IRON-ORE

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A REVIEW OF SOUTH AFRICA'S IRON-ORE SECTOR

The material contained in this report was compiled by Mariaan Webb and the Research Unit of Creamer Media (Pty) Ltd, based in Johannesburg.

Report edited by Sheila Barradas, David Shepherd and Ria Theron.

Ordering information
To subscribe to Research Channel Africa or purchase this report contact:
Creamer Media (Pty) Ltd
Tel +27 11 622 3744
Email subscriptions@creamermedia.co.za

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CONTENTS

ABBREVIATIONS AND ACRONYMS

AMSA	ArcelorMittal South Africa
BEE	black economic empowerment
CAGR	compound annual growth rate
DMS	dense-media separation
dmt	dry metric tonne
Ebitda	earnings before interest, tax, depreciation and amortisation
IMF	International Monetary Fund
JV	joint venture
MoU	memorandum of understanding
PV	photovoltaic
TFR	Transnet Freight Rail
TSF	tailings storage facility
UHDMS	ultrahigh dense-media separation
USGS	US Geological Survey
WAIO	Western Australian Iron Ore
wmt	wet metric tonne
WTS2	Western Turner Syncline Phase 2
Woodmac	Wood Mackenzie

Source: Kumba Iron Ore

Port of Saldanha, in South Africa

KEY DEVELOPMENTS

May 2019: Brazilian iron-ore miner Vale appoints Eduardo Bartolomeo as its new CEO, succeeding Fabio Schvartsman, who resigned in March 2019, following the January 2019 dam disaster in Minas Gerais.

July 2019: Australian miner Fortescue breaks ground on its $1.25-billion Eliwana iron-ore project, in the Pilbara.

July 2019: The Western Australian government approves mining major BHP's long-term plans for its Pilbara iron-ore operations, which includes a potential 11 more iron-ore projects over the next 50 to 100 years.

October 2019: Australian miner Fortescue confirms that it has submitted a bid to develop two blocks in the giant Simandou iron-ore deposit, in Guinea.

October 2019: The Samarco joint venture between BHP and Vale in Brazil obtains a corrective operating licence to progress towards operational start of one concentrator.

November 2019: A consortium of Guinea's Société Minière de Boké and Singapore's Winning International Group win a tender to develop blocks 1 and 2 of Guinea's Simandou iron-ore deposit, edging out Fortescue in a $14-billion deal.

November 2019: Global mining group Rio Tinto announces a $749-million investment in the Greater Tom Price operations Western Turner Syncline Phase 2, in the Pilbara region of Western Australia, to sustain production capacity.

November 2019: Steel producer ArcelorMittal South Africa announces the closure of its Saldanha Works operations, in the Western Cape.

January 2020: Brazilian prosecutors charge iron-ore major Vale's former CEO, Fabio Schvartsman, and 15 others with homicide for the 2019 dam disaster that killed 270 people.

February 2020: Australia's Rio Tinto downgrades its iron-ore export expectations for 2020, following a tropical cyclone.

February 2020: Brazil's Vale posts a sharp decline in fourth-quarter and full-year iron-ore production. With that, the miner officially lost its position in 2019 as the world's top iron-ore producer to Australia's Rio Tinto.

March 2020: Brazilian mining major Vale warns it will postpone the resumption of lost production capacity, owing to possible coronavirus-related delays in inspections, assessments and authorisations.

March 2020: Mining company Assore, which has been listed on the JSE since 1950, announces a transaction that will result in the minorities in the company being bought out and the company delisting from the exchange.

March 2020: South Africa imposes a 21-day national lockdown to combat the spread of Covid-19. Assmang, a joint venture between Assore and African Rainbow Minerals, shuts its Northern Cape iron-ore mines, while Kumba Iron Ore, an Anglo American subsidiary, operates its mines with 50% of its workforce.

April 2020: Ferrous metals miner Assmang is granted permission to operate its iron-ore load-out stations during South Africa's national lockdown period.

April 2020: Australia's Fortescue Metals increases its guidance for 2020 by two-million tons to range from 175-million to 177-million tons, while Brazil's Vale reduces its guidance by at least 15-million tonnes to range from 340-million to 355-million tonnes.

April 2020: Brazil's National Mining Agency halts operations at 47 mining dams that failed to certify their stability, including 25 belonging to iron-ore miner Vale.

April 2020: Government allows certain South African mines to start operating at 50% during the national lockdown.

April 2020: Iron-ore miner Kumba Iron Ore reduces its 2020 production guidance to between 38-million and 40-million tons and lowers its capital expenditure guidance by R1-billion to between R5.60-billion and R6.10-billion.

June 2020: South Africa moves to its coronavirus alert Level 3, which allows mining operations to resume at full capacity, subject to strict Covid-19 protocols.

June 2020: An Australian indigenous group suspends global mining group Rio Tinto from its reconciliation plan after it blasts two ancient sacred caves as part of the expansion of its Brockman mine, in the Pilbara, where one of the caves showed evidence of continual habitation dating back 46 000 years.

June 2020: Western Australia approves multinational mining company BHP's application to disturb 40 culturally significant Aboriginal sites as part of the expansion of its South Flank mine. This just days after Rio Tinto blew up sacred rock caves in the same area, in the Juukan Gorge.

MARKET OVERVIEW

A year on from the Brumadinho tailings dam tragedy that significantly reduced Brazil's iron-ore production and delivered a bittersweet windfall for Australian miners, the iron-ore industry entered 2020 on high caution.

The novel coronavirus first battered China, the world's biggest iron-ore market, before engulfing countries worldwide, unleashing economic chaos and setting the global economy on course for an economic recession.

The world economy grew at 2.90% in 2019 and was forecast to grow at 3.30% in 2020, following the US and China agreeing a truce in their two-year trade war. However, as panic over the global spread of Covid-19 gripped world markets, hopes for economic expansion were crushed.

The International Monetary Fund (IMF) has warned that the global economy will endure its steepest decline since the Great Depression and has warned that the "Great Lockdown" recession will be the steepest in almost a century. The IMF said in April that global gross domestic product would shrink 3% in 2020.

Despite the global recession looming and a substantial drop in economic activity, the price of iron-ore has been remarkably strong. In contrast, the copper price fell by about 27% in the first quarter of 2020 amid fears over demand for industrial metals and minerals.

Much of the strength of the iron-ore market has been ascribed to the drastic measures that China took to contain the virus. The country imposed strict travel restrictions and extended the shutdown after its Lunar New Year holiday. These measures made it difficult for steel producers to source and transport iron-ore domestically, forcing mills on the seaboard to lean on the seaborne iron-ore market.

China's domestic steel industry accounts for about half of global steel production and the country buys about 70% of global seaborne iron-ore.

World iron-ore production measured in usable ore (data in thousand metric tons, or tonnes)

	2018	2019e
Australia	900 000	930 000
Brazil	460 000	480 000
Canada	52 400	54 000
Chile	14 000	14 000
China	335 000	350 000
India	205 000	210 000
Iran	36 400	38 000
Kazakhstan	41 900	43 000
Mexico	22 300	23 000
Peru	14 200	15 000
Russia	96 100	99 000
South Africa	74 300	77 000
Sweden	35 800	37 000
Ukraine	60 300	62 000
United States	49 500	62 000
Other countries	62 500	48 000
World total (rounded)	**2 460 000**	**2 500 000**

Source: US Geological Survey

Usable ore refers to ore that can be used directly in a downstream process. Usable iron-ore typically contains from 58% to 65% iron content and may include products such as concentrates, direct-shipping ore, pellets and sinter.

SUPPLY

A few key players on the demand and supply side control the iron-ore market. Data from the US Geological Survey (USGS) shows that the five biggest iron-ore producing countries – Australia, Brazil, China, India and Russia – controlled about 80% of global iron-ore production in 2019.

Based on usable ore, Australia produced 930-million tonnes in 2019 and Brazil produced 480-million tonnes, followed by China at 350-million tonnes, India at 210-million tonnes and Russia at 99-million tonnes. The USGS estimates South Africa's production for 2019 at 77-million tonnes, but the Minerals Council of South Africa estimates it at 70.50-million tonnes.

Total global production, as reported by the USGS, increased from 2.46-billion tonnes in 2018 to 2.50-billion tonnes in 2019.

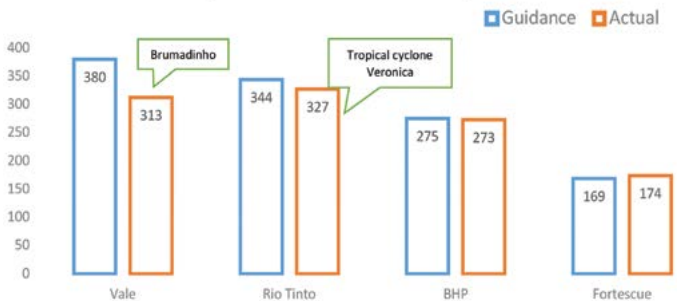
Australia and Brazil dominate the seaborne trade in iron-ore – iron-ore to be shipped to other countries. Both countries suffered supply setbacks in 2019, roiling the seaborne market. A dam breach in Brazil in January 2019 took about 90-million tonnes of iron-ore major Vale offline, which was nearly one-quarter of the group's original target for 2019.

Australia's production also suffered when a category-four tropical cyclone struck on the west coast of the country in March 2019, affecting shipments from major producers, including Rio Tinto and BHP.

Although the top three producers – Vale, Rio Tinto and BHP – increased their production in 2019, shipments fell short of their guidance for the year.

Global iron-ore production expanded at an average of 3% a year during 2010 to 2019, but only modest growth is forecast for the next decade. Fitch Solutions, which estimates 2019 global production at 2.90-million tonnes, calculates that global iron-ore production will expand by an average 0.80% a year to 3.26-million tonnes by 2029.

Big four miners' iron-ore shipments, actual vs guidance (2019 wet metric tons)



Source: Kumba Iron Ore

Supply growth will be primarily driven by India and Brazil, where Vale is planning to expand production to between 390-million tonnes and 400-million tonnes by 2022. Conversely, China, where miners operate at the higher-end of the iron-ore cost curve, will be forced to cut output, owing to falling grades.

Brazil produces high-quality iron-ore that is favoured by Chinese steel producers. Using premium-grade ores can enable plants to boost efficiency and comply with tougher curbs on pollution. Fitch expects the country's production growth to rebound in the coming years, with output forecast to increase from an estimated 466-million tonnes in 2020 to 573-million tonnes by 2029, averaging yearly growth of 2.60%.

The Brumadinho dam disaster, in Minas Gerais, has triggered various investigations into Brazilian major Vale's operations and has resulted in about 40-million tonnes a year of capacity being idled. Vale said in February 2020 that it was hoping to resume operations at various mines undergoing post-Brumadinho safety reviews, but a month later, the miner cautioned that it might delay the resumption of lost capacity, owing to possible coronavirus-related delays in inspections, assessments and authorisations.

Australia – home to Rio Tinto, BHP and Fortescue Metals – expanded its iron-ore supply by an average of 9.20% a year between 2010 and 2019. However, as junior miners mothball mines and major players maintain their production growth targets to crowd out high-cost producers, Fitch is forecasting average yearly growth of 0.70% from 2020 to 2029. Some of the large production replacement projects include BHP's 80-million-tonne-a-year South Flank project, Rio Tinto's 43-million-tonne-a-year Koidaideri mine, sustaining projects at the West Angelas and Robe Valley joint venture projects, and an investment in the Western Turner Syncline Phase 2.

In March 2020, however, there were concerns that Covid-19 restrictions could impact on iron-ore operations in Australia's Pilbara region, which has a high dependency on a fly-in, fly-out workforce. Rio Tinto and BHP, however, have made plans to continue operations.

In terms of the other large iron-ore-producing nations, India should experience strong production growth, while growth will be more muted in China.

Fitch expects India's iron-ore output to increase from 194-million tons in 2020 to 216-million tons in 2029, representing average yearly growth of 0.60% – in line with the 0.60% year-on-year growth from 2010 to 2019.

Analytics company GlobalData's forecast is that India's iron-ore production will expand at a compound annual growth rate (CAGR) of 7.20% to 271.20-million tons in 2024. The resumption of operations at auctioned mines will be behind the growth. The

auctioning process of several iron-ore mines was completed in February 2020 as their leases were about to expire in March. Out of an estimated 25 noncaptive iron-ore mines, 22 were successfully auctioned, while three were put on hold as a result of a pending legal suit from the Supreme Court of India.

Meanwhile, China's domestic production is not expanding fast, but the Asian giant is backing a major African iron-ore project, which could have a major impact on dynamics in the global industry.

The Simandou project, in Guinea, has a near-mythical status in the industry, having been coveted by everyone – from Glencore's Ivan Glasenberg and Fortescue Metals' Andrew Forrest to Vale's former CEO, the late Roger Agnelli. If developed, the mine could have major implications for global miners supplying China, as only half of the project could deliver more than 100-million tons a year of high-quality ore, which equates to about 10% of Beijing's yearly imports. Simandou's ores reportedly contain 65% to 66% iron, beating the industry benchmark of 62% iron content.

Bloomberg News reported in March that China's State-owned Assets Supervision and Administration Commission, which oversees the biggest government-owned enterprises, is actively progressing with the project.

The deposit is divided into four blocks, the first two of which were handed to SMB-Winning consortium, backed by Chinese and Singapore companies, in 2019, while blocks three and four are held by Rio Tinto and Aluminium Corp of China, known as Chinalco.

However, the cost of building infrastructure for the project, including a 650 km railway, has been a roadblock for developers, with estimates that it could cost as much as $13-billion. With Chinese funding, the project could be more feasible.

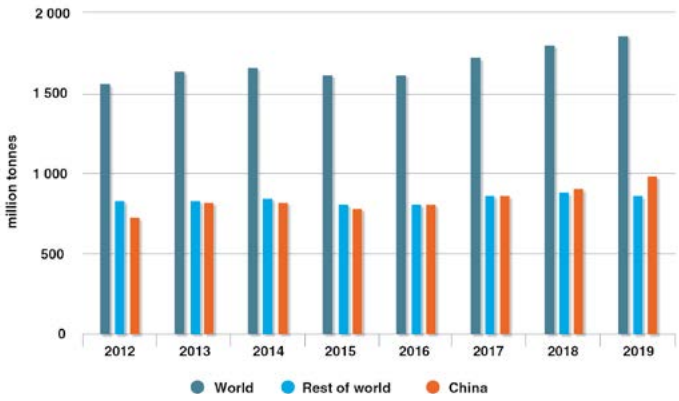
DEMAND

As a necessary input for the production of primary steel, iron-ore supplies the world's biggest metal market and is the backbone of global infrastructure. To produce 1 000 kg of crude steel in a blast furnace, about 1 400 kg of iron-ore and about 800 kg of metallurgical coal are needed.

The world produced about 1.87-billion tonnes of steel in 2019. China is the top steel-producing nation, with 996.30-million tonnes produced in 2019, followed by India at 111.20-million tonnes and Japan at 99.30-million tonnes.

China's steel industry relies mainly on iron-ore imports and requires high-grade ores to manage air pollution and boost productivity. Its iron-ore imports increased from 1.064-billion tonnes in 2018,

Crude steel production in 2019



Source: World Steel Association

to 1.069-billion tonnes in 2019, according to data from the General Administration of Customs. Imports in 2019 were the second highest on record and not too far below the all-time record of 1.075-billion tonnes in 2017.

Chinese steel demand is tilted towards construction and infrastructure, which remained strong, owing to government's backing of these sectors. However, as the coronavirus spread worldwide in the first few months of 2020, the iron-ore market felt the impact of Covid-19.

In January and February – at the height of the Covid-19 emergency in China – unprecedented measures were announced to contain the spread of the virus, leading to a sharp decrease in demand for steel and fears of a substantial market disruption. However, despite construction, infrastructure and factory curtailments, steel producers continued to operate their blast furnaces, providing a market for seaborne iron-ore supply.

China's crude steel output registered steady growth in the first two months of 2020, according to data from the China Iron and Steel Association. Crude steel output rose 3.07% to 155-million tonnes in the first two months of the year, with daily output of 2.58-million tonnes.

Steel inventory levels ballooned during the construction activity hiatus, with S&P Global Platts estimating that stockpiles may have reached 100-million tonnes in the March 2020 quarter. China's iron-ore imports decreased in March, as mills slowed output to digest the record-high steel inventories.

China imported 262.70-million tonnes of iron-ore in the first quarter of 2020, rising from 259.30-million tonnes in the same period of 2019.

Before the widespread outbreak of Covid-19, the Australian government in its December 2019 'Resources and Energy Quarterly' report, published by the Office of the Chief Economist, said that Chinese steel production faced significant downside risks, owing to broader global uncertainty and tighter environmental regulations.

World trade in iron-ore								
	Million tonnes							
	2019	2020[1]	2021[2]	2022[3]	2023[3]	2024[3]	2025[3]	CAGR[4]
Total world trade	1 760	1 775	1 795	1 817	1 843	1 872	1 908	1.40
Iron-ore imports								
China	1 263	1 276	1 297	1 321	1 349	1 380	1 418	1.90
European Union 28	147	147	147	147	147	147	147	0
Japan	122	123	122	121	120	119	117	–0.70
South Korea	74	76	76	75	74	74	73	–0.30
India	5	5	5	5	5	5	5	0
Iron-ore exports								
Australia	836	892	907	938	938	953	1 033	3.60
Brazil	473	451	453	449	462	470	447	–0.90
Ukraine	38	36	37	36	37	38	36	–0.90
India	35	33	33	33	34	34	33	–14.30

Source: Australian Department of Industry, Science, Energy and Resources

[1] estimate

[2] forecast

[3] projection

[4] average yearly growth between 2019 and 2025 or 2018/19 and 2024/25

Over the longer term, miners are preparing for an era of slower growth and an eventual high point in China's steel output. Rio Tinto, BHP and Vale are introducing a range of initiatives, including developing a mobile application for portside sales and selling directly from China's ports in yuan instead of shipping cargoes from Australia or Brazil that are sold in dollars, to retain customers.

Selling at ports enables miners to blend different types of ore, and means "more money in the miners' pockets", newswire Reuters has quoted UBS Group MD and global head of mining, Glyn Lawcock, as saying. "We have seen over the last few years increasing sales to traders and now the miners are clawing back some of that lost margin essentially," says Lawcock. In particular, using the Chinese yuan is a breakthrough for an industry dominated by the dollar. For mills, this eliminates currency risks. For miners, this broadens their customer base and again cuts out the traders.

BHP completed its first yuan-based iron-ore sale to China Baowu Steel Group in May. The steelmaker has now concluded yuan-based deals with the three biggest iron-ore suppliers – BHP, Rio Tinto and Vale. The fourth-biggest iron-ore miner, Fortescue, is also selling in yuan after establishing a trading entity in China in April.

India has also become a pivotal player in global steel production in recent years, but the industry faces an array of challenges, including tight margins, ample international supply, domestic economic slowdown and global trade tensions.

The coronavirus outbreak is also deepening a slump in that country's steel demand. Covid-19 led to lockdowns, the halting in new construction projects and delays in acquisitions of expensive goods such as vehicles and houses.

By March, the outbreak in Europe had a significant impact on steel demand on that continent. The construction and automotive sectors account for about half of Europe's steel consumption and both industries were severely impacted on by lockdowns announced to curb the spread of the pandemic. For instance, by the end of March 2020, all major European car manufacturers had halted output, withdrawing an estimated 61 000 vehicles a day from production. With an average of 900 kg of steel used in a car, S&P Global Platts calculates the loss of automotive production has had a 55-million-ton-a-day impact on steel demand.

In response, several European steel producers have reduced their production to match demand. These curtailments are in addition to an already dramatic slowdown in European steel production, which fell by 5.60% in 2019. During that year, Germany's production contracted by 6.50%, Italy's by 5.20% and Turkey's by 9.60%.

In March and April 2020, steel producers in Brazil also reduced their output. Brazilian steelmaker Gerdau even temporarily shut down blast furnaces, which is considered as one of the more radical measures that a steelmaker can take in times of crisis. When a blast furnace is idled, the furnace itself hardens into a mass of solid iron and to restore it requires that the entire furnace be dismantled and replaced with a new one.

BHP, the world's third-biggest iron-ore producer and a big supplier to China, said in late February 2020 that, if Covid-19 was contained in the March quarter, an accelerated run-rate in the construction and manufacturing sectors could compensate for the loss of activity at the outset of the year.

PRICING

Seaborne iron-ore pricing is driven by Chinese production of pig iron – a function of demand for steel in China's construction and manufacturing sectors.

Global iron-ore prices reached multiyear highs in 2019, owing to supply disruptions because of Vale's fatal dam collapse, in Brazil, and reduced output from BHP and Rio Tinto, in Australia. The supply disruptions, combined with increased demand, contributed to an iron-ore price rally. Iron-ore prices started 2019 at about $75/t and peaked at $125/t. Prices moderated towards the end of the year, finishing 2019 at about $91.50/t.

South African producer Kumba Iron Ore notes that the iron-ore price averaged $93/t in 2019, up 34% year-on-year and the highest level since 2015 in dollar terms, while in rand terms it was the highest level ever recorded.

The Covid-19 outbreak in the lead-up to the Lunar New Year, in China, put pressure on prices, which fell to $84.95/t on January 28. However, despite Chinese construction activity grinding to an almost complete halt in February, iron-ore prices demonstrated resilience, averaging $83.50/t in the first four months of the year, as blast furnaces continued to buy iron-ore, owing to the difficulties of switching off furnaces.

While iron-ore prices in the first quarter of 2020 were largely supported, the iron-ore price entered unchartered territory in the second quarter, as demand improved in China, while cargoes destined for Europe were searching for new buyers.

In May, iron-ore surged past $100/t as supply woes in Brazil coincided with sustained, robust demand in top steel producer China.

Benchmark spot prices climbed to $101.05 as Brazil saw a surge in coronavirus infections, stoking worries that the pandemic may curb local supply.

In April, miner Vale cut its yearly shipment guidance on bad weather and the virus's impact on operations. Meanwhile, port stockpiles of iron-ore in China continued to decline.

Bloomberg Intelligence warned in May, however, that the market might flip to a surplus in the second half of the year. The early resumption of industrial operations in China has fuelled a recovery in downstream activity and steel mills continue to increase output, China International Capital Corp analysts wrote in a note. "Iron-ore will fundamentally maintain a tight balance this year," with supply gradually recovering from the third quarter, they said.

According to a Bloomberg article published in May, Credit Suisse Group contended that the market was at its "peak tightness," a condition that it forecasted would, probably persist until July 2020.

Bloomberg Intelligence expects a 34-million-ton iron-ore surplus in the second half of 2020 on higher supply and stagnating demand, from a 25-million-ton deficit in the first half, throwing the spotlight on whether the price gains are sustainable.

Analysts differ on the scale of the decline in iron-ore prices in 2020.

Global consultancy group Wood Mackenzie (Woodmac) says iron-ore prices could gravitate towards $70/t in 2020, and research director Paul Gray has warned that it could fall even further. In a research note dated March 25, Woodmac said that it was not yet forecasting a glut of seaborne iron-ore, but that risks were escalating, and that the balance was tilting towards a bigger impact on iron-ore demand than supply. "If demand turns out to be weaker than forecast and the iron-ore market moves into acute oversupply, prices could fall as low as $50/t, and we view this as the lower bound for prices," said Gray.

Research firm Fitch Solutions, however, said in a note dated May 5 that it expected stronger steel production from China in the second half of 2020 to support prices. Its forecast for the year is $85/t of iron-ore. The Bloomberg consensus price for the year is $81.50/t. Over the longer term, Fitch is forecasting iron-ore prices to average $90/t in 2021 and $85/t in 2020.

TAILINGS DAM REVIEW

Brazilian major Vale's Brumadinho dam disaster has had a profound impact on the global mining scene. On January 25, 2019, the tailings dam collapsed, unleashing a tidal wave of mud that destroyed a workers' canteen and killed about 270 people.

The dam was holding 11.70-million cubic metres of iron-ore tailings – or almost 5 000 Olympic-sized swimming pools – and stood 86 m high.

Dams are built in four ways to store tailings. The construction method is important because it can be indicative of a dam's level of risk. In upstream dams, new dikes are built upstream of existing dikes. Considered the cheapest method, upstream dams, such as Brumadinho, are vulnerable to liquefaction when the tailings behind the dam are saturated with water. The liquid mixture erodes the structure of the dam and increases the potential for a rupture.

Developed to minimise the risks of rupture, downstream dams create structural stability by not storing wet tailings underneath the dikes. This is the most expensive construction method, as it requires a larger area and more material.

Source: Reuters

In January 2019, the Brumadinho tailings dam collapsed, unleashing a tidal wave of mud that destroyed a workers' canteen and killed about 270 people

The other forms of tailings dams are centreline dams, which is an intermediate solution in terms of cost and volume, and drystacking, which sucks water from the mine waste so that it can be stored safely, effectively as dirt. The latter is expensive and limited to smaller mines.

Investors, including the Church of England Pensions Board and the Swedish Funds Council of Ethics, have put pressure on mining companies to disclose information about their storage dam safety risks. Known as the Investor Mining and Safety Initiative, the investor-led group contacted 726 companies in April 2019, including oil and gas companies, asking them to disclose data on all their dams.

The biggest mining companies responded, including BHP, Rio Tinto, Anglo American and Vale. Most Chinese and Indian mining companies did not respond.

Relying on the miners' disclosures, the investor review found that tailings dams worldwide hold about 45.70-billion cubic metres of waste. The disclosures showed 166 out of 1 635 tailings dams have had stability issues, although it was unclear how severe those issues had been and the miners said the problems had been addressed.

Vale released information on 85 dams that it either operates or is involved in through joint ventures. Of these, 30 dams in Brazil were categorised as likely to cause a high level of damage if they were breached.

On the anniversary of the Brumadinho disaster on January 25, 2020, a database of the world's tailings dams was launched.

A month later, Vale released an in-depth in-house report examining the causes of the Brumadinho disaster. The report, compiled by a committee led by former Brazilian Supreme Court Judge Ellen Gracie, said the company had information as far back as 2003 pointing to the fragility of the Brumadinho Dam 1, in Minas Gerais. Steps taken to deal with the problem and heighten the dam's security were limited and ineffective, according to the report. Vale responded that the independent committee did not "really bring any new facts, nor surprises to the table".

The eventual aim of the global tailings dam review initiative is to set the global standards for tailings dams.

The United Nations Environment Programme, the International Council of Mining and Metals and the Council of Ethics have been working on establishing an international standard for the safe management of tailings facilities.

A public consultation document was published in October 2019, and the final standard is expected to be published in 2020.

Kumba Iron Ore and its tailings facilities

South African iron-ore miner Kumba Iron Ore, part of Anglo American, has said that it has confidence in the integrity of the four tailings storage facilities (TSFs) that it manages in the Northern Cape.

These facilities are subject to the highest global safety and stewardship standards and are operated in accordance with the South African mandatory code of practice on mine residue deposits as stipulated by the Department of Mineral Resources and Energy. These TSFs are also subject to Anglo American's own technical standards.

"As an industry, there is a clear ethical and moral imperative to do everything possible to ensure that tailings facilities are managed to the highest standards of safety using appropriate advanced technologies, and to work together to build greater levels of trust with all our stakeholders," says CEO Themba Mkwanazi.

Of the four TSFs that Kumba manages, one is an active facility, constructed as a water-retaining structure, at Kolomela mine, while three are located at Sishen mine using the upstream method of construction, of which only one is active.

Upstream tailings dams are generally considered to be an appropriate design for facilities in dry and seismically stable regions with flat topography, including the locations of the TSFs managed by Kumba, in South Africa.

Kumba does not have an ownership interest in any other TSFs.

Anglo American's technical standard, which applies to all TSFs managed by Kumba, sets minimum requirements for design criteria, monitoring, inspection and surveillance, and has been peer-reviewed by international specialists. In line with that standard, all TSFs managed by Kumba have a competent person in charge and an externally appointed Engineer of Record, providing continuous technical management, from initial design and construction to monitoring and support. A dedicated team of engineering specialists at Anglo American provides strategic direction and technical assurance.

Source: Kumba Iron Ore

MAJOR GLOBAL PRODUCERS

BHP

BHP's main iron-ore unit is Western Australia Iron Ore (WAIO), which operates an integrated system of four processing hubs and five mines connected by more than 1 000 km of rail infrastructure and port facilities in the Pilbara region. The group employs more than 72 000 employees and contractors globally, of which more than 18 000 are employed in Australia.

The company has four main iron-ore joint ventures (JVs), including Mt Newman, Yandi, Mt Goldsworthy and Jimblebar. BHP's interest in each of the JVs is 85%, with Japanese groups Mitsui and Itochu owning the remaining 15%. BHP, Mitsui and Itochu are also participants in the Posmac JV, a venture with a subsidiary of South Korea's Posco that involves the sublease of parts of one of WAIO's existing mineral leases. The ore from the Posmac JV is sold to the Mt Goldsworthy JV.

BHP also has a 50% interest in Samarco Mineração, the owner of the Samarco iron-ore mine, in Brazil. The mine has been suspended since November 2015, when the Fundão tailings dam collapsed. Samarco's main product is iron-ore pellets. The BHP/Vale JV aims to restart operations by the end of 2020, having been granted the necessary approvals to do so. The restarted operations will use new technologies for dry tailings stacking.

On a 100% basis, WAIO's production fell from 275-million tonnes in the 2018 financial year to June 30, to 270-million tonnes in the 2019 financial year.

BHP's iron-ore division increased its underlying earnings before interest, tax, depreciation and amortisation (Ebitda) from $8.89-billion in the 2018 financial year, to $11.13-billion in the 2019 financial year. The group generated 48% of its Ebitda from iron-ore. WAIO unit costs were lower in 2019 than in the prior year at $14.16/t, or C$12.86/t on a C1 basis, excluding third-party royalties. Unit costs in the 2020 financial year are expected to decrease to between $13/t and $14/t.

Source: BHP

Mt Newman iron-ore train

In the first half of the 2020 financial year, WAIO (on a 100% basis) produced 137-million tonnes at a unit cost of $14.51/t.

BHP is investing $2.90-billion in the development of the South Flank project to replace production from the 80-million-tonne-a-year Yandi operation, which is approaching the end of its economic life.

The project will expand the existing infrastructure at Mining Area C, and involves the construction of an 80-million-tonne-a-year crushing and screening plant, an overland conveyor system, stockyard and train-loading facilities, the procurement of a new mining fleet, and substantial mine development and prestrip work. In March 2020, the project was 66% complete and first ore remained scheduled for 2021.

BHP snapshots from 2019 financial year (iron-ore division)		
Western Australia Iron Ore shipments (100%) **270-million tonnes** (2018: 275-million tonnes)	Revenue **$17.26-billion** (2018: $14.81-billion)	Underlying Ebitda **$11.13-billion** (2018: $8.93-billion)

Snapshots from 2020 half-year (iron-ore division)		
Western Australia Iron Ore shipments (100%) **137-million tonnes** (H12019: 135-million tonnes)	Revenue **$10.37-billion** (H12019: $7.40-billion)	Underlying Ebitda **$7.12-billion** (H12019: $4.30-billion)

Compiled from BHP information

BHP Scope 3 greenhouse-gas emissions (million tonnes carbon-dioxide equivalent)			
Year ended June 30	**2019**	**2018**	**2017**
Upstream			
Purchased goods and services	17.30	8.20	7.70
Fuel- and energy-related activities	1.30	1.40	1.40
Upstream transportation and distribution	3.60	3.60	3.20
Business travel	0.10	0.10	0.10
Employee commuting	<0.10	<0.10	<0.10
Downstream			
Downstream transportation and distribution	4	5	2
Processing of sold products	304.70	322.60	313.70
Iron-ore to steel	299.60	317.40	309.50
Copper to copper wire	5.10	5.20	4.20
Use of sold products	232.70	253.80	254.10
Metallurgical coal	111.40	112.30	105.50
Energy coal	67	71	72.10
Natural gas	28.30	36.40	38.30
Crude oil and condensates	23.30	29.60	33.10
Natural gas liquids	28.80	4.50	5.10
Investments (non-operated assets)	3.10	1.70	1.90

Source: BHP and Reuters

The project is also expected to increase the average iron-ore content of the ore BHP mines, in the Pilbara, from 61% to 62%, and the overall proportion of lump from 25% to about 35%.

In July 2019, the Western Australian government approved the major's long-term plans for its Pilbara iron-ore operations. BHP's Pilbara expansion strategic proposal details a cumulative picture of the miner's planned and potential operations across the Pilbara, including mining operations, rail, storage areas, dams and associated mine infrastructure, for the next 50 to 100 years. The proposal also outlines the potential for up to 11 more iron-ore projects in the Pilbara.

Western Australia says BHP can disturb 40 sacred sites in mine expansion

On June 11, Western Australia approved multinational mining company BHP's application to disturb 40 culturally significant Aboriginal sites as part of a mine expansion. This was just days after Rio Tinto blew up sacred rock caves in the same area, in the Juukan Gorge, one of which showed evidence of continual human habitation stretching over 46 000 years.

State Aboriginal Affairs Minister Ben Wyatt said in a statement that he had approved BHP's application to "impact" the sites in the iron-ore-rich Pilbara region, where BHP is planning its $3.40-billion South Flank expansion.

Under a legal loophole, traditional owners are not able to object to ministerial decisions made under Section 18 of the state's Aboriginal Heritage Act when "land users conclude that impact to a site is unavoidable".

The loophole allows for mining companies to apply for an exemption to damage or destroy cultural sites.

"No objections were filed and I approved the notice on May 29, 2020." Wyatt said in his statement.

BHP said in a statement at the time that it would not disturb any sites without further study and consultation with the Banjima people to understand the cultural significance of the region where it has been active for more than half a century.

Chairperson of Banjima Native Title Aboriginal Corporation, Maitland Parker, said: "As a matter of lore and culture shared with other traditional owners across Australia and the world, the Banjima people do not support the destruction of sites of cultural significance."

Wyatt said the area covered by BHP's application was subject to a 2015 land-use agreement in which the Banjima people committed to support the South Flank project. That agreement included 72 exclusion zones containing sites regarded as significant by the Banjima People, he said.

Source: Reuters

BHP and Scope 3 greenhouse-gas emissions

Major miner BHP has pledged to invest A$400-million over five years, starting in 2020, to reduce emissions. The investment will be in technologies to reduce emissions, and research and development of potential future solutions. Investments will target operational emissions reduction and potential reductions of Scope 3 emissions, including from the processing and use of its products.

The company is the world's biggest listed miner, the biggest coking coal producer and a major iron-ore producer. Coking coal and iron-ore are used to make steel, which produce millions of tonnes of carbon dioxide.

Emissions are divided into categories. Scope 1 and 2 cover an organisation's direct emissions and indirect emissions generated by the power it buys to run its operations. Scope 3 emissions occur when a company's products are used, during, for example, steelmaking.

BHP says its Scope 3 emissions are estimated to be about 40 times greater than its Scope 1 and 2 emissions.

Rio Tinto has said Scope 3 emissions are caused by its customers, especially in China, and it has little control over them.

Coronavirus response

BHP has said that it supports the border controls that Western Australia introduced in March 2020 to combat the spreading of Covid-19. The company has also introduced several measures across its WAIO sites, including the temporary relocation of interstate workers, amending rosters to minimise travel to the Pilbara, restricting fly-in, fly-out workers from entering the townships of Newman and Port Hedland, as well as increasing the use of charter flights and health screening, such as temperature checks, at mine sites and airports.

BHP has further established a A$50-million Vital Resources Fund to help support regional Australian communities in its areas of operation, which are facing the significant challenge of the Covid-19 pandemic.

Spending will be focused on the regions surrounding BHP's Australian operations, including the Bowen basin, in Central Queensland; the Hunter Valley, in New South Wales; Roxby Downs and the Upper Spencer Gulf, in South Australia; and the Pilbara and Goldfields regions, in Western Australia.

Source: BHP

FORTESCUE METALS GROUP

Australian miner Fortescue Metals owns and operates integrated operations spanning two iron-ore mine hubs, the five-berth Herb Elliott Port and Judith Street Harbour towage facility, in Port Hedland, and the fastest heavy haul railway in the world. Fortescue directly and indirectly employs about 10 000 people, with about 95% of its direct employees based in Western Australia.

The Chichester Hub, in the Chichester Ranges, comprises the Cloudbreak and Christmas Creek mines, has a production capacity of 100-million tonnes a year from three ore processing facilities. The Solomon Hub comprises the Firetail and Kings Valley mines, with a combined production capacity of 70-million tonnes to 75-million tonnes a year.

The miner remains focused on the successful delivery of its $3.87-billion investment in two iron-ore projects in the Pilbara, which will maintain its production rate at about 175 000 t/y.

Fortescue had expressed an interest in acquiring blocks of the Simandou project, in Guinea, but the company was informed in November 2019 that its bid failed.

In the 2019 financial year, to the end of June, Fortescue shipped 167.70-million wet tonnes, which is 1% less than the 169.80-million wet tonnes shipped the year before. The miner operates at an industry-leading C1 cash cost of $13.11/wet metric tonne (wmt).

Fortescue's revenue increased by 45% to $9.97-billion in 2019, as its average revenue increased from $44 a dry metric tonne (dmt) to $65/dmt.

The miner's guidance for the 2020 financial year to June 30 is to ship between 175-million and 177-million tonnes, inclusive of 17-million to 20-million tonnes of West Pilbara Fines product, at a C1 cost of $12.75/wmt to $13.25/wmt. The company expects its shipments for the year to be at the upper-end of its guidance.

In the first half the 2020 financial year, Fortescue increased shipments by 7% year-on-year to a record 88.60-million tonnes at a C1 cash cost of 12.73/wmt. The miner generated $6.50-billion in half-year revenue at an average realised price of $80/dmt. Net profit after tax increased to $2.50-billion.

In terms of capital projects, Fortescue is developing the $1.28-billion Eliwana mine and rail development, in Pilbara, in Western Australia, which includes 143 km of rail and 30-million tonnes a year of dry ore processing facilities.

The project underpins the introduction of the 60.10% iron-grade product, West Pilbara Fines, and is aimed at maintaining Fortescue's low-cost status, providing greater flexibility to capitalise on market dynamics while maintaining overall production at a minimum of 170-million tonnes a year over 20 years. The first sod was turned in July 2019 and first ore is expected in December 2020.

The $2.60-billion Iron Bridge magnetite project will have a capacity of 22-million tonnes a year, producing a 67% iron content, as well as low impurity concentrate suitable for pellet feed or blending with sinter fines. First ore is expected in the first half of 2022, and ramp-up to full production is expected to take about 12 months.

In addition to Eliwana and Iron Bridge, Fortescue is spending $287-million on its Queens Valley mining area, at the Solomon Hub, from 2019 to 2022. The development of the Queens Valley mining area will maintain production of the low-alumina Kings Fines product, which is supplied to customers in China, Japan and Korea.

Under pressure to curb carbon emissions, Fortescue is weaning itself off the most polluting power sources. The company has set a target to achieve net zero operational emissions by 2040.

The company has said that the net zero emissions goal is core to its climate change strategy and is underpinned by a pathway to decarbonisation, including the reduction of Scope 1 and 2 emissions from its existing operations by 26%, from 2020 levels by 2030.

Since late 2019, Fortescue and its partners have announced investments worth about $800-million in energy infrastructure projects, which will increase the use of renewable energy, and will contribute to the company's emissions reduction target.

Fortescue Metals snapshots from 2019 financial year		
Shipments **167.70-million tonnes** (2018: 169.80-million tonnes)	Sales revenue **$9.97-billion** (2018: $6.89-billion)	Underlying net profit **$3.19-billion** (2018: $1.08-billion)
Fortescue Metals snapshots from 2020 half-year		
Shipments **88.60-million tonnes** (H12019: 82.70-million tonnes)	Sales revenue **$6.48-billion** (H12019: $3.54-billion)	Underlying net profit **$2.46-billion** (H12019: $644-million)

Source: Compiled from Fortescue results

Fortescue product mix			
In million wet tonnes	**FY2019**	**Product mix percentage**	**FY2018**
West Pilbara fines	9	5%	15
Kings fines	14.20	9%	75
Fortescue blend	72.40	43%	–
Fortescue lump	8.60	5%	80
Super special fines	61.70	37%	–
Manganese iron-ore	1.80	1%	170
Total	**167.70**	**100%**	**170.00**

Source: Fortescue

The infrastructure includes the Chichester solar gas hybrid project, which will result in the installation of 60 MW of solar generation, as well as a $700-million investment into the Pilbara Energy Connect programme, which along with the Chichester hybrid project will deliver between 25% and 30% of Fortescue's stationary energy requirements from solar power.

"Mining is one of the most innovative industries in the world and Fortescue is harnessing this technology and capability to achieve carbon neutrality with a sense of urgency.

"In addition to the development of gas technology and renewables for our stationary energy requirements, we are working towards decarbonising our mobile fleet through the next phase of hydrogen and battery electric energy solutions," Fortescue CEO Elizabeth Gaines has said.

Gaines has said that hydrogen will be an export opportunity to countries, such as Japan and South Korea, which are focused on developing hydrogen technology for energy requirements.

Fortescue signed a landmark partnership agreement with the Commonwealth Scientific and Industrial Research Organisation in 2018 to develop metal membrane technology, providing the potential for the bulk transportation of hydrogen through ammonia.

Source: Fortescue Metals Group

Herb Elliott Port iron-ore shiploader

The miner is also part of a Green Hydrogen consortium with BHP, Anglo American and consulting engineering firm Hatch. The consortium aims to accelerate the decarbonisation of their global operations.

Coronavirus response

Fortescue has said that its operations continue in the Pilbara, despite the strict border controls that the Western Australian government imposed in March 2020. The majority of the company's workforce is Western Australia-based.

The company has shifted its rosters to a four-week-on, two-week-off rotation, which will reduce travel to and from sites by about 40%.

To ensure safety of those still travelling for work, Fortescue has arranged for additional charter buses and flights to maintain distances between travelling team members, as well as health tests at the Perth airport and site aerodromes.

Office-based employees and those that were not critical to site operations have been relocated to work from home unless Fortescue requires their attendance.

The iron-ore giant has also suspended all Australian and international exploration in line with local travel restrictions.

The company is further contributing significantly to efforts to fight the coronavirus. Founder Andrew Forrest's Minderoo Foundation and Fortescue have made A$160-million available to procure and distribute medical supplies and increase testing.

The company has also contributed to the Chamber of Minerals and Energy's Covid-19 initiatives.

Rio Tinto snapshots from 2019 (iron-ore division)			
Pilbara shipments **327.40-million tonnes** (2018: 338.20-million tonnes)	Gross sales revenue **$24.08-billion** (2018: $18.73-billion)	Net cash from operating activities **$11.42-billion** (2018: $8.35-billion)	Underlying earnings **$9.64-billion** (2018: $6.53-billion)

Source: Rio Tinto

RIO TINTO

Anglo-Australian multinational Rio Tinto, of Australia, is the world's second-biggest metals and mining corporation after BHP, producing iron-ore, copper, diamonds, gold, coal and uranium. The group employs 46 000 people, has 60 operations and projects in 36 countries.

Rio Tinto's iron-ore operations in the Pilbara, Western Australia, include an integrated network of 16 iron-ore mines, four independent port terminals, a 1 700 km rail network and related infrastructure. The operations use cutting-edge technology to mine and transport iron-ore.

AutoHaul – the world's first automated heavy-haul, long-distance rail network – operates 2.40-km-long trains to transport the miner's product to ports. Rio Tinto's AutoHaul was first deployed in December 2018. "AutoHaul has brought the rail freight industry in this country into the twenty-first century and is rightfully the subject of global interest," Western Australian Mines and Petroleum Minister Bill Johnston said at an event marking the official celebration of the rail technology programme in June 2019.

Further, about 50% of the Rio Tinto Pilbara truck fleet is fully autonomous. By the end of 2020, a "large majority" of the fleet will be automated.

The Pilbara mines produced 326.70-million tonnes (Rio Tinto's share is 326.70-million tonnes) in 2019, which was 3% lower than in 2018 and below the group's guidance of 330-million to 343-million tonnes. Weather and operational challenges in the first half of 2019 and an active decision to protect the quality of its flagship Pilbara Blend, which is preferred by Chinese steel mills, impacted on production. The group's second-half performance was strong, with production and shipments exceeding the same period in 2018, despite planned, extended rail maintenance, which limited capacity for 12 days.

Rio Tinto has started trials of portside trading. The company has some inventory at Chinese ports and can also handle material from third parties and from its Iron Ore Company of Canada. Its guidance for 2020 was adjusted in February, following Tropical Cyclone Damien.

The miner downgraded its shipment guidance from the previous 330-million to 343-million tonnes, to between 324-million and 334-million tonnes.

Rio Tinto benefitted from strong iron-ore prices, as a result of strong demand from China and constrained seaborne supply. The higher prices helped the group lift its underlying Ebitda from iron-ore by 41% to $16.10-billion. The group operated at a unit cash cost of $14.40/t.

Meanwhile, Rio Tinto continued to invest in the Pilbara iron-ore assets in 2019. Projects with a combined value of $4.60-billion are under construction, with $460-million spent across projects at Koodaideri, West Angelas and the Robe Valley.

The $2.60-billion Koodaideri iron-ore project will be Rio Tinto's most technologically advanced. Once fully commissioned, the initial mine development will have a capacity of 43-million tonnes, which will increase the lump-to-fines ratio of the entire portfolio from an average of 35% to 38%, and will boost the capacity of the Pilbara system to 360-million tonnes a year. First ore from Koodaideri is expected in 2021.

Pilbara production		
In million tonnes	**2019**	**versus 2018**
Pilbara Blend and SP10 Lump	19.90	–5%
Pilbara Blend and SP10 Fines	30.30	–3%
Robe Valley Lump	1.60	–14%
Robe Valley Fines	2.80	–16%
Yandicoogina Fines	14.20	–2%
Total Pilbara production	**68.80**	**–4%**
Total Pilbara production (100% basis)	**83.60**	**–3%**

Source: Rio Tinto

Rio Tinto loses Australian indigenous backing after blasting sacred caves

An Australian indigenous group suspended global mining group Rio Tinto from its reconciliation plan, as part of the expansion of the Brockman iron-ore mine, in the Pilbara, after it blasted two ancient sacred caves in late May 2020. One of the caves showed evidence of continual habitation dating back 46 000 years.

Reconciliation Australia, the lead body for promoting better ties between the wider Australian community and Aboriginal and Torres Strait Islander peoples, announced the decision after Rio Tinto destroyed the caves.

"The blasting activity in Juukan Gorge by Rio Tinto exposes a broken relationship with the Puutu Kunti Kurama and Pinikura (PKKP) Peoples and a breathtaking breach of a respectful relationship," Reconciliation Australia said.

Rio Tnto won state government approval to disturb the sites in 2013 under laws that cannot be appealed by traditional owners. The PKKP has said Rio, whose head of iron-ore Chris Salisbury later offered his apologies, knew the cultural and historic significance of the site before it was blasted.

The mining company said in a statement that it would continue dialogue with the nongovernmental organisation as it focused on rebuilding trust with the PKKP people.

The NGO said that it had met with Rio Tinto executives to convey its "extreme concern" and that a review of the suspension would depend on how it engages with the Traditional Owner groups.

It is also dependent on Rio Tinto releasing a full and public review into the matter, sustained action in light of the review, and "meaningful accountability."

"Our heritage processes will be comprehensively reviewed, with board and indigenous leader oversight, to help identify, understand and recommend ways to improve," Rio Tinto said.

Source: Reuters

At Koodaideri, Rio Tinto is also investing in a company-owned solar facility, with about 100 000 panels set to supply the mine with electricity. The company is investing $98-million in a 34 MW solar photovoltaic (PV) plant, which is complemented by a 12 MWh battery energy storage system in Tom Price to help power its entire Pilbara power network. The PV plant is expected to supply all Koodaideri's electricity demand during peak solar power generation times and about 65% of the mine's average electricity demand. Construction is expected to begin in 2020, subject to government approvals, and is due to be completed in 2021.

The West Angelas and Robe Valley projects are in a JV with Mitsui and Nippon Steel. Rio Tinto has a 53% share. The JV partners will develop the Mesa B, C and H deposits at Robe Valley and deposits C and D at the existing West Angelas operation, enabling Rio to sustain production of its Pilbara Blend and Robe Valley lump and fines products. First ore from these projects is expected in 2021.

Rio Tinto announced a $749-million investment in Western Turner Syncline Phase 2 (WTS2) in November 2019. As part of the existing Greater Tom Price operations, WTS2 will produce high-quality Brockman ore, which will support the group's flagship Pilbara Blend. With a capital intensity of about $25/t production capacity, Rio Tinto says the mine is expected to deliver an attractive internal rate of return.

The haul truck fleet at WTS2 will also use autonomous haulage system technology from 2021, which delivers safety benefits, enhanced productivity and lowered costs. First ore from WTS2 is expected in 2021. At its peak, the construction workforce is expected to be more than 1 000.

Meanwhile, Rio Tinto is investing $1-billion over five years in climate change initiatives. The group is aiming to reduce its carbon intensity by 30% and its absolute emissions by 15% by 2030. Some shareholders are demanding that Rio Tinto report on short-, medium- and long-term targets for direct and indirect greenhouse-gas emissions, as well as those of its end-customers – known as scope 1, 2 and 3 emissions – and performance targets against those. The company argues that customer emissions are beyond its control. Steelmaking is among the highest-emitting industries.

It has signed a memorandum of understanding (MoU) with steel producer China Baowu Steel Group and Tsinghua University to develop methods to reduce carbon emissions and improve the environmental performance across the steel value chain. The MoU will allow for the formation of a joint working group tasked with identifying a pathway to support the goal of reducing carbon emissions across the entire steel value chain.

Coronavirus response

Rio Tinto has relocated more than 700 of its staff with specialist skills to Perth from interstate as the Western Australian government put in place a hard border on March 24. While interstate fly-in,

fly-out workers are allowed into the state, they will be subject to a strict 14-day self-isolation measure before being allowed onto Western Australian mine sites.

Rio said on April 6 that more than 1 200 of its employees at two of its Pilbara sites started new rosters that had been redesigned to reduce the risk of spreading the virus.

The staff at Yandicoogina and Greater Brockman operations would work two weeks on, followed by two weeks off. The rosters at the company's other sites in the Pilbara, which employed more than 3 500 people, had also been adjusted to reduce the travel frequency in and out of the Pilbara. These measures meant the group could keep its operations running.

The company has introduced a number of health and safety measures to contain the spread of Covid-19, including screening all employees prior to boarding flights, control measures at site, reduced passenger capacity on buses, tightened physical distancing measures and increased cleaning schedules.

On February 7, Rio Tinto announced a $1-million donation to the Chinese Red Cross Foundation to support a nationwide effort to help those affected by the outbreak.

On March 30, Rio Tinto pledged A$25-million in funding to support global grassroots community Covid-19 preparedness and recovery efforts.

Source: Rio Tinto

Rio Tinto's Koodaideri iron-ore project

VALE

Brazilian major Vale is a diversified mining company with operations in iron-ore, nickel, manganese, coal and copper. The group has operations in 30 countries and provides employment for about 125 000 direct employees and permanent contractors. The company is one of the world's biggest iron-ore and pellet producers.

Carajás is Vale's biggest operation, located in the Amazon region of northern Brazil. Iron-ore from this region is considered the highest quality in the world, with an average iron-ore content of 67%.

Vale has described 2019 as the most challenging year in its history. In late January 2019, one of its tailings dams in the town of Brumadinho burst, unleashing a torrent of water and killing about 270 people. The Brumadinho dam failure occurred three years and two months after the Mariana dam disaster in November 2015, which killed 19 people and destroyed the village of Bento Rodrigues.

Under pressure from prosecutors, Vale has initiated a series of production shutdowns, pledged to reconstruct or decommission many of its other dams and fired a number of executives. The group has allocated $1.90-billion to accelerate the decommissioning of nine mine-waste dams in Minas Gerais. Brazilian state prosecutors charged former CEO Fabio Schvartsman and 15 other people with homicide in January 2020. Schvartsman is charged with knowing about the safety issues at the massive Brumadinho tailings dam beforehand and helping to hide them prior to the event, the deadliest of its kind in Brazil's history. Ironically, Schvartsman began his role as the Vale CEO with a vow to never allow a repeat of the 2015 disaster.

CEO Eduardo Bartolomeo became CEO in May 2019 and has pledged to address safety at the company's dams. "We have not spared, and will not spare, resources or efforts to repair any damages caused to the families involved, to the infrastructure of the communities and to the environment" caused by failures at its operations, Bartolomeo has assured.

The group's iron-ore production reflected the impact of the disaster, reducing from 384.64-million tonnes in 2018 to 301.97-million tonnes in 2019 – a decrease of 21.49% year-on-year. Sales volumes for iron-ore fines and pellets were 312.51-million tonnes, which was 14.50% less than the previous year, as Vale relied on inventory drawdowns of 14-million tonnes.

Vale's 2019 sales include: 267.99-million tonnes of iron-ore fines (2018: 307.43-million tonnes), 1.31-million tonnes run-of-mine ore (2018: 1.55-million tonnes) and 43.20-million tonnes of pellets (2018: 56.59-million tonnes).

The miner generated $23.34-billion in revenue from the sale of iron-ore fines and $5.95-billion from the sale of pellets. In total, its ferrous minerals division generated revenue of $30.01-billion, compared with $27.93-billion in 2018.

Iron-ore fines were produced at a C1 cash cost of $78/t in 2019, compared with $53/t in 2018. Stoppage expenses pertaining to Brumadinho added $13.40/t to Vale's costs.

The adjusted earnings before interest, tax, depreciation and amortisation of the ferrous minerals business segment was $17-billion in 2019, an increase of 16% on 2018, mainly owing to higher prices, which were offset by lower volumes and higher costs.

Iron-ore production capacity was significantly impacted on by the stoppage of operations, with interdicts issued for the Brucutu, Vargem Grande, Alegria, Timbopeba and Fábrica operations. About 40-million tonnes of production capacity was idled as a result.

The group has made progress to restart idled operations. Authorities allowed Vale to restart operations at the Brucutu mine in June 2019, re-introducing 30-million tonnes a year of production capacity. However, in December 2019, the miner suspended operations, owing to the disposal of tailings at the Laranjeiras dam, reducing capacity to about 40%, with a monthly production impact of 1.50-million tonnes.

At the Vardem Grande complex, Vale was allowed to partially resume dry processing operations at the site in July 2019. This allowed for five-million tonnes of production in 2019, which represents 12-million tonnes a year of production capacity.

In November 2019, Vale received the necessary authorisation to resume the operations of the Alegria mine, enabling three-million tonnes of production in 2019, which represents eight-million tonnes a year of production capacity.

Vale's initial guidance for 2020 was to ship between 340-million and 355-million tonnes, but as the company delayed restarting operations, owing to the coronavirus outbreak that is delaying inspections, the miner lowered its guidance. It is now forecasting production of between 310-million and 330-million tonnes for 2020.

Vale snapshot from 2019 (ferrous minerals unit)		
Fines and pellet shipments **312.50-million tonnes** (2018: 338.20-million tonnes)	Ferrous metals sales revenue **$30-billion** (2018: $27.93-billion)	Ferrous metals adjusted Ebitda **$17-billion** (2018: $14.71-billion)

Source: Vale

Vale adds sustainability goals to long-term compensation

Brazilian miner Vale has included environmental, social and governance goals to the long-term variable compensation of its top management and resumed 2019 bonus payments.

The move comes as Vale's reputation was damaged after its tailings dam at Brumadinho burst in January 2019, killing more than 270 people in the state of Minas Gerais.

Health, safety and sustainability targets will respond to 20% of the long-term variable compensation, while the remaining part will depend on Vale's total shareholder return, compared with its peers, starting in 2020.

Until 2019, long-term compensation was entirely based on shareholder return, although short-term bonuses already included sustainability goals.

Vale also said it resumed payments of variable compensation for employees who were not under investigation for the Brumadinho disaster. The company cancelled 2019 variable compensation after its second deadly dam burst over a four-year period.

Source: Reuters

In April 2020, the National Mining Agency halted operations at 25 of Vale's iron-ore dams, after the company had failed to certify their stability. The miner has acknowledged that its Santana dam, in Minas Gerais state, has failed to register its declaration of stability. That dam was placed on a level one emergency alert in October 2019 and has been under 24-hour surveillance since then. The company is planning to make structural improvements to the dam in the second half of the year.

The S11D Eliezer Batista Complex mine, said to be the world's biggest openpit mine producing iron-ore, will produce at its full capacity of 90-million tonnes a year in 2020.

Before the Covid-19 outbreak, research firm Wood Mackenzie said that Vale should be able to match its 2018 peak production of 385-million tonnes as soon as 2021.

Coronavirus response

To safeguard its employees, businesses and communities surrounding its operations from the threats posed by Covid-19, Vale announced several measures in the first few months of 2020. These included limiting travelling and introducing working-from-home policies. Although Vale has placed its nickel operation, in Canada, on care and maintenance, none of its iron-ore production centres had been affected by April 10. The company has installed 81 thermal cameras at the entrance of its facilities in Brazil to identify people with high body temperatures, which is one of the symptoms of Covid-19.

It has also ordered five-million rapid test kits for the coronavirus to help Brazil fight the pandemic. Further, Vale pledged to prepay 932-million reais to small suppliers to help ease the economic impact of the outbreak.

Source: Bloomberg

SOUTH AFRICAN PRODUCERS

The known iron-ore reserves in South Africa are estimated to be depleted within the next two decades in the absence of further exploration and discoveries. Minerals Council South Africa states that promoting a greenfield exploration boom that incentivises exploration is particularly urgent for the domestic iron-ore industry.

Although only a limited resource, South African iron-ore is of a higher grade, commanding world prices in the upper tier.

The highest-quality and most important iron-ores for steelmaking are hematite and magnetite. Hematite is the more sought-after ore and the preferred raw material in efficient steelmaking mills. It accounts for about 95% of South Africa's iron-ore production.

Kumba Iron Ore, South Africa's biggest iron-ore producer, produces high-quality lump (64% iron) and high-grade sinter fines (63.50% iron).

South Africa's iron-ore production decreased by 5.10% to 70.50-million tonnes in 2019. Despite the lower production, nominal sales increased by 39.40% to R71.40-billion.

The industry had 19 092 direct employees in 2019 and paid workers a total of R6.60-billion. It also contributed R2.10-billion to State coffers through royalties paid.

President Cyril Ramaphosa announced a 21-day lockdown period, starting at midnight on March 26, to combat the spreading of Covid-19.

The lockdown was extended to April 30. The country eased some restrictions on May 1, in line with a phased, risk-adjusted strategy to reopening the economy.

During the Level 4 lockdown period, more activity was allowed to resume, subject to precautions required to limit community transmission and outbreaks. The country moved to Level 3 on June 1, which allowed for the mining industry to operate at full capacity.

KUMBA IRON ORE

Kumba Iron Ore, a subsidiary of global miner Anglo American, is South Africa's top producer of the ferrous metal. The Themba Mkhwanazi-led company's mining operations are in the Northern Cape, and its port operations are in Saldanha Bay, in the Western Cape.

The bulk of Kumba's iron-ore production comes from the Sishen mine, near the town of Kathu. Kolomela, near Postmasburg, is Kumba's newest mine, having entered into production in 2011.

The miner produces high-quality iron-ore with an average iron content of 64.20%. Its lump-to-fine ratio was 67:33 in 2019 and premium products comprised 19.30% of sales in that year. Lump can be directly fed into the blast furnace in steel production, bypassing the sintering process.

Operationally, 2019 was a challenging year for Kumba. Sishen was subjected to unscheduled maintenance at the mine and the plant, while the dense-medium separation (DMS) plant at Kolomela was closed for an infrastructure upgrade.

Notwithstanding these issues, total tonnes mined increased by 2% to 297.90-million tons, while total production volumes decreased by 2% to 42.40-million tons. Its revised guidance for the year was 42-million to 43-million tons.

Total sales volumes of 42.20-million tons were also within the revised guidance of 41.50-million to 42.50-million tons.

The 2.40% decrease from 2018 was driven by lower domestic sales, owing to JSE-listed steel producer ArcelorMittal South Africa's (AMSA's) decision to wind down operations at its Saldanha steel plant.

AMSA announced the closure of its Saldanha plant in November 2019, as it had lost its "structural competitive cost advantage".

Kumba sales summary (in tons)

	December 2019	December 2018	% change
Total	42 218 000	43 257 000	(2%)
Export sales	40 038 000	39 966 000	–
Domestic sales	2 180 000	3 291 000	(34%)

Source: Kumba

Kumba has said that it is investigating a number of options to increase its export sales capacity to compensate for the lower domestic sales as a result of the Saldanha steel plant closing.

The South Africa-based company exports more than half of its production to China. In 2019, Chinese shipments comprised 56% of its overall exports, while the European Union, the Middle East, North Africa and the Americas received a combined 25% of total sales. About 18% of export sales were shipped to Japan and South Korea.

Like larger rivals, Kumba is following a value-over-volume strategy. The group believes its quality product and diversified client base should help it weather coronavirus disruptions that affected China at the onset of 2020.

During South Africa's 35-day lockdown in March and April, Kumba continued with about 50% of its workforce and continued to export iron-ore. "By continuing operations, we will be able to sustain our market share of the global iron-ore market, generate much-needed foreign exchange income and be in a stronger position overall to contribute towards South Africa's economy, particularly as a result of the impact of Covid-19," Kumba said.

In March, Kumba expected the scaling down of operations to have an impact of between two-million and three-million tons on its production and updated its guidance for 2020 to between 41.50-million and 42.50-million tons. A month later, the company issued a new production and sales guidance of 37-million to 39-million tons and 38-million to 40-million tons, respectively, reflecting the 35-day lockdown.

Kumba CE Themba Mkhwanazi has expressed full commitment to South Africa's efforts to combat the Covid-19 pandemic and has scaled down its operations to ensure physical distancing, issuing personal protective gear and providing rigorous health screening, along with continuous supply of essential services to local communities.

The country moved to coronavirus alert Level 3 on June 1, which allowed for mining operations to resume at 100% capacity.

Kumba pledges a third of top pay towards Covid-19 relief initiatives

Mining company Kumba has provided a wide range of essential services in its host communities while responding directly with additional support to help alleviate the health and economic effects of Covid-19.

Beyond the company's breadth of support initiatives and following the lead of President Cyril Ramaphosa and his Cabinet, the Kumba board resolved to donate the equivalent of one-third of their personal directors' fees or salaries for the second quarter towards Covid-19 relief initiatives, while the executive team had selected to contribute to the employee matching scheme supported by the Anglo American Foundation.

The foundation has pledged to match employees' personal donations – up to an initial aggregate value of $1-million, giving a total matched value of $2-million – to a number of local organisations, including the Solidarity Fund.

Source: *Mining Weekly*

Financial results

Kumba's average realised iron-ore export price increased by 35% to $97/t in 2019, while the exchange rate weakened by 9%. This price and currency gains helped the miner to generate a material increase in revenue to R64.29-billion in the year ended December 31, 2019.

Cashflow from operations was also up by 79% to R34-billion, with the company ending the year at a net cash position of R12.87-billion, compared with a net cash position of R11.67-billion in 2018.

Net profit and headline earnings increased by 69% to R21.32-billion and R16.31-billion respectively. To expand and sustain its business, Kumba spent R5.60-billion in 2019 (2018: R4.46-billion). To maintain liquidity, the company reduced its capital expenditure guidance for 2020 by R1-billion to between R5.60-billion and R6.10-billion.

Financial snapshot

	2019	2018
Revenue	R64.29-billion	R45.73-billion
Average export price	$97/t	$72/t
Earnings before interest, tax, depreciation and amortisation	R33.37-billion	R20.57-billion
Net profit	R21.32-billion	R12.60-billion
Headline earnings	R16.31-billion	R9.68-billion
Net cash position	R12.87-billion	R11.67-billion
Capital expenditure	R5.60-billion	R4.46-billion

Source: Compiled from Kumba financial statements

Picture by: Creamer Media

Kumba Iron Ore's Sishen iron-ore mine

Kumba distributed dividends to shareholders of R19.60-billion (2018: R12.50-billion). The miner delivered a payout ratio of 92% of headline earnings a share in 2019, exceeding its 50% to 75% dividend payout policy. Its final cash dividend of R15.99 a share, combined with an interim dividend of R30.79 a share, amounted to R46.78 a share for the year. In 2018, the dividend was R30.24 a share.

Kumba implemented a cost-savings plan in 2017 to save R2.60-billion by 2022. It initially announced a targeted saving of R960-million in 2020, but said in April that it was targeting an additional saving of R325-million in 2020.

Investment

Kumba is advancing an expansion plan for the Sishen mine through the R3-billion ultrahigh dense-medium separation (UHDMS) project. Initially, the project focused on boosting production by another six-million tonnes a year using an advanced beneficiation technology from the lower-grade resources previously classified as waste.

However, with AMSA closing its Saldanha Steelworks, the company has taken the time to re-evaluate the value proposition of the UHDMS project. It has identified that optimal value will be achieved through life-of-mine extension and leveraging the ability of UHDMS technology to increase the overall product quality.

The feasibility study has been extended until the second half of 2020 to recalibrate a portion of the detailed engineering design and include new value-add items. First production is expected to be achieved in the first half of 2023.

Exploration is also a key focus for Kumba. The two prospective targets, Ploegfontein and Heuningkranz, which will extend the Kolomela mine's life beyond 2030, continue to be explored.

Kumba has also secured access to explore neighbouring properties close to Kolomela with the option to take up to a 70% shareholding in the deposits, should its exploration activities prove successful.

ASSMANG

Assmang, a joint venture (JV) between mining and marketing company Assore and Patrice Motsepe's African Rainbow Minerals, is South Africa's second-biggest iron-ore producer.

Assmang owns the Khumani iron-ore mine, near Kathu, and the Beeshoek mine, near Postmasburg, both in the Northern Cape. It also operates manganese operations in the Northern Cape at Nchwaning and Gloria, as well as a manganese alloys facility at Cato Ridge, in KwaZulu-Natal, and at Machadodorp, in Mpumalanga.

Assmang's iron-ore production decreased from 18.58-million tons in the financial year ended June 30, 2018, to 17.79-million tons in 2019. The JV exported 14.43-million tons and sold 3.11-million tons locally. Its export lump/fines split is 60:40.

In the six months ended December 2019, iron-ore production increased by 17% year-on-year to 9.35-million tons, although sales volumes, at 7.75-million tons, were 11% lower than in the prior-year period, owing to the timing of shipments. Assore has explained that there were constraints at the Saldanha port.

Assore to delist from JSE

Mining company Assore, which has been listed on the JSE since 1950, has announced a transaction that will result in the minorities in the company being bought out and the company delisting from the exchange.

Commenting on the transaction, Assore CEO Charles Walters has said that the low liquidity of the share means that many institutional shareholders could not easily invest in the company and those who are invested could not easily trade out of the share.

Assmang, which Assore owns jointly with African Rainbow Minerals, provides three of Assore's four commodities – iron-ore, manganese ore and manganese alloys – and Assore's exposure to chrome ore is through its ownership of the Dwarsrivier chrome mine.

Assore's current shareholding structure comprises 52.40% by Oresteel Investments, owned by the Sacco family and Sumitomo of Japan, and 26.10% by black economic-empowerment (BEE) partners, with the remaining 21.50% free float being held by various minorities. Of this small free float, 4.10% is held by various members of the Sacco family in their individual capacities, leaving only 17.40% as a true minority free float.

The board is proposing a scheme of arrangement whereby the company will use its internal cash resources. The company recently reported R8-billion net cash on its balance sheet as at end December to buy back the 17.40% of its shares not held by Oresteel, BEE partners or the Sacco family.

The offer price is R320 a share, excluding the interim dividend of R7 a share for a total consideration of R7.80-billion, a 27% premium. Following the transaction, the shareholdings of Oresteel, the BEE partners and the Sacco family in Assore will be increased pro-rata to 63.40%, 31.60% and 5% respectively, and the company will be delisted from the JSE and run privately.

Source: *Mining Weekly*

The Beeshoek and Khumani mines were put on care and maintenance, and production ceased on March 26, in line with the South African government's lockdown period to help curb the spread of Covid-19.

Assmang continued to operate its iron-ore load-out facilities and railed on-mine stock to Saldanha port. On April 16, government announced that it would allow for a phase-up in mining capacity to 50% during the lockdown period.

Assmang has declared force majeure on customer, supplier and freight contracts, but has undertaken to pay all suppliers on time for goods and services received.

The Khumani mine struggles with water supply challenges. Assmang is engaging with the Sedibeng Water Board to address the challenges on the Vaal Gamagara Water System and is part of a collaborative team effort to recapitalise and upgrade the water system to ensure sufficient capacity and the sustainability of the system. The Sedibeng Water Board has approved a capital raising levy of R17.58/kℓ, to be charged from September 2019 for the 2020 and 2021 financial years, pending the finalisation of the offtake agreements with the respective mines and/or industries.

The Vaal Gamagara Water Supply Scheme entails a pipeline from Delportshoop to Black Rock over about 330 km. Phase 1 of the project is at construction stage.

Financial results

Iron-ore accounted for 59% of Assmang's revenue for the 2019 financial year. The JV benefitted from the higher crude steel production in China that maintained demand for iron-ore. Assmang delivered a strong increase in turnover from R27.55-billion in the 2018 financial year ended June to R35.61-billion in the 2019 financial year. The venture delivered a near R3-billion increase in its net profit, which rose from R7.07-billion in 2018 to R9.10-billion in 2019.

In the first half of 2020, Assmang recorded headline earnings of R3.70-billion (H1 2019: R4.30-billion).

Assmang sales summary

	Year ended June 2019	Year ended June 2018	% change
Total	17.54-million tons	17.87-million tons	(2%)
Export sales	14.43-million tons	14.30-million tons	1%
Domestic sales	3.11-million tons	3.57-million tons	(34%)

Source: ARM

Financial snapshot: Assmang joint venture		
	Year-ended June 2019	**Year-ended June 2018**
Turnover	R35.61-billion	R27.55-billion
Headline earnings	R3.89-billion	R2-billion
After-tax profit	R9.10-billion	R7.07-billion
Capital expenditure	R4.41 -billion	R3.08-billion
	Six-months ended December 2019	**Six-months ended December 2018**
Headline earnings	R3.70-billion	R4.30-billion
Capital expenditure	R2.10-billion	R1.98-billion

Source: Compiled from Assore information

The average index price for the first half of 2020 was $95/t, compared with $69/t during the first half of 2019. The "lumpy" premium weakened to $6/t during the first half of 2020, but recovered at the end of the period to $15/t as steel mills margins improved and restrictions on sintering plants in China supported demand for lumpy material.

The high iron-ore prices and weaker exchange rate helped increase the iron-ore division's attributable profit for the first half by 12% over the previous period.

Investment

Assmang's capital expenditure (capex) increased by 43% from R3.08-billion in the 2018 financial year to R4.41-billion in the 2019 financial year. In the iron-ore business, capex increased from R1.78-billion to R2.10-billion, with funds going to fleet and mining equipment replacement at Khumani and Beeshoek as part of the life cycle of machinery.

Assmang also reported increased capitalised waste stripping at the Khumani King and Beeshoek Village pits, with the stripping ratio for Khumani increasing to 2.22, while Beeshoek's ratio was 4.26. This compares with an average remaining life-of-mine stripping ratio of 2.75. Capitalised waste stripping also started at the Bruce pit of the Khumani mine.

The balance of Assmang's capex was spent in the manganese division.

Meanwhile, Assmang is studying self-generation of electricity for its mines, which are located in an area of South Africa that has significant solar power potential.

Mines have been granted permission by the State to generate energy for their own use without going through the cumbersome process of applying for a licence. To date, there have been administrative and regulatory barriers preventing mining companies from generating power for self-consumption, so this decision is a welcome shift in policy for the sector.

OTHERS

Besides Kumba Iron Ore and Assmang, several smaller companies have iron-ore operations in South Africa or are developing projects in the country. Other than Afrimat, these companies are not publicly listed and, thus, limited information is available.

Afrimat is listed on the JSE and owns the Demaneng mine, in the Northern Cape. The company acquired Demaneng, then known as Diro Iron Ore, in 2016 for R400-million, which includes rehabilitation costs. The iron-ore mine delivered an exceptional contribution to the group's results in the 2019 financial year, owing to favourable pricing of the high-grade ore that the mine produces.

The business has completed the recommissioning of both its inherited dense-media separation plants during the first half of the 2019 financial year, and completed the expansion of the load-out facility, reaching stable production volumes during the second half of the year. The mine has negotiated a 900 000 t/y export capacity with State-owned logistics provider Transnet.

Demaneng continued production with 50% of its workforce during the initial 35-day lockdown period. The mine ramped up to 100% capacity from mid-May.

Also in the Northern Cape is the Sedibeng mine, which is majority owned by Swiss-headquartered metals and mining company IMR Metallurgical Resources. India's Tata Steel sold its 63% share in the mine to IMR in February 2019. The other shareholders in the mine are the Cape Gannet consortium, with a 26% shareholding, and the State-owned Industrial Development Corporation, with 10%.

Autumn Skies Resources and Logistics also operates near Postmasburg. According to 2018 information, the mine was ramping up to 12-million tonnes a year.

Manngwe Mining launched its Assen iron-ore mine, near Brits, in the North West, in 2017. Boasting a measured resource of about 20-million tonnes, the mine produces about 60 000 t/m of saleable ore, according to 2019 information.

SOUTH AFRICA'S IRON-ORE EXPORT INFRASTRUCTURE

South Africa's iron-ore destined for export markets is transported on an 861-km-long heavy-haul line from the iron-ore mining hub of the Northern Cape, to the deep-water Port of Saldanha, on the West Coast.

The line, operated by State-owned logistics company Transnet Freight Rail (TFR), has a capacity of 60-million tonnes a year, although feasibility studies have been done for further expansions to 82.50-million tonnes.

The port at Saldanha Bay is the only dedicated iron-ore export facility in South Africa and is larger than the country's other four major ports combined. The ore quay at Saldanha has two berths where two vessels of 310 000 deadweight tonnage can simultaneously tie up at the iron-ore jetty.

The terminal operates 24/7 and has the capacity to offload 10 000 t/h onto a vessel. From arrival to departure an ore vessel carrying 170 000 t will be in Saldanha Bay for just 24 hours.

TFR transported 58.43-million tons in its 2019 financial year, ended March 31, down from 58.50-million tons in the previous financial year.

The main reason for the marginal decrease was a November 2018 bridge incident in which a truck collided with a railway bridge, resulting in a loss of 1.70-million tons in rail capacity. TFR is forecasting exports of 60-million tons in 2020.

Kumba Iron Ore is the biggest user of the dedicated iron-ore export line and transported 42-million tons of ore to the port in its financial year to December 31, 2019. That is an improvement of 3.40% from the 40.60-million tons of 2018.

Kumba said that its mines had focused on optimising the loading of the trains and reducing variability of the loads, as well as improving turnaround times at its load-out stations, which helped to improve reliability and stability in the system and increased the rate at which ore was railed to port.

Source: Kumba Iron Ore

Saldanha Bay iron-ore export facility

OUTLOOK

Picture by: Creamer Media

With hardly any market left untouched by the coronavirus pandemic, commodity markets are chartering uncertain times. Relatively strong Chinese demand has been supporting iron-ore prices in 2020, but uncertainty surrounding other economies is increasing.

The team of analysts at Fastmarkets, which provides an independent view on market developments, argues that although China managed to fight the virus, its economy is not immune to a global downturn, especially in a global steel market. This is a view shared by consultancy group Wood Mackenzie, which has warned that the risks are increasing for a glut of seaborne iron-ore on the back of a looming global economic recession.

Research group Fitch Solutions expects significant volatility in the iron-ore market, especially as China grapples with multiple objectives of bolstering economic growth and reining in financial risks in its economy. Supply chains are also disrupted and global demand for Chinese steel exports remains uncertain.

The coronavirus situation is fluid and in May there was concern that a second wave in the pandemic could require more lockdowns in China and elsewhere.

Ratings agency Moody's Investors Service says the outbreak exacerbates the already challenging operating environment for steelmakers worldwide. The broad macroeconomic weakness spreading in the wake of the pandemic is driving down demand for steel in core industries such as manufacturing, automotive, construction, and oil and gas exploration. Moody's had existing negative industry outlooks for the US, Europe and Asia, but also cut the outlook for the Russian and Brazilian steel industries to negative in April.

Assore believes that South Africa's high-quality iron-ore stands it in good stead in the turbulent economic times brought on by Covid-19.

"South African iron-ore quality is very good and perhaps superior to the majors of Brazil and Australia; so, we do, as South Africa, get a bit of a shield in terms of us possibly being the last ore that the market stops buying, but we'll always be pushed, from a price point of view, to where the spot market is trading," Assore CEO Charles Walters said in February, when the virus pummelled China. Iron-ore is South Africa's most important export to China, valued at R30-billion in 2019 (2018: R20.10-billion).

South Africa's iron-ore production will be affected by the lockdown that President Cyril Ramaphosa's government imposed at midnight on March 26, as part of efforts to flatten the curve of the Covid-19 pandemic. Assore has placed its two mines on care and maintenance during the lockdown period, while Kumba Iron Ore continued with 50% of its workforce and has said that the reduced capacity will have a two- to- three-million-ton impact on its production. Both companies continued to export iron-ore during the lockdown using stockpiles.

Covid-19-related restrictions were also announced in Canada and a national lockdown has been implemented in India, which could hamper the seaborne iron-ore supply side. Should production from these countries be significantly impacted on by coronavirus-related constraints, the price of iron-ore could spike.

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