

Rio Tinto announces record financial results and total dividend of 1,040 US cents per share for 2021, a 79% payout

23 February 2022

Rio Tinto Chief Executive Jakob Stausholm said: "Our people have continued to safely run our world-class assets and are working hard to improve our operational performance, despite challenging operating conditions from prolonged COVID-19 disruptions. The recovery of the global economy, driven by industrial production, resulted in significant price strength for our major commodities, which we were able to capture, achieving record financial results with free cash flow of \$17.7 billion and underlying earnings of \$21.4 billion, after taxes and government royalties of \$13.0 billion. This enables us to pay our highest total dividend ever of 1,040 US cents per share, including a 247 US cents per share special dividend, representing a 79% payout.

"With the launch of our new strategy, we have set a new direction for Rio Tinto to thrive in a decarbonising world. We have a portfolio that is well positioned, and are targeting disciplined investment in commodities that will see strong demand in the coming decades. Our agenda is an ambitious, multi-year journey which we are determined to deliver and we have already taken the first steps, with underground operations under way following the Oyu Tolgoi agreement and a binding agreement to acquire the Rincon lithium project in Argentina. We continue to evolve and deepen the way we engage and interact with all stakeholders as we work hard to generate and strengthen relationships wherever we operate. Our actions will ensure we continue to deliver attractive returns to shareholders, invest in sustaining and growing our portfolio, and make a broader contribution to society, particularly in relation to the drive to net-zero carbon emissions."

At year end	2021	2020	Change
Net cash generated from operating activities (US\$ millions)	25,345	15,875	60 %
Purchases of property, plant and equipment and intangible assets (US\$ millions)	7,384	6,189	19 %
Free cash flow ¹ (US\$ millions)	17,664	9,407	88 %
Consolidated sales revenue (US\$ millions)	63,495	44,611	42 %
Underlying EBITDA ¹ (US\$ millions)	37,720	23,902	58 %
Profit after tax attributable to owners of Rio Tinto (net earnings) (US\$ millions)	21,094	9,769	116 %
Underlying earnings per share ¹ (EPS) (US cents)	1,321	770	72 %
Ordinary dividend per share (US cents)	793.0	464.0	71 %
Special dividend per share (US cents)	247.0	93.0	166 %
Total dividend per share (US cents)	1,040.0	557.0	87 %
Net cash / (debt) ¹ (US\$ millions)	1,576	(664)	
Underlying return on capital employed (ROCE) ¹	44 %	27 %	

¹ This financial performance indicator is a non-GAAP alternative performance measure ("APM"). It is used internally by management to assess the performance of the business and is therefore considered relevant to readers of this document. It is presented here to give more clarity around the underlying business performance of the Group's operations. APMs are reconciled to directly comparable IFRS financial measures on pages 78 to 86. Our financial results are prepared in accordance with International Financial Reporting Standards (IFRS) - see page 43 for further information. Footnotes are set out in full on page 8.

- Safety continues to be our first priority: our managed operations were fatality-free for a third successive year. The all-injury frequency rate deteriorated slightly to 0.40: fatigue, labour shortages and other pressures from COVID-19 have heightened the safety risk in day-to-day operations and we recognise that there is no room for complacency.
- On 1 February 2022, we [published](#) a comprehensive external review of our workplace culture, commissioned as part of our commitment to ensure sustained cultural change across our global operations. The review is part of the work being undertaken by our Everyday Respect task force,

which was launched in March 2021 to better understand, prevent and respond to harmful behaviours in the workplace. We will implement all recommendations from the report.

- We continue to focus on rebuilding our relationships with Traditional Owners across our global operations. In September we [published](#) an interim report on our Communities and Social Performance commitments showing our progress. At the end of 2021, the relationship between the Puutu Kunti Kurrama and Pinikura (PKKP) leadership and Rio Tinto Iron Ore is constructive and considered. An agreement on a co-management of Country approach and appropriate remedy for the destruction of Juukan Gorge is substantially progressed.
- On 14 February 2022, we [announced](#) an agreement with the Yinhawangka Aboriginal Corporation on a new co-designed management plan to ensure the protection of significant social and cultural heritage values as part of our proposed development of the Western Range iron ore project in the Pilbara region of Western Australia. The Social, Cultural Heritage Management Plan is the result of strong collaboration over the past year between the Yinhawangka people and Rio Tinto including "on-Country" visits, archaeological and ethnographic surveys and workshops. As a result, the mine has been designed to reduce impacts on social and cultural heritage values. We submitted the plan to Western Australia's Environmental Protection Authority on 1 February 2022, as part of our submission regarding the Greater Paraburdoo Iron Ore Hub Proposal.
- In October, we unveiled a longer term strategy to ensure we thrive in a decarbonising world, while continuing to pay attractive dividends, in line with our shareholder returns policy. To achieve this, we will accelerate our own decarbonisation, grow in materials enabling the global energy transition and develop products and services that help our customers to decarbonise, through our key enablers of becoming best operator, excelling in development, achieving an impeccable ESG performance and strengthening our social licence to operate.
- To deliver our strategy, we set a new target to reduce our Scope 1 and 2 carbon emissions by 50% by 2030, more than tripling our previous target, and are bringing forward our 15% reduction in emissions to 2025 (previously 2030), supported by an estimated \$7.5 billion of direct investments between 2022 and 2030. These projects deliver a range of economic outcomes but in aggregate are value accretive at a very modest carbon price. Most importantly, they safeguard the integrity of our assets over the longer term and reduce the risk profile of our cash flows. We are accelerating our activity in the Pilbara and expanding our tenure for potential wind and solar sites.
- Following the comprehensive agreement [announced](#) on 25 January 2022, underground operations are now under way at the Oyu Tolgoi copper/gold project in Mongolia. The agreement will move the project forward, reset the relationship between the partners and unlock the most valuable part of the mine, with first sustainable production expected in the first half of 2023.
- In line with our rigorous approach to capital allocation, we made significant progress with our Battery Minerals portfolio in 2021, signing a binding agreement to acquire the Rincon lithium project in Argentina. We also committed funding for the Jadar lithium-borates project in Serbia, subject to receiving all relevant approvals, permits and licences. In January 2022, the Government of Serbia cancelled the Spatial Plan for the Jadar project and required all related permits to be revoked. We are disappointed by this announcement and are committed to exploring all options and are reviewing the legal basis of the decision and the implications for our activities and people in Serbia.
- To achieve our ambition of becoming the best operator, we initiated the Rio Tinto Safe Production System at five pilot sites in 2021, focusing on sustainably unlocking capacity. We are already seeing returns, including a significant improvement at the Kennecott concentrator since deployment in July. We are planning a more extensive programme in 2022, subject to COVID-19 constraints, with up to 30 deployments at 15 sites and up to 80 rapid improvement projects, targeting bottlenecks.

Key financial highlights

- \$25.3 billion net cash generated from operating activities was 60% higher than 2020 driven by higher prices. This flowed through to 88% higher free cash flow¹ of \$17.7 billion, which included a 19% rise in capital expenditure to \$7.4 billion.
- \$21.1 billion of net earnings, 116% higher than 2020, reflected the higher prices, the impact of closure provision increases at Energy Resources of Australia (ERA) and other non-operating sites, \$0.5 billion of exchange and derivative gains and \$0.2 billion of impairments². Effective tax rate on net earnings of 27.7% compared with 33.1% in 2020.
- \$37.7 billion underlying EBITDA¹ was 58% above 2020, with an underlying EBITDA margin¹ of 57%.
- \$21.4 billion underlying earnings¹ (underlying EPS¹ of 1,321.1 US cents) were 72% above 2020 with a 28.0% effective tax rate on underlying earnings¹, compared with 29.5% in 2020.
- \$1.6 billion of net cash¹ at year end, compared with net debt¹ of \$0.7 billion at the start of the year, reflected the free cash flow¹ of \$17.7 billion, partly offset by \$15.4 billion of cash returns to shareholders.
- \$16.8 billion full-year dividend, equivalent to 1,040 US cents per share and 79% of underlying earnings, includes \$6.7 billion record final ordinary dividend (417 US cents per share) and \$1.0 billion final special dividend (62 US cents per share) declared today.

\$16.8 billion* of dividends declared for 2021: payout ratio averages 74% over past six years

Ordinary dividend	US\$ billion	US cents per share
Interim ordinary dividend paid in September 2021	6.1	376
Final ordinary dividend to be paid in April 2022	6.7	417
Full-year ordinary dividend represents 60% payout	12.8	793
Additional returns		
Special dividend paid in September 2021	3.0	185
Special dividend to be paid in April 2022	1.0	62
Combined total is 79% of 2021 underlying earnings	16.8	1,040

* Based on weighted average number of shares and declared dividends per share for the respective periods excluding foreign exchange impacts on payment.

Strong cash flow from operations

	2021 US\$m	2020 US\$m
Net cash generated from operating activities	25,345	15,875
Purchases of property, plant and equipment and intangible assets	(7,384)	(6,189)
Sales of property, plant and equipment	61	45
Lease principal payments	(358)	(324)
Free cash flow¹	17,664	9,407
Disposals	4	10
Dividends paid to equity shareholders	(15,357)	(6,132)
Share buy-backs	—	(208)
Other	(71)	(90)
Decrease in net debt¹	2,240	2,987

Footnotes are set out on page 8.

- \$25.3 billion in net cash generated from operating activities, 60% higher than 2020, primarily driven by higher prices for our major commodities, which also led to an increase in dividends received from equity accounted units and paid to joint venture partners. It is net of an increase in taxes and royalties paid in line with higher profits and a rise in working capital, primarily due to higher iron ore

portside inventories following higher volumes of SP10 and constrained availability of high-grade blending stocks in the fourth quarter.

- \$7.4 billion capital expenditure was comprised of \$0.6 billion of growth capital, \$3.3 billion of replacement capital and \$3.5 billion of sustaining capital. In 2021, we funded our capital expenditure from operating activities and expect to continue funding our capital programme from internal sources, except for the Oyu Tolgoi underground development, which is currently project-financed.
- \$15.4 billion of dividends paid in 2021 was comprised of the 2020 final paid in April 2021 (\$6.4 billion) and the 2021 interim paid in September (\$9.0 billion, including foreign exchange impacts).
- As a result of the above, net debt¹ improved by \$2.2 billion in 2021, ending the year with net cash¹ of \$1.6 billion.

Guidance

- We expect capital expenditure to be around \$8.0 billion in 2022, which considers potential increases of around 15% for the Pilbara replacement projects. In each of 2023 and 2024, we expect capital expenditure to be between \$9.0 and \$10.0 billion, which includes the ambition to invest up to \$3.0 billion in growth per year, depending on opportunities. Each year also includes sustaining capital of around \$3.5 billion, of which around \$1.5 billion a year is for Pilbara iron ore, subject to ongoing inflationary pressure. Around half of our capital expenditure is denominated in Australian dollars. In addition, our guidance includes around \$1.5 billion over the next three years on decarbonisation projects, mainly relating to repowering the Pilbara: this will accelerate from 2025, bringing our best estimate to around \$7.5 billion, in aggregate from 2022 to 2030.

- Effective tax rate on underlying earnings of ~30% in 2022. In June 2022, we expect to make a US\$1.1 billion* final payment to the Australian Taxation Office in respect of 2021 corporate profits.

* Based on the 2021 year-end Australian dollar exchange rate of 0.73.

2022 unit cost guidance	2021 Actuals	2022 Guidance
Pilbara iron ore unit cash costs, free on board (FOB) basis - US\$ per wet metric tonne ¹	18.6	19.5-21.0
Australian dollar exchange rate	0.75	0.75
Copper C1 unit costs (average for Kennecott, Oyu Tolgoi and Escondida) - US cents per lb	82	130-150

¹ Excludes COVID-19 costs (defined below) of \$0.5 per tonne in 2021.

- In 2022, we expect Pilbara iron ore unit cash costs to increase to \$19.5-21.0 per tonne. Guidance reflects rising input prices and labour costs, an increased mining work index and higher mine processing plant maintenance, partially offset by the ramp-up of Gudai-Darri and continued efficiency improvements. Unit costs are stated at an Australian dollar exchange rate of 0.75 and exclude any additional COVID-19 response costs.
- In 2022, we expect copper C1 unit costs to rise due to lower by-product credits, as a result of mining areas with lower gold volumes at Oyu Tolgoi and lower molybdenum grades at Kennecott and rising input costs, partially offset by higher refined copper production at Kennecott.

2022 production guidance (Rio Tinto share, unless otherwise stated)	2021 Actuals	2022 Guidance
Pilbara iron ore (shipments, 100% basis) (Mt)	322	320 to 335
Bauxite (Mt)	54	54 to 57
Alumina (Mt)	7.9	8.0 to 8.4
Aluminium (Mt)	3.2	3.1 to 3.2
Mined copper (kt)	494	500 to 575
Refined copper (kt)	202	230 to 290
Diamonds ² (M carats)	3.8	5.0 to 6.0
Titanium dioxide slag (Mt)	1.0	1.1 to 1.4
Iron Ore Company of Canada pellets and concentrate (Mt)	9.7	10.0 to 11.0
Boric oxide equivalent (Mt)	0.5	~0.5

² Reflects 100% ownership of Diavik (previously 60%) from 1 November 2021.

- Production guidance is unchanged from our Fourth Quarter Operations Review [released](#) on 18 January 2022.
- Iron ore shipments and bauxite production guidance remain subject to weather and market conditions.
- Our cost and volume guidance assumes development of the pandemic does not lead to further government-imposed restrictions or an increase in cases and/or severity, which could result in a significant number of our production-critical workforce and contractor base being unable to work due to illness and/or isolation requirements. This risk extends to prolonged interruption of service from a key partner or supplier which could lead to severely constrained operational activity of a key

asset or project. This risk is exacerbated globally by tight labour markets, localised inflation and supply chain delays.

- Pilbara shipments guidance remains subject to commissioning and ramp-up of new mines and management of cultural heritage, including any impacts from the Aboriginal Cultural Heritage Act 2021. We support the strengthening of Aboriginal heritage protection in Western Australia and continue to engage with Traditional Owners regarding current and proposed plans for mining activities, adjusting mine plans where required. Given the quality of our resource, we retain a range of development options in the Pilbara, subject to heritage and environmental approvals.
- There have been no material changes to the estimates of Pilbara Ore Reserves from those reported in our 2020 Annual Report released to the Australian Securities Exchange on 22 February 2021. However, during 2021 there has been some depletion in reserves, including a further 46 million dry tonnes due to protection of heritage sites, primarily from Gudai-Darri. This is in addition to the 54 million dry tonne reduction due to heritage considerations in Ore Reserves in 2020.
- COVID-19 costs include incremental travel costs (such as chartering aircraft in the event of the withdrawal of commercial alternatives), incremental logistical costs from disruption of normal arrangements, the cost of leasing alternative office accommodation, medical treatment and repatriation costs for stranded travellers and expatriates, the cost of deep cleaning affected locations, incremental costs arising from the shutdown of facilities (such as security, care & maintenance costs), increased overtime and temporary contractor costs to cover sickness, the incremental cost of alternative procurement where normal supply chains are broken and critical items are sourced elsewhere and increased spend on IT infrastructure and capacity to support remote working.

Our projects and development options

- We increased our exploration and evaluation spend by 16% to \$726 million in 2021, as we advanced our evaluation projects, progressed our greenfield exploration programmes and unlocked new opportunities.
- Commissioning and ramp-up of Pilbara growth and brownfield mine replacement projects has been impacted by ongoing COVID-19 restrictions, including labour access and supply chain quality issues. The latter have been exacerbated by an inability to conduct pre-delivery quality assurance and control at international steel and equipment manufacturers due to limitations on travel.
 - The \$2.6 billion³ Gudai-Darri greenfield iron ore mine in Western Australia is advancing. The first train was loaded from the mobile crushing and screening facilities in December and first production from the main plant is expected in the second quarter of 2022, subject to the continuing impacts of COVID-19. This first phase of Gudai-Darri, with a 43 million tonne annual capacity, will replace depleting orebodies and provide some incremental capacity.
 - The \$0.9 billion³ (Rio Tinto share) investment in the Robe River Joint Venture replacement iron ore mines is progressing. First ore at West Angelas (C and D deposits) was achieved in June and are now fully commissioned. First ore at Robe Valley (Mesa B, C, H) was achieved in August. Ongoing Mesa A wet plant construction and commissioning challenges have impacted production ramp-up. New wet plant components are on order and production will operate at a reduced capacity until repairs are completed.
 - The \$0.8 billion³ Western Turner Syncline phase 2 mine, which will also replace existing iron ore production, achieved first ore in October, following commissioning of the autonomous mining truck fleet. Some residual brownfield plant works are due to be complete during mid-year shutdowns.
- Underground operations are now under way at the Oyu Tolgoi underground copper/gold project in Mongolia, following the comprehensive agreement [reached](#) with our partners on 25 January 2022. Sustainable production is expected in the first half of 2023, with the capital forecast at \$6.925 billion, including \$175 million of estimated COVID-19 impacts to the end of 2021⁴.
- The \$0.9 billion first phase of the south wall pushback at Kennecott in the US, extending mine life to 2026, is now complete and we are gradually accessing higher copper grades. Stripping for the \$1.5 billion second phase, extending operations to 2032, remains on track. In July, we [announced](#) a \$108 million investment for underground characterisation studies: potential underground mining would occur concurrently with open pit operations and result in increased output.
- At the Jadar lithium-borates project, we committed \$2.4 billion of funding in July, subject to receiving all relevant approvals, permits and licences. In January 2022, the Government of Serbia cancelled the Spatial Plan for the Jadar project and required all related permits to be revoked. We are disappointed by this announcement and are committed to exploring all options and are reviewing the legal basis of the decision and the implications for our activities and people in Serbia.
- The Zulti South project at Richards Bay Minerals (RBM) in South Africa remains on full suspension.
- At the Winu copper-gold project in Western Australia, there has been progress towards securing consent from the Traditional Owners to the Project Agreement in advance of submitting the necessary environmental and regulatory approvals. Drilling, fieldwork and study activities continue to progress to schedule.
- At the Resolution Copper project in Arizona, we continue to work with the US Forest Service to secure approval of the Final Environmental Impact Statement. In parallel, mine studies and engagement with the Native American tribes and local communities continue to progress.

- At the Simandou iron ore project in Guinea, we continue to engage with key stakeholders in-country including the Government of Guinea. We remain committed to an inclusive partnership, seeking mutual and sustainable benefits by developing our project in line with international social and environmental standards. A new drilling programme has commenced, and expressions of interest are being sourced for construction and early development works expected to be carried out in 2022.

1. *This financial performance indicator is a non-GAAP alternative performance measure ("APM"). It is used internally by management to assess the performance of the business and is therefore considered relevant to readers of this document. It is presented here to give more clarity around the underlying business performance of the Group's operations. APMs are reconciled to directly comparable IFRS financial measures on pages 78 to 86.*
2. *Refer to page 50 for pre-tax analysis of impairment charge.*
3. *Potential for capital cost to rise by around 15% due to ongoing COVID-19 restrictions on commissioning and ramp-up of Pilbara growth and brownfield mine replacement projects, including labour access and supply chain quality issues. The latter has been exacerbated by an inability to conduct pre-delivery quality assurance and control at international steel and equipment manufacturers due to limitations on travel.*
4. *These estimates exclude any impacts of delays to work schedules caused by restricted approved budgets since the start of 2021. This, together with any ongoing COVID-19 impacts, will be assessed following the commencement of underground operations with further updates provided to the market in due course. Panels 1 and 2 studies will be ongoing throughout 2022. Further study work is also under way to assess the extraction methodology and ultimate recovery of the Panel 0 recoverable pillars.*

Communities & Social Performance (CSP)

At the end of 2021, the relationship between Puutu Kunti Kurrama and Pinikura (PKKP) leadership and Rio Tinto Iron Ore is constructive and considered. The ongoing rehabilitation works at Juukan Gorge are on schedule and have the active involvement of the appointed Puutu Kunti Kurrama (PKK) committee members. An agreement on a co-management of Country approach and an appropriate remedy for the destruction of Juukan Gorge is substantially progressed. Together we are charting new territory, and this takes time, but we are moving forward on a model which is respectful and seeks to provide certainty of protection for cultural heritage while mining activities take place.

On 30 September, we [published](#) our first CSP commitments interim report as part of our efforts to increase transparency in our approach to cultural heritage protection. Over the past months, we have been working hard to rebuild trust and meaningful relationships with the Pilbara Traditional Owners. We have also been working on actions to strengthen our cultural heritage approach, processes and performance.

On 17 October, we [welcomed](#) the Joint Standing Committee on Northern Australia's final report into the destruction of the rock shelters at Juukan Gorge. We continue to work closely with Traditional Owners to build trusted relationships and better understand and protect their cultural heritage.

On 14 February 2022, we [announced](#) an agreement with the Yinhawangka Aboriginal Corporation on a new co-designed management plan to ensure the protection of significant social and cultural heritage values as part of our proposed development of the Western Range iron ore project in the Pilbara region of Western Australia. The Social, Cultural Heritage Management Plan is the result of strong collaboration over the past year between the Yinhawangka people and Rio Tinto including "on-Country" visits, archaeological and ethnographic surveys and workshops. As a result, the mine has been designed to reduce impacts on social and cultural heritage values. We submitted the plan to Western Australia's Environmental Protection Authority on 1 February 2022, as part of our submission regarding the Greater Paraburdoo Iron Ore Hub Proposal.

Climate change strategy update

We have put the low-carbon transition at the heart of our new business strategy and are ready to make an important contribution to tackling climate change. In 2021, we set more ambitious decarbonisation targets for our operations and we are stepping up our approach and goals to partnering with our customers for the decarbonisation of our value chains.

We now aim to achieve a 15% absolute reduction in Scope 1 and 2 emissions five years earlier, by 2025, and have more than tripled our 2030 target to reduce emissions by 50% against our 2018 equity baseline. Our new target with our commitment to reach net zero emissions by 2050 is aligned with efforts to limit warming to 1.5°C, which is aligned with the stretch goal of the Paris Agreement.

In 2021, our Scope 1 and 2 emissions were 31.1Mt CO₂e (2020: 31.5Mt CO₂e), 4% below our 2018 equity baseline. The reductions achieved since 2018 are primarily the result of switching to renewable electricity contracts at Kennecott in the US and the Escondida mine in Chile (managed by BHP; Rio Tinto owns 30%), and also relate to unplanned operational disruptions in 2021 at Richards Bay Minerals in South Africa and the Kitimat aluminium smelter in Canada.

Our 2025 and 2030 targets are supported by a decarbonisation roadmap focused on the accelerated deployment of renewable power and the development of projects from our marginal abatement cost curve. In 2021, we progressed studies across a broad range of emissions reduction opportunities and approved 0.26Mt CO₂e of new abatement projects, including solar and wind projects at Weipa, QIT Madagascar Minerals (QMM) and Kennecott.

We recognise that to thrive in the long term we need to be part of net zero value chains. Our approach to addressing Scope 3 emissions is to engage with our customers on climate change and work with them to develop and scale up the technologies to decarbonise steel and aluminium production.

Our Scope 3 emissions were 554Mt CO₂e in 2021 (2020: 570Mt CO₂e), of which around 95% is from the processing of iron ore, bauxite and other products by our customers. 94% of these processing emissions take place at customer facilities in China, South Korea, Japan and other countries that have pledged to be carbon neutral by around mid-century. As our customers start to align with their governments' pledges, we note that about 28% of our iron sales are directly to steel producers that have already set public targets for their Scope 1 and 2 emissions (our Scope 3), and have ambitions to reach net zero by around mid-century.

For 2022, we have committed to engage with all our direct iron ore customers, representing approximately 75% of our iron ore sales and related Scope 3 emissions, and all our bauxite customers to share information on our respective climate change goals and roadmaps, and actively seek areas of mutual collaboration on decarbonisation projects and technologies. Progress on both our Scope 1 and 2 targets as well as Scope 3 goals are explicitly linked to executive remuneration.

In 2021, the Board announced its intention to put a Climate Action Plan before shareholders at our 2022 annual general meetings and seek a non-binding advisory vote on the company's ambitions, emissions targets and actions to achieve them.

Our 2021 Climate Change Report is available on our website, [riotinto.com](https://www.riotinto.com).

Underlying EBITDA and underlying earnings by product group

	Underlying EBITDA			Underlying earnings		
	2021	2020 Adjusted	Change	2021	2020 Adjusted	Change
Year ended 31 December	US\$m	US\$m	%	US\$m	US\$m	%
Iron Ore	27,592	18,837	46 %	17,323	11,398	52 %
Aluminium	4,382	2,152	104 %	2,468	471	424 %
Copper	3,969	2,084	90 %	1,579	754	109 %
Minerals	2,603	1,710	52 %	888	580	53 %
Reportable segment total	38,546	24,783	56 %	22,258	13,203	69 %
Other operations	(28)	24	(217)%	(84)	(48)	75 %
Inter-segment transactions	42	(94)	(145)%	19	(32)	(159)%
Product group total	38,560	24,713	56 %	22,193	13,123	69 %
Central pension costs, share-based payments, insurance and derivatives	110	117	(6)%	133	118	13 %
Restructuring, project and one-off costs	(80)	(133)	(40)%	(51)	(108)	(53)%
Other central costs	(613)	(545)	12 %	(585)	(455)	29 %
Central exploration and evaluation	(257)	(250)	3 %	(215)	(216)	— %
Net interest				(95)	(14)	579 %
Total	37,720	23,902	58 %	21,380	12,448	72 %

The financial information by Product group has been recast in accordance with the organisational restructure announced on 28 January 2021. See page 76 for further information. Underlying EBITDA and underlying earnings are non-GAAP alternative performance measures ("APMs") used by management to assess the performance of the business, and provide additional information which investors may find useful. APMs are reconciled to directly comparable IFRS financial measures on pages 78 to 86.

Central and other costs

Pre-tax central pension costs, share-based payments, insurance and derivatives were a \$110 million credit compared with a \$117 million credit in 2020, mainly due to higher insurance recoveries in 2021 combined with slightly lower claims than in 2020, offset by derivative losses in 2021 of \$97 million compared to gains of \$45 million in 2020.

On a pre-tax basis, restructuring, project and one-off central costs were 40% lower than 2020 mainly due to lower provisions with respect to legacy operations.

Other central costs of \$613 million were 12% higher than in 2020 driven by stronger local currencies and inflation, along with increased costs associated with progressing our CSP and ESG objectives.

Continuing to prioritise our central exploration programmes

We have a strong portfolio of exploration projects with activity in 18 countries across seven commodities in early exploration and studies stages, reflected in our pre-tax central spend of \$257 million. All projects have followed government COVID-19 requirements, while focusing on protecting the wellbeing and health of local communities. In 2021, we continued to prioritise our exploration portfolio, with a particular focus on copper projects in Australia, Canada, United States, Kazakhstan and Zambia and increased activity on greenfield nickel projects in Canada and Finland. We continue to partner with other companies in all regions where we explore: examples are our agreement with KoBold Metals for copper and nickel exploration and our agreement with Western Copper and Gold Corporation, where we made a strategic investment to advance exploration on the Casino copper-gold project located in Yukon, Canada. We also signed a mineral investment contract with the Republic of Angola and Endiama to explore for diamonds, and continued mine-lease exploration at our managed businesses including Pilbara Iron in Australia and Diavik in Canada. We renewed our exploration technology strategy and further invested in technology to support our exploration teams on the ground.

Commentary on financial results

To provide additional insight into the performance of our business, we report underlying EBITDA and underlying earnings. The principal factors explaining the movements in underlying EBITDA are set out in this table.

	US\$m
2020 underlying EBITDA	23,902
Prices	17,464
Exchange rates	(606)
Volumes and mix	(583)
General inflation	(690)
Energy	(398)
Operating cash unit costs	(1,051)
Higher exploration and evaluation spend	(101)
Non-cash costs/other	(217)
2021 underlying EBITDA	37,720

Strong financial results driven by significant momentum from higher prices

We have continued to safely run our world-class assets and are working hard to improve our operational performance, despite challenging operating conditions from prolonged COVID-19 disruptions. The recovery of the global economy resulted in significant price strength for our major commodities: we maintained our financial discipline in 2021 and were able to retain around 80% of the benefit from higher prices, achieving record financial results.

The strong commodity prices drove a \$17,464 million uplift in underlying EBITDA compared with 2020. This was primarily from the strength in the Platts index for 62% iron fines, partially offset by a higher proportion of lower quality products (+\$11,589 million). Higher London Metal Exchange (LME) prices were the main driver for a significant price uplift for copper (+\$1,896 million) and for our Aluminium business (+\$3,027 million). We have included a table of prices and exchange rates on page 88.

The 2021 monthly average Platts index for 62% iron fines converted to an FOB basis was 45% higher on average compared with 2020. There was a strong resurgence in demand for iron ore, with global crude steel production estimated to have grown by 6%. Chinese demand strength was most apparent in the first half of 2021 while the recovery in demand for steel and iron ore in developed and other emerging economies maintained its momentum. At the same time, seaborne iron ore supply recovered, albeit at a slower than anticipated rate.

The average LME price for copper was 50% higher, while the LME aluminium price was 46% higher, compared with 2020. The gold price rose 2%.

The mid-west premium duty paid for aluminium in the US averaged \$584 per tonne, 119% higher than in 2020.

Australian and Canadian dollars strengthened during 2021

Compared with 2020, on average, the US dollar weakened by 9% against the Australian dollar, by 7% against the Canadian dollar and by 11% against the South African rand. Currency movements lowered underlying EBITDA by \$606 million relative to 2020.

Lower iron ore sales volumes impact underlying EBITDA

Lower sales volumes and changes in product mix across the portfolio reduced underlying EBITDA by \$583 million compared to 2020. This was mostly attributable to a 3% decline in iron ore shipments from the Pilbara, as a result of above average rainfall in the first half of the year, our focus on cultural heritage management and delays in growth and brownfield mine replacement tie-in projects. Other

key variances included lower volumes at Iron Ore Company of Canada (labour and equipment availability challenges) and reduced copper sales volumes at Escondida (prolonged COVID-19 impact leading to lower recoveries and throughput). These were partly offset by higher product premiums in our Aluminium business, increased gold sales from Oyu Tolgoi (the significant improvement in grades is expected to reverse in 2022) and higher refined copper sales at Kennecott despite a furnace failure in September 2021 (2020 was significantly impacted by an earthquake and a major smelter maintenance shutdown).

Impact of rising inflation and rebound in energy prices

Average movements in energy prices compared with 2020 reduced underlying EBITDA by \$398 million, mainly due to higher diesel prices for our trucks, trains and ships and an increase in power costs at Kennecott. Rising general price inflation across our global operations resulted in a \$690 million reduction in underlying EBITDA.

Focus on cost control

We remained focused on cost control throughout the year, in particular maintaining discipline on our long-run fixed costs: however, a rise in our operating cash unit costs reduced underlying EBITDA by \$1,051 million (on a unit cost basis) compared with 2020. This reflects fixed cost inefficiencies from the reduction in volumes, along with temporary cost pressures over and above general inflation, reflecting higher market-linked prices for raw materials and the constraints that COVID-19 has placed on resourcing and supply chains. We also made targeted investments in our ESG and CSP teams in 2021, in order to advance our social licence priorities. Unit costs at our Pilbara iron ore operations rose to \$18.6 per tonne (\$19.1 per tonne including COVID-19 costs) contributing to the variance, reflecting: higher input prices, including labour and explosives, an increase in the mine work index, operational readiness costs for our growth and brownfield mine replacement tie-in projects and fixed cost inefficiencies from lower volumes. At our Aluminium business, we incurred cyclical cost increases for coke, pitch and alloys, while our Bauxite business in Queensland experienced higher maintenance costs following overruns on planned shutdowns. These cost pressures were partly offset by fixed cost efficiencies at Oyu Tolgoi in line with higher copper and gold production.

Increasing our global exploration and evaluation activity

We increased our exploration and evaluation spend by \$101 million, or 16%, to \$726 million. This was focused on our greenfield programmes across 18 countries and our highest value evaluation projects, particularly the Winu copper-gold project in Western Australia, Resolution Copper in Arizona, Simandou iron ore in Guinea and Jadar lithium-borates in Serbia.

Non-cash costs/other

Movements in non-cash costs, one-off and other items lowered underlying EBITDA by \$217 million compared with 2020. This mainly reflected the impact of community disruption at RBM in 2021 (-\$162 million); reduced capacity at the Kitimat aluminium smelter (-\$280 million) following the strike which commenced in July, with agreement reached in October; and additional provisions (-\$218 million), mainly environmental, for our legacy operations and Pacific Aluminium smelters. This was partly offset by the non-recurrence of the pot failures at Kitimat in 2020 (\$206 million) and the impact of community disruption at RBM in 2020 (\$91 million). COVID-19 costs across the Group were \$39 million lower than in 2020.

Net earnings

The principal factors explaining the movements in underlying earnings and net earnings are set out here.

	US\$m
2020 net earnings	9,769
Total changes in underlying EBITDA	13,818
Increase in depreciation and amortisation (pre-tax) in underlying earnings	(372)
Decrease in interest and finance items (pre-tax) in underlying earnings	(100)
Increase in tax on underlying earnings	(3,574)
Increase in underlying earnings attributable to outside interests	(840)
Total changes in underlying earnings	8,932
Changes in exclusions from underlying earnings:	
Movement in net impairment charges	918
Gain on recognition of a new wharf at Kitimat, Canada	336
Movement in exchange differences and gains/losses on debt	1,810
Movement in closure estimates (non-operating and fully impaired sites)	(671)
2021 net earnings	21,094

Depreciation and amortisation, net interest, tax and non-controlling interests

The depreciation and amortisation charge was \$372 million higher than 2020, mainly due to the impact of the stronger Australian and Canadian dollars against the US dollar.

Lower interest and finance items (pre-tax) were reflective of a lower level of net debt on average during the year, in part due to repayment of \$526 million of Euro Bonds, which matured in May 2020. It also reflected more of our debt being at floating interest rates and lower LIBOR rates.

The 2021 effective corporate income tax rate on underlying earnings, excluding equity accounted units, was 28.0%, compared with 29.5% in 2020, mainly due to the re-recognition of deferred tax assets in Australia. The effective tax rate on underlying earnings in Australia was 30% in 2021 compared with 32% in 2020. We anticipate an effective tax rate on underlying earnings of approximately 30% in 2022.

Items excluded from underlying earnings

Net impairment charges decreased by \$918 million compared with 2020. In 2021, we impaired the value of the Kitimat aluminium smelter by \$197 million: as a result of a workforce strike in mid-2021, output was reduced to 25% and ramp-up to full capacity will extend through 2022, giving rise to an impairment test. In 2020, we recognised \$1,115 million of impairment charges, consisting of \$472 million related to three of our Pacific Aluminium smelters (NZAS, Bell Bay and Boyne), \$131 million related to the ISAL smelter in Iceland, \$220 million for the Sohar smelter in Oman and \$292 million related to our interest in the Diavik Diamond Mine.

There is a detailed explanation of the impairment process on pages 50 to 53.

On 3 December, we gained control over a new wharf at Kitimat, Canada that was built and paid for by LNG Canada. The \$336 million gain on recognition has been excluded from underlying earnings on the grounds of materiality and linkage to the impairment.

In 2021, we recognised non-cash exchange and derivative gains of \$546 million. This was mainly on US dollar debt in non-US dollar functional currency Group companies, intragroup balances, and the revaluation of certain derivatives which do not qualify for hedge accounting. These gains compared with a 2020 loss of \$1,264 million, giving rise to a positive year-on-year movement of \$1,810 million. The exchange gains are largely offset by currency translation losses recognised in equity. The quantum of US dollar debt is largely unaffected and we will repay it from US dollar sales receipts.

In 2021, we recognised a \$671 million increase in closure costs relating to the Diavik Diamond Mine, Gove refinery, ERA and some of our legacy sites, where the environmental impact preceded our ownership. The adjustments at ERA and the Gove refinery have been recognised in the income statement as these are non-operating sites, and excluded from underlying earnings due to the magnitude of the individual updates and materiality when aggregated. In 2020, we initially recognised an increase in the Diavik closure provision based on our preliminary findings from the pre-feasibility study. On completion of the study in 2021 a true-up was recorded and has been excluded, in line with the treatment of the initial increase in 2020, which was excluded from underlying earnings as Diavik was fully impaired during the year. Other closure costs excluded in 2020 were the increase in the Gove refinery provision offset by a decrease in the Argyle mine provision on completion of pre-feasibility studies at each site. These are included in Movement in closure estimates. Further analysis can be found on pages 85 to 86.

Profit

Net earnings and underlying earnings refer to amounts attributable to the owners of Rio Tinto. The net profit attributable to the owners of Rio Tinto in 2021 was \$21.1 billion (2020: \$9.8 billion). We recorded a profit after tax in 2021 of \$22.6 billion (2020: \$10.4 billion) of which a profit of \$1.5 billion (2020: \$0.6 billion) was attributable to non-controlling interests.

Net earnings and underlying earnings

The differences between underlying earnings and net earnings are set out in this table (all numbers are after tax and exclude non-controlling interests).

	2021 US\$m	2020 US\$m
Underlying earnings	21,380	12,448
Items excluded from underlying earnings		
Impairment charges net of reversals	(197)	(1,115)
Gain on recognition of a new wharf at Kitimat, Canada	336	—
Foreign exchange and derivative gains/(losses) on net debt and intragroup balances and derivatives not qualifying for hedge accounting	546	(1,264)
Net losses from movements to closure estimates (non-operating and fully impaired sites)	(971)	(300)
Net earnings	21,094	9,769

On pages 85 to 86 there is a detailed reconciliation from underlying earnings to net earnings, including pre-tax amounts and additional explanatory notes. The differences between Profit after tax and underlying EBITDA are set out in the table on page 79.

Balance sheet

Net debt reduced by \$2.2 billion in 2021, resulting in a net cash position of \$1.6 billion at 31 December 2021. This reflected our strong free cash flow, partly offset by dividend payments of \$15.4 billion.

Our net gearing ratio (net (cash) / debt to total capital) improved to -3% at 31 December 2021 (31 December 2020: 1%).

Our total financing liabilities excluding net debt derivatives at 31 December 2021 (see page 55) were US\$13.5 billion (31 December 2020: \$13.8 billion) and the weighted average maturity was around 11 years. At 31 December 2021, approximately 85% of these liabilities were at floating interest rates (94% excluding leases).

On 28 October, we issued \$1.25 billion 30-year fixed rate SEC-registered bonds with a coupon of 2.75%. The proceeds of the new issuance were used to fund the early redemption and extinguishment of the company's \$1.20 billion 3.75% bonds due to mature in June 2025. The

maximum amount within non-current borrowings maturing in any one calendar year is \$1.4 billion, which matures in 2024.

We had \$15.2 billion in cash and cash equivalents plus other short-term cash investments at 31 December 2021 (31 December 2020: \$12.9 billion). In November, we took advantage of strong market conditions and completed the renewal of our \$7.5 billion of fully committed Revolving Credit Facilities with 26 participating banks. The Facilities remained undrawn throughout the period, mature in November 2026 (previously November 2023) and include two consecutive one-year extension options.

Provision for closure costs

At 31 December 2021, provisions for close-down and restoration costs and environmental clean-up obligations were \$14.5 billion (31 December 2020: \$13.3 billion). The principal movements during the year were weaker Australian and Canadian currencies (-\$0.5 billion), increases in existing and new provisions adjusted to mining properties (\$0.5 billion) and charged to profit (\$1.5 billion), partly offset by utilisations of the provision through spend (-\$0.5 billion). Of the \$14.5 billion in provisions, \$10.7 billion relates to operating sites and \$3.8 billion is for legacy sites. Remaining lives of operations and infrastructure range from one to over 50 years with an average for all sites, weighted by present closure obligation, of around 16 years (2020: 17 years).

The provisions are based on risk-adjusted cash flows using a real-rate discount rate of 1.5% to reflect the obligations at present value.

In 2022, we expect to utilise around \$0.7 billion of the provisions as we advance our closure activities at Argyle, ERA, Gove alumina refinery and legacy sites.

We have disclosed further information, including the composition of the provision by cost category and by geography, on pages 57 to 60.

Our shareholder returns policy

The Board is committed to maintaining an appropriate balance between cash returns to shareholders and investment in the business, with the intention of maximising long-term shareholder value.

At the end of each financial period, the Board determines an appropriate total level of ordinary dividend per share. This takes into account the results for the financial year, the outlook for our major commodities, the Board's view of the long-term growth prospects of the business and the company's objective of maintaining a strong balance sheet. The intention is that the balance between the interim and final dividend be weighted to the final dividend.

The Board expects total cash returns to shareholders over the longer term to be in a range of 40 to 60% of underlying earnings in aggregate through the cycle. Acknowledging the cyclical nature of the industry, it is the Board's intention to supplement the ordinary dividend with additional returns to shareholders in periods of strong earnings and cash generation.

Record cash returns* declared: 74% average payout over past six years

	2021 US\$ billion	2020 US\$ billion
Ordinary dividend		
Interim	6.1	2.5
Final	6.7	5.0
Full-year ordinary dividend	12.8	7.5
Additional returns		
Special dividend announced in July 2021, paid in September 2021	3.0	n/a
Special dividend announced in February, paid in April of the following year	1.0	1.5
Total cash returns to shareholders declared for each year	16.8	9.0
Combined total as % of underlying earnings	79 %	72 %

*Based on weighted average number of shares and declared dividends per share for the respective periods and excluding foreign exchange impacts on payment.

We determine dividends in US dollars. We declare and pay Rio Tinto plc dividends in pounds sterling and Rio Tinto Limited dividends in Australian dollars. The 2021 final dividend has been converted at exchange rates applicable on 22 February 2022 (the latest practicable date before the dividend was declared). American Depositary Receipt (ADR) holders receive dividends at the declared rate in US dollars.

Ordinary dividend per share declared	2021 dividends	2020 dividends
Rio Tinto Group		
Interim (US cents)	376.00	155.00
Final (US cents)	417.00	309.00
Full-year (US cents)	793.00	464.00
Rio Tinto plc		
Interim (UK pence)	270.84	119.74
Final (UK pence)	306.72	221.86
Full-year (UK pence)	577.56	341.60
Rio Tinto Limited		
Interim (Australian cents)	509.42	216.47
Final (Australian cents)	577.04	397.48
Full-year (Australian cents)	1,086.46	613.95
Special dividend per share declared	2021 dividends	2020 dividends
Rio Tinto Group		
Interim (US cents)	185.00	—
Final (US cents)	62.00	93.00
Rio Tinto plc		
Interim (UK pence)	133.26	—
Final (UK pence)	45.60	66.77
Rio Tinto Limited		
Interim (Australian cents)	250.64	—
Final (Australian cents)	85.80	119.63

The 2021 final ordinary dividend and the special dividend to be paid to our Rio Tinto Limited shareholders will be fully franked. The Board expects Rio Tinto Limited to be in a position to pay fully franked dividends for the foreseeable future.

On 21 April 2022, we will pay the 2021 final ordinary dividend and the special dividend to holders of ordinary shares and holders of ADRs on the register at the close of business on 11 March 2022 (record date). The ex-dividend date is 10 March 2022.

Rio Tinto plc shareholders may choose to receive their dividend in Australian dollars, and Rio Tinto Limited shareholders may choose to receive theirs in pounds sterling. Currency conversions will be based on the pound sterling and Australian dollar exchange rates five business days before the dividend payment date. Rio Tinto plc and Rio Tinto Limited shareholders must register their currency elections by 29 March 2022.

We will operate our Dividend Reinvestment Plans for the 2021 final dividend – see our website riotinto.com for details. Rio Tinto plc and Rio Tinto Limited shareholders' election notice for the Dividend Reinvestment Plans must be received by 29 March 2022. Purchases under the Dividend Reinvestment Plan are made on or as soon as practicable after the dividend payment date and at prevailing market prices. There is no discount available.

Review of operations

Iron Ore

2021 year-end results	2021	2020	Change
Pilbara production (million tonnes - 100%)	319.7	333.4	(4)%
Pilbara shipments (million tonnes - 100%)	321.6	330.6	(3)%
Salt production (million tonnes - Rio Tinto share) ¹	5.8	4.9	20 %
Gross product sales (US\$ millions)	39,582	27,508	44 %
Average realised price (US\$ per dry metric tonne, FOB basis)	143.8	98.9	45 %
Underlying EBITDA (US\$ millions)	27,592	18,837	46 %
Pilbara underlying FOB EBITDA margin ²	76 %	74 %	
Underlying earnings (US\$ millions)	17,323	11,398	52 %
Net cash generated from operating activities (US\$ millions)	19,177	13,218	45 %
Capital expenditure (US\$ millions) ³	(3,947)	(2,941)	34 %
Free cash flow (US\$ millions)	15,172	10,233	48 %
Underlying return on capital employed ⁴	100 %	74 %	

1. Dampier Salt is reported within Iron Ore, reflecting management responsibility. Iron Ore Company of Canada continues to be reported within Minerals. The Simandou iron ore project in Guinea is reported within Copper.

2. The Pilbara underlying free on board (FOB) EBITDA margin is defined as Pilbara underlying EBITDA divided by Pilbara gross product sales, excluding freight revenue.

3. Capital expenditure is the net cash outflow on purchases less sales of property, plant and equipment, capitalised evaluation costs and purchases less sales of other intangible assets.

4. Underlying return on capital employed (ROCE) is defined as underlying earnings excluding net interest divided by average capital employed.

Financial performance

Our Pilbara iron ore shipments decreased by 3% compared with 2020. Shipments were impacted by lower mined production due to above-average rainfall in the first half of 2021, cultural heritage management and delays in growth and brownfield mine replacement tie-in projects.

Underlying EBITDA of \$27.6 billion was 46% higher than 2020, driven by higher prices (\$10.3 billion), with a 45% rise in the monthly average Platts index for 62% iron fines adjusted to an FOB basis compared with 2020. This more than compensated for the impact from reduced shipments and rising unit costs.

2021 Pilbara unit cash costs, which were \$18.6 per tonne (excluding COVID-19 costs of \$0.5 per tonne), marginally exceeded guidance of \$18.0 to 18.5 per tonne and compared with \$14.8 per tonne in 2020 (excluding COVID-19 costs of \$0.6 per tonne). Unit cost performance was driven by higher input prices including labour, explosives and energy, a 9% stronger Australian dollar, an increase in the mine work index, operational readiness costs for our growth and brownfield mine replacement tie-in projects and fixed cost inefficiencies from lower volumes.

We have continued investing in productivity and automation: around 80% of the haul truck fleet is now autonomous.

Our Pilbara operations delivered an underlying FOB EBITDA margin of 76%, compared with 74% in 2020.

We price the majority of our iron ore sales (77%) by reference to the average index price for the month of shipment. In 2021, we priced approximately 11% of sales with reference to the prior quarter's average index lagged by one month with the remainder sold either on current quarter average, current month average or on the spot market. We made approximately 72% of sales including freight and 28% on an FOB basis.

We achieved an average iron ore price of \$132.3 per wet metric tonne on an FOB basis (2020: \$91.0 per wet metric tonne) across our product suite. This equates to \$143.8 per dry metric tonne, assuming 8% moisture (2020: \$98.9 per dry metric tonne), which compares with the monthly average Platts index for 62% iron fines converted to an FOB basis of \$146.9 per dry metric tonne (2020: \$101.3 per dry metric tonne). The slightly lower realised price compared to the Platts index was due to the higher proportion of SP10 volumes and the increased discounts for lower grade products, particularly in the second half of 2021.

Gross product sales for our Pilbara operations included freight revenue of \$2.7 billion (2020: \$1.5 billion).

Net cash generated from operating activities of \$19.2 billion was 45% higher than 2020, in line with the movement in underlying EBITDA. Free cash flow of \$15.2 billion was 48% higher than 2020, due to a 34% increase in capital expenditure to \$3.9 billion, relating to construction of growth and brownfield mine replacement tie-in projects.

Review of operations

Pilbara operations produced 319.7 million tonnes (Rio Tinto share 266.8 million tonnes) in 2021, 4% lower than 2020, for the reasons mentioned above. Ongoing COVID-19 restrictions and a tight labour market have further impacted our ability to access experienced contractors and particular skill sets.

Production from the new greenfield mine at Gudai-Darri and brownfield mine replacement project at Robe Valley was delayed due to the COVID-19 impact on labour availability and other factors, including an inability to conduct pre-delivery quality assurance and control at international steel manufacturers due to limitations on travel. First ore from Gudai-Darri was railed in December from the modular crushing and screening plant installed to supplement production and mitigate commissioning delays. Robe Valley production was significantly impacted by the Mesa A wet plant commissioning delays.

2021 shipments of 321.6 million tonnes (Rio Tinto share 267.9 million tonnes) included 36.6 million tonnes of lower grade SP10 products, 11% of shipments, on a 100% basis (2020: 3%). As growth and replacement mines ramp up through the first half of 2022, we expect to see a gradual decrease in SP10 over the medium term.

We continue to increase our iron ore portside sales in China, with a total of 14.0 million tonnes in 2021 (2020: 5.5 million tonnes). We experienced increased inventory levels of Pilbara product at the port at December (2021: 8.8 million tonnes, 2020: 1.7 million tonnes), due to higher volumes of SP10 and constrained availability of high grade blending stocks in the fourth quarter. Our portside operation handles product from the Pilbara and Canada as well as third-party product, and provides blending and screening capabilities. Approximately 81% of portside sales in 2021 were either blended or screened in Chinese ports.

Our principal projects and growth options

Commissioning and ramp-up of Pilbara growth and brownfield mine replacement projects have been impacted by ongoing COVID-19 restrictions, including labour access and supply chain quality issues. The latter have been exacerbated by an inability to conduct pre-delivery quality assurance and control at international steel and equipment manufacturers due to limitations on travel.

Mining and operational readiness activities are progressing at the \$2.6 billion¹ Gudai-Darri mine and the railway is operational. The first train was loaded from the mobile crushing and screening facilities in December and first production from the main plant is now expected in the second quarter of 2022, subject to the continuing impacts of COVID-19. This new production hub will be our most

technologically advanced, incorporating a processing plant and infrastructure including an airport, camp and a 166-kilometre rail line connecting the mine to our existing network. Once fully commissioned, this first phase will have an annual capacity of 43 million tonnes, replacing depleting orebodies and providing some incremental capacity.

Our \$0.8 billion¹ investment in the Western Turner Syncline phase 2 mine, part of Greater Tom Price operations, will facilitate mining of new deposits and includes construction of a new crusher and a 13-kilometre conveyor. The project achieved first ore in October, following commissioning of the autonomous mining truck fleet. Some residual brownfield plant works are due to be complete during mid-year shutdowns.

We are also investing \$1.7 billion¹ with our joint venture partners, Mitsui and Nippon Steel Corporation (our 53% share is \$0.9 billion), at the Robe Valley and West Angelas operations. First ore at West Angelas C and D was achieved in June, and the mines are now commissioned. At Robe Valley (Mesa B, C, H), the autonomous mining truck fleet has been commissioned. Since achieving first ore in August, ongoing Mesa A wet plant construction and commissioning challenges have impacted production ramp-up. New wet plant components are on order and production will operate at a reduced capacity until repairs are completed.

1. *Potential for capital cost to rise by around 15% due to ongoing COVID-19 restrictions on commissioning and ramp-up of Pilbara growth and brownfield mine replacement projects, including labour access and supply chain quality issues. The latter has been exacerbated by an inability to conduct pre-delivery quality assurance and control at international steel and equipment manufacturers due to limitations on travel.*

Aluminium

2021 year-end results	2021	2020	Change
Bauxite production (000 tonnes - Rio Tinto share)	54.3	56.1	(3)%
Alumina production (000 tonnes - Rio Tinto share)	7.9	8.0	(2)%
Aluminium production (000 tonnes - Rio Tinto share)	3.2	3.2	(1)%
Gross product sales (US\$ millions)	12,695	9,314	36 %
Average realised aluminium price (US\$ per tonne)	2,899.0	1,946.0	49 %
Underlying EBITDA (US\$ millions)	4,382	2,152	104 %
Underlying EBITDA margin (integrated operations)	38 %	26 %	
Underlying earnings (US\$ millions) ¹	2,468	471	424 %
Net cash generated from operating activities (US\$ millions)	3,606	1,930	87 %
Capital expenditure - excluding EAUs (US\$ millions) ²	(1,300)	(1,009)	29 %
Free cash flow (US\$ millions)	2,272	892	155 %
Underlying return on capital employed ³	16 %	3 %	

1. Underlying earnings includes a \$0.2 billion benefit for the recognition of previously written down deferred tax assets in Australia (2020: \$0.2 billion charge for the partial de-recognition of deferred tax assets in Australia).
2. Capital expenditure is the net cash outflow on purchases less sales of property, plant and equipment, capitalised evaluation costs and purchases less sales of other intangible assets. It excludes equity accounted units (EAUs).
3. Underlying return on capital employed (ROCE) is defined as underlying earnings excluding net interest divided by average capital employed.

Financial performance

In 2021, aluminium prices rallied to multi-year highs, following a firm recovery in global demand and extensive power-related supply disruptions in China, which led to a global market deficit. This rebound in sales prices, together with increased demand for value-added product (VAP), were the key drivers for our aluminium business to more than double underlying EBITDA and deliver a substantial increase in cash flow.

Underlying EBITDA of \$4.4 billion, which was 104% higher than 2020, benefited from the stronger pricing environment, in particular for primary metal and alumina, and higher product premiums for primary metal. This was only partly offset by the impact of stronger local currencies, lower bauxite and alumina shipments and cyclical cost inflation for coke, pitch and alloys. This increased our industry-leading underlying EBITDA margin to 38%.

We achieved an average realised aluminium price of \$2,899 per tonne, 49% higher than 2020 (\$1,946 per tonne). This comprised the LME price, a market premium and a product (VAP) premium. The cash LME price averaged \$2,480 per tonne, 46% higher than 2020, while in our key US market, the midwest premium duty paid increased by 119% to \$584 per tonne (2020: \$267 per tonne). Our VAP sales represented 50% of the primary metal we sold (2020: 43%) and generated product premiums averaging \$230 per tonne of VAP sold (2020: \$213 per tonne).

We generated \$3.6 billion in net cash from operating activities, reflective of the higher underlying EBITDA achieved, net of a \$0.5 billion build in working capital, driven by the higher pricing environment and supply chain constraints. Free cash flow increased by 155% to \$2.3 billion.

Review of operations

Bauxite production of 54.3 million tonnes was 3% lower than 2020 due to severe wet weather in the first quarter impacting system stability throughout the year, equipment reliability issues and overruns on planned shutdowns at our Pacific operations.

We shipped 37.6 million tonnes of bauxite to third parties in 2021, 4% lower than the same period of 2020 due to the major weather events in the first quarter causing shipment delays. In 2021, gross

product sales for bauxite declined 4% to \$2.2 billion: this includes freight revenue of \$462 million (2020: \$423 million).

Alumina production of 7.9 million tonnes was 2% lower than 2020, as a result of outages during the year at the Yarwun refinery in Queensland, Australia and at Vaudreuil refinery in Quebec, Canada. Production at the Queensland refinery remained stable year on year.

Aluminium production of 3.2 million tonnes was 1% lower than 2020 due to reduced capacity at our Kitimat smelter in British Columbia following a strike which commenced in July. Agreement was reached with the labour union and employees in October, with a gradual restart in 2022 and full capacity expected to be reached by December 2022. The reduced capacity was partly offset by a robust performance across the remaining smelting portfolio.

Our principal projects and growth options

At the Kemano project in Kitimat, British Columbia, where we are constructing a second tunnel to de-risk our 100% owned hydropower facility, the tunnel boring machine is being dismantled and removed following breakthrough in October. Although COVID-19 continues to affect the workforce, completion remains on schedule for the second half of 2022. Total approved capital stands at \$0.8 billion.

In December 2021, we [opened](#) a newly extended wharf that will increase the capacity of our port facilities in Kitimat and support economic diversification in Northern British Columbia. The new wharf will be used for imports of alumina, anodes and other supplies, and for exports of low-carbon aluminium made at our BC Works smelter in Kitimat. As the wharf was built and paid for by LNG Canada, when we gained control over it in December we recognised a \$336 million gain, which has been excluded from underlying earnings on the grounds of materiality and linkage to the impairment recognised in 2021.

ELYSIS, our joint venture with Alcoa, supported by Apple and the Governments of Canada and Quebec, is developing a breakthrough technology that eliminates all direct greenhouse gases from the aluminium smelting process. In 2021, ELYSIS successfully produced aluminium at its Industrial Research and Development Center in the Saguenay, Quebec. Construction of the first commercial-scale prototype cells of ELYSIS™ inert anode technology has now begun at our Alma smelter. These prototype cells are expected to become operational in 2023. ELYSIS aims to have its technology available for installation from 2024 and production of larger volumes of carbon-free aluminium approximately two years later.

We [announced](#) an \$87 million investment to increase aluminium production with 16 new smelting cells at our AP60 smelter, in the Saguenay. Production will rise by around 45%, or 26,500 tonnes of primary aluminium per year, to a capacity of 86,500 metric tonnes.

We announced a number of investments to sustain our assets in the Saguenay, including C\$92 million to [refurbish](#) the Isle-Maligne hydroelectric power station, the oldest in our network, commissioned 95 years ago, and C\$105 million to [modernise](#) the Port-Alfred port facilities.

At our Weipa bauxite mine in northern Queensland, construction of a new 4MW solar farm and 4MW/4MWh battery storage [commenced](#), which will triple the local electricity network's solar generation capacity. The new facility will be built, owned and operated by EDL and will complement the existing 1.6MW solar farm at Weipa, which was completed in 2015.

We [partnered](#) with the Australian Renewable Energy Agency to research the potential for using clean hydrogen to replace natural gas in the calcination process of alumina refining at Yarwun. We are also [partnering](#) with Sumitomo Corporation to study the construction of a pilot plant at Yarwun, which could produce hydrogen for the Gladstone Hydrogen Ecosystem.

Copper

	2021	Adjusted ⁵ 2020	Change
2021 year-end results			
Mined copper production (000 tonnes - Rio Tinto share)	494	528	(7)%
Refined copper production (000 tonnes - Rio Tinto share)	202	155	30 %
Gross product sales (US\$ millions)	7,827	4,969	58 %
Average realised copper price (US cents per pound) ¹	424	283	50 %
Underlying EBITDA (US\$ millions)	3,969	2,084	90 %
Underlying EBITDA margin (product group operations)	59 %	50 %	
Underlying earnings (US\$ millions)	1,579	754	109 %
Net cash generated from operating activities (US\$ millions) ²	2,634	982	168 %
Capital expenditure - excluding EAUs ³ (US\$ millions)	(1,328)	(1,659)	(20)%
Free cash flow (US\$ millions)	1,295	(687)	289 %
Underlying return on capital employed (product group operations) ⁴	14 %	8 %	

1. Average realised price for all units sold. Realised price does not include the impact of the provisional pricing adjustments, which positively impacted revenues by \$246 million (2020: \$182 million).

2. Net cash generated from operating activities excludes the operating cash flows of equity accounted units (EAUs) but includes dividends from EAUs (Escondida).

3. Capital expenditure is the net cash outflow on purchases less sales of property, plant and equipment, capitalised evaluation costs and purchases less sales of other intangible assets. It excludes EAUs.

4. Underlying return on capital employed (ROCE) is defined as underlying earnings (product group operations) excluding net interest divided by average capital employed.

5. Following a reorganisation of the management team in 2021, the Diamonds business is reported within Minerals and the Simandou iron ore project in Guinea is reported within Copper. 2020 comparatives have been adjusted accordingly.

Financial performance

The improvement in our financial performance was primarily attributable to strong market conditions, with the copper price driven higher by renewed speculative interest, declining LME stocks, a weaker US dollar and COVID-19 related supply constraints. We also benefited from higher sales volumes of refined metal at Kennecott in the US and temporarily higher gold grades at Oyu Tolgoi in Mongolia. These compensated for lower volumes at Escondida in Chile, where ongoing preventive measures in response to COVID-19 continued to impact workforce availability. As a result, underlying EBITDA was up 90% to \$4.0 billion, with margins rising to 59%.

Price movements for all products benefited underlying EBITDA by \$2.2 billion for the full year. Our average realised copper price increased by 50% to 424 US cents per pound, even before taking into account the provisional pricing benefit to revenues of \$246 million in 2021, while the benchmark gold price rose just 2% to \$1,799 per ounce. We incurred additional costs related to our response to COVID-19, higher energy costs, notably in the US driven by higher diesel costs, and higher unit costs at Escondida due to lower concentrator throughput. These were offset by an improvement in volumes at Oyu Tolgoi and higher refined copper volumes at Kennecott, despite a furnace failure in September 2021, which was followed by safe restart in October. Downtime in 2020 was more significant, due to an earthquake and a major smelter maintenance shutdown.

Our copper unit costs, at 82 cents per pound in 2021, were 26% lower than in 2020, but marginally above guidance of 75 to 80 cents per pound. Lower throughput and grades at Escondida and higher royalties, in line with stronger prices, at Kennecott and Oyu Tolgoi were offset by higher production of copper and, in particular, gold at Oyu Tolgoi, driven by higher grades.

We continue to advance our future evaluation projects, in particular at Resolution Copper in Arizona, at Winu in Western Australia and at the Simandou iron ore project in Guinea.

We generated \$2.6 billion in net cash from our operating activities, a 168% increase on 2020, from the same drivers as underlying EBITDA and a \$0.8 billion increase in dividends from our 30% equity holding in Escondida to \$1.4 billion, partly offset by a \$0.4 billion tax payment in Mongolia. Free cash flow of \$1.3 billion reflected the higher operating cash flow and high level of capital investment (\$1.3 billion), mainly relating to the ongoing development of the Oyu Tolgoi underground project, where we have a 34% effective interest but fully consolidate on the basis of management control.

Review of operations

Mined copper, at 494 thousand tonnes, was 7% lower than 2020, due to lower recoveries and throughput at Escondida as a result of the prolonged impact of COVID-19, partly offset by higher recoveries and grades at Oyu Tolgoi and Kennecott.

Kennecott's mined copper production was 14% higher than 2020, with higher grades and recovery but less than expected production due to a slope failure in May. The transition to the south wall is complete, with copper head grade exceeding 0.5% in the second half. Refined copper production was 69% higher than 2020 as a result of improved performance through most of the year relative to 2020, despite the furnace failure in September 2021. The smelter was safely restarted in late October and has been stable since. In 2020, there was significant downtime following an earthquake and major maintenance.

Escondida's mined copper production was 17% lower than 2020, mainly due to 10% lower grade in ore feed to the concentrators, 4% lower throughput and 31% lower recoverable copper in ore stacked for leaching, mostly caused by continuous COVID-19 restrictions in 2021 which impacted mine development due to lower workforce availability.

Oyu Tolgoi's mined copper production from the open pit was 9% higher than 2020 with improved performance, a temporary increase in grades and increased mill feed following geotechnical issues in the first half, partly offset by lower staffing levels due to COVID-19.

Our principal projects and growth options – Oyu Tolgoi underground project

The Oyu Tolgoi underground project in Mongolia is expected to produce 500,000 tonnes of copper per year on average, from 2028 to 2036, from the open pit and underground and an average of around 350,000 tonnes for a further five years (from 2037 to 2041)¹, compared to 163,000 tonnes from the open pit in 2021. The underground Ore Reserve has an average copper grade of 1.52%, which is more than three times higher than the open pit Ore Reserve, and contains 0.31 grammes of gold per tonne.²

By 2030, Oyu Tolgoi is expected to be the fourth-largest copper mine in the world. It is a complex greenfield project comprising an underground block cave mine and copper concentrator as well as an open pit mine which has been successfully operating for ten years. It is also one of the most modern, safe, sustainable and water-efficient operations globally, with a workforce which is more than 96% Mongolian. Since 2010, Oyu Tolgoi has spent a total of \$13.4 billion in-country, including \$3.6 billion of taxes, fees and other payments to Mongolian national and local governments. The size and quality of this Tier 1 asset provides additional options, which could see production sustained for many decades.

In December 2021, the updated Resources and Reserves were registered in Mongolia in accordance with Mongolian regulations, and approval from the Mongolian authorities of the 2022 Annual Mine Plan was received.

A comprehensive agreement was [reached](#) with all partners on 25 January 2022, resetting the relationship between the partners, increasing the value the project delivers for Mongolia, and allowing underground operations to commence.

As part of a comprehensive package, Turquoise Hill Resources (TRQ) agreed to waive in full, funding balances arising from a carry account loan with Erdenes Oyu Tolgoi (EOT) of \$2.4 billion, comprising the amount of common share investments in Oyu Tolgoi LLC funded by TRQ on behalf of EOT to build the project to date, plus accrued interest.

The Parliament of Mongolia has approved a resolution (Resolution 103) that substantially resolves the outstanding issues that have been subject to negotiations with the Government of Mongolia over the last two years in relation to addressing Parliament Resolution 92 (December 2019).

An updated funding plan has been agreed to address the current estimated funding requirement for the project. Until sustainable underground production is achieved, Oyu Tolgoi will be funded by cash on hand and rescheduling of existing debt repayments, together with a pre-paid copper concentrate sales agreement with TRQ. This is in line with restrictions on debt financing contained in Resolution 103, passed by the Parliament of Mongolia on 30 December 2021.

Rio Tinto and TRQ have amended the Heads of Agreement signed in April 2021 to ensure they appropriately fund Oyu Tolgoi, including seeking to reschedule existing project finance repayments and raising additional supplemental debt on terms acceptable to all the parties, as well as a loan facility from Rio Tinto and up to \$1.5 billion of equity offerings by TRQ, with an initial offering of at least \$650 million in 2022. The capital forecast stands at \$6.925 billion, including \$175 million of estimated COVID-19 impacts to the end of 2021, with sustainable production expected in the first half of 2023. A reforecast will be undertaken in the first half of 2022 to determine a revised cost and schedule estimate that will reflect any further COVID-19 impacts; any additional time-based impacts and market price escalation arising from resequencing due to 2021 budget constraints (as a result of the Oyu Tolgoi Board not approving the capital budget uplift at the time the Definitive Estimate was finalised); and updated risk ranging reflecting the latest project execution risks.

The Oyu Tolgoi Board has also approved the signing of an electricity supply agreement to provide Oyu Tolgoi with a long-term source of power from the Mongolian grid, under terms already agreed with the Government of Mongolia. In meeting Oyu Tolgoi's commitment to sourcing power domestically, we will work with the Government to support long-term renewable energy generation in support of the Mongolian grid. The Government of Mongolia and Oyu Tolgoi are in constructive discussions with the Inner Mongolia Power International Cooperation Company (IMPIC) for an extension of current power import arrangements beyond the current agreement of July 2023. IMPIC has indicated its support for an extension and commercial terms are being finalised.

Other principal projects and growth options

The \$0.9 billion investment in phase one of the south wall pushback project at Kennecott, extending mine life to 2026, is complete and we are gradually accessing higher grades. The \$1.5 billion phase two investment will further extend pre-stripping and support additional infrastructure development, allowing mining to continue into a new area of the ore body between 2026 and 2032, generating attractive returns. Pre-feasibility studies are also being progressed to extend open-pit mining beyond 2032, with a further pushback of the north wall. In July, we [announced](#) the approval of a \$108 million investment to support an underground mine below the existing open pit, with studies due to be complete by 2024. Potential underground mining would occur concurrently with open pit operations and result in increased copper output.

At the Resolution Copper project in Arizona, the US Forest Service (USFS) published the Final Environmental Impact Statement (FEIS) in January 2021, six months behind the target date in its original project schedule set in 2015 by the Obama Administration. In March 2021, the US Department of Agriculture directed the USFS to rescind the FEIS to allow the agency to undertake further review and consultation. Resolution Copper has used this time to deepen dialogue and partnerships with local communities and Native American tribes, building on the significant consultation undertaken over the past decade.

There are five different Native American groups, the O'odham, Hopi, Pueblo of Zuni, Western Apache, and Yavapai, who traditionally used and occupied this land, each with unique histories and interactions, cultural traditions, and perspectives on the way of life. The O'odham, Hopi and Zuni have ties to this land dating back thousands of years. From these five groups, there are 11 federally recognised tribes which establishes them as domestic dependent nations within the US with inherent sovereign authority who are part of the formal consultation process, all of whom have different views around this project. We are already progressing partnerships with over half of these tribes and our aim is to have a mutual dialogue with all tribes. For example, in the second quarter of 2021 the USFS, in partnership with Resolution Copper and Western Apache Tribal elders began a restoration effort for Emory Oak trees, guided by Indigenous Traditional and Ecological Knowledge. The project has advanced restoration activities at a dozen priority Emory Oak Groves identified by Western Apache elders on Arizona National Forests, White Mountain Apache Tribal lands and Resolution Copper private property.

In 2021, we also hosted tribal leaders and elders in our business and local community to share the importance of their culture and acknowledge their ancestral ties to Arizona's landscape. Throughout the year, we continued to support fieldwork by Native American tribal monitors who use traditional knowledge to identify ancestral sites, seeps, springs and medicinal plants on Resolution Copper private lands and partner with us on preservation and co-management approaches.

At the Winu copper-gold project in the Paterson Province of Western Australia, we continue to actively engage with the Traditional Owners and have begun discussions on the initial scope and mine design with Western Australia's Environmental Protection Authority. We have taken particular care to build transparent, credible and trusting relationships with the Traditional Owners and continue to prioritise building these partnerships moving forward. Drilling, fieldwork and development activities continue to progress to schedule. Timelines to sanction and first production will be disclosed on completion of relevant agreements and permitting processes.

At the Simandou iron ore project⁴ in Guinea, technical optimisation work continued in 2021 with the support of China-based institutions and partners. Progress continued on updating and implementing our 2012 Social and Environmental Impact Assessment, alongside a new drilling programme that commenced in the fourth quarter. We established a new office in Conakry to accommodate our expanding in-country team and have issued expressions of interest for construction and early development works and in-country activities to be carried out in 2022.

We continued to engage with the Guinean authorities on potential mechanisms for collaboration on infrastructure development, while seeking mutual and sustainable benefits by developing our projects in line with international social and environmental standards and practices. We have continued to work closely with local communities, supporting them through the COVID-19 pandemic.

We remain committed to the development of Simandou, one of the world's largest and richest iron ore deposits, demand for which is increasing as steelmakers look to reduce carbon emissions, while delivering benefits to our partners, local communities and the people of Guinea.

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1. *The 500ktpa target (stated as recovered metal) for the Oyu Tolgoi underground and open pit mines is underpinned 17% by Proved Ore Reserves and 83% by Probable Ore Reserves for the years 2028-2036. The 350ktpa production target for the following five years is underpinned 18% by Proved Ore Reserves and 82% by Probable Ore Reserves. These production targets have been scheduled from current mine designs by Competent Persons in accordance with the requirements of the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, 2012 Edition (the JORC code).*
 2. *This information in relation to the underground Ore Reserves was previously reported in the release to the ASX dated 16 December 2020. The Competent Persons responsible for reporting the Ore Reserves were Ferrin Prince and Mark Bixley, Competent Persons, who are a Member and Fellow respectively of The Australasian Institute of Mining and Metallurgy. Rio Tinto is not aware of any new information or data that materially affect these Ore Reserve estimates and confirms that all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed. The form and context in which the Competent Persons' findings are presented have not been materially modified from the release dated 16 December 2020.*
 3. *These estimates exclude any impacts of delays to work schedules caused by restricted approved budgets since the start of 2021. This, together with any ongoing COVID-19 impacts, will be assessed following the commencement of underground operations with further updates provided to the market in due course. Panels 1 and 2 studies will be ongoing throughout 2022. Further study work is also under way to assess the extraction methodology and ultimate recovery of the Panel 0 recoverable pillars.*
 4. *Operating under the Simfer joint venture where the government of Guinea holds 15% and Simfer Jersey holds 85%. Simfer Jersey is owned by Chalco Iron Ore Holdings (CIOH) (47%) and Rio Tinto (53%). CIOH is owned by Chinalco (75%), Baosteel Resources (20%), China Civil Engineering Construction Corporation (CCECC) (2.5%) and China Harbour Engineering Company (CHEC) (2.5%). This structure has been in place since 2017.*

Minerals

	2021	Adjusted ⁵ 2020	Change
2021 year-end results			
Iron ore pellets and concentrates production ¹ (million tonnes - Rio Tinto share)	9.7	10.4	(6)%
Titanium dioxide slag production (000 tonnes - Rio Tinto share)	1,014	1,120	(9)%
Borates production (000 tonnes - Rio Tinto share)	488	480	2 %
Diamonds production (000 carats - Rio Tinto share) ²	3,847	14,676	(74)%
Gross product sales (US\$ millions)	6,481	5,170	25 %
Underlying EBITDA (US\$ millions)	2,603	1,710	52 %
Underlying EBITDA margin (product group operations)	43 %	35 %	
Underlying earnings (US\$ millions)	888	580	53 %
Net cash generated from operating activities (US\$ millions)	1,433	1,122	28 %
Capital expenditure (US\$ millions) ³	(644)	(455)	42 %
Free cash flow (US\$ millions)	762	642	19 %
Underlying return on capital employed (product group operations) ⁴	21 %	14 %	

1. Iron Ore Company of Canada continues to be reported within Minerals.
2. Diamonds production for 2021 solely relates to Diavik Diamond Mine, following the closure of Argyle in 2020. On 17 November 2021, Rio Tinto's interest in Diavik increased from 60% to 100%. Production and financials reflect this from 1 November 2021.
3. Capital expenditure is the net cash outflow on purchases less sales of property, plant and equipment, capitalised evaluation costs and purchases less sales of other intangible assets.
4. Underlying return on capital employed (ROCE) is defined as underlying earnings (product group operations) excluding net interest divided by average capital employed.
5. Following a reorganisation of the management team in 2021, the Diamonds business is reported within Minerals and the Simandou iron ore project in Guinea is reported within Copper. 2020 comparatives have been adjusted accordingly.

Our colleague Nico Swart was tragically killed in a shooting incident while driving to work at Richards Bay Minerals (RBM) in South Africa on 24 May. Our sympathies are with Nico's family and we continue to offer support to his family, friends and colleagues.

Financial performance

In 2021, we benefited from strong market conditions in particular for iron ore pellets and concentrate, but also for titanium dioxide pigment and borates, driven by global economic growth and underpinned by a robust construction market. We also saw a recovery in diamond prices following a pandemic-related build-up of demand and low inventory levels.

The business continued to comply with government-imposed COVID-19 restrictions, notably in Canada, the US and South Africa. At our titanium dioxide business we experienced 9% lower production, as a result of community disruptions and subsequent curtailment of operations at Richards Bay Minerals (RBM) in South Africa for around three months coupled with an extended ramp-up period, as well as unplanned maintenance and equipment reliability issues at Rio Tinto Fer et Titane (RTFT) in Canada.

Underlying EBITDA of \$2.6 billion was 52% higher than 2020, primarily due to the strong pricing environment which more than offset the impact of lower volumes, which in turn drove up cash unit costs due to fixed cost inefficiencies.

We generated net cash of \$1.4 billion from our operating activities, and \$0.8 billion of free cash flow, 28% and 19% higher than 2020, respectively, reflecting the strong pricing environment and higher dividends paid to holders of non-controlling interests at Iron Ore Company of Canada.

Review of operations

Iron Ore Company of Canada (IOC)

Iron ore production was 6% lower than 2020 due to prolonged labour and equipment availability issues impacting product feed and various other operational challenges throughout the year.

Iron & Titanium

Titanium dioxide production of 1.0 million tonnes was 9% lower than 2020 as a result of community disruptions and subsequent curtailment of operations at RBM and unplanned maintenance and equipment reliability issues at RTFT. On 24 August, RBM resumed operations following stabilisation of the security situation, supported by the national and provincial government, as well as engagement with host communities and their traditional authorities.

Borates

Borates production was in line with 2020 and benefited from improved refinery operating rates following the successful implementation of productivity initiatives supporting system stability.

Diamonds

On 18 November, we [announced](#) we had become the sole owner of Diavik Diamond Mine in the Northwest Territories of Canada, continuing its leading role in the Canadian diamond industry. Carats recovered at Diavik were 3% higher than in 2020, due to the increased share of production from November, which offset lower ore grade. The 74% decline in diamond production reflects the closure of the Argyle mine on 3 November 2020.

Our principal projects and growth options

The \$463 million Zulti South project at RBM remains on full suspension.

On 27 July, the Board [committed](#) \$2.4 billion of funding for the Jadar lithium-borates project in Serbia, subject to receiving all relevant approvals, permits and licences. In January 2022, the Government of Serbia cancelled the Spatial Plan for the Jadar project and required all related permits to be revoked. We are disappointed by this announcement and are committed to exploring all options and are reviewing the legal basis of the decision and the implications for our activities and people in Serbia.

In December, we [entered](#) into a binding agreement to acquire the Rincon lithium project in Argentina, demonstrating our commitment to build our battery materials business and strengthen our portfolio for the global energy transition. Located in the heart of the lithium triangle in Salta Province, Rincon is a long-life, scalable resource capable of producing battery-grade lithium carbonate. It also has the potential to have one of the lowest carbon footprints in the industry that can help deliver on our commitment to decarbonise our portfolio. The transaction is expected to be complete in the first half of 2022, subject to approval by Australia's Foreign Investment Review Board.

At our Boron operations in California, US, we have successfully produced battery-grade lithium from waste rock at our lithium demonstration plant as part of continued research, development, testing and experimentation of our proprietary technology in this space. The demonstration plant has a design capacity of ten tonnes per year. We are progressing with a feasibility study to evaluate options to expand to a 5,000 tonne per annum capacity.

Price and exchange rate sensitivities

The following sensitivities give the estimated effect on underlying EBITDA, assuming that each price or exchange rate moved in isolation. The relationship between currencies and commodity prices is a complex one; movements in exchange rates can affect movements in commodity prices and vice versa. The exchange rate sensitivities quoted here include the effect on operating costs of movements in exchange rates, but do not include the effect of the revaluation of foreign currency working capital. Please use them with care.

	Average published price/exchange rate for 2021	US\$ million impact on full year 2021 underlying EBITDA of a 10% change in prices/exchange rates
Aluminium - US\$ per tonne	2,480	813
Copper - US\$ per pound	4.22	543
Gold - US\$ per troy ounce	1,799	120
Iron ore realised price (62% Fe CFR freight-adjusted) - US\$ per dry metric tonne	143.8	3,605
Australian dollar against the US dollar	0.75	736
Canadian dollar against the US dollar	0.80	285
Oil (Brent) - US per barrel	\$70/bbl	111

The impact of a \$100 per tonne change in each of the input costs below is expected to have the following impact on our Canadian¹ aluminium smelting unit cash cost² of \$1,373 per tonne in 2021:

	US\$/t
Alumina (FOB)	191
Green petroleum coke (FOB)	25
Calcined petroleum coke (FOB)	36
Coal tar pitch (FOB)	8

1. Canadian smelters include all fully-owned smelters in Canada (Alma, AP60, Arvida, Grande-Baie, Kitimat and Laterrière), as well as our share of the Becancour and Alouette smelters.
2. The smelting unit cash cost refers to all costs which have been incurred before casting, excluding depreciation but including corporate allocations and with alumina at market price, to produce one metric tonne of primary aluminium.

Capital projects

Projects (Rio Tinto 100% owned unless otherwise stated)	Total approved capital cost (100% unless otherwise stated)	Approved capital remaining to be spent from 1 January 2022	Status/Milestones
Completed in 2021			
Investment in the Greater Tom Price operations (Western Turner Syncline phase 2) to sustain iron ore production capacity in the Pilbara region of Western Australia. The investment includes construction of a new crusher and a 13-kilometre conveyor.	\$0.8bn		- Approved in November 2019, the investment will enable us to sustain production of our Pilbara Blend™ and facilitate mining of existing and new deposits around Tom Price. The project achieved first ore in October, in line with previous guidance.
Investment in the south wall pushback, to extend mine life at Kennecott, Utah, US, from 2019 to 2026.	\$0.9bn		- Funding for the continuation of open pit mining via the push back of the south wall: the transition to the south wall is complete, with copper head grade exceeding 0.5% in the second half of 2021.
Ongoing and approved			
Iron Ore			
Investment in the Robe River Joint Venture (West Angelas C and D and Mesa B, C and H at Robe Valley) in the Pilbara to sustain production capacity.	\$0.9bn (Rio Tinto share)	\$0.1bn (Rio Tinto share)	Approved in October 2018, the investments will enable us to sustain production of our Pilbara Blend™ and Robe Valley products. First ore at West Angelas (C and D) was achieved in June 2021. At Robe Valley, the autonomous mining truck fleet has been commissioned: since achieving first ore in August, ongoing wet plant construction and commissioning challenges have impacted production ramp-up¹.
Investment in Gudai-Darri, a new production hub in the Pilbara region of Western Australia. The investment incorporates a processing plant and infrastructure including a 166-kilometre rail line connecting the mine to our existing network. Once complete, the mine will have an initial annual capacity	\$2.6bn	\$0.4bn	Approved in November 2018. Labour shortages have impacted both steel fabrication and site construction activities in 2021. The railway is operational with the first train loaded from the mobile crushing and screening facilities in December. First production from the main plant is now expected in the second quarter of 2022, subject to the continuing impacts of COVID-19¹.
Aluminium			
Investment in a second tunnel at the 1000MW Kemano hydropower facility at Kitimat, British Columbia, Canada, which will ensure the long-term reliability of the power supply to the Kitimat smelter.	\$0.8bn	\$0.1bn	The project was first approved in 2017, with \$155 million of additional capital approved in 2020 and a further \$132 million approved in July 2021. Works resumed at full capacity in 2021 first half and tunnel boring excavation is now complete. The project is scheduled to complete in the second half of 2022, subject to there being no further COVID-19 delays.

Projects (Rio Tinto 100% owned unless otherwise stated)	Total approved capital cost (100% unless otherwise stated)	Approved capital remaining to be spent from 1 January 2022	Status/Milestones
Ongoing and approved			
Copper			
Phase two of the south wall pushback to extend mine life at Kennecott by a further six years.	\$1.5bn	\$1.3bn	Approved in December 2019, the investment will further extend strip waste rock mining and support additional infrastructure development. This will allow mining to continue into a new area of the orebody between 2026 and 2032.
Development of the Oyu Tolgoi underground copper/gold mine in Mongolia (Rio Tinto 34%), which is expected to produce (from the open pit and underground) an average of ~500,000 tonnes ² of copper per year from 2028 to 2036 and an average of ~350,000 tonnes ² of copper per year for a further five years, compared with 163,000 tonnes in 2021 (open pit).	\$6.925bn ³	\$1.8bn	The project was originally approved in May 2016 for \$5.3 billion, with an additional \$1.45 billion approved by the Rio Tinto Board in December 2020, following completion of the Definitive Estimate. It now includes \$175 million of estimated COVID-19 impacts to the end of 2021 ³ . First sustainable production is expected in the first half of 2023, following the comprehensive agreement between the Oyu Tolgoi partners announced in January 2022.
Minerals			
Development of the Zulti South project at Richards Bay Minerals (RBM) in South Africa (Rio Tinto 74%).	\$0.5bn	\$0.3bn	Approved in April 2019 to underpin RBM's supply of zircon and ilmenite over the life of the mine. The project remains on full suspension.
Development of the greenfield Jadar lithium-borates project in Serbia. The development will include an underground mine with associated infrastructure and equipment, including electric haul trucks, as well as a beneficiation chemical processing plant.	\$2.4bn	\$2.4bn	The Board committed the funding in July 2021, subject to receiving all relevant approvals, permits and licences. First saleable production was expected in 2027 with ramp-up to full production of 58,000 tonnes of battery-grade lithium carbonate, 160,000 tonnes of boric acid (B ₂ O ₃ units) and 255,000 tonnes of sodium sulphate per year. ⁴ In January 2022, the Government of Serbia cancelled the Spatial Plan for the Jadar project and required all related permits to be revoked. We are disappointed by this announcement and are committed to exploring all options and are reviewing the legal basis of the decision and the implications for our activities and people in Serbia.

1. Potential for capital cost to rise by around 15% due to ongoing COVID-19 restrictions on commissioning and ramp-up of Pilbara growth and brownfield mine replacement projects, including labour access and supply chain quality issues. The latter has been exacerbated by an inability to conduct pre-delivery quality assurance and control at international steel and equipment manufacturers due to limitations on travel.
2. The 500ktpa target (stated as recovered metal) for the Oyu Tolgoi underground and open pit mines is underpinned 17% by Proved Ore Reserves and 83% by Probable Ore Reserves for the years 2028-2036. The 350ktpa production target for the following five years is underpinned 18% by Proved Ore Reserves and 82% by Probable Ore Reserves. These production targets have been scheduled from current mine designs by Competent Persons in accordance with the requirements of the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, 2012 Edition (the JORC code).
3. These estimates exclude any impacts of delays to work schedules caused by restricted approved budgets since the start of 2021. This, together with any ongoing COVID-19 impacts, will be assessed following the commencement of underground operations with further updates provided to the market in due course. Panels 1 and 2 studies will be ongoing throughout 2022. Further study work is also underway to assess the extraction methodology and ultimate recovery of the Panel 0 recoverable pillars.
4. These production targets are reported in a release to the Australian Securities Exchange (ASX) dated 23 February 2022, "Rio Tinto updates Ore Reserves and Mineral Resources at Jadar". All material assumptions underpinning the production targets continue to apply and have not materially changed.

PRELIMINARY FINAL REPORT FOR THE FINANCIAL YEAR

NAME OF ENTITY

Rio Tinto Limited

ACN

004 458 404

Preliminary Final

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FINANCIAL YEAR ENDED

31 December 2021

This preliminary announcement contains financial information which has been extracted from the latest financial statements, which have been audited. This announcement does not constitute the full financial statements, which have been approved by the board and will subsequently be released to the Australian Securities Exchange.

The report has been prepared on a going concern basis in accordance with UK-adopted international accounting standards and an Order under section 340 of the Australian Corporations Act 2001 issued by the Australian Securities & Investments Commission on 16 July 2021.

The report should be read in conjunction with the Rio Tinto annual report and financial statements for 2020 and the financial information for the six months ended 30 June 2021 published on 28 July 2021.

Results for announcement to the market

US\$ millions			
Consolidated sales revenue	up 42.3%	to	63,495
Net earnings attributable to members	up 115.9%	to	21,094
Underlying earnings attributable to members	up 71.8%	to	21,380
US cents			
Dividends	Amount per share	Franked amount per share	
Final dividend	417.0	417.0	(at 30%)
Final special dividend	62.0	62.0	(at 30%)
Interim dividend	376.0	376.0	(at 30%)
Interim Special dividend	185.0	185.0	(at 30%)
Australian cents			
Dividends	Amount per share	Franked amount per share	
Final dividend	577.04	577.04	(at 30%)
Final special dividend	85.80	85.80	(at 30%)
Interim dividend	509.42	509.42	(at 30%)
Interim Special dividend	250.64	250.64	(at 30%)

Registrable transfers received by the company up to 5.00pm AEDT (or 7.00pm AEDT in respect of holdings on the CHESS subregister) on 11 March 2022 will be registered before entitlements to the final and special dividends are determined.

A definition of underlying earnings is given on page 81 of the financial information, which accompanies this document.

The 2022 annual general meeting of Rio Tinto Limited will be held at the Grand Ballroom, Sofitel Melbourne On Collins, 25 Collins Street, Melbourne Victoria, on Thursday, 5 May 2022.

This report is based on the consolidated financial statements for year ended 31 December 2021 which have been audited by KPMG.



Tim Paine, Joint Company Secretary
23 February 2022



Steve Allen, Joint Company Secretary
23 February 2022

Group income statement

Years ended 31 December

	2021 US\$m	2020 US\$m
Consolidated operations		
Consolidated sales revenue	63,495	44,611
Net operating costs (excluding items shown separately)	(32,690)	(26,254)
Impairment charges net of reversals ^(a)	(269)	(904)
Exploration and evaluation costs	(726)	(625)
Profit relating to interests in undeveloped projects	7	1
Operating profit	29,817	16,829
Share of profit after tax of equity accounted units	1,042	652
Impairment of investments in equity accounted units	—	(339)
Profit before finance items and taxation	30,859	17,142
Finance items		
Net exchange gains/(losses) on net external and intragroup debt balances	802	(1,124)
Net losses on derivatives not qualifying for hedge accounting	(231)	(123)
Finance income	64	141
Finance costs ^(b)	(243)	(268)
Amortisation of discount on provisions	(418)	(377)
	(26)	(1,751)
Profit before taxation	30,833	15,391
Taxation ^(c)	(8,258)	(4,991)
Profit after tax for the year	22,575	10,400
– attributable to owners of Rio Tinto (net earnings)	21,094	9,769
– attributable to non-controlling interests	1,481	631
Basic earnings per share^(d)	1,303.4c	604.0c
Diluted earnings per share^(d)	1,295.0c	599.8c

(a) Refer to Impairment charges note on pages 50 to 53.

(b) Finance costs in the income statement are net of amounts capitalised of US\$358 million (2020: US\$340 million). In 2021, we completed a bond buy-back programme of US\$1.2 billion (nominal value) and incurred a loss on the early redemption of the bond of US\$69m. We did not undertake a bond buy-back programme in 2020.

(c) Refer to Taxation note on page 54.

(d) For the purpose of calculating basic earnings per share, the weighted average number of Rio Tinto plc and Rio Tinto Limited shares outstanding during the year was 1,618.4 million (2020: 1,617.4 million). The weighted average number of shares is calculated as the average number of Rio Tinto plc shares outstanding not held as treasury shares of 1,247.4 million (2020: 1,246.5 million) plus the average number of Rio Tinto Limited shares outstanding of 371.0 million (2020: 370.9 million) over the relevant period. There were no cross holdings of shares between Rio Tinto Limited and Rio Tinto plc in either periods presented. The income statement figures used in the calculation of basic and diluted earnings per share are based on the profits for the year attributable to owners of Rio Tinto.

For the purposes of calculating diluted earnings per share, the effect of dilutive securities of 10.5 million shares in 2021 (2020: 11.2 million) is added to the weighted average number of shares described above. The effect is calculated under the treasury stock method.

Status of financial information

The full year financial information contained in this announcement, which does not constitute statutory accounts as defined in Section 434 of the Companies Act 2006, has been derived from the statutory accounts for the year ended 31 December 2021. These statutory accounts have been audited, were approved by the Board on 23 February 2022, and will be filed with the Registrar of Companies in the United Kingdom and the Australian Securities and Investments Commission in due course. Statutory accounts for the year ended 31 December 2020 have been filed with the Registrar of Companies.

Unless stated otherwise, financial information for the years ended 31 December 2021 and 31 December 2020 has been extracted from the full financial statements for that year prepared under the historical cost convention, as modified by the revaluation of certain derivative contracts and financial assets, the impact of fair value hedge accounting on the hedged items and the accounting for post-retirement assets and obligations.

The Auditors' reports on the full financial statements for the years ended 31 December 2021 and 31 December 2020 were both unqualified and, in relation to Rio Tinto plc, did not contain a statement under section 498 (2) (regarding adequacy of accounting records and returns), or under section 498 (3) (regarding provision of necessary information and explanations) of the United Kingdom Companies Act 2006, and in relation to Rio Tinto Limited, contained a statement that the financial report is in accordance with the Corporations Act 2001 as amended by the ASIC Order dated 16 July 2021.

Group statement of comprehensive income

Years ended 31 December

	2021 US\$m	2020 US\$m
Profit after tax for the year	22,575	10,400
Other comprehensive (loss)/income		
Items that will not be reclassified to the income statement:		
Re-measurement gains/(losses) on pension and post-retirement healthcare plans	1,026	(474)
Changes in the fair value of equity investments held at fair value through other comprehensive income (FVOCI)	5	10
Tax relating to these components of other comprehensive income	(305)	112
Share of other comprehensive income/(losses) of equity accounted units, net of tax	12	(6)
	738	(358)
Items that have been/may be subsequently reclassified to the income statement:		
Currency translation adjustment ^(a)	(1,843)	2,967
Fair value movements:		
– Cash flow hedge (losses)/gains	(211)	24
– Cash flow hedge losses/(gains) transferred to the income statement	14	(63)
Net change in costs of hedging reserve	(18)	7
Tax relating to these components of other comprehensive loss/(income)	62	3
Share of other comprehensive (losses)/income of equity accounted units, net of tax	(12)	4
Other comprehensive (loss)/income for the year, net of tax	(1,270)	2,584
Total comprehensive income for the year	21,305	12,984
– attributable to owners of Rio Tinto	19,896	12,201
– attributable to non-controlling interests	1,409	783

(a) Excludes a currency translation charge of US\$211 million (2020: gain of US\$333 million) arising on Rio Tinto Limited's share capital for the year ended 31 December 2021, which is recognised in the Group statement of changes in equity. Refer to the Group statement of changes in equity on page 41.

Group cash flow statement

Years ended 31 December

	2021 US\$m	2020 US\$m
Cash flows from consolidated operations^(a)	33,936	21,822
Dividends from equity accounted units	1,431	594
Cash flows from operations	35,367	22,416
Net interest paid	(438)	(569)
Dividends paid to holders of non-controlling interests in subsidiaries	(1,090)	(683)
Tax paid	(8,494)	(5,289)
Net cash generated from operating activities	25,345	15,875
Cash flows from investing activities		
Purchases of property, plant and equipment and intangible assets	(7,384)	(6,189)
Disposals of subsidiaries, joint ventures, unincorporated joint operations and associates	4	10
Purchases of financial assets	(45)	(5)
Sales of financial assets ^(b)	114	63
Sales of property, plant and equipment and intangible assets	61	45
Net receipts/(funding) from/of equity accounted units	6	(43)
Other investing cash flows ^(c)	85	(437)
Net cash used in investing activities	(7,159)	(6,556)
Cash flows before financing activities	18,186	9,319
Cash flows from financing activities		
Equity dividends paid to owners of Rio Tinto	(15,357)	(6,132)
Proceeds from additional borrowings ^(d)	1,488	125
Repayment of borrowings and associated derivatives ^{(e)(f)}	(1,707)	(721)
Lease principal payments	(358)	(324)
Proceeds from issue of equity to non-controlling interests	66	129
Own shares purchased from owners of Rio Tinto	—	(208)
Other financing cash flows	6	1
Net cash flows used in financing activities	(15,862)	(7,130)
Effects of exchange rates on cash and cash equivalents	100	165
Net increase in cash and cash equivalents	2,424	2,354
Opening cash and cash equivalents less overdrafts	10,381	8,027
Closing cash and cash equivalents less overdrafts ^(g)	12,805	10,381
(a) Cash flows from consolidated operations		
Profit after tax for the year	22,575	10,400
Adjustments for:		
– Taxation	8,258	4,991
– Finance items	26	1,751
– Share of profit after tax of equity accounted units	(1,042)	(652)
– Impairment charges of investments in equity accounted units after tax	—	339
– Impairment charges net of reversals	269	904
– Depreciation and amortisation	4,697	4,279
– Provisions (including exchange differences on provisions)	1,903	894
– Pension settlement	(291)	—
Utilisation of provision for post-retirement benefits	(129)	(192)
Utilisation of provisions	(771)	(582)
Change in inventories	(1,397)	(281)
Change in receivables and other assets ^(h)	(367)	(562)
Change in trade and other payables	685	558
Other items ⁽ⁱ⁾	(480)	(25)
	33,936	21,822

Group cash flow statement (continued)

- (b) In 2021, the Group received net proceeds of US\$107 million (2020: net proceeds of US\$58 million) from its sales and purchases of investments within a separately managed portfolio of fixed income instruments. Purchases and sales of these securities are reported on a net cash flow basis.
- (c) In 2021, other investing cash flows include inflows relating to net settlement upon completion of a transaction increasing the Group's 60% share in the Diavik Diamond Mine to sole ownership. In 2020, other investing cash flows included US\$299 million cash outflow relating to payments made by Energy Resources Australia into a trust fund controlled by the Government of Australia. At 31 December 2021 the total amount held in the trust fund was US\$388 million (31 December 2020: US\$410 million).
- (d) On 28 October 2021, we issued US\$1.25 billion 30-years fixed rate SEC-registered debt securities with a coupon of 2.75%. We received the funds net of issuance fees and discount. The proceeds of the new issuance were used to fund the early redemption and extinguishment of the company's US\$1.20 billion 3.75% bonds due to mature in June 2025, refer to the below footnote.
- (e) During the last quarter of 2021, we completed a US\$1.20 billion (nominal value) bond buy-back programme. The notes purchased and redeemed have been cancelled. The net cash outflow of US\$1.27 billion represents the repayment of the bond at a premium offset by the monetisation of the gain from the derivatives that hedged the bond.
- (f) During 2020, we repaid our €402 million (nominal value) Rio Tinto Finance plc Euro Bonds on their maturity. The total cash outflow of US\$526 million included the cash outflow of the bond and the realised loss from the derivatives that hedged the bonds.
- (g) Closing cash and cash equivalents less overdrafts for the purposes of the cash flow statement differs from cash and cash equivalents on the Group balance sheet as per the following reconciliation:

	31 December 2021	31 December 2020
	US\$m	US\$m
Closing cash and cash equivalents less overdrafts		
Balance per Group balance sheet	12,807	10,381
Bank overdrafts repayable on demand (unsecured)	(2)	—
Balance per Group cash flow statement	12,805	10,381

- (h) In 2021, the Mongolian Tax Authority required payment by Oyu Tolgoi of US\$356 million in relation to disputed tax matters. Oyu Tolgoi continues to dispute the matters and has classified amounts subject to international arbitration as prepayments pending resolution.
- (i) At 31 December 2021, other items include US\$336 million related to a gain on recognition of a new wharf at Kitimat, Canada with no associated cash flow.

Group balance sheet

At 31 December

	2021 US\$m	2020 US\$m
Non-current assets		
Goodwill	879	946
Intangible assets	2,832	2,755
Property, plant and equipment	64,927	62,882
Investments in equity accounted units	3,504	3,764
Inventories	196	174
Deferred tax assets	3,375	3,385
Receivables and other assets	2,194	1,796
Tax recoverable	29	4
Other financial assets	528	829
	78,464	76,535
Current assets		
Inventories	5,436	3,917
Receivables and other assets	3,574	3,644
Tax recoverable	72	62
Other financial assets	2,543	2,851
Cash and cash equivalents	12,807	10,381
	24,432	20,855
Total assets	102,896	97,390
Current liabilities		
Borrowings and other financial liabilities	(1,381)	(607)
Trade and other payables	(7,733)	(7,421)
Tax payable	(1,407)	(1,850)
Provisions including post-retirement benefits	(2,106)	(1,729)
	(12,627)	(11,607)
Non-current liabilities		
Borrowings and other financial liabilities	(12,788)	(13,408)
Trade and other payables	(798)	(820)
Tax payable	(660)	(477)
Deferred tax liabilities	(3,503)	(3,239)
Provisions including post-retirement benefits	(15,930)	(15,936)
	(33,679)	(33,880)
Total liabilities	(46,306)	(45,487)
Net assets	56,590	51,903
Capital and reserves		
Share capital ^(a)		
– Rio Tinto plc	207	207
– Rio Tinto Limited	3,570	3,781
Share premium account	4,320	4,314
Other reserves	9,998	11,960
Retained earnings	33,337	26,792
Equity attributable to owners of Rio Tinto	51,432	47,054
Attributable to non-controlling interests	5,158	4,849
Total equity	56,590	51,903

Group balance sheet (continued)

- (a) At 31 December 2021, Rio Tinto plc had 1,248.1 million ordinary shares in issue and held by the public, and Rio Tinto Limited had 371.2 million shares in issue and held by the public. There were no cross holdings of shares between Rio Tinto Limited and Rio Tinto plc in either periods presented. As required to be disclosed under the ASX Listing Rules, the net tangible assets per share amounted to US\$29.47 (31 December 2020: US\$26.79).

Group statement of changes in equity

	Attributable to owners of Rio Tinto						
	Share capital US\$m	Share premium account US\$m	Other reserves US\$m	Retained earnings US\$m	Total US\$m	Non-controlling interests US\$m	Total equity US\$m
Year ended 31 December 2021							
Opening balance	3,988	4,314	11,960	26,792	47,054	4,849	51,903
Total comprehensive income for the year ^(a)	—	—	(1,916)	21,812	19,896	1,409	21,305
Currency translation arising on Rio Tinto Limited's share capital	(211)	—	—	—	(211)	—	(211)
Dividends ^(b)	—	—	—	(15,385)	(15,385)	(1,090)	(16,475)
Own shares purchased from Rio Tinto shareholders to satisfy share awards to employees ^(c)	—	—	(95)	(18)	(113)	—	(113)
Change in equity interest held by Rio Tinto ^(d)	—	—	—	76	76	(76)	—
Treasury shares reissued and other movements	—	6	—	—	6	—	6
Equity issued to holders of non-controlling interests	—	—	—	—	—	66	66
Employee share awards charged to the income statement	—	—	49	60	109	—	109
Closing balance	3,777	4,320	9,998	33,337	51,432	5,158	56,590

	Attributable to owners of Rio Tinto						
	Share capital US\$m	Share premium account US\$m	Other reserves US\$m	Retained earnings US\$m	Total US\$m	Non-controlling interests US\$m	Total equity US\$m
Year ended 31 December 2020							
Opening balance	3,655	4,313	9,177	23,387	40,532	4,710	45,242
Total comprehensive income for the year ^(a)	—	—	2,798	9,403	12,201	783	12,984
Currency translation arising on Rio Tinto Limited's share capital	333	—	—	—	333	—	333
Dividends ^(b)	—	—	—	(6,132)	(6,132)	(689)	(6,821)
Share buy-back ^(e)	—	—	—	(1)	(1)	—	(1)
Own shares purchased from Rio Tinto shareholders to satisfy share awards to employees ^(c)	—	—	(76)	(31)	(107)	—	(107)
Change in equity interest held by Rio Tinto ^(d)	—	—	—	84	84	(84)	—
Treasury shares reissued and other movements	—	1	—	—	1	—	1
Equity issued to holders of non-controlling interests	—	—	—	—	—	129	129
Employee share awards charged to the income statement	—	—	61	82	143	—	143
Closing balance	3,988	4,314	11,960	26,792	47,054	4,849	51,903

Group statement of changes in equity (continued)

- (a) Refer to Group statement of comprehensive income for further details. Adjustments to other reserves include currency translation attributable to owners of Rio Tinto, other than that arising on Rio Tinto Limited's share capital.
- (b) The dividends paid in 2021 are based on the following US cents per share amounts: 2020 final – 309.0 cents, 2020 final special - 93.0 cents, 2021 interim – 376.0 cents, 2021 interim special - 185.0 cents (2020 dividends paid: 2019 final – 231.0 cents, 2020 interim – 155.0 cents). Dividends declared in the announcement of the results for 2021 represent the 2021 final ordinary dividend of 417.0 cents per share and a special dividend of 62.0 cents per share.
- (c) Net of contributions received from employees for share awards.
- (d) Includes accrual of interest on funding balances with holders of non-controlling interests in Oyu Tolgoi. On 25 January 2022, Turquoise Hill agreed to waive the full amount of funding balances and interest; refer to page 73.
- (e) In 2020, the amount of US\$1 million together with the amounts paid during the year in respect of an irrevocable contract in place at the end of 2019 to cover the share buy-back programme, totalled US\$208 million, as reported in the cash flow statement.

Accounting Policies

The condensed consolidated financial statements included in this report have been prepared on a going concern basis in accordance with the Companies Act 2006 applicable to companies reporting under International Financial Reporting Standards and in accordance with applicable UK law, applicable Australian law as amended by the Australian Securities and Investments Commission Order dated 16 July 2021, Article 4 of the European Union IAS regulation and also with:

- International Financial Reporting Standards as issued by the International Accounting Standards Board (IASB) and interpretations issued from time to time by the IFRS Interpretations Committee (IFRS IC) which are mandatory at 31 December 2021.

The above accounting standards and interpretations are collectively referred to as “IFRS” in this report. While the financial information included in this report has been prepared in accordance with IFRS the report does not contain all the information required to comply with IFRS. The Group will publish full financial statements that comply with IFRS on 23 February 2022.

The Group has not early adopted any amendments, standards or interpretations that have been issued but are not yet mandatory.

The Group's financial statements have been prepared on the basis of accounting policies consistent with those applied in the financial statements for the year ended 31 December 2020, except for the accounting requirements set out below, effective as at 1 January 2021, which did not have a significant impact on the Group's financial statements.

The Group adopted Interest Rate Benchmark Reform - Phase 2 (Amendments to IFRS 9, IAS 39, IFRS 7, IFRS 4 and IFRS 16) at 1 January 2021. The amendments address the financial reporting impact from reform of the London Interbank Offered Rate (LIBOR) and other benchmark interest rates (collectively “IBOR reform”). The Group applied the Phase 2 amendments retrospectively. However, in accordance with the exceptions permitted in the Phase 2 amendments, it has elected not to restate comparatives for the prior periods to reflect the application of these amendments. Since the Group had no transactions for which the benchmark rate had been replaced with an alternative benchmark rate as at 31 December 2020, there is no impact on opening equity balances as a result of retrospective application.

On 5 March 2021 LIBOR's administrator, ICE Benchmarks Administration (IBA) and its supervisor, the UK Financial Conduct Authority (FCA), issued statements which provide the dates that all LIBOR settings will either cease to be provided by any administrator or will no longer be representative. This will occur: immediately after 31 December 2021, for all GBP, Euro, CHF and JPY LIBOR settings, and for 1-week and 2-month USD LIBOR settings; and immediately after 30 June 2023, for the remaining USD LIBOR settings. The Group has taken relevant Phase 2 practical reliefs from certain requirements in IFRS 9, IFRS 7, IFRS 4 and IFRS 16 relating to changes in the basis for determining contractual cash flows of financial assets, financial liabilities and hedge accounting.

Accounting Policies (continued)

Our hedging arrangements impacted by the reform of US LIBOR are part of the International Swaps and Derivatives Association (ISDA) Fallbacks Protocol, which provides a global standardised mechanism for replacement of the current benchmark. At 31 December 2021, the Group has interest rate risk exposure including US\$6.1 billion nominal values of fixed-rate borrowings swapped to US dollar rates in fair value hedge relationships impacted by the reform. We expect the application of the Phase 2 reliefs to result in continuation of the Group's pre-existing hedge accounting upon amendment of designated arrangements in response to the replacement of IBOR with new benchmarks.

In addition, the Group has a number of arrangements which reference IBOR benchmarks and extend beyond 2021. These include third-party borrowings relating to the Oyu Tolgoi LLC project finance, other secured loans, a number of intragroup balances and certain commercial contracts. Other arrangements, which currently reference IBOR benchmarks include shareholder loan facilities. Phase 2 amendments will require the Group to account for a change in the basis for determining the cash flows of a financial asset or a financial liability measured at amortised cost, by updating their respective effective interest rates as required by IBOR reform. As a result of the Phase 2 relief the Group expects that no material gain or loss will arise from these updates. Most intragroup balances transitioned to alternative benchmarks by 31 December 2021.

Proceeds before Intended Use (Amendments to IAS 16 “Property, Plant and Equipment”, mandatory in 2022 and not yet endorsed by the UK)

The amendments prohibit the deduction, from the cost of major project construction work in progress, of proceeds (net of additional processing costs) from selling items before the related item of property, plant and equipment is available for use. Under the amendment such proceeds are recognised in the income statement together with the costs of producing those items. The amendments will result in higher reported revenue, operating costs, inventory and property plant and equipment balances (capital works in progress) relating to major development projects completed after 1 January 2020. IAS 2 “Inventories” will apply to the measurement of pre-production inventory and identifying the related cost may require significant estimation and judgment in the selection of an appropriate method for allocating development expenditure to such inventory. During 2021, the Group completed a review of the impact of these amendments and concluded that adjustments to Group retained earnings at 1 January 2020, and restatement of the 2020 and 2021 Group Income Statement and Balance Sheet upon adoption of the amendments in 2022 in respect of such projects are not material.

Onerous Contracts – Cost of Fulfilling a Contract (Amendments to IAS 37 “Provisions, Contingent Liabilities and Contingent Assets”), mandatory in 2022 and not yet endorsed by the UK)

The amendments specify which costs an entity includes in determining the cost of fulfilling a contract for the purpose of assessing whether the contract is onerous. Under the amendment the cost of fulfilling a contract comprises all directly related costs, including both incremental amounts and an allocation of other directly related expenditure. The Group currently makes provision for onerous contracts when the assets dedicated to the contract are fully impaired or the contract becomes stranded as a result of a business decision. From 2022, the Group will record a provision if a contract is found to be loss-making on a stand-alone basis following allocation of all directly related costs as required by the amendments to IAS 37. As required by the transition arrangements, the Group will apply the amendments in its 2022 Financial Statements without restatement. During 2021, the Group completed a review of the impact of these amendments and concluded that adjustments to retained earnings at 1 January 2022 are not material.

Accounting Policies (continued)

Deferred Tax related to Assets and Liabilities arising from a Single Transaction (Amendments to IAS 12 Income Taxes, mandatory in 2023 and not yet endorsed by the UK)

Narrow-scope amendments to IAS 12 introduce an exception to the initial recognition exemption for transactions that give rise to equal taxable and deductible temporary differences. The most significant impact from implementing these amendments is expected to be from temporary differences related to the Group's provisions for close-down, restoration, environmental and lease obligations and corresponding capitalised closure costs and right-of-use assets.

Our existing accounting policy states that “where the recognition of an asset and liability from a single transaction gives rise to equal and offsetting temporary differences, Rio Tinto applies the Initial Recognition Exemption allowed by IAS 12, and consequently recognises neither a deferred tax asset nor a deferred tax liability in respect of these temporary differences”.

Under the amendment, deferred tax assets and liabilities will be required to be recognised in respect of such temporary differences. Upon transition in 2023, the Group anticipates material adjustments (prior to required offsetting within the same tax jurisdiction) as at 1 January 2021 to deferred tax assets and deferred tax liabilities with the net difference recorded in reserves. Work is ongoing to quantify the impact, including appropriate offsets against existing deferred tax liabilities or assets in various jurisdictions. There will be no impact on tax cash flows or balance sheet tax recoverable or payable as a result of implementing these amendments and the unwind of the newly recognised deferred tax is not expected to materially impact annual profits and losses.

The Group continues to evaluate the impact of adopting other new standards and amendments mandatory in 2023 and 2024. These include, IFRS 17 “Insurance Contracts”, and “Amendments to IAS 1 – Presentation of financial statements” on the classification of liabilities as current or non-current.

More detailed information on new accounting pronouncements will be included in the Group's 2021 full financial statements.

COVID-19 Impact

The Group has demonstrated resilience in dealing with ongoing COVID-19 challenges with continued prioritisation of the safety of our people and communities. Rio Tinto continues to proactively manage COVID-19 impacts and prioritises work across critical projects, as challenges associated with interstate and international border access continue, impacting the availability and movement of people, most notably in Australia and Mongolia. Plans to mitigate labour shortages are in place.

Despite this, we progressed a number of our projects, including the Pilbara replacement mines. Mining and operational readiness activities are progressing at the Gudai-Darri mine and the railway is operational. Production from the new greenfield mine at Gudai-Darri and the Robe Valley brownfield mine replacement project is delayed due to the tight labour market in Western Australia. First production from the main plant at Gudai-Darri is now expected in the second quarter of 2022, subject to the continuing impacts of COVID-19. The Oyu Tolgoi underground project in Mongolia was technically and operationally ready for undercut, which commenced in January 2022, despite continued COVID-19 constraints in Mongolia. The delay to the commissioning of shafts 3 and 4 is still expected to be approximately nine months based on known COVID-19 impacts to date, contributing to delays in first sustainable production expected in the first half of 2023.

Accounting Policies (continued)

In addition, Escondida's mined copper production was lower than 2020 mostly as a result of the prolonged impact of COVID-19. The Group continues to monitor government-imposed restrictions related to COVID-19, and any other potential COVID-19 related disruptions, such as shipment delays. Recognising the broad and complex impacts of the pandemic on our markets, operations and financial performance, we have chosen not to segregate COVID-19 related costs from our underlying performance metrics.

Going concern

Management has prepared detailed cash flow forecasts for the next 12 months and has updated life-of-mine plan models with longer-term cash flow projections. These forecasts demonstrate that the Group has sufficient cash, other liquid resources and undrawn credit facilities to enable it to meet its obligations as they fall due. As such, the directors considered it appropriate to adopt the going concern basis of accounting in preparing the full-year financial information.

Climate change

We have put the net zero transition at the heart of our business strategy: combining investments in commodities that enable the energy transition with actions to decarbonise our operations and value chains. As a result of this, our strategy and approach to climate change are supported by strong governance, processes and capabilities. In 2021, we updated our Scope 1 and 2 emissions targets and now aim to reduce emissions by 15% in 2025, by 50% in 2030 (relative to our 2018 equity baseline) and to achieve net zero emissions by 2050. These targets are aligned with efforts to limit global warming to 1.5°C, which is aligned with the stretch goal of the Paris Agreement. The goals of the Paris Agreement are set out in Article 2, which includes holding the increase in global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C.

We frame the strategic context for the Group through the lens of three scenarios, developed by the Strategy and Economics teams, structured around our analysis of the interplay of three global forces: geopolitics, society and technology.

- In a geopolitics-led scenario, strong nationalistic tendencies hold back global action on climate change, carbon prices remain low (in the range US\$0-30/t CO₂e) and warming exceeds 3°C by 2100.
- In a society-led scenario, strong global co-ordination of climate policies, supported by high and rising carbon prices (reaching US\$130/t CO₂e in 2050), accelerates the energy transition and we believe achieves the goal of the Paris Agreement by limiting warming to well below 2°C by 2100.
- In a technology-led scenario, innovation boosts economic productivity and decarbonisation efforts; however, carbon prices remain modest (ranging US\$10 to US\$75/t CO₂e by 2030) and action to limit emissions is insufficient, so warming exceeds 2°C by 2100.

We recognise that the pace of decarbonisation across the global economy is uncertain and that current climate policies in many countries are not yet aligned with stated ambitions. These policy uncertainties are captured in our scenario analysis, which in turn informs the central case carbon price assumptions. We continue to monitor alternative scenarios including ones that limit warming to 1.5°C. For example, the IEA NZE50 assumes higher carbon prices and a much faster energy transition than our scenarios; they also require a higher level of co-ordination in climate policies across sectors and countries. The IEA's scenario also assumes stronger demand for commodities such as copper or battery minerals that are critical to the accelerated deployment of solar and wind renewables or electric vehicles.

Accounting Policies (continued)

Portfolio strategy

Our scenarios above inform our portfolio strategy, the internal commodity price setting process and strongly influence our critical accounting judgements and estimates. Through our strategy process we test the resilience of our portfolio against each of these three scenarios and conclude that overall, our portfolio is expected to perform more strongly in scenarios with proactive climate action, particularly in relation to aluminium and copper. Our strategy to focus our growth capital expenditure on materials that enable the energy transition is informed by these scenarios. Our ambition is to increase our growth capital expenditure to up to US\$3 billion per year in 2023 and 2024, developing new options and finding innovative ways of bringing projects on-stream faster. This includes investment in lithium production at Rincon and Jadar, copper at Oyu Tolgoi and Winu, as well as high-grade iron ore from Simandou.

Accounting judgements

The forecast commodity prices (including carbon prices) are informed by a blend of our three scenarios and are used pervasively in our financial processes from budgeting, forecasting, capital allocation and project evaluation to the determination of ore reserves. In turn, these prices are used to derive critical accounting estimates including as inputs to impairment testing, estimation of remaining economic life for units of production depreciation and discounting closure and rehabilitation provisions. As only one of our scenarios represents the Group's view of the goals of the Paris Agreement, and because of the policy uncertainties described above, our commodity price assumptions are not consistent with the expectation of climate policies required to accelerate the global transition to meet these goals.

In addition to prices, given the significant investment we are making to abate our carbon emissions, we have also considered the potential for asset obsolescence, with a particular focus on our Pilbara operations where we are prioritising investment in renewables to switch away from natural gas power generation, but no material changes to accounting estimates have been necessary. The closure date and cost of closure is also sensitive to climate assumptions but no material changes have been made in the year specific to climate change.

The Group has identified impairment triggers during the year for cash-generating units in the aluminium and copper segments. The Group considers the long-term pricing outlook for aluminium and copper is positive as these metals are critical to the global transition to a low-carbon future. The outlook for iron ore pricing is less certain and depends on the development of low-emissions steel technology. However, considering the high return on capital generated by our existing iron ore asset base, none of our three scenarios would give rise to an impairment today. When measuring the recoverable amount for these cash-generating units, a blend of the three strategic scenarios has been used to forecast the cash flows. As only one of the strategic scenarios represents the Group's view of the goals of the Paris Agreement, the impairment outcome cannot be described as Paris-aligned. However, in these circumstances, we have also disclosed sensitivity information based on cash flows flexed for sales prices and carbon taxes in the society-led scenario, which has a well below 2°C outcome. These sensitivities indicate that higher recoverable amounts would have been determined if the accounting was aligned with the society-led scenario.

Using a carbon price to accelerate our mitigation action

We are committed to align our future capital expenditure with our 2025 and 2030 Scope 1 and 2 emissions reduction targets. As noted above, we conclude that our targets are aligned with efforts to limit warming to 1.5°C and the stretch goal of the Paris Agreement. To deliver our climate targets, the Group

Accounting Policies (continued)

expects to make incremental capital investment of US\$7.5 billion over the period to 2030 (approximately US\$1.5 billion over the period 2022 to 2024). We also expect our incremental operating expenditure to support the Climate Action Plan to be in the order of US\$200 million per year, including research and development initiatives.

For internal approval purposes, a notional carbon price of US\$75/t CO₂e is now used to drive improvements in energy efficiency across our assets, help to identify new abatement projects as well as incentivise and accelerate the delivery of capital investment in abatement projects and operational improvements. The US\$75/t CO₂e price is derived from our analysis of carbon mitigation options across our assets (summarised in our Marginal Abatement Cost Curve) – it is unrelated to the prices in our scenarios.

Alternative performance measures

The Group presents certain alternative performance measures (APMs), including underlying earnings, which are reconciled to directly comparable IFRS financial measures on pages 78 to 86 of this report. These APMs are used by management to assess the performance of the business and may therefore be useful to investors. They are not a substitute for the IFRS measures and should be considered supplementary to those measures.

Reconciliation with Australian Accounting Standards

The Group's financial statements have been prepared in accordance with IFRS, as defined in the accounting policies section of this report, which differs in certain respects from the version of International Financial Reporting Standards that is applicable in Australia, referred to as Australian Accounting Standards (AAS).

Prior to 1 January 2004, the Group's financial statements were prepared in accordance with UK GAAP. Under IFRS, goodwill on acquisitions prior to 1998, which was eliminated directly against equity in the Group's UK GAAP financial statements, has not been reinstated. This was permitted under the rules governing the transition to IFRS set out in IFRS 1. The equivalent Australian Standard, AASB 1, does not provide for the netting of goodwill against equity. As a consequence, shareholders' funds under AAS include the residue of such goodwill, which amounted to US\$377 million at 31 December 2021 (2020: US\$374 million). Save for the exception described above, the Group's financial statements drawn up in accordance with IFRS are consistent with the requirements of AAS.

Geographical analysis (by destination)

Years ended 31 December

Consolidated sales revenue by destination ^(a)	2021 %	2020 %	2021 US\$m	2020 US\$m
China	57.2	58.1	36,308	25,940
United States of America	12.6	10.9	8,012	4,867
Asia (excluding China and Japan)	9.4	10.2	5,985	4,536
Japan	7.9	7.5	5,012	3,354
Europe (excluding UK)	5.2	5.9	3,271	2,623
Canada	2.6	2.9	1,677	1,289
Australia	1.8	1.7	1,122	745
UK	0.4	0.5	243	242
Other countries	2.9	2.3	1,865	1,015
Consolidated sales revenue	100	100	63,495	44,611

(a) Consolidated sales revenue by geographical destination is based on the ultimate country of the product's destination, if known. Where the ultimate destination is not known, we have defaulted to the shipping address of the customer. Rio Tinto is domiciled in both the UK and Australia.

Product analysis (by revenue type)

	Revenue from contracts with customers 2021 US\$m	Other revenue ^(a) 2021 US\$m	Consolidated sales revenue 2021 US\$m	Revenue from contracts with customers 2020 US\$m	Other revenue ^(a) 2020 US\$m	Consolidated sales revenue 2020 US\$m
Iron ore	42,992	(796)	42,196	28,202	1,000	29,202
Aluminium, alumina and bauxite	12,336	103	12,439	9,092	54	9,146
Copper	3,229	96	3,325	1,721	64	1,785
Industrial minerals (comprising titanium dioxide slag, borates and salt)	2,114	3	2,117	2,054	(3)	2,051
Gold	1,075	2	1,077	471	6	477
Diamonds	501	—	501	459	—	459
Other products ^(b)	1,837	3	1,840	1,493	(2)	1,491
Consolidated sales revenue	64,084	(589)	63,495	43,492	1,119	44,611

(a) Certain of the Group's products may be provisionally priced at the date revenue is recognised. The change in value of the provisionally priced receivables is based on relevant forward market prices and is included in "Other revenue" above.

(b) "Other products" includes metallic co-products, molybdenum, silver and other commodities. This category also now includes uranium sales of US\$229 million (2020: US\$299 million) that were previously disclosed separately.

Impairment charges net of reversals

	Pre-tax amount 2021 US\$m	Taxation 2021 US\$m	Non- controlling interest 2021 US\$m	Net amount 2021 US\$m	Pre-tax amount 2020 US\$m
Aluminium – Kitimat	(269)	72	—	(197)	—
Aluminium – Pacific Aluminium	—	—	—	—	(489)
Aluminium – Sohar	—	—	—	—	(220)
Aluminium – ISAL	—	—	—	—	(93)
Minerals – Diavik	—	—	—	—	(441)
Total impairment charges net of reversals	(269)	72	—	(197)	(1,243)
Comprising:					
Impairment charges of consolidated balances				(269)	(904)
Impairment charges related to EAU's (pre-tax)				—	(368)
Total impairment charges in the financial information by business unit (page 74)				(269)	(1,272)
Taxation (including related to EAU's)				72	157
Non-controlling interests				—	—
Total impairment charges net of reversals in the income statement				(197)	(1,115)

2021

Aluminium – Kitimat, Canada

On 3 December 2021, we announced completion of the newly-constructed wharf at Kitimat. Construction spend was incurred by LNG Canada and therefore a gain of US\$336 million representing the estimated fair value of the cost of construction has been recorded and the carrying value of the Kitimat cash-generating unit (CGU) increased accordingly. Output from the smelter was reduced to 25% as a result of a workforce strike in mid-2021 and ramp-up to full capacity will extend through 2022. As a previously impaired CGU, and therefore carrying limited headroom, these factors were identified as conditions that could indicate that the uplifted carrying value may not be supportable and therefore the CGU was tested for impairment.

The recoverable amount for the Kitimat CGU has been calculated based on the IAS 36 "Impairment" fair value less cost of disposal (FVLCD) methodology by reference to the net present value of post-tax cash flows, expressed in real-terms and discounted at 6.6%. The recoverable amount of US\$3,126 million is less than the carrying value of US\$3,323 million, resulting in a post-tax impairment charge of US\$197 million, equivalent to US\$269 million pre-tax. The overall adjustment to the carrying value of the property, plant and equipment at Kitimat from the gain on recognition of the wharf less the impairment charge is an increase of US\$67 million.

The pricing data used to calculate net present value of cash flows is based on a blend of the three strategic pricing scenarios described in the climate change section on page 46 to 48. While keeping all other inputs constant, we have flexed the cash flows to reflect the carbon and commodity prices generated by the one scenario that we believe is consistent with the goals of the Paris Agreement. The net present value of post-tax cash flows would have been US\$58 million greater under this interpretation of Paris-aligned accounting.

Impairment charges net of reversals (continued)

To illustrate the sensitivity of the recoverable amount, an increase in the discount rate by 50 basis points to 7.1% (post-tax real terms rate) would reduce the recoverable amount by US\$180 million with all other valuation inputs remaining constant.

Copper – Oyu Tolgoi, Mongolia

Development of the Oyu Tolgoi underground progressed through 2021 at a slower pace than anticipated due to COVID-19 affecting staffing levels. Initiation of the caving process, known as the undercut, was expected to occur during 2021, however at 31 December 2021 the non-technical criteria for approval, including negotiations with the Government of Mongolia, remained ongoing and therefore this aspect of the construction was paused. On 30 December 2021, the Mongolian parliament approved Resolution 103 which indicated support for concessions offered by Rio Tinto during these negotiations, but introduced new funding constraints on the shareholders of Oyu Tolgoi LLC until first sustainable production. As a critical milestone in the development of the mine, we identified the delay to the undercut and consequential delay to production from the underground operations as being an impairment trigger and therefore assessed the recoverable amount of the project as at 31 December 2021.

The recoverable amount of the Oyu Tolgoi CGU has been prepared in accordance with the FVLCD methodology. It is based on forecast post-tax future cash flows over the life of mine of the open pit and underground reserves of Hugo North Lift 1 (HNL1) together with an estimate of future expansion potential to extract mineral resources from further underground developments and enlarged open pit. Mining of these mineral resources is subject to future investment decisions and comprises approximately 20% of the total value. These cash flows, expressed in real terms, have been discounted to present value using a project specific post-tax discount rate of 8%.

The development of HNL1 underground comprises three continuous sections. The initial development in 'Panel 0' is in the central section of the orebody with Panel 1 to the north and Panel 2 located to the south. Evaluation of mine plans for Panels 1 and 2 remain under study and are linked to the lateral development of project. To reflect the risk inherent in these aspects of the mine plan that are currently at the pre-feasibility study level of confidence, a risk adjustment factor of 10% has been applied to the net cash flows associated with years of the development of those sections of the underground mine.

At 31 December 2021, the non-technical criteria for the undercut had not been satisfied and therefore, an adjustment to the underlying cash flows of the valuation model was made to weight the timing of the undercut between an immediate approval and the potential for a six-month delay.

In finalising the determination of a recoverable amount for the cash-generating unit, we considered the likely impact of elevated uncertainty on a market participant's perspective at the balance sheet date, in particular that arising from the incomplete status of negotiations and financing arrangements. Considerations included immediate funding requirements and the restrictions placed thereon in Resolution 103. To represent this uncertainty, a further judgmental reduction has been applied to the total net present value of cash flows from mining operations. After taking all of the above adjustments into account, the resulting recoverable amount almost equals the carrying value for the cash-generating unit of US\$11.8 billion. Accordingly, management has determined that neither an impairment charge nor an impairment reversal is required.

Impairment charges net of reversals (continued)

As described in the subsequent event section, on 25 January 2022, Rio Tinto, Turquoise Hill Resources and the Government of Mongolia reached agreement to unanimously approve the commencement of underground operations. Through this agreement, the non-technical criteria for the undercut have been satisfied, including agreement over the pathway to funding the project to sustainable production. Underground mining operations have subsequently commenced. No hindsight has been applied in determining the appropriate valuation assumptions at 31 December 2021, however the timing and substance of the agreement reached was within the range of plausible outcomes considered in making this determination.

The pricing data used to calculate the net present value of cash flows is based on a blend of the three strategic pricing scenarios described in the climate change section above. While keeping all other inputs constant, we have flexed the cash flows to reflect carbon and commodity prices under this one scenario that we believe is consistent with achieving the goals of the Paris Agreement. The net present value of post-tax cash flows would have been US\$1.9 billion greater under this interpretation of Paris-aligned accounting, assuming no changes to the ore mined (ie alternative economic grade cut-off is impractical to estimate, but higher prices could potentially result in more ore being mined and sold).

To further illustrate the sensitivity of the recoverable amount, an increase in the discount rate by 50 basis points to 8.5% (post-tax real terms rate) would reduce the recoverable amount by US\$0.8 billion with all other valuation inputs remaining constant.

The funding of equity contributions to the project on behalf of Erdenes Oyu Tolgoi (Erdenes) by way of a carry account loan has been accounted for in accordance with the accounting policy and additional information regarding these funding balances owing from Erdenes to Turquoise Hill and the impact on non-controlling interests is provided on page 70. On 25 January 2022, as part of a comprehensive package negotiated with the Government of Mongolia in order to approve commencement of underground operations, Turquoise Hill agreed to waive the full amount of funding balances and interest owing from Erdenes to Turquoise Hill. The waiver does not have an impact on the Group's assessment of impairment for either 2021 or 2022; refer to the subsequent events note on page 73.

2020

Aluminium – Pacific Aluminium, Australia and New Zealand

On 9 July 2020, we announced the conclusion of the NZAS strategic review and gave Meridian Energy 14 months' notice for the termination of the power contract. As a result of the decision to wind-down operations an impairment trigger was identified. The net present value of post-tax cash flows over the remaining life for this CGU was negative and therefore the non-current assets of the smelter were fully impaired.

High operating costs and challenging outlook for the aluminium industry also resulted in impairment triggers being identified at the Bell Bay aluminium smelter in Tasmania, Australia and at Boyne Smelter in Queensland, Australia at 30 June 2020. The forecast net present value of cash flows over the period to anticipated expiry in 2025 of a power contract with Hydro Tasmania was negative taking into account market conditions at the time. The property, plant and equipment of the Bell Bay smelter was therefore fully impaired. We determined the recoverable amount for our share of the Boyne Smelter CGU, which also includes the Gladstone Power Station, as US\$273 million based on post-tax cash flows expressed in real terms and discounted at 6.6%. Accordingly our share of impairment after tax in the equity accounted unit was US\$119 million (US\$148 million pre-tax) related to the smelter and US\$26 million (US\$36 million pre-tax) related to the power station.

Impairment charges net of reversals (continued)

Aluminium – Sohar

In 2020, the challenging outlook for the Middle Eastern aluminium industry was identified as an impairment trigger at the Sohar aluminium smelter in Oman, an equity accounted unit of the Group.

At 30 September 2020, we determined the recoverable amount for our share of the Sohar CGU to be US\$258 million based on post-tax cash flows expressed in real terms and discounted at 7.6%.

Accordingly, our share of impairment after tax in the equity accounted unit was US\$220 million.

Aluminium – ISAL smelter, Iceland

Our announcement in February 2020 of a strategic review of the ISAL smelter in Iceland, combined with challenging market conditions, was identified as an impairment trigger at 30 June 2020. Subsequent restoration of smelter competitiveness resulting from improved power delivery terms represented an indicator of partial impairment reversal at 31 December 2020. We calculated a post-tax recoverable amount for the CGU of US\$139 million at 31 December 2020 based on FVLCD, discounted using a post-tax rate of 6.6%. As a consequence, with full impairment of the CGU and a pre-tax impairment charge of US\$204 million in the first half of 2020 followed by reversal of US\$111 million to previously recorded pre-tax impairment in the second half of 2020, the full year results for the year ended 31 December 2020 included a net pre-tax impairment charge of US\$93 million.

Minerals (previously under Copper & Diamonds) – Diavik, Canada

The COVID-19 pandemic significantly disrupted global demand for diamonds, and in April 2020 our then joint venture partner in the Diavik 'Diamond Mine' filed for creditor protection and defaulted on cash calls. These circumstances were identified as an impairment trigger. The net present value of post-tax cash flows projected over the remaining life of the Diavik 'Diamond Mine' to 2025 did not support retaining any carrying value, resulting in the Group's 60% interest in plant and equipment and intangible assets of the CGU being fully impaired at 30 June 2020.

Prima facie tax reconciliation

Years ended 31 December

	2021 US\$m	2020 US\$m
Profit before taxation	30,833	15,391
Deduct: share of profit after tax of equity accounted units ^(a)	(1,042)	(652)
Add: impairment after tax of investments in equity accounted units ^(a)	—	339
Parent companies' and subsidiaries' profit before tax	29,791	15,078
Prima facie tax payable at UK rate of 19% (2020:19%) ^(b)	5,660	2,865
Higher rate of taxation of 30% on Australian underlying earnings (2020: 30%)	2,693	1,779
Other tax rates applicable outside the UK and Australia on underlying earnings	110	(80)
Impact of items excluded in arriving at underlying earnings ^(c) :		
– Impairment charges ^(d)	(21)	44
– Exchange and gains/losses on derivatives	(126)	260
– Losses from increases to closure estimates (non-operating and fully impaired sites)	84	(24)
– Utilisation of capital losses on the gain from the recognition of the wharf at Kitimat, Canada	(64)	—
Resource depletion and other depreciation allowances	(52)	(34)
Recognition of previously unrecognised deferred tax assets ^(e)	(212)	(182)
Write-down of previously recognised deferred tax assets ^(f)	—	173
Amounts under/(over) provided in prior years	63	9
Other items ^(g)	123	181
Total taxation charge^(a)	8,258	4,991

(a) This tax reconciliation relates to the Group's parent companies, subsidiaries and joint operations, and excludes equity accounted units. The Group's share of profit of equity accounted units is net of tax charges of US\$659 million (2020: US\$363 million). Impairment after tax of investments in equity accounted units is net of tax credits of US\$nil (2020: US\$29 million).

(b) As a UK headquartered and listed Group, the reconciliation of expected tax on accounting profit to tax charge uses the UK corporation tax rate to calculate the prima facie tax payable. Rio Tinto is also listed in Australia, and the reconciliation includes the impact of the higher tax rate in Australia where a significant proportion of the Group's profits are currently earned. The impact of other tax rates applicable outside the UK and Australia is also included. The weighted average statutory corporation tax rate on profit before tax is approximately 29% (2020: 30%).

(c) The impact for each item includes the effect of tax rates applicable outside the UK.

(d) The tax impact of impairments relates to a tax rate differential between the Canadian and UK rates on the Kitimat impairment. In the comparative period to 31 December 2020 the tax impact of impairments includes the write-down of deferred tax assets at ISAL and NZAS and non-recognition of deferred tax on those impairments. The tax impact also includes recognition at local tax rates of deferred tax assets arising on the impairments of Bell Bay, Gladstone Power Station and Diavik. Refer to the impairment charges described on page 50 to 53.

(e) The recognition of previously unrecognised deferred tax assets relates to the recognition of prior year deferred tax assets at Oyu Tolgoi and in our Australian Aluminium business due to improved deferred tax asset recovery expectations. In the comparative period to 31 December 2020 the recognition of previously unrecognised deferred tax assets relates to the recognition of prior year deferred tax assets on losses and on impaired assets at Oyu Tolgoi due to improved deferred tax asset recovery expectations.

Prima facie tax reconciliation(continued)

- (f) In the comparative period to 31 December 2020 the write down of previously recognised deferred tax assets relates primarily to the partial de-recognition of deferred tax assets in our Australian Aluminium business.
- (g) Other items include non-deductible costs and withholding taxes, and various adjustments to provisions for taxation, the most significant of which relate to transfer pricing matters, including issues under discussion with the Australian Tax Office.

Consolidated net cash/(debt)

	Financing liabilities			Other assets		
	Borrowings excluding overdrafts ^(a) US\$m	Lease liabilities ^(b) US\$m	Net-debt related derivatives (included in Other financial assets/liabilities) ^(c) US\$m	Cash and cash equivalents including overdrafts US\$m	Other investments ^(d) US\$m	Net cash/(debt) US\$m
Year ended 31 December 2021						
Analysis of changes in consolidated net cash/(debt)						
Opening balance	(12,653)	(1,178)	248	10,381	2,538	(664)
Foreign exchange adjustment	67	30	(45)	100	—	152
Cash movements excluding exchange movements	270	358	(51)	2,324	(107)	2,794
Other non-cash movements	150	(573)	(253)	—	(30)	(706)
Closing balance	(12,166)	(1,363)	(101)	12,805	2,401	1,576
	Financing liabilities			Other assets		
	Borrowings excluding overdrafts ^(a) US\$m	Lease liabilities ^(b) US\$m	Net-Debt related derivatives (included in Other financial assets/liabilities) ^(c) US\$m	Cash and cash equivalents including overdrafts US\$m	Other investments ^(d) US\$m	Net debt US\$m
Year ended 31 December 2020						
Analysis of changes in consolidated net debt						
Opening balance	(12,806)	(1,309)	(147)	8,027	2,584	(3,651)
Foreign exchange adjustment	(83)	(47)	39	165	—	74
Cash movements excluding exchange movements	505	324	91	2,189	(58)	3,051
Other non-cash movements	(269)	(146)	265	—	12	(138)
Closing balance	(12,653)	(1,178)	248	10,381	2,538	(664)

- (a) Borrowings excluding overdrafts and including lease liabilities at 31 December 2021 of US\$13,529 million (2020: US\$13,831 million) differ from total borrowings and other financial liabilities of US\$14,169 million (2020: US\$14,015 million) on the balance sheet as they exclude other current financial liabilities of US\$245 million (2020: US\$23 million), other non-current financial liabilities of US\$393 million (2020: US\$161 million) and bank overdraft of US\$2 million (2020: US\$nil).

- (b) Other movements in lease liabilities include the net impact of additions, modifications and terminations during the year.

Consolidated net cash/(debt) (continued)

- (c) Included within “Net debt-related derivatives” are interest rate and cross currency interest rate swaps that are in hedge relationships with the Group's debt. In 2021, we have also included currency forwards that we use to mitigate the foreign exchange exposure on our non-US dollar separately managed funds. These forwards are not in a hedge relationship but are included within the Group's net debt definition.
- (d) Other investments comprise US\$2,401 million (2020: US\$2,538 million) of highly liquid financial assets held in managed investment funds classified as held for trading. During the year we entered into non-US dollar denominated managed investment funds.

Provisions and post-retirement benefits

	Pensions and post-retirement healthcare US\$m	Other employee entitlements ^(b) US\$m	Close-down and restoration/environmental ^(c) US\$m	Other US\$m	Total 2021 US\$m	Total 2020 US\$m
At 1 January	3,055	419	13,335	856	17,665	15,103
Adjustment on currency translation	(11)	(23)	(483)	(29)	(546)	890
Adjustments to mining properties/right of use assets:						
– increases to existing and new provisions	—	—	518	3	521	141
– change in discount rate	—	—	—	—	—	816
Charged/(credited) to profit:						
– increases to existing and new provisions	161	112	1,475	382	2,130	1,074
– change in discount rate	—	—	—	—	—	140
– unused amounts reversed	—	(21)	(192)	(37)	(250)	(299)
– exchange losses on provisions	—	—	23	—	23	(22)
– amortisation of discount	—	—	415	3	418	377
Utilised in year	(129)	(102)	(541)	(128)	(900)	(774)
Re-measurement (gains)/losses recognised in other comprehensive income	(687)	—	—	—	(687)	250
Transfers and other movements ^(a)	(291)	9	(8)	(48)	(338)	(31)
At 31 December	2,098	394	14,542	1,002	18,036	17,665
Balance sheet analysis:						
Current	66	317	1,023	700	2,106	1,729
Non-current	2,032	77	13,519	302	15,930	15,936
Total	2,098	394	14,542	1,002	18,036	17,665

Projected cash spend for the undiscounted close-down and restoration/environmental clean up provision

Undiscounted close-down and environmental restoration cash flows	<1yr US\$m	1-3 yrs US\$m	3-5 yrs US\$m	> 5 yrs US\$m	Total US\$m
At 31 December 2021	1,023	1,652	1,680	14,420	18,775
At 31 December 2020	776	1,203	1,433	13,988	17,400

(a) During the year ended 31 December 2021, the Group entered into an agreement to transfer its partially funded pension obligations in France to an external insurer. The insurance premium was paid by the transfer of the existing pension assets valued at US\$89 million plus an additional cash payment of €247 million (US\$294 million), of which US\$3 million was taken to the income statement. The Group has no further legal or constructive obligation relating to the insured pensions and has reflected this transaction as a settlement.

(b) The provision for other employee entitlements includes a provision for long service leave of US\$272 million (2020: US\$283 million), based on the relevant entitlements in certain Group operations and includes US\$60 million (2020: US\$62 million) of provision for redundancy and severance payments.

Provisions and post-retirement benefits (continued)

- (c) Close-down and restoration costs are a normal consequence of mining, and the majority of close-down and restoration expenditure is incurred in the years following closure of the mine, refinery or smelter. Non-current provisions for close-down, restoration and environmental expenditure include amounts relating to environmental clean-up of US\$645 million (2020: US\$468 million) expected to take place between one and five years from the balance sheet date, and US\$1,059 million (2020: US\$937 million) expected to take place later than five years after the balance sheet date. Close-down, restoration and environmental liabilities at 31 December 2021 have not been adjusted for closure related receivables amounting to US\$410 million (2020: US\$574 million) due from the ERA trust fund and other financial assets held for the purposes of meeting closure obligations. These are included within "Receivables and other assets" on the balance sheet.

Analysis of close-down and restoration/environmental clean-up provisions

As at 31 December	2021 US\$m	2020 US\$m
Undiscounted close-down and environmental restoration obligations	18,775	17,400
Impact of discounting	(4,233)	(4,065)
Present closure obligation	14,542	13,335
Attributable to:		
Operating sites	10,727	10,736
Non-operating sites	3,815	2,599
Total	14,542	13,335

Remaining lives of operations and infrastructure range from one to over 50 years with an average for all sites, weighted by present closure obligation, of around 16 years (2020: 17 years). Although the ultimate cost to be incurred is uncertain, the Group's businesses estimate their respective costs based on current restoration standards, techniques and expected climate conditions.

Provisions of US\$14,542 million (2020: US\$13,335 million) for close-down and restoration costs and environmental clean-up obligations are based on risk-adjusted cash flows. The Group re-assessed the closure discount rate in the current year and continues to consider that real rate of 1.5%, applied prospectively since 30 September 2020, is the most appropriate rate to use. This assumption is based on the currency in which we plan to fund the closures and our expectation of long-term interest rate and exchange rate parity at the locations of our operations. Prior to 30 September 2020 and in recent years, the close-down and restoration costs and environmental clean-up obligations were discounted at a real rate of 2.0%. To illustrate the sensitivity of the provision to discounting, if the discount rate at 31 December 2021 were decreased to 1.0% then the provision would be US\$1.3 billion higher, of which approximately US\$1.2 billion would be capitalised within "Property, plant and equipment" at operating sites and US\$0.1 billion would be charged to the income statement for non-operating and fully impaired sites. If the discount rate were increased to 3.0% then the provision would be US\$2.8 billion lower, of which approximately US\$2.5 billion would result in a decrease within "Property, plant and equipment" at operating sites and US\$0.3 billion would be credited to the income statement for non-operating and fully impaired sites.

Provisions and post-retirement benefits (continued)

Closure cost composition as at 31 December	2021 US\$m	2020 US\$m
Decommissioning, decontamination and demolition	3,343	3,131
Closure and rehabilitation earthworks ^(a)	4,125	4,223
Long-term water management costs ^(b)	967	966
Post closure monitoring and maintenance	1,676	1,318
Indirect costs, owners' costs and contingency ^(c)	4,431	3,697
Total	14,542	13,335

The underlying costs for closure have been estimated with varying degrees of accuracy based on a function of the age of the underlying asset and proximity to closure. For assets within ten years of closure, closure plans and cost estimates are supported by detailed studies which are refined as the closure date approaches. These closure studies consider climate change and plan for resilience to expected climate conditions with a particular focus on precipitation rates. For new developments, consideration of climate change and ultimate closure conditions are an important part of the approval process. For longer-lived assets, closure provisions are typically based on conceptual level studies that are refreshed at least every five years; these are evolving to incorporate greater consideration of forecast climate conditions at closure.

- (a) A key component of earthworks rehabilitation involves re-landscaping the area disturbed by mining activities utilising the largely diesel powered heavy mobile equipment. In developing low-carbon solutions for our mobile fleet, this may include electrification of the vehicles during the mine life. The forecast cash flows for the heavy mobile equipment in the closure cost estimate are based on existing fuel sources. The cost incurred during closure could reduce if these activities are powered by renewable energy.
- (b) Long-term water management relates to the post-closure treatment of water due to acid rock drainage and other environmental commitments and is an area of research and development focus for our Closure team. The cost of this water processing can continue for many years after the bulk earthworks and demolition activities have completed and are therefore exposed to long-term climate change. This could materially affect rates of precipitation and therefore change the volume of water requiring processing. It is not currently possible to forecast accurately the impact this could have on the closure provision as some of our locations could experience drier conditions whereas others could experience greater rainfall. A further consideration relates to the alternative commercial use for the processed water, which could support ultimate transfer of these costs to a third party.
- (c) Indirect costs, owners' costs and contingency include adjustments to the underlying cash flows to align the closure provision with a central-case estimate. This excludes allowances for quantitative estimation uncertainties, which are allocated to the underlying cost driver and presented within the respective cost categories above.

Provisions and post-retirement benefits (continued)

Geographic composition as at 31 December	2021 US\$m	2020 US\$m
Australia	7,605	7,076
USA	4,057	3,819
Canada	1,662	1,482
Rest of World	1,218	958
Total	14,542	13,335

The geographic composition of the closure provision shows that our closure obligations are largely in countries with established levels of regulation in respect of mine and site closure.

Financial Instruments disclosures

Except where stated, the information relates to the financial instruments of the parent companies and their subsidiaries and joint operations, and excludes those of equity accounted units.

Fair values disclosure of financial instruments

The following table shows the carrying amounts and fair values of our borrowings including those which are not carried at an amount which approximates their fair value at 31 December 2021 and 31 December 2020. The fair values of our cash equivalents, loans to equity accounted units and other financial liabilities approximate their carrying values because of their short maturity, or because they carry floating rates of interest.

	31 December 2021		31 December 2020	
	Carrying value US\$m	Fair value US\$m	Carrying value US\$m	Fair value US\$m
Borrowings (including overdrafts)	12,168	13,904	12,653	15,076

Total borrowings with a carrying value of US\$7.3 billion (2020: US\$7.6 billion) relate to listed bonds with a fair value of US\$8.7 billion (2020: US\$9.5 billion) and are categorised as level 1 in the fair value hierarchy.

Borrowings with a carrying value of US\$4.2 billion (2020: US\$4.2 billion) relate to project finance drawn down by Oyu Tolgoi, with a fair value of US\$4.4 billion (2020: US\$4.7 billion) and are categorised as level 3 in the fair value hierarchy. We use different valuation inputs for the pre-and post-completion phases to reflect Rio Tinto's completion support guarantee during the pre-completion phase. To measure the fair value of the project finance pre-completion our valuation input includes market yield over the pre-completion period, the variability of which we consider a reasonable indicator of fair value movements on amounts outstanding under the project finance facility. Post-completion, we estimate the fair value with reference to the annual interest rate on each tranche of the facility, and after considering factors that could indicate a change in the credit assessment of Oyu Tolgoi LLC as a counterparty to project finance. These factors include in-country risk relating to the Oyu Tolgoi project, and the assumed date of transition from pre-completion to post-completion. These valuation inputs are considered to be level 3. Transition from pre-completion to post-completion is determined by a set of tests for both completion of physical infrastructure and the ability to extract and process ore of defined grades over a defined period.

Our remaining borrowings have a fair value measured by discounting estimated cash flows with an applicable market quoted yield, and are categorised as level 2 in the fair value hierarchy.

New interest rate swaps and debt maturity

On 28 October 2021, the Group issued US\$1.25 billion of 30-year fixed rate debt with a coupon of 2.75%. On settlement of the bond, we entered into interest rate swaps to convert the interest payable on these bonds from fixed to floating rates rate for the next seven years. The bond and the swaps are in a fair value hedge relationship. The proceeds of the new issuance were used to fund the early redemption and extinguishment of the company's US\$1.20 billion 3.75% bonds due to mature in June 2025.

Financial Instruments disclosures (continued)

We enter into interest rate swaps to hedge the interest rate exposure from our fixed rate borrowings, and review these positions on a regular basis. The tenor of the interest rate swaps is sometimes shorter than the tenor of the bond which means, we remain exposed to long term fixed rate funding. In 2020 we entered into US\$1.5 billion of interest rate swaps with a tenor of five years to hedge the Alcan bonds which had been historically held at fixed rates. In 2021, we issued a 30-year US\$1.25 billion bond which was swapped to floating rates for a tenor of seven years. As interest rate swaps mature, new medium dated swaps are generally transacted to maintain this floating rate exposure. The economic characteristics of the interest rate swaps are shown in the table below.

The fair value of interest rate and cross currency interest rate swaps at 31 December 2021 was US\$139 million (2020: US\$388 million) asset and US\$240 million (2020: US\$140 million) liability, respectively. These are included within "Other financial assets" and "Other financial liabilities" in the balance sheet.

On 16 November 2021, Rio Tinto Finance plc and Rio Tinto Finance Limited completed the renewal of our US\$7.5 billion multi-currency revolving credit facility with a syndicate of banks. The facility is guaranteed by Rio Tinto plc and Rio Tinto Limited and has a five-year term, that now matures in November 2026. Other features include: two consecutive one-year extension options and a US\$6.2 billion denominated same day access swing-line facility. The new facility replaced the US\$7.5 billion dual tranche revolving credit facility dated 15 November 2013, last amended in November 2020. The facility remained undrawn throughout the year.

The effective interest rates of our borrowings, impacted by swaps, are summarised below. All nominal values are fully hedged unless otherwise stated:

Borrowings in a hedge relationship	Nominal value 2021 US\$m	Nominal value 2020 US\$m	Weighted average interest rate after swaps	Swap maturity	Carrying value 2021 US\$m	Carrying value 2020 US\$m
Rio Tinto Finance plc Euro Bonds 2.875% due 2024	546	546	3 month LIBOR +1.64%	2024	497	555
Rio Tinto Finance (USA) Limited Bonds 3.75% 2025	—	1,200	3 month LIBOR +1.39%	2025	—	1,299
Rio Tinto Finance (USA) Limited Bonds 7.125% 2028	750	750	3 month LIBOR +3.27%	2028	934	1,005
Alcan Inc. Debentures 7.25% due 2028	100	100	3 month LIBOR +5.43%	2024	105	109
Rio Tinto Finance plc Sterling Bonds 4.0% due 2029	807	807	3 month LIBOR +2.65%	2024	682	717
Alcan Inc. Debentures 7.25% due 2031	400	400	3 month LIBOR +5.72%	2025	420	438
Alcan Inc. Global Notes 6.125% due 2033	750	750	3 month LIBOR +5.67%	2025	722	744
Alcan Inc. Global Notes 5.75% due 2035	300	300	3 month LIBOR +5.18%	2025	283	292
Rio Tinto Finance (USA) Limited Bonds 5.2% 2040	1,150	1,150	3 month LIBOR +3.79%	2022	1,156	1,173
Rio Tinto Finance (USA) plc Bonds 4.75% 2042	500	500	3 month LIBOR +3.42%	2023	495	501
Rio Tinto Finance (USA) plc Bonds 4.125% 2042	750	750	3 month LIBOR +2.83%	2023	735	743
Rio Tinto Finance (USA) Limited Bonds 2.75% 2051	1,250	—	6 month SOFR + 1.57%	2028	1,225	—

Financial Instruments disclosures (continued)

Valuation hierarchy of financial instruments carried at fair value on a recurring basis

The tables below show the financial instruments by fair value measurement method in accordance with IFRS 13 at 31 December 2021 and 31 December 2020.

	Held at fair value				Held at amortised cost US\$m
	Total US\$m	Level 1 ^(a) US\$m	Level 2 ^(b) US\$m	Level 3 ^(c) US\$m	
At 31 December 2021					
Assets					
Cash and cash equivalents ^(d)	12,807	4,138	—	—	8,669
Investments in equity shares and funds	117	64	—	53	—
Other investments, including loans ^(e)	2,682	2,422	—	238	22
Trade and other financial receivables ^(f)	2,762	1	1,163	—	1,598
Derivatives (net)					
Forward contracts and option contracts: designated as hedges ^(g)	(125)	—	—	(125)	—
Forward contracts and option contracts, not designated as hedges ^(g)	(120)	—	(131)	11	—
Derivatives related to net debt ^(h)	(101)	—	(101)	—	—
Liabilities					
Trade and other financial payables	(6,356)	—	(67)	—	(6,289)
Total	11,666	6,625	864	177	4,000

	Held at fair value				Held at amortised costs US\$m
	Total US\$m	Level 1 ^(a) US\$m	Level 2 ^(b) US\$m	Level 3 ^(c) US\$m	
At 31 December 2020					
Assets					
Cash and cash equivalents ^(d)	10,381	6,411	—	—	3,970
Investments in equity shares and funds	75	35	—	40	—
Other investments, including loans ^(e)	2,899	2,563	—	198	138
Trade and other financial receivables ^(f)	3,286	5	1,802	—	1,479
Derivatives (net)					
Forward contracts and option contracts: designated as hedges ^(g)	53	—	7	46	—
Forward contracts and option contracts, not designated as hedges ^(g)	180	—	69	111	—
Derivatives related to net debt ^(h)	248	—	248	—	—
Liabilities					
Trade and other financial payables	(5,847)	—	(30)	—	(5,817)
Total	11,275	9,014	2,096	395	(230)

Financial Instruments disclosures (continued)

- (a) Valuation is based on unadjusted quoted prices in active markets for identical financial instruments. This category includes listed equity shares and other quoted funds.
- (b) Valuation is based on inputs that are observable for the financial instruments, which include quoted prices for similar instruments or identical instruments in markets which are not considered to be active, or inputs, either directly or indirectly based on observable market data.
- (c) Valuation is based on inputs that are not based on observable market data (unobservable inputs).
- (d) Cash and cash equivalents include money market funds which are treated as fair value through profit or loss (FVPL) under IFRS 9 with the fair value movements going into finance income.
- (e) Other investments, including loans, comprise: cash deposits in rehabilitation funds, government bonds, managed investment funds and royalty receivables. The royalty receivables are valued based on future expected output as well as forward commodity prices.
- (f) Trade receivables include provisionally priced invoices. The related revenue is initially based on forward market selling prices for the quotation periods stipulated in the contracts with changes between the provisional price and the final price recorded separately within "Other revenue". The selling price can be measured reliably for the Group's products, as it operates in active and freely traded commodity markets. At 31 December 2021, US\$1,114 million (2020: US\$1,671 million) of provisionally priced receivables were recognised.
- (g) Level 3 derivatives consist of derivatives embedded in electricity purchase contracts linked to the LME with terms expiring between 2025 and 2036 (2020: 2025 and 2029). The embedded derivatives are measured using discounted cash flows and option model valuation techniques.
- (h) Interest rate and currency interest rate swaps are valued using applicable market quoted swap yield curves adjusted for relevant basis and credit default spreads. Currency interest rate swap valuations also use market quoted foreign exchange rates. A discounted cash flow approach is used to derive fair value from these inputs to the underlying cash flows.

Financial Instruments disclosures (continued)

Level 3 Financial instruments

The table below shows the summary of changes in the fair value of the Group's level 3 financial assets and financial liabilities.

	2021 Level 3 financial assets and financial liabilities US\$m	2020 Level 3 financial assets and financial liabilities US\$m
Opening balance	395	383
Currency translation adjustments	(6)	16
Total realised gains/(losses) included in:		
– consolidated sales revenue	27	11
– net operating costs	(50)	(39)
Total unrealised gains included in:		
– net operating costs	68	24
Total unrealised (losses)/gains transferred into other comprehensive income through cash flow hedges	(212)	26
Additions to (financial liabilities)/assets	(21)	1
Disposals/maturity of financial instruments	(6)	(27)
Transfers	(18)	—
Closing balance	177	395
Net gains for the year included in the income statement for assets and liabilities held at year end^(a)	20	—

(a) In 2020 gains and losses included in the income statement offset each other to the extent that the net result is less than US\$1 million.

Sensitivity analysis in respect of level 3 financial instruments

Forward contracts and options whose fair value is determined using unobservable inputs are calculated using appropriate discounted cash flow and option model valuation techniques.

To value the long-term aluminium embedded derivatives, we use unobservable inputs when the term of the derivative extends beyond observable market prices. In 2021 and 2020, changing the level 3 inputs to reasonably possible alternative assumptions does not change the fair value significantly, taking into account the expected remaining term of contracts. The fair value of our level 3 aluminium embedded derivatives is US\$146 million at 31 December 2021 (2020: US\$126 million).

We also have receivables, with a carrying value of US\$136 million (2020: US\$113 million), that relate to royalties arising from the sale of coal from our previously divested businesses. These are classified as “Other investments”, including loans within “Other financial assets”. The fair values are determined using level 3 unobservable inputs. This royalty receivable includes US\$53 million from forecast production beyond 2030. This has not been adjusted for potential changes in production rates that could occur due to climate change targets impacting the operator.

Financial Instruments disclosures (continued)

The main unobservable input is the long-term coal price used over the life of the royalty receivable. A 15% increase in the coal spot price would result in a US\$63 million increase (2020: US\$198 million increase) in the carrying value. A 15% decrease in the coal spot price would result in a US\$53 million decrease (2020: US\$46 million decrease) in the carrying value. We have used a 15% assumption to calculate our exposure as it represents the annual coal price movement that we deem to be reasonably probable (on an annual basis over the long run).

Other disclosures

Capital commitments at 31 December 2021

Capital commitments, excluding the Group's share of joint venture capital commitments, were US\$2,551 million (2020: US\$3,152 million). Our capital commitments include open purchase orders for managed operations and expenditure on major projects already authorised by our Investment Committee for non-managed operations. It does not include the estimated incremental capital expenditure relating to decarbonisation projects referred to in the climate section earlier. On a legally enforceable basis, capital commitments would be approximately US\$1.1 billion (2020: US\$1.5 billion) as many of the contracts relating to the Group's projects have various cancellation clauses.

The Group's share of joint venture capital commitments was US\$11 million at 31 December 2021 (2020: US\$9 million).

Other Commitments

On 21 December 2021, the Group entered into a binding agreement to acquire the Rincon lithium project in Argentina for US\$825 million. The transaction will be treated as an asset purchase. Completion, expected in 2022, is subject to regulatory approval in Australia.

Contingent liabilities (subsidiaries and joint operations)

Contingent liabilities, indemnities and other performance guarantees were US\$441 million at 31 December 2021 (2020: US\$146 million).

Contingent liabilities, indemnities and other performance guarantees represent the potential outflow of funds from the Group for the satisfaction of obligations including those under contractual arrangements (for example undertakings related to supplier agreements) not provided for in the balance sheet, where the likelihood of the contingent liabilities, guarantees or indemnities being called is assessed as possible rather than probable or remote.

There were no material contingent liabilities arising in relation to the Group's joint ventures and associates. The Group has not established provisions for certain additional legal claims in cases where we have assessed that a payment is either not probable or cannot be reliably estimated. A number of Group companies are, and will likely continue to be, subject to various legal proceedings and investigations that arise from time to time. As a result, the Group may become subject to substantial liabilities that could affect our business, financial position and reputation. Litigation is inherently unpredictable and large judgments may at times occur. The Group may incur, in the future, judgments or enter into settlements of claims that could lead to material cash outflows. We do not believe that any of these proceedings will have a materially adverse effect on our financial position.

Other disclosures (continued)

Contingent liabilities - not quantifiable

The current status of the following contingent liabilities means it is not practicable to provide a reliable estimate of possible financial exposure:

Litigation disputes

In October 2017, Rio Tinto announced that it had been notified by the U.S. Securities and Exchange Commission (SEC) that the SEC had filed a complaint in relation to Rio Tinto's disclosures and timing of the impairment of Rio Tinto Coal Mozambique (RTCM). The impairment was reflected in Rio Tinto's 2012 year-end accounts. The SEC alleges that Rio Tinto, a former chief executive, Tom Albanese, and a former chief financial officer, Guy Elliott, committed violations of the antifraud, reporting, books and records and internal control provisions of the federal securities law by not accurately disclosing the value of RTCM and not impairing it when Rio Tinto published its 2011 year-end accounts in February 2012 or its 2012 interim results in August 2012. In June 2019, the trial court dismissed an associated US class action on behalf of securities holders. In August 2020, the appeals court partially overturned the court's dismissal and the case is with the trial court for further consideration.

In March 2018, the Australian Securities and Investments Commission (ASIC) filed civil proceedings in the NSW District Registry of the Federal Court of Australia against Rio Tinto Limited, Albanese, and Elliott. On 1 May 2018, ASIC expanded its proceedings. ASIC alleges that Rio Tinto committed violations of the disclosure, accounting, and misleading or deceptive conduct provisions of the Corporations Act by making misleading or deceptive statements related to RTCM in its 2011 Annual Report and its 2012 interim financial statements, not complying with accounting standards in respect of its 2012 interim financial statements, and not disclosing an impairment of RTCM in its 2012 interim financial statements. ASIC further alleges Albanese and Elliott breached their duties as directors or officers, and failed to take all reasonable steps to comply with relevant accounting requirements.

Rio Tinto believes that the SEC case and the ASIC proceedings are unwarranted and will defend the allegations vigorously. Hence, no provisions have been recognised for these cases.

Rio Tinto continues to co-operate fully with relevant authorities in connection with their investigations in relation to contractual payments totalling US\$10.5 million made to a consultant who had provided advisory services in 2011 on the Simandou project in Guinea. In August 2018, the court dismissed a related US class action commenced on behalf of securities holders. No provision has been recognised for this case.

At 31 December 2021, the outcomes of these matters remained uncertain, but they could ultimately expose the Group to material financial cost. The Board is giving these matters its full and proper attention and a dedicated Board committee continues to monitor the progress of these matters, as appropriate.

Other contingent liabilities

The Group is in the process of modernising agreements with Traditional Owner groups as outlined in our response to the Juukan Gorge incident. We have provided for our best estimate of historical claims; however, the process is incomplete and it is possible that further claims could arise relating to past events.

Other disclosures (continued)

Close-down and restoration provisions are not recognised for those operations that have no known restrictions on their lives as the date of closure cannot be reliably estimated. This applies primarily to Canadian aluminium smelters which are not dependent upon a specific orebody and have access to indefinite-lived power from owned hydro-power stations with water rights permitted by local governments. In these instances a closure obligation may exist at the reporting date; however, due to the indefinite nature of asset lives it is not possible to arrive at a sufficiently reliable estimate for the purposes of recognising a provision. Close-down and restoration provisions are recognised at these operations for separately identifiable closure activities which can be reasonably estimated, such as the demolition and removal of fixed structures after a pre-determined period. Any contingent liability for these assets will crystallise into a closure provision if and when a decision is taken to cease operations.

Related party matters

Transactions and balances with equity accounted units are summarised below. Purchases, trade and other receivables, and trade and other payables relate largely to amounts charged by equity accounted units for toll processing of alumina and purchasing of bauxite and aluminium. Sales relate largely to sales of alumina to equity accounted units for smelting into aluminium.

Details of the Group's principal equity accounted units are given in the 2021 Annual Report.

	2021 US\$m	2020 US\$m
Income statement items		
Purchases from equity accounted units	(1,167)	(960)
Sales to equity accounted units	432	271
Cash flow statement items		
Dividends from equity accounted units	1,431	594
Net receipts/(funding) from/of equity accounted units	6	(43)
Balance sheet items		
Investments in equity accounted units ^(a)	3,504	3,764
Loans to equity accounted units	—	41
Trade and other receivables: amounts due from equity accounted units ^(b)	251	251
Trade and other payables: amounts due to equity accounted units	(253)	(241)

(a) Investments in equity accounted units include quasi equity loans.

(b) This includes prepayments of tolling charges.

Rio Tinto plc has provided a number of guarantees in relation to various pension funds. Subject to certain conditions, Rio Tinto plc would pay any contributions due from Group companies participating in these funds in the event that the companies fail to meet their contribution requirements.

Other disclosures (continued)

Acquisitions and Disposals

On 18 November 2021, we announced completion of a transaction to acquire the 40% share in the Diavik Diamond Mine in the Northwest Territories of Canada held by Dominion Diamond Mines, becoming sole owner as a result. The transaction did not meet the definition of a business combination and therefore the incremental assets and liabilities were treated as an asset purchase. Prior to purchase the Group recognised its existing 60% share of assets, revenues and expenses, with liabilities recognised according to its contractual obligations, and a corresponding 40% receivable or contingent asset representing the co-owner's share where applicable. Receivables relating to the co-owner's share were de-recognised and treated as part of the net purchase consideration on completion.

On 21 December 2021, the Group entered into a binding agreement to acquire the Rincon lithium project in Argentina for US\$825 million. The Rincon lithium project does not meet the definition of a business as defined by IFRS 3 "Business Combinations" and the transaction will be treated as an asset purchase; completion is subject to regulatory approval in Australia.

Other disclosures (continued)

Summary financial information for subsidiaries that have non-controlling interests that are material to the Group

This summarised financial information is shown on a 100% basis. It represents the amounts shown in the subsidiaries' financial statements prepared in accordance with IFRS under Group accounting policies, including fair value adjustments, and before intercompany eliminations.

	Iron Ore Company of Canada 2021 US\$m	Iron Ore Company of Canada 2020 US\$m	Turquoise Hill ^{(a)(b)} 2021 US\$m	Turquoise Hill ^{(a)(b)} 2020 US\$m
Income statement summary for the year ended 31 December				
Revenue	3,308	2,269	1,971	1,078
Profit after tax	1,193	611	893	357
– attributable to non-controlling interests	493	252	496	130
– attributable to Rio Tinto	700	359	397	227
Other comprehensive income	39	56	3	2
Total comprehensive income	1,232	667	896	359
Balance sheet summary as at 31 December				
	2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m
Non-current assets	2,974	2,733	12,250	10,930
Current assets	599	670	1,129	1,496
Current liabilities	(581)	(462)	(954)	(540)
Non-current liabilities	(1,020)	(993)	(4,085)	(4,404)
Net assets	1,972	1,948	8,340	7,482
– attributable to non-controlling interests	818	804	2,846	2,424
– attributable to Rio Tinto	1,154	1,144	5,494	5,058
Cash flow statement summary for the year ended 31 December				
	2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m
Cash flow from operations	2,119	1,027	825	380
Dividends paid to non-controlling interests	(495)	(180)	—	—

(a) Turquoise Hill Resources Ltd holds a controlling interest in Oyu Tolgoi LLC. Under the terms of the project finance facility held by Oyu Tolgoi LLC, there are certain restrictions on the ability of Oyu Tolgoi LLC to make shareholder distributions.

(b) Since 2011, Turquoise Hill has funded common share investments in Oyu Tolgoi LLC on behalf of Erdenes Oyu Tolgoi LLC ("Erdenes"). In accordance with the Amended and Restated Shareholders Agreement dated 8 June 2011, such funded amounts earn interest at an effective annual rate of LIBOR plus 6.5% and are repayable to them via a pledge over Erdenes' share of future OT common share dividends. Erdenes also has the right to reduce the outstanding balance by making payments directly to Turquoise Hill. Common share investments funded on behalf of Erdenes, including accrued interest, are recorded as a reduction to the net carrying value of their component of non-controlling interests. As at 31 December 2021, the cumulative amount of such funding was US\$1,399 million (2020: US\$1,378 million), excluding accrued interest of US\$953 million (2020: US\$804 million) relating to this funding. On 25 January 2022, Turquoise Hill agreed to waive in full amount of funding balances and interest; refer to page 73.

Other disclosures (continued)

Summary financial information for subsidiaries that have non-controlling interests that are material to the Group (continued)

Income statement summary for the year ended 31 December	Robe River Mining Co Pty 2021 US\$m	Robe River Mining Co Pty 2020 US\$m	Other companies and eliminations^(c) 2021 US\$m	Other companies and eliminations^(c) 2020 US\$m	Robe River 2021 US\$m	Robe River 2020 US\$m
Revenue	2,454	1,738	2,863	2,028	5,317	3,766
Profit after tax	1,352	939	1,518	1,019	2,870	1,958
– attributable to non-controlling interests	541	376	—	—	541	376
– attributable to Rio Tinto	811	563	1,518	1,019	2,329	1,582
Other comprehensive (loss)/income	(183)	294	(97)	136	(280)	430
Total comprehensive income	1,169	1,233	1,421	1,155	2,590	2,388
Balance sheet summary as at 31 December	2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m
Non-current assets	3,472	3,452	4,166	4,247	7,638	7,699
Current assets	495	865	2,118	2,239	2,613	3,104
Current liabilities	(371)	(380)	(329)	(414)	(700)	(794)
Non-current liabilities	(421)	(255)	(4,378)	(4,752)	(4,799)	(5,007)
Net assets	3,175	3,682	1,577	1,320	4,752	5,002
– attributable to non-controlling interests	1,268	1,397	—	—	1,268	1,397
– attributable to Rio Tinto	1,907	2,285	1,577	1,320	3,484	3,605
Cash flow statement summary for the year ended 31 December	2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m
Cash flow from operations	2,130	1,491	2,512	1,771	4,642	3,262
Dividends paid to non-controlling interests	(589)	(332)	—	(165)	(589)	(497)

(c) “Other companies and eliminations” includes North Mining Limited (a wholly-owned subsidiary of the Group which accounts for its interest in Robe River) and goodwill of US\$362 million (2020: US\$383 million) that arose on the Group’s acquisition of its interest in Robe River.

Other disclosures (continued)

Summary information for joint ventures that are material to the Group

This summarised financial information is shown on a 100% basis. It represents the amounts shown in the joint ventures' financial statements prepared in accordance with IFRS under Group accounting policies, including fair value adjustments and amounts due to and from Rio Tinto.

	Minera Escondida Ltda^(a) 2021 US\$m	Minera Escondida Ltda^(a) 2020 US\$m	Sohar Aluminum Co.L.L.C.^(b) 2021 US\$m	Sohar Aluminum Co.L.L.C.^(b) 2020 US\$m
Revenue	9,783	7,650	900	640
Depreciation and amortisation	(1,160)	(1,427)	(115)	(115)
Impairment charges (see pages 50 to 53)	—	—	—	(1,100)
Other operating costs	(3,066)	(2,756)	(510)	(430)
Operating profit/(loss)	5,557	3,467	275	(1,005)
Finance expense	(134)	(137)	(30)	(20)
Income tax	(2,133)	(1,197)	(35)	(15)
Profit/(loss) after tax	3,290	2,133	210	(1,040)
Other comprehensive profit/(loss)	40	(40)	—	—
Total comprehensive income/(loss)	3,330	2,093	210	(1,040)
Non-current assets	11,490	11,833	1,765	1,850
Current assets	2,857	3,107	360	270
Current liabilities	(2,017)	(1,813)	(175)	(675)
Non-current liabilities	(4,633)	(4,560)	(730)	(200)
Net assets	7,697	8,567	1,220	1,245
Assets and liabilities above include:				
– cash and cash equivalents	857	1,103	45	30
– current financial liabilities	(550)	(790)	(40)	(565)
– non-current financial liabilities	(2,660)	(2,560)	(560)	(30)
Dividends received from joint venture (Rio Tinto share)	1,374	585	47	—

Reconciliation of the above amounts to the investment recognised in the Group balance sheet

Group interest	30 %	30 %	20 %	20 %
Net assets	7,697	8,567	1,220	1,245
Group's ownership interest	2,309	2,570	244	249
Carrying value of Group's interest	2,309	2,570	244	249

(a) In addition to its "Investment in equity accounted units", the Group recognises deferred tax liabilities of US\$322 million (2020: US\$358 million) relating to tax on unremitted earnings of equity accounted units.

(b) As part of the project financing agreements, there are certain restrictions on the ability of Sohar Aluminium Co. L.L.C to make shareholder distributions.

Events after the balance sheet date

Oyu Tolgoi: approval for commencement of underground operations

On 25 January 2022, Rio Tinto, Turquoise Hill Resources Ltd (Turquoise Hill) and the Government of Mongolia announced their agreement, and unanimous approval by the Board of Oyu Tolgoi, to commencement of underground operations.

As part of a comprehensive project budget and funding package undertaken between the parties in reaching this agreement, Turquoise Hill agreed to waive in full, funding balances arising from a carry account loan with Erdenes Oyu Tolgoi (Erdenes) of US\$2.4 billion, comprising the amount of common share investments in Oyu Tolgoi LLC funded by Turquoise Hill on behalf of Erdenes to build the project to date, plus US\$1.0 billion of accrued interest. The waiver took effect on 25 January 2022. Rio Tinto and Turquoise Hill have also agreed a plan to deliver the funding required until sustainable underground production is reached.

Prior to the waiver agreement, the funding balances owing from Erdenes to Turquoise Hill were expected to be repaid via a pledge over Erdenes' share of future Oyu Tolgoi common share dividends. For this reason, and because the arrangement is between Turquoise Hill and Erdenes rather than with Oyu Tolgoi LLC itself, both the principal and interest are treated as transactions with owners acting in their capacity as owners. Consequently, at 31 December 2021, related amounts are recorded as a reduction in the share of equity attributable to non-controlling interests, resulting in an increase to the effective interest in Oyu Tolgoi attributable to owners of Rio Tinto.

Funding balances owing from Erdenes to Turquoise Hill are not classified as loan receivables in the Group Balance Sheet, and there is no interest income shown in the Group Income Statement. Accumulation of interest on the funding balances increases the share of retained earnings attributable to Rio Tinto as it is accrued.

Waiving the funding balances owing from Erdenes to Turquoise Hill increases Erdenes' economic share arising through entitlement to cash flows from future dividends of Oyu Tolgoi. In the 2022 Group results, there will be no Income Statement charge for loan forgiveness or write-off as a result of the waiver, and net assets and liabilities for Oyu Tolgoi included in the Group Balance sheet remained unchanged. There is no exchange of cash or other financial assets between parties and there will be no change to the underlying free cash flows of the Oyu Tolgoi operations and development project. The waiver does not have an impact on the Group's assessment of impairment indicators for either 2021 or 2022, since it relates to the project shareholders' funding arrangements rather than the economic capability of the Cash Generating Unit itself. A reallocation of the net asset value allocation between the owners of Oyu Tolgoi will be recorded in the Group Statement of Changes in Equity for 2022 reporting periods by reducing equity attributable to owners of Rio Tinto and increasing equity attributable to non-controlling interests:

	Retained earnings US\$m	Non-controlling interests US\$m
Change in equity interest held by Rio Tinto	(490)	490
Equity issued to owners of non-controlling interests	(711)	711

There were no other significant events after the balance sheet date requiring disclosure.

Rio Tinto financial information by business unit

	Rio Tinto interest %	Gross product sales ^(a) for the year ended 31 December		Underlying EBITDA ^(b) for the year ended 31 December		Underlying earnings ^(c) for the year ended 31 December	
		2021 US\$m	Adjusted	2021 US\$m	Adjusted	2021 US\$m	Adjusted
			2020 US\$m		2020 US\$m		2020 US\$m
Iron Ore							
Pilbara	(d)	39,111	27,027	27,837	18,896	17,544	11,551
Dampier Salt	68.4	298	252	39	43	10	12
Evaluation projects/other	(e)	2,147	657	(81)	(32)	(79)	(112)
Intra-segment	(e)	(1,974)	(428)	(203)	(70)	(152)	(53)
Total Iron Ore		39,582	27,508	27,592	18,837	17,323	11,398
Aluminium							
Bauxite		2,203	2,302	619	943	174	434
Alumina		2,743	2,233	569	262	306	92
Primary Metal		6,706	4,489	2,592	904	1,454	169
Pacific Aluminium		2,947	1,944	693	112	426	(6)
Intra-segment and other		(2,718)	(2,510)	14	6	192	(159)
Integrated operations		11,881	8,458	4,487	2,227	2,552	530
Other product group items		814	856	26	7	17	(5)
Product group operations		12,695	9,314	4,513	2,234	2,569	525
Evaluation projects/other		—	—	(131)	(82)	(101)	(54)
Total Aluminium		12,695	9,314	4,382	2,152	2,468	471
Copper							
Kennecott	100.0	2,528	1,529	1,142	588	513	149
Escondida	30.0	2,935	2,296	2,013	1,462	1,003	650
Oyu Tolgoi and Turquoise Hill	(f)	1,971	1,078	1,213	390	325	160
Product group operations		7,434	4,903	4,368	2,440	1,841	959
Simandou iron ore project	(g)	—	—	(58)	(14)	(43)	(6)
Evaluation projects/other		393	66	(341)	(342)	(219)	(199)
Total Copper		7,827	4,969	3,969	2,084	1,579	754
Minerals							
Iron Ore Company of Canada	58.7	3,526	2,444	2,026	1,130	734	383
Rio Tinto Iron & Titanium	(h)	1,791	1,651	470	476	176	216
Rio Tinto Borates	100.0	592	564	89	126	32	65
Diamonds	(i)	501	459	180	83	99	9
Product group operations		6,410	5,118	2,765	1,815	1,041	673
Evaluation projects/other		71	52	(162)	(105)	(153)	(93)
Total Minerals		6,481	5,170	2,603	1,710	888	580
Other operations	(j)	251	321	(28)	24	(84)	(48)
Inter-segment transactions		(268)	(264)	42	(94)	19	(32)
Product group total		66,568	47,018	38,560	24,713	22,193	13,123
Central pension costs, share-based payments, insurance and derivatives				110	117	133	118
Restructuring, project and one-off costs				(80)	(133)	(51)	(108)
Central costs	(k)			(613)	(545)	(585)	(455)
Central exploration and evaluation				(257)	(250)	(215)	(216)
Net interest						(95)	(14)
Underlying EBITDA/earnings				37,720	23,902	21,380	12,448
Items excluded from underlying EBITDA/earnings				(811)	(395)	(286)	(2,679)
Reconciliation to Group income statement							
Share of equity accounted unit sales and intra-subsidary/equity accounted unit sales		(3,073)	(2,407)				
Impairment charges net of reversals				(269)	(1,272)		
Depreciation and amortisation in subsidiaries excluding capitalised depreciation				(4,525)	(4,074)		
Depreciation and amortisation in equity accounted units				(497)	(576)		
Taxation and finance items in equity accounted units				(759)	(443)		
Finance items				(26)	(1,751)		
Consolidated sales revenue/profit before taxation/net earnings		63,495	44,611	30,833	15,391	21,094	9,769

Rio Tinto financial information by business unit (continued)

	Rio Tinto interest %	Capital expenditure ⁽ⁱ⁾ for the year ended 31 December		Depreciation and amortisation for the year ended 31 December		Operating assets ^(m) as at 31 December		Employees for the year ended 31 December	
		Adjusted		Adjusted		Adjusted		Adjusted	
		2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m	2021 US\$m	2020 US\$m	2021	2020
Iron Ore									
Pilbara	(d)	3,928	2,919	2,003	1,819	16,850	16,253	12,810	11,522
Dampier Salt	68.4	19	22	20	19	159	163	388	351
Evaluation projects/other	(e)	—	—	—	—	1,283	338	16	10
Intra-segment	(e)	—	—	—	—	(255)	(104)	—	—
Total Iron Ore		3,947	2,941	2,023	1,838	18,037	16,650	13,214	11,883
Aluminium									
Bauxite		180	142	328	290	2,542	2,593	2,972	2,853
Alumina		362	228	165	138	2,258	2,294	2,463	2,383
Primary Metal		698	602	694	643	9,734	9,361	6,280	6,282
Pacific Aluminium		133	114	103	119	228	455	2,450	2,469
Intra-segment and other		(1)	(1)	(1)	1	839	662	185	141
Total Aluminium		1,372	1,085	1,289	1,191	15,601	15,365	14,350	14,128
Copper									
Kennecott	100.0	411	618	538	472	2,404	2,317	2,051	2,171
Escondida	30.0	220	178	348	428	2,515	2,726	1,166	1,124
Oyu Tolgoi and Turquoise Hill	(f)	911	1,038	213	189	8,998	8,111	3,508	3,450
Product group operations		1,542	1,834	1,099	1,089	13,917	13,154	6,725	6,745
Simandou iron ore project	(g)	—	(2)	—	—	13	16	101	69
Evaluation projects/other		6	5	4	4	210	192	228	159
Total Copper		1,548	1,837	1,103	1,093	14,140	13,362	7,054	6,973
Minerals									
Iron Ore Company of Canada	58.7	377	243	197	170	1,077	1,009	2,877	2,716
Rio Tinto Iron & Titanium	(h)	184	144	213	173	3,369	3,390	4,129	4,151
Rio Tinto Borates	100.0	43	42	51	49	487	502	978	966
Diamonds	(i)	25	25	12	60	(19)	(7)	646	885
Product group operations		629	454	473	452	4,914	4,894	8,630	8,718
Evaluation projects/other		15	1	1	—	43	33	136	77
Total Minerals		644	455	474	452	4,957	4,927	8,766	8,795
Other operations	(j)	(11)	2	199	199	(1,533)	(550)	297	488
Inter-segment transactions						(12)	129		
Product group total		7,500	6,320	5,088	4,773	51,190	49,883	43,681	42,267
Other items		117	79	106	82	(1,334)	(2,165)	5,664	5,207
Less: equity accounted units		(294)	(255)	(497)	(576)				
Total		7,323	6,144	4,697	4,279	49,856	47,718	49,345	47,474
Add back: Proceeds from disposal of property, plant and equipment		61	45						
Total capital expenditure per cash flow statement		7,384	6,189						
Add: Net cash/(debt)						1,576	(664)		
Equity attributable to owners of Rio Tinto						51,432	47,054		

Notes to financial information by business unit

Business units are classified according to the Group's management structure.

The financial information by business unit has been recast in accordance with the organisational restructure announced on 28 January 2021 and to improve the grouping of central costs according to their nature. The main impacts are as follows: Simandou has moved from the previous Energy & Minerals product group to the Copper product group; Uranium has moved from the previous Energy & Minerals product group to Other Operations; Diamonds has moved from the previous Copper & Diamonds product group to the Minerals product group; the Minerals product group retains the Argyle residual operations and from 1 January 2021, Argyle closure has moved to Other Operations. Argyle Residual operations includes activity relating to the sale of remaining diamond inventory and property held. Argyle closure includes activity relating to the management and execution of the Argyle mine closure obligations and management of entities with interests in state and traditional owner agreements and licences. As a result of these changes, the Copper & Diamonds segment is renamed Copper and the Energy & Minerals segment is renamed Minerals from 2021.

The disclosures in this note include certain alternative performance measures (APMs). For more information on the APMs used by the Group, including definitions and calculations, please refer to pages 78 to 86.

- (a) Gross product sales include the sales revenue of equity accounted units on a proportionately consolidated basis (after adjusting for sales to subsidiaries) in addition to consolidated sales. Consolidated sales revenue includes subsidiary sales to equity accounted units, which are not included in gross product sales.
- (b) Underlying EBITDA of subsidiaries, joint operations and the Group's share relating to equity accounted units represents profit before: tax, net finance items, depreciation and amortisation charged to the income statement in the period. Underlying EBITDA excludes the EBITDA impact of the same items that are excluded from underlying earnings.
- (c) Underlying earnings represent net earnings attributable to the owners of Rio Tinto, adjusted to exclude items which do not reflect the underlying performance of the Group's operations. Business unit earnings are stated before finance items, but after the amortisation of discount related to provisions. Earnings attributed to business units do not include amounts that are excluded in arriving at underlying earnings.
- (d) Pilbara represents the Group's 100% holding in Hamersley, 50% holding in Hope Downs Joint Venture and 65% holding in Robe River Iron Associates. The Group's net beneficial interest in Robe River Iron Associates is 53%, as 30% is held through a 60% owned subsidiary and 35% is held through a 100% owned subsidiary.
- (e) Gross product sales, Underlying EBITDA, Net Earnings and Operating assets within Evaluation projects/other include activities relating to the shipment and blending of Pilbara and Iron Ore Company of Canada (IOC) iron ore inventories held at portside in China and sold to domestic customers. Transactions between Pilbara and our portside trading business are eliminated through the Iron Ore "intra-segment" line and transactions between IOC and the portside trading business are eliminated through "inter-segment transactions".

Notes to financial information by business unit (continued)

- (f) Our interest in Oyu Tolgoi is held indirectly through our 50.8% investment in Turquoise Hill Resources Ltd (TRQ), where TRQ's principal asset is its 66% investment in Oyu Tolgoi LLC, which owns the Oyu Tolgoi copper-gold mine.
- (g) Simfer Jersey Limited, a company incorporated in Jersey, in which the Group has a 53% interest, has an 85% interest in Simfer S.A., the company that manages the Simandou project in Guinea. The Group therefore has a 45.05% indirect interest in Simfer S.A. These entities are consolidated as subsidiaries and together referred to as the Simandou iron ore project.
- (h) Includes our interests in Rio Tinto Fer et Titane (100%), QIT Madagascar Minerals (QMM, 80%) and Richards Bay Minerals (attributable interest of 74%).
- (i) Includes our interests in Argyle (100%) residual operations which relates to the sale of remaining inventory and Diavik. Until 18 November we recognised our 60% share of assets, revenue and expenses relating to the Diavik joint venture. Liabilities were recognised according to Diavik Diamond Mine Inc's contractual obligations at 100%, with a corresponding 40% receivable or contingent asset representing the co-owner's share where applicable. Post acquisition, we now consolidate (100%) of the Diavik Diamond Mine. From 1 June 2021, management responsibility for rehabilitation of the Argyle site moved from Minerals to Rio Tinto Closure (RTC), hence, Argyle closure is reported in Other operations effective from 1 January 2021. Refer to (j) below.
- (j) Other operations include our 100% interest in the Gove alumina refinery (under rehabilitation), Rio Tinto Marine, and the remaining legacy liabilities of Rio Tinto Coal Australia. These include provisions for onerous contracts, in relation to rail infrastructure capacity, partly offset by financial assets and receivables relating to contingent royalties and disposal proceeds. From 1 January 2021, Uranium moved from Minerals to Other operations. From 1 January 2021, Argyle closure is reported as part of Other Operations.
- (k) Mark-to-market movements on commodity derivatives entered into with the commercial objective of achieving spot pricing for the underlying transaction at the date of settlement have been reclassified from Central costs and are now included in Central pensions, share based payments, insurance & derivatives, in order to provide a better understanding of Central costs. The impact of this change on the reported comparatives is insignificant, and therefore the comparatives have not been restated.
- (l) Capital expenditure is the net cash outflow on purchases less sales of property, plant and equipment, capitalised evaluation costs and purchases less sales of other intangible assets. The details provided include 100% of subsidiaries' capital expenditure and Rio Tinto's share of the capital expenditure of joint operations and equity accounted units.
- (m) Operating assets of the Group represents equity attributable to Rio Tinto adding back net cash/(debt). Operating assets of subsidiaries, joint operations and the Group's share relating to equity accounted units are comprised of net assets excluding net cash/(debt) and post-retirement assets and liabilities, net of tax. Operating assets are stated after the deduction of non-controlling interests, these are calculated by reference to the net assets of the relevant companies (i.e. inclusive of such companies' debt and amounts due to or from Rio Tinto Group companies).

Alternative performance measures

The Group presents certain alternative performance measures (APMs) which are reconciled to directly comparable IFRS financial measures below. These APMs are used by management to assess the performance of the business and provide additional information, which investors may find useful. APMs are presented in order to give further insight into the underlying business performance of the Group's operations.

APMs are not consistently defined and calculated by all companies, including those in the Group's industry. Accordingly, these measures used by the Group may not be comparable with similarly titled measures and disclosures made by other companies. Consequently, these APMs should not be regarded as a substitute for the IFRS measures and should be considered supplementary to those measures.

The following tables present the Group's key financial measures not defined according to IFRS and a reconciliation between those APMs and their nearest respective IFRS measures.

APMs derived from the income statement

The following income statement measures are used by the Group to provide greater understanding of the underlying business performance of its operations and to enhance comparability of reporting periods. They indicate the underlying commercial and operating performance of our assets including revenue generation, productivity and cost management.

Gross product sales

Gross product sales include consolidated sales revenue plus the equivalent sales revenue of equity accounted units in proportion to our equity interest (after adjusting for sales to/from subsidiaries).

Gross product sales measures revenue on a basis that is comparable to our Underlying EBITDA metric.

	2021 US\$m	2020 US\$m
Consolidated sales revenue	63,495	44,611
Share of equity accounted unit sales and inter-subsiary/equity accounted unit sales	3,073	2,407
Gross product sales	66,568	47,018

Alternative performance measures (continued)

Underlying EBITDA

Underlying EBITDA represents earnings attributable to owners of Rio Tinto before tax, net finance items, depreciation and amortisation excluding the EBITDA impact of the same items that are excluded in arriving at underlying earnings (as defined on page 81).

	2021 US\$m	2020 US\$m
Profit after tax	22,575	10,400
Depreciation and amortisation in subsidiaries excluding capitalised depreciation	4,525	4,074
Depreciation and amortisation in equity accounted units	497	576
Finance items in subsidiaries	26	1,751
Taxation in subsidiaries	8,258	4,991
Taxation and finance items in equity accounted units	759	443
Impairment charges net of reversals	269	1,272
Gain on recognition of a new wharf at Kitimat, Canada	(336)	—
Losses/(gains) on embedded commodity derivatives not qualifying for hedge accounting (including exchange)	51	(6)
Change in closure estimates (non-operating and fully impaired sites)	1,096	401
Underlying EBITDA	37,720	23,902

Underlying EBITDA margin

Underlying EBITDA margin is defined as Group underlying EBITDA divided by gross product sales.

	2021 US\$m	2020 US\$m
Underlying EBITDA	37,720	23,902
Gross product sales	66,568	47,018
Underlying EBITDA margin	57 %	51 %

Pilbara underlying FOB EBITDA margin

The Pilbara underlying free on board (FOB) EBITDA margin is defined as Pilbara underlying EBITDA divided by Pilbara gross product sales, excluding freight revenue.

	2021 US\$m	2020 US\$m
Pilbara		
Underlying EBITDA	27,837	18,896
Pilbara gross product sales	39,111	27,027
Less: Freight revenue	(2,707)	(1,487)
Pilbara gross product sales, excluding freight revenue	36,404	25,540
Pilbara underlying FOB EBITDA margin	76 %	74 %

Alternative performance measures (continued)

Underlying EBITDA margin from Aluminium integrated operations

Underlying EBITDA margin from integrated operations is defined as underlying EBITDA divided by gross product sales.

	2021 US\$m	2020 US\$m
Aluminium		
Underlying EBITDA - integrated operations	4,487	2,227
Gross product sales - integrated operations	11,881	8,458
Underlying EBITDA margin from integrated operations	38 %	26 %

Underlying EBITDA margin (product group operations)

Underlying EBITDA margin (product group operations) is defined as underlying EBITDA divided by gross product sales.

		Adjusted ^(a)
	2021 US\$m	2020 US\$m
Copper		
Underlying EBITDA - product group operations	4,368	2,440
Gross product sales - product group operations	7,434	4,903
Underlying EBITDA margin - product group operations	59 %	50 %
		Adjusted ^(a)
	2021 US\$m	2020 US\$m
Minerals		
Underlying EBITDA - product group operations	2,765	1,815
Gross product sales - product group operations	6,410	5,118
Underlying EBITDA margin - product group operations	43 %	35 %

(a) The comparatives have been recast in accordance with the organisational restructure announced on 28 January 2021. Refer to page 76 for further details.

Alternative performance measures (continued)

Underlying earnings

Underlying earnings represent net earnings attributable to the owners of Rio Tinto, adjusted to exclude items, which do not reflect the underlying performance of the Group's operations.

Exclusions from underlying earnings are those gains and losses, that individually, or in aggregate with similar items, are of a nature and size to require exclusion in order to provide additional insight into underlying business performance.

The following items are excluded from net earnings in arriving at underlying earnings in each period irrespective of materiality:

- Net gains/(losses) on disposal of interests in businesses.
- Impairment charges and reversals.
- Profit/(loss) after tax from discontinued operations.
- Exchange and derivative gains and losses. This exclusion includes exchange gains/(losses) on external net debt and intragroup balances, unrealised gains/(losses) on currency and interest rate derivatives not qualifying for hedge accounting, unrealised gains/(losses) on certain commodity derivatives not qualifying for hedge accounting, and unrealised gains/(losses) on embedded derivatives not qualifying for hedge accounting.
- Adjustments to closure provisions where the adjustment is associated to an impairment charge, for legacy sites where the disturbance or environmental contamination relates to the pre-acquisition period.

The reconciliation of underlying earnings to net earnings can be found on page 85 to 86.

Basic underlying earnings per share

Basic underlying earnings per share is calculated as underlying earnings divided by the weighted average number of shares outstanding during the year.

On a per share basis, this allows the comparability of underlying financial performance adjusted to exclude items, which do not reflect the underlying performance of the Group's operations.

	2021 (cents)	2020 (cents)
Basic earnings per ordinary share	1,303.4	604.0
Items excluded from underlying earnings per share	17.7	165.6
Basic underlying earnings per ordinary share	1,321.1	769.6

Alternative performance measures (continued)

Interest cover

Interest cover is a financial metric used when managing our risk. It represents the number of times finance income and finance costs (including amounts capitalised) is covered by profit before taxation before finance income, finance costs, share of profit after tax of equity accounted units and items excluded from underlying earnings, plus dividends from equity accounted units.

	2021 US\$m	2020 US\$m
Profit before taxation	30,833	15,391
Add back		
Finance income	(64)	(141)
Finance costs	243	268
Share of profit after tax of equity accounted units	(1,042)	(652)
Items excluded from underlying earnings	508	2,891
Add: Dividends from equity accounted units	1,431	594
Calculated earnings	31,909	18,351
Finance income	64	141
Finance costs	(243)	(268)
Add: Amounts capitalised	(358)	(340)
Total Finance income/costs before capitalisation	(537)	(467)
Interest cover	59	39

Payout ratio

The payout ratio is used by us to guide the dividend policy we implemented in 2016, with which we have sought to return 40-60% of underlying earnings, on average through the cycle to shareholders as dividends. It is calculated as total equity dividends per share to owners of Rio Tinto declared in respect of the financial year divided by underlying earnings per share (as defined above). Dividends declared usually include an interim dividend paid in the year, and a final dividend paid after the end of the year. Any special dividends declared in respect of the financial year are also included.

	2021 (cents)	2020 (cents)
Interim dividend declared per share	376.0	155.0
Interim special dividend declared per share	185.0	—
Final dividend declared per share	417.0	309.0
Final special dividend declared per share	62.0	93.0
Total dividend declared per share for the year	1,040.0	557.0
Underlying earnings per share	1,321.1	769.6
Payout ratio	79 %	72 %

Alternative performance measures (continued)

APMs derived from cash flow statement

Capital expenditure

Capital expenditure comprises the net sustaining and development expenditure on property, plant and equipment, and on intangible assets. This is equivalent to “Purchases of property, plant and equipment and intangible assets” in the cash flow statement less “Sales of property, plant and equipment and intangible assets”.

This measure is used to support management's objective of effective and efficient capital allocation as we need to invest in existing assets in order to maintain and improve productive capacity, and in new assets to grow the business.

Free cash flow

Free cash flow is defined as net cash generated from operating activities minus purchases of property, plant and equipment and intangibles and payments of lease principal, plus proceeds from the sale of property, plant and equipment and intangible assets.

This measures the net cash returned by the business after the expenditure of sustaining and development capital. This cash can be used for shareholder returns, reducing debt and other investing/financing activities.

	2021 US\$m	2020 US\$m
Net cash generated from operating activities	25,345	15,875
Less: Purchase of property, plant and equipment and intangible assets	(7,384)	(6,189)
Less: Lease principal payments	(358)	(324)
Add: Sales of property, plant and equipment and intangible assets	61	45
Free cash flow	17,664	9,407

APMs derived from the balance sheet

Net cash/(debt)

Net cash/(debt) is total borrowings plus lease liabilities less cash and cash equivalents and other liquid investments, adjusted for derivatives related to net debt.

Net cash/(debt) measures how we are managing our balance sheet and capital structure. Refer to Consolidated net cash/(debt) on page 55 for the reconciliation.

Alternative performance measures (continued)

Net gearing ratio

Net gearing ratio is defined as net (cash)/debt divided by the sum of net debt and total equity at the end of each period. It demonstrates the degree to which the Group's operations are funded by debt versus equity.

	2021 US\$m	2020 US\$m
Net (cash)/debt	(1,576)	664
Net (cash)/debt	(1,576)	664
Total equity	56,590	51,903
Net (cash)/debt plus total equity	55,014	52,567
Net gearing ratio	(3%)	1%

Underlying return on capital employed

Underlying return on capital employed ("ROCE") is defined as underlying earnings excluding net interest divided by average capital employed (operating assets).

Underlying ROCE measures how efficiently we generate profits from investment in our portfolio of assets.

	2021 US\$m	2020 US\$m
Profit after tax attributable to owners of Rio Tinto (net earnings)	21,094	9,769
Items added back to derive underlying earnings (refer to page 85)	286	2,679
Underlying earnings	21,380	12,448
Add/(deduct):		
Finance income per the income statement	(64)	(141)
Finance costs per the income statement	243	268
Tax on finance cost	(52)	(38)
Non-controlling interest share of net finance costs	(64)	(107)
Net interest cost in equity accounted units (Rio Tinto share)	32	32
Net interest	95	14
Adjusted underlying earnings	21,475	12,462
Equity attributable to owners of Rio Tinto - beginning of the period	47,054	40,532
Net debt - beginning of the period	664	3,651
Capital employed - beginning of the period	47,718	44,183
Equity attributable to owners of Rio Tinto - end of the period	51,432	47,054
Net (cash)/debt - end of the period	(1,576)	664
Capital employed - end of the period	49,856	47,718
Average capital employed	48,787	45,951
Underlying return on capital employed	44 %	27 %

Alternative performance measures (continued)

Reconciliation of underlying earnings to net earnings

Underlying earnings are reported by Rio Tinto to provide greater understanding of the underlying business performance of its operations. Underlying earnings and net earnings both represent amounts attributable to owners of Rio Tinto. Exclusions from underlying earnings relating to equity

accounted units are stated after tax and included in the column “Pre-tax”. Items (a) to (f) below are excluded from net earnings in arriving at underlying earnings.

	Pre-tax 2021 US\$m	Taxation 2021 US\$m	Non- controlling interests 2021 US\$m	Net amount 2021 US\$m	Net amount 2020 US\$m
Underlying earnings	31,341	(8,482)	(1,479)	21,380	12,448
Items excluded from underlying earnings					
Impairment charges net of reversals ^(a)	(269)	72	—	(197)	(1,115)
Exchange and derivative gains/(losses):					
– Exchange gains/(losses) on net external debt, intragroup balances and derivatives ^(b)	800	(78)	4	726	(1,125)
– Losses on currency and interest rate derivatives not qualifying for hedge accounting ^(c)	(211)	88	(4)	(127)	(157)
– (Losses)/Gains on embedded commodity derivatives not qualifying for hedge accounting ^(d)	(68)	17	(2)	(53)	18
Net losses from movements to closure estimates (non-operating and fully impaired sites) ^(e)	(1,096)	125	—	(971)	(300)
Gain on recognition of a new wharf at Kitimat, Canada ^(f)	336	—	—	336	—
Total excluded from underlying earnings	(508)	224	(2)	(286)	(2,679)
Net earnings	30,833	(8,258)	(1,481)	21,094	9,769

(a) Refer to Impairment charges note on pages 50 to 53.

(b) Exchange gains/(losses) on external net debt and intragroup balances comprise post-tax foreign exchange losses on net debt of US\$187 million offset by post-tax gains of US\$913 million on intragroup balances, primarily as a result of the Australian dollar weakening against the US dollar. In 2020, exchange losses on external net debt and intragroup balances comprise post-tax foreign exchange losses on intragroup balances of US\$1,330 million partially offset by post-tax gains of US\$205 million on external net debt, primarily as a result of strengthening of the Australian dollar against the US dollar.

(c) Valuation changes on currency and interest rate derivatives, which are ineligible for hedge accounting, other than those embedded in commercial contracts, and the currency revaluation of embedded US dollar derivatives contained in contracts held by entities whose functional currency is not the US dollar.

(d) Valuation changes on derivatives, embedded in commercial contracts, that are ineligible for hedge accounting, but for which there will be an offsetting change in future Group earnings. Mark-to-market movements on commodity derivatives entered into with the commercial objective of achieving spot pricing for the underlying transaction at the date of settlement are included in underlying earnings.

Alternative performance measures (continued)

Reconciliation of underlying earnings to net earnings (continued)

- (e) On 2 February 2022, Energy Resources of Australia released preliminary findings from its reforecast of the total undiscounted cost schedule for the Ranger rehabilitation project. Information available from this study resulted in the Group recording an increase to the closure provision of US\$510 million at 31 December 2021. Other increases to closure estimates charged to the income statement in 2021 relate to Diavik, Gove refinery, and a number of the Group's legacy sites where the environmental damage preceded ownership by Rio Tinto. The adjustments at Energy Resources Australia and Gove refinery have been recognised in the income statement as these are non-operating sites, and excluded from underlying earnings due to the magnitude of the individual updates and materiality when aggregated. In 2020 we recognised an increase in the Diavik closure provision based on preliminary Pre-Feasibility Study findings. On completion of the study in 2021 a true up was recorded in the income statement and excluded from underlying earnings in line with the treatment of the initial increase in 2020, which was excluded from underlying earnings as Diavik was fully impaired during the year. Other closure costs excluded in 2020 were the increase in the Gove refinery closure provision offset by a decrease in the Argyle mine closure provision on completion of Pre-Feasibility Studies at each site. The 2020 comparative also included the net earnings impact (US\$138 million loss) in respect of increases to Closure provisions in legacy and non-operating sites following a reduction to the closure discount rate to 1.5%. When further funding is required, no allocation is made to the non-controlling interests of partially owned legacy sites until the funding is received.
- (f) On 3 December 2021 we gained control over a new wharf at Kitimat, Canada that was built and paid for by LNG Canada. The gain on recognition has been excluded from underlying earnings on the grounds of individual magnitude and consistency with the associated impairment charge. Refer to the impairment note on pages 50 to 53.

Summary financial data in Australian dollars, sterling and US dollars

2021 A\$m	2020 A\$m	2021 £m	2020 £m		2021 US\$m	2020 US\$m
84,488	64,577	46,151	34,749	Consolidated sales revenue	63,495	44,611
88,577	68,061	48,385	36,624	Gross product sales	66,568	47,018
41,027	22,279	22,411	11,989	Profit before tax from continuing operations	30,833	15,391
30,039	15,055	16,409	8,101	Profit for the year from continuing operations	22,575	10,400
28,068	14,141	15,332	7,609	Net earnings attributable to Rio Tinto shareholders	21,094	9,769
50,191	34,599	27,417	18,618	Underlying EBITDA	37,720	23,902
28,449	18,019	15,540	9,696	Underlying earnings ^(a)	21,380	12,448
1734.3c	874.3c	947.4p	470.5p	Basic earnings per ordinary share ^(b)	1303.4c	604.0c
1757.8c	1114.1c	960.2p	599.5p	Basic underlying earnings per ordinary share ^{(a)(b)}	1321.1c	769.6c
				Dividends per share to Rio Tinto shareholders ^(c)		
906.90c	566.21c	492.70p	297.21p	- paid – ordinary dividend	685.0c	386.0c
370.27c	—	200.03p	—	- paid – special dividend	278.0c	—
577.04c	397.48c	306.72c	221.86p	- proposed – ordinary dividend	417.0c	309.0c
85.80c	119.63c	45.60c	66.77p	- proposed – special dividend	62.0c	93.0c
24,199	13,490	13,218	7,259	Cash flow before financing activities	18,186	9,319
2,173	(864)	1,168	(488)	Net cash/(debt)	1,576	(664)
70,906	61,252	38,108	34,592	Equity attributable to Rio Tinto shareholders	51,432	47,054

(a) Underlying earnings exclude impairments and other charges of US\$286 million (2020: US\$2,679 million), which are analysed on pages 85 and 86.

(b) Basic earnings per ordinary share and basic underlying earnings per ordinary share do not recognise the dilution resulting from share options on issue.

(c) The Australian dollar and sterling amounts are based on the US dollar amounts, retranslated at average or closing rates as appropriate, except for the dividends which are the actual amounts.

Metal prices and exchange rates

		2021	2020	Increase/ (Decrease)
Metal prices - average for the year				
Copper	- US cents/lb	422	281	50 %
Aluminium	- US\$/tonne	2,480	1,704	46 %
Gold	- US\$/troy oz	1,799	1,770	2 %

	Full-year average			Year-end		
Exchange rates against the US dollar	2021	2020	Increase/ (Decrease)	2021	2020	Increase/ (Decrease)
Pound sterling	1.38	1.28	8 %	1.35	1.36	(1)%
Australian dollar	0.75	0.69	9 %	0.73	0.77	(5)%
Canadian dollar	0.80	0.75	7 %	0.78	0.78	— %
Euro	1.18	1.14	4 %	1.13	1.23	(8)%
South African rand	0.068	0.061	11 %	0.063	0.068	(7)%

Forward-looking statements

This report includes “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. All statements other than statements of historical facts included in this report, including, without limitation, those regarding Rio Tinto’s financial position, business strategy, plans and objectives of management for future operations (including development plans and objectives relating to Rio Tinto’s products, production forecasts and reserve and resource positions), are forward-looking statements. The words “intend”, “aim”, “project”, “anticipate”, “estimate”, “plan”, “believes”, “expects”, “may”, “should”, “will”, “target”, “set to” or similar expressions, commonly identify such forward-looking statements.

Such forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Rio Tinto, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such forward-looking statements are based on numerous assumptions regarding Rio Tinto’s present and future business strategies and the environment in which Rio Tinto will operate in the future. Among the important factors that could cause Rio Tinto’s actual results, performance or achievements to differ materially from those in the forward-looking statements include, but are not limited to: an inability to live up to Rio Tinto’s values and any resultant damage to its reputation; the impacts of geopolitics on trade and investment; the impacts of climate change and the transition to a low-carbon future; an inability to successfully execute and/or realise value from acquisitions and divestments; the level of new ore resources, including the results of exploration programmes and/or acquisitions; disruption to strategic partnerships that play a material role in delivering growth, production, cash or market positioning; damage to Rio Tinto’s relationships with communities and governments; an inability to attract and retain requisite skilled people; declines in commodity prices and adverse exchange rate movements; an inability to raise sufficient funds for capital investment; inadequate estimates of ore resources and reserves; delays or overruns of large and complex projects; changes in tax regulation; safety incidents or major hazard events; cyber breaches; physical impacts from climate change; the impacts of water scarcity; natural disasters; an inability to successfully manage the closure, reclamation and rehabilitation of sites; the impacts of civil unrest; the impacts of the Covid-19 pandemic; breaches of Rio Tinto’s policies, standard and procedures, laws or regulations; trade tensions between the world’s major economies; increasing societal and investor expectations, in particular with regard to environmental, social and governance considerations; the impacts of technological advancements; and such other risks identified in Rio Tinto’s most recent Annual Report and accounts in Australia and the United Kingdom and the most recent Annual Report on Form 20-F filed with the United States Securities and Exchange Commission (the “SEC”) or Form 6-Ks furnished to, or filed with, the SEC. Forward-looking statements should, therefore, be construed in light of such risk factors and undue reliance should not be placed on forward-looking statements. These forward-looking statements speak only as of the date of this report. Rio Tinto expressly disclaims any obligation or undertaking (except as required by applicable law, the UK Listing Rules, the Disclosure Guidance and Transparency Rules of the Financial Conduct Authority and the Listing Rules of the Australian Securities Exchange) to release publicly any updates or revisions to any forward-looking statement contained herein to reflect any change in Rio Tinto’s expectations with regard thereto or any change in events, conditions or circumstances on which any such statement is based.

Nothing in this report should be interpreted to mean that future earnings per share of Rio Tinto plc or Rio Tinto Limited will necessarily match or exceed its historical published earnings per share.

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This announcement is authorised for release to the market by Rio Tinto's Group Company Secretary.

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Classification: 3.1 Additional regulated information required to be disclosed under the laws of a Member State