

Rio Tinto announces total dividend of 557 US cents per share for 2020, a 72% pay-out, from robust results during a challenging year

17 February 2021

Rio Tinto Chief Executive Jakob Stausholm said: "It has been an extraordinary year – our successful response to the COVID-19 pandemic and strong safety performance were overshadowed by the tragic events at the Juukan Gorge, which should never have happened.

"During 2020, the agility and resilience of the business and our employees, coupled with strong commodity prices, enabled us to deliver underlying EBITDA of \$23.9 billion and Return on Capital Employed of 27%. As a result, the Board has approved a total dividend of 557 US cents per share including a special dividend of 93 US cents per share, representing a 72% full year pay-out ratio, which builds on our five-year pay-out track record.

"My new executive team and wider leadership of the company are all committed to unleashing Rio Tinto's full potential. We will increase our focus on operational excellence and project development and strengthen our ESG credentials. Working closely with the Board, we must earn the right to become a trusted partner for Traditional Owners, host communities, governments and other stakeholders but we all recognise that this will require sustained and consistent effort.

"Safe and well-run operations, together with world-class assets, great people, capital discipline and a strong balance sheet, leave Rio Tinto well placed to generate superior returns for shareholders, invest in sustaining and growing our portfolio, and make a broader contribution to society."

At year end	2020	2019	Change
Net cash generated from operating activities (US\$ millions)	15,875	14,912	6 %
Capital expenditure ¹ (US\$ millions)	6,189	5,488	13 %
Free cash flow ² (US\$ millions)	9,407	9,158	3 %
Consolidated sales revenue (US\$ millions)	44,611	43,165	3 %
Underlying EBITDA ² (US\$ millions)	23,902	21,197	13 %
Net earnings (US\$ millions)	9,769	8,010	22 %
Underlying earnings per share ² (EPS) (US cents)	769.6	636.3	21 %
Ordinary dividend per share (US cents)	464.0	382.0	21 %
Total dividend per share (US cents)	557.0	443.0	26 %
Net debt ² (US\$ millions)	(664)	(3,651)	
Return on capital employed (ROCE) ²	27 %	24 %	

Our financial results are prepared in accordance with International Financial Reporting Standards (IFRS) and are unaudited - see page 34 for further information. Footnotes are set out on page 5.

- Strong safety performance in 2020, fatality-free for a second year in a row, with the all injury frequency rate improving to 0.37. However, fatigue 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.
- We are working to restore trust with the Puutu Kunti Kurrama and Pinikura (PKKP) people following the Juukan Gorge events. Progress has been made as set out in the [joint statement](#) issued in December following a meeting between the PKKP and Rio Tinto boards, but we do not underestimate the time and effort it will take for us to help restore trust and rebuild our reputation.
- 2020 was a significant year for our climate strategy with the introduction of new Scope 1 and 2 targets: today, we have set new Scope 3 emissions goals and the Board intends to put the

company's annual TCFD-aligned reporting (Task Force on Climate-related Financial Disclosures) to an advisory vote at our 2022 Annual General Meetings.

- \$15.9 billion net cash generated from operating activities was 6% higher than 2019 primarily driven by higher iron ore prices and stability in operating performance. These flowed through to 3% higher free cash flow² of \$9.4 billion, which was net of a \$0.7 billion increase in capital expenditure¹ to \$6.2 billion.
- \$23.9 billion underlying EBITDA² was 13% above 2019, with an underlying EBITDA margin² of 51%.
- \$12.4 billion underlying earnings² (underlying EPS² of US 769.6 cents) were 20% above 2019 with a 29.5% effective tax rate on underlying earnings³ – in line with 2019. Taking exclusions into account, net earnings of \$9.8 billion were 22% higher than 2019, mainly reflecting \$1.1 billion³ of impairments, most of which were taken in the first half of 2020 (five aluminium smelters and the Diavik diamond mine) and \$1.3 billion of exchange losses. This compared with \$1.7 billion³ of impairments in 2019 (primarily the Oyu Tolgoi underground copper/gold project and the Yarwun alumina refinery).
- Strong balance sheet with net debt² of \$0.7 billion, a decrease of \$3.0 billion, reflected the strength of our free cash flow, partly offset by \$6.3 billion of cash returns to shareholders in 2020.
- \$9.0 billion full-year dividend, equivalent to 557 US cents per share and 72% of underlying earnings, includes \$5.0 billion record final ordinary dividend (309 US cents per share) and \$1.5 billion special dividend (93 US cents per share) declared today.

72% pay-out builds on our five-year track record; \$9.0 billion of dividends declared for 2020

Ordinary dividend	US\$ billion	US cents per share
Interim ordinary dividend paid in September 2020	2.5	155
Final ordinary dividend to be paid in April 2021	5.0	309
Full-year ordinary dividend represents 60% pay-out	7.5	464
Additional returns		
Special dividend to be paid in April 2021	1.5	93
Combined total is 72% of 2020 underlying earnings	9.0	557

Strong cash flow from operations enhances free cash flow

	2020	2019
	US\$m	US\$m
Net cash generated from operating activities	15,875	14,912
Capital expenditure ¹	(6,189)	(5,488)
Sales of property, plant and equipment	45	49
Lease principal payments	(324)	(315)
Free cash flow ²	9,407	9,158
Disposals ⁴	10	(80)
Dividends paid to equity shareholders	(6,132)	(10,334)
Share buy-backs	(208)	(1,552)
Non-cash impact from implementation of IFRS 16 "Leases" from 1 January 2019	—	(1,248)
Other	(90)	150
Decrease/(increase) in net debt²	2,987	(3,906)

Footnotes are set out on page 5.

- \$15.9 billion in net cash generated from operating activities, 6% higher than 2019, was driven primarily by higher underlying EBITDA from higher iron ore prices, net of an increase in tax paid in line with profits, a modest rise in working capital (primarily higher prices in receivables), increased dividends paid to joint venture partners and lower dividends received from equity accounted units.
- \$6.2 billion capital expenditure¹ comprised of \$3.2 billion of development capital, of which \$2.1 billion is replacement capital, and \$3.0 billion of sustaining capital. In 2020, we funded our

capital expenditure from operating activities. We expect to continue funding our capital programme from internal sources, except for the Oyu Tolgoi underground development, which is project-financed.

- \$6.1 billion of dividends paid in 2020 comprised of the 2019 final paid in April 2020 (\$3.6 billion) and the 2020 interim paid in September (\$2.5 billion).
- \$0.2 billion of share buy-backs with 3.6 million Rio Tinto plc shares repurchased.
- As a result of the above, net debt² decreased by \$3.0 billion in 2020, ending the year at \$0.7 billion.

Growth projects and development options gather momentum

- We maintained our exploration and evaluation spend at \$625 million in 2020, as we progressed our greenfield programmes and advanced our evaluation projects, in particular Resolution Copper in Arizona, Jadar lithium-borates in Serbia and Winu copper-gold in Western Australia.
- At Winu, we [declared](#) a maiden Inferred Mineral Resource of 503 Mt at 0.45% copper equivalent and announced the discovery of a new zone of gold dominant mineralisation approximately two kilometres east of Winu.⁵ We are now targeting first production in 2024, subject to regulatory approvals, Traditional Owner and other consents, and COVID-19 restrictions.
- At Jadar, we progressed to the feasibility study stage, following Board [approval](#) of almost \$200 million of funding, and [declared](#) a maiden Ore Reserve. The studies are expected to be complete by the end of 2021. If the investment is approved, construction would take approximately four years. The project could produce ~55 thousand tonnes of battery-grade lithium carbonate, 160 thousand tonnes of boric acid (B₂O₃ units) and 255 thousand tonnes of sodium sulphate per year.⁶
- At Resolution Copper, the independently prepared Final Environmental Impact Statement was published by the US Forest Service. We have now [entered](#) the next phase of public comment in the ongoing permitting process. We are committed to ongoing stakeholder engagement in our effort to seek consent to progress the project consistent with the International Council on Mining and Metals (ICMM) Statement on Indigenous Peoples and Mining.
- At the Simandou iron ore project (Blocks 3 and 4) in Guinea, we expect to complete the first phase of the technical optimisation work on the infrastructure components in the first half of 2021. Activity at the mine area has commenced and an update of the Social and Environmental Impact Assessment is underway.
- The \$2.6 billion Gudai-Darri (formerly known as Koodaideri) replacement iron ore mine in Western Australia is progressing, with production ramp-up on track for early 2022. This first phase of Gudai-Darri will have a 43 Mt annual capacity, underpinning production of the Pilbara Blend™.
- First ore from the other iron ore sustaining production projects – the \$0.8 billion (our share) Robe River Joint Venture (West Angelas C&D and Mesa B, C and H at Robe Valley) and the \$0.8 billion Western Turner Syncline phase 2 mine – is on track for 2021.
- At the Oyu Tolgoi underground copper/gold project in Mongolia, we confirmed development capital of \$6.75 billion⁷ following completion of the definitive estimate, with sustainable production for Panel 0 expected to commence in October 2022. We are in active discussions with the government of Mongolia to address and close all outstanding issues and increase the project's benefits to all stakeholders.
- The \$0.9 billion first phase of the south wall pushback at the Kennecott copper mine in the US, which will extend mine life to 2026, remains on track with gradually higher copper grades accessed from 2021. Stripping for the \$1.5 billion second phase is also on track and is expected to extend operations for a further six years.
- The Zulti South project at Richards Bay Minerals (RBM) in South Africa, which will sustain current capacity and extend mine life, remains on full suspension, pending normalisation of operations.

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1. *Capital expenditure is presented gross, before taking into account any cash received from disposals of property, plant and equipment (PP&E).*
 2. *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 71 to 76.*
 3. *Refer to page 47 for pre-tax analysis of impairment charge.*
 4. *Net disposal proceeds in 2019 included a cash outflow representing Rössing Uranium's cash balance at the date of sale.*
 5. *Refer to the release to the Australian Securities Exchange (ASX) on 28 July 2020 "Rio Tinto reveals maiden Resource at Winu and new discovery". The Competent Person responsible for the information in that release that relates to Mineral Resources and Exploration Results is Dr Julian Verbeek. Rio Tinto confirms that it is not aware of any new information or data that materially affects the information included in the market announcement, that all material assumptions and technical parameters underpinning the estimates in the market announcement continue to apply and have not materially changed, and that the form and context in which the Competent Person's findings are presented have not been materially modified.*
 6. *These production targets were previously reported in a release to the ASX dated 10 December 2020, "Rio Tinto declares maiden Ore Reserve at Jadar". All material assumptions underpinning the production targets continue to apply and have not materially changed.*
 7. *This estimate is at a "better than feasibility study" level of accuracy.*

Cultural heritage

We have almost completed implementing the recommendations of the Board review of cultural heritage management. We have also set out our [actions](#) in response to the recommendations of the the Joint Standing Committee on Northern Australia in their interim report following the Parliamentary Inquiry into the destruction of the rockshelters at Juukan Gorge. Details can be found on our [website](#).

We are developing additional measures to enhance our partnerships, as we continue to focus on the longer-term process of earning the trust of Traditional Owners. To support this, we are focused on making sure that we build a more inclusive and diverse work culture, which will require sustained effort over many years.

On 23 December, we issued a [joint statement](#) with the Puutu Kunti Kurrama and Pinikura (PKKP) people confirming our shared commitment to work together to rebuild our relationship following the Juukan Gorge events in May 2020. Progress has been made in recent months:

- With the PKKP, we have worked on a rehabilitation programme for the Juukan 1 and Juukan 2 rock shelters and we are assessing ways to protect the area for the future. This includes a permanent mining moratorium around the Juukan Gorge area. We have moved the artefacts previously uncovered from the rockshelters to a purpose-built facility, with the support of the PKKP.
- The PKKP and Rio Tinto boards met to reaffirm our apology and commitment to rebuilding our relationship. This followed a visit to the Juukan Gorge by our Chairman and the Chair of our Sustainability Committee with PKKP elders.
- We have reassessed all activities which have the potential to impact heritage sites. We will continue to review mine plans to ensure the protection of sites of exceptional cultural value and have increased monitoring of operating activities that have the potential to impact heritage sites. We have also integrated heritage management into our mining operations - our Product Groups have primary responsibility for our Communities and Social Performance (CSP) partnerships and engagement.
- We have confirmed that Traditional Owners are not restricted from raising concerns about cultural heritage matters with anyone, or from applying for statutory protection of any cultural heritage sites. This forms part of our commitment to modernise our agreements with Traditional Owner groups in the Pilbara. This will take time to ensure the process involves meaningful participation of Traditional Owners. We will also engage with Traditional Owners on how best to incorporate a process of independent review to support the modernisation process. In the meantime, we continue to work with Traditional Owners under existing agreements and have increased engagement regarding current and proposed plans for mining activities.
- We have appointed Indigenous community leader, Wayne Bergmann, to consult with Traditional Owners on the formation of an Indigenous Advisory Group in Australia. The Advisory Group will advise the Board and senior management team and provide an alternative pathway for Traditional Owners to escalate any concerns they may have about our performance at a local level.
- We have strengthened the operational leadership of relationships with Traditional Owners and we are strengthening our business-wide cultural competency programme to build awareness and understanding.
- Further to our commitment to invest US\$50 million to increase employment opportunities for Indigenous Australians in our business and enhance Indigenous leadership in our Australian operations, we have progressed plans to advance Indigenous leadership in our business with the launch of a leadership programme involving more than 200 Indigenous employees. We have also implemented a two-way mentoring relationship between Indigenous employees and senior leaders as part of a broader cultural competency programme.

Climate change strategy update

Our portfolio of high-quality iron ore, copper, aluminium and minerals has an essential role in enabling the low-carbon transition. We divested the last of our coal businesses in 2018 and no longer extract fossil fuels. Our 2030 targets* are aligned, on a managed emissions basis, with the goals of the Paris Agreement and the Intergovernmental Panel on Climate Change pathway to 1.5°C, which requires a 45% reduction in global emissions by 2030 relative to 2010 levels. Most of our assets already sit in the low end of their respective carbon intensity curves – emissions from our Canadian smelters** are only 2.13 tCO₂e per tonne of aluminium, more than 80% lower than the industry average of 12.4 tCO₂e/tAl.

In 2020, we made progress executing our climate change strategy – we completed the studies for the 34MW solar plant at Gudai-Darri and commence construction in 2021. We also developed detailed five-year decarbonisation roadmaps for each product group. Our approved spend on climate-related projects in 2020 was over \$140 million of the total \$1 billion committed over the period 2020 to 2024. Our ELYSIS partnership completed the construction of the first industrial pilot facility to scale up a breakthrough technology that eliminates all direct greenhouse gas emissions from the aluminium smelting process.

Since 2018, we have reduced Scope 1 and 2 emissions by 1.1Mt CO₂e, or 3%, which is on track with our 2030 target for absolute emissions. However, our 2020 emissions remained at the same level as in 2019 at 31.5Mt CO₂e: we expect progress on emissions reduction to accelerate in the target period as we develop and implement our abatement projects together with continued focus on R&D. In 2020, 75% of electricity used at our managed operations was from renewable sources.

In 2020 we updated our methodology for calculating Scope 3 emissions and set new Scope 3 emissions reduction goals to guide our partnership approach across our value chain:

- Work in partnerships with customers on steel decarbonisation pathways and invest in technologies that could deliver reductions in steelmaking carbon intensity of at least 30% from 2030,
- Work in partnerships to develop breakthrough technologies with potential to deliver carbon neutral steelmaking pathways by 2050, and advance at least one project to industrial pilot scale by 2025,
- Continue to scale up the ELYSIS™ technology enabling the production of zero-carbon aluminium, and progress to commercial maturity by 2025, and
- Develop plans to meet our new ambition to reach net zero emissions from shipping of our products by 2050, and meet International Maritime Organisation (IMO) goal of 40% reduction in shipping intensity by 2030.

We will continue to advance our value chain climate partnerships in 2021. We recently committed \$10 million to fund the joint establishment of a Low Carbon Raw Materials Preparation R&D Centre with Baowu and signed a new Memorandum of Understanding with Nippon Steel to explore technologies to transition to a low-carbon emission steel value chain.

In 2021, the Remuneration Committee approved revisions to how we include climate change in the short-term incentive plans. Safety, environment, social and governance matters, including climate change, are now assigned an explicit performance weighting of 35%, of which 20% relates to safety.

The Board intends to put the company's annual TCFD-aligned reporting to an advisory vote at our 2022 Annual General Meetings.

**Our ambition is for net zero emissions from our operations by 2050. Our targets for Scope 1 and 2 emissions for our managed and non-managed operations (on an equity share basis) are:*

- A 30% reduction in emissions intensity by 2030 from 2018 baseline adjusted for divestments
- A 15% reduction in absolute emissions by 2030 from 2018 baseline adjusted for divestments

*** Includes the ISAL smelter in Iceland.*

Guidance

- We expect capital expenditure to be around \$7.5 billion in each of 2021 and 2022 (previously around \$7.0 billion in each year). 2023 capital expenditure is included for the first time and is also expected to be around \$7.5 billion. Each year includes sustaining capex of \$3.0-3.5 billion, of which \$1.2-1.6 billion is for Pilbara iron ore. The \$0.5 billion increase in 2021 and 2022 from previous guidance is due to the Australian dollar, which is forecast to strengthen from 69 to 77 cents. Around half of our capital expenditure is denominated in Australian dollars.
- Effective tax rate on underlying earnings of ~30% in 2021. In June 2021, we expect to make a US\$0.9 billion* final payment to the Australian Taxation Office in respect of 2020 corporate profits.

* Based on the 2020 year-end Australian dollar exchange rate of 0.77.

2021 unit cost guidance	2020 Actuals	2021
Pilbara iron ore unit cash costs, free on board (FOB) basis - US\$ per wet metric tonne	15.4	16.7-17.7
Australian dollar exchange rate	0.69	0.77
Copper C1 unit costs (average for Kennecott, Oyu Tolgoi and Escondida) - US cents per lb	111	60-75

- In 2021, we expect Pilbara iron ore unit cash costs to increase to \$16.7-17.7 per tonne. This mainly reflects a forecast 12% strengthening of the Australian dollar (77 cents in 2021 vs 69 cents in 2020), given that a significant majority of our Pilbara costs are Australian-dollar denominated (excluding freight and royalties). In 2021, we expect to incur commissioning costs associated with tying in 90 million tonnes of replacement mine capacity and start-up costs for Gudai-Darri, with production ramping up in 2022. We also anticipate additional study costs for the next wave of replacement mines. There are no COVID-19 costs in our 2021 guidance compared with 60 cents per tonne in 2020.
- In 2021, Copper C1 unit costs are expected to benefit from a gradual return to higher copper grades at Kennecott and a one-off benefit from higher gold grades at Oyu Tolgoi.

2021 production guidance (Rio Tinto share, unless otherwise stated)	2020 Actuals	2021
Pilbara iron ore (shipments, 100% basis)	331	325 to 340 Mt
Bauxite	56	56 to 59 Mt
Alumina	8	7.8 to 8.2 Mt
Aluminium	3.2	3.1 to 3.3 Mt
Mined copper	528	500 to 550 kt
Refined copper	155	210 to 250 kt
Diamonds*	3.7	3.0 to 3.8 M carats
Titanium dioxide slag	1.1	~1.1 to 1.3 Mt
Iron Ore Company of Canada pellets and concentrate	10.4	10.5 to 12.0 Mt
Boric oxide equivalent	0.5	~0.5 Mt

* 2021 diamonds guidance is for Diavik only following the closure of Argyle in 2020.

- Production guidance is unchanged from our [Fourth Quarter Operations Review](#) released on 19 January 2021.
- We will continue to monitor and adjust production levels and product mix to meet customer requirements in line with our value over volume strategy, government-imposed restrictions related to COVID-19 and any other potential COVID-19 related disruptions.
- Iron ore shipments and bauxite production guidance remain subject to weather and market conditions. Iron ore guidance also takes into account the risks associated with tying in approximately 90 million tonnes of replacement mine capacity at existing hubs in Robe Valley, West Angelas and Western Turner Syncline phase 2 as well as the start-up of Gudai-Darri.
- Our updated assessment of Ore Reserves reflects measures we have put in place following the events at Juukan Gorge. These are intended to protect a number of sites, and to mitigate impacts to sites where there are existing heritage approvals, or a decision has been made not to seek regulatory approval to conduct mining activities, given heritage considerations identified by

Traditional Owners. As a result, we have removed 54 million dry tonnes from Reserves. Our iron ore reserves totalled 3 billion tonnes at the end of 2020 across our Pilbara mines.

- The future impact on our Pilbara iron ore operations, mine developments and heritage approach from the reform of the Aboriginal Heritage Act 1972 (WA) remains unknown. We will maintain a high level of engagement with Traditional Owners regarding current and proposed plans for mining activities. We continue to work through scenarios in an iterative manner as cultural assessments and mine designs progress, with a broad range of options available given the flexibility in our Pilbara network.

Underlying EBITDA and underlying earnings by product group

	Underlying EBITDA			Underlying earnings		
	2020	2019	Change	2020	2019	Change
Year ended 31 December	US\$m	US\$m	%	US\$m	US\$m	%
Iron Ore	18,837	16,098	17 %	11,398	9,638	18 %
Aluminium	2,152	2,285	(6)%	471	599	(21)%
Copper & Diamonds	2,172	2,073	5 %	763	554	38 %
Energy & Minerals	1,646	1,762	(7)%	577	611	(6)%
Reportable segment total	24,807	22,218	12 %	13,209	11,402	16 %
Other operations	—	(77)	(100)%	(54)	(89)	(39)%
Inter-segment transactions	(94)	(9)	944 %	(32)	(3)	967 %
Product group total	24,713	22,132	12 %	13,123	11,310	16 %
Central pension costs, share-based payments and insurance	72	59	22 %	81	60	35 %
Restructuring, project and one-off costs	(133)	(183)	(27)%	(108)	(94)	15 %
Other central costs	(500)	(496)	1 %	(418)	(550)	(24)%
Central exploration and evaluation	(250)	(315)	(21)%	(216)	(231)	(6)%
Net interest				(14)	(122)	(89)%
Total	23,902	21,197	13 %	12,448	10,373	20 %

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 71 to 76.

Central and other costs

Pre-tax central pension costs, share-based payments and insurance were a \$72 million credit compared with a \$59 million credit in 2019, mainly due to higher insurance recoveries in 2020 with claims at a consistent level with 2019.

On a pre-tax basis, restructuring, project and one-off central costs were 27% lower than 2019 mainly due to lower provisions recognised in 2020 in respect of legacy operations and the absence of operating model project costs in 2020.

Other central costs of \$500 million were in line with 2019.

Central exploration and evaluation costs

We have a strong portfolio of projects with activity in 16 countries across eight commodities. In 2020, COVID-19 impacted our greenfield exploration activities in some jurisdictions, reflected in the 21% lower spend. We were able to redistribute some activities from regions with greater COVID-19 restrictions such as Europe, Central Asia and the Americas, and ramp-up activities in Australia, following the easing of restrictions. We were able to keep programmes running throughout 2020 whilst maintaining strong safety standards, protecting our people and communities. The reduction in our central exploration and evaluation spend also reflects the Winu project being transferred to the Copper & Diamonds product group in 2020.

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
2019 underlying EBITDA	21,197
Prices	3,407
Exchange rates	(103)
Volumes and mix	(452)
General inflation	(251)
Energy	461
Operating cash unit costs	(450)
One-off items	153
Non-cash costs/other	(60)
2020 underlying EBITDA	23,902

Significant momentum from higher iron ore prices

Commodity price movements in 2020 increased underlying EBITDA by \$3,407 million compared with 2019. This was primarily driven by the strength in pricing for iron ore (+\$3,262 million) and copper (+\$405 million) and was partly offset by lower prices for aluminium, alumina and bauxite (-\$314 million). We have included a table of prices and exchange rates on page 80.

The 2020 monthly average Platts index for 62% iron fines adjusted to an FOB basis was 19% higher on average compared with 2019, driven by continued supply disruptions in the seaborne market and strong demand following record Chinese steel output.

The average London Metal Exchange (LME) price for copper was 3% higher, while the LME aluminium price was 5% lower, compared with 2019. The gold price rose 27%.

The midwest premium for aluminium in the US averaged \$313 per tonne, 2% lower than in 2019.

Exchange rates impacted by stronger A\$ at year-end

Compared with 2019, on average, the US dollar was broadly flat against the Australian and Canadian dollars but strengthened by 12% against the South African rand. Currency movements, which lowered underlying EBITDA by \$103 million relative to 2019, mainly related to exchange rate losses on receivables following the significant strengthening of the Australian dollar at 2020 year-end.

Volumes and product mix

Underlying EBITDA was \$452 million lower than 2019 from movements in sales volumes and changes in product mix across the portfolio. Although iron ore shipments from the Pilbara rose by 1%, the year-on-year gains are mostly included in Other, reflecting recovery from the fire at Cape Lambert A port in 2019. Other key variances included lower gold volumes following a reduction in grades at Oyu Tolgoi and Kennecott, lower titanium dioxide feedstock volumes and lower sales of value added products in our aluminium business in line with market demand.

Energy prices substantially lower

Average movements in energy prices compared with 2019 improved underlying EBITDA by \$461 million, mainly due to lower diesel prices and reduced coal prices for two of our Pacific Aluminium smelters.

Higher costs driven by lower volumes

The impact of higher cash operating costs, which we reflect on a unit cost basis, reduced underlying EBITDA by \$450 million compared with 2019. There was continued respite on cost inflation for certain raw materials for Aluminium, in particular caustic soda, pitch, petroleum coke and alloys. However, this was outweighed by other cost pressures, notably fixed cost inefficiencies at Kennecott, due to the lower grades and the extended smelter maintenance, and higher unit cash costs at Oyu Tolgoi in line with lower output.

Maintained our exploration spend

Our exploration and evaluation spend was largely unchanged at \$625 million. This went to our greenfield programmes and highest value projects, particularly on evaluating the Resolution copper project in Arizona, advancing our Winu copper/gold deposit in Australia and progressing our Jadar lithium-borate project in Serbia. In addition, \$82 million for iron ore feasibility studies in the Pilbara was recognised as capital expenditure.

One-off items

One-off items aggregated to be \$153 million less than in 2019. 2020 one-offs primarily reflected earlier than planned pot-lining replacement at the Kitimat aluminium smelter (\$51 million) and an increased impact from curtailment of operations at RBM (\$23 million). These were offset by the non-recurrence of 2019 events, including the \$199 million charge at Escondida to reflect cancellation of existing coal powered energy contracts following a switch to renewables and \$68 million for challenges faced at our ISAL and Kitimat aluminium smelters.

Non-cash costs/other

Movements in non-cash costs and other items, which lowered underlying EBITDA by \$60 million compared with 2019, mainly reflected additional costs (\$333 million) incurred from COVID-19 across the Group such as screening, equipment hire, roster changes, temporary relocation and hygiene. This was offset by recovery from the fire at the Cape Lambert A port in the Pilbara in 2019 (\$184 million) and lower provisions in respect of legacy operations (\$23 million).

Net earnings

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

	US\$m
2019 net earnings	8,010
Total changes in underlying EBITDA	2,705
Decrease in depreciation and amortisation (pre-tax) in underlying earnings	275
Decrease in interest and finance items (pre-tax) in underlying earnings	143
Increase in tax on underlying earnings	(839)
Increase in underlying earnings attributable to outside interests	(209)
Total changes in underlying earnings	2,075
Changes in exclusions from underlying earnings:	
Movement in net impairment charges	543
Movement in losses on consolidation and disposal of interests in businesses	291
Movement in exchange differences and gains/losses on debt	(1,064)
Movements in other exclusions	(86)
2020 net earnings	9,769

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

The depreciation and amortisation charge was \$275 million lower than 2019, mainly due to a lower asset base following impairments in 2019 and in the first half of 2020, together with accelerated depreciation in 2019 following the pot failures at Kitimat.

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.

The 2020 effective corporate income tax rate on underlying earnings, excluding equity accounted units, was 29.5%, in line with 2019. The effective tax rate on underlying earnings in Australia was 32% in 2020 compared with 31% in 2019. We anticipate an effective tax rate on underlying earnings of approximately 30% in 2021.

Items excluded from underlying earnings

Net impairment charges decreased by \$543 million compared with 2019. We recognised \$1,115 million of impairment charges in 2020, comprised 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.

In 2019, we recognised impairment charges of \$1,658 million, after tax and non-controlling interests, primarily related to the Oyu Tolgoi copper/gold underground project and the Yarwun alumina refinery. There is a detailed explanation of the impairment process on pages 47 to 49.

The \$291 million movement in losses on consolidation and disposals of interests in businesses primarily relates to the disposal of our stake in Rössing Uranium in 2019.

In 2020, we recognised non-cash exchange and derivative losses of \$1,264 million. This was mainly on US dollar debt in non-US dollar functional currency Group companies, intragroup balances, and on the revaluation of certain derivatives which do not qualify for hedge accounting. These losses compared with a 2019 loss of \$200 million, giving rise to a negative year-on-year movement of \$1,064 million. The exchange losses are largely offset by currency translation gains recognised in equity. The quantum of US dollar debt is largely unaffected and we will repay it from US dollar sales receipts.

In 2020, we excluded net additional closure costs of \$300 million from underlying earnings principally relating to a non-operating site (Gove), a fully impaired site (Argyle) and the net earnings impact in respect of increases to closure provisions following a reduction to the closure discount rate. These are included in Movements in other exclusions. Further analysis can be found on pages 77 to 78.

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 2020 was \$9.8 billion (2019: \$8.0 billion). We recorded a profit after tax in 2020 of \$10.4 billion (2019: \$7.0 billion) of which a profit of \$0.6 billion (2019 loss: \$1.0 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).

	2020 US\$m	2019 US\$m
Underlying earnings	12,448	10,373
Items excluded from underlying earnings		
Impairment charges	(1,115)	(1,658)
Net losses on consolidation and disposal of interests in businesses	—	(291)
Foreign exchange and derivative losses on net debt and intragroup balances and derivatives not qualifying for hedge accounting	(1,264)	(200)
Net losses from movements to closure estimates (non-operating and fully impaired sites)	(300)	—
Other exclusions	—	(214)
Net earnings	9,769	8,010

On pages 77 to 78 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 72.

Balance sheet

Our net debt of \$0.7 billion decreased by \$3.0 billion in 2020, reflecting dividend payments of \$6.1 billion and \$0.2 billion of share buy-backs, more than offset by our strong free cash flow.

Our net gearing ratio (net debt to total capital) declined to 1% at 31 December 2020 (31 December 2019: 7%).

Our total financing liabilities at 31 December 2020 (see page 51) were US\$13.8 billion (31 December 2019: \$14.3 billion) and the weighted average maturity was around nine years. At 31 December 2020, approximately 86% of these liabilities were at floating interest rates (94% excluding leases). The maximum amount within non-current borrowings maturing in any one calendar year was \$1.8 billion, which matures in 2025.

We had \$12.9 billion in cash and cash equivalents plus other short-term cash investments at 31 December 2020 (31 December 2019: \$10.6 billion) and we have \$7.5 billion of fully committed Revolving Credit Facilities, which remained undrawn throughout the period, and mature in November 2023.

Provision for closure costs

This year we have enhanced our disclosure on Provisions for close-down and restoration costs and environmental clean-up obligations, which at 31 December 2020, were \$13.3 billion (31 December 2019: \$11.1 billion). The principal movements during the year were currency appreciation (\$0.7 billion), reduction in discount rate (\$1.0 billion), changes to existing and new provisions (\$0.6 billion) and drawdowns in the provision through spend (\$0.4 billion). Of the \$13.3 billion in provisions, \$10.7 billion relates to operating sites and \$2.6 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 17 years (2019: 18 years).

The provisions are based on risk-adjusted cash flows. In September 2020, we completed a review of the discount rate used to reflect the obligations at present value and updated it to a real-rate of 1.5% (previously 2.0%), applied prospectively from that date.

In 2021, we expect to utilise around \$0.6 billion of the provisions as we advance our closure activities at Argyle, Energy Resources of Australia, 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 53 to 56.

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 40-60% 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.

Total cash returns declared: building on our five-year track record with a 72% pay-out

	2020 US\$ billion	2019 US\$ billion
Ordinary dividend		
Interim	2.5	2.5
Final	5.0	3.7
Full-year ordinary dividend	7.5	6.2
Additional returns		
Special dividend announced in August 2019, paid in September 2019	n/a	1.0
Special dividend announced in February 2021, to be paid in April 2021	1.5	n/a
Total cash returns to shareholders declared for each year	9.0	7.2
Combined total as % of underlying earnings	72 %	70 %

Total cash returns paid: 2019 includes 2018 special dividend from divestment proceeds

	2020 US\$ billion	2019 US\$ billion
Previous year's final ordinary dividend paid in April of each year	3.6	2.9
Special dividend announced in February 2019, paid in April 2019	n/a	3.9
Interim ordinary dividend paid in September of each year	2.5	2.5
Special dividend announced in August 2019, paid in September 2019	n/a	1.0
Share buy-back programme, completed in February 2020	0.2	1.6
Total cash returns paid to shareholders	6.3	11.9

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 2020 final dividend has been converted at exchange rates applicable on 16 February 2021 (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	2020 dividends	2019 dividends
Rio Tinto Group		
Interim (US cents)	155.00	151.00
Final (US cents)	309.00	231.00
Full-year (US cents)	464.00	382.00
Rio Tinto plc		
Interim (UK pence)	119.74	123.32
Final (UK pence)	221.86	177.47
Full-year (UK pence)	341.60	300.79
Rio Tinto Limited		
Interim (Australian cents)	216.47	219.08
Final (Australian cents)	397.48	349.74
Full-year (Australian cents)	613.95	568.82

Special dividend per share declared	2020 dividends	2019 dividends
Rio Tinto Group		
Declared with 2019 interim results (US cents)	n/a	61.00
Declared with 2020 full year results (US cents)	93.00	n/a
Rio Tinto plc		
Declared with 2019 interim results (UK pence)	n/a	49.82
Declared with 2020 full year results (UK pence)	66.77	n/a
Rio Tinto Limited		
Declared with 2019 interim results (Australian cents)	n/a	88.50
Declared with 2020 full year results (Australian cents)	119.63	n/a

The 2020 final 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 15 April 2021, we will pay the 2020 final dividend and the special dividend to holders of ordinary shares and holders of ADRs on the register at the close of business on 5 March 2021 (record date). The ex-dividend date is 4 March 2021.

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 23 March 2021.

We will operate our Dividend Reinvestment Plans for the 2020 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 23 March 2021. 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.

In line with market practice, we will be introducing a dividend fee on cash dividends paid on the ADR. The fee revenue will cover costs associated with the management of the ADR programme. The fee of \$0.005 per ADR, per cash dividend, will be introduced with the 2021 interim dividend which is payable on 23 September 2021. The fee will be deducted by the depositary.

Review of operations

Iron Ore

2020 year end results	2020	2019	Change
Pilbara production (million tonnes - 100%)	333.4	326.7	2 %
Pilbara shipments (million tonnes - 100%)	330.6	327.4	1 %
Salt production (million tonnes - Rio Tinto share) ¹	4.9	5.4	(10)%
Gross product sales (US\$ millions)	27,508	24,075	14 %
Average realised price (US\$ per dry metric tonne)	98.9	85.9	15 %
Underlying EBITDA (US\$ millions)	18,837	16,098	17 %
Pilbara underlying FOB EBITDA margin ²	74 %	72 %	
Underlying earnings (US\$ millions)	11,398	9,638	18 %
Net cash generated from operating activities (US\$ millions)	13,218	11,420	16 %
Capital expenditure (US\$ millions) ³	(2,941)	(1,741)	69 %
Free cash flow (US\$ millions)	10,233	9,601	7 %
Return on capital employed ⁴	74 %	67 %	

1. Dampier Salt is reported within Iron Ore, reflecting management responsibility. Iron Ore Company of Canada and the Simandou iron ore project in Guinea continue to be reported within Energy & Minerals.
2. The Pilbara underlying free on board (FOB) EBITDA margin is defined as Pilbara underlying EBITDA divided by Pilbara revenues, 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. Return on capital employed (ROCE) is defined as underlying earnings excluding net interest divided by average capital employed (operating assets).

Financial performance

Our strong operational performance in the Pilbara in 2020 enabled us to take advantage of the rising price environment for our high-quality products. This price strength was driven by buoyant demand from China and constraints in global seaborne supply. We increased our iron ore shipments by 1% and production by 2% compared with 2019, whilst implementing strict measures to manage COVID-19.

Underlying EBITDA of \$18.8 billion was 17% higher than 2019, primarily reflective of higher prices, partially offset by rising unit costs. The monthly average Platts index for 62% iron fines adjusted to an FOB basis was 19% higher than 2019. Higher realised prices increased underlying EBITDA by \$3.2 billion, while a stronger Australian dollar reduced underlying EBITDA by \$0.3 billion.

2020 Pilbara unit cash costs, which were \$15.4 per tonne (2019: \$14.4 per tonne), include \$0.6 per tonne of COVID-19 costs, which relate to the controls we have put in place to keep our people safe such as additional cleaning and flights, screening and roster changes. We experienced a higher monthly volatility in the iron ore price and an appreciation in the Australian dollar at year end. This triggered exchange and related effects, including losses on receivables, which added a net \$0.4 per tonne to unit cash costs in 2020. A significant majority of our Pilbara operating costs (excluding freight and royalties) are denominated in Australian dollars. We also experienced a higher mining work effort from longer haul distances, below water table mining and increased maintenance activity which we offset through productivity gains from increased automation and lower fuel prices. Overall, underlying unit cash costs were stable year on year, excluding the impact of foreign exchange and COVID-19 costs.

We have continued investing in productivity and automation and are now seeing an improved effectiveness of our integrated system: around 60% of our truck fleet in the Pilbara is now fully

autonomous. We have a pathway that will see around two thirds of the fleet being automated by the end of 2021.

Our Pilbara operations delivered an underlying FOB EBITDA margin of 74%, compared with 72% in 2019.

We price the majority of our iron ore sales (77%) by reference to the average index price for the month of shipment. In 2020, we priced approximately 13% of sales by 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 70% of sales including freight and 30% on an FOB basis.

We achieved an average iron ore price of \$91.0 per wet metric tonne on an FOB basis (2019: \$79.0 per wet metric tonne) across our product suite. This equates to \$98.9 per dry metric tonne, assuming 8% moisture (2019: \$85.9 per dry metric tonne), which compares with the monthly average Platts index for 62% iron fines converted to an FOB basis of \$101.3 per dry metric tonne (2019: \$84.9 per dry metric tonne). The slightly lower realised price compared to the Platts index was due to lower market premiums for lump and the effect of the sales priced by reference to the prior quarter's average index lagged by one month in a rising price environment throughout 2020.

Gross product sales for our Pilbara operations included freight revenue of \$1.5 billion (2019: \$1.7 billion).

Net cash generated from operating activities of \$13.2 billion was 16% higher than 2019, in line with the increase in underlying EBITDA.

The \$10.2 billion of free cash flow was 7% higher than 2019, reflecting a 69% increase in capital spend, mainly related to the ramp-up of construction activity at the new Gudai-Darri hub.

Review of operations

We achieved a strong operating performance across the network in 2020, managing the challenges of weather disruptions and the implementation of strict measures to manage COVID-19. Our Pilbara operations produced 333.4 million tonnes (our share 275.5 million tonnes), 2% higher than 2019, underpinned by record total material moved for the year, 7% higher than the previous record set in 2019, highlighting the improvements to mine and asset health.

2020 shipments of 330.6 million tonnes (our share 273.1 million tonnes), which were 1% higher than 2019, were impacted by Cyclone Damien in the first quarter and by COVID-19, which also resulted in the deferral of maintenance at the port to the third quarter. We continue to ramp up our port sales in China, with 5.5 million tonnes of sales in 2020. Our portside operation handles product from our operations in the Pilbara and in Canada, as well as third-party product, and provides blending and screening capabilities.

Following the events at Juukan Gorge, we continue to reassess all activities which have the potential to impact heritage sites. We will continue to review mine plans to ensure the protection of sites of exceptional cultural value and have increased monitoring of operating activities that have the potential to impact heritage sites. We have also integrated heritage management into our mining operations – our Iron Ore business now has primary responsibility for our Communities and Social Performance partnerships and engagement.

New projects and growth options

We are progressing our \$2.6 billion Gudai-Darri iron ore mine, with key construction activities on schedule. 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. We continue to anticipate production to ramp up in early 2022. Once fully commissioned, the initial mine development will have an annual capacity of 43 million tonnes. This will increase the lump to fines ratio in our Pilbara Blend shipments to 38%.

We have multiple project scopes under study for Gudai-Darri Phase 2, following Board approval for a \$44 million pre-feasibility study. Ultimately, the capacity of the hub could be up to 70 million tonnes per year, depending on market conditions.

We are also investing \$1.55 billion with our joint venture partners, Mitsui and Nippon Steel, (our 53% share is \$820 million) at the Robe Valley and West Angelas operations. We have received all required approvals, and procurement and construction activities are progressing well. We anticipate first ore from these projects in 2021.

Our \$749 million 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. First ore is expected in 2021.

Markets

The COVID-19 pandemic had a disparate impact on iron ore demand in 2020, where solid growth in China's imports more than offset the contractions in all other regions. Scrap collection and availability were significantly disrupted by the pandemic, further supporting iron ore demand at a time when extreme weather events constrained supply from the major producing regions. As a result, the monthly average Platts index for 62% iron fines converted to an FOB basis rose 19% in 2020. With the exception of products sold at ports in China, all of our Pilbara products are priced with reference to the 62% index.

Global steel production contracted by 1% in 2020 compared with 2019, as China lifted its steel output to a record 1.05 billion tonnes, which compensated for the 9% contraction in the rest of the world. Pandemic-related capacity and production cuts in Europe, Japan and the US brought steel output down by between 12% and 17% compared with 2019. India, the world's second largest steel producer, recorded an 11% contraction in 2020. Combined crude steel production in the world ex-China recovered to 2019 levels for the first time in October 2020 and grew during the fourth quarter.

Weather events in Brazil and Australia during the first half of 2020 curtailed seaborne iron ore supply, but the cumulative shipments of the major producers increased by 2% (around 25 million tonnes) over the year. Meanwhile, China's domestic iron ore supply expanded by around 20 million tonnes to around 290 million tonnes and helped meet record demand in 2020, as elevated iron ore prices incentivised some previously idled small-scale mines to restart operation during the second half of the year. Reflecting the demand disparity between domestic and export markets, China's net finished steel exports also contracted by 36% in 2020 to 33 million tonnes.

Aluminium

2020 year end results	2020	2019	Change
Bauxite production (000 tonnes - Rio Tinto share)	56,131	55,105	2 %
Alumina production (000 tonnes - Rio Tinto share)	8,039	7,744	4 %
Aluminium production (000 tonnes - Rio Tinto share)	3,180	3,171	— %
Gross product sales (US\$ millions)	9,314	10,340	(10)%
Average realised aluminium price (US\$ per tonne)	1,946	2,132	(9)%
Underlying EBITDA (US\$ millions)	2,152	2,285	(6)%
Underlying EBITDA margin (integrated operations)	26 %	26 %	
Underlying earnings (US\$ millions) ¹	471	599	(21)%
Net cash generated from operating activities (US\$ millions)	1,930	2,183	(12)%
Capital expenditure - excluding EAUs (US\$ millions) ²	(1,009)	(1,316)	(23)%
Free cash flow (US\$ millions)	892	821	9 %
Return on capital employed ³	3 %	4 %	

1. Underlying earnings includes a \$0.2 billion charge in 2020 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. Return on capital employed (ROCE) is defined as underlying earnings excluding net interest divided by average capital employed (operating assets).

Financial performance

Our aluminium business was resilient in 2020, despite significantly lower sales prices and reduced demand for value-added product (VAP), driven by market conditions from the impact of COVID-19. Markets were particularly challenging for aluminium metal where global demand for primary aluminium declined by approximately 3% and global supply was largely unchanged. However, our focus on operational stability, resilience through COVID-19 and cash flow generation, enabled us to deliver solid underlying EBITDA and strong cash flows.

Underlying EBITDA of \$2.2 billion declined by just \$0.1 billion, 6% lower than 2019, despite the weaker pricing environment, which impacted underlying EBITDA by \$0.3 billion. We were able to offset most of the pricing impact through operational improvements and productivity gains, along with lower prices for our inputs, which totalled \$0.3 billion. These included raw material efficiencies, reduced energy costs and lower input prices, primarily for caustic soda and petroleum coke. This enabled us to maintain our industry-leading underlying EBITDA margin at 26%, in line with 2019.

We achieved an average realised aluminium price of \$1,946 per tonne, 9% lower than 2019 (\$2,132 per tonne). This comprised the LME price, a market premium and a product (VAP) premium. The cash LME price averaged \$1,702 per tonne, 5% lower than 2019, even after a sharp recovery in the second half of 2020. In our key US market, the midwest premium dropped 2% to \$313 per tonne on average in 2020. VAP represented 43% of the primary metal we sold, in line with market demand (2019: 51%), and generated product premiums averaging \$213 per tonne of VAP sold (2019: \$234 per tonne). Market demand for VAP rebounded in the fourth quarter of 2020, returning to normal levels.

Although we are broadly balanced in alumina, approximately 2.2 million tonnes of our legacy alumina sales contracts are exposed to a fixed linkage to the LME price. These contracts date back to 2005 or earlier, and the majority expire between 2023 and 2030. In 2020, the opportunity loss was \$0.1 billion, compared with \$0.2 billion in 2019.

Despite the significantly weaker market environment, we generated \$1.9 billion in net cash from operating activities with free cash flow increasing by 9% to \$0.9 billion. This was underpinned by productivity improvements, lower costs, reductions in working capital in the year and lower capital expenditure.

Review of operations

Bauxite production of 56.1 million tonnes was 2% higher than 2019 supported by the ramp-up of the expansion at the CBG mine in Guinea, and steady performance at the Pacific mines, including additional volumes from the start-up of the Amrun mine in 2019.

We shipped 39.4 million tonnes of bauxite to third parties, 1% lower than in 2019. Shipments were prioritised throughout the year to align with customer needs, with a higher proportion of internal shipments to our Pacific refineries.

In 2020, gross product sales for bauxite declined 8% to \$2.3 billion – this includes freight revenue of \$423 million (2019: \$464 million).

Alumina production of 8.0 million tonnes was 4% higher than 2019, as a result of strong production at both our Pacific refineries.

Aluminium production of 3.2 million tonnes was in line with 2019, with lower volumes from the curtailment of Line 4 at the Tiwai Point smelter in New Zealand and from the Kitimat smelter pot relining campaign, offset by the ramp-up of the Becancour smelter in Quebec following its restart after a lockdown at the end of 2019.

In January 2021, we reached agreement on a new electricity supply with Meridian Energy that allows New Zealand Aluminium Smelter (NZAS) to continue operating the Tiwai Point smelter until December 2024. This extension of operations provides certainty to employees, the local community and customers while providing more time for all stakeholders to plan for the future.

On 15 February 2021, we reached agreement on an amended power contract with the energy supplier, Landsvirkjun, that will allow the ISAL aluminium smelter in Iceland to continue operating with an improved competitive position. We have withdrawn our complaint filed with the Icelandic Competition Authority.

New projects and growth options

At the Kemano project in Kitimat, British Columbia, we are constructing a second tunnel to de-risk our 100% owned hydropower facility. The project was originally approved in 2017, with \$155 million of additional capital approved in 2020, bringing the total to \$630 million. It was impacted by the departure of the main contractor in the first half of 2020. Tunnel excavation works restarted in September. However, due to the escalation of COVID-19 in the province, tunnel excavation works have been interrupted. We expect to restart late in the first quarter of 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 traditional aluminium smelting process. In December 2020, we announced that construction of the ELYSIS Industrial Research and Development (R&D) Centre at our Complexe Jonquière in the Saguenay, Quebec was complete. This new centre will produce metal at a similar scale to smaller, industrial-sized smelting cells that are in operation by some producers today. Commissioning of the Industrial R&D Centre is underway.

Markets

Demand for primary aluminium declined by around 3% in 2020, following a fall of around 1% in 2019. COVID-19 severely impacted consumption this year, but with notable regional differences in recovery rates: gradual in the developed world, with China experiencing a strong V-shaped recovery. Demand in the transport sector has been especially weak in 2020, but robust in the packaging sector. We expect overall demand to rebound in 2021, but ongoing COVID-19 restrictions and political risks remain.

The alumina market remained in moderate surplus and low prices have resulted in a high level of idled capacity in inland China.

China continues to drive demand in the global seaborne bauxite market as result of stricter environmental measures and the depletion of domestic bauxite. Chinese bauxite imports rose by around 11% to 112 million tonnes in 2020 on the back of increased imports from Guinea, Australia and Indonesia.

Copper & Diamonds

2020 year end results	2020	2019	Change
Mined copper production (000 tonnes - Rio Tinto share)	527.9	577.4	(9)%
Refined copper production (000 tonnes - Rio Tinto share)	155.0	259.6	(40)%
Diamonds production (000 carats - Rio Tinto share)	14,676	17,030	(14)%
Gross product sales (US\$ millions)	5,428	5,815	(7)%
Average realised copper price (US cents per pound)	283	275	3 %
Underlying EBITDA (US\$ millions)	2,172	2,073	5 %
Underlying EBITDA margin (product group operations)	47 %	41 %	
Underlying earnings (US\$ millions)	763	554	38 %
Net cash generated from operating activities (US\$ millions) ¹	1,064	1,505	(29)%
Capital expenditure - excluding EAUs ² (US\$ millions)	(1,686)	(1,772)	(5)%
Free cash flow (US\$ millions)	(637)	(284)	(124)%
Return on capital employed ³	6 %	5 %	

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

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 EAUs.

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

Financial performance

In 2020, we increased underlying EBITDA despite lower revenues amidst a challenging year. It was a year of transition for our operational mine plans at Kennecott and Oyu Tolgoi, with a temporary reduction in copper and gold grades. Weak market conditions in the first half, COVID-19 restrictions and a 5.7 magnitude earthquake in Utah in March, were the principal external challenges. In addition, we incurred a delay in restarting the Kennecott smelter, following a planned shutdown.

A strong recovery in the copper price and fully operational Kennecott smelter by October, coupled with strong actions to address the headwinds, namely tight cost control and acceleration of access to higher gold grades at Oyu Tolgoi, led to a 5% increase in underlying EBITDA to \$2.2 billion, with margins rising to 47%.

Price movements for all products benefited underlying EBITDA by \$0.5 billion for the full year. Our average realised copper price increased by 3% to 283 US cents per pound. Other prices were mixed, with gold rising 27% to \$1,770 per ounce while our realised diamond prices declined by 21% on a weighted average basis. An unplanned flash converting furnace rebuild at Kennecott following the earthquake and delays in restarting the smelter following planned major maintenance after the shutdown also impacted underlying EBITDA through reduced volumes, leading to fixed cost inefficiencies. This was partially offset by 82% higher molybdenum concentrate volumes at Kennecott, where we also realised some exports of copper concentrate into a strengthening market.

Our copper unit costs, at 111 cents per pound in 2020, were 20% higher than in 2019, due to lower copper grades at Kennecott and Escondida and delays in restarting the Kennecott smelter, driving lower volumes. This was partly offset by cost reduction programmes and higher by-product credits, with higher prices for gold and higher molybdenum volumes, due to improved grades, albeit at lower prices.

We continued to advance our future copper evaluation projects, in particular at Resolution Copper in Arizona and at Winu in Western Australia.

We generated \$1.1 billion in cash from our operating activities, a 29% decline on 2019, primarily driven by anticipated lower copper and gold grades, combined with the operational challenges at Kennecott. We also received \$0.1 billion lower dividends from our 30% equity holding in Escondida. Free cash flow was an outflow of \$0.6 billion reflecting the lower operating cash flow and a sustained level of capital investment (\$1.7 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 527.9 thousand tonnes, was 9% lower than 2019, primarily due to lower grades at Kennecott, as a result of planned pit sequencing, and lower grades and lower material moved at Escondida.

Kennecott

Mined copper production at Kennecott was 25% lower than 2019, due to a 28% reduction in grade and the optimisation of molybdenum ore during the extended shutdown of the smelter, which, in combination with higher molybdenum grades, led to an 82% increase in the production of molybdenum concentrate. Development in the pit progressed despite COVID-19 disruptions. We expect grades to gradually increase from 2021, as mining transitions from the east to the south wall.

Refined copper production was 54% lower than 2019 due to the rebuild of the flash converting furnace, required following the earthquake, and delays in restarting the smelter following planned major maintenance in mid-2020. The smelter was safely restarted and became fully operational in October.

Escondida

Escondida's mined copper production was 1% lower than 2019, mainly due to 15% lower material stacked onto the leaching pads. This was a result of preventive measures in response to COVID-19, which were mostly offset by 5% higher concentrator throughput in 2020. Refined copper was also impacted by lower material stacked onto the leach pads.

Oyu Tolgoi

Mined copper production from the open pit at Oyu Tolgoi was 2% higher than 2019, reflecting the anticipated move to higher grade areas, primarily due to accelerated mine development and production phasing. Access to higher copper and gold grades is expected to continue in 2021. We maintained shipments across the Chinese border despite COVID-19 measures in Mongolia and continue to work closely with the authorities to manage the risk of supply chain disruptions.

Diamonds

Diamond production was 14% lower than 2019, attributable to lower carats recovered at Diavik, where a 10% reduction in grade was partially offset by an increase in tonnes processed, and the closure of Argyle, as planned, on 3 November. We expect to take five years to decommission the Argyle mine and rehabilitate the area, followed by a further period of monitoring.

New projects and growth options – Oyu Tolgoi underground project

In 2020, we progressed the underground project despite restrictions from COVID-19 controls and ongoing international travel restrictions. The project has deployed mitigations that include extended on-site rosters, securing commitments from critical vendors to remain on site for extended periods and layered screening of personnel.

Overall underground lateral development has now reached 53,000 equivalent metres (eqm), with development for first drawbell substantially complete.

The project has now exceeded one million tonnes of material moved through shaft 2 since commissioning and the scheduled annual maintenance of the shaft was successfully completed in October 2020 using remote technology.

On 16 December, we [confirmed](#) the definitive estimate of cost and schedule for Panel 0 with sustainable production expected to commence in October 2022 and development capital of \$6.75 billion¹, in line with the ranges first announced in July 2019. These estimates include the known impacts of COVID-19.² Oyu Tolgoi is expected to produce 480,000 tonnes³ of copper per year on average, from 2028 to 2036, from the open pit and underground. 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.⁴

Rio Tinto considers that additional milestones need to be met in order to ensure that the project can commence caving operations in 2021: outstanding government approvals – including registering the updated Resources and Reserves submitted in February 2020 and accepting the updated feasibility study (OTFS20) completed in July 2020 in accordance with the 2009 Investment Agreement and Mongolian regulation; funding as agreed with Turquoise Hill Resources (TRQ) in a Memorandum of Understanding in [September 2020](#); and, achieving the power milestones agreed with the government of Mongolia in [June 2020](#). We continue to work closely with our partners, the government of Mongolia and TRQ, in the coming months to finalise these milestones, as outlined in our 16 December [announcement](#).

On 22 December, Oyu Tolgoi received a tax assessment for approximately \$228 million from the Mongolian Tax Authority, relating to an audit of taxes paid between 2016 and 2018. This assessment is in addition to \$752 million of taxes and royalties paid in the same period. Oyu Tolgoi's application to include these matters in the pending international arbitration related to 2013 to 2015 has been accepted.

On 4 January 2021, the government of Mongolia advised Rio Tinto that they were dissatisfied with the results of the definitive estimate and the funding implications for the sharing of economic benefits between the shareholders of Oyu Tolgoi. We are engaging with the government of Mongolia in relation to the definitive estimate.

We are in active discussions with the government of Mongolia to address and close all outstanding issues and increase the project's benefits to all stakeholders.

Other new projects and growth options

The \$0.9 billion investment in phase one of the south wall pushback project at Kennecott, which will extend mine life to 2026, remains on track. We expect to gradually access higher grades made available from this project from 2021. The \$1.5 billion investment in phase two (stripping and additional infrastructure development), which is also on track, will allow mining to move into a new area of the ore body for a further six years. Both phases will continue to generate attractive returns for Kennecott.

At our Resolution Copper project in Arizona, the shaft 9 remediation and sinking project was completed in November, four months ahead of schedule and within budget. On 15 January 2021, we entered the next phase of public comment in the ongoing permitting process, led by the US Forest Service, with the release of its independently prepared Final Environmental Impact Statement (EIS). The delay in publication of the Final EIS, which was originally scheduled for July 2020 by the Obama Administration, is a result of extensive public consultation, significant interagency coordination and COVID-19 related changes to the pace of work. We are committed to ongoing stakeholder

engagement in our effort to seek consent to progress the project consistent with the International Council on Mining and Metals Statement on Indigenous Peoples and Mining.

At the 100% owned Winu copper-gold project in the Paterson Province of Western Australia, we disclosed the maiden Inferred Mineral Resource in July and revealed the discovery of a new zone of gold-dominant mineralisation approximately two kilometres east of the Winu deposit. The Inferred Mineral Resource, reported at a 0.2% copper equivalent cut-off, is 503 million tonnes at 0.45% copper equivalent (CuEq). This includes a higher grade component of 188 million tonnes at 0.68% CuEq at a cut-off grade of 0.45% CuEq.⁵ Drilling and fieldwork activities continue, with 90 kilometres of drilling completed in 2020. We are actively engaging with the Traditional Owners through on-country heritage surveys, monitoring and agreement making, which is expected to continue into 2021, with first ore now expected in 2024, subject to regulatory approvals, Traditional Owner and other consents and COVID-19 restrictions.

Markets

Copper prices fell to a low of 209 US cents per pound in March 2020 as COVID-19 severely impacted demand. The price rebound was led by recovering Chinese demand and supply tightness due to reduced scrap availability and mined supply disruptions. Chinese inventories subsequently reached their lowest level in over eight years and LME stocks fell to their lowest in 15 years. Prices reached a 7-year high of 361 US cents per pound in December 2020, over 70% higher than the low earlier in the year, as net-long investor positions (on COMEX and LME) reached the equivalent of 2 million tonnes. However, the rate of recovery in growth is slowing in many economies and the rise of renewed lockdowns threatens the recovery.

Policy direction in the medium-term indicates a strong copper-intensive outlook with the continued rise of electric vehicles, potential green stimulus packages around the world and the Chinese push for carbon neutrality by 2060.

In diamonds, a heavy decline in spending on jewellery impacted underlying demand, while lockdowns in India's manufacturing centres restricted the volume of rough diamonds purchased from miners.

1. *This estimate is at a "better than feasibility study" level of accuracy.*
2. *The definitive estimate assumes restrictions in 2021 that are no more stringent than those experienced in September 2020. Mongolia implemented further restrictions at the end of 2020 in response to a re-emergence of COVID-19. Should COVID-19 constraints be maintained at December 2020 levels, escalate further in 2021 leading to tougher restrictions, or continue beyond 2021, additional costs and schedule impacts will arise.*
3. *This production target (stated as recovered metal) for the Oyu Tolgoi underground and open pit mines was previously reported in a release to the market on 16 December 2020 (market release). All material assumptions underpinning the production target continue to apply and have not materially changed.*
4. *This Ore Reserve estimate was set out in the Market release dated 16 December 2020. The Competent Persons responsible for the information in the Market release that relates to Ore Reserves were Mr Ferrin Prince and Mr Mark Bixley who are a Member and Fellow respectively of The Australasian Institute of Mining and Metallurgy. Rio Tinto confirms that it is not aware of any new information or data that materially affects the information included in the Market release, that all material assumptions and technical parameters underpinning the estimates in the Market release continue to apply and have not materially changed, and that the form and context in which the Competent Persons' findings are presented have not been materially modified.*
5. *Refer to the release to the ASX on 28 July 2020 "Rio Tinto reveals maiden Resource at Winu and new discovery". The Competent Person responsible for the information in that release that relates to Mineral Resources and Exploration Results is Dr Julian Verbeek. Rio Tinto confirms that it is not aware of any new information or data that materially affects the information included in the market announcement, that all material assumptions and technical parameters underpinning the estimates in the market announcement continue to apply and have not materially changed, and that the form and context in which the Competent Person's findings are presented have not been materially modified.*

Energy & Minerals

2020 year end results	2020	2019	Change
Iron ore pellets and concentrates production ¹ (million tonnes - Rio Tinto share)	10.4	10.5	(1)%
Titanium dioxide slag production (000 tonnes - Rio Tinto share)	1,120	1,206	(7)%
Borates production (000 tonnes - Rio Tinto share)	480	520	(8)%
Uranium production (000 lbs - Rio Tinto share) ²	2,870	2,640	9 %
Gross product sales (US\$ millions)	5,014	5,150	(3)%
Underlying EBITDA (US\$ millions)	1,646	1,762	(7)%
Underlying EBITDA margin (product group operations)	35 %	37 %	
Underlying earnings (US\$ millions)	577	611	(6)%
Net cash generated from operating activities (US\$ millions)	1,053	1,387	(24)%
Capital expenditure (US\$ millions) ³	(428)	(551)	(22)%
Free cash flow (US\$ millions)	604	817	(26)%
Return on capital employed ⁴	12 %	15 %	

1. Iron Ore Company of Canada and the Simandou iron ore project in Guinea continue to be reported within Energy & Minerals.
2. To allow production numbers to be compared on a like-for-like basis, we have excluded production from asset divestments completed in 2019 from our share of prior year production data. The financial data above includes the results of divested assets up to the date of sale. In February 2020, our interest in Energy Resources of Australia (ERA) increased from 68.4% to 86.3% as a result of new ERA shares issued to Rio Tinto under the Entitlement Offer and Underwriting Agreement to raise funds for the rehabilitation of the Ranger Project Area. Production is reported including this change from 1 March 2020.
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. Return on capital employed (ROCE) is defined as underlying earnings excluding net interest divided by average capital employed (operating assets).

Financial performance

The business was flexible and resilient from an operational perspective, while fully complying with significant government-imposed COVID-19 restrictions, notably in Canada, the US and South Africa. At Iron Ore Company of Canada (IOC), we took advantage of stronger market conditions in Asia in the first half of the year and switched our product mix, prioritising concentrate over pellets, and then returned to higher pellet production as European demand recovered.

Underlying EBITDA of \$1.6 billion was 7% lower than 2019 with IOC shipping 8% higher volumes and benefiting from stronger pricing, while Minerals (titanium dioxide feedstocks and borates) were impacted by COVID-19 restrictions and weaker market conditions.

We progressed our evaluation studies with funding approved for the Jadar lithium-borate feasibility study and activity starting at the mine area of the Simandou iron ore project.

We generated net cash of \$1.1 billion from our operating activities, a 24% decline on 2019, driven by the same trends as underlying EBITDA and the timing of tax payments from higher profits at IOC in 2019, with the final payments made in 2020. Free cash flow of \$0.6 billion reflected tight control of capital expenditure, down 22% on 2019.

Review of operations

Uranium

Our share of uranium production was 9% higher than 2019, primarily due to the change in our shareholding (from 68.4% to 86.3%) following completion of ERA's entitlement offer in February 2020. ERA's Ranger operation continued to process existing stockpiles uninterrupted in 2020, with production ceasing on 8 January 2021.

Iron Ore Company of Canada (IOC)

Production of pellets and concentrate at IOC was 1% lower than 2019 due to unplanned maintenance at the processing facilities in the third and fourth quarters.

Minerals

Titanium dioxide slag production of 1.1 million tonnes was 7% lower than 2019 due to COVID-19 restrictions in Quebec and South Africa, lower market demand and operational disruptions at Richards Bay Minerals (RBM). With the COVID-19 resurgence in Quebec and South Africa, we continue to operate our assets with extensive measures in place to ensure the safety of our employees and communities.

Borates production was 8% lower than 2019 due to a period of lower demand related to COVID-19 uncertainty resulting in an adjustment to refinery operating rates. The extension of a planned shutdown impacted fourth quarter production.

New projects and growth options

The \$463 million Zulti South construction project at RBM remains on full suspension. We will assess a restart after normalisation of operations.

At the 100%-owned Jadar lithium-borate project in western Serbia, we progressed to the feasibility study stage, following Board approval of almost \$200 million, with the studies expected to be complete by the end of 2021. If the investment is approved, construction would take approximately four years. In December, we [disclosed](#) a maiden Ore Reserve and updated Mineral Resource. The Ore Reserve is 16.6 million tonnes at 1.81% Li₂O and 13.4% B₂O₃.¹ Jadar would be capable of producing approximately 55 thousand tonnes of battery-grade lithium carbonate, as well as 160 thousand tonnes of boric acid (B₂O₃ units) and 255 thousand tonnes of sodium sulphate as by-products per annum.² Due to the different reporting system used in Serbia, Jadar also submitted its "Elaborate of Resources and Reserves" to the Serbian Mining Ministry in the fourth quarter of 2020. This document was approved, and the respective Certificate was received on 6 January 2021. The adoption of "Elaborate of Resources and Reserves" allowed the project to then immediately submit the application for exploitation field licence which provides tenure for the deposit. In accordance with Serbian regulations, this permit is expected within the coming months.

At the Simandou iron ore project³ in Guinea, we expect to complete the first phase of the technical optimisation work on the infrastructure components in the first half of 2021. Activity in the mine area is starting including roadworks. We are making progress with implementation of the project's Social and Environmental Impact Assessment.

Markets

Due to robust demand and global supply constraints, the market for iron ore concentrate and pellets was strong throughout the year. This is expected to continue into 2021 as more steel producers requiring high-grade, low impurity pellets increase production and global supply constraints persist.

Underlying demand for titanium dioxide pigment fell sharply in the second quarter of 2020 leading to a deterioration of feedstock demand by the middle of 2020. Leading indicators suggest a recovery in 2021. Structural factors remain favourable for high-grade titanium dioxide feedstock and zircon supply.

Medium to long-term demand for borates is tied to increases in wealth and living standards but is prone to short-term shocks, as witnessed in 2020. A decline in demand impacted all regions globally and coincided with a reduction in supply volumes. A moderate recovery is expected in 2021.

- For personal use only
1. *This Ore Reserve estimate was set out in a release to the ASX dated 10 December 2020 "Rio Tinto declares maiden Ore Reserve at Jadar" (ASX release). The Competent Person responsible for the information in the ASX release that relates to Ore Reserves is Mr Allan Earl who is a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM). Mr Earl's assessment is supported from a metallurgical perspective by Mr Gary Davis who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM). Rio Tinto confirms that it is not aware of any new information or data that materially affects the information included in the ASX release, that all material assumptions and technical parameters underpinning the estimates in the ASX release continue to apply and have not materially changed, and that the form and context in which the Competent Persons' findings are presented have not been materially modified.*
 2. *These production targets were previously reported in the ASX release on 10 December 2020. All material assumptions underpinning the production targets continue to apply and have not materially changed.*
 3. *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.*

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 2020	US\$ million impact on full year 2020 underlying EBITDA of a 10% change in prices/exchange rates
Aluminium - US per tonne	1,702	577
Copper - US cents per pound	281	370
Gold - US\$ per troy ounce	1,770	62
Iron ore realised price (62% Fe CFR freight-adjusted) - US\$ per dry metric tonne	98.9	2,318
Australian dollar against the US dollar	0.69	617
Canadian dollar against the US dollar	0.75	201
Oil (Brent) - US per barrel	\$42/bbl	85

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 \$1,162 per tonne in 2020:

	US\$/t
Alumina (FOB)	191
Green petroleum coke (FOB)	27
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 2021	Status/Milestones
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 region of Western Australia to sustain production capacity.	\$0.8bn (RT share)	\$0.3bn (RT share)	Approved in October 2018, the investments will enable us to sustain production of our Pilbara Blend™ and Robe Valley products. All approvals have been received. Construction activities are progressing to plan with first ore expected in 2021.
Investment in Gudai-Darri (formerly Koodaideri), a new production hub in the Pilbara region of Western Australia, to sustain existing production in our iron ore system.	\$2.6bn	\$1.1bn	Approved in November 2018, the investment incorporates a processing plant and infrastructure including a 166-kilometre rail line connecting the mine to our existing network. Key construction activities are on schedule and we expect production to ramp up in 2022. Once complete, the mine will have an initial annual capacity of 43 million tonnes.
Investment in the Greater Tom Price operations (Western Turner Syncline phase 2) to sustain production capacity.	\$0.8bn	\$0.4bn	Approved in November 2019, the investment will facilitate mining of existing and new deposits. It includes construction of a new crusher and a 13-kilometre conveyor. First ore from the crusher is expected in 2021.
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.	\$0.6bn	\$0.3bn	The project was approved in 2017, with \$155 million of additional capital approved in 2020. It was impacted by the departure of the main contractor in the first half of 2020. Tunnel excavation works restarted in September. However, due to the escalation of COVID-19 in the province, tunnel excavation works have been interrupted. We expect to restart late in the first quarter of 2021.

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 2021	Status/Milestones
Ongoing and approved			
Copper & Diamonds			
Investment in the south wall pushback, to extend mine life at Kennecott, Utah, US, from 2019 to 2026.	\$0.9bn	\$0.3bn	Funding for the continuation of open pit mining via the push back of the south wall: the project largely consists of simple mine stripping activities.
Phase two of the south wall pushback to extend mine life at Kennecott by a further six years.	\$1.5bn	\$1.4bn	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 480,000 tonnes ¹ of copper per year on average from 2028 to 2036 (open pit and underground), compared with 149,600 tonnes in 2020 (open pit).	\$6.75bn ²	\$2.5bn	The project was originally approved in May 2016 for \$5.3bn, with an additional \$1.45 billion approval by the Rio Tinto Board in December 2020, following completion of the definitive estimate. Sustainable production for Panel 0 is expected to be achieved by October 2022. ²
Energy & Minerals			
Development of the Zulti South project at Richards Bay Minerals (RBM) in South Africa (Rio Tinto 74%), to sustain current capacity and extend mine life.	\$0.5bn	\$0.3bn	Approved in April 2019, the investment will underpin RBM's supply of zircon and ilmenite over the life of the mine. Construction remains on full suspension, pending normalisation of operations.

1. This production target (stated as recovered metal) for the Oyu Tolgoi underground and open pit mines was previously reported in a release to the market on 16 December 2020 (market release). All material assumptions underpinning the production target continue to apply and have not materially changed.
2. These estimates include the known impacts of COVID-19. The definitive estimate assumes restrictions in 2021 that are no more stringent than those experienced in September 2020. Mongolia implemented further restrictions at the end of 2020 in response to a re-emergence of COVID-19. Should COVID-19 constraints be maintained at December 2020 levels, escalate further in 2021 leading to tougher restrictions, or continue beyond 2021, additional costs and schedule impacts will arise.

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 2020

This preliminary announcement contains financial information which has been extracted from the latest financial statements, which are in the process of being 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 in accordance with International Financial Reporting Standards as adopted for use in the European Union ('EU IFRS') and an Order under section 340 of the Australian Corporations Act 2001 issued by the Australian Securities and Investments Commission on 24 July 2020.

The report should be read in conjunction with the Rio Tinto annual report and financial statements for 2019 and the financial information for the six months ended 30 June 2020 published on 29 July 2020.

Results for announcement to the market

		US\$ millions
Consolidated sales revenue	up 3.3%	to 44,611
Net earnings attributable to members	up 22.0%	to 9,769
Underlying earnings attributable to members	up 20.0%	to 12,448
		US cents
Dividends	Amount per share	Franked amount per share
Final dividend	309.00	309.00 (at 30%)
Special dividend	93.00	93.00 (at 30%)
Interim dividend	155.00	155.00 (at 30%)
Interim Special dividend	-	- (at 30%)
		Australian cents
Dividends	Amount per share	Franked amount per share
Final dividend	397.48	397.48 (at 30%)
Special dividend	119.63	119.63 (at 30%)
Interim dividend	216.47	216.47 (at 30%)
Interim Special dividend	-	- (at 30%)
<p>Registrable transfers received by the company up to 5 p.m. (or 7 p.m. in respect of holdings on the CHESSE subregister) on 5 March 2021 will be registered before entitlements to the final and special dividends are determined.</p> <p>A definition of underlying earnings is given on page 77 of the financial information, which accompanies this document.</p> <p>The 2021 annual general meeting of Rio Tinto Limited will be held on Thursday, 6 May 2021.</p>		
 		
Tim Paine, Joint Company Secretary 17 February 2021		Steve Allen, Joint Company Secretary 17 February 2021

Group income statement

Years ended 31 December

	2020 US\$m	2019 US\$m
Consolidated operations		
Consolidated sales revenue	44,611	43,165
Net operating costs (excluding items shown separately)	(26,254)	(27,307)
Impairment charges ^(a)	(904)	(3,487)
Net losses on consolidation and disposal of interests in businesses	—	(291)
Exploration and evaluation costs	(625)	(624)
Profit relating to interests in undeveloped projects	1	10
Operating profit	16,829	11,466
Share of profit after tax of equity accounted units	652	301
Impairment of investments in equity accounted units	(339)	—
Profit before finance items and taxation	17,142	11,767
Finance items		
Net exchange (losses)/gains on net external and intragroup debt balances	(1,124)	58
Net losses on derivatives not qualifying for hedge accounting	(123)	(68)
Finance income	141	300
Finance costs ^(b)	(268)	(554)
Amortisation of discount	(377)	(384)
	(1,751)	(648)
Profit before taxation	15,391	11,119
Taxation^(c)	(4,991)	(4,147)
Profit after tax for the year	10,400	6,972
– attributable to owners of Rio Tinto (net earnings)	9,769	8,010
– attributable to non-controlling interests	631	(1,038)
Basic earnings per share^(d)	604.0c	491.4c
Diluted earnings per share^(d)	599.8c	487.8c

(a) Refer to Impairment charges note on pages 47 to 49.

(b) Finance costs in the income statement are net of amounts capitalised of US\$340 million (2019: US\$321 million).

(c) Refer to Taxation note on page 50.

(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 1,617.4 million (2019: 1,630.1 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 1,246.5 million (2019: 1,259.4 million) plus the average number of Rio Tinto Limited shares outstanding of 370.9 million (2019: 370.7 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 profit and loss figures used in the calculation of basic and diluted earnings per share are based on the profits and losses for the year attributable to owners of Rio Tinto.

For the purposes of calculating diluted earnings per share, the effect of dilutive securities of 11.2 million shares in 2020 (2019: 12.0 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

Rio Tinto has completed its preparation of the Group's 2020 Annual Report and Accounts. The Group has, however, been advised by its auditor, KPMG, that they have experienced delays in completing their audit procedures and are therefore not yet in a position to sign their audit report on the annual financial statements. KPMG were appointed as Group auditors during 2020 and they have faced additional challenges during their first audit from Covid-19 restrictions which have required their teams to work remotely. KPMG has confirmed to Rio Tinto that at the present time KPMG are not aware of any matters that may give rise to a modification to their audit report. Based on the latest advice from KPMG, Rio Tinto expects the 2020 full financial statements to be signed by the directors and published as part of the 2020 Annual Report and Accounts by 22 February 2021.

This preliminary announcement does not constitute the Group's full financial statements for 2020. This report is based on accounts which are in the process of being audited and will be approved by the Board and subsequently filed with the Registrar of Companies in the United Kingdom and the Australian Securities and Investments Commission. Accordingly, the financial information for 2020 is unaudited and is not statutory accounts within the meaning of Section 434 of the United Kingdom Companies Act 2006.

Unless stated otherwise, financial information for the year ended 31 December 2019 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, as filed with the Registrar of Companies.

The Auditors' reports on the full financial statements for the year ended 31 December 2019 was 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 14 December 2015.

Group statement of comprehensive income

Years ended 31 December

	2020 US\$m	2019 US\$m
Profit after tax for the year	10,400	6,972
Other comprehensive income/(loss)		
Items that will not be reclassified to profit or loss:		
Actuarial losses on post-retirement benefit plans	(474)	(262)
Changes in the fair value of equity investments held at fair value through other comprehensive income (FVOCI)	10	(5)
Tax relating to these components of other comprehensive income	112	83
Share of other comprehensive losses of equity accounted units, net of tax	(6)	(6)
	(358)	(190)
Items that have been/may be subsequently reclassified to profit or loss:		
Currency translation adjustment ^(a)	2,967	343
Currency translation on companies disposed of, transferred to the income statement	—	215
Fair value movements:		
– Cash flow hedge gains	24	12
– Cash flow hedge gains transferred to the income statement	(63)	(41)
Net change in costs of hedging	7	3
Tax relating to these components of other comprehensive loss/(income)	3	(6)
Share of other comprehensive income of equity accounted units, net of tax	4	10
Other comprehensive income for the year, net of tax	2,584	346
Total comprehensive income for the year	12,984	7,318
– attributable to owners of Rio Tinto	12,201	8,351
– attributable to non-controlling interests	783	(1,033)

(a) Excludes a currency translation gain of US\$333 million (2019: charge of US\$29 million) arising on Rio Tinto Limited's share capital for the year ended 31 December 2020, which is recognised in the Group statement of changes in equity. Refer to Group statement of changes in equity on page 40.

Group cash flow statement

Years ended 31 December

	2020 US\$m	2019 US\$m
Cash flows from consolidated operations^(a)	21,822	19,705
Dividends from equity accounted units	594	669
Cash flows from operations	22,416	20,374
Net interest paid	(569)	(537)
Dividends paid to holders of non-controlling interests in subsidiaries	(683)	(376)
Tax paid	(5,289)	(4,549)
Net cash generated from operating activities	15,875	14,912
Cash flows from investing activities		
Purchases of property, plant and equipment and intangible assets ^(b)	(6,189)	(5,488)
Disposals of subsidiaries, joint ventures, unincorporated joint operations, and associates	10	(80)
Purchases of financial assets ^(c)	(5)	(43)
Sales of financial assets ^(c)	63	83
Sales of property, plant and equipment and intangible assets	45	49
Net funding of equity accounted units	(43)	(33)
Other investing cash flows ^(d)	(437)	11
Net cash used in investing activities	(6,556)	(5,501)
Cash flows before financing activities	9,319	9,411
Cash flows from financing activities		
Equity dividends paid to owners of Rio Tinto	(6,132)	(10,334)
Proceeds from additional borrowings	125	80
Repayment of borrowings and associated derivatives ^(e)	(721)	(203)
Lease principal payments	(324)	(315)
Proceeds from issue of equity to non-controlling interests	129	101
Own shares purchased from owners of Rio Tinto	(208)	(1,552)
Other financing cash flows	1	4
Net cash flows used in financing activities	(7,130)	(12,219)
Effects of exchange rates on cash and cash equivalents	165	(54)
Net increase/(decrease) in cash and cash equivalents	2,354	(2,862)
Opening cash and cash equivalents less overdrafts	8,027	10,889
Closing cash and cash equivalents less overdrafts	10,381	8,027
(a) Cash flows from consolidated operations		
Profit after tax for the year	10,400	6,972
Adjustments for:		
– Taxation	4,991	4,147
– Finance items	1,751	648
– Share of profit after tax of equity accounted units	(652)	(301)
– Net losses on consolidation and disposal of interests in businesses	—	291
– Impairment charges of investments in equity accounted units after tax	339	—
– Impairment charges	904	3,487
– Depreciation and amortisation	4,279	4,384
– Provisions (including exchange differences on provisions)	894	753
Utilisation of provisions	(582)	(539)
Utilisation of provision for post-retirement benefits	(192)	(205)
Change in inventories	(281)	28
Change in receivables and other assets	(562)	163
Change in trade and other payables	558	(191)
Other items	(25)	68
	21,822	19,705

Group cash flow statement (continued)

- (b) Capital expenditure includes US\$323 million (2019: US\$394 million) capitalised in accordance with IFRIC 20 "Stripping costs in the production phase of a surface mine"; a significant proportion of stripping costs capitalised relate to the Group's Copper operations.
- (c) In 2020, the Group received net proceeds of US\$58 million (2019: net purchases of US\$28 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 within "Sales of financial assets" or "Purchases of financial assets" depending on the overall net position at each reporting date.
- (d) During 2020, Energy Resources of Australia Ltd (ERA) deposited US\$299 million into a trust fund controlled by the Government of Australia. ERA is entitled to reimbursement from the fund once specific phases of rehabilitation relating to the Ranger Project are completed. The fund is outside of the scope of IFRS 9 - 'Financial Instruments' and therefore classified as an "other receivable" within 'Receivables and other assets in the balance sheet'. At 31 December 2020 the total amount held in the trust fund was US\$410 million (31 December 2019: US\$53 million).
- (e) On 11 May 2020, we repaid our €402 million (nominal value) Rio Tinto Finance plc Euro Bonds on their maturity. The cash outflow relating to the repayment of the bonds and the realised loss on the derivatives have been recognised within "Repayment of borrowings and associated derivatives" in the Group cash flow statement and totalled US\$526 million.

Group balance sheet

At 31 December

	2020 US\$m	2019 US\$m
Non-current assets		
Goodwill	946	922
Intangible assets	2,755	2,637
Property, plant and equipment	62,882	57,372
Investments in equity accounted units	3,764	3,971
Inventories	174	139
Deferred tax assets	3,385	3,102
Receivables and other assets	1,796	1,716
Tax recoverable	4	5
Other financial assets	829	635
	76,535	70,499
Current assets		
Inventories	3,917	3,463
Receivables and other assets	3,644	3,027
Tax recoverable	62	116
Other financial assets	2,851	2,670
Cash and cash equivalents	10,381	8,027
	20,855	17,303
Total assets	97,390	87,802
Current liabilities		
Borrowings and other financial liabilities	(607)	(1,372)
Trade and other payables	(7,421)	(6,480)
Tax payable	(1,850)	(1,874)
Provisions including post-retirement benefits	(1,729)	(1,399)
	(11,607)	(11,125)
Non-current liabilities		
Borrowings and other financial liabilities	(13,408)	(13,341)
Trade and other payables	(820)	(794)
Tax payable	(477)	(376)
Deferred tax liabilities	(3,239)	(3,220)
Provisions including post-retirement benefits	(15,936)	(13,704)
	(33,880)	(31,435)
Total liabilities	(45,487)	(42,560)
Net assets	51,903	45,242
Capital and reserves		
Share capital ^(a)		
– Rio Tinto plc	207	207
– Rio Tinto Limited	3,781	3,448
Share premium account	4,314	4,313
Other reserves	11,960	9,177
Retained earnings	26,792	23,387
Equity attributable to owners of Rio Tinto	47,054	40,532
Attributable to non-controlling interests	4,849	4,710
Total equity	51,903	45,242

Group balance sheet (continued)

- (a) At 31 December 2020, Rio Tinto plc had 1,246.9 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\$26.79 (31 December 2019: US\$22.81).

Group statement of changes in equity

	Attributable to owners of Rio Tinto					Non-controlling interests US\$m	Total equity US\$m
	Share capital US\$m	Share premium account US\$m	Other reserves US\$m	Retained earnings US\$m	Total 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 ^(c)	—	—	—	(1)	(1)	—	(1)
Own shares purchased from Rio Tinto shareholders to satisfy share awards to employees ^(d)	—	—	(76)	(31)	(107)	—	(107)
Change in equity interest held by Rio Tinto	—	—	—	84	84	(84)	—
Treasury shares reissued and other movements	—	1	—	—	1	—	1
Equity issued to holders of non-controlling interests	—	—	—	—	—	129	129
Employee share options and other IFRS 2 charges to the income statement	—	—	61	82	143	—	143
Closing balance	3,988	4,314	11,960	26,792	47,054	4,849	51,903

	Attributable to owners of Rio Tinto					Non-controlling interests US\$m	Total equity US\$m
	Share capital US\$m	Share premium account US\$m	Other reserves US\$m	Retained earnings US\$m	Total US\$m		
Year ended 31 December 2019							
Opening balance	3,688	4,312	8,661	27,025	43,686	6,137	49,823
Adjustment for transition to new accounting pronouncements ^(e)	—	—	—	(113)	(113)	(2)	(115)
Restated opening balance	3,688	4,312	8,661	26,912	43,573	6,135	49,708
Total comprehensive income for the year ^(a)	—	—	519	7,832	8,351	(1,033)	7,318
Currency translation arising on Rio Tinto Limited's share capital	(29)	—	—	—	(29)	—	(29)
Dividends ^(b)	—	—	—	(10,334)	(10,334)	(376)	(10,710)
Share buy-back ^(c)	(4)	—	4	(1,135)	(1,135)	—	(1,135)
Companies no longer consolidated	—	—	—	—	—	(32)	(32)
Own shares purchased from Rio Tinto shareholders to satisfy share options ^(d)	—	—	(63)	(43)	(106)	—	(106)
Change in equity interest held by Rio Tinto	—	—	—	85	85	(85)	—
Treasury shares reissued and other movements	—	1	—	—	1	—	1
Equity issued to holders of non-controlling interests	—	—	—	—	—	101	101
Employee share options and other IFRS 2 charges to the income statement	—	—	56	70	126	—	126
Closing balance	3,655	4,313	9,177	23,387	40,532	4,710	45,242

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 2020 are based on the following US cents per share amounts: 2019 final - 231.0 cents and 2020 interim – 155.0 cents (2019 dividends paid: 2018 final – 180.0 cents, 2018 special – 243.0 cents, 2019 interim – 151.0 cents and 2019 interim special dividend - 61.0 cents). Dividends declared in the announcement of the results for 2020 represent the 2020 final ordinary dividend of 309.0 cents per share (2019: 231.0 cents) and a special dividend of 93.0 cents per share.
- (c) 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 beginning of the year to cover the share buy-back programme totalled US\$208 million as reported in the cash flow statement. In 2019, the total amount of US\$1,135 million included own shares purchased from the owners of Rio Tinto as per the cash flow statement of US\$1,552 million and a financial liability recognised in respect of an irrevocable contract in place as at the reporting date to cover the share buy-back programme, less amounts paid during the year in respect of a similar irrevocable contract in place at the beginning of the year.
- (d) Net of contributions received from employees for share awards and share options.
- (e) This represents the impact to the Group of transitioning to the new accounting pronouncements; IFRS 16 'Leases' and IFRIC 23 'Uncertainty over Income Tax Treatments' on 1 January 2019

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 24 July 2020, 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) both as adopted pursuant to Regulation (EC) No 1606/2002 as it applies in the European Union (IFRSs as adopted by the EU), and which are mandatory for EU reporting as at 31 December 2020; (EU IFRS) and
- International Financial Reporting Standards as issued by the IASB and interpretations issued from time to time by the IFRS IC which are mandatory as at 31 December 2020.

The above accounting standards and interpretations are collectively referred to as "IFRS" in this report. Whilst 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. Full financial statements that comply with IFRS are in the process of being audited and will be approved by the Board and subsequently filed with the Registrar of Companies in the United Kingdom and the Australian Securities and Investments Commission.

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 2019, except for the accounting requirements set out below, all of which were effective as at 1 January 2020 without restatement of prior years.

The Group's accounting policies and critical accounting judgements have been updated to include the Group's approach to materiality upon implementation of "Definition of Material, Amendments to IAS 1 and IAS 8". The amendments do not affect the Group's approach to identifying and evaluating material transactions, or result in any change to policies and procedures for reviewing whether a disclosure or presentation is material. Information on the impact of this amendment was presented in the Group's condensed consolidated interim financial statements for the period ended 30 June 2020, and will be included in the Group's 2020 Annual Report.

The IASB revised its Conceptual Framework which is mandatory in 2020. It is not a standard and does not override any standard, but its principles apply to arrangements not covered by IFRS standards. No arrangements have been identified which require a change in accounting treatment under the revised Conceptual Framework.

The Group has adopted the definition of a Business as required by "Definition of a business - amendments to IFRS 3". Changes might result in future investment in new operations being accounted for as asset acquisitions rather than as business combinations, however no evaluation of a transaction under the amended IFRS 3 has been required in 2020.

Accounting Policies (continued)

“Interest Rate Benchmark Reform – Phase 2 (Amendments to IFRS 9, IAS 39, IFRS 7, IFRS 4 and IFRS 16)” is mandatory in 2021. The Group expects to take the Phase 2 practical reliefs from certain requirements in existing current IFRS standards relating to changes in the basis for determining contractual cash flows of financial assets, financial liabilities, lease liabilities and hedge accounting, in order to minimise accounting impacts. Based on the Group’s preliminary assessment we expect that the most significant impact on the Group’s hedging arrangements will arise from reform of US LIBOR.

The Group continues to evaluate the impact of adopting new standards and amendments mandatory in 2022 and 2023. These include “Property, Plant and Equipment: Proceeds before Intended Use (Amendments to IAS 16)”, “Onerous contracts – Costs of Fulfilling a Contract (Amendments to IAS 37)”, 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 2020 full financial statements.

COVID-19 Impact

Despite various COVID-19 related challenges, the Group’s assets have continued to operate, with our first priority being the protection of the health and safety of all our employees and communities. During the COVID-19 pandemic, the Group has implemented strict protocols globally across the business. These range from physical distancing, travel restrictions, roster changes and team splits, to flexible working arrangements, rapid screening and personal hygiene controls. The Group has delivered a good operational performance across most of our assets, catching up on planned maintenance activity in the second half of the year, particularly in iron ore, and continuing to adapt to new operating conditions as we learn to live with COVID-19. 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 cash flow forecast scenarios that represent plausible downside scenarios to the business and global economy including the effects arising from the COVID-19 pandemic for a period of at least 12 months from the date of approval of the financial statements, which have been reviewed by the directors. 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

The Group continues to develop its assessment of the potential impacts of climate change, the transition to a low-carbon future and our ambition to achieve net zero emissions across our operations by 2050.

We framed the strategic context for the Group and our internal price setting process, including carbon price assumptions, through the lens of three plausible scenarios structured around the interplay of three global forces: Realpolitik, Society and Technology.

- In Realpolitik, a fragmented world order, defined by strong nationalistic tendencies including structural tensions between the United States and China, holds back trade and global action on climate. Despite a low growth environment, global warming is on a path to reach or even exceed 3°C by 2100. Carbon prices remain low – in the range US\$0-30/tCO₂e

- In Society, strong global co-ordination of climate policies, supported by high and rising carbon prices (reaching US\$130/tCO₂e in developed countries by 2040), accelerates the energy transition. Despite stronger economic growth in low-income countries, global emissions peak and start to decline early, turning net-negative during the second half of the century, to meet the Paris goal of keeping temperature increases below 2°C.
- In Technology, the fast roll-out of innovation provides both a strong boost to global economic productivity and decarbonisation efforts. But, without adequate policy support and with carbon prices remaining modest (US\$15 to US\$30/tCO₂e by 2030) the decline in global emissions is insufficient to keep temperature increases below 2°C by 2100.

Through our strategy process we test the resilience of our portfolio against each of these three scenarios. Overall, our portfolio is expected to perform more strongly in scenarios with proactive climate action, however we have not yet assessed the complete financial reporting consequences of a single Paris aligned scenario (more details on our portfolio scenario analysis can be found in our 2020 Climate Change report).

The scenarios also inform the internal price setting process led by our Economics team. Those prices (including carbon) 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 the scenarios is aligned with the goals of the Paris Agreement, our internal carbon prices are not consistent with the expectation of climate policies required to accelerate the global transition to meet those goals.

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 71 to 76 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, as defined in the accounting policies section of this report, 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\$374 million at 31 December 2020 (2019: US\$379 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)	2020 %	2019 %	2020 US\$m	2019 US\$m
China	58.1	51.3	25,940	22,135
Asia (excluding China and Japan)	10.2	10.6	4,536	4,558
United States of America	10.9	14.2	4,867	6,125
Japan	7.5	8.9	3,354	3,855
Europe (excluding UK)	5.9	6.0	2,623	2,610
Canada	2.9	3.3	1,289	1,478
Australia	1.7	1.7	745	737
UK	0.5	0.6	242	248
Other countries	2.3	3.4	1,015	1,419
Consolidated sales revenue	100	100	44,611	43,165

(a) Consolidated sales revenue by geographical destination is based on the ultimate country of destination of the product, if known. If the eventual destination of the product sold through traders is not known then revenue is allocated to the location of the product at the time when control is transferred. Rio Tinto is domiciled in both the UK and Australia.

Product analysis (by revenue type)

	Revenue from contracts with customers 2020 US\$m	Other revenue ^(a) 2020 US\$m	Consolidated sales revenue 2020 US\$m	Revenue from contracts with customers 2019 US\$m	Other revenue ^(a) 2019 US\$m	Consolidated sales revenue 2019 US\$m
Iron ore	28,202	1,000	29,202	25,516	229	25,745
Aluminium, Alumina and Bauxite	9,092	54	9,146	10,207	(32)	10,175
Copper	1,721	64	1,785	2,030	(7)	2,023
Industrial minerals	2,054	(3)	2,051	2,251	(12)	2,239
Gold	471	6	477	667	2	669
Diamonds	459	—	459	619	—	619
Uranium ^(b)	299	—	299	375	—	375
Other ^(b)	1,194	(2)	1,192	1,322	(2)	1,320
Consolidated sales revenue	43,492	1,119	44,611	42,987	178	43,165
Share of equity accounted unit sales and intra-subsiary/equity accounted unit sales			2,407			2,202
Gross product sales			47,018			45,367

(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) Uranium sales revenues were previously included within "Other". These sales revenues are now presented separately and the 2019 comparatives have been adjusted to ensure comparability.

Impairment charges

	Pre-tax amount 2020 US\$m	Taxation 2020 US\$m	Non- controlling interest 2020 US\$m	Net amount 2020 US\$m	Pre-tax amount 2019 US\$m
Aluminium – Pacific Aluminium	(489)	17	—	(472)	—
Aluminium – Sohar	(220)	—	—	(220)	—
Aluminium – ISAL	(93)	(38)	—	(131)	(109)
Copper & Diamonds – Diavik	(441)	149	—	(292)	—
Copper & Diamonds – Oyu Tolgoi	—	—	—	—	(2,240)
Aluminium - Yarwun alumina refinery	—	—	—	—	(1,138)
Total impairment charge	(1,243)	128	—	(1,115)	(3,487)
Comprising:					
Impairment charges of consolidated balances				(904)	(3,487)
Impairment charges related to EAUs (pre-tax)				(368)	—
Total impairment charges in the financial information by business unit (page 67)				(1,272)	(3,487)
Taxation (including related to EAUs)				157	323
Non-controlling interests				—	1,506
Total impairment in the income statement				(1,115)	(1,658)

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 cash-generating unit (CGU) was negative and therefore the non-current assets of the smelter were fully impaired. On 14 January 2021 a new agreement was reached with Meridian Energy in relation to power prices, allowing NZAS to continue operating the Tiwai Point aluminium smelter until December 2024. The extension allows time for detailed closure studies to be completed and for NZAS to support the government and Southland community in planning for the future. We have evaluated and concluded that these updated circumstances are not a trigger for impairment reversal.

The high operating costs and challenging outlook for the aluminium industry have 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. Bell Bay has a power contract to 2025 with Hydro Tasmania and with the current market context the forecast net present value of cash flows over that period was negative. 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.

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.

Impairment charges (continued)

Aluminium – ISAL smelter, Iceland

In 2019, the non-current assets of the ISAL CGU no longer met the accounting criteria to be classified as assets held for sale. Accordingly these non-current assets were tested for impairment. We calculated the recoverable amount for the CGUs based on the IAS 36 value-in-use methodology by reference to the net present value of post-tax cash flows expressed in real terms and discounted at 6.9%. These were US\$302 million for the CGU comprising ISAL and Aluchemie and US\$46 million for Alufluor. This resulted in a pre-tax impairment charge of US\$109 million allocated to property, plant and equipment and intangibles in the ISAL and Aluchemie CGU.

In February 2020 we announced a strategic review of the ISAL smelter in Iceland and the challenging market conditions were identified as an impairment trigger. The net present value of cash flows projected over the remaining life for this CGU did not support retaining any carrying value for the non-current assets of the CGU, which were fully impaired following a pre-tax impairment charge of US\$204 million in the first half of 2020.

During subsequent negotiations Landsvirkjun tabled an improved offer for power delivery, restoring the competitiveness of the smelter over its remaining life. We have concluded these updated circumstances, represent an indicator of partial impairment reversal. When combined with improved pricing since the half year we have calculated a recoverable amount of US\$139 million based on the IAS 36 fair value less cost of disposal (FVLCD) methodology, discounted using a post-tax discount rate of 6.6% expressed in real terms. As a result we have reversed previously recorded pre-tax impairment of US\$111 million reflected as an adjustment to the impairment charge recognised in the first half of 2020.

Copper & Diamonds – Diavik, Canada

The COVID-19 pandemic has significantly disrupted the global demand for diamonds with many countries restricting the movement of citizens and closing retail outlets. Our 40% joint venture partner at the Diavik diamond mine filed for creditor protection in April 2020 and has since defaulted on its cash calls. Together 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 for the property, plant and equipment and intangible assets of the CGU, which have therefore been fully impaired.

Copper & Diamonds – Oyu Tolgoi, Mongolia

On 16 July 2019 we announced that the first sustainable production from the Oyu Tolgoi underground project could be delayed by 16 to 30 months compared with the original feasibility study guidance in 2016. We also announced that development capital spend for the project may increase by between US\$1.2 billion and US\$1.9 billion in excess of the US\$5.3 billion previously disclosed.

We identified these matters as an impairment trigger and prepared an assessment of the recoverable amount for the CGU at 30 June 2019 using a FVLCD model, as prescribed by IAS 36 “Impairment of Assets”.

In arriving at a recoverable amount, as at 30 June 2019, we estimated post-tax cash flows expressed in real terms over the current life of mine plus anticipated future expansions, utilising mineral resources. The mineral resources incorporate almost two billion tonnes of ore, which contributes approximately 20% to the total recoverable amount. We discounted the cash flows using a post-tax discount rate of 8.3% expressed in real terms. Due to the inputs used, the recoverable amount of the Oyu Tolgoi CGU was classified as level 3 under the fair value hierarchy.

Impairment charges (continued)

At 30 June 2019 we determined the recoverable amount to be US\$8.3 billion on a post-tax basis which resulted in a pre-tax impairment charge of US\$2.2 billion (100% basis). This was allocated to mining properties and the underground development assets under construction. The net adjustment to tax represented an increase to deferred tax assets of US\$320 million for the temporary difference corresponding to the impairment and a decrease in deferred tax assets of US\$359 million for tax losses that were expected to expire without utilisation.

Since June 2019, the carrying value of Oyu Tolgoi on the same basis has increased to US\$10.1 billion (100% basis), mainly due to capital expenditure completed in the interim. The execution of this capital expenditure also results in a corresponding increase in the value of the asset over this period. Prior to completion of the underground project, the net present value of cash flows also increases by approximately US\$1.1 billion per annum due to unwinding of the discount for the time value of money. Such valuation increases are not indicative of impairment reversal.

On 16 December 2020 we confirmed the completion of the Definitive Estimate and selection of a preferred development option for the Oyu Tolgoi underground project. Development capital assumptions of US\$6.75 billion and forecast sustainable production by October 2022 incorporate the impacts of COVID-19. The latest information is within the range of assumptions used to calculate the CGU's recoverable amount in the most recent impairment test, described above, and is not indicative of an impairment loss. The next major milestone for the project development is the undercut, scheduled for mid-2021, which initiates the caving process. Study work also continues on the Panel 1 and Panel 2 sections of the underground, with initial recommendations expected mid-2021. These studies will also consider options and associated costs to recover the copper and gold contained within the pillars added to the mine design of Panel 0.

On 4 January 2021, the Government of Mongolia advised Rio Tinto that they were dissatisfied with the results of the Definitive Estimate and the funding implications for the sharing of economic benefits between the shareholders of Oyu Tolgoi LLC. The Government has also stressed the importance of achieving a comprehensive solution which addresses the social issues of importance to Mongolia, such as water usage and the tax matters which have been referred to International Arbitration. We are engaging with the Government in relation to the definitive estimate and are in active discussions with them to address and close all outstanding issues and increase the project's benefit to all stakeholders. Should future negotiations with the Government of Mongolia result in changes to the operating cash profile of the assets, an impairment test may be necessary.

Aluminium – Yarwun alumina refinery

In 2019, our annual impairment assessment of the Yarwun CGU resulted in a pre-tax impairment charge of US\$1,138 million to property, plant and equipment as a result of this CGU being assessed on a stand-alone basis for the first time and a 30 per cent year-on-year reduction in the spot price of alumina to US\$275/t at 31 December 2019.

In 2020, we continued to monitor the Yarwun CGU closely for additional indicators of impairment given the limited headroom as a consequence of previous impairment, together with the sensitivity of the valuation to movements in the alumina price and headwinds faced by the aluminium sector since the onset of the COVID-19 pandemic.

We have considered the impact of recent volatility in the alumina spot price through 2020, noting its recovery from a low of US\$226/t in June 2020 to over US\$300/t by the end of the year, as well as valuation upside attributable to a reduction in input costs over the period under review. No impairment triggers have been identified in 2020 and the carrying value remains supportable.

Prima facie tax reconciliations

Years ended 31 December

	2020 US\$m	2019 US\$m
Profit before taxation	15,391	11,119
Deduct: share of profit after tax of equity accounted units^(a)	(652)	(301)
Add: impairment after tax of investments in equity accounted units ^(a)	339	—
Parent companies' and subsidiaries' profit before tax	15,078	10,818
Prima facie tax payable at UK rate of 19% (2019:19%)	2,865	2,055
Higher rate of taxation on Australian underlying earnings	1,779	1,495
Impact of items excluded in arriving at underlying earnings ^(b) :		
– Impairment charges ^(c)	44	340
– Net gains and losses on consolidation and disposal of interests in businesses	—	55
– Exchange and gains/losses on derivatives	260	(22)
– Losses from increases to closure estimates (non-operating and fully impaired sites)	(24)	—
– Other exclusions	—	38
Impact of changes in tax rates and laws	—	1
Other tax rates applicable outside the UK and Australia on underlying earnings	(80)	(110)
Resource depletion and other depreciation allowances	(34)	(57)
Recognition of previously unrecognised deferred tax assets ^(d)	(182)	—
Write-down of previously recognised deferred tax assets ^(e)	173	42
Amounts under/(over) provided in prior years	9	83
Other items ^(f)	181	227
Total taxation charge^(a)	4,991	4,147

(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\$363 million (2019: US\$190 million). Impairment after tax of investments in equity accounted units is net of tax credits of US\$29 million (2019: US\$nil).

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

(c) 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. In the comparative period to 31 December 2019, the tax impact of impairment includes the write down of deferred tax in respect of prior year tax losses in Mongolia and recognition of deferred tax on impaired assets. Refer to the Impairment charges note on page 47 to 49.

(d) 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.

(e) Write down of previously recognised deferred tax assets relates primarily to the partial de-recognition of deferred tax assets in our Australian Aluminium business.

(f) 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 (debt)/cash

	Financing liabilities			Other assets		
	Borrowings excluding overdrafts ^(a) US\$m	Lease liabilities ^(b) US\$m	Debt-related derivatives (included in Other financial assets/liabilities) ^(c) US\$m	Cash and cash equivalents ^(d) US\$m	Other investments ^(e) 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)

	Financing liabilities			Other assets		
	Borrowings excluding overdrafts ^(a) US\$m	Lease liabilities ^(b) US\$m	Debt-related derivatives (included in Other financial assets/liabilities) ^(c) US\$m	Cash and cash equivalents ^(d) US\$m	Other investments ^(e) US\$m	Net (debt)/cash US\$m
Year ended 31 December 2019						
Analysis of changes in consolidated net (debt)/cash						
Opening balance	(12,707)	(44)	(288)	10,772	2,522	255
Adjustment for transition to new accounting standard ^(f)	—	(1,248)	—	—	—	(1,248)
Foreign exchange adjustment	(5)	(9)	3	(54)	—	(65)
Cash movements excluding exchange movements	123	315	—	(2,808)	28	(2,342)
Other non-cash movements	(217)	(323)	138	117	34	(251)
Closing balance	(12,806)	(1,309)	(147)	8,027	2,584	(3,651)

(a) Borrowings excluding overdrafts and including lease liabilities at 31 December 2020 of US\$13,831 million (2019: US\$14,115 million) differ from total borrowings and other financial liabilities of US\$14,015 million (2019: US\$14,713 million) on the balance sheet as they exclude other current financial liabilities of US\$23 million (31 December 2019: US\$350 million) and other non-current financial liabilities of US\$161 million (31 December 2019: US\$248 million).

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

Consolidated net (debt)/cash (continued)

- (c) Included within "Debt-related derivatives" are interest rate and cross currency interest rate swaps that are in hedge relationships with the Group's debt.
- (d) Other non-cash movements in the year ended 31 December 2019 of US\$117 million represents the elimination of cash movements during the year in respect of assets held for sale which are included in the cash flow statement.
- (e) Other investments comprise US\$2,538 million (2019: US\$2,584 million) of highly liquid financial assets held in managed investment funds classified as held for trading.
- (f) The impact of the transition to new accounting pronouncement IFRS 16 "Leases" on 1 January 2019.

Provisions and post-retirement benefits

	Pensions and post-retirement healthcare US\$m	Other employee entitlements ^(a) US\$m	Close-down and restoration/environmental ^(b) US\$m	Other US\$m	Total 2020 US\$m	Total 2019 US\$m
At 1 January	2,714	354	11,090	945	15,103	13,608
Adjustment to opening balance on transition to new accounting standard ^(c)	—	—	—	—	—	(66)
Restated opening balance	2,714	354	11,090	945	15,103	13,542
Adjustment on currency translation	83	34	736	37	890	65
Adjustments to mining properties/right of use assets:						
– increases to existing and new provisions	—	—	130	11	141	840
– change in discount rate	—	—	816	—	816	—
Charged/(credited) to profit:						
– increases to existing and new provisions	200	127	562	185	1,074	850
– change in discount rate	—	—	138	2	140	—
– unused amounts reversed	—	(19)	(123)	(157)	(299)	(100)
– exchange losses on provisions	—	—	(21)	(1)	(22)	3
– amortisation of discount	—	—	373	4	377	387
Utilised in year	(192)	(77)	(366)	(139)	(774)	(744)
Actuarial losses recognised in equity	250	—	—	—	250	235
Transfers and other movements	—	—	—	(31)	(31)	25
At 31 December	3,055	419	13,335	856	17,665	15,103
Balance sheet analysis:						
Current	70	327	777	555	1,729	1,399
Non-current	2,985	92	12,558	301	15,936	13,704
Total	3,055	419	13,335	856	17,665	15,103

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

	<1yr US\$m	1-3 yrs US\$m	3-5 yrs US\$m	> 5 yrs US\$m	Total US\$m
Undiscounted close-down and environmental restoration cash flows					
At 31 December 2020	776	1,203	1,433	13,988	17,400
At 31 December 2019	541	955	1,100	13,470	16,066

(a) The provision for other employee entitlements includes a provision for long service leave of US\$283 million (2019: US\$248 million), based on the relevant entitlements in certain Group operations and includes US\$62 million (2019: US\$30 million) of provision for redundancy and severance payments.

Provisions and post-retirement benefits (continued)

(b) 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 and restoration/environmental expenditure include amounts relating to environmental clean-up of US\$468 million (2019: US\$382 million) expected to take place between one and five years from the balance sheet date, and US\$937 million (2019: US\$883 million) expected to take place later than five years after the balance sheet date. Close-down and restoration/environmental liabilities at 31 December 2020 have not been adjusted for closure related receivables amounting to US\$574 million (31 December 2019: US\$166 million) due from the ERA trust fund, the co-owners of the Diavik Joint Venture and other financial assets held for the purposes of meeting closure obligations.

(c) Impact of the transition to new accounting pronouncement IFRS 16 "Leases" on 1 January 2019.

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

As at 31 December	2020 US\$m	2019 US\$m
Undiscounted close-down and environmental restoration obligations	17,400	16,066
Impact of discounting	(4,065)	(4,976)
Present closure obligation	13,335	11,090
Attributable to:		
Operating sites	10,736	9,255
Non-operating sites	2,599	1,835
Total	13,335	11,090

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 17 years (2019: 18 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\$13,335 million (2019: US\$11,090 million) for close-down and restoration costs and environmental clean-up obligations are based on risk-adjusted cash flows. The Group completed a review of the discount rate used to present value the obligations on 30 September 2020 and updated it to a real-rate of 1.5%, applied prospectively from that date. 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 2020 was 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 was increased to 3.0% then the provision would be US\$2.6 billion lower, of which approximately US\$2.4 billion would result in a decrease within "Property, plant and equipment" at operating sites and US\$0.2 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	2020 US\$m	2019 US\$m
Decommissioning, decontamination and demolition	3,131	2,066
Closure and rehabilitation earthworks ^(a)	4,223	3,889
Long-term water management costs ^(b)	966	920
Post closure monitoring and maintenance	1,318	855
Indirect costs, owners' costs and contingency ^(c)	3,697	3,360
Total	13,335	11,090

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; these could reduce if this power is sourced from 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	2020 US\$m	2019 US\$m
Australia	7,076	5,610
USA	3,819	3,377
Canada	1,482	1,267
Rest of World	958	836
Total	13,335	11,090

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 2020 and 31 December 2019. 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 2020		31 December 2019	
	Carrying value US\$m	Fair value US\$m	Carrying value US\$m	Fair value US\$m
Borrowings	12,653	15,076	12,806	14,678

Total borrowings with a carrying value of US\$7.6 billion (2019: US\$7.7 billion) relate to listed bonds with a fair value of US\$9.5 billion (2019: US\$9.1 billion) and are categorised as level 1 in the fair value hierarchy.

Borrowings with a carrying value of US\$4.2 billion (2019: US\$4.2 billion) relate to project finance drawn down by Oyu Tolgoi, with a fair value of US\$4.7 billion (2019: 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.

Financial Instruments disclosures (continued)

New interest rate swaps and debt maturity

During 2020, we entered into US\$1.5 billion of interest rate swaps to convert the remaining fixed Alcan debt to floating interest rates. This is in accordance with our floating interest rate policy. We have put these swaps into fair value hedge relationships with the respective tranches of debt.

The main sources of ineffectiveness of the fair value hedges include changes in the timing of the cash flows of the hedging instrument compared to the underlying hedged item, and changes in the credit risk of parties to the hedging relationships. The changes in fair value of the bonds and the swaps as well as the ineffectiveness recorded in the income statement is not material to the Group.

The fair value of interest rate and cross currency interest rate swaps at 31 December 2020 was US\$388 million (2019: US\$151 million) asset and US\$140 million (2019: US\$298 million) liability, respectively. These are included within "Other financial assets" and "Other financial liabilities" in the balance sheet.

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 US\$m	Weighted average interest rate after swaps	Swap maturity	Carrying value 2020 US\$m	Carrying value 2019 US\$m
Rio Tinto Finance plc Euro Bonds 2.0% due 2020 ^(a)	526	3 month LIBOR +1.35%	2020	—	455
Rio Tinto Finance plc Euro Bonds 2.875% due 2024	546	3 month LIBOR +1.64%	2024	555	508
Rio Tinto Finance (USA) Limited Bonds 3.75% 2025	1,200	3 month LIBOR +1.39%	2025	1,299	1,229
Rio Tinto Finance (USA) Limited Bonds 7.125% 2028	750	3 month LIBOR +3.27%	2028	1,005	958
Alcan Inc. Debentures 7.25% due 2028	100	3 month LIBOR +5.43%	2024	109	104
Rio Tinto Finance plc Sterling Bonds 4.0% due 2029	807	3 month LIBOR +2.65%	2024	717	647
Alcan Inc. US\$400m Debentures 7.25% due 2031 ^(b)	400	3 month LIBOR +5.72%	2025	438	—
Alcan Inc. US\$750m Global Notes 6.125% due 2033 ^(b)	750	3 month LIBOR +5.67%	2025	744	—
Alcan Inc. US\$300m Global Notes 5.75% due 2035 ^(b)	300	3 month LIBOR +5.18%	2025	292	—
Rio Tinto Finance (USA) Limited Bonds 5.2% 2040	1,150	3 month LIBOR +3.79%	2022	1,173	1,137
Rio Tinto Finance (USA) plc Bonds 4.75% 2042	500	3 month LIBOR +3.42%	2023	501	483
Rio Tinto Finance (USA) plc Bonds 4.125% 2042	750	3 month LIBOR +2.83%	2023	743	716

(a) On 11 May 2020 we repaid, in full, the nominal amount of the Rio Tinto Finance plc Euro Bonds 2% due 2020.

(b) In 2020 we entered into new swaps to convert the interest payable in relation to these bonds from fixed to floating rates.

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 valuation method in accordance with IFRS 9 at 31 December 2020 and 31 December 2019.

At 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	
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)

At 31 December 2019	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	
Assets					
Cash and cash equivalents ^(d)	8,027	5,320	—	—	2,707
Investments in equity shares and funds	61	26	—	35	—
Other investments, including loans ^(e)	2,839	2,607	—	211	21
Trade and other financial receivables ^(f)	2,938	15	1,122	—	1,801
Derivatives (net)					
Forward contracts and option contracts: designated as hedges ^(g)	42	—	—	42	—
Forward contracts and option contracts, not designated as hedges ^(g)	120	—	25	95	—
Derivatives related to net debt ^(h)	(147)	—	(147)	—	—
Liabilities					
Trade and other financial payables	(5,398)	—	(57)	—	(5,341)
Total	8,482	7,968	943	383	(812)

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 2020, US\$1,671 million (31 December 2019: US\$1,040 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 2029 (2019: 2025 and 2030). 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.

	2020 Level 3 financial assets and financial liabilities US\$m	2019 Level 3 financial assets and financial liabilities US\$m
Opening balance	383	637
Currency translation adjustments	16	(1)
Total realised gains/(losses) included in:		
– consolidated sales revenue	11	—
– net operating costs	(39)	(7)
Total unrealised (losses)/gains included in:		
– net operating costs	24	(254)
Total unrealised gains transferred into other comprehensive income through cash flow hedges	26	28
Additions	1	1
Disposals/maturity of financial instruments	(27)	(21)
Closing balance	395	383
Net losses for the year included in the income statement for assets and liabilities held at year end^(a)	—	(263)

(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 2020 and 2019, 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 the long-term aluminium embedded derivatives is US\$126 million at 31 December 2020 (2019: US\$120 million).

We also have royalty receivables, with a carrying value of US\$113 million (2019: US\$124 million), arising from the sale of our coal assets in prior periods. These are classified as "Other investments", including loans within "Other financial assets". The fair values are determined using level 3 unobservable inputs.

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\$198 million increase (2019: US\$214 million increase) in the carrying value. A 15% decrease in the coal spot price would result in a US\$46 million decrease (2019: US\$57 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 2020

Capital commitments, excluding the Group's share of joint venture capital commitments, were US\$3,152 million (31 December 2019: US\$4,053 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. On a legally enforceable basis, capital commitments would be approximately US\$1.5 billion (2019: US\$0.9 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\$9 million (31 December 2019: US\$93 million).

Contingent liabilities (subsidiaries and joint operations)

Contingent liabilities, indemnities and other performance guarantees were US\$146 million at 31 December 2020 (31 December 2019: US\$204 million).

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 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.

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.

Other disclosures (continued)

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.

The outcomes of these matters remain 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.

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.

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 2020 Annual report.

	2020 US\$m	2019 US\$m
Income statement items		
Purchases from equity accounted units	(960)	(1,155)
Sales to equity accounted units	271	268
Cash flow statement items		
Dividends from equity accounted units	594	669
Net funding of equity accounted units	(43)	(33)
Balance sheet items		
Investments in equity accounted units ^(a)	3,764	3,971
Loans to equity accounted units	41	39
Trade and other receivables: amounts due from equity accounted units ^(b)	251	259
Trade and other payables: amounts due to equity accounted units	(241)	(271)

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

(b) This includes prepayments of tolling charges.

Other disclosures (continued)

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.

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.

Income statement summary for the year ended 31 December	Iron Ore Company of Canada 2020 US\$m	Iron Ore Company of Canada 2019 US\$m	Energy Resources of Australia 2020 US\$m	Energy Resources of Australia 2019 US\$m	Turquoise Hill ^{(a)(b)(c)} 2020 US\$m	Turquoise Hill ^{(a)(b)(c)} 2019 US\$m
Revenue	2,269	2,014	162	145	1,078	1,166
Profit/(loss) after tax	611	543	9	5	357	(2,137)
– attributable to non-controlling interests	252	224	3	2	130	(1,490)
– attributable to Rio Tinto	359	319	5	3	227	(647)
Other comprehensive income	56	57	20	2	2	—
Total comprehensive income/(loss)	667	600	29	7	359	(2,137)
Balance sheet summary as at 31 December	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m
Non-current assets	2,733	2,585	329	76	10,930	9,589
Current assets	670	610	371	258	1,496	2,449
Current liabilities	(462)	(532)	(176)	(127)	(540)	(493)
Non-current liabilities	(993)	(927)	(427)	(462)	(4,404)	(4,405)
Net assets/(liabilities)	1,948	1,736	97	(255)	7,482	7,140
– attributable to non-controlling interests	804	718	18	—	2,424	2,369
– attributable to Rio Tinto	1,144	1,018	79	(255)	5,058	4,771
Cash flow statement summary for the year ended 31 December	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m
Cash flow from operations	1,027	1,039	(15)	(73)	380	298
Dividends paid to non-controlling interests	(180)	(228)	—	—	—	—

(a) Turquoise Hill Resources Ltd holds a controlling interest in Oyu Tolgoi LLC (OT).

(b) Under the terms of the project finance facility held by OT, there are certain restrictions on the ability of OT to make shareholder distributions.

Other disclosures (continued)

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

- (c) Since 2011, Turquoise Hill has funded common share investments in OT 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 2020, the cumulative amount of such funding was US\$1,378 million (31 December 2019: US\$1,241 million), excluding accrued interest of US\$804 million (31 December 2019: US\$655 million) relating to this funding.

Income statement summary for the year ended 31 December	Robe River Mining Co Pty 2020 US\$m	Robe River Mining Co Pty 2019 US\$m	Other companies and eliminations ^(d) 2020 US\$m	Other companies and eliminations ^(d) 2019 US\$m	Robe River 2020 US\$m	Robe River 2019 US\$m
Revenue	1,738	1,493	2,028	1,743	3,766	3,236
Profit after tax	939	808	1,019	825	1,958	1,633
– attributable to non-controlling interests	376	312	—	—	376	312
– attributable to Rio Tinto	563	496	1,019	825	1,582	1,321
Other comprehensive income/(loss)	294	(13)	136	(12)	430	(25)
Total comprehensive income	1,233	795	1,155	813	2,388	1,608
Balance sheet summary as at 31 December	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m
Non-current assets	3,452	2,622	4,247	3,687	7,699	6,309
Current assets	865	1,161	2,239	1,873	3,104	3,034
Current liabilities	(380)	(173)	(414)	(303)	(794)	(476)
Non-current liabilities	(255)	(84)	(4,752)	(3,392)	(5,007)	(3,476)
Net assets	3,682	3,526	1,320	1,865	5,002	5,391
– attributable to non-controlling interests	1,397	1,404	—	—	1,397	1,404
– attributable to Rio Tinto	2,285	2,122	1,320	1,865	3,605	3,987
Cash flow statement summary for the year ended 31 December	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m
Cash flow from operations	1,491	1,255	1,771	1,447	3,262	2,702
Dividends paid to non-controlling interests	(332)	(139)	(165)	—	(497)	(139)

- (d) "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\$383 million (2019: US\$349 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) 2020 US\$m	Minera Escondida Ltda^(a) 2019 US\$m	Sohar Aluminum Co.L.L.C.^(b) 2020 US\$m	Sohar Aluminum Co.L.L.C.^(b) 2019 US\$m
Revenue	7,650	7,120	640	715
Depreciation and amortisation	(1,427)	(1,693)	(115)	(115)
Impairment charges (see pages 47 to 49)	—	—	(1,100)	—
Other operating costs	(2,756)	(3,670)	(430)	(505)
Operating profit/(loss)	3,467	1,757	(1,005)	95
Finance expense	(137)	(157)	(20)	(35)
Income tax	(1,197)	(627)	(15)	(10)
Profit/(loss) after tax	2,133	973	(1,040)	50
Other comprehensive loss	(40)	(17)	—	—
Total comprehensive income/(loss)	2,093	956	(1,040)	50
Non-current assets	11,833	12,450	1,850	3,045
Current assets	3,107	2,250	270	290
Current liabilities	(1,813)	(1,827)	(675)	(205)
Non-current liabilities	(4,560)	(4,670)	(200)	(845)
Net assets	8,567	8,203	1,245	2,285
Assets and liabilities above include:				
– cash and cash equivalents	1,103	603	30	20
– current financial liabilities	(790)	(807)	(565)	(110)
– non-current financial liabilities	(2,560)	(2,380)	(30)	(675)
Dividends received from joint venture (Rio Tinto share)	585	666	—	—
Reconciliation of the above amounts to the investment recognised in the Group balance sheet				
Group interest	30%	30%	20%	20%
Net assets	8,567	8,203	1,245	2,285
Group's ownership interest	2,570	2,461	249	457
Carrying value of Group's interest	2,570	2,461	249	457

(a) In addition to its "Investment in equity accounted units", the Group recognises deferred tax liabilities of US\$358 million (2019: US\$362 million) relating to tax on unremitted earnings of equity accounted units.

(b) Under covenants stipulated in the agreement to Sohar Aluminium Co. L.L.C.'s secured loan facilities, Sohar Aluminium Co. L.L.C. is currently restricted from making any shareholder distributions until 2021 unless a specified amount of the loan facilities is funded.

Events after the balance sheet date

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

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Rio Tinto financial information by business unit

		Gross product sales ^(a) for the year ended 31 December		Underlying EBITDA ^(b) for the year ended 31 December		Net earnings ^(c) for the year ended 31 December	
	Rio Tinto interest %	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m
Iron Ore							
Pilbara	(d)	27,027	23,681	18,896	15,936	11,551	9,619
Dampier Salt	68.4	252	271	43	75	12	27
Evaluation projects/other	(e)	657	123	(32)	87	(112)	(8)
Intra-segment	(e)	(428)	—	(70)	—	(53)	—
Total Iron Ore		27,508	24,075	18,837	16,098	11,398	9,638
Aluminium	(f)						
Bauxite		2,302	2,490	943	1,045	434	498
Alumina		2,233	2,720	262	567	92	247
Primary Metal		4,489	4,940	904	755	169	40
Pacific Aluminium		1,944	2,204	112	(22)	(6)	(137)
Intra-segment and other		(2,510)	(3,079)	6	30	(159)	21
Integrated operations		8,458	9,275	2,227	2,375	530	669
Other product group items		856	1,065	7	16	(5)	10
Product group operations		9,314	10,340	2,234	2,391	525	679
Evaluation projects/other		—	—	(82)	(106)	(54)	(80)
Total Aluminium		9,314	10,340	2,152	2,285	471	599
Copper & Diamonds							
Rio Tinto Kennecott	100.0	1,529	1,879	588	843	149	397
Escondida	30.0	2,296	2,136	1,462	1,034	650	325
Oyu Tolgoi and Turquoise Hill	(g)	1,078	1,166	390	357	160	25
Diamonds	(h)	459	619	83	151	9	(21)
Product group operations		5,362	5,800	2,523	2,385	968	726
Evaluation projects/other		66	15	(351)	(312)	(205)	(172)
Total Copper & Diamonds		5,428	5,815	2,172	2,073	763	554
Energy & Minerals							
Iron Ore Company of Canada	58.7	2,444	2,189	1,130	1,024	383	332
Rio Tinto Iron & Titanium	(i)	1,651	1,938	476	611	216	254
Rio Tinto Borates	100.0	564	593	126	180	65	96
Uranium	(j)	303	375	24	55	6	25
Product group operations		4,962	5,095	1,756	1,870	670	707
Simandou iron ore project	(k)	—	—	(14)	(12)	(6)	(5)
Evaluation projects/other		52	55	(96)	(96)	(87)	(91)
Total Energy & Minerals		5,014	5,150	1,646	1,762	577	611
Other operations	(l)	18	18	—	(77)	(54)	(89)
Inter-segment transactions		(264)	(31)	(94)	(9)	(32)	(3)
Product group total		47,018	45,367	24,713	22,132	13,123	11,310
Central pension costs, share-based payments and insurance				72	59	81	60
Restructuring, project and one-off costs				(133)	(183)	(108)	(94)
Central costs				(500)	(496)	(418)	(550)
Exploration and evaluation				(250)	(315)	(216)	(231)
Net interest						(14)	(122)
Underlying EBITDA/earnings				23,902	21,197	12,448	10,373
Items excluded from underlying EBITDA/earnings				(395)	(722)	(2,679)	(2,363)
Reconciliation to Group income statement							
Share of equity accounted unit sales and intra-subsidiary/equity accounted unit sales		(2,407)	(2,202)				
Impairment charges				(1,272)	(3,487)		
Depreciation and amortisation in subsidiaries excluding capitalised depreciation				(4,074)	(4,272)		
Depreciation and amortisation in equity accounted units				(576)	(653)		
Taxation and finance items in equity accounted units				(443)	(296)		
Finance items				(1,751)	(648)		
Consolidated sales revenue/profit before taxation/net earnings		44,611	43,165	15,391	11,119	9,769	8,010

Rio Tinto financial information by business unit (continued)

		Capital expenditure ^(m) for the year ended 31 December		Depreciation and amortisation for the year ended 31 December		Operating assets ⁽ⁿ⁾ as at 31 December		Employees for the year ended 31 December	
	Rio Tinto interest %	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m	2020 US\$m	2019 US\$m	2020	2019
Iron Ore									
Pilbara	(d)	2,919	1,720	1,819	1,704	16,253	13,865	11,522	10,634
Dampier Salt	68.4	22	21	19	19	163	152	351	347
Evaluation projects/other	(e)	—	—	—	—	338	2	10	—
Intra-segment	(e)	—	—	—	—	(104)	—	—	—
Total Iron Ore		2,941	1,741	1,838	1,723	16,650	14,019	11,883	10,981
Aluminium	(f)								
Bauxite		142	387	290	286	2,593	2,597	2,853	2,940
Alumina		228	282	138	187	2,294	2,009	2,383	2,269
Primary Metal		602	658	643	682	9,361	9,674	6,282	6,357
Pacific Aluminium		114	129	119	154	455	970	2,469	2,356
Intra-segment and other		(1)	—	1	—	662	780	141	127
Integrated operations		1,085	1,456	1,191	1,309	15,365	16,030	14,128	14,049
Product group operations		1,085	1,456	1,191	1,309	15,365	16,030	14,128	14,049
Evaluation projects/other		—	—	—	3	—	—	—	—
Total Aluminium		1,085	1,456	1,191	1,312	15,365	16,030	14,128	14,049
Copper & Diamonds									
Rio Tinto Kennecott	100.0	618	444	472	457	2,317	2,012	2,171	2,066
Escondida	30.0	178	315	428	508	2,726	2,871	1,124	1,068
Oyu Tolgoi and Turquoise Hill	(g)	1,038	1,289	189	208	8,111	6,780	3,450	3,152
Diamonds	(h)	25	38	60	144	(7)	195	885	940
Product group operations		1,859	2,086	1,149	1,317	13,147	11,858	7,630	7,226
Evaluation projects/other		5	1	4	3	192	152	159	150
Total Copper & Diamonds		1,864	2,087	1,153	1,320	13,339	12,010	7,789	7,376
Energy & Minerals									
Iron Ore Company of Canada	58.7	243	255	170	172	1,009	803	2,716	2,617
Rio Tinto Iron & Titanium	(i)	144	249	173	193	3,390	3,507	4,151	4,115
Rio Tinto Borates	100.0	42	43	49	60	502	525	966	924
Uranium	(i)	—	5	—	3	(71)	(363)	364	857
Product group operations		429	552	392	428	4,830	4,472	8,197	8,513
Simandou iron ore project	(k)	(2)	(1)	—	—	16	20	69	74
Evaluation projects/other		1	—	—	—	33	37	77	53
Total Energy & Minerals		428	551	392	428	4,879	4,529	8,343	8,640
Other operations	(l)	2	(4)	199	177	(479)	(83)	124	159
Inter-segment transactions						129	127		
Product group total		6,320	5,831	4,773	4,960	49,883	46,632	42,267	41,205
Other items		79	64	82	77	(2,165)	(2,449)	5,207	4,802
Less: equity accounted units		(255)	(456)	(576)	(653)	—	—	—	—
Total		6,144	5,439	4,279	4,384	47,718	44,183	47,474	46,007
Add back: Proceeds from disposal of property, plant and equipment		45	49						
Total capital expenditure per cash flow statement		6,189	5,488						
Less: Net debt						(664)	(3,651)		
Equity attributable to owners of Rio Tinto						47,054	40,532		

Notes to financial information by business unit

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

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 71 to 76.

- (a) Gross product sales includes 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 and the Group's share relating to equity accounted units represents earnings attributable to owners of Rio Tinto before: tax, net finance items, depreciation and amortisation charged to the income statement in the period and excludes the EBITDA impact of the same items that are excluded from underlying earnings as defined on page 77.
- (c) Represents profit after tax for the period attributable to the owners of the Rio Tinto Group. 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 the 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".
- (f) In order to reflect the evolution of the Aluminium business, the following changes have been implemented:
 - The consolidation line for Bauxite & Alumina has been removed to reflect the less integrated nature of the business and the evolution of the Bauxite business towards a primarily export oriented operation. As a result of this change, the intra-group segment elimination for Gross product sales, Underlying EBITDA, Net Earnings and Operating assets between bauxite and alumina are now reported on line "Intra-segment and other". The intra-segment eliminations for the year ended 31 December 2020 would have been US\$722 million, US\$31 million, US\$21 million and US\$7 million respectively. For the year ended 31 December 2019 the eliminations were US\$825 million, US\$10 million, US\$7 million and US\$27 million.
 - The Underlying EBITDA and Net Earnings have been restated to include the impact of the legacy alumina contracts (2019: US\$218 million and US\$171 million, respectively) in the Alumina business instead of being included in the Other product group items line, in order to provide a comprehensive view of the performance of the Alumina business.

- The Gross product sales, Underlying EBITDA and Net Earnings have been restated to reallocate the margin generated by internal shipping activities to Bauxite (2019: US\$31 million, US\$76 million and US\$57 million, respectively) and Alumina businesses (2019: US\$63 million, US\$157 million and US\$117 million, respectively), instead of being included in the Evaluation project/other line in order to provide a comprehensive view of the performance of the Bauxite and Alumina businesses.

Gross product sales, Underlying EBITDA, Net Earnings and Operating assets of the overall Rio Tinto Aluminium business were not impacted by these changes.

- (g) 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.
- (h) Includes our interests in Argyle (100%) and Diavik (60%).
- (i) Includes our interests in Rio Tinto Fer et Titane (100%), QIT Madagascar Minerals (QMM, 80%) and Richards Bay Minerals (attributable interest of 74%).
- (j) Includes our interests in Energy Resources of Australia (ERA) and in Rössing Uranium Limited (Rössing) (68.6%) up until the sale on 16 July 2019. In February 2020, our interest in ERA increased from 68.4% to 86.3% as a result of new ERA shares issued to Rio Tinto under the Entitlement Offer and Underwriting Agreement to raise funds for the rehabilitation of the Ranger Project Area.
- (k) Simfer Jersey Limited, 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.
- (l) Other operations include our 100% interest in the Gove alumina refinery, Rio Tinto Marine and, with effect from the first half of 2019, the remaining operating assets of Rio Tinto Coal Australia. As at 31 December 2020, these include provisions for onerous contracts in relation to rail infrastructure capacity, partly offset by deferred tax assets and financial assets and receivables relating to contingent royalties and disposal proceeds.
- (m) 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.
- (n) Operating assets of subsidiaries is comprised of net assets excluding post-retirement assets and liabilities, net of tax, and before deducting net debt. Operating assets are stated after the deduction of non-controlling interests – these are calculated by reference to the net assets of the relevant companies (ie 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 measure.

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 includes 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.

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

	2020 US\$m	2019 US\$m
Consolidated sales revenue	44,611	43,165
Share of equity accounted unit sales and inter-subsiary/equity accounted unit sales	2,407	2,202
Gross product sales	47,018	45,367

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 77).

	2020 US\$m	2019 US\$m
Profit after tax	10,400	6,972
Less (profits)/losses attributable to non-controlling interests	(631)	1,038
Profit after tax attributable to owners of Rio Tinto (net earnings)	9,769	8,010
Depreciation and amortisation in subsidiaries excluding capitalised depreciation	4,074	4,272
Depreciation and amortisation in equity accounted units	576	653
Finance items in subsidiaries	1,751	648
Taxation in subsidiaries	4,991	4,147
Taxation and finance items in equity accounted units	443	296
Add back profits/(losses) attributable to non-controlling interests	631	(1,038)
Impairment charges	1,272	3,487
(Gains)/losses on embedded commodity derivatives not qualifying for hedge accounting (including exchange)	(6)	260
Net losses on consolidation and disposal of interests in businesses	—	291
Change in closure estimates (non-operating and fully impaired sites)	401	—
Change in other exclusions	—	171
Underlying EBITDA	23,902	21,197

Underlying EBITDA margin

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

	2020 US\$m	2019 US\$m
Underlying EBITDA	23,902	21,197
Gross product sales	47,018	45,367
Underlying EBITDA margin	51 %	47 %

Pilbara underlying FOB EBITDA margin

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

	2020 US\$m	2019 US\$m
Pilbara		
Underlying EBITDA	18,896	15,936
Pilbara gross product sales	27,027	23,681
Freight revenue	1,487	1,671
Gross product sales	25,540	22,010
Pilbara underlying FOB EBITDA margin	74 %	72 %

Underlying EBITDA margin from Aluminium integrated operations

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

	2020 US\$m	2019 US\$m
Aluminium		
Underlying EBITDA - integrated operations	2,227	2,375
Gross product sales - integrated operations	8,458	9,275
Underlying EBITDA margin from integrated operations	26 %	26 %

Underlying EBITDA margin (product group operations)

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

	2020 US\$m	2019 US\$m
Copper & Diamonds		
Underlying EBITDA - product group operations	2,523	2,385
Gross product sales - product group operations	5,362	5,800
Underlying EBITDA margin - product group operations	47 %	41 %

	2020 US\$m	2019 US\$m
Energy & Minerals		
Underlying EBITDA - product group operations	1,756	1,870
Gross product sales - product group operations	4,962	5,095
Underlying EBITDA margin - product group operations	35 %	37 %

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 the magnitude:

- Net gains/(losses) on disposal and consolidation of interests in businesses.
- Impairment charges and reversals.
- Profit/(loss) after tax from discontinued operations.
- Certain exchange and derivative gains and losses.

The reconciliation of underlying earnings to net earnings can be found on pages 77 to 78.

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.

	2020 (cents)	2019 (cents)
Basic earnings per ordinary share	604.0	491.4
Items excluded from underlying earnings per share	165.6	144.9
Basic underlying earnings per ordinary share	769.6	636.3

APMs derived from cash flow statement

Capital expenditure

Capital expenditure comprises 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, hence, presented gross, before taking into account any cash received from disposals 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.

	2020 US\$m	2019 US\$m
Net cash generated from operating activities	15,875	14,912
Less: Purchase of property, plant and equipment and intangible assets	(6,189)	(5,488)
Less: Lease principal payments	(324)	(315)
Add: Sales of property, plant and equipment and intangible assets	45	49
Free cash flow	9,407	9,158

APMs derived from the balance sheet

Net debt

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

Net debt measures how we are managing our balance sheet and capital structure. Refer to Consolidated net debt note for the reconciliation on pages 51 to 52.

Net gearing ratio

Net gearing ratio is defined as net 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.

	2020 US\$m	2019 US\$m
Net debt	664	3,651
Net debt	664	3,651
Total equity	51,903	45,242
Net debt plus total equity	52,567	48,893
Net gearing ratio	1 %	7 %

Operating assets

The Group's operating assets comprise our share of net assets before deducting net debt. This measure shows the net value of assets and liabilities used to generate profits.

	2020 US\$m	2019 US\$m
Equity attributable to owners of Rio Tinto	47,054	40,532
Add: Net debt	664	3,651
Operating assets	47,718	44,183

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).

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

	2020 US\$m	2019 US\$m
Profit after tax attributable to owners of Rio Tinto (net earnings)	9,769	8,010
Items added back to derive underlying earnings (refer to page 77)	2,679	2,363
Underlying earnings	12,448	10,373
Add/(deduct):		
Finance income per the income statement	(141)	(300)
Finance costs per the income statement	268	554
Tax on finance cost	(38)	(145)
Non-controlling interest share of net finance costs	(107)	(25)
Net interest cost in Equity Accounted Units (Rio Tinto share)	32	38
Adjusted net interest	14	122
Adjusted underlying earnings	12,462	10,495
Equity attributable to owners of Rio Tinto - beginning of the period	40,532	43,686
Net debt/(cash) - beginning of the period	3,651	(255)
Capital employed - beginning of the period	44,183	43,431
Equity attributable to owners of Rio Tinto - end of the period	47,054	40,532
Net debt - end of the period	664	3,651
Capital employed - end of the period	47,718	44,183
Average capital employed	45,951	43,807
Return on capital employed	27 %	24 %

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 (h) below are excluded from net earnings in arriving at underlying earnings.

	Pre-tax ^(h) 2020 US\$m	Taxation 2020 US\$m	Non- controlling interests 2020 US\$m	Net amount 2020 US\$m	Net amount 2019 US\$m
Underlying earnings	18,282	(5,195)	(639)	12,448	10,373
Impairment charges ^(a)	(1,243)	128	—	(1,115)	(1,658)
Net losses on consolidation and disposal of interests in businesses ^(b)	—	—	—	—	(291)
Exchange and derivative gains/(losses):					
– Exchange (losses)/gains on net external debt, intragroup balances and derivatives ^(c)	(1,138)	5	8	(1,125)	51
– Losses on currency and interest rate derivatives not qualifying for hedge accounting ^(d)	(142)	(19)	4	(157)	(59)
– Gains/(losses) on embedded commodity derivatives not qualifying for hedge accounting ^(e)	33	(10)	(5)	18	(192)
Net losses from movements to closure estimates (non-operating and fully impaired sites) ^(f)	(401)	100	1	(300)	—
Other exclusions ^(g)	—	—	—	—	(214)
Total excluded from underlying earnings	(2,891)	204	8	(2,679)	(2,363)
Net earnings	15,391	(4,991)	(631)	9,769	8,010

(a) Refer to Impairment charges note on pages 47 to 49.

(b) In 2019, the net loss mainly related to the disposal of our entire 68.62% stake in Rössing Uranium on 16 July 2019 for which we recorded a pre-tax loss of US\$289 million (US\$289 million net of tax).

(c) 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. In 2019, exchange gains on external net debt and intragroup balances comprise post-tax foreign exchange gains on net debt of US\$60 million and post-tax losses of US\$9 million on intragroup balances, primarily as a result of the Canadian dollar strengthening against the US dollar.

(d) 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.

(e) 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.

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- (f) In 2020 the pre-feasibility study for the Gove refinery closure was completed, resulting in an increase to the closure provision. As a non-operating asset, this increase was recognised through the income statement. Also in 2020, the feasibility study for the Argyle mine closure was completed, resulting in a decrease to the closure provision. As the assets at Argyle had previously been fully impaired this decrease was recognised through the income statement, in line with previous movements to the closure provision. This amount also includes an increase in Diavik's closure provision to reflect the latest findings from the ongoing Pre-Feasibility Study, recognised through the income statement as Diavik was fully impaired during the year. It also includes the net earnings impact (US\$138 million loss) in respect of increases to these closure provisions following a reduction to the closure discount rate to 1.5%.
 - (g) In 2019, other exclusions included provisions for obligations in respect of legacy operations of US\$246 million (loss of US\$233 million after tax), partially offset by the write-back of a net realisable value provision in respect of low grade stockpile inventories at Oyu Tolgoi of US\$75 million (gain of US\$19 million after tax and non-controlling interest). As a result of increased uncertainty over timing of production from the Oyu Tolgoi underground project (refer to Impairment charges note on pages 47 to 49), we expected to utilise low value stockpiles sooner than previously expected. This was excluded from underlying earnings, consistent with the related impairment charge recognised in 2019.
 - (h) Exclusions from underlying earnings relating to equity accounted units are stated after tax and are included in the column "Pre-tax".

Summary financial data in Australian dollars, sterling and US dollars

2020 A\$m	2019 A\$m	2020 £m	2019 £m		2020 US\$m	2019 US\$m
68,061	64,810	36,624	35,443	Gross product sales	47,018	45,367
64,577	61,664	34,749	33,723	Consolidated sales revenue	44,611	43,165
22,279	15,884	11,989	8,687	Profit before tax from continuing operations	15,391	11,119
15,055	9,960	8,101	5,447	Profit for the year from continuing operations	10,400	6,972
14,141	11,443	7,609	6,258	Net earnings attributable to Rio Tinto shareholders	9,769	8,010
34,599	30,281	18,618	16,560	Underlying EBITDA	23,902	21,197
18,019	14,819	9,696	8,104	Underlying earnings ^(a)	12,448	10,373
874.3c	702.0c	470.5p	383.9p	Basic earnings per ordinary share ^(b)	604.0p	491.4p
1114.1c	909.1c	599.5p	497.1p	Basic underlying earnings per ordinary share ^{(a)(b)}	769.6p	636.3p
				Dividends per share to Rio Tinto shareholders ^(c)		
566.21c	469.97c	297.21p	259.28p	- paid – ordinary dividend	386.0c	331.0c
—c	427.20	—p	233.37	- paid – special dividend	—c	304.00
397.48c	349.74c	221.86p	177.47p	- proposed – ordinary dividend	309.0c	231.0c
119.63c	—c	66.77p	—p	- proposed – special dividend	93.0c	—c
13,490	13,444	7,259	7,352	Cash flow before financing activities	9,319	9,411
(864)	(5,216)	(488)	(2,787)	Net debt	(664)	(3,651)
61,252	57,903	34,592	30,940	Equity attributable to Rio Tinto shareholders	47,054	40,532

- (a) Underlying earnings exclude impairments and other charges of US\$2,679 million (2019: US\$2,363 million), which are analysed on pages 77 to 78.
- (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

		2020	2019	Increase/ (Decrease)
Metal prices - average for the year				
Copper	- US cents/lb	281	273	3 %
Aluminium	- US\$/tonne	1,702	1,791	(5)%
Gold	- US\$/troy oz	1,770	1,393	27 %

	Full-year average			Year-end		
Exchange rates against the US dollar	2020	2019	Increase/ (Decrease)	2020	2019	Increase/ (Decrease)
Sterling	1.28	1.28	— %	1.36	1.31	4 %
Australian dollar	0.69	0.70	(1)%	0.77	0.70	10 %
Canadian dollar	0.75	0.75	— %	0.78	0.77	1 %
Euro	1.14	1.12	2 %	1.23	1.12	10 %
South African rand	0.061	0.069	(12)%	0.068	0.071	(4)%

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