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Global Iron Ore Mining Outlook

26 Aug 2021

Global

Iron Ore

Key View

- Global iron ore production growth will accelerate over 2021-2025 after stagnating during the previous five years.
- Continued, albeit slower growth in Australia, faster growth in Brazil and stabilisation in China's ore output will be the main drivers of growth.
- China will invest heavily in overseas mines in order to improve security of iron ore import supply. Guinea will be an important beneficiary of this trend via the Simandou project.

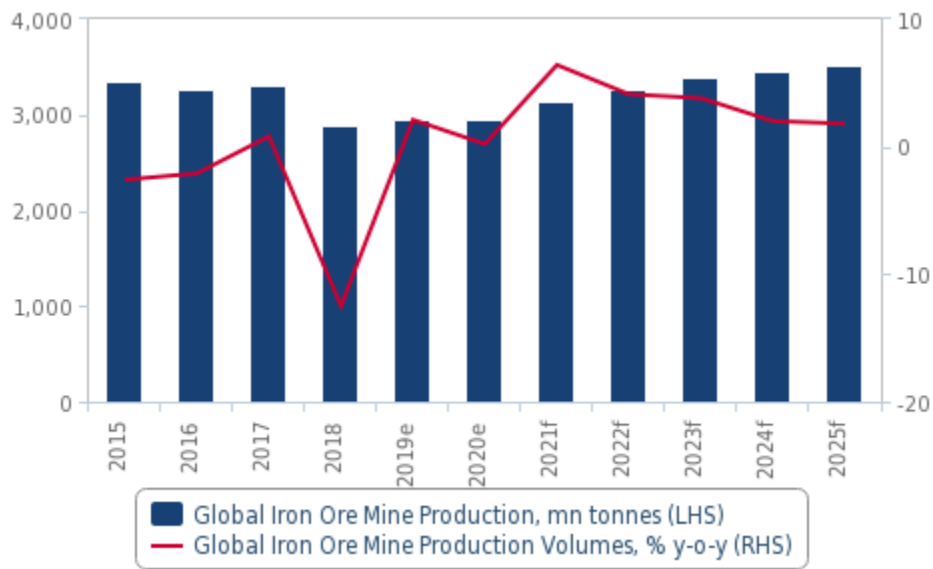
Global iron ore production growth will accelerate in the coming years, bringing an end to the stagnation that has persisted since iron ore prices hit a decade-low average of USD55.0/tonne in 2015. We forecast global mine output growth to average 3.6% over 2021-2025 compared to -2.3% over the previous five years. This would lift annual production by 571mn tonnes in 2025 compared to 2020 levels, roughly the equivalent of India and Brazil's combined 2020 output.

Supply growth will be primarily driven by Brazil and Australia. Brazilian miner **Vale** has aggressive expansion plans, while miners in Australia including **BHP Billiton**, **Rio Tinto** and **Fortescue** will re-invest currently buoyant profits into additional production. In China, iron ore production will rise once again in the next 3-4 years as the country works to increase its self sufficiency and reduce Australian imports, having declined significantly over recent years. . Nonetheless, as China's miners operate at the higher end of the iron ore cost curve and domestic ore grades will continue to decline, we expect Chinese firms to prioritise investment in overseas iron ore mines, such as the enormous Simandou deposit in Guinea.

Looking beyond 2025, we expect that lower prices will eventually drag on production growth rates. We forecast annual production growth to average just 1.1% over 2026-2030, with output levels stagnating by the end of the decade.

Output Acceleration Over 2021-2025

Global - Iron Ore Mine Production & Growth (2015-2025)



e/f = Fitch Solutions estimate/forecast. Source: USGS, Fitch Solutions

Australia

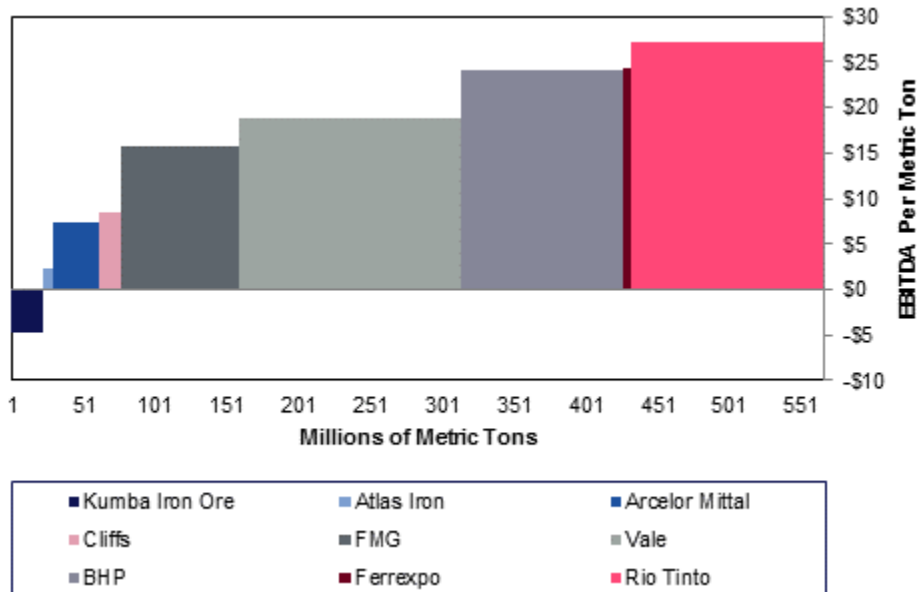
We forecast iron ore production in Australia to grow at an annual average of 1.8% over 2021-2025. While significantly slower than 3.0% over the previous five years, this would still lift annual output by 88mn tonnes compared to 2020 levels by 2025. We believe Australia's seating at the lowest-end of the global iron ore cost curve will provide a healthy buffer against falling prices in the coming years. On average, the cost of producing iron ore in Australia is USD30/tonne, compared with USD40-50/tonne in West Africa and USD90/tonne in China.

Production growth will stagnate over the longer term and we forecast production to actually peak around mid-decade at around 1.35bn tonnes. This production slowdown will be due to mothballing of mines by junior miners and a pullback in capital expenditure by larger firms as iron ore prices decline.

Majors continue to decrease costs and increase production in the longer term.

Rio To Remain Outperformer In Terms Of Efficiency

Select Iron Ore Miners - Iron Ore Production, Mnt & EBITDA Per Metric Tonne, USD



Source: Bloomberg, Fitch Solutions

Brazil

Brazil's iron ore production growth will rebound in the coming years following contraction and stagnation over 2018-2020. Low operating costs, a solid project pipeline and Brazil's high-quality iron ore increasingly favoured by Chinese steel producers will all contribute to higher output. We forecast Brazil's iron ore production to increase at annual average rate of 10.6% over 2021 to increase from 397mnt in 2020 to 542mnt in 2025. Production growth will slow over the longer term and we forecast average annual growth of 1.8% over 2026-2030, which would take annual output to 592mn tonnes by 2030.

The Brumadinho dam collapse has sparked a flurry of investigations into Vale's operations, leading to executive removals, idling operations, and fines on the horizon. The disaster triggered an initiative by Vale to decommission its remaining upstream tailings dams over the next three years, effectively cutting off 40mnt of iron ore per annum. Since the announcement, multiple operations have been idled, causing further supply disruptions. For example, the Brucutu mine (30mtpa) was idled for six weeks, allowed to reopen, then idled again days later following another court ruling, then finally reopened in June. We expect to see continued regulatory scrutiny over Vale and the iron ore sector as the government grapples with the deadliest environmental disaster in the nation's history.

In December 2020, Reuters reported the Samarco joint venture (owned by BHP and Vale) is set to restart and begin commissioning. Production is initially aimed at 26% of its 30.5mnt capacity. This announcement is in line with the previous timetable set by Vale in late 2019.

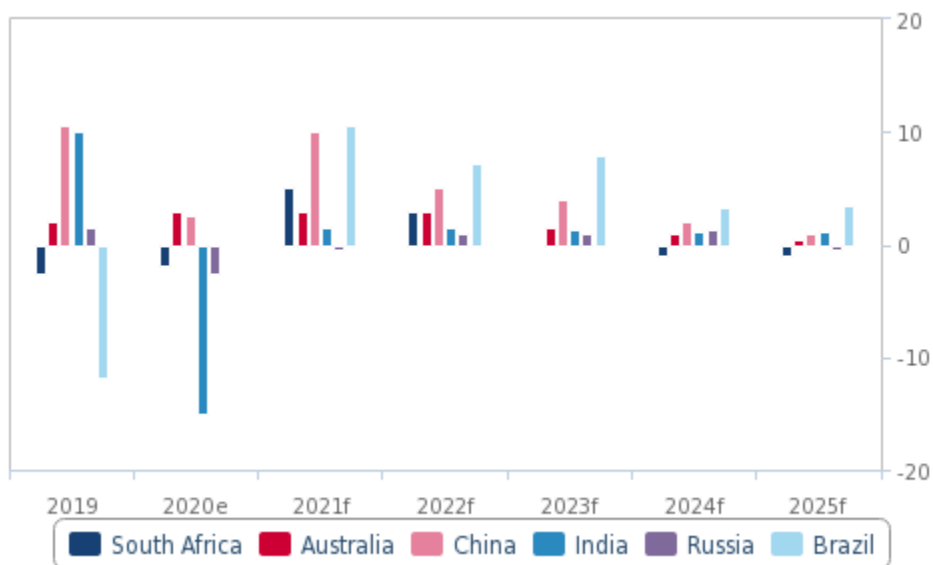
China

China's iron ore production will rise once again in the next 3-4 years as the country works to increase its self sufficiency and reduce Australian imports, having declined significantly over recent years. We forecast production to reach a peak of 1.07bnt in 2025, before declining once again. Growth in output will be prevented by weak iron ore prices and tightening environmental regulations

China's iron ore sector will become increasingly consolidated due to high costs of mining low grade ore, and environmental regulations in China that will eventually see the phasing out of iron ore used in the production of steel as electric arc furnaces and decarbonised steel take precedence. According to Bloomberg, around 70% of Chinese iron ore output is uneconomical at prices below USD96/tonne. In particular, miners operating in provinces such as Hebei, Fujian, Guangdong and Xinjiang will take the strain of lower prices due to their sitting at the highest end of the iron ore cost curve.

Brazil To Lead Growth

Select Countries - Iron Ore Production Growth, % y-o-y (2019-2025)



e/f = Fitch Solutions estimate/forecast. Source: USGS, Fitch Solutions

India

India's iron ore output growth will be supported by the removal of export taxes in the Union Budget for low-grade ores and the country's Mines & Minerals (Development & Regulation) (MMDR) Act, which will streamline licensing and reopen closed mines. Although the MMDR Act will support ore output growth, the royalties included in the Act will limit the sector's overall growth potential. As part of India's 2016 Union Budget, export duties for iron ore lumps and fines below 58% Fe content were reduced to nil from 30% and 10% respectively.

This reduction was aimed at boosting shipments from the western state of Goa where the Supreme Court lifted an earlier iron ore mining ban. However, the decision by India's top court to cancel all iron ore permits in Goa in February 2018 will mean that production from that state is likely to head lower rather than increase. As a result, we forecast India's iron ore output to grow from 174mnt in 2020 to 194mnt in 2030, with annual output growth averaging 1.1% over the period.

NEW IRON ORE PROJECTS BY CAPEX ALLOCATION

Region	Country	Mine	Primary Company	Secondary Company	Total Allocation CAPEX (USDmn)	Notes
North America	Canada	Lac Otelnuik	Wuhan Iron and Steel (60%)	Sprott Resource Holdings (40%)	14,186.4	Proved Reserves: 4943mnt; Estimated Production: 50mnt/yr; Mine Life: 30years
North America	Canada	Taconite (Millennium Iron Range)	New Millennium Iron (100%)		7,391.3	Estimated Production: 23mnt/yr; Reserves: 6317mnt; Mine Life: 25years; The project consists of LabMag, Howells Lake-Howells River North, Sheps Lake, Perault Lake, Lac Ritchie and KeMag deposits

na = not available. Source: Company announcements, Fitch Solutions Mine Projects Database

North America			Century Global Commodities Corporation				Indicated Resources: 7259.6mnt; Mine Life: 30years
Asia	Canada	Full Moon (Rainy Lake)	(81.1%)	WISCO (18.9%)	5,717.7		May 2021 - Zanaga Iron Ore Company has completed re-costing exercise at the project; Estimated Production: 30mnt/yr; Proved Reserves: 770mnt; Mine Life: 30years
Middle East	Australia	Zanaga			4,708		July 2019 - Sundance Resources has signed an agreement with AustSino Resources Group for the development of the project; Expected Production: 40mnt/yr; Probable Reserves: 517mnt; The project straddles the border of Cameroon and Republic of Congo; Mine Life: 12years; The project is 100% owned by Cam Iron S.A, a JV between Sundance Resources and Hold Co SA, on Cameroon side and 100% owned by Congo Iron S.A, an 85% owned subsidiary of Sundance Resources, on Congo side
Latin America	Saudi Arabia	Mbalam-Nabeba	Sundance Resources (90%)	Hold Co SA (10%)	4,700		March 2021 - The Government of the Republic of Congo has signed a deal with Sangha Mining Development Sasu to exploit iron ore at the project; December 2020 - The Government of the Republic of Congo has stripped Sundance Resources of its mining permit to develop the project and granted them to Sangha Mining Development Sasu; Expected Production: 40mnt/yr; Probable Reserves: 517mnt; The project straddles the border of Cameroon and Republic of Congo; Mine Life: 12years
Africa	Brazil	Mbalam-Nabeba		Sangha Mining Development Sasu	4,700		
Europe	Ghana	Duncan Lake	Century Global Commodities Corporation (65%)	Automotive Finco Corporation (35%)	4,436.6		Measured Resources: 405.6mnt; Mine Life: 20years
	Finland	Putu		Government of Liberia	3,500		January 2016 - Severstal's subsidiary, Putu Mining, has perpetually shut down its operations in Liberia due to the ongoing conflict between Ukraine and Russia, and also due to the drastic reduction in the price of Iron Ore on the world market; Resources: 4400mnt; Estimated Production: 20mnt/yr; Mine Life: 20years

na = not available. Source: Company announcements, Fitch Solutions Mine Projects Database

North America	United States	Fire Lake North	Champion Iron (100%)	2,738.8	Proved Reserves: 23.7mnt; Mine Life: 19.6years; Expected Production: 9.3mnt/yr; The mine includes Fire Lake North, Don Lake, Bellechasse and Oil Can deposits
Asia					May 2021 - Fortescue Metals Group Ltd is expected to have first production at the project in December 2022; The project includes North Star, Glacier Valley and West Star deposits; Probable Reserves: 716mnt; FMG Iron Bridge ownership: (88% Fortescue, 12% Baosteel); Number of Employees: 3000 (Construction), 900 (Operations); Expected Production: 22mnt/yr; Mine Life: 20years
North America	Australia	Iron Bridge	FMG Iron Bridge (69%)	2,600	Estimated Production: 25mnt/yr; Indicated Resources: 824mnt
Africa	Canada	Jiboia	Formosa Group (31%) Eurasian Resources Group (100%)	2,600	March 2020 - Rio Tinto has awarded additional contracts to Primero for the project; Proved Reserves: 214mnt; Estimated Production: 43mnt/yr; Expected Start Year: 2021
Asia	Nigeria	Koodaideri	Rio Tinto (100%)	2,600	January 2020 - A scoping study has identified a viable and significant open cut mining opportunity at the project; November 2019 - Flinders Mines Limited has negotiated binding agreements and associated documents with BBI Group in relation to a farm-in incorporated joint venture to hold and develop the project; Measured Resources: 54mnt; The project includes Blacksmith and Anvil deposits
Africa	China	Pilbara	Flinders Mines (100%)	2,533.5	January 2020 - Oceanic Iron Ore Corp. has filed a technical report for the project; Measured Resources: 774.2mnt; Estimated Production: 10mnt/yr; Mine Life: 28years
Africa	Cameroon	Hopes Advance	Oceanic Iron Ore Corporation (100%)	2,515	May 2021 - Carpentaria Resources Limited has completed the acquisition of a 24.149% stake in the project from Pure Metals Pty Ltd; Probable Reserves: 755mnt; Estimated Production: 10mnt/yr; Mine Life: 20years
Africa	Liberia	Hawsons	Carpentaria Resources (93.963%) Pure Metals (6.037%)	2,356.5	August 2020 - Hesteel Group Company Limited has signed a joint venture agreement with Zhongrong Xinda Group for the project; Estimated Production: 28.2mnt/yr; Mine Life: 23.5years; Number of Employees: 3294 (Construction), 1256 (Operation); Reserves: 910.5mnt; Estimated Start Year: 2024
	Cote d'Ivoire	Pampa de Pongo	Jiangtong Group Copper Material Co. Ltd. (51%) Zhongrong Xinda Group (49%)	2,200	

na = not available. Source: Company announcements, Fitch Solutions Mine Projects Database

Asia			Sinosteel Midwest Corporation			Resources: 300mnt; Mine Life: 25years;
	Australia	Weld Range	Limited	2,119.3		Expected Production: 10mnt/yr
Africa						January 2016 - General Nice is unlikely to develop the mine as long as iron prices remain low; Indicated Resources: 114mnt; Expected
	Liberia	Isua	General Nice (100%)	2,000		Production: 15mnt/yr
Asia						March 2021 - Wheaton Precious Metals Corp. has entered into a definitive precious metal purchase agreement with Capstone Mining Corp. over the project; September 2020 - Capstone Mining Corp. has entered into a memorandum of understanding with Puerto
			Capstone Mining Corporation			Ventanas S.A. for the project; Proved Reserves: 65.4mnt; Estimated Production: 4.2mnt/yr; Mine Life: 18years; The project includes Santo
	Australia	Santo Domingo	(70%)	1,952.9		Domingo Sur, Iris, Iris Norte and Estrellita deposits
Africa			Korea Resources Corporation (30%)			December 2017 - Shine Minerals Corporation (formerly Ironside Resources) and Juniper Capital Partners has acquired London Mining's contractual equity rights to a 25% carried interest in the mine, whose license is held with
			National Mining Company - Saudi Arabia			National Mining Company - Saudi Arabia; Indicated Resources: 248mnt; Mine Life: 21years; Estimated Production: 5mnt/yr
Asia	Guinea	Wadi Sawawin		1,900		May 2021 - Iron Road Ltd has reported that Metalytics has completed the independent technical review of project's ore processing flow sheet; February 2019 - Iron Road Limited has reduced total project capital requirements
						by 56% to USD1.74bn; Proved Reserves: 2131mnt; Estimated Production: 12mnt/yr; Mine Life: 22years; The project includes
North America	Australia	Central Eyre	Iron Road Limited (100%)	1,742.9		Warrambo, Kopi and Hambidge occurrences
						November 2020 - Champion Iron Limited has agreed to acquire the project from Alderon Iron Ore Corp.; Estimated Production: 7.8mnt/yr; Proved Reserves: 392.7mnt; Mine Life: 23years; The project includes Rose Central,
	Canada	Kamistiatusset (Kami)	Alderon Iron Ore Corp. (75%)	1,474.2		Rose North and Mills Lake deposits
			Hesteel Group (25%)			

na = not available. Source: Company announcements, Fitch Solutions Mine Projects Database

Asia					April 2021 - TNG Limited has reported that the SMS Group has provided the key deliverables of the front-end loading -3 for the Darwin TIVAN processing facility at the project; July 2020 - TNG has signed a binding life-of-mine off-take agreement with Vimson for the project; Probable Reserves: 41.1mnt; Mine Life: 37years; Estimated Production: 0.5mnt/yr
Latin America	Australia	Mount Peake	TNG Ltd (100%)	1,378.2	August 2020 - Fortescue Metals is on track to deliver first ore from the mine in December 2020; Mine Life: 20years; Estimated Production: 30mnt/yr; Proved Reserves: 143mnt; Number of Employees: 1900 (Construction), 500 (Operations); Expected Start Year: 2020
Asia	Chile	Eliwana	Fortescue Metals Group (100%)	1,275	April 2019 - The Government of the Republic of Liberia and Niron Metals Plc have signed a memorandum of understanding, regarding the passage through Liberia of iron ore from the project; Estimated Production: 2mnt/yr
Africa	Australia	Zogota	Niron Metals	1,260	January 2019 - A joint venture over the project between Mineral Resources Limited and Brockman Mining Limited has kicked off, after the parties executed a mine-to-ship logistics agreement for the transport of the Marillana ore to Port Hedland; Probable Reserves: 1417mnt; Mine Life: 25years; Estimated Production: 20mnt/yr expandable up to 30mnt/yr; Expected Start Year: Q322
Africa	Cameroon	Marillana	Brockman Mining (100%)	1,184.9	August 2017 - Fancamp Exploration Ltd. has filed a technical report for the project; Indicated Resources: 74.7mnt; Estimated Production: 5mnt/yr; Mine Life: 20years
Africa	Angola	South Lamelee	Fancamp Exploration (100%)	859.4	May 2021 - Black Iron Inc. it has selected Cargill Incorporated for offtake rights on the initial 4mnt/yr of production from the mine; Measured Resources: 355.1mnt; Expected Production: 4mnt/yr (Phase 1), 8mnt/yr (Phase 2); Mine Life: 17years
Africa	Angola	Shymanivske	Black Iron (100%)	830.5	Mine Life: 17years; Proved Reserves: 113.7mnt; Number of Employees: 500 (Construction), 300 (Operational); The project includes Kuervitikko and Hannukainen deposits
	Tanzania	Hannukainen	Tapojarvi Oy (100%)	810	

na = not available. Source: Company announcements, Fitch Solutions Mine Projects Database

Africa

Congo- Brazzaville	Mont Sorcier	Vanadium One Iron Corporation (100%)	795.6
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May 2021 - Vanadium One Iron Corp. has reported an updated mineral resource of 1067.2mnt at the project; Estimated Production: 4.8mnt/yr; Mine Life: 37years; Indicated Resources: 113.5mnt

na = not available. Source: Company announcements, Fitch Solutions Mine Projects Database

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