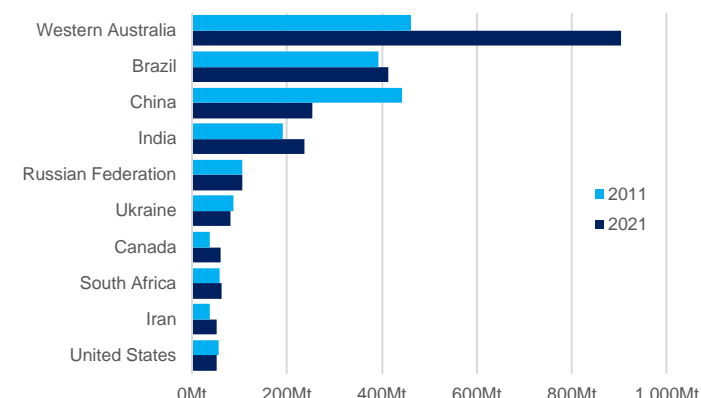




## WESTERN AUSTRALIA IRON ORE PROFILE – December 2021

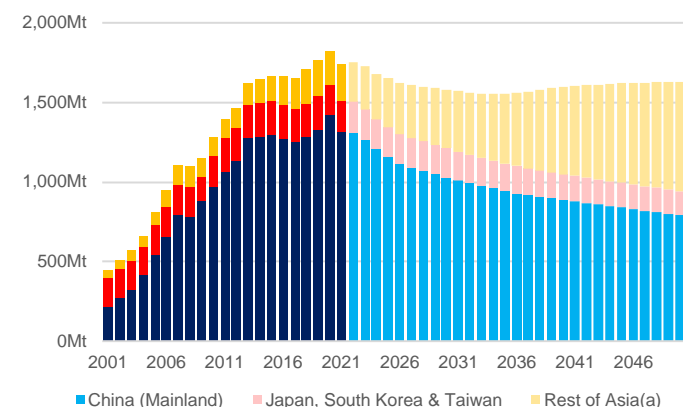
### Major global iron ore suppliers<sup>1</sup>: Calendar years



Mt = Million tonnes. <sup>1</sup> Mined iron ore on a marketable tonne basis.  
Source: Wood Mackenzie, Global Iron Ore Markets Iron Ore Q4 2021 (Quarterly).

- Western Australia is the largest iron ore supplier in the world, accounting for 38% of global supply in 2021, followed by Brazil (17%).
- China (11%), India (10%) and the Russian Federation (4%) are major global iron ore suppliers, but retain most of their iron ore for domestic steel manufacturing.
- In 2021, iron ore supply from:
  - Western Australia fell 1% to 905 million tonnes.
  - Brazil rose 8% to 413 million tonnes.
  - China fell 12% to 254 million tonnes.
  - India rose 15% to 237 million tonnes.
- Western Australia's iron ore supply increased by 443 million tonnes between 2011 and 2021, which was greater than the increase in global iron ore supply over this period as supply fell from China and other countries.

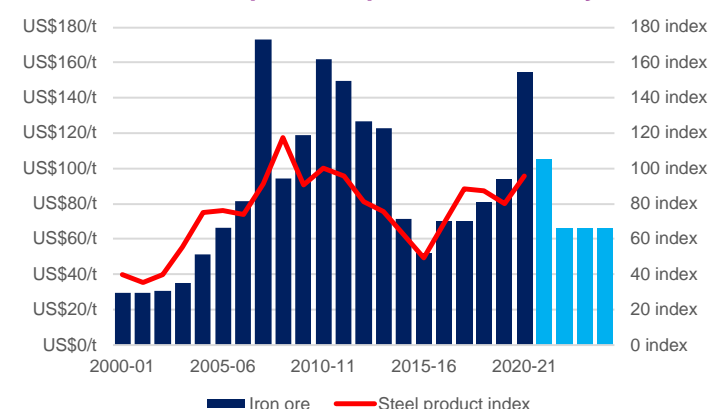
### Iron ore demand<sup>1</sup> in Asia: Calendar years



Mt = Million tonnes. <sup>1</sup> Total iron ore consumption. (a) India, Indonesia, Vietnam and other Asian countries.  
Source: Wood Mackenzie, Global Iron Ore Markets Iron Ore Q4 2021 (Quarterly).

- Asia accounted for 78% of global iron ore demand in 2021, with China (59%), India (9%), Japan (5%) and South Korea (3%) having the largest shares of world demand in Asia.
- In 2021, Asia's iron ore demand fell 4% to 1,742 million tonnes. Within Asia, iron ore demand from:
  - China fell 8% to 1,314 million tonnes.
  - Japan, South Korea and Taiwan combined rose 7% to 196 million tonnes.
  - Rest of Asia rose 9% to 232 million tonnes.
- Wood Mackenzie forecasts Asia's iron ore demand will fall by 112 million tonnes between 2021 and 2050, with the forecast increase in demand from the rest of Asia (455 million tonnes) being more than offset by forecasted lower demand from China (down 522 million tonnes) and Japan, South Korea and Taiwan combined (down 45 million tonnes).

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

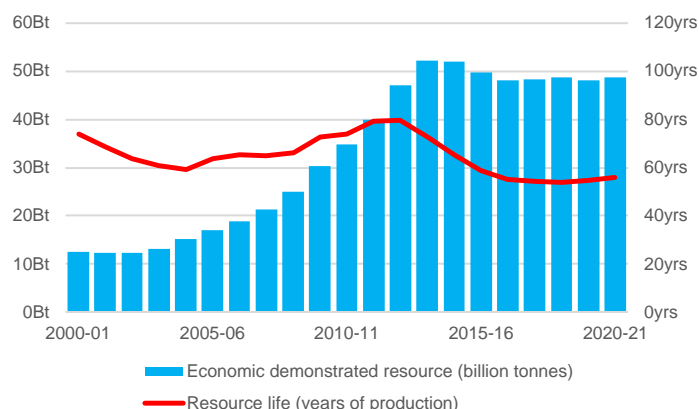


<sup>1</sup> China spot price in nominal US dollars, cost and freight (CFR). <sup>2</sup> China steel product price index (2010-11 = 100.0). <sup>3</sup> Annual average.  
Source: World Bank, Commodity Markets (Monthly); CEIC, China Premium Database (Monthly); and WA Government Mid-year Financial Projections Statement 2021-22 (December 2021).

- In 2020-21, the iron ore price rose 65% to US\$155 a tonne and steel product prices rose 19%. Strong Chinese steel demand and disruptions to Brazilian iron ore supply raised prices for iron ore and steel in 2020-21.
- In November 2021, the average monthly iron ore price fell 21.7% to US\$96 a tonne, coinciding with steel product prices falling 11.9%.
- The WA Government Mid-year Financial Projections Statement 2021-22 forecasts the price of iron ore delivered to north China (including cost and freight) will average US\$105 a tonne in 2021-22, as it starts to return to its long-term annual average of US\$66 a tonne in 2022-23 and 2023-24.



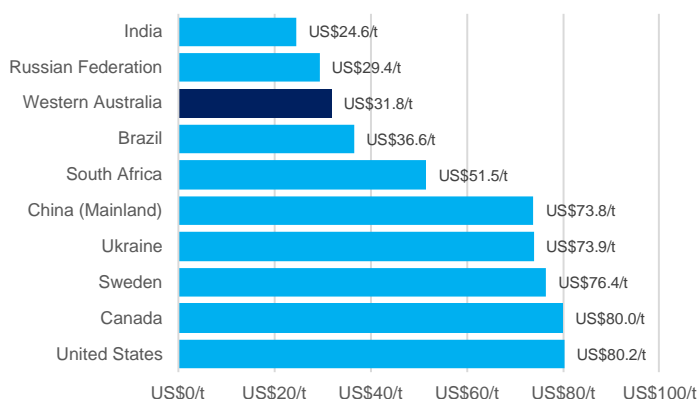
## Western Australia's iron ore resources<sup>1</sup>: Financial years



<sup>1</sup> Estimated from Australia's iron ore resources using Western Australia's share of Australia's iron ore production. <sup>2</sup> US Geological Survey.  
Source: ABS 5204.0 Australian System of National Accounts (Annual).

- Western Australia has large iron ore reserves, accounting for 28% of the world's crude iron ore reserves in 2020.<sup>2</sup>
- Western Australia had an estimated 48.8 billion tonnes of economic demonstrated iron ore resource in 2020-21, which could sustain production for 56 years (at 2020-21 production rates).
- Western Australia's reserves had an average iron content of 48% in 2020, in line with the world average of 48%.<sup>2</sup>
- Western Australia's iron ore production had an average iron content of 62% in 2020, in line with the world average of 62%.<sup>2</sup>
- The value of Western Australia's exploration expenditure on iron ore rose 30% to \$455 million in 2020-21, compared with its compound annual decline of 2% over the past 10 years.

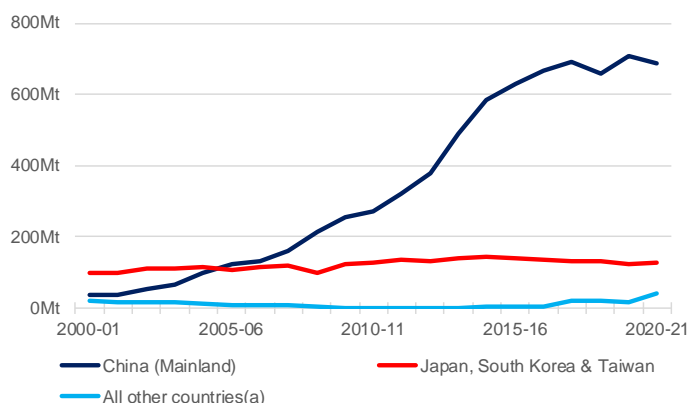
## Total cash cost<sup>1</sup> of global iron ore production<sup>2</sup>: 2021 calendar year



<sup>1</sup> Total cash cost per dry metric tonne in US dollars, cost and freight (CFR). <sup>2</sup> Includes the 10 largest iron ore producers only.  
Source: S&P Global Market Intelligence, Mine Economics Model (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\$31.8 a tonne in 2021, below the world average of US\$41.8 a tonne, and below its main competitor in Brazil (US\$36.6 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.
- According to Wood Mackenzie, the iron ore freight rate from Western Australia to China rose 84% to an average of US\$12.2 a wet tonne in 2021, well below the iron ore freight rate from Brazil to China of US\$27.1 a wet tonne in 2021.

## Western Australia's major markets for iron ore exports: Financial years

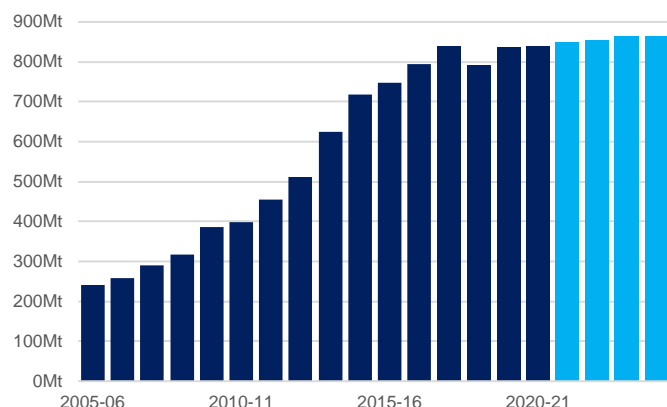


Mt = Million tonnes. (a) Included mainly Hong Kong (SAR of China), Singapore, Vietnam, Indonesia and Malaysia in 2020-21.  
<sup>1</sup> Excludes China, Japan, South Korea and Taiwan.  
Source: ABS 5368.0 International Trade in Goods and Services, Australia (Monthly).

- 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 80% of iron ore export volumes in 2020-21.
- The volume of Western Australia's iron ore exports to China fell 3% to 688 million tonnes in 2020-21.
- The volume of Western Australia's iron ore exports to Japan, South Korea and Taiwan combined rose 4% to 128 million tonnes in 2020-21.
- The volume of Western Australia's iron ore exports to all other countries<sup>1</sup> rose 134% to 42 million tonnes in 2020-21, mainly driven by increased volumes to Hong Kong (SAR of China) and Singapore. However, it is likely that most iron ore exported to Hong Kong (SAR of China) and Singapore is re-exported to China.
- In 2020, Western Australia accounted for the majority of iron ore imported by China (59%), Japan (52%) and South Korea (75%).

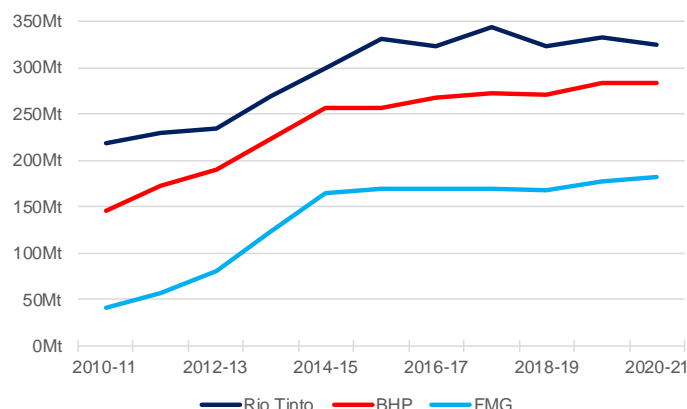


## Western Australia's volume of iron ore sales: Financial years



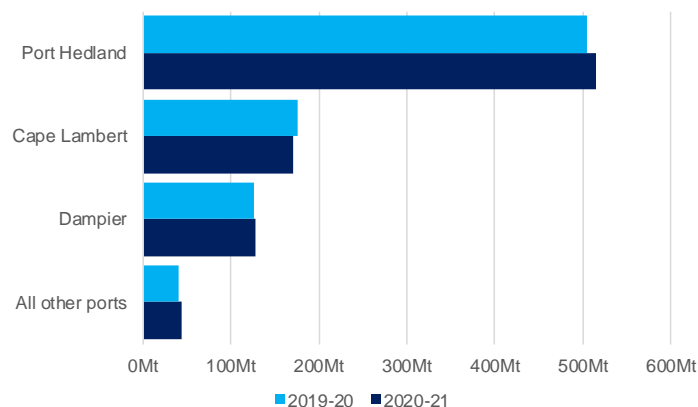
Mt = Million tonnes.  
Source: WA Department of Mines, Industry Regulation and Safety, Resource Data Files (Bi-Annual); and WA Government Mid-year Financial Projections Statement 2021-22 (December 2021).

## Western Australia's volume of iron ore sales by major producer<sup>1</sup>: Financial 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).

## Western Australia's major ports for iron ore exports: Financial years



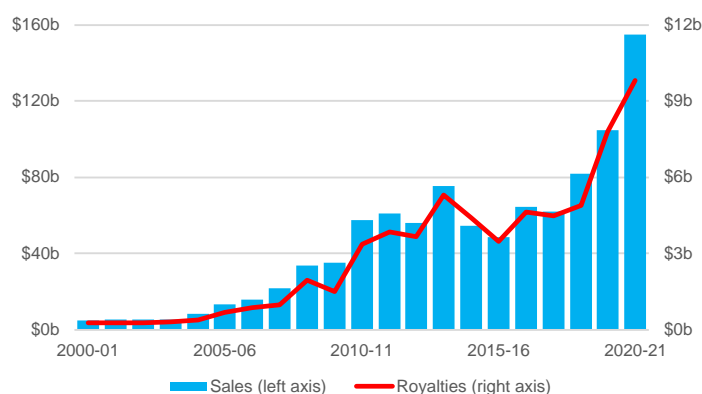
Mt = Million tonnes.  
Source: ABS 5368.0 International Trade in Goods and Services, Australia (Monthly).

- The volume of Western Australia's iron ore sales rose 0.2% to 839 million tonnes in 2020-21.
  - The WA Government Mid-year Financial Projections Statement 2021-22 forecasts Western Australia's iron ore sales volumes will rise to 862 million tonnes in 2024-25.
  - According to S&P Global, Western Australia produced mainly iron ore fines (72%) in 2021, followed by lump (25%) and concentrate (3%).
  - Western Australia's major iron ore fines products in 2021 were FMG's Chichester Hub Fines (91.5 million tonnes), FMG's Solomon Hub Fines (62.7 million tonnes), BHP's Mining Area C Fines (55.6 million tonnes) and Rio Tinto's Yandicoogina Fines (54.6 million tonnes).
  - Western Australia's major iron ore lump products in 2021 were Rio Tinto's Brockman Lump (26.1 million tonnes), Hancock Prospecting's Roy Hill Lump (23.2 million tonnes) and BHP's Mining Area C Lump (21.3 million tonnes).
  - Western Australia also produced iron ore concentrates in 2021 from CITIC Pacific's Sino Iron (19.7 million tonnes) and Gindalbie's Karara (7.5 million tonnes) operations.
- 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 fell 2% to 325 million tonnes in 2020-21 due to above average rainfall, shutdowns to tie-in new mines, lower processing capacity and cultural heritage management. Production guidance for 2021 is 320 to 325 million tonnes. Rio Tinto's rail and port capacity is 360 million tonnes a year and it is developing new mines so its production can meet this capacity.
  - BHP's iron ore sales volumes from Western Australia rose 0.2% to 284 million tonnes in 2020-21 and its production guidance for 2021-22 is 278 to 288 million tonnes. BHP received regulatory approval in September 2021 to expand its port capacity to 330 million tonnes a year and will begin port debottlenecking in the December quarter 2021.
  - FMG's iron ore sales volumes from Western Australia rose 2% to 182 million tonnes in 2020-21 and its sales guidance for 2021-22 is 180 to 185 million tonnes. FMG is expanding its port capacity to 210 million tonnes a year to allow for the additional production from its Iron Bridge development.

- Port Hedland is the largest bulk export port in the world.
- Over 60% of Western Australia's iron ore sales volumes were exported from Port Hedland in 2020-21, followed by Cape Lambert (20%), Dampier (15%) and all other ports (5%).
- In 2020-21, the volume of iron ore exports from:
  - Port Hedland rose 2% to 516 million tonnes.
  - Cape Lambert fell 3% to 170 million tonnes.
  - Dampier rose 0.4% to 127 million tonnes.
  - All other ports rose 11% to 44 million tonnes.
- Rio Tinto expanded Cape Lambert and Dampier in 2015, raising annual capacity to 210 million tonnes and 150 million tonnes respectively. Annual shipping capacity in Port Hedland increased to 617 million tonnes in 2019 due to investment in port dredging, marine technology and other port efficiencies. FMG has approval to expand its material handling capacity at Herb Elliott Port, from 175 million tonnes a year to 210 million tonnes a year.



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



<sup>1</sup> Includes North West Shelf Grants.

Source: WA Department of Mines, Industry Regulation and Safety, Resource Data Files (Bi-Annual).

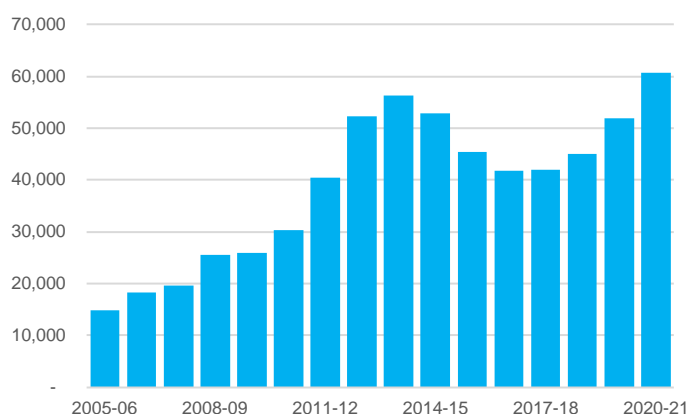
## Major iron ore projects<sup>1</sup> in Western Australia

Operator	Mine/deposit	Capital expenditure (\$m):	Capacity (Mtpa)	Grade (Fe content) <sup>2</sup>	Start of operations
<b>Recently completed</b>					
FMG	Solomon Hub	9,600	70	58	2013
Indalbie	Karara*	2,600	8-16	66	2013
CITIC Pacific	Sino Iron*	12,000	24	66	2013
BHP	Jimblebar	3,800	35-55	63	2013
Rio Tinto	Nammuldi	2,200	10-20	62	2014
Hancock Prospecting	Roy Hill	13,700	55-60	61	2015
Rio Tinto	Silvergrass	338	10-20	62	2017
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
<b>Under construction or committed</b>					
Rio Tinto	Robe Valley	1,200	n.a.	62	2022
Rio Tinto	Gudai-Darri	3,600	43	59	2022
FMG	Iron Bridge 2*	4,600	22	67	2022
FMG	Queens Valley	400	n.a.	58	2022

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 Markets Long-term Outlook Data; and company investor information (announcements, reports and presentations).

## 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).

- The iron ore industry is a large part of Western Australia's economy, accounting for 25% of gross state product in 2019-20.
- In 2020-21, iron ore accounted for 67% of the value of Western Australia's exports of goods.
- The value of Western Australia's iron ore sales rose 48% to \$154.7 billion in 2020-21, above compound annual growth of 10% over the past 10 years.
- Iron ore accounted for 89% of Western Australia's royalty revenue<sup>1</sup> and 28% of State government general revenue in 2020-21.
- Iron ore royalties in Western Australia rose 26% to \$9.8 billion in 2020-21.

- Western Australia has around \$10 billion of major iron ore projects under construction or committed.
- Rio Tinto's Western Turner Syncline 2 project started operating in November 2021. Rio Tinto's Gudai-Darri project is expected to start production in the March quarter 2022 and reach full capacity of 43 million tonnes a year in 2023. Rio Tinto is also proposing to expand production at Gudai-Darri to 70 million tonnes a year in the next decade.
- BHP completed its development of South Flank in May 2021, which will start to replace Yandi mine production. South Flank will ramp up production to 80 million tonnes a year over the next 3 years. BHP is studying options to develop its Western Ridge deposits adjacent to Mt Whaleback. The project will cost \$500 million and add 20 million tonnes a year of production to replace Orebody 24 production.
- FMG completed its development of Eliwana in December 2020, which will begin to replace Firetail mine production. FMG is also developing Iron Bridge (Magnetite) Stage 2 and Queens Valley (Solomon Hub), both of which are due to start operations in 2022.

- Direct full-time equivalent employment in Western Australia's iron ore industry rose 17% (8,843) to 60,810 in 2020-21.
- Iron ore accounted for 59% of direct full-time equivalent employment in Western Australia's minerals mining industry in 2020-21 (excluding exploration).
- Western Australia's largest employing mine sites in 2020-21 were:
  - FMG's Solomon (4,004 or 6.6% of iron ore employment).
  - FMG's Christmas Creek (3,546 or 5.8%).
  - BHP's Newman (3,173 or 5.2%).
  - Hancock Prospecting's Roy Hill (3,087 or 5.1%).
  - CITIC Pacific's Sino Iron (3,072 or 5.1%).
  - BHP's South Flank (2,870 or 4.7%).
  - FMG's Cloudbreak (2,831 or 4.7%).
  - BHP's Mining Area C (2,736 or 4.5%).
  - Rio Tinto's Tom Price (2,156 or 3.5%).