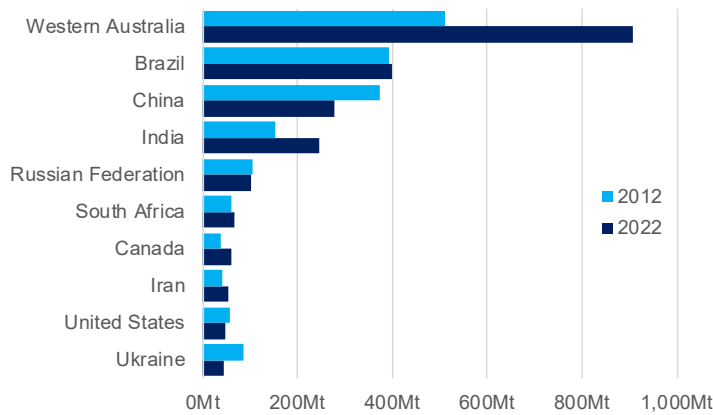




## WESTERN AUSTRALIA IRON ORE PROFILE – February 2023

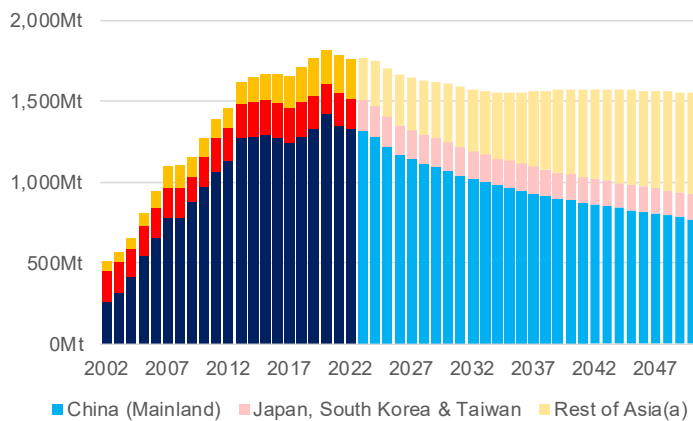
### Major global iron ore suppliers<sup>1</sup>: calendar years



Mt = Million tonnes. <sup>1</sup> Mined iron ore on a marketable tonne basis.  
Source: Wood Mackenzie, Global Iron Ore Investment Horizon Outlook – Q4 2022 (Quarterly).

- Western Australia is the largest iron ore supplier in the world, accounting for 38% of global supply in 2022, followed by Brazil (17%).
- China (12%), India (10%) and Russia (4%) are major global iron ore suppliers, but retain most of their iron ore for domestic steel manufacturing.
- In 2022, iron ore supply from:
  - Western Australia fell 1% to 908 million tonnes
  - Brazil fell 4% to 399 million tonnes
  - China fell 5% to 278 million tonnes
  - India rose 0.1% to 247 million tonnes
  - Russia fell 9% to 103 million tonnes
  - Ukraine fell 45% to 45 million tonnes.
- Western Australia's iron ore supply increased by 396 million tonnes between 2012 and 2022, which was greater than the increase in global iron ore supply over this period as supply fell from China and other countries.

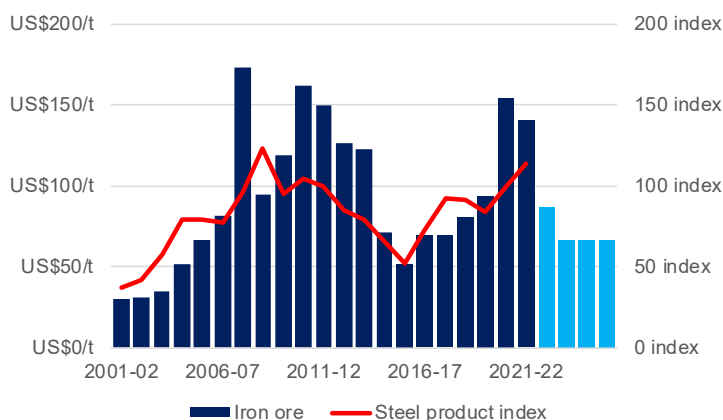
### Iron ore demand<sup>1</sup> in Asia: calendar years



Mt = Million tonnes. <sup>1</sup> Total iron ore consumption. (a) India, Indonesia, Vietnam and other Asian countries.  
Source: Wood Mackenzie, Global Iron Ore Investment Horizon Outlook – Q4 2022 (Quarterly).

- Asia accounted for 79% of global iron ore demand in 2022. Among Asian countries, China (60%), India (9%), Japan (4%) and South Korea (3%) had the largest shares of global iron ore demand.
- In 2022, Asia's iron ore demand fell 2% to 1,761 million tonnes. Within Asia, iron ore demand from:
  - China fell 1% to 1,331 million tonnes
  - Japan, South Korea and Taiwan combined fell 8% to 186 million tonnes
  - Rest of Asia rose 1% to 244 million tonnes.
- Wood Mackenzie forecasts Asia's iron ore demand will fall by 207 million tonnes between 2022 and 2050, with the forecast decrease in demand over this period from China (down 556 million tonnes) and Japan, South Korea and Taiwan combined (down 34 million tonnes) more than offsetting forecasted higher demand from the rest of Asia (up 383 million tonnes).

### Iron ore<sup>1</sup> and steel product<sup>2</sup> prices: financial years<sup>3</sup>

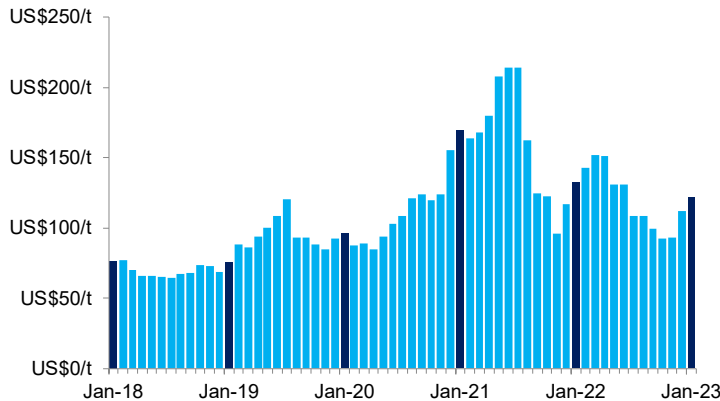


<sup>1</sup> The benchmark (62% iron content) iron ore price delivered to China inclusive of cost and freight. <sup>2</sup> China steel product price index (2011-12 = 100.0). <sup>3</sup> Annual average.  
Source: World Bank, Commodity Markets (Monthly); CEIC, China Premium Database (Monthly); and 2022-23 WA Government Mid-year Financial Projections Statement (December 2022).

- Iron ore and steel product prices tend to move in the same direction because iron ore is the most significant input in the steel-making process. However, steel product prices are affected by other input costs, such as other raw materials (coking coal), labour and energy, as well as steel demand and competition between steel producers.
- In 2021-22, the average iron ore price fell 10% to US\$140 a tonne despite steel product prices rising 14%. Weaker steel demand and temporary reductions in steel production capacity in China saw iron ore prices fall in 2021-22. Increases in iron ore supply from Australia and Brazil also contributed in lower iron ore prices in 2021-22. The rise in Chinese steel product prices in 2021-22 was due to increases in the costs of non-iron ore inputs.
- The 2022-23 WA Government Mid-year Financial Projections Statement forecasts the iron ore price will average US\$87.4 a tonne in 2022-23 as it returns to its long-term annual average of US\$66 a tonne in 2023-24.



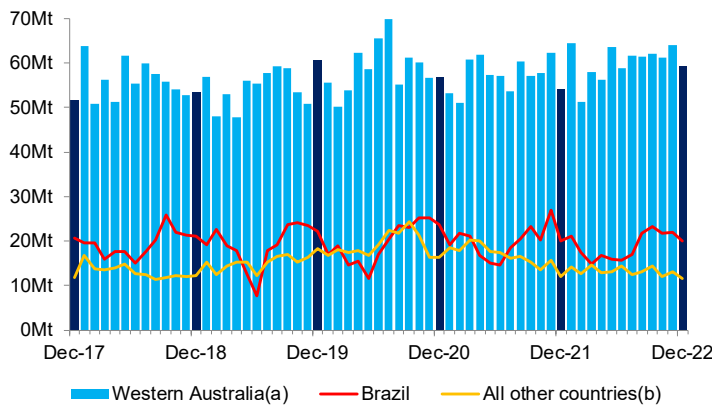
### Iron ore<sup>1</sup> prices: months



<sup>1</sup> The benchmark (62% iron content) iron ore price delivered to China inclusive of cost and freight.  
Source: World Bank, Commodity Markets (Monthly).

- The average monthly price of iron ore increased significantly over the three months to January 2023, as China's demand for iron ore rose following the introduction of stimulus measures for its property sector and the removal of COVID-19 restrictions.
- In January 2023, the average monthly iron ore price rose 9.3% to US\$122.2 a tonne.
- In 2022, the average annual price of iron ore fell 25.0% to US\$121.3 a tonne.

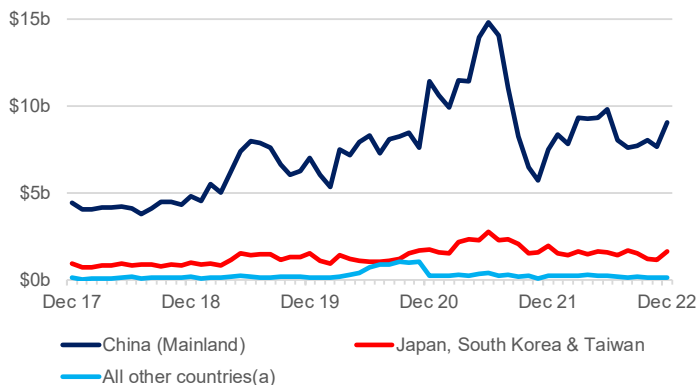
### China's iron ore imports: months



(a) Estimated as 99% of Australia's iron ore imports by China. (b) Includes mainly South Africa, India, Peru, Ukraine, Canada and Chile. <sup>1</sup> Excludes Western Australia and Brazil.  
Source: CEIC, China Premium Database (Monthly).

- China imported 83% of the iron ore it consumed in 2022, with the rest coming from domestic production.
- China's iron ore imports fell 8.1% (8.0 million tonnes) to 91 million tonnes in December 2022.
- The decrease in China's iron ore imports in December 2022 was the result of supply from:
  - Western Australia falling by 4.7 million tonnes (7.4%) to 59 million tonnes
  - Brazil falling by 1.8 million tonnes (8.4%) to 20 million tonnes
  - All other countries<sup>1</sup> falling by 1.4 million tonnes (11.0%) to 12 million tonnes.
- Western Australia's share of China's iron ore imports remained at 65% in December 2022.

### Western Australia's iron ore exports by market: months

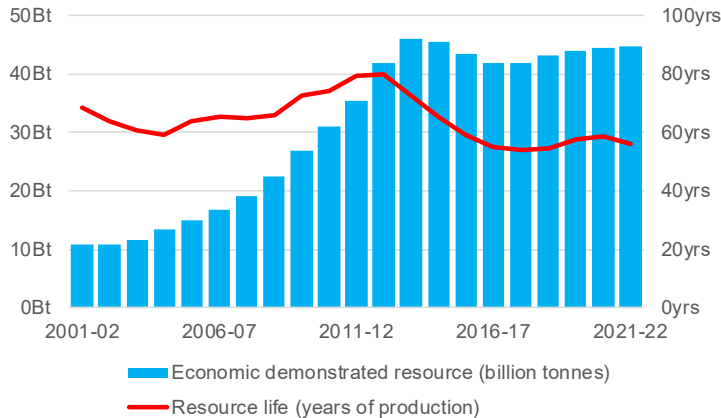


(a) Includes mainly Vietnam, Singapore, Hong Kong (SAR of China), Indonesia, Malaysia and India.  
Source: Based on data from ABS 5368.0 International Trade in Goods and Services, Australia (Monthly).

- The value of Western Australia's iron ore exports to China rose 17.5% to \$9.0 billion in December 2022.
- The value of Western Australia's iron ore exports to Japan, South Korea and Taiwan combined rose 42.9% to \$1.7 billion in December 2022.
- The value of Western Australia's iron ore exports to all other countries<sup>(a)</sup> rose 5.9% to \$150 million in December 2022, due to an increase in iron ore exports to Indonesia.



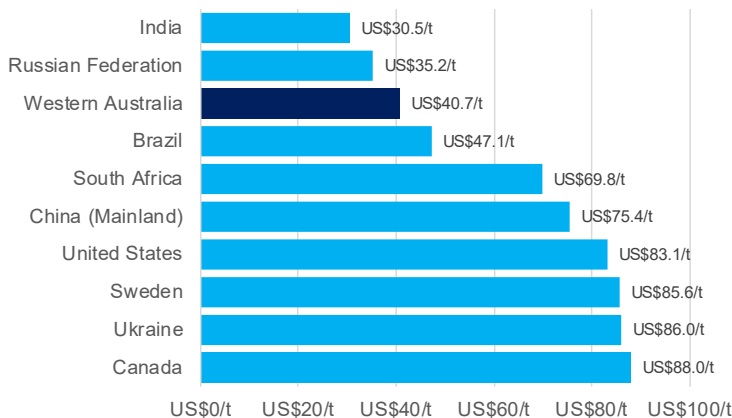
### Western Australia's iron ore resources<sup>1</sup>: financial years



<sup>1</sup> Estimated as 86% of Australia's economic demonstrated iron ore resources taken from Geoscience Australia's Australia's Identified Mineral Resources 2021. <sup>2</sup> US Geological Survey.  
Source: Based on data from ABS 5204.0 Australian System of National Accounts (Annual).

- Western Australia has large iron ore reserves, accounting for 24% of the world's crude iron ore reserves in the 2022 calendar year.<sup>2</sup>
- Western Australia had an estimated 44.7 billion tonnes of economic demonstrated iron ore resource in 2021-22, which could sustain production for 56 years at 2021-22 production rates.
- Western Australia's reserves had an average iron content of 49% in 2021, above the world average of 47%.<sup>2</sup>
- Western Australia's iron ore production had an average iron content of 62% in 2021, in line with the world average of 62%.<sup>2</sup>
- The value of Western Australia's exploration expenditure on iron ore rose 23% to \$649 million in 2022.

### Total cash cost<sup>1</sup> of global iron ore production<sup>2</sup>: 2022 calendar year



<sup>1</sup> Total cash cost per dry metric tonne in US dollars, cost and freight (CFR). <sup>2</sup> Includes the ten largest iron ore producers only. <sup>3</sup> Wood Mackenzie, Global Iron Ore Investment Horizon Outlook – Q4 2022 (Quarterly).  
Source: S&P Global Market Intelligence (Annual).

- Western Australia's iron ore miners are among the world's lowest cost seaborne iron ore exporters.
- The average total cash cost of Western Australia's iron ore exports was US\$40.7 a tonne in 2022, below the world average of US\$52.1 a tonne, and below its main competitor in Brazil (US\$47.1 a tonne).
- Western Australia's major iron ore ports are close to the largest iron ore markets in Asia, reducing shipping costs relative to some of its competitors.
- The iron ore freight rate for capesize vessels from Western Australia to China fell 19% to an average of US\$9.7 a wet tonne in 2022, well below the iron ore freight rate for capesize vessels from Brazil to China of US\$24.3 a wet tonne in 2022.<sup>3</sup>

### Major iron ore projects<sup>1</sup> in Western Australia

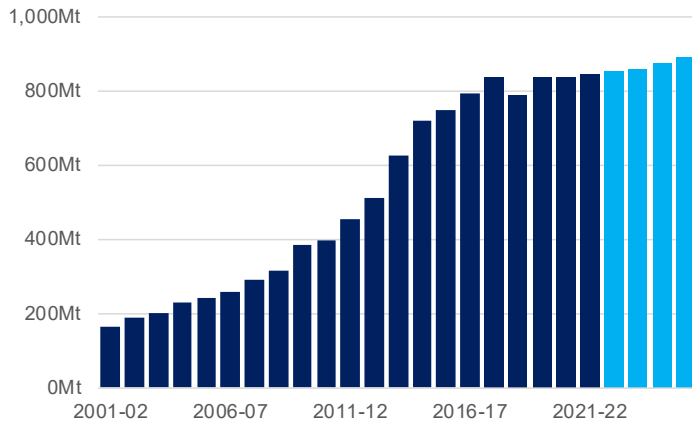
Operator	Mine/deposit	Capital expenditure (\$m)	Capacity (Mtpa)	Grade (Fe content) <sup>2</sup>	Start of operations
<b>Recently completed</b>					
FMG	Eliwana	1,800	30	60	2020
GWR Group	Wiluna West	200	10	60	2020
Atlas Iron	Sanjiv Ridge	53	5	57	2020
BHP	South Flank	4,700	80	62	2021
Rio Tinto	West Angelas C+D	735	n.a.	62	2021
Mt Gibson	Shine	20	1.5	59	2021
Rio Tinto	Western Turner Syncline 2	1,000	30	62	2021
Rio Tinto	Gudai-Darri	4,300	43	59	2022
Rio Tinto	Robe Valley	1,200	n.a.	62	2022
<b>Under construction or committed</b>					
FMG	Iron Bridge 2*	5,000	22	67	2023
MRL	Onslow Iron	2,500	30	58	2023
Rio Tinto	Western Range	3,000	25	62	2025

Mtpa = million tonnes per annum. n.a. – not available or not applicable. \* Magnetite. <sup>1</sup> Includes mines and rail and port infrastructure. <sup>2</sup> Product grade if available, otherwise reserve grade for direct shipping ores.  
Source: S&P Global Market Intelligence; Wood Mackenzie, Global Iron Ore Investment Horizon Outlook – Q3 2022; and company investor information (announcements, reports and presentations).

- Rio Tinto's Gudai-Darri project delivered first ore in June 2022 and will ramp up production to 43 million tonnes a year in 2023 (with a potential expansion to 70 million tonnes a year). Rio Tinto started developing its Western Range project in early 2023, with annual production of 25 million tonnes of iron ore expected to start in 2025. Rio Tinto will also complete an Order of Magnitude study in 2023 to develop the Rhodes Ridge deposit to produce 40 million tonnes of iron ore a year post-2030.
- BHP completed its development of South Flank in May 2021, which is ramping up production to 80 million tonnes a year by 2024. BHP is studying options to develop its Western Ridge deposits adjacent to Mt Whaleback. The project would add 20 million tonnes a year of production, replacing production volumes from the Orebody 24 mine.
- Fortescue Metals Group (FMG) is developing Iron Bridge (Magnetite) Stage 2, which is due to start operations at the end of the March quarter 2023.
- Construction on Mineral Resources Limited's (MRL) Onslow Iron project began in August 2022. Iron ore shipments from the project are expected to start in December 2023.



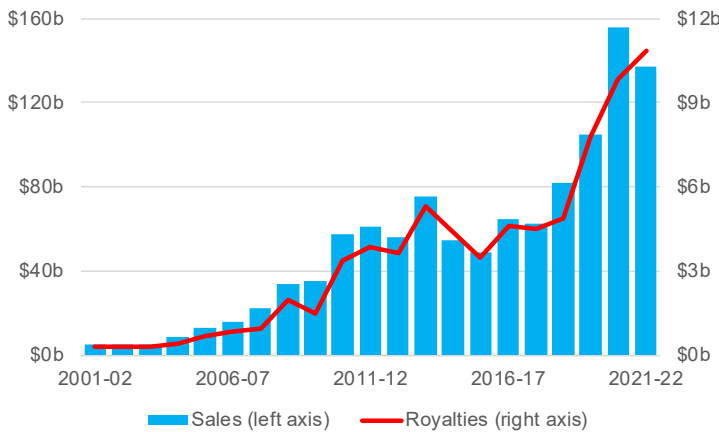
### Western Australia's iron ore sales: financial years



Mt = Million tonnes.  
Source: WA Department of Mines, Industry Regulation and Safety, Resource Data Files (Bi-Annual); and 2022-23 WA Government Mid-year Financial Projections Statement (December 2022).

- The volume of Western Australia's iron ore sales rose 0.6% to 844 million tonnes in 2021-22.
- The 2022-23 WA Government Mid-year Financial Projections Statement forecasts Western Australia's iron ore sales volumes will rise to 892 million tonnes in 2025-26.
- According to S&P Global Market Intelligence, Western Australia produced mainly iron ore fines (72%) in 2022, followed by lump (25%) and concentrate (3%).
- Western Australia's major iron ore fines products in 2022 were FMG's Chichester Hub Fines (91.5 million tonnes), BHP's Mining Area C Fines (81.8 million tonnes) and Rio Tinto's Yandicoogina Fines (54.6 million tonnes).
- Western Australia's major iron ore lump products in 2022 were BHP's Mining Area C Lump (35.3 million tonnes), Rio Tinto's Brockman Lump (26.1 million tonnes) and Hancock Prospecting's Roy Hill Lump (23.9 million tonnes).
- Western Australia also produced iron ore concentrates in 2022 from CITIC Pacific's Sino Iron (19.1 million tonnes) and Gindalbie's Karara (7.5 million tonnes) operations.

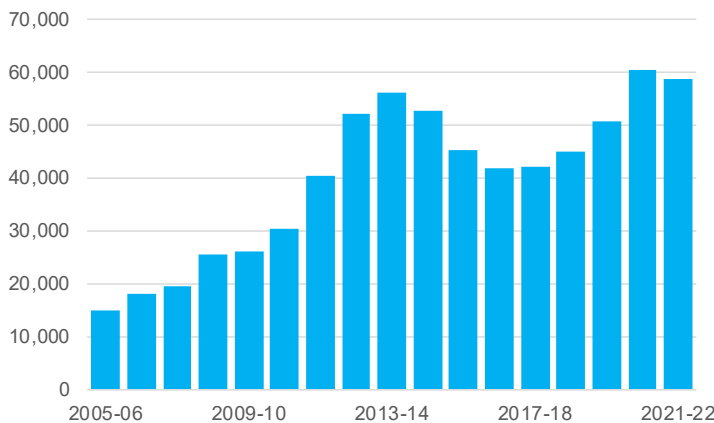
### Western Australia's iron ore sales and royalty revenue: financial years



<sup>1</sup> Regulation 86A of the Mining Regulations 1981 requires that royalties be paid within 30 days following the end of a quarter. As a result, cash receipts are necessarily offset by one quarter. <sup>2</sup> Includes North West Shelf Grants.  
Source: WA Department of Mines, Industry Regulation and Safety, Resource Data Files (Bi-Annual).

- The iron ore industry is a large part of Western Australia's economy, accounting for an estimated 29% of the State's gross state product in 2021-22.
- In 2021-22, iron ore accounted for 55% of the value of Western Australia's exports of goods.
- The value of Western Australia's iron ore sales fell 12% to \$137.1 billion in 2021-22, in contrast to the compound annual growth of 8% over the past 10 years.
- Iron ore royalties in Western Australia rose 11% to \$10.8 billion in 2021-22. The increase in royalties despite the fall in sales value in 2021-22 is due to a lag between the time of sale and the time of royalty payment<sup>1</sup>; that is, a portion of the royalties accrued in the last months of the 2020-21 financial year (when iron ore prices were very high) were not paid until the 2021-22 financial year.
- In 2021-22, iron ore accounted for 85% of Western Australia's royalty revenue<sup>2</sup> and 25% of State government general revenue.

### Western Australia's iron ore industry employment<sup>1</sup>: financial years

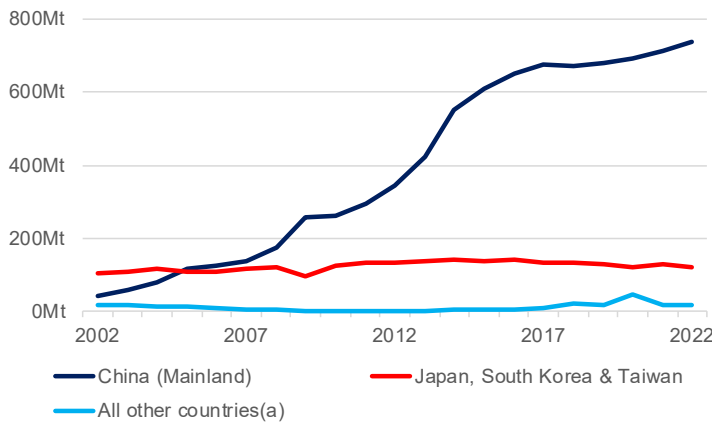


<sup>1</sup> Direct employment. Full-time equivalent (average on site).  
Source: WA Department of Mines, Industry Regulation and Safety, Resource Data Files (Bi-Annual).

- Direct full-time equivalent employment in Western Australia's iron ore industry fell 3% (1,661) to 58,828 in 2021-22.
- Iron ore accounted for 50% of direct full-time equivalent employment in Western Australia's minerals mining industry in 2021-22 (excluding exploration).
- Western Australia's largest employing iron ore mine sites in 2021-22 were:
  - FMG's Solomon (4,274 or 7.2% of iron ore employment in Western Australia)
  - BHP's Mining Area C (3,624 or 6.1%)
  - Hancock Prospecting's Roy Hill (3,374 or 5.7%)
  - FMG's Christmas Creek (3,005 or 5.0%)
  - FMG's Cloudbreak (2,992 or 5.0%)
  - Mount Bruce's East Pilbara (2,919 or 4.9%)
  - CITIC Pacific's Sino Iron (2,905 or 4.9%)
  - BHP's Newman (- 2,715 or 4.6%)
  - IB's Port Hedland (2,293 or 3.9%)
  - Rio Tinto's Brockman 2 and Nammuldi (2,205 or 3.7%).



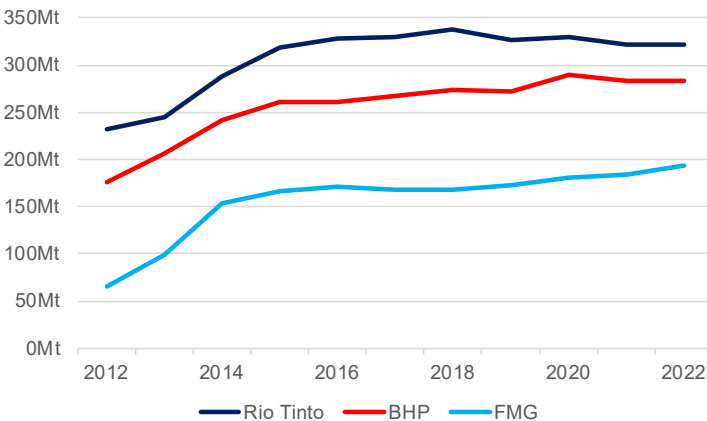
### Western Australia's iron ore exports by market: calendar years



Mt = Million tonnes. (a) Includes mainly Vietnam, Indonesia, Singapore, Hong Kong (SAR of China), Malaysia and India.  
<sup>1</sup> Excludes China, Japan, South Korea and Taiwan.  
 Source: Based on data from ABS 5368.0 International Trade in Goods and Services, Australia (Monthly).

- Western Australia's iron ore industry has established long-term trade relationships across Asia.
- China is Western Australia's largest iron ore market, accounting for 84% of iron ore export volumes in 2022. The volume of Western Australia's iron ore exports to China rose 3% to 736 million tonnes in 2022.
- The volume of Western Australia's iron ore exports to Japan, South Korea and Taiwan combined fell 8% to 120 million tonnes in 2022.
- The volume of Western Australia's iron ore exports to all other countries<sup>1</sup> fell 5% to 17 million tonnes in 2022.
- In 2022, Western Australia accounted for the majority of iron ore imported by China (68%), Japan (53%) and South Korea (63%).

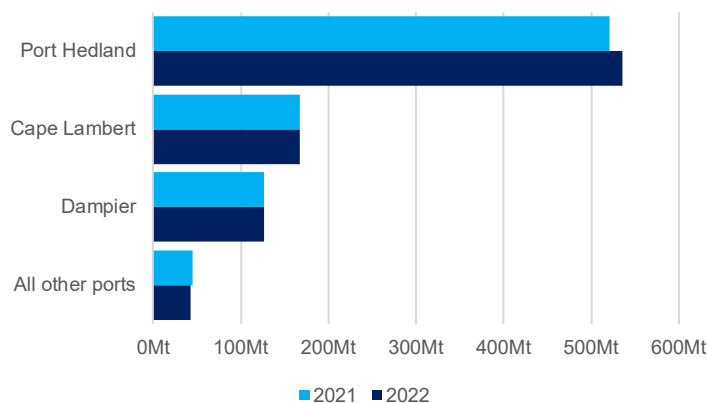
### Western Australia's iron ore sales by major producer<sup>1</sup>: calendar years



Mt = Million tonnes. <sup>1</sup> Western Australian operations only. Inclusive of third party tonnes. Wet tonnes.  
 Source: Rio Tinto, BHP and Fortescue Metals Group Investor Information, Operations reports (Quarterly).

- Rio Tinto, BHP and FMG are the largest global iron ore producers behind Vale from Brazil.
- Rio Tinto's iron ore sales volumes from Western Australia rose 0.01% to 322 million tonnes in 2022. Production guidance for 2023 is 320 to 335 million tonnes. Rio Tinto's rail and port capacity is 360 million tonnes a year and it is developing new mines so its production meets this capacity.
- BHP's iron ore sales volumes from Western Australia fell 0.3% to 283 million tonnes in 2022. Production guidance for 2022-23 is 278 to 290 million tonnes. BHP is expanding its port capacity to 330 million tonnes a year.
- FMG's iron ore sales volumes from Western Australia rose 4.4% to 193 million tonnes in 2022 and its sales guidance for 2022-23 is 187 to 192 million tonnes. FMG is expanding its port capacity to 210 million tonnes a year for the additional production from its Iron Bridge project.

### Western Australia's iron ore exports by port: calendar years



Mt = Million tonnes.  
 Source: Based on data from ABS 5368.0 International Trade in Goods and Services, Australia (Monthly).

- Port Hedland, the world's largest bulk export port, accounted for 61% of Western Australia's iron ore sales volumes in 2022. The next largest ports in Western Australia for iron ore sales volumes in 2022 were Cape Lambert (19%) and Dampier (15%).
- In 2022, the volume of iron ore exports from:
  - Port Hedland rose 3% to 536 million tonnes
  - Cape Lambert rose 0.1% to 167 million tonnes
  - Dampier rose 0.04% to 127 million tonnes
  - All other ports fell 5% to 43 million tonnes.
- Rio Tinto expanded Cape Lambert and Dampier in 2015, raising annual capacity to 210 million tonnes and 150 million tonnes respectively. The Port of Port Hedland is planning to increase iron ore export capacity to 660 million tonnes a year. FMG has approval to expand its material handling capacity at Herb Elliott Port to 210 million tonnes a year.