expectation that steel demand growth in India in the next decade may be far slower than that of China during the past decade, although steel demand on an absolute basis will no doubt be far above the level at present.*
- *The answer is perhaps "Yes" because developments in India will ultimately have a huge impact on steel producers in the region and globally."*

On balance, WSD is now more optimistic when it comes to India's steel demand growth, partly because it is poised to be higher, and partly because the basis of comparison – China – has seen its steel demand growth slow from ~16% per annum during the first decade of the 2000s to ~4.7% during the second decade. In fact, our current projection for India's steel demand growth to 2030 is about 6.7% per annum – well above the Chinese figure from 2010-2020. There's no doubt the importance of India's steel sector from a global perspective is on the rise as China's steel demand growth has peaked and has entered a contraction phase.

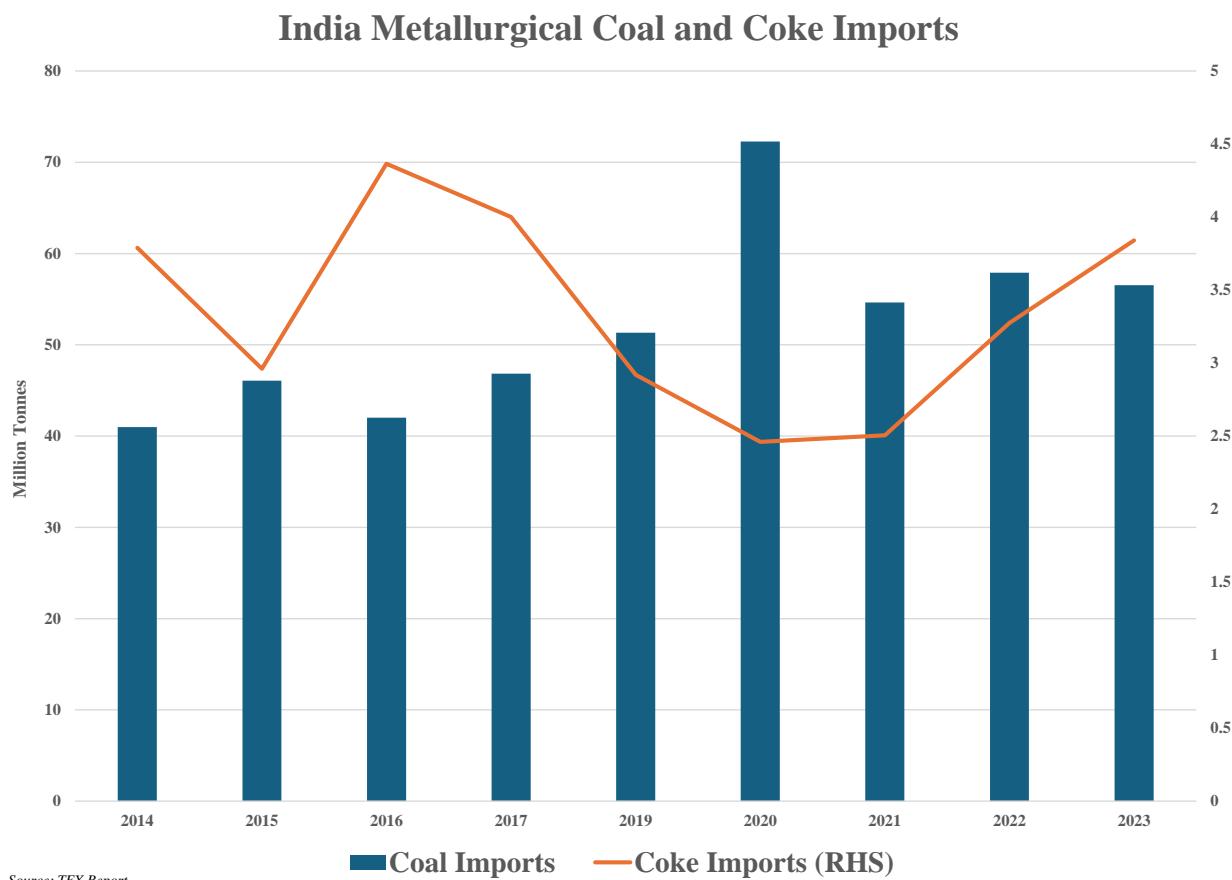
India remains an ideal place to build a steel plant, in WSD's opinion, for a variety of reasons, the foremost being the availability of high-grade iron ore. Other benefits for new Indian steel plants include:

- Skilled and low-cost workers.
- Massive improvements to the country' infrastructure to move bulk materials. For example, massive new ports and rail lines are being built and more are in the works. (*This, of course, is also hugely beneficial to steel demand growth.*)
- Steel demand growth of 6-8% (with upside potential in the 10% range) is a good news story from the mills point of view.

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That being said, the increasing pressure to produce steel with lower CO₂ emissions presents a massive challenge given the combination of competing factors Indian steelmakers face:

- On the one hand, cheap and readily-available (granted the process of obtaining mining rights remains arduous and complex) iron ore makes the Blast Furnace/BOF route the logical choice, especially given its efficiencies of scale during a period of rapid growth and relatively low CAPEX on a per tonne basis
- On the other hand, the BF/BOF route is among the most CO₂-intensive; with only the Indian “informal” sector that utilizes coal-based sponge iron (produced in rotary kilns) worse from an emissions viewpoint (estimated by WSD as high as 3T_{CO2}/T_{DRI})
 - Furthermore, India remains heavily dependent on imported high-quality coking coal for its blast furnaces, with the vast majority coming from Australia; as such, WSD estimates that Indian coking coal imports in the next 10-15 years will single-handedly maintain the upward trajectory for the seaborne metallurgical coal market.



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These developments theoretically raise an obvious dilemma for a group seeking to invest in greenfield or brownfield capacity in India – should one be building a blast furnace (BF/BOF) based plant or an electric arc furnace (EAF) facility instead? In practice, the decision appears to be an easy one in the near term as the vast majority of planned capacity investment over the next 3-10 years is BF/BOF-based. Beyond the near-term horizon, the decision is complicated by the uncertainty surrounding a myriad of factors, including: a) concern about rising imports of ultra-low-priced Chinese steel products; b) future government policy around carbon emissions standards (*not likely to impact the steel sector significantly for at least another 10 years, in WSD's view*); and c) the sustainability of recent demand growth in the long run. Such a decision-making morass could, in theory, result in a lag of investment in new capacity and perhaps sharply dampens the potential for growth later in the next decade. In practice, WSD observed little in the way of hesitation to boost capacity investment to meet growing demand on the part of India's major steelmakers.

One reason this is the case has been the relatively robust profitability condition in the domestic market from the viewpoint of major Indian producers the past few years. Consider:

- During 2015-16 at the height of the “Chise Export Armada,” the average domestic price of hot-rolled coil, excluding VAT, was about \$416 per tonne, with an average spread over the world export price of about \$41 per tonne. During that period, the average operating cost of the Indian integrated steelmaker was about \$361 per tonne, including overhead, for a theoretical profit of \$55 per tonne.
- During 2017-19, preceding Covid, the average domestic price of hot-rolled coil, excluding VAT, was about \$598 per tonne, with an average spread over the world export price of about \$59 per tonne. During that period, the average operating cost of the Indian integrated steelmaker was about \$405 per tonne, including overhead, for a theoretical profit of \$193 per tonne.
- From 2021 through mid-2024, the average domestic price of hot-rolled coil, excluding VAT, was about \$767 per tonne, with an average spread over the world export price of only \$20 per tonne (largely because the domestic price lagged international prices during the peak periods in 2021-2022; hence, the rise in Indian exports during that time). During that period, the average operating cost of the Indian integrated steelmaker was about \$430 per tonne, including overhead, for a theoretical profit of \$337 per tonne.

The latter figure of \$337 per tonne profit, granted theoretical and not inclusive of profits on downstream value-added products such as cold-rolled and galvanized, translates to about \$20 Billion in profits on an annualized basis given a roughly 60 million tonne flat-rolled market. Assuming a cost of about \$1,000 per tonne for greenfield capacity, the \$20B figure would allow for 20 million tonnes of new capacity investment per year should the producers generating these profits choose to reinvest them entirely in expansion. Although this is likely to be far from reality, many of the major producers headlining India's large-scale capacity expansion plans tell WSD they plan to re-invest their profits aggressively in support of their projects.

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India will probably sustain a major cost advantage versus almost all its competitors on the export market for hot-rolled band, and it's likely to be the lowest-cost producer, on average, in the Pacific Basin for years to come. Government policies to restrict the exports of iron ore are often rumored, as is the case at present, when exports of the product surge, pushing up prices and reducing supply for domestic steel mills. The country will continually benefit from improving infrastructure and skilled and relatively low-paid workers.

India Iron Ore Exports Jan to March 2024

(thousand metric tonnes)

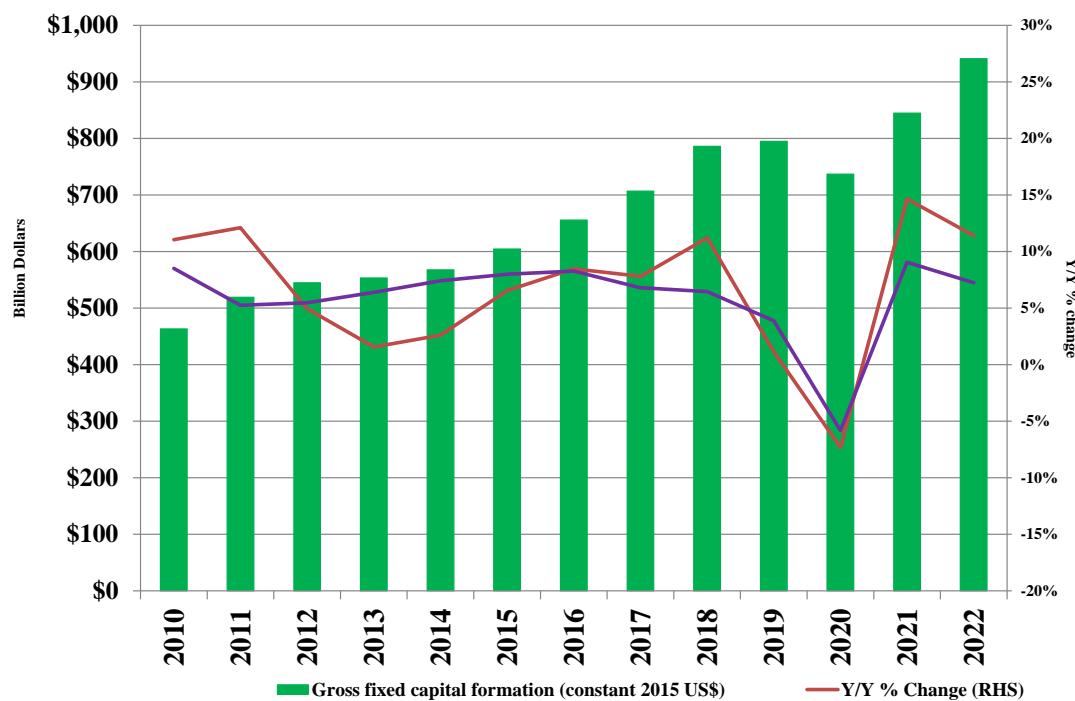
	2024	2023	2022	Y/Y % 24/23	Y/Y % 23/22
Jan to Mar	14,190	11,666	6,684	21.64%	74.54%
FY	-	43,845	16,185	-	170.90%

Source: Tex Report, Ministry of Commerce & Industry, WSD Estimates

Indian Steel Demand

Steel demand in India at present is about 140 million tonnes (on a finished steel basis) versus about 890 million tonnes in China, if Indian steel demand grows about 5.4% per annum through the end of this decade and the Chinese figure declines about 1.8%, the consumption numbers in 2030 would be 192 million tonnes and 797 million tonnes, respectively. WSD is of the opinion that Fixed Asset Investment (FAI), and more precisely Gross Fixed Capital Formation (GFCF) act as the dominant drivers of steel demand growth. Since the onset of Covid in 2020, several factors have contributed to pushing up the rate of steel demand growth from only about 4.7% per annum during the prior decade (2010-2019) to more than 10% since 2020:

India Gross fixed capital formation (constant 2015 US\$) (\$ billion dollars)

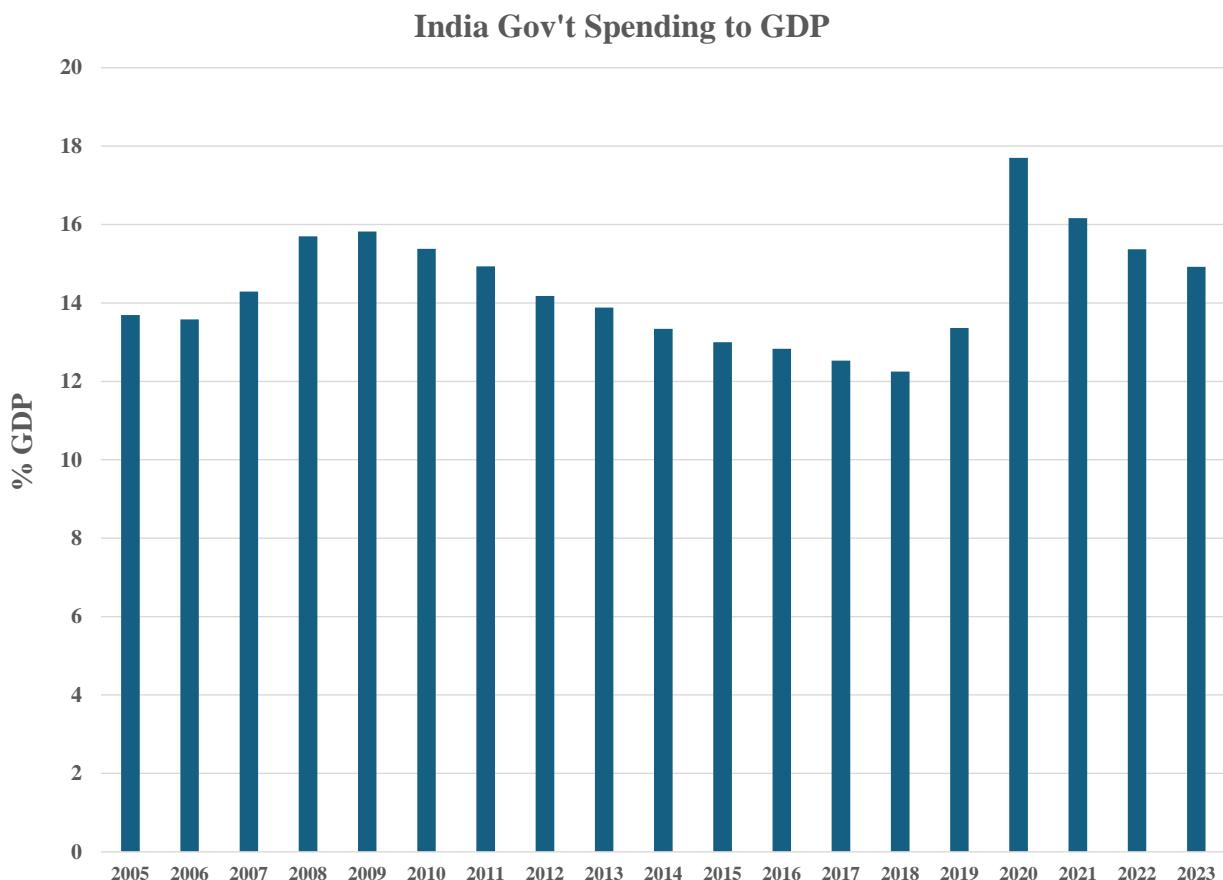


Source: World Bank, WSD Estimates

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The most important factor has been a massive surge in government-incentivized infrastructure spending, pushing up construction growth from an average of about 4.9% per annum during the prior decade to 13.5% in the past three years. GFCF has surged about 26% in the past few years compared to the five-year period preceding Covid (2021-2022 versus 2015-2019 in constant dollar terms).

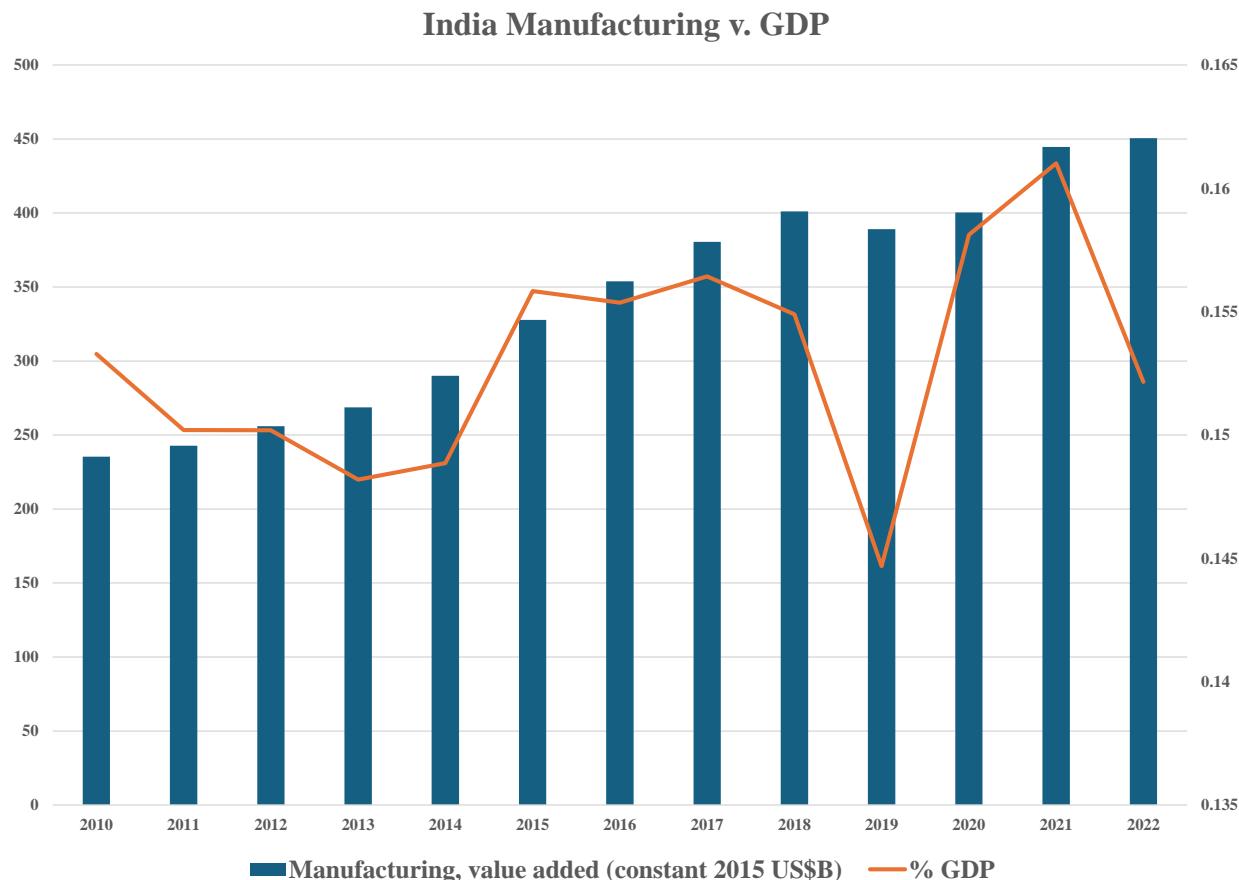
- The implementation of certain policies, such as electronic tax collection for individuals and businesses – both small and large – has simultaneously kept the central government debt in check; in fact, it has declined as a percentage of GDP from about 90% in 2020 to about 87% in 2023 while boosting government spending, from an average of 13.6% of GDP from 2010-2019 (and 12.8% from 2015-2019) to 16% from 2020-2023
- India has benefited from the relatively low price of imported energy, especially crude oil from Russia at a steep discount to global benchmarks, thus keeping inflation largely in check at about 4.75% in May of this year compared to about 8% at its peak in 2022 and ~4.2% from 2015-2019. India imports more than 80% of its domestic crude oil consumption; hence, its inflation and GDP growth is highly sensitive to global crude oil prices.



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The outlook for Indian steel demand growth appeared relatively assured for the next three to five years, in WSD's opinion; however, the surprising "fragility" of the Modi regime could undermine this outlook. In WSD's view, many of the factors that caused the surge in the growth rate of steel consumption the past few years may not be sustained for much longer, especially if the recent election outcome results in a weakening of confidence in Modi and his ability to continue his reform policies around land rights and other factors critical to maintaining the recent pace of infrastructure investment. Furthermore, many remain skeptical that the still largely agrarian economy will successfully transition to a manufacturing-based one, despite the tailwinds that are favorable at present given the trade friction between China and the USA (as well as the EU and other Developed Economies seeking to relocate their manufacturing).

- Manufacturing as a share of GDP has been largely stagnant during the recent three-year steel boom at about 15.7% versus 15.2% during the prior decade, further emphasizing the lack of progress in establishing India as a manufacturing powerhouse.



- Additional "rigidities" related to political and gubernatorial structure in India further dampen the potentially stratospheric upside for steel demand growth in the country. Corruption, political favoritism and the overall inefficiency and ineffectiveness of various sectors within the Indian political bureaucracy are likely to impede overall economic progress in the country for the foreseeable future – all of these phenomena are not new, granted the situation has improved somewhat in the past few years.

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- States remain a powerful player in both the politics and implementation of policies in India – as such, the recent election results whereby a number of states that have seen an erosion of support for the Modi government may be signaling their unwillingness to cooperate with his reform policies in the next few years.

Many groups in India are optimistic that the recent positive trajectory of the Indian economy, fueled by massive growth in government-promoted infrastructure spending, will retain its upward trajectory and continue to grow at about a 10%+ rate per annum – a figure that is similar to the recent growth rate from 2021-2024 of about 10.4% per annum compared to an average rate of 4.7% during the prior decade (from 2010-2019).

WSD is skeptical that such a high growth figure is sustainable over the next decade-plus. Instead, a figure closer to 6% is more likely, in WSD's opinion, based on a number of factors including: a) the rate of GFCF and its impact on steel demand growth; b) the rate of investment in industrial and manufacturing activity; and c) population trends. On this basis, we project the following for Indian steel demand (finished steel basis):

- The figure rises to about 192 million tonnes by 2030 compared to about 140 million tonnes in 2024 (and about 135 million tonnes on a fiscal-year basis).
- WSD forecasts an average growth rate of about 5.4% per annum from 2030-2040. As a result, steel demand would be as much as 250 million tonnes by 2035, for an increase of 120 million versus calendar 2024.
 - Maintaining this growth rate through the end of the decade puts steel demand at about 326 million tonnes by 2040, bringing the overall increase to nearly 200 million tonnes in the next ~15 years.

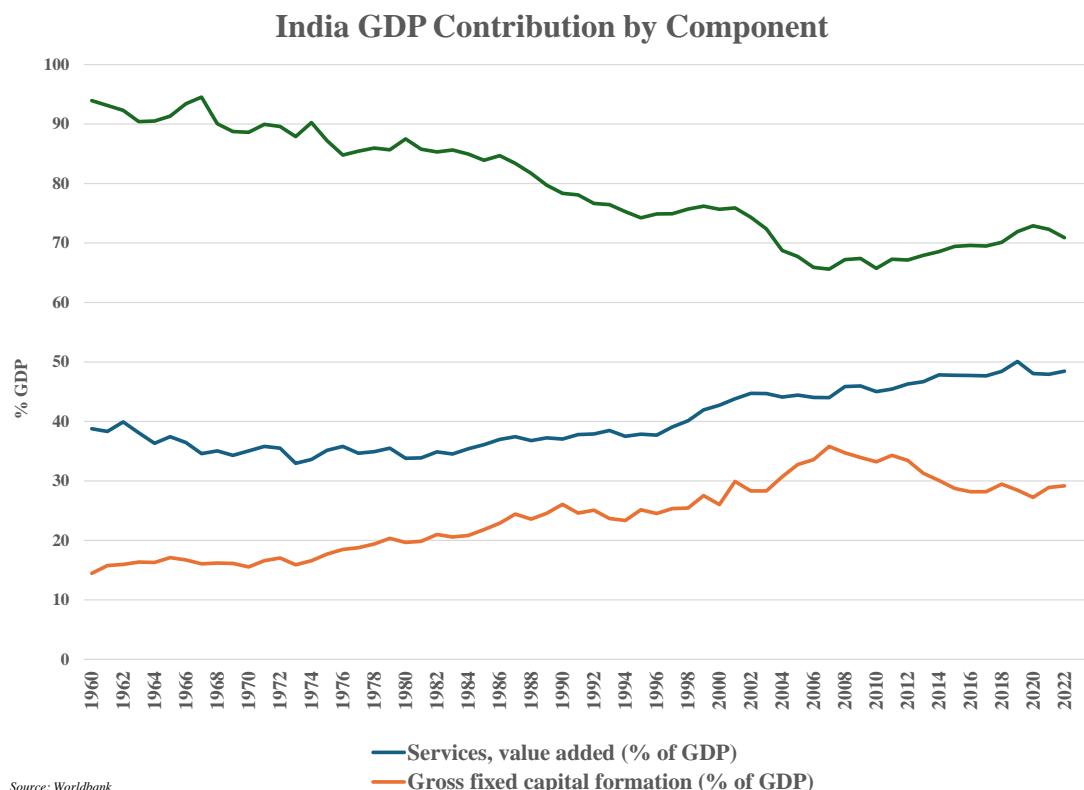
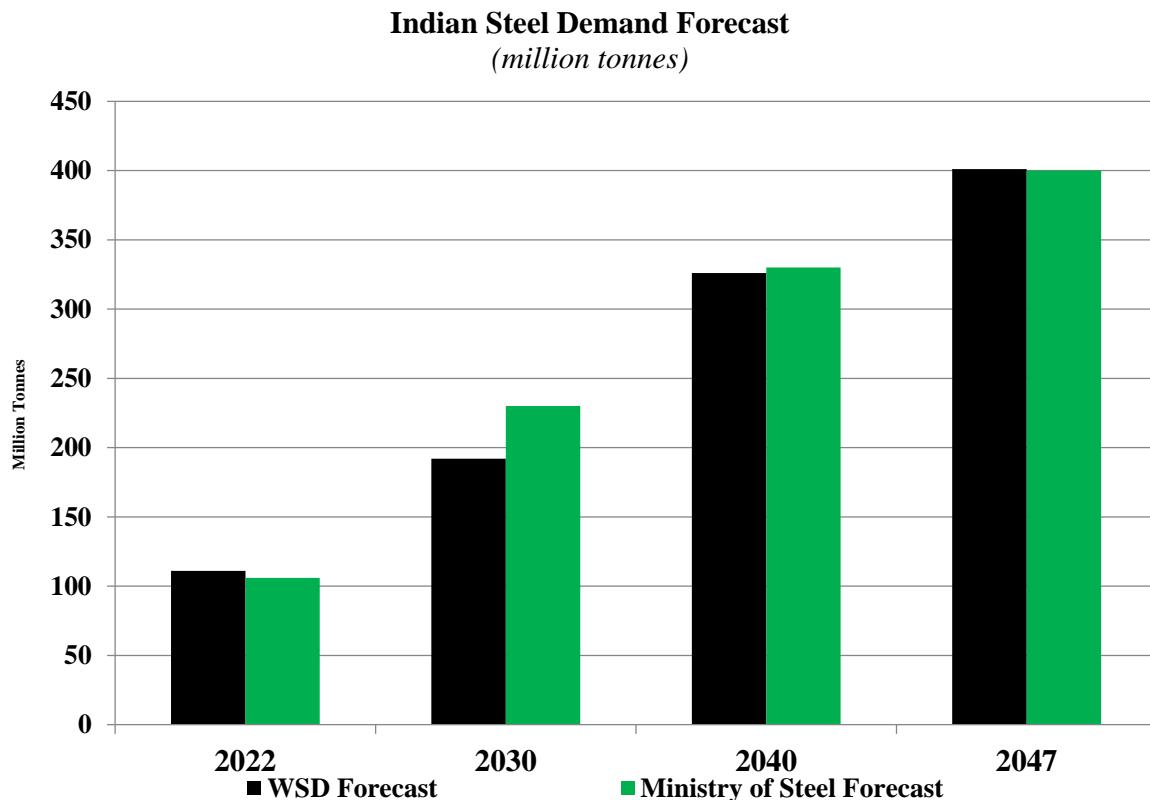
As of August 2022, India's Ministry of Steel has laid out its own scenario for steel demand growth based on a series of expected GDP growth rates and other factors. Based on these projections, the outlook for steel demand is as follows:

- For the fiscal year 2030, steel demand is forecast to be 230 million tonnes at a per capita consumption of 160 kg
- For the fiscal year 2040, steel demand is forecast to be 330 million tonnes at a per capita consumption of 210 kg
- For the fiscal year 2047, steel demand is forecast to be 400 million tonnes at a per capita consumption of 245 kg (*Note: WSD preliminarily forecasts a ~3.0% per annum growth rate for Indian steel demand during the 2040-2050 decade, which yields nearly the same 401 million tonnes figure for 2047*)

The implied growth rates of steel demand corresponding to these figures are surprisingly conservative from WSD's viewpoint given the propensity of India's policymakers to take an excessively optimistic view in the past. Nevertheless, the difference in the near-term view is not insignificant, perhaps reflecting some of that traditional “optimism” with the Ministry of

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Steel growth rate of about 10.2% per annum from 2022-2030, well above WSD's projection of 7.0% on average.



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Capacity & Production Outlook

Indian steel companies tend to have strong leaders at the helm, whose ambitious growth plans for their companies are well positioned to materialize, in WSD's opinion. Based on WSD's company visits during a recent trip to India, already announced expansion plans amount to nearly 115 million tonnes with an expected completion of FY 2031 or earlier – a figure we are optimistic will be achieved more or less on schedule. Of this figure, about 100 million tonnes are expected to come via the leading companies, including JSW, Tata, AMNS, JSPL, SAIL, and others, with the remaining ~15 million from the “informal” or “Secondary” sector made up of producers that utilize induction furnaces and/or sponge-iron (kiln) based steelmaking on a relatively small scale.

Indian steel production growth averaged about 5.6% per annum from 2010 to 2019 – above the domestic demand growth figure of 4.7% per annum during that period. Consequently, net steel trade went from a net import figure of 3.1 million tonnes in 2010 and a peak of 6.1 million tonnes of net imports in 2015 during the height of the Chinese “Export Armada” to a net export figure of 7.1 million tonnes by 2017. From 2019-2023 India has been a net exporter of about 5.7 million tonnes, on average. Regarding the specifics of production and trade:

- Crude steel production amounted to 68.3 million tonnes in 2010 and increased to 111.3 million tonnes by 2019; crude steel output reached 140 million tonnes in 2023.
- Imports of finished and semi-finished steel products amounted to 9.3 million tonnes in 2010 and declined slightly to 7.2 million tonnes by 2019. In 2020-21, imports declined to about 5 million tonnes, and rose again to ~9.7 million tonnes in 2023.
- Exports of finished and semi-finished steel products amounted to 6.2 million tonnes in 2010 and increased to 9.6 million tonnes by 2019. Exports experienced a massive surge to an average figure of ~15 million tonnes during 2020-2022 driven by surging global steel prices and supply/demand dislocation in the international steel markets due to the Russia/Ukraine war. By 2023 the export figure was back down to about 8 million tonnes as Chinese exports skyrocketed and international steel prices cooled (all the while Indian domestic demand was surging).

Looking ahead, WSD sees a relatively balanced situation, assuming our demand forecast is correct; WSD estimates India will be largely in balance through the end of this decade and could become a slight net exporter of steel products:

- Crude steel production might grow at an average rate of 6.9% per annum from 2024 to 2030 and 4.8% in the subsequent decade from 2030 to 2040. This implies steel output of 210 million tonnes by 2030 and 345 million tonnes by 2040.
- Apparent consumption of finished steel products is forecast to grow to 192 million tonnes by 2030 and 326 million tonnes by 2040. On a crude steel equivalent basis, these figures amount to 209 million and 355 million tonnes, respectively.
- Therefore, the Indian steel market would be essentially trade-balanced by the end of this decade and could actually see a deficit of about 10 million tonnes by 2040.

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That being said, the projected outlook for trade on the basis of oncoming capacity and steel demand implies a slightly different story, at least with respect to 2030 with an implied surplus of about 10 million tonnes. This, of course, is predicated on the assumption that the average capacity utilization rate is about 85% - in other words, near full capacity utilization and, therefore, a relatively small excess would need to be exported. In effect, WSD is forecasting that actual production will in fact reflect domestic requirements.

Indian Steel Supply Balance
(Million tonnes)

	2015	2019	2020	2021	2022	2023	2024	2025	2030	CAGR ('21-'30)
Capacity	109.9	142.2	142.3	143.9	154.3	161.3	175.6	198.1	264.5	
Effective Capacity (85%)	93.4	120.9	121.0	122.3	131.1	137.1	149.3	168.4	224.8	7.0%
Demand (FP Basis)	88.43	100.33	89.71	107.16	114.01	125.2	133.1	141.5	192.3	
Demand (Crude Basis)	98.3	111.5	99.7	119.1	126.7	139.1	147.9	157.3	213.7	6.7%
Surplus (Deficit)	-4.9	9.4	21.3	3.3	4.5	-2.0	1.3	11.1	11.2	

Source: WSD Estimates

Regarding steelmaking capacity expansion, there is no shortage of ambition permeating the landscape in India. However, two key components remain among the foremost challenges for those wishing to invest in steel related projects in the country: land rights and acquisition; and iron ore property rights and/or mining leases. The latter has become somewhat of a less controversial subject in recent years as the various state and local governments have streamlined the process for obtaining mining licenses.

Various discussions with WSD contacts in India during the recent trip provided a first-hand insight into the informal expectations regarding capacity expansion plans by 2030. Combining those insights and a slew of capacity announcements made by the major producers in India yields ~116 million tonnes of capacity slated to come online by the end of this decade:

- By 2030, crude steel capacity is expected to increase by 116 million tonnes to about 291 million tonnes.
 - About 200 million tonnes, or roughly 69% of the total, comes via the “formal” sector comprised of the major large-scale producers employing the BF/BOF process and other technologies.
 - The remaining ~91 million tonnes is comprised of the “secondary” sector utilizing small-scale induction furnaces and/or sponge-iron produced via coal-based kilns that utilize EAFs to produce low-quality billet primarily for rebar and other commodity long products. An induction furnace uses high amounts of electricity – about 750 kWh per tonne – to melt steel scrap and high-iron materials to steel. A growing number of these plants receive feedstock from their own coal-based sponge iron units (kilns), with the extra heat energy used to generate low-cost power for the induction furnace. This sector has been growing rapidly from perhaps only about 20 million tonnes in 2010 to about 67 million at present. With many of the producers struggling to gain access to additional iron ore, coking coal and electricity, WSD expects a dramatic reduction in capacity growth from this sector going forward. (Note: Apparently,

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(these producers are so flexible in operating their kilns that, depending on market conditions, they can quickly shift from producing sponge iron to cement.)

- JSW leads the way on capacity expansion, adding about 27 million tonnes of capacity, of which as much as 12 million tonnes is likely to come via expansion of its flagship integrated steelworks in Vijayanagar, Karnataka. Assuming this expansion unfolds as planned, this plant could be the largest single steel production site in the world. The recently expanded Dolvi steelworks in Maharashtra is now a 10 million tonnes facility, and could see another 5 million tonnes added by 2026-2027. Additional expansion is underway at the former Bhushan Steel and Power works acquired in 2021 which would bring that plant to ~5 million tonnes per annum. Based on these projections, JSW would become the largest producer in India by the end of this decade or early next with about 55 million tonnes of capacity.
- Tata steel would follow at about 42 million tonnes of capacity at decade's end, with an additional 21 million tonnes during this period. Significant capacity expansion is unlikely at the existing Tata flagship plant in Jamshedpur given its location near the center of the city. The bulk of the expansion plans are focused on the recently completed greenfield site in Kalinganagar, Orissa which will expand from 3 to 8 million tonnes, with a further 8 million likely bringing the ultimate scale of that site to about 16 million tonnes. The former Bhushan Steel facility in Orissa – acquired by Tata during the massive restructuring spree of highly-indebted upstart India steelmakers in the 2014-2018 period – could see its capacity grow from about 5.2 million tonnes at present to perhaps 8 million tonnes or more.
- The former Essar Hazira complex, now a joint venture between ArcelorMittal and Nippon Steel known as AMNS, is expected to grow from about 7.5 million tonnes at present (which includes about 5 million tonnes of DRI capacity that has previously operated on a limited basis due to natural gas shortages) to about 15 million tonnes by 2026. Ultimately, there are plans to expand the operation to about 24 million tonnes with upside to 28 million by the end of the decade.
- The government companies – SAIL and RINL, are expected to aggressively increase capacities. SAIL could go from roughly 21 million tonnes per year to 36 million tonnes. Vizag (RNIL), having already expanded from about 3 million tonnes per year to 7 million tonnes may not see much additional growth given the company's recent financial struggles; however, the oncoming 3.0 million tonne NMDC plant in Chhattisgarh state will boost the overall capacity of the "government owned" producers to 46 million tonnes by the end of the decade from 28 million at present.

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Indian Steel Capacity Forecast (Million Tonnes)

Producer	FY'23	FY'24	FY'25	FY'26	FY'27	FY'28	FY'29	FY'30	FY'31	FY'24	%-CAGR
JSW	27.0	28.2	36.7	36.7	41.7	48.2	50.2	55.2	55.2	27	10%
Tata	21.6	21.6	26.6	28.1	34.1	34.1	38.6	38.6	42.1	21	10%
SAIL	20.7	20.7	20.7	20.7	20.7	25.2	27.6	35.7	35.7	15	8%
AMNS	7.6	7.6	9.0	15.0	15.0	15.0	20.0	20.0	29.2	22	21%
JSPL	9.6	9.6	15.9	15.9	19.9	19.9	23.9	23.9	27.9	18	16%
RINL	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	0	0%
NMDC	0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0	0%
Primary	93.8	98	119.2	126.7	148.2	148.2	168.2	175.6	200.4	102	11%
Secondary	67.5	77.6	78.8	80.8	82.8	84.8	86.8	88.8	90.8	13	2%
Capacity	161.3	175.6	198.1	207.6	224.6	233.1	255	264.5	291.2	116	7%

Source: WSD Estimates, company reports

Indian Steelmakers' Production Cost

Based on data from WSD's World Cost Curve system, the average cost to produce hot-rolled band in India has risen from about \$447 per tonne in 2010 (and \$415 per tonne in 2019), to about \$477 per tonne as of May 2024. Although this increase in production cost might appear minor at first, it is important to note that global costs have risen at a slower pace, on average, than those for Indian steelmakers. While the average production cost ex-India rose 2.1% per annum from 2019 to 2024, the figure for India was about 2.8% per annum during the same period. Globally, the operating cost to produce hot-rolled band, including overhead, has been highly volatile on an overall rising trend:

- In November 2010 the average global cost (excluding overhead) was about \$512 per tonne:
 - Indian steelmakers enjoyed the lowest costs, on average, at an estimated \$396 per tonne.
 - Japanese integrated producers were the highest-cost with an estimated average figure of \$616 per tonne
- By June 2015, steelmakers' costs were in decline as global raw material prices plummeted. Global oversupply driven by a rapid increase in Chinese steel exports (peaking at 120 million tons annualized), led to lower production rates elsewhere. The average production cost in June 2015 declined 29% versus the figure in November 2010 to \$362 per tonne:
 - CIS steel producers were lowest cost at an estimated figure of \$277 per tonne, followed closely by Indian producers at \$304 per tonne.
 - USA Integrated producers' typical iron ore cost advantage, which is derived from vertically integrated fixed cost iron ore, had diminished amid a global decline in steelmakers' raw material costs. U.S. Integrated producers had an average cost of \$453 per ton. USA EAF producers' costs were nearly as high at \$449 per tonne.

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- By the end of the decade in mid-2019, the average global operating cost was about \$436 per tonne – rising almost 20% versus 2015:
 - CIS steelmakers were the lowest cost producers at an average of \$329 per tonne. India remained the second lowest cost producer with an average steelmaking cost of \$359 per tonne.
 - Reflecting relatively low raw material costs, a balanced value in use cost for steel scrap and integrated steelmakers' raw materials (iron ore and coal), and an historically flat global cost curve, multiple countries' average steelmaking cost were within a tight range. USA mini mills' average cost were \$487 per tonne with USA integrated producers, Japanese and Chinese producers all averaging \$486 per tonne.
- In May 2024, following years of global cost inflation, the average global operating cost spiked 15% to about \$500 per tonne versus the figure in mid-2019:
 - CIS producers remained the lowest cost at \$307 per tonne, reflecting significant currency depreciation versus the U.S. dollar and captive sources of low cost steelmakers raw materials. Indian producers, impacted by significantly higher global metallurgical coal costs rose to \$423 per tonne, which remained well below the global average.
 - USA mini-mill producers, dependent to a large degree on steel scrap as the primary feedstock in their operations, were highest-cost at \$612 per tonne. Japanese steelmakers were second highest at \$589 per tonne.

WSD May 2024 World Cost Curve Average Cost Comparison
(\$ per metric tonne)

	USA Integ	USA Mini	Mexico	Lat. Am.	Western Europe	CIS	India	South Korea (Integ)	Japan	China	Global Average
Coal + Coke	\$90	\$1	\$139	\$144	\$136	\$60	\$226	\$167	\$133	\$157	\$125
Iron Ore	\$111	\$2	\$181	\$133	\$187	\$94	\$68	\$211	\$175	\$216	\$138
Scrap	\$94	\$303	\$118	\$57	\$92	\$79	\$37	\$73	\$88	\$47	\$99
Raw Material (Total)	\$357	\$475	\$437	\$334	\$426	\$238	\$338	\$451	\$461	\$424	\$394
Liquid Steel	\$327	\$453	\$373	\$312	\$403	\$215	\$315	\$433	\$439	\$399	\$367
Slab	\$336	\$575	\$389	\$322	\$413	\$229	\$327	\$440	\$450	\$410	\$389
HRB	\$525	\$612	\$560	\$334	\$539	\$307	\$423	\$567	\$589	\$541	\$500
HRB w/ OH	\$553	\$653	\$631	\$485	\$576	\$331	\$477	\$596	\$636	\$575	\$551

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WSD June 2019 World Cost Curve Average Cost Comparison

(\$ per metric tonne)

	USA Integ	USA Mini	Mexico	Lat. Am.	Western Europe	CIS	India	South Korea (Integ)	Japan	China	Global Average
Coal + Coke	\$72	\$0	\$55	\$118	\$116	\$65	\$159	\$120	\$100	\$130	\$94
Iron Ore	\$114	\$0	\$119	\$129	\$187	\$114	\$71	\$160	\$132	\$187	\$121
Scrap	\$72	\$226	\$87	\$40	\$67	\$68	\$29	\$61	\$59	\$42	\$75
Raw Material (Total)	\$307	\$346	\$261	\$287	\$381	\$251	\$264	\$340	\$337	\$364	\$314
Liquid Steel	\$277	\$327	\$222	\$268	\$360	\$227	\$246	\$326	\$321	\$341	\$292
Slab	\$285	\$334	\$232	\$277	\$369	\$241	\$255	\$331	\$329	\$351	\$300
HRB	\$486	\$487	\$368	\$398	\$500	\$329	\$359	\$464	\$486	\$486	\$436
HRB w/ OH	\$518	\$535	\$428	\$452	\$549	\$355	\$415	\$494	\$535	\$521	\$480

WSD June 2015 World Cost Curve Average Cost Comparison

(\$ per metric tonne)

	USA Integ	USA Mini	Mexico	Lat. Am.	Western Europe	CIS	India	South Korea (Integ)	Japan	China	Global Average
Coal + Coke	\$59	\$1	\$54	\$80	\$69	\$50	\$79	\$69	\$57	\$77	\$60
Iron Ore	\$117	\$2	\$124	\$101	\$127	\$93	\$54	\$120	\$100	\$135	\$97
Scrap	\$67	\$218	\$63	\$30	\$65	\$49	\$42	\$49	\$48	\$26	\$66
Raw Material (Total)	\$287	\$316	\$241	\$212	269	195	216	238	240	240	\$245
Liquid Steel	\$263	\$301	\$206	\$198	254	176	201	228	229	226	\$228
Slab	\$271	\$308	\$215	\$204	261	187	208	232	234	232	\$235
HRB	\$453	\$449	\$355	\$318	380	277	304	354	369	365	\$362
HRB w/ OH	\$487	\$490	\$417	\$372	434	333	359	394	412	399	\$410

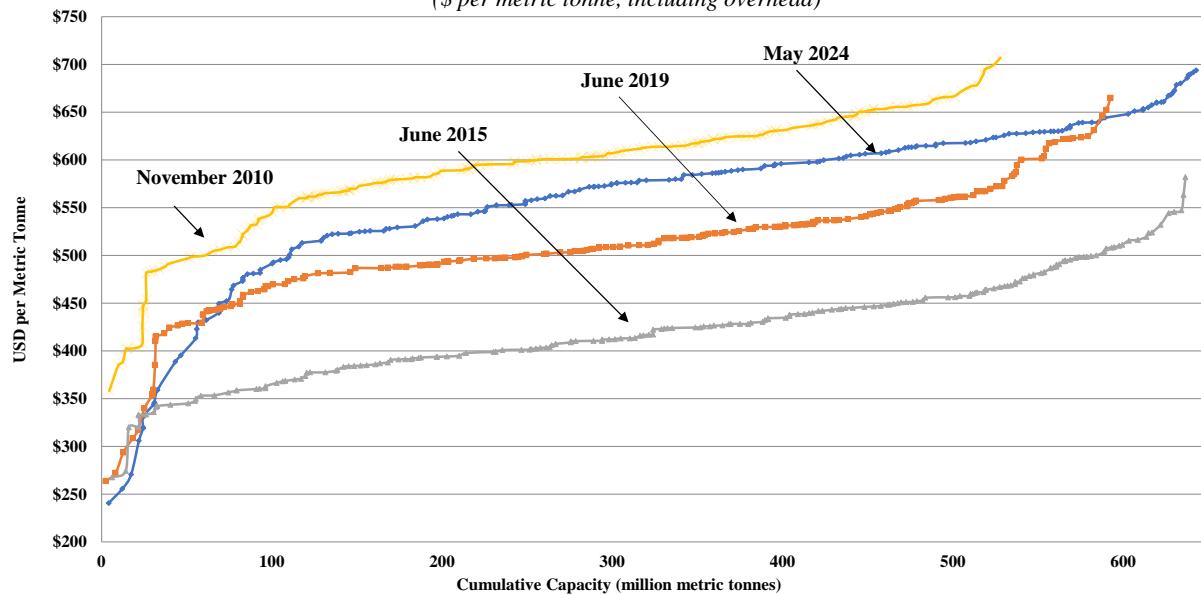
WSD November 2010 World Cost Curve Average Cost Comparison

(\$ per metric tonne)

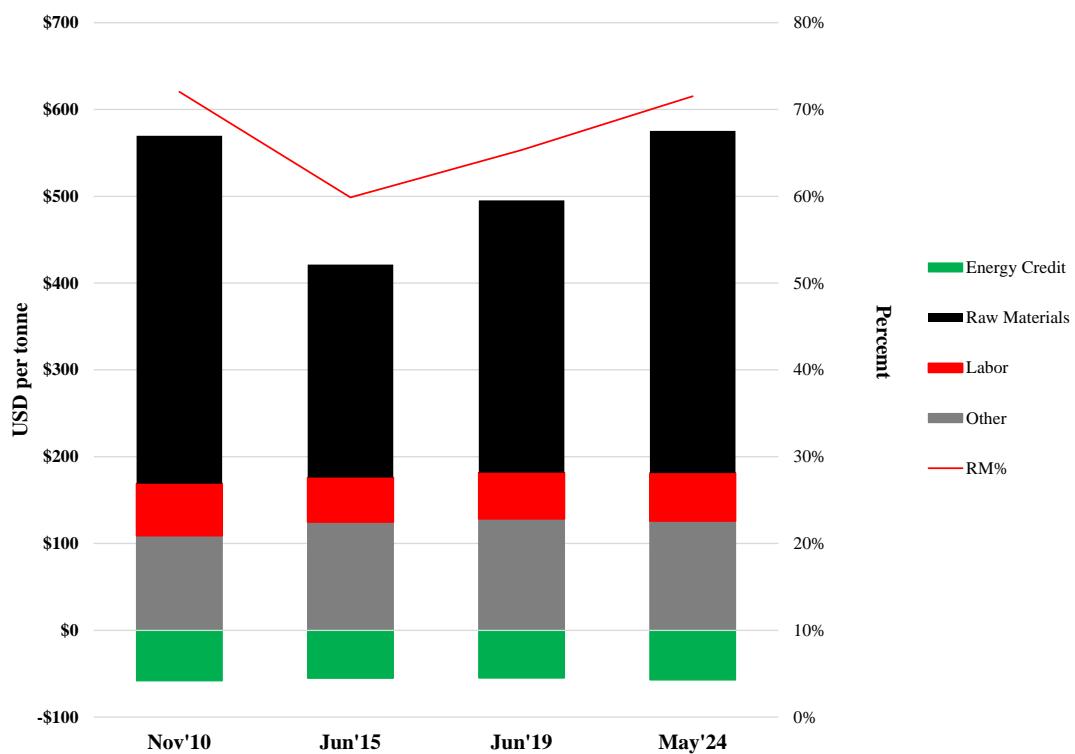
	USA Integ	USA Mini	Mexico	Lat. Am.	Western Europe	CIS	India	South Korea (Integ)	Japan	China	Global Average
Coal + Coke	\$116	\$1	\$77	\$137	\$135	\$84	\$138	\$133	\$119	\$127	\$107
Iron Ore	\$144	\$2	\$147	\$187	\$251	\$161	\$71	\$248	\$212	\$269	\$169
Scrap	\$97	\$294	\$85	\$46	\$82	\$85	\$56	\$73	\$84	\$50	\$95
Raw Material (Total)	\$411	\$410	\$309	\$371	\$480	\$335	\$306	\$454	\$469	\$463	\$401
Liquid Steel	\$379	\$389	\$264	\$349	\$454	\$303	\$285	\$437	\$448	\$436	\$374
Slab	\$390	\$397	\$275	\$359	\$466	\$322	\$295	\$443	\$459	\$448	\$385
HRB	\$569	\$544	\$458	\$484	\$603	\$417	\$396	\$454	\$616	\$575	\$512
HRB w/ OH	\$600	\$568	\$483	\$522	\$631	\$444	\$447	\$598	\$653	\$618	\$557

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World Cost Curve for Hot-rolled Band
(\$ per metric tonne, including overhead)



Raw Material Contribution to Total Cost



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Indian steelmakers' costs have been impacted to the greatest degree by the changes in the price of imported coking coal. Unlike iron ore, high quality coking coal is not nearly as abundant in India. While the smaller DRI-based (via the rotary kiln route) producers are able to utilize lower-grade coals that are relatively abundant from domestic mines in India, many of the integrated producers in the country are dependent on imports of high quality coking coal for their operations. In 2015, Indian imports of coking coal (for coke production) amounted to about 46 million tonnes and by 2023 the figure rose to about 56.5 million tonnes. Although this is a substantial increase on an absolute basis, it is important to keep in mind that Indian steel production, and implicitly coking coal demand, was growing during this period:

- In 2015, of the ~60 million tonne coking coal requirement, 46.1 million tonnes, or 77%, was imported. The average spot price of coking coal, FOB Australia, was about \$87 per tonne and the average reported price of Indian imported coal was \$139 per tonne.
- In 2019, of the ~85 million tonne coking coal requirement, 51.3 million tonnes, or 60%, was imported. The average spot price of coking coal, FOB Australia, surged 117% versus 2015 to about \$178 per tonne. Meanwhile, the average reported price of Indian imported coal was \$183 per tonne.
- In 2023, of the ~110 million tonne coking coal requirement, 56.5 million tonnes, or 51%, was imported. The average price of coking coal, FOB Australia, surged another 66% versus 2019 to about \$296 per tonne. Meanwhile, the average reported price of Indian imported coal was \$271 per tonne.

India Coking Coal Imports by Country

	Australia		Canada		Indonesia		Mozambique	
	Tonnes (M)	Avg. Price	Tonnes (M)	Avg. Price	Tonnes (M)	Avg. Price	Tonnes (M)	Avg. Price
2015	40.02	\$107	1.49	\$108	0.04	\$105	2.11	\$99
2019	34.79	\$184	4.90	\$190	1.45	\$154	1.96	\$176
2021	6.17	\$116	9.27	\$287	2.51	\$243	0.97	\$244
2022	33.36	\$353	2.55	\$384	2.00	\$318	2.28	\$327
2023	28.97	\$281	2.92	\$277	2.07	\$262	1.85	\$236

	New Zealand		Russia		USA		Total Tonnes (M)
	Tonnes (M)	Avg. Price	Tonnes (M)	Avg. Price	Tonnes (M)	Avg. Price	
2015	0.78	\$112	0.00	\$109	1.30	\$122	46.1
2019	0.51	\$161	0.88	\$123	4.03	\$189	51.3
2021	0.04	\$326	10.67	\$198	10.18	\$262	54.6
2022	0.18	\$333	3.32	\$278	7.27	\$376	57.9
2023	0.29	\$220	5.90	\$207	7.63	\$273	56.5

Source: Tex Report, WSD Estimates

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Indian Metallics Balances

In general, given the abundant domestic supply of high grade iron ore, Indian steel and foundry producers have naturally oriented their metallics consumption in steelmaking furnaces toward pig iron and steel-scrap supplements (SSS). At the moment, India is the number one producer of steel-scrap supplements in the world with an output of about 49 million tonnes in 2023.

In 2023, Indian steelmakers produced 140.3 million tonnes of crude steel of which 64.3 million tonnes, or 46%, were produced via the basic-oxygen furnace (BOF) route, and 76.0 million tonnes, or 54% were produced via the electric arc furnace (EAF) route.

India Metallics Balances

	<u>2000</u>	<u>2010</u>	<u>2015</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2030</u>	<u>2035</u>
Steel Production, Consumption, and Trade:										
Apparent Consumption of Finished Steel Products per annum change from prior period (%)	23.65 8.16%	66.28 10.11%	88.43 0.69%	100.47 -16.65%	83.74 12.26%	94.00 18.32%	111.23 18.02%	131.27 4.11%	181.79 5.52%	238.03
Crude Steel Production per annum change from prior period (%)	26.92 7.55%	68.32 1.99%	89.03 4.49%	111.25 -10.57%	99.49 18.84%	118.24 6.02%	125.36 11.88%	140.25 4.07%	196.00 5.52%	256.45
Ratio: ASC (FP) to Crude Steel Production	0.88	0.97	0.99	0.90	0.84	0.80	0.89	0.94	0.93	0.93
Crude Steel Production via BOF	14.73	26.01	38.22	48.63	44.30	53.01	57.46	64.29	128.38	185.67
Ratio: BOF Production to Total Crude Steel	0.55	0.38	0.43	0.44	0.45	0.45	0.46	0.46	0.66	0.72
Crude Steel Production via EAF	9.69	41.31	50.81	62.61	55.20	65.23	67.89	75.96	67.62	70.78
Ratio: EAF Production to Total Crude Steel	0.36	0.60	0.57	0.56	0.55	0.55	0.54	0.54	0.35	0.28
Crude Steel Production via OH	2.50	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratio: OH Production to Total Crude Steel	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crude Steel Production via Continuous Casting	16.40	47.50	61.93	77.38	69.21	82.25	87.20	97.56	136.34	178.39
Ratio: CC Route to Total Crude Steel	0.61	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Crude Steel Production via Ingot Route	10.52	20.82	27.10	33.86	30.28	35.99	38.16	42.69	59.66	78.06
Ratio: Ingot Route to Total Crude Steel	0.391	0.305	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.304
Foundry Production	2.91	5.83	7.78	8.84	7.37	8.27	9.78	11.55	15.99	20.94
Ratio: Foundry Production to Total Crude Steel	0.11	0.09	0.09	0.08	0.07	0.07	0.08	0.08	0.08	0.08
Ingots Production	10.52	20.82	27.10	33.86	30.28	35.99	38.16	42.69	59.66	78.06
Ratio: Ingots Production to Total Crude Steel	0.39	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Production of Finished Products	25.09	63.32	82.32	102.05	89.77	102.83	111.92	130.44	179.75	235.16
Finished Products from Imported Semi-Finished	0.38	0.52	0.71	0.37	0.27	0.16	0.93	1.23	1.16	1.57
Imports of Finished Products	1.53	8.70	12.17	6.77	4.75	4.67	6.02	8.32	9.43	10.52
Share (%) Imports of Finished Products	0.63%	3.09%	2.79%	1.88%	1.33%	1.25%	1.68%	2.30%	2.56%	2.76%
Exports of Finished Products	2.97	5.75	6.05	8.36	10.78	13.49	6.72	7.49	7.39	7.66
Share (%) Exports of Finished Products	1.16%	1.85%	1.55%	2.26%	2.97%	3.57%	1.86%	2.07%	2.00%	2.00%
Imports of Semi Finished Products	0.41	0.56	0.76	0.40	0.29	0.17	1.00	1.33	1.25	1.70
Share (%) Imports of Semi Finished Products	0.74%	1.02%	1.44%	0.57%	0.42%	0.23%	1.44%	1.89%	1.50%	1.50%
Exports of Semi Finished Products	0.21	0.43	0.77	1.23	2.43	6.31	4.71	0.62	2.69	3.60
Share (%) Exports of Semi Finished Products	0.40%	0.71%	1.49%	1.64%	3.26%	8.07%	6.24%	0.81%	3.00%	3.00%

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Pig iron accounted for approximately 90% of the BOF steelmakers' total metallics requirement – a figure that is in line with the global average. Globally, steelmakers producing crude steel via the BOF route consumed about 1.01 billion tonnes of pig iron accounting for 86% of the 1.52 billion tonne metallics requirement for this segment.

WSD's GMB forecast calls for pig iron production to grow from about 91 million tonnes in 2023 to roughly 195 million tonnes in 2035 – an average annual growth rate of 6.5% per annum.

Based on GMB estimates, one tonne of pig iron produced in India consumes approximately 1.61 tonnes of iron ore. In 2023, pig iron production consumed about 147 million tonnes of iron ore, of which 7.6 million tonnes were lump iron ore, 21 million tonnes was pelletized and 119 million tonnes were fine ores.

India Metallics Balances

	<u>2000</u>	<u>2010</u>	<u>2015</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2030</u>	<u>2035</u>
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Pig Iron

Pig Iron Production	21.32	38.69	57.21	74.10	67.78	77.85	81.60	91.29	138.65	194.70
Ratio: Pig Iron Production to BOF Production	1.45	1.49	1.50	1.5238	1.53	1.47	1.42	1.42	1.08	1.05
Ratio: Pig Iron Production to Total Crude Steel Production	0.79	0.57	0.64	0.67	0.68	0.66	0.65	0.65	0.71	0.76
Pig Iron Imports	0.00	0.01	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Share (%) Imports of Global Pig Iron	0.01%	0.11%	0.28%	0.16%	0.17%	0.14%	0.17%	0.16%	0.16%	0.16%
Pig Iron Exports	0.27	0.75	0.54	0.63	0.64	0.64	0.62	0.62	0.58	0.57
Share (%) Exports of Global Pig Iron	2.07%	6.95%	4.43%	4.56%	4.56%	4.56%	4.56%	4.56%	4.56%	4.56%
Total Pig Iron Requirement	21.05	37.95	56.71	73.49	67.17	77.22	81.00	90.70	138.09	194.15
Ratio: Pig Iron Requirement to Total Fe Metallics Requirement (0.59	0.43	0.49	0.51	0.53	0.51	0.50	0.50	0.55	0.59
Pig Iron Requirement for BOF Crude	16.57	25.42	40.18	51.16	46.97	55.76	60.68	67.78	127.00	181.28
Ratio: Pig Iron for BOF to Total Fe Metallics Required BOF	0.96	0.84	0.90	0.90	0.91	0.90	0.91	0.91	0.85	0.84
Pig Iron Requirement for EAF Crude	1.21	9.62	14.19	19.68	17.99	18.98	17.38	19.45	6.30	6.59
Ratio: Pig Iron for EAF to Total Fe Metallics Required EAF	0.11	0.20	0.24	0.27	0.28	0.25	0.22	0.22	0.08	0.08
Pig Iron Requirement for Foundry	1.31	2.19	2.33	2.65	2.21	2.48	2.93	3.46	4.80	6.28
Ratio: Pig Iron for Foundry to Total Fe Metallics Required Foun	0.3	0.25	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

Steel Scrap Supplements

India is the world's largest producer of directly reduced iron (sponge iron), at an estimated 48.5 million tonnes of output in 2023, which accounted for 34% of global production. DRI/sponge iron production has resumed its growth trajectory after declining from about 23 million tonnes in 2010 to a low of 17 million in 2014 as a significant number of smaller rotary-kiln operators were essentially forced out of commission. These small, often local, producers relied heavily on nearby sources of iron ore; production declined as Indian authorities cracked down on a number of these mines which were deemed "illegal" as a result. Since then, with the streamlining of iron ore property access via auctions, production has resumed its growth trajectory.

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Indian DRI producers are split among two segments:

- **Shaft-furnace DRI producers:** There are three Indian steelmaking facilities utilizing traditional natural gas-based shaft-furnace DRI-making modules: AMNS, Hazira; JSPL (Angul & Raigarh), JSW Steel (Vijayangar & Raigad). The combined operating capacity of these facilities is ~11.8 million tonnes per annum. Shaft-furnace DRI-making technology is perhaps limited in its growth outlook at the moment due to the high price and limited domestic supply of natural gas. This outlook could change rapidly, in WSD's opinion, should LNG prices moderate in the years ahead and Indian steelmakers find this technology to be cost-advantaged as well as lower-CO₂-emitting.
- **Rotary kiln DRI producers:** There are as many as 200-300 Indian coal based rotary kiln producers. WSD estimates that, in 2023, perhaps 39.4 of the 48.5 million tonnes of reported Indian DRI production were via rotary kiln production. On average, coal based DRI producers require approximately 1.68 tonnes of non-metallurgical grade coking coal per tonne of DRI produced.

Indian DRI production has grown at a rapid 12.1% per annum rate between 2014 and 2023 – since production bottomed out in the middle of the last decade. WSD believes that this rate of observed growth is unlikely to be sustained going forward, given limited supplies of low-cost natural gas, a dwindling supply of lump iron ore, continued crackdown by authorities on the fringe and highly polluting rotary kiln based sector, and the prodigious pace of capacity investment by the “formal” sector crowding-out the smaller players. The GMB forecasts DRI production could grow to a peak of ~53 million tonnes in the next few years and decline moderately from there at a 2.3% per annum rate to 42.5 million tonnes in 2035.

Steel Scrap

The GMB calculates that Indian steelmakers and foundry producers consumed approximately 41.4 million tonnes of steel scrap in 2023, of which:

- Home scrap consumption accounted for 19.6 million tonnes
- New scrap consumption accounted for 16.6 million tonnes
- Obsolete scrap consumption accounted for 5.2 million tonnes

Based on GMB calculations, Indian steelmakers and foundry producers will require record levels of steel scrap per tonne of crude steel and foundry production in the future. Overall, the GMB calculates that about 0.23 tonnes of scrap were consumed per tonne of steel and foundry metal produced in 2023, which compares to an average scrap requirement of 0.28 per tonne of crude steel and foundry metal between by 2035.

Indian producers, on average, consume significantly less scrap per tonne of steel produced in the EAF than most EAF-based producers outside of India. Given India's world leading production of steel scrap supplements (sponge iron/directly-reduced iron), Indian EAF producers consume approximately 0.23 tonnes of steel scrap per tonne compared to a global average of 0.67 tonnes of steels scrap per tonne of steel produced via the EAF.

WORLDSTEELDYNAMICS

India Metallics Balances

2000 2010 2015 2019 2020 2021 2022 2023 2030 2035

DRI/HBI/Sponge Iron

DRI/HBI Production	5.44	23.42	17.68	33.74	32.98	39.11	43.55	48.48	41.67	42.54
Ratio: DRI/HBI Production to EAF Production	0.56	0.57	0.35	0.54	0.60	0.60	0.64	0.64	0.62	0.60
Ratio: DRI/HBI Production to Total Crude Steel Production	0.20	0.34	0.20	0.30	0.33	0.33	0.35	0.35	0.21	0.17 -2.5%
DRI/HBI Imports	0.00	0.06	0.04	0.23	0.22	0.23	0.22	0.22	0.26	0.29
Share (%) Imports of Global DRI/HBI	0.00%	0.84%	0.59%	1.96%	1.97%	1.81%	1.80%	1.80%	1.81%	1.82%
DRI/HBI Exports	0.04	0.08	0.15	0.31	0.18	0.32	0.23	0.23	0.52	0.74
Share (%) Exports of Global DRI/HBI	0.97%	1.06%	-1.57%	2.60%	1.56%	2.54%	1.87%	1.86%	3.57%	4.59%
Total DRI/HBI Requirement	5.40	23.40	17.57	33.67	33.03	39.02	43.54	48.47	41.41	42.09
Ratio: DRI/HBI Requirement to Total Fe Metallics Requirement (Crude/Foundry)	0.15	0.27	0.15	0.24	0.26	0.26	0.27	0.27	0.16	0.13
Ratio: DRI/HBI Requirement to Total Fe Metallics Required EAF	0.48	0.49	0.30	0.46	0.51	0.51	0.55	0.55	0.53	0.51

Scrap

Total Scrap Requirement for Steel and Foundry Production	9.40	26.95	41.00	35.57	26.65	33.78	36.04	41.39	72.60	93.65
Ratio: Scrap Requirement to Total Fe Metallics Required Steel and Foundry	0.26	0.31	0.36	0.25	0.21	0.23	0.22	0.23	0.29	0.28
Total Scrap Requirement For Steel Production	6.34	20.40	31.67	24.97	17.81	23.86	24.30	27.53	53.41	68.53
Ratio: Scrap Requirement to Total Fe Metallics Required Steel	0.20	0.26	0.31	0.19	0.15	0.17	0.17	0.17	0.23	0.23
Total Scrap Requirement for BOF Production	0.60	4.85	4.30	5.44	4.59	5.94	6.20	7.05	22.42	34.83
Ratio: Scrap Requirement to Total Fe Metallics Required BOF	0.04	0.16	0.10	0.10	0.09	0.10	0.09	0.09	0.15	0.16
Total Scrap Requirement for EAF Production	4.68	15.06	27.37	19.53	13.23	17.92	18.09	20.49	30.99	33.70
Ratio: Scrap Requirement to Total Fe Metallics Required EAF	0.41	0.31	0.46	0.27	0.21	0.24	0.23	0.23	0.39	0.41
Total Scrap Requirement for OH Production	1.06	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratio: Scrap Requirement to Total Fe Metallics Required OH	0.35	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Scrap Requirement for Foundry Production	3.06	6.56	9.33	10.60	8.84	9.92	11.74	13.85	19.19	25.12
Ratio: Scrap Requirement to Total Fe Metallics Required Foundry	0.70	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Total Scrap Imports	0.70	4.64	6.71	4.57	3.99	4.64	4.45	4.78	4.92	4.59
Share (%) Imports of Global Scrap	1.10%	4.93%	8.59%	5.86%	5.71%	5.75%	6.00%	6.33%	4.82%	3.98%
Total Scrap Exports	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Share (%) Exports of Global Scrap	0.00%	0.01%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
Total Home Scrap Generation	5.32	11.77	12.63	15.45	13.70	16.29	17.57	19.62	27.44	35.91
Home Scrap from Liquid Steel to Crude Steel	0.58	1.42	1.79	2.24	2.00	2.38	2.52	2.82	3.94	5.16
Home Scrap from Ingots and Molds	0.38	0.75	0.98	1.22	1.09	1.30	1.37	1.54	2.15	2.81
Home Scrap from Finished Steel Production	3.19	7.50	7.07	8.81	7.95	9.64	10.15	11.10	15.59	20.40
Home Scrap from Foundry	1.18	2.10	2.80	3.18	2.65	2.98	3.52	4.16	5.76	7.54
Ratio: Home Scrap Generation to Crude Steel + Foundry Production	0.18	0.16	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Total New Scrap Generation	3.87	9.63	12.26	12.68	10.57	11.86	14.04	16.57	22.94	30.04
New Scrap from Foundry	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
New Scrap from Steel Products	3.45	8.86	11.27	11.55	9.63	10.81	12.79	15.10	20.91	27.37
Ratio: New Scrap Generation to Apparent Consumption of FP	0.164	0.145	0.139	0.126	0.126	0.126	0.126	0.126	0.126	0.126
Obsolete Scrap Requirement	0.20	5.55	16.11	7.44	2.39	5.63	4.43	5.20	22.22	27.70
per annum change from prior period (%)			203.82%	-12.85%	-36.76%	-67.95%	135.93%	-21.26%	17.33%	1.18% 16.03%
Aggregate Obsolete Scrap Reservoir (10-40 year)	129.45	256.59	376.27	537.74	589.63	647.05	702.27	749.85	1205.18	1726.26
per annum change from prior period (%)			8.87%	8.35%	10.51%	9.65%	9.74%	8.53%	6.78%	6.04% 7.83%
Ratio: Obsolete Scrap Requirement to Aggregate Scrap Reservoir	0.00	0.02	0.04	0.01	0.00	0.01	0.01	0.01	0.02	0.02
Available Scrap Reservoir Size (10-40 Year)	4.18	8.28	12.14	17.35	19.02	20.87	22.65	24.19	38.88	55.69
per annum change from prior period (%)			8.87%	8.35%	10.51%	9.65%	9.74%	8.53%	6.78%	6.04% 7.83%
Ratio: Obsolete Scrap Requirement to Average Scrap Reservoir (10-40 year)	0.05	0.67	1.33	0.43	0.13	0.27	0.20	0.21	0.57	0.50
Annual Addition to the Scrap Reservoir	22.49	56.92	67.84	89.18	78.15	84.78	102.54	121.05	152.61	201.23
Total Low Residual Scrap Generated	3.82	7.15	10.58	10.50	8.63	10.54	11.74	13.41	28.48	40.54
Low Residual Scrap via the BOF	1.93	3.13	3.59	4.56	4.18	5.07	5.47	6.02	12.07	17.46
Low Residual Scrap via New Scrap	1.86	3.19	4.58	4.82	4.09	4.63	5.60	6.61	13.07	18.92
Low Residual Scrap via Obsolete Scrap	0.03	0.83	2.42	1.12	0.36	0.84	0.66	0.78	3.33	4.15
Total Low Residual Scrap Usage	2.25	8.70	12.73	10.87	8.04	10.68	10.94	12.40	27.58	37.83
Low Residual Scrap usage BOF	0.45	3.64	3.22	4.08	3.44	4.45	4.65	5.28	16.81	26.12
Low Residual Scrap usage EAF	1.27	4.82	9.51	6.79	4.60	6.23	6.29	7.12	10.77	11.71
Low Residual Scrap Usage OH	0.53	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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As a result, India's obsolete steel scrap reservoir has been largely untapped:

Pig iron and DRI are the preferred metallics charge given India's abundant domestic supply of high-quality iron ore. Although India has relatively poor domestic sources of high-quality metallurgical coal, producers have been innovative in blending low volatility coals in their coke batteries and in using non-metallurgical grade coals to provide reducing gases for their rotary kilns.

- A slight imbalance in trade of finished steel products implies that India's generation of new steel scrap has been slightly lagging the growth of crude steel production. Since 2010, new scrap generation has grown at an average rate of 4.3% per annum compared to an average growth rate of 5.7% per annum for crude steel.

WSD estimates the average size of India's obsolete scrap reservoir may grow from about 24.2 million tonnes in 2023 to about 55.7 million tonnes in 2035 – a compounded average growth of 7.2% per annum. Comparatively, India's obsolete scrap requirement may grow 15.0% per annum from 5.2 million tonnes in 2023 to about 27.7 million tonnes in 2035; nevertheless, this results in a surplus of about 28 million tonnes.

Steady growth in India's obsolete scrap reservoir is a function of apparent consumption of steel 10-40 years prior. The growth rate of new scrap generation may increase to 5.1% per annum between 2023 and 2035, compared to 4.3% per annum growth between 2010 and 2023; thus, India's growing supply of obsolete and new scrap may prevent Indian steelmakers from being increasingly dependent on foreign scrap imports. The GMB calculates that Indian steel scrap imports will in effect be stagnant at 4.6 million tonnes in 2035 versus 4.8 million tonnes in 2023.

This report includes forward-looking statements that are based on current expectations about future events and are subject to uncertainties and factors relating to operations and the business environment, all of which are difficult to predict. Although we believe that the expectations reflected in our forward-looking statements are reasonable, they can be affected by inaccurate assumptions we might make or by known or unknown risks and uncertainties, including among other things, changes in prices, shifts in demand, variations in supply, movements in international currency, developments in technology, actions by governments and/or other factors.

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WORLDSTEELDYNAMICS

WSD's Global Metallics Balance System (GMB) calculates that the total metallics requirement in 2023 for steelmaking and foundry production was about 180.6 million tonnes. This requirement was comprised of:

- Pig iron (inclusive of hot-metal and merchant pig iron) consumption of 90.7 million tonnes, or 50.2% of the total metallics requirement;
- Steel scrap supplements (inclusive of sponge iron and merchant HBI) consumption of 48.5 million tonnes, or 26.9% of the total metallics requirement;
- Steel scrap consumption of 41.4 million tonnes, or 22.9% of the total metallics requirement.

In the period from 2010 to 2019, Indian crude steel production and the total requirement for steelmaking metallics rose at an average compounded rate of 5.6% and 5.5% per annum, respectively. A noticeable shift in steelmaking methodologies could be observed during this period:

- BOF production accounted for 38% of total crude steel production in 2010 versus 44% of the total in 2019.
- EAF production accounted for 60% of total crude steel production in 2010 versus 56% of the total in 2019.

WSD expects that the demographics of steelmaking capital investment going forward will continue to evolve the current balance in the direction of a BOF-dominant sector. In 2035, the GMB forecast assumes:

- BOF production will account for about 72% of crude steel production
- EAF production will account for about 28% of crude steel production

Pig Iron

Indian steelmaker's pig iron requirement has expanded from 38 million tonnes in 2010 to 91 million tonnes in 2023 – a compounded average growth rate of 6.9% per annum. This is roughly in line with the 7.2% per annum average growth rate of BOF steel output during this time, which has increased to 64.3 million tonnes in 2023 versus 26.0 million tonnes in 2010.

In 2023, Indian steelmakers and merchant pig iron manufacturers produced 91.3 million tonnes of pig iron, of which 0.62 million tonnes were exported and the remaining 90.7 million tonnes were consumed domestically. The GMB calculates that the breakdown of pig iron consumption was as follows:

- BOF steelmakers consumed 67.8 million tonnes
- EAF steelmakers consumed 19.5 million tonnes
- Foundry producers consumed 3.5 million tonnes

WORLDSTEELDYNAMICS

Appendix: Commentary by Wu Wenzhang, Chairman of Shanghai SteelHome

Future Trends in China's Steel Industry and

Market Outlook for 2024 and 2025

Wu Wenzhang, Shanghai SteelHome

18 June 2024, New York

In 2024-2025, China aims for GDP growth to exceed 5%.

In 2024-2025, China's steel consumption is expected to remain stable or grow slightly in most industries, except for real estate and infrastructure which may decline.

In 2024-2025, the Chinese government will continue regulating the total crude steel output in the steel industry, while the demand for iron ore and coking coal in China's steel industry is expected to decline.

Forecast for steel and iron ore prices in the Chinese market for 2024-2025.



I. Future Development Trends in China's Steel Industry

2. China's steel industry is entering the third stage of its lifecycle—maturity.

2.2 China's real estate sector is in a phase of deep adjustment, while infrastructure development is advancing into a phase of optimization. Steel consumption in China's construction industry is on a downward trend.

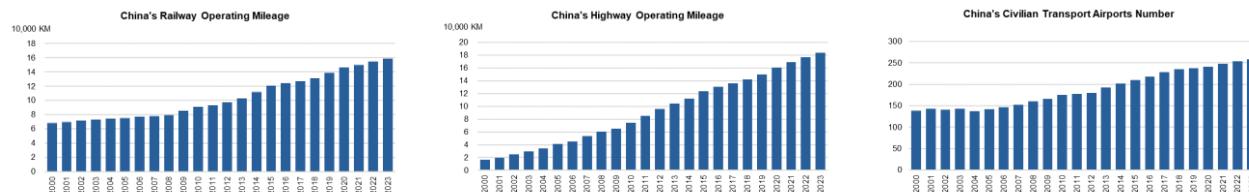


Table. Changes in China's Transportation Infrastructure Mileage (2000-2023)

Year	2000	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	2027	2035
Railways, Ten Thousand KM	6.87	9.12	12.1	12.4	12.7	13.1	13.9	14.63	15	15.5	15.9	17	20
Annual Average Increase, Ten Thousand KM	2001-2010: 0.23				2011-2020: 0.55				2021-2023: 0.42			2024-2027: 0.28	2028-2035: 0.38
Including: High-speed Rail, KM	0	8358	19000	22000	25000	29000	35000	38000	40000	42000	45000	53000	70000
Annual Average Increase, KM	2001-2010: 836				2011-2020: 2964				2021-2023: 2333			2024-2027: 2000	2028-2035: 2125
Highways, Ten Thousand KM	1.63	7.41	12.35	13.1	13.64	14.26	14.96	16.1	16.91	17.73	18.4		27
Annual Average Increase, Ten Thousand KM	2001-2010: 0.58				2011-2020: 0.87				2021-2023: 0.77			2024-2035: 0.72	
Civilian Airports	139	175	210	218	229	235	238	241	248	254	259	280	400
Annual Average Increase	2001-2010: 3.6				2011-2020: 6.6				2021-2023: 6.0			2024-2027: 5.3	2028-2035: 15

Source from CNBS, SteelHome

WORLDSTEELDYNAMICS



I. Future Development Trends in China's Steel Industry

2. China's steel industry is entering the third stage of its lifecycle—maturity.

2.3 China is currently undertaking a project to modernize and upgrade its manufacturing sector, promoting its transformation towards high-end, intelligent, and eco-friendly processes. This indicates that there is still potential for increased steel consumption in China's manufacturing industry.

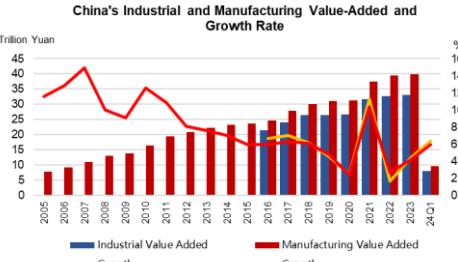
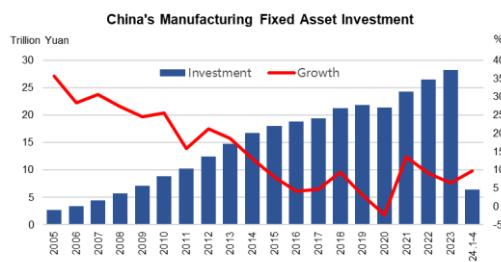


Table. China's Manufacturing Fixed Asset Investment and Manufacturing Value Added (2000-2024)

	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Jan-Apr, 2024
Manufacturing Fixed Asset Investment, Trillion Yuan		2.6576	8.8619	18.0365	18.7836	19.3616	21.201	21.8582	21.3773	24.2632	26.4712	28.1918	6.4174
Growth Rate, %		35.7	25.5	8.1	4.2	4.8	9.5	3.1	-2.2	13.5	9.1	6.5	9.7
Industrial Value Added, Trillion Yuan	4.0259	7.7958	16.5123	23.6506	24.7878	27.8328	30.1089	31.1859	31.2903	37.4546	39.5044	39.9103	9.64 (Q1)
Growth Rate, %	9.9	11.6	12.6	6	6	6.3	6.1	4.8	2.4	10.4	2.7	4.2	6 (Q1)
Manufacturing Value Added, Trillion Yuan				21.4289	24.0505	26.482	26.4137	26.6418	31.6581	32.6077	33.0028	33.0028	8.01 (Q1)
Growth Rate, %					6.7	7	6.2	4.6	2.5	11.3	1.7	4.4	6.4 (Q1)

Source from CNBS, SteelHome



I. Future Development Trends in China's Steel Industry

2. China's steel industry is entering the third stage of its lifecycle—maturity.

2.4 The Chinese government will continue to strictly control steel production capacity and output, and impose stringent restrictions on steel exports. In the future, direct exports of steel will decrease while indirect exports will increase. China's steel industry will continue to strengthen market-driven mergers and restructurings, leading to further increases in industry concentration.

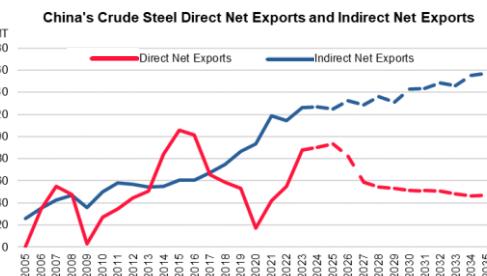
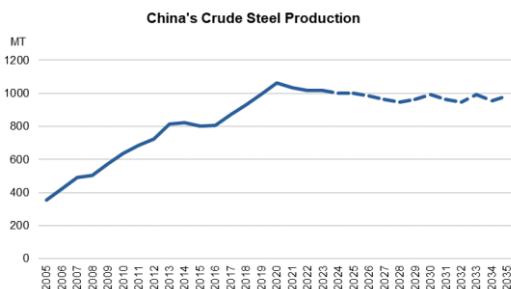


Table. China's Crude Steel Production and Direct Net Exports, Indirect Net Exports in 2035

Year	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	2035E
Crude Steel Production, MT	353.24	637.23	803.83	807.61	870.74	929.04	996.34	1064.77	1035.24	1017.96	1019.08	950-1000
Direct Net Exports, MT	0.25	27.18	105.72	101.59	65.8	58.79	53.01	17.11	41.74	54.76	87.9	45-50
Indirect Net Exports, MT	25.81	50.14	60.6	60.48	67.65	74.5	86.38	93.54	118.48	114.3	126.35	150

Source from CNBS, Customs, SteelHome

WORLDSTEEL DYNAMICS



I. Future Development Trends in China's Steel Industry

3. Four Key Trends in the High-Quality Development of China's Steel Industry.

3.2 China's steel industry will ramp up the comprehensive utilization of scrap steel. By 2025, EAF steel is set to account for 15% of crude steel production, projected to rise to 20-30% by 2035. Approximately 20% of scrap steel will be utilized in BF-BOF processes, leading to a gradual decline in China's demand for iron ore in the future.

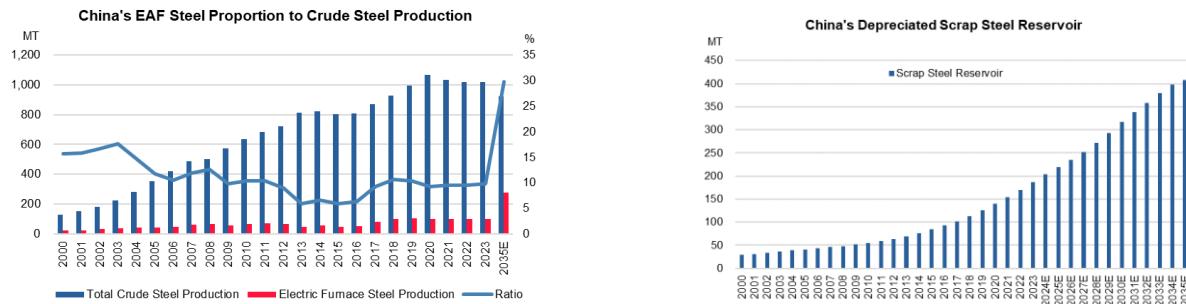


Table. China's Electric Arc Furnace Steel Ratio and Scrap Steel Reservoir (2000-2023)

Year	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	2035E
Crude Steel Production, MT	128.5	353.2	637.2	803.8	807.6	870.7	929	995.4	1064.8	1035.2	1018	1019.1	950-1000
EAF Steel Production, MT	20.2	41.8	66.3	47.5	50.9	80.7	99	102.5	98	98.3	96.7	100	200-300
Ratio, %	15.7	11.8	10.4	5.9	6.3	9.3	10.7	10.3	9.2	9.5	9.5	9.8	20-30
Depreciated Scrap Steel Reservoir, MT	30	40.9	54.7	84.1	92.7	102.4	112.5	125.6	139.4	153.92	169.29	186.81	407.52

Source from CNBS, SteelHome



II. Market Outlook for China's Steel Industry in 2024 and 2025

1. In 2024-2025, China aims for GDP growth to exceed 5%.

In 2024 and 2025, China's GDP growth rates are expected to be 5% and 5.2%, respectively. Fixed asset investment will rise by 5% in 2024 and 6% in 2025, while foreign trade exports are projected to grow by 4%-5% annually. Retail sales of consumer goods are forecasted to increase by 5% in 2024 and 6% in 2025. Real estate development investment in 2025 is anticipated to stabilize.

Table. Forecast of Key Economic Indicators in China for 2024-2025

Year	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Jan-Apr., 2024	2024E	2025E
Gross Domestic Product (GDP), Trillion Yuan	10.03	18.73	41.21	68.89	74.64	83.20	91.93	98.65	101.36	114.92	120.47	126.06	29.63	132.00	138.34
Growth Rate, %	8.5	11.4	10.6	7	6.8	6.9	6.7	6	2.2	8.4	3	5.2	5.3 (Q1)	5	5.2
Industrial Added Value, Trillion Yuan	4.03	7.80	16.51	23.50	24.54	27.51	30.11	31.19	31.29	37.45	39.50	39.91	9.64	41.30	43.00
Growth Rate, %	9.9	11.6	12.6	5.7	5.7	6.2	6.1	4.8	2.4	10.4	2.7	4.2	6.0	6	6
Fixed Asset Investment, Trillion Yuan	2.62	6.85	19.00	33.74	36.21	38.54	40.82	43.01	44.28	46.47	48.85	50.30	14.34	52.80	56.00
Growth Rate, %	10.5	23.5	21	9	7.3	6.4	5.9	5.4	2.9	4.9	5.1	3	4.2	5	6
Real Estate Development Investment, Trillion Yuan	0.50	1.59	4.75	9.05	9.64	10.28	11.20	12.26	13.08	13.63	12.27	11.09	3.09	10.04	10.04
Growth Rate, %	21.5	20.9	32.3	0.8	6.7	6.8	9.1	9.7	6.8	4.3	-10	-9.6	-9.8	-9.5	0
Infrastructure Construction Investment, Trillion Yuan	0.88	1.59	5.02	10.13	11.89	14.00	14.53	15.08	15.22	15.28	16.72	17.70	4.47	18.76	19.90
Growth Rate, %	7.1	24.9	22	17.2	17.4	19	3.8	3.8	0.9	0.4	9.4	5.9	6	6	6
Manufacturing Fixed Asset Investment, Trillion Yuan		2.66	8.86	18.04	18.78	19.36	21.20	21.86	21.38	24.26	26.47	28.19	6.42	31.00	34.10
Growth Rate, %		35.7	25.5	8.1	4.2	4.8	9.5	3.1	-2.2	13.5	9.1	6.5	9.7	10	10
Total Retail Sales of Consumer Goods, Trillion Yuan	3.91	6.84	15.70	30.09	33.23	36.63	38.10	41.16	39.20	44.08	43.97	47.15	15.60	49.50	52.47
Growth Rate, %	9.7	14.9	18.3	10.7	10.4	10.2	9	8	-3.9	12.5	-0.2	7.2	4.1	5	6
Foreign Trade Export Volume, Trillion Yuan	2.06	6.26	10.70	14.12	13.84	15.33	16.41	17.24	17.93	21.43	23.74	23.77	7.81	24.85	26.00
Growth Rate, %	27.7	27.6	30.5	-1.9	-1.9	10.8	7.1	5.0	4.0	19.5	10.8	0.1	4.9	4-5	4-5

Source from CNBS, Customs, SteelHome

WORLDSTEELDYNAMICS



II. Market Outlook for China's Steel Industry in 2024 and 2025

1. In 2024-2025, China aims for GDP growth to exceed 5%.

Table. Forecast of Output in China's Major Downstream Industries for 2024-2025

Year	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Jan-Apr., 2024	2024E	2025E
Automobile Production, Million Units	2.07	5.7	18.27	24.5	28.12	29.02	27.83	25.68	25.32	26.26	27.14	30.11	8.98	31	32
Growth, %	13	12.1	32.4	3.3	14.8	3.2	-4.1	-7.7	-1.4	3.7	3.3	11	7.7	2.9	3
Large and Medium-sized Tractors, Thousand Units	41	163	337	688	618	344	262	281	345	412	400	380	156	349.6	310
Growth, %	-37.3	43.5	-9.3	6.9	-10.1	-44.3	-23.9	7.1	22.9	19.3	-3	-4.9	-7.7	-8	-10
Shipbuilding Completion Volume, Million DWT	2.24	12.12	65.6	41.84	35.32	42.68	34.58	36.72	38.53	39.7	37.86	42.32	13.05	52.9	63.5
Growth, %	10	37.7	54.6	7.1	-15.6	20.8	-19	6.2	4.9	3	-4.6	11.8	23.6	25	20
Metal Containers, Million Cubic Meters	58.64	72.64	73.61	115.16	99.86	103.48	111.75	72.36	98.64	230.58	147.58	101.89	59.65	147.7	155.09
Growth, %	39.5	-16.8	228.9	-11.5	-13.3	3.6	8	-35.2	36.3	133.8	-36	-31	133.1	45	5
Household Refrigerators, Million Units	12.79	29.87	72.96	79.93	84.82	83.14	81.09	79.04	90.15	89.92	86.64	96.32	32.86	106	114.5
Growth, %	5.7	-0.7	23	-9.1	6.1	-2	-2.5	-2.5	14	-0.3	-3.6	11.2	14.1	10	8
Room Air Conditioners, Million Units	18.27	67.65	108.87	142	143.42	178.62	209.56	218.66	210.35	218.36	222.47	244.87	99.14	281.6	315.4
Growth, %	36.6	5.9	34.8	-1.8	1	24.5	17.3	4.3	-3.8	3.8	1.9	10.1	17.6	15	12
Household Washing Machines, Million Units	14.43	30.36	62.48	72.75	76.21	75.01	72.62	74.33	80.42	86.19	91.06	104.58	35.46	113	120
Growth, %	7.5	19.8	25.6	2.3	4.8	-1.6	-3.2	2.4	8.2	7.2	5.7	14.8	10.3	8	6

Source from CNBS, Customs, SteelHome



II. Market Outlook for China's Steel Industry in 2024 and 2025

3. In 2024-2025, the Chinese government will continue regulating the total crude steel output in the steel industry, while the demand for iron ore and coke in China's steel industry is expected to decline.

Projected for 2024, China's **crude steel production** is expected to reach **1 billion tons**, down by 1.9% year-on-year, and steel production to reach 1.34 billion tons, down by 1.7%. Imports are forecasted to be 7.5 million tons, with **exports** reaching **100 million tons**. Apparent consumption of crude steel and steel is projected to be 900 million tons and 1.248 billion tons respectively, down by 3.2% and 2.5%. In 2025, China's steel consumption is expected to remain stable compared to 2024.

Table. Forecast of China's Crude Steel and Steel Products Output, Import and Export Volume, and Apparent Consumption for 2024-2025

Year	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Jan-Apr., 2024	2024e	2025e	
Production	Crude Steel, MT	128.5	353.24	637.23	803.83	807.61	870.74	929.04	996.34	1064.77	1035.24	1017.96	1019.08	343.67	1000	985
	Growth, %	3	24.9	11.4	-2.2	0.5	7.8	6.7	7.2	7	-2.8	-1.7	0	-3	-1.9	-1.5
	Steel Products, MT	131.46	377.71	802.77	1034.68	1048.13	1046.42	1132.87	1204.77	1324.89	1336.67	1340.34	1362.68	451.03	1340	1325
	Growth, %	8.6	18.1	15.7	-8	1.3	-0.2	8.3	6.3	10	0.9	-0.8	1.7	2.9	-1.7	-1.1
Import	Steel Products, MT	15.96	25.82	16.43	12.78	13.21	13.3	13.17	12.3	20.23	14.27	10.57	7.65	2.41	7.5	7.5
	Steel Semis, MT	4.75	1.31	0.64	0.26	0.25	0.51	1.05	3.06	18.33	13.72	6.37	3.27	1.01	3	3
Export	Steel Products, MT	6.21	20.52	42.45	112.4	108.93	75.43	69.34	64.29	53.54	66.9	67.32	90.26	35.02	100	85
	Steel Semis, MT	4.34	7.07	0.14	0.01	0.01	0.01	0.01	0.03	0.02	0.04	1.03	3.28	0.85	2.5	2
Apparent Consumption	Crude Steel, MT	139.29	353.12	610.05	698.1	706.02	805.15	870.32	944.06	1047.65	992.94	962.93	931.18	309.12	902.1	903.55
	Growth, %	3.1	19	7.1	-5.4	1.1	14	8.1	8.5	11.2	-5.2	-3.1	-3.5	-5.6	-3.1	0.2
	Steel Products, MT	141.22	383.01	776.75	935.06	952.41	984.29	1076.7	1152.78	1291.59	1284.04	1283.59	1280.07	418.41	1247.5	1247.5
	Growth, %	6.8	14.4	13	-10.6	1.9	3.3	9.4	7.1	12.1	-0.6	-1.2	-0.3	1.3	-2.5	0

China's steel output is influenced by domestic production controls, while export volume is dictated by global market demand.

Source from CNBS, Customs, SteelHome

WORLDSTEELDYNAMICS



II. Market Outlook for China's Steel Industry in 2024 and 2025

3. In 2024-2025, the Chinese government will continue regulating the total crude steel output in the steel industry, while the demand for iron ore and coke in China's steel industry is expected to decline.

Table. Forecast of China's Pig Iron, Coke, and Iron Ore Production, Import and Export Volume, and Apparent Consumption for 2024-2025

Year	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023	Jan-Apr, 2024	2024e	2025e	
Production	Pig Iron, MT	131.01	343.75	597.33	691.41	702.27	713.62	779.88	809.37	887.52	868.57	863.83	871.01	284.99	860	850
	Growth, %	4.5	28.1	8	-3.1	1.6	1.6	9.3	3.8	4.3	-4.3	-0.8	0.7	-4.3	-1.3	-1.2
	Coke, MT	121.84	265.12	386.58	448.23	449.11	431.43	448.34	471.26	471.16	464.46	473.44	492.6	158.48	485	480
	Growth, %	0.9	28.6	8.2	-6.6	0.2	-3.9	3.9	5.1	0	-2.2	1.3	3.6	-2.1	-1.5	-1
	Iron Ore, MT	222.56	420.49	1071.56	1381.29	1280.89	1229.37	763.37	844.36	866.72	980.53	967.87	990.56	368.87	1050	1080
	Growth, %	6.3	35.6	21.6	-7.7	-3	7.15	-3.07	4.9	3.7	9.4	-1	7.1	14	6	2.9
Import	Iron Ore, MT	69.97	275.23	618.63	952.72	1024.12	1074.74	1064.47	1068.95	1170.37	1124.32	1106.86	1179.06	411.82	1150	1100
	Coke, MT	0.0001	0.0005	0.1095	0.0038	0.0004	0.0097	0.0909	0.523	2.98	1.33	0.514	0.24	0.032	0.1	0.1
Export	Coking Coal, MT	0.34	7.19	47.24	47.2	59.31	69.9	64.98	74.64	72.56	54.7	63.84	102.51	37.84	105	100
	Coke, MT	15.2	12.76	3.35	9.85	10.21	8.09	9.85	6.525	3.49	6.44	8.93	8.79	3.33	7.5	6
	Iron Ore, MT	0.0006	0.0019	0.025	0.11	0.66	5.45	11.09	15.61	15.64	23.34	22.32	21.48	7.38	25	25
	Coking Coal, MT	6.47	5.26	1.14	0.96	1.2	2.3	1.08	1.4	0.87	0.09	0.25	0.37	0.26	0.5	0.5
Supply	Coke, MT	106.64	252.35	383.34	438.38	438.91	423.35	438.58	465.26	470.65	459.35	465.02	484.05	155.18	477.6	474.1
	Growth, %	-3.7	31.9	7.4	-7	0.1	-3.5	3.6	6.1	1.2	-2.4	0.6	3.6	-2.6	-1.3	-0.7

China's iron ore demand will decrease yearly, with recent import rises tied to declining ore quality.

Source from CNBS, Customs, SteelHome



II. Market Outlook for China's Steel Industry in 2024 and 2025

4. Forecast for steel and iron ore prices in the Chinese market for 2024-2025

In 2024, the average price of common **hot-rolled steel** (Shanghai) in China is forecasted to be between **3700-3800 yuan per ton**, a decrease of 200 yuan per ton from 2023. The average price in 2025 is expected to remain stable compared to 2024. The **import price of iron ore** (62%) in China is projected to be **\$110 per ton** in 2024, down by \$10 per ton from 2023, and \$90-100 per ton in 2025, a decrease of \$10-20 per ton from 2023.

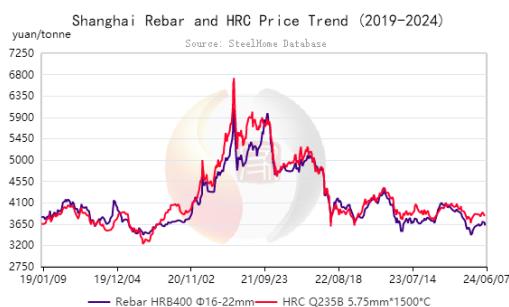


Table. Forecast of China's Hot Rolled Steel and Iron Ore Prices for 2024-2025

Average Price	2019	2020	2021	2022	2023	Jan.1-Jun.7, 2024	2024e	2025e
Rebar, yuan/t	3887	3721	5029	4388	3905	3715	3700	3700
Hot Rolled Coil, yuan/t	3783	3818	5326	4420	4008	3892	3800	3800
Iron Ore Import, USD/t	93	109	161	120	119	119	110	100

Source from SteelHome



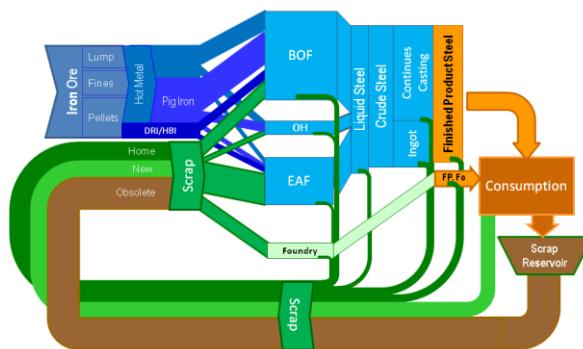
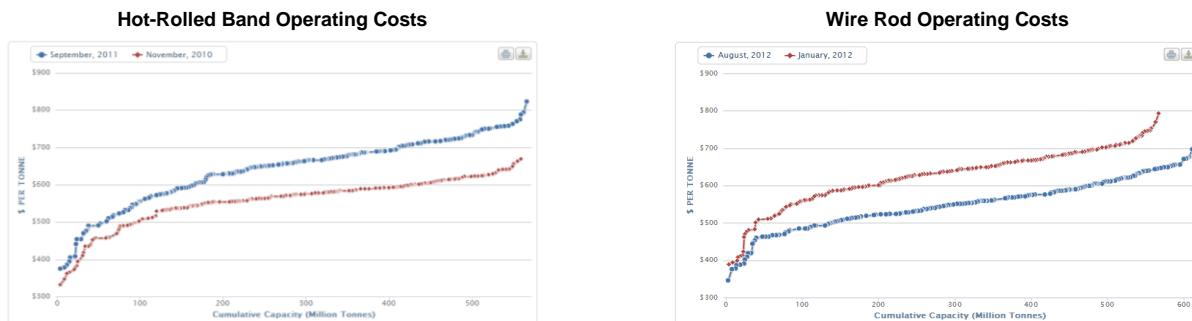
Global Steel Information System (GSIS)

Interactive Web-Based Data Platform

WSD has created the **Global Steel Information System (GSIS)** – a multi-dimensional platform of data driven interactive products to meet your marketing, operational and strategic needs. The all-encompassing suite of “real-time” tools enables the steel industry planner, analyst or advisor to find the inflection points in the ever-changing structure of the industry. Stay ahead of the curve with *monthly updates of all key factors* impacting the industry dynamics. The system permits direct download into Excel for your own analysis and manipulation.

The existing and soon to be developed components of the GSIS include:

- ❖ World Cost Curve for Steel Sheet
- ❖ World Cost Curve for Billet/Wire Rod
- ❖ World Cost Curve for Plate
- ❖ Global Metallics Balances System
- ❖ Plantfacts Capacity Database
- ❖ Tradeflow Analytics



The Interactive Global Steel Information System is priced at \$35,000 annually.

Please contact Philipp Englin or Adam Green for additional information
 Tel: (201) 503-0900 e-mail: wsd@worldsteeldynamics.com
 or visit <http://gsis.worldsteeldynamics.com>



WSD Consulting

The combination of experience, information and insight that World Steel Dynamics brings to its consulting services is unparalleled in the industry. World Steel Dynamics Consulting provides highly customized advisory services to US and international steelmakers, customers, raw material and other suppliers, banks, private equity, unions, governments – the full range of stakeholders with an interest in the strategic issues facing the industry. Our Consulting group draws upon the information and resources of the entire World Steel Dynamics enterprise, whose professionals have more than 250 years of combined experience in serving the needs of the international steel industry.

In recent years, the steel industry has experienced feast, famine and every state in between. We expect sustained (if erratic) long-term growth in steel demand on a global basis with continued modernization and urbanization of developing economies acting as the key driver; however, this masks dramatic differences between world regions. Steel industry conditions in slow growth economies suggest the need for facility rationalization and cost control. Developing economies will experience continued growth in demand and capacity, but must consolidate, modernize and control raw material costs. All steel and raw material suppliers must make informed decisions about new capacity to ensure economic operations. Volatility in raw material and energy costs promise continued uncertainty both on an intra and inter regional basis with respect to the competitiveness of specific operations. Overall, the industry is subject to many cyclical and structural forces, and successful companies must adapt to and exploit these forces.

Our consulting team can draw upon the world's most comprehensive data and analysis of industry, company, and plant performance. This allows us to put firms and individual plants in a detailed competitive context, identify key gaps in performance, and develop options to improve overall operating and financial results. With our extensive network of specialized contacts and partners, we can provide a full range of consulting capabilities that includes: price and cost benchmarking, new market and product planning, asset and business evaluations, market and competitive positioning studies, and mill viability analyses.

Please contact WSD to discuss your specific consulting needs.

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Interactive Web-Based Plantfacts Capacity Database

Powered by data from the Stahl Institut VDEh Plantacts – an unparalleled database with over 35 years of accumulated information – WSD's online interactive system allows users to understand the global landscape of steelmaking capacity on both a macro and micro level. The system gives users access to in-depth equipment detail for over 12,000 facilities in 110 countries.

For each facility, steelmaking equipment is categorized into as many as 36 equipment types, providing users with information detailing the entire steelmaking supply chain ranging from pelletizing and coke making to steelmaking furnace specifications and finished product capabilities. Equipment data includes essential information on start-up and modernization dates, nominal capacity, operating status, equipment manufacturer and other technical equipment specifications. Details for announced capacity changes (i.e., announced closures, expansion of existing facilities and Greenfield plant development) are noted where available. Such is the depth and breadth of WSD's online system.

Key features of the Plantfacts Capacity system include:

- ❖ **Quarterly updates**
- ❖ **36 steelmaking equipment types**
- ❖ **110 countries represented**
- ❖ **12 Regional groupings**
- ❖ **Over 12,000 facilities**
- ❖ **Excel download capability**



Please contact Philipp Englin for information on access and pricing

Tel: (201) 503-0900 e-mail: wsd@worldsteeldynamics.com

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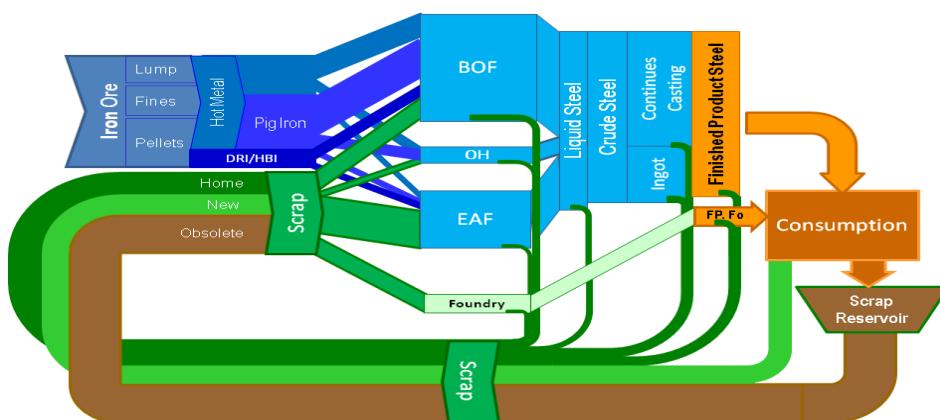
Interactive Web-Based Global Metallics Balance System

The real world factors driving steelmakers' pricing volatility are now instantaneously available in the newly constructed online version of WSD's *Global Metallics Balance System*. The immense complexity of one of the most important driving forces in the steel industry has been synthesized into a user friendly interactive web-based application.

The *Interactive GMB* is **updated monthly** and supported by a historical database comprised of best-in-class sources covering detailed country-by-country steel production and raw material consumption, trade and production. Users have the ability to manipulate as many as **15 key factors/variables** in the model across a 15-year forecast period, including:

- Crude steel production by methodology and by country/region
- Trade balances of finished and finished steel products
- Trade balances of scrap, iron ore, coal, pig iron and DRI
- Coke and PCI usage in steelmaking

Having accessed the *Global Metallics Balance* online system, users have the ability to view WSD's most recent forecast, customize and alter the forecast to their own specifications, or simply browse the vast historical database of production and trade data at the core of the system. Should the user wish to experiment with scenarios of his choosing, the system processes and stores the new results which may be viewed and quickly compared to the base WSD forecast. The *GMB* output is available at various levels of geographic granularity – from individual country to various regional/economic aggregations. The system offers a variety of graphical and analytical displays, and all *GMB* data is easily exportable to Microsoft Excel.



To see the utility of our new system for yourself, please view this brief video demonstration:

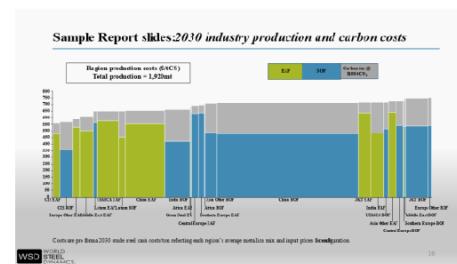
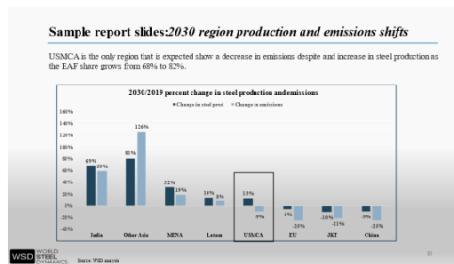
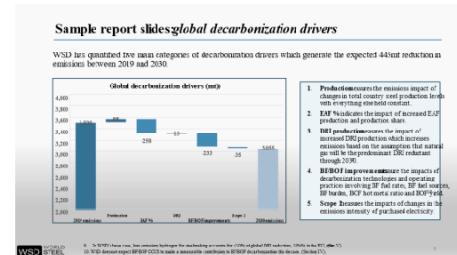
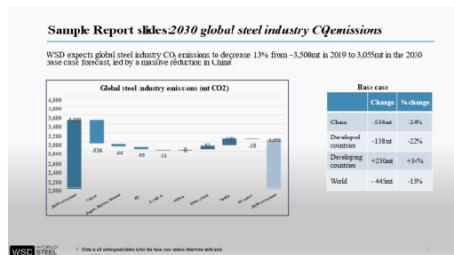
[Global Metallics Balance Demonstration Video](#)

The **Interactive Global Metallics Balance** is priced at \$15,000 annually.

Steel Decarbonization Dynamics Service (SDDS)

The Steel Decarbonization Dynamics Service (SDDS) is a comprehensive information package focused on the global steel industry's decarbonization challenge that consists of analyses, forecasts and customizable models with an outlook to 2030, 2040 and beyond. It differs from the ever-increasing number of steel industry decarbonization reports in three key ways:

- Our **Reports** focus not on what *could happen or what needs to happen*, but rather on what *is likely to happen... and why*.
- Our **proprietary model** provides a holistic assessment of CO₂ emissions, cost structures, raw materials balances, and energy requirements as a function of technologies, operating practice changes, and market dynamics.
- As a supplement to the Reports, SDDS includes a **data package** derived from our proprietary model and delivered to you in an excel file that is updated several times per year.
- The Service offers the opportunity for the user to create **customized scenarios** by manipulating hundreds of inputs (country/region/plant-specific)
- The Decarbonization Projects Database includes an active database of major industry investments in steel decarbonization projects.



The **Steel Decarbonization Dynamics Service** is priced at \$15,000 annually.

Please contact Mary Connors for additional information
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 or visit www.worldsteeldynamics.com/services/usa-steel-dynamics/



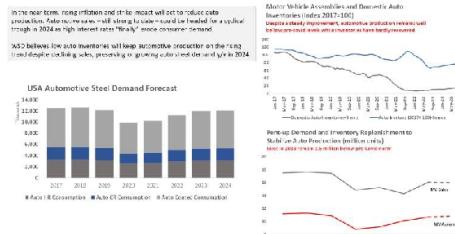
USA Steel Dynamics Service

WSD is pleased to introduce USA Steel Dynamics – an extensive data, analytics and forecasting service that seeks to provide a comprehensive outlook of USA steel sheet market evolution on a near and long-term basis. With our reports and data package, you will have access to first-hand insights into the factors driving USA steel demand, supply, pricing dynamics, and industry profitability. This information will help you plan your strategy, budget for the short, medium, and long term, and ensure that your business will stay ahead of the curve.

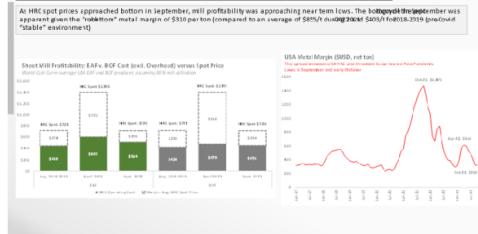
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\$6,200 for Report + Data Package + Steel and Scrap Prices

Please contact Mary Connors for additional information
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