

Strategic report 2019



Our purpose

**As pioneers
in mining
and metals,
we produce
materials
essential
to human
progress**

Contents

Strategic report

Our business

2019 at a glance	4
Chairman's statement	6
Chief Executive's statement	10
Our business model	14
Our values	15
Strategic context	16
Our stakeholders	18
Our strategy	20
Key performance indicators	22
Chief Financial Officer's statement	27
Financial review	29
Portfolio management	38

Business reviews

Iron Ore	40
Aluminium	44
Copper and Diamonds	48
Energy and Minerals	52
Growth and Innovation	56
Commercial	58

Sustainability 60

Risk report

Risk management	71
Principal risks and uncertainties	74
Five-year review	81

Supplementary information

Independent Limited Assurance Report i


Summary Remuneration report:

Annual statement by the Remuneration Committee Chairman	iii
Single total figure remuneration for executive directors	v
Single total figure remuneration for non-executive directors	v

Summary shareholder information vi

Navigating through our Strategic report

UK companies are required to include a strategic report within their full annual report. We produce this additional Strategic report to provide investors with the option of receiving a document that is more concise.

The first 81 pages of Rio Tinto's 2019 Annual report constitute its 2019 Strategic report. References to page numbers beyond 81 are references to pages in the full 2019 Annual report – as indicated by this icon .

Copies of Rio Tinto's shareholder documents – the 2019 Annual report and Strategic report are available to view on the Group's website at riotinto.com. Shareholders may obtain a hard copy of these documents free of charge by contacting Rio Tinto's registrars, whose details are set out at the back of this document.

Please visit Rio Tinto's website to learn more about the Group's performance in 2019.

Directors' approval statement

This Strategic report is delivered in accordance with a resolution of the board, and has been signed on behalf of the board by:



Simon Thompson
Chairman
26 February 2020

The Group's 2019 Strategic report complies with Australian and UK reporting requirements.

The auditors' report on the Group's 2019 annual accounts was unqualified. Within that report, the auditors' statements under section 496 Companies Act 2006, confirming that the Strategic report and Directors' report are consistent with the accounts, was also unqualified.

A copy of the auditors' report on the Group's 2019 Annual report is contained on pages 258 to 265 of that document.

Reporting currency: We report in US dollars unless otherwise stated. Where specified, A\$ refers to Australian dollars and C\$ refers to Canadian dollars.

Our strategy is to create superior value for shareholders by meeting our customers' needs, maximising cash from our world-class assets and allocating capital with discipline.

resilient

2019 financial highlights

\$21.2bn

underlying EBITDA

\$7.2bn

total dividends declared

\$10.4bn

underlying earnings

\$3.7bn

net debt

\$9.2bn

free cash flow

24%

return on capital employed (ROCE)



ence

Strategic report

Our business

2019 at a glance	4
Chairman's statement	6
Chief Executive's statement	10
Our business model	14
Our values	15
Strategic context	16
Our stakeholders	18
Our strategy	20
Key performance indicators	22
Chief Financial Officer's statement	27
Financial review	29
Portfolio management	38

Business reviews

Iron Ore	40
Aluminium	44
Copper and Diamonds	48
Energy and Minerals	52
Growth and Innovation	56
Commercial	58

Sustainability 60

Risk report

Risk management	71
Principal risks and uncertainties	74
Five-year review	81

Traditional owners near Amrun,
our newest bauxite mine in
Queensland, Australia.

strength

2019 at a glance

Our business comprises a portfolio of world-class assets that generate strong cash flows through the cycle.



Group highlights

\$14.9bn

net cash generated from operating activities
(2018: \$11.8bn)

50%

total shareholder return (% over five years)
(2018: 33%)

636 US cents

underlying earnings per share
(2018: 512 US cents)

0.42

all injury frequency rate (AIFR)
(2018: 0.44)

443 US cents

total dividend per share
(2018: 550 US cents)

46%

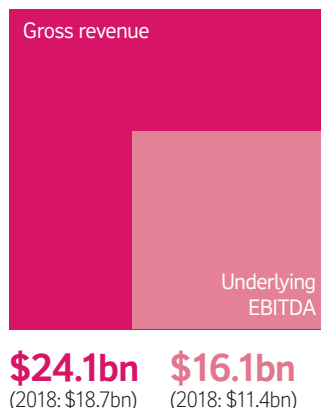
reduction in absolute emissions
(since 2008, managed operations)

A train travels through the Pilbara region of Western Australia, home to our iron ore business.

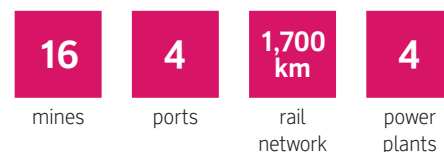
Fe

Iron Ore

Iron ore is the primary component of steel. In the Pilbara region of Western Australia, we have a world-class, integrated portfolio of iron ore assets as well as certain salt assets; we are one of the leading contributors to the seaborne market. Our quality product suite, including our flagship Pilbara Blend™ of iron ore, is well positioned to benefit from continued demand across China, Japan and other markets.



Pilbara managed iron ore operations



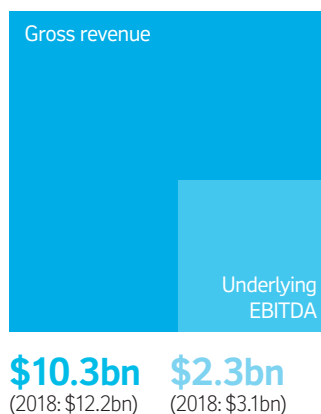
Production* (100% basis)

326.7mt
iron ore
(2018: 337.8mt)

Al

Aluminium

Aluminium is one of the world's fastest-growing major metals. Lightweight and recyclable, it is found in everything from jet engines to electric vehicles to smartphones. Our vertically integrated aluminium portfolio spans from high-quality bauxite mines to alumina refineries to smelters which, in Canada, are powered entirely by clean, renewable energy and located in the first decile of the cost curve.



Managed and non-managed operations



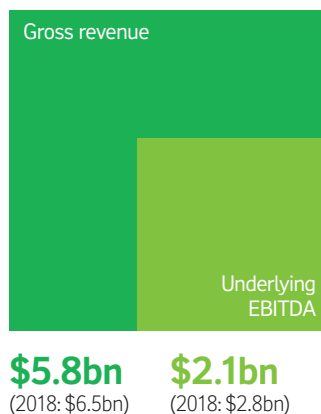
Production* (our share)

55.1mt bauxite (2018: 50.4mt)
3,171kt aluminium (2018: 3,231kt)

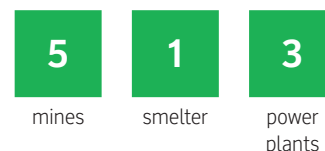
Cu

Copper and Diamonds

Copper plays a key role in electrification and power generation, including in renewable energy and electric vehicles. Our operations span the globe, from Mongolia to the US, and occupy various stages of the mining lifecycle. Our two diamond mines in Australia and Canada make us one of the largest producers, and our white and coloured diamonds are some of the world's most sought-after gems.



Managed and non-managed operations



Production* (our share)

577kt mined copper
(2018: 608kt)

Ti, B, Fe

Energy and Minerals

Our Energy and Minerals product group comprises materials essential to a wide variety of industries, including renewable energy and agriculture. We produce titanium dioxide, borates, high-grade iron ore pellets and concentrate and uranium. Our Ventures division is also exploring growth opportunities in battery metals.



Managed operations



Production* (our share)

1,206kt titanium dioxide slag (2018: 1,116kt)
10.5mt iron ore pellets and concentrates (2018: 9.0mt)

* To allow production numbers to be compared on a like-for-like basis, we have excluded production from asset divestments completed in 2018 from our share of prior year production data. The financial data above includes the results of divested assets up to the date of sale.

Year on year decrease attributable to divestments.



“We aim to achieve and maintain industry-leading safety and sustainability performance, operational excellence, capital discipline and the financial strength to invest throughout the cycle, while providing superior returns to our shareholders.”

Simon Thompson
Chairman

26 February 2020

2019 highlights

Our value over volume strategy, capital discipline, and strong markets for some of our key commodities enabled us to deliver a robust financial performance in 2019.

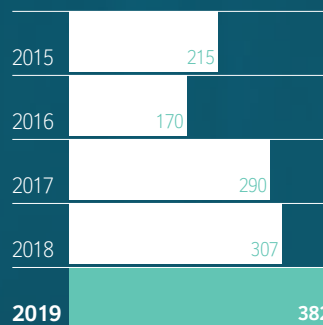
Total dividends declared



\$7.2bn

(2018: \$13.5bn)

Full-year ordinary dividend per share



382 US cents per share

(2018: 307 US cents per share)

\$10.4bn

underlying earnings

\$45.1bn

direct economic contribution

Shareholder returns policy

Our shareholder returns policy balances three factors:

- Maintaining a strong balance sheet
- Investing for future growth
- Directly rewarding shareholders

We expect total cash returns to shareholders to be in the range of 40-60% of underlying earnings through the cycle. For our shareholder returns policy, see page 36.

Chairman's statement

Rio Tinto produces materials essential to human progress. There is hardly any aspect of modern life that our products do not touch, and our 46,000 employees work hard – every shift, every day – to safely fulfil our purpose.

Mining is a highly competitive, capital- and energy-intensive, long-cycle industry that has major impacts, both positive and negative, on society and the environment. To deliver long-term, sustainable success, we need to meet or surpass our customers' expectations; invest in developing the skills and capabilities of our people and the productive capacity of our assets; build mutually beneficial relationships with our suppliers and technology partners; protect the environment; bring lasting social and economic benefits to our local communities and host governments; and reward our shareholders.

We aim to achieve and maintain industry-leading safety and sustainability performance, operational excellence, capital discipline and the financial strength to invest throughout the cycle, while providing superior returns to our shareholders. In 2019, I am pleased to report that your company has made good progress in all of these areas.

Performance

Safety is our top priority. In 2019, all of our safety performance indicators improved and we had zero fatalities. This is an outstanding achievement that reflects years of hard work and commitment by the leadership team and all of our employees and suppliers. But we are not complacent, and we know that we now need to sustain this success.

Overall, the operating performance of the Group was satisfactory, despite a number of challenges during the year, and our value over volume strategy, capital discipline, and strong markets for some of our key commodities enabled us to deliver a robust financial performance in 2019.

Underlying earnings increased to \$10.4 billion (2018: \$8.8 billion), underlying EBITDA rose to \$21.2 billion (2018: \$18.1 billion), representing an underlying EBITDA margin of 47% (2018: 42%), and free cash flow amounted to \$9.2 billion (2018: \$7.0 billion). As a result, we were able to maintain our strong balance sheet, while maintaining our track record of superior returns to shareholders. The Board has recommended a final ordinary dividend of 231 US cents per share, taking total dividends declared to shareholders announced this year to \$7.2 billion.

We continue to invest in high-return projects to sustain and grow our production capacity, including in our iron ore operations in Australia and the Kennecott copper mine in the US. We also continue to make progress with the Oyu Tolgoi underground development in Mongolia, one of the most complex capital projects in the world today.

In order to develop future growth options, including the Resolution copper project in the US and the Winu copper-gold exploration project in Australia, in 2019, we boosted exploration and evaluation expenditure from \$488 million to \$624 million.

Sustainability

In parallel with this report, we have published our second report on climate change, which has been guided by the recommendations of the Taskforce on Climate-related Financial Disclosure (TCFD). The report includes our new 2030 targets to reduce our emissions intensity by 30% and our absolute emissions by 15% from 2018 levels. To deliver these targets, we will spend approximately \$1 billion over five years in climate-related projects, and research and development. We also report on progress in developing a feasible pathway towards our longer term ambition of net zero emissions by 2050.

The mining and metals value chain includes numerous "hard to abate" sectors, such as aluminium smelting, steel making and shipping, where there are significant technological and economic hurdles to the development of viable decarbonisation pathways. In order to address these challenges, we have established a number of technology partnerships that collectively represent a fundamental pillar of our sustainability strategy. However, there are limits to what business can achieve alone. Enabling regulation, such as carbon pricing, is essential to incentivise the decarbonisation of these sectors, together with measures to maintain the competitiveness of trade-exposed industries. Urgent, coordinated government action is therefore needed to encourage such investment within the timeframe required by the Paris Agreement.

We have also made good progress in other areas of sustainability. For example, we have continued to promote industry-leading practices in tax transparency by publishing our mineral development contracts and the beneficial ownership of our managed and non-managed joint ventures. We believe that such transparency helps to build trust and will result in better social and economic outcomes over the long term.

Tax payments and economic contribution

In 2019, we paid \$4.5 billion in corporate taxes to governments around the world, helping our host governments to provide vital services to their citizens and to pursue their development goals. Our direct economic contribution to the communities in which we operate – including community investment, development contributions and payments to landowners – was \$45.1 billion. While the monetary amount is clearly significant, equally important are the opportunities we have created for many thousands of people and local businesses to grow and to prosper.

Engagement

As expectations continue to increase about the role of business in society, it is vital that the Board hears first hand from stakeholders about their perceptions of our performance and the opportunities and challenges that lie ahead. This year, we held civil society roundtables in Australia, Canada and the US. The discussions focused on climate change and the environment, industry lobbying and our impact on the communities in which we operate.

We have already acted on much of the valuable feedback that we received at these events – for example, by engaging with industry associations in Australia and elsewhere on climate change policy; intensifying our focus on delivering our water monitoring and resettlement compensation commitments to herders in Mongolia; and seeking to improve how we communicate our environmental performance to the local community and civil society in Madagascar. We also engaged with customers and suppliers, commissioning a customer attitudes' survey and inviting a major supplier and technology partner to present their views of Rio Tinto to the Board.

Board members continue to engage with Rio Tinto employees around the world. Almost 500 people attended our second "Employee AGM" in Montreal and individual Board members held smaller town halls in Australia, Madagascar, Singapore, South Africa and the US. The most frequent topics raised by employees in the Q&A sessions at these events related to sustainability, culture and behaviours, and technological change, emphasising the importance that our employees attach to our performance in these critical areas. Some examples of how engagement with our employees has shaped the Board's thinking and decision-making can be found on pages 92 and 93 [AR](#).

Visits to our sites and global hubs are one of the most rewarding parts of my job as Chairman and I am always impressed by the pride and commitment of our employees and the extraordinary scope of the innovations taking place across the Group. I would like to thank J-S, the leadership team and all of our employees for their hard work and dedication over the year, and to congratulate them on their achievements.

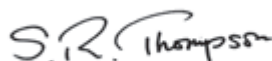
We look forward to meeting many of our shareholders at our annual general meetings in April and May 2020, in London and Brisbane, respectively. In addition to routine matters, we will be asking shareholders to approve the appointment of KPMG as our new auditors from 1 January 2020.

The Board

This year, the Board bid farewell to Ann Godbehere and Dame Moya Greene, who stepped down as non-executive directors in May and June, respectively. I am delighted to welcome Hinda Gharbi, Jennifer Nason and Ngaire Woods, who join the Board in 2020. We look forward to benefiting from their insights and expertise in natural resources, finance, technology, governance and public policy.

A look ahead

Looking ahead, we continue to face significant geopolitical uncertainties and we are currently evaluating the impact of the Covid-19 virus on our business as we enter a new decade, I am pleased to say Rio Tinto continues to be well positioned to create long-term, sustainable value for all of our stakeholders.



Simon Thompson
Chairman

26 February 2020



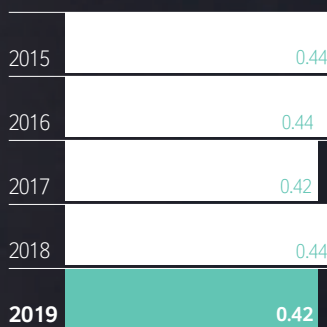
“2019 marked another year of strong financial performance. With a strong balance sheet and continuing investment in high-value growth, Rio Tinto is well-positioned to be resilient and to thrive.”

J-S Jacques
Chief Executive
 26 February 2020

2019 highlights

This year, we continued to invest in our business and to strengthen our portfolio, aiming to ensure our business remains strong and resilient well into the future.

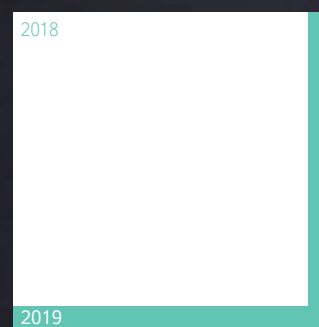
All injury frequency rate (AIFR)



0.42

per 200,000 hours worked
 (2018: 0.44)

Underlying EBITDA



\$21.2bn

(2018: \$18.1bn)

\$10.4bn

underlying earnings

\$9.2bn

free cash flow

\$14.9bn

net cash generated from
 operating activities

24%

return on capital employed (ROCE)

Chief Executive's statement

Over the past years, our aim has been constant: to deliver superior shareholder value and contribute to society as we produce the materials essential to modern life. Our strong focus on generating cash from our world-class assets allows us to do exactly this.

0.42

all injury frequency rate (AIFR)

47%

Group underlying EBITDA margin

\$3.7bn

net debt

With a strong balance sheet and our continuing investment in high-value growth, sustainability and workforce capabilities, we are well positioned to be resilient, and to thrive, in a new era of complexity.

I am grateful to our employees and partners around the world who made our success possible, particularly in safety. As I look back on our performance in 2019, I am most proud of our teams' efforts here. We improved our all injury frequency rate (AIFR), which was 0.42 this year (down from 0.44 in 2018), reflecting lower severity rates. We also ended the year with no fatalities and improved process safety performance. While this is a meaningful achievement, we know we cannot be complacent; we will continue to make safety our number one priority, with the aim of sending everyone home safely at the end of every shift, every day.

Performance

2019 marked another year of strong financial performance for our company, driven by favourable iron ore pricing and stronger operational performance in the second half of the year.

We delivered underlying EBITDA of \$21.2 billion and an underlying EBITDA margin of 47%. Operating cash flow for the year was \$14.9 billion, free cash flow was \$9.2 billion and we ended the year with net debt of \$3.7 billion – a strong balance sheet supports our resilience and provides optionality.

As a result, we were able to announce a record final ordinary dividend of \$3.7 billion, or 231 US cents per share, bringing the full year ordinary dividend to 382 US cents per share. In total, we announced \$7.2 billion in cash returns to shareholders this year, bringing the total returns declared since 2016 to \$36 billion.

From an operational perspective, in the first half of this year we experienced some challenges in our iron ore business in the Pilbara, in Western Australia, which we proactively addressed, closing the year with solid production momentum. Overall, shipments for the year were 3% lower than in 2018, primarily due to these operational challenges and weather-related incidents. Despite this, our Pilbara iron ore operations delivered a 72% underlying free on board (FOB) EBITDA margin in 2019.

In aluminium, this year the market recorded significant price decreases in alumina and aluminium. Despite these challenges, our aluminium business maintained its position as the sector leader, delivering an EBITDA margin of 26% from integrated operations and a 21% increase in third-party bauxite sales.

In copper, our 2019 operational performance was affected by lower grades at all operations, which we partly offset by higher throughput and productivity improvements. Our average realised copper price for the year was down 7% compared to 2018; in 2019, the London Metal Exchange (LME) recorded a decline of 8%.

In our Energy and Minerals (E&M) product group, a favourable pricing environment, combined with improved operational performance, contributed to strong results. In 2019, E&M delivered underlying EBITDA of \$1.8 billion, 41% higher than 2018 (excluding divested coal assets).

Portfolio

This year, we continued to strengthen our portfolio by increasing investment in high-value growth projects to ensure our business remains strong and resilient well into the future.

In December, for example, we announced a \$1.5 billion investment at our Kennecott copper mine in Utah, in the US, which will serve to extend operations to 2032. In November, we announced a \$749 million investment in our Greater Tom Price operations, in the Pilbara, to help sustain the production capacity of our iron ore business. In April, we announced we would sustain current capacity and extend the life of our Richards Bay Minerals operation through the investment of \$463 million in the Zulti South project. After a number of security incidents, construction of this project is currently on hold; we will assess restarting construction after operations normalise.

In April, we committed \$302 million of additional expenditure to advance the Resolution Copper project in Arizona, in the US, to fund additional drilling, orebody studies, infrastructure improvements and permitting activities as the project moves to the final stage of permitting.

At the Oyu Tolgoi underground copper and gold mine, in Mongolia, we completed the primary production shaft – a key milestone – in October 2019. Work continues on the mine design and, overall, we remain within the cost and schedule ranges announced in July 2019. We continue to expect to complete the mine design in the first half of 2020 and the definitive estimate of cost and schedule in the second half of 2020.

To create options for future growth, this year also saw us maintain our industry-leading investment in exploration. In 2019, we invested \$624 million in 69 programmes in seven commodities across 17 countries, with copper remaining the focus. For example, we were pleased that our Winu copper-gold exploration project, in Western Australia, had some early success; we ended 2019 with phase 2 drilling well underway.

We also continued our work to make our portfolio as efficient as possible, in part through the use of technology and innovation, including automation. We begin 2020 with a fleet of 183 autonomous trucks, which, in the Pilbara, cost 15% less to operate than an equivalent manned truck. Rio Tinto is also home to the world's largest autonomous drill fleet – 26 drills – which this year, in our Pilbara iron ore business, unlocked a 25% increase in productivity and a 40% improvement in equipment utilisation. AutoHaul™, our automated rail network

in Western Australia, also continues to play an important role in increasing efficiency; to date, it has increased capacity by 10mt, a figure we expect to see increase with further optimisation.

Partners

Once again this year, our focus on partnership continued and intensified – we are very clear that no business can have sustainable, meaningful impact on its own. Partnership is a core enabler of our sustainability strategy, and I was very pleased with our progress in forming new, innovative connections across the value chain.

For example, recognising that students need the skills to keep pace with a rapidly changing world, we launched an innovative partnership in Australia with leading start-up accelerator BlueChilli and Amazon Web Services. Our collective aim is to fast-track the development of skills needed for the digital future, including critical thinking, problem-solving, automation, systems design and data analytics. Rio Tinto will invest \$7 million (A\$10 million) in this four-year national programme, which will crowd-source ideas from other start-ups as well as schools and universities.

And in Canada, we signed a historic agreement with the Innu community of Ekuanitshit. Named “Uauitshitun,” or “mutual support” in the Innu language, the agreement is designed to generate economic development opportunities in a variety of ways. For example, we will support Innu businesses by providing health and safety training and improving their competitiveness in the procurement process. We will also partner in other areas such as environment, land stewardship, and traditional practices and education, through pre-employment vocational training and school programmes.

We also strengthened our commitment to climate change, which has been part of our strategic thinking for well over two decades. Since 2008, we have reduced absolute emissions from our managed operations by 46% (18% excluding divestments). Today, 76% of our electricity consumption at managed operations is supplied from renewable energy. Most of our operations now have significantly lower carbon intensities than sector averages. We announced new climate and environmental partnerships in 2019, including our initiative with China Baowu Steel Group, our customer in China, and Tsinghua University. We believe it is important to work with our customers and suppliers to help support mutual goals to reduce emissions and strengthen the resilience of our businesses.

In 2020, we set a new ambition: to reach net zero emissions across our operations by 2050. We also set new targets – to reduce our emissions intensity by 30% and our absolute emissions by 15%, both by 2030 and from 2018 levels. And overall, our growth between now and 2030 will be carbon neutral.

To continue to improve our performance, we plan to spend approximately \$1 billion over the next five years in climate-related projects, research and development, partnerships and other activities to enhance the climate resilience of our business. For example, in early 2020, we announced a \$98 million investment to build a 34 MW solar plant at our new Koodaideri iron ore mine in the Pilbara, alongside a lithium-ion battery energy storage system. The plant and battery will limit our annual carbon dioxide emissions by about 90,000 tonnes (compared to conventional gas-powered generation). This is the equivalent of taking about 28,000 cars off the road.

People

This year, I again spent a significant amount of time with our employees, visiting 17 assets and each of our global hubs and satellite offices. Over the course of the year, I held more than 30 town halls and small group discussions in 20 locations. I continue to be impressed by our employees' energy, creativity and ambition, and am proud of the efforts we have made to strengthen our culture and improve innovation, world-class technical talent and commercial capability. All three are critical to our success, today and into the future.

We continued building our innovation culture through initiatives like our Pioneering Pitch programme, in which our employees are encouraged to come up with new, creative ideas on how to strengthen and improve our business, and then pitch them to a panel of Rio Tinto judges, who award up to \$250,000 and expert support to implement the best of them. In 2019, thanks to our employees' ingenuity, Pioneering Pitch identified \$35 million in potential benefit to our business.

We also strengthened the technical capability of our employees, including by expanding our Centres of Excellence (CoEs) from three to eight. Our CoEs pool the company's technical expertise in areas such as tailings, geotechnical engineering and process and underground mining safety, allowing our experts to collaborate more effectively while also providing our operations with an easy to access, ready resource. RioExcel, our programme for recognising and promoting our technical experts, also continued to progress, with 50 employees taking part in 2019.

A look ahead

As we end one decade and begin another, our focus will remain on delivering our value over volume strategy, and striving to ensure our company remains strong, resilient and able to deliver superior returns to shareholders in the short, medium and long term.

This year, we did significant work on developing scenarios to help us understand what we need to do to thrive in this era of increasing complexity. Our focus on innovation, operational and commercial excellence, as well as high-value growth, will be key.

With \$20 billion of capital expenditure planned over the next three years, we will continue disciplined investment in our business, renewing many of our operations through the replacement of mines and major equipment and by investing in growth, notably at Oyu Tolgoi.

Sustainability and partnership will remain important priorities and indeed, will play an increasingly important role across all aspects of our business. And our promise to our employees and contractors – to do everything we can to keep them safe, healthy, and equipped to meet this new era's challenges and opportunities – is as strong as ever.

And our purpose – to produce materials essential to human progress – will guide our company into what promises to be an exciting future.



J-S Jacques
Chief Executive
26 February 2020

\$1bn

to be spent in climate-related projects

Investing

A\$10m

in building skills for the digital future in Australia

Our business model

Our ability to create value is underpinned by the quality of our assets, the capability of our people, our operational performance, innovative partnerships and disciplined capital allocation.

Explore and evaluate

Explore and evaluate

We use some of the most advanced exploration technologies in the world to find potential new sources of minerals and metals. And we consider new products and operations with an understanding of customers' and communities' needs. We are also mindful of the future: our environmental impact as well as the diversity and balance of our portfolio.

Develop and innovate

Develop and innovate

We assess each potential operation with a focus on risk, potential returns, and long-term sustainability and value. Once we have approved an investment, we design and build each operation. We aim to develop every potential site to achieve optimal, long-term productivity while minimising risks.

We work in partnership with a growing network of stakeholders – governments, communities, customers and suppliers – who help expand our thinking, understanding, capabilities and, ultimately, our ability to deliver mutual benefit.

Mine and process

Mine and process

A safe site is a productive site, and advanced technologies are playing a more important role in how we achieve both. We share best practices across our assets to create safe, environmentally responsible working practices and a high-performing culture that targets production at lower costs.

At the same time, our operations aim to benefit local economies by contributing jobs, taxes and royalties, contracts with local businesses, and social and community investment. By understanding and respecting our business partners, employees, communities and the environment, we can create sustainable value for all our stakeholders.

Market and deliver

Market and deliver

Our minerals and metals are used in a vast array of everyday products – from cars to coffee pods to smartphones. Our commercial team ensure that we manage our products in line with market and customer needs. And our network of rail, ports and ships means that we can control end-to-end logistics to deliver our products safely, efficiently and reliably.

Repurpose and renew

Repurpose and renew

We aim to design and run our assets to create a positive legacy once our mining activity concludes. Applying this approach could entail rehabilitating the land for a nature reserve, for example, or repurposing it for light industrial use. Each of our sites has rehabilitation plans that we review every year. We see this long-term approach – planning and operating with the future in mind – as integral to running a safe, responsible and profitable business.

Disciplined capital allocation

Disciplined capital allocation

Our business is underpinned by a disciplined approach to capital allocation; we strive to use every dollar prudently. Today, our balance sheet is a key strength, providing a resilient platform for strong and consistent shareholder returns, as well as enabling us to invest throughout the commodity cycle.

Our values

Our values reflect our commitment to the safety, rights and wellbeing of our employees, the integrity of our business and supply chain, and respect for the environment.

Safety

Caring for human life and wellbeing above everything else

We make the safety and wellbeing of our employees, contractors and communities our number one priority. Always. Safely looking after the environment is an essential part of our care for future generations.

Teamwork

Collaborating for success

We work together with colleagues, partners and communities globally to deliver the products our customers need. We learn from each other to improve our performance and achieve success.

Respect

Fostering inclusion and embracing diversity

We recognise and respect diverse cultures, communities and points of view. We treat each other with fairness and dignity to make the most of everyone's contributions.

Integrity

Having the courage and commitment to do the right thing

We do the right thing, even when this is challenging. We take ownership of what we do and say. And we are honest and clear with each other, and with everyone we work with. This helps us to build trust.

Excellence

Being the best we can be for superior performance

We challenge ourselves and others to create lasting value and achieve high performance. We adopt a pioneering mindset and aim to do better every day.

RioTinto

An employee at our aluminium operations in Quebec, Canada.

Strategic context

The forces shaping the world influence our thinking about our strategy; the actions we take in response will determine the strength and resilience of our business.

Our strategy is formulated through the lens of plausible scenarios. We expect to face greater complexity as we move into a new decade, which we believe will be characterised by the interplay between three global forces: geopolitics, society and technology.

Technology

The transition to the fourth stage of industrialisation, in which technology becomes interwoven into increasing aspects of everyday life, continues. This era will be defined by a step change in digital connectivity and 'intelligent' systems that can gather and analyse data and communicate with other systems, supported by advanced analytics and artificial intelligence. There is no doubt the transition has already been deeply transformative in some sectors, resulting in a mix of disruption and new opportunity. Whether and how quickly this will translate to a broader boost in global economic productivity and growth remains uncertain.

Similarly, while the mining industry has arguably been at the forefront of automating mobile equipment over the past decade, the scope of digital transformation in the sector has been fairly limited. Nevertheless, technology and digital will need to play a key role in the industry's renewed productivity effort, which remains essential after a long period of productivity declines during the China boom. This effort will require companies like ours to further develop and strengthen partnerships – with original equipment manufacturers, research institutions and technology providers – to drive and further integrate technological innovation in mining.

Furthermore, the interplay between technology and society brings uncertainties related to the future of work, as well as the geopolitical and social tensions that emerge from a greater concentration of wealth and data in large technology companies. On the other hand, innovation and a continued drop in the cost of low-carbon technologies may lower barriers to a faster transition to a more sustainable, lower-carbon world.

Society

Sustainability, including climate change, is becoming an ever more pressing challenge facing society. Many would argue that the pursuit of sustainable goals can be constrained by a lack of accompanying social progress, including efforts to address social and economic inequality. Business has an important role to play in addressing each of these challenges – but the private sector cannot address the unprecedented challenge of climate change alone. It needs to work within strong and predictable policy frameworks and alongside robust local and global institutions promoting inclusive and sustainable growth.

This is certainly the case for our industry. While a safe, sustainable approach to mining is critical, it must also include a strong focus on local communities, including jobs and employment, and the effective management of shared resources, such as air and water, land and waste, through the mining life cycle. The mining industry must also be part of the solution in the global effort to address climate change. This will require the industry, including our business, to work together across the full value chain to develop materials with a reduced environmental footprint and support the transition to a lower-carbon economy.

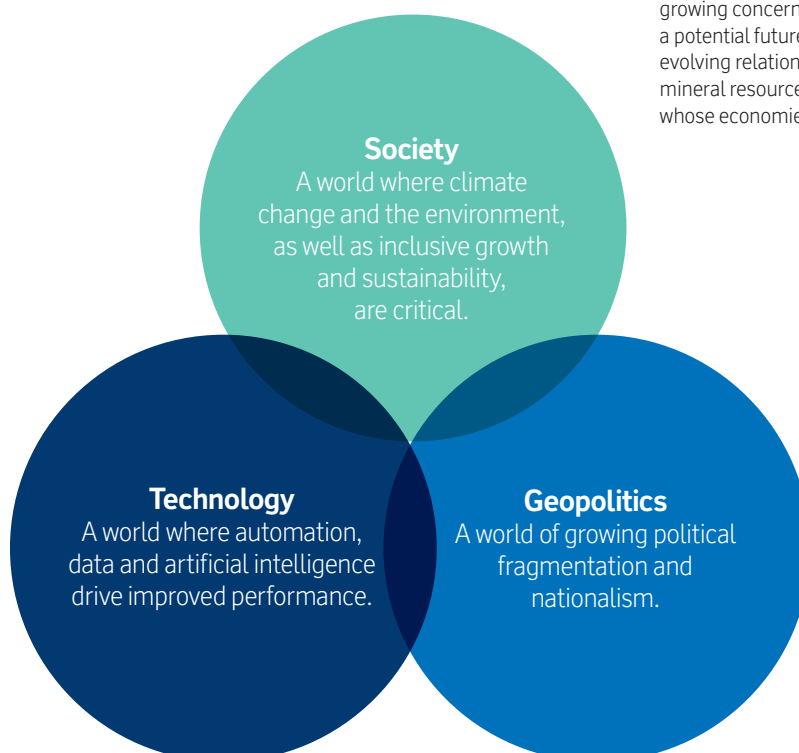
Ultimately, addressing societal challenges requires broad and deep collaboration, domestically and globally, and the mobilisation of a complex web of stakeholders around shared interests. Today, the international institutions that helped preserve global stability for much of the 20th century are themselves under pressure, reflecting tensions between segments of society and the established geopolitical order.

Geopolitics

Since the middle of the 20th century, geopolitics has been defined by globalisation – a dominant force that culminated with the development of China, which has been unprecedented in terms of scale and speed. However, while the development gap between countries has narrowed significantly over the past decade, it is also true that globalisation has not benefitted people equally within countries. This is, in turn, fragmenting the social and political landscape around the world and arguably leading to the rise of nationalism and the distrust of a political and business establishment that is perceived by some to be biased towards a global elite.

This change in the geopolitical cycle is further accentuated by a marked shift in the relationship between the US and China. Arguably, the world's most important relationship stands at a significant juncture as China's economy reaches maturity and continues to progress along the New Era roadmap articulated by President Xi Jinping. The interplay between geopolitics and technology will be particularly important as the US and China vie for leadership in the transition to the fourth industrial revolution. This could potentially lead to divergent technology standards and ecosystems with implications for the structure of global supply chains.

The mining industry, which is heavily dependent on free trade and growth, will need to be resilient in this new phase of geopolitics. We have already seen a shift in the industry's competitive landscape, with more acquisitions and minerals development being made by Chinese companies as part of the Chinese government's global development strategy known as the Belt and Road Initiative. Ensuring a secure supply of critical minerals is also becoming a growing concern for many countries. This points to a potential future in which the market is defined by evolving relationships between host countries of mineral resources and countries, such as China, whose economies generate large demand.



Our stakeholders

As a mining and metals company, we recognise the impact our business can have on our many stakeholders and the wider responsibilities this brings.

We work hard to understand our stakeholders' needs and expectations. We want our success to allow us to invest to meet our obligations to our employees, our customers, suppliers, local communities and host governments, as well as to generate superior returns for our shareholders.

There is more detailed information on our stakeholder engagement in the Sustainability section on pages 60 to 70 of this Annual report, and we set out how the Board takes account of stakeholder interests (our 'section 172(1) Statement') in the Governance section on pages 92 to 93 [AR](#).

Students in the Pilbara region of Western Australia, home to our iron ore business.

Employees

Our 46,000 employees in 36 countries are our most important asset. They want to work in an environment where they are safe and respected, and have the opportunity to learn, reach their potential and develop successful careers in a company they can be proud of.

We know that engaged employees make a productive and innovative business, and we have a wide range of activities aimed at understanding their views. In addition to the day-to-day engagement within teams, we hold numerous town halls with our Chief Executive and other senior leaders, and have regular conversations via our Yammer social platform.

By listening in this way, we continue to refine how and what we offer to meet the varying needs of our workforce. We do this by, for example, further investing in leadership development, as we know leaders are key to engaging and developing employees; by reviewing how we recognise individuals for their contribution and excellence; and by setting clear expectations for how we treat each other to bring our organisational values to life and give people a voice.

We conduct a six-monthly employee engagement survey to help measure our progress and to further understand how people feel about the company and its direction.

Customers and suppliers

Our business works with long-term horizons – our investments must often deliver returns for decades, not years – and both our customers and suppliers have an interest in developing partnerships that allow them to consistently share the benefits of our work together. This in turn requires trust and transparency: they want to know that we will do what we say we will do.

We work closely with customers and suppliers, and in doing so, bring their voice, and the needs of a dynamic market, into our operational, investment and production decisions. For example, by extending our supply chain into Chinese ports, we have enabled access to new customers, created value through product screening and blending, and increased the optionality in our supply chain. In addition, by working closely with our suppliers we have captured supply chain innovation to deliver improved operational performance. We have also continued to enhance how we engage with our markets, customers and suppliers, in part by using technology, data and analytics. We are continuing to pilot the latest technologies, including blockchain and paperless solutions, to evolve the way we conduct our business and make our transactions more efficient, safe and cost-effective.

Our suppliers are vital to our business success and we are continuing to work to improve our partnerships with them. We consider a supply chain of strong local suppliers to be good for our business, local communities and the economy. We are continuing to develop local procurement strategies designed to increase opportunities for businesses to be a part of the Rio Tinto supply chain.

Communities and governments

Trust and partnership with the communities and governments that host our operations is vital.

Each of these groups has a strong interest not only in the employment opportunities our business creates, both directly and indirectly, but also the wider societal benefits that accrue – be it taxes and royalties or the millions we invest in our communities every year. Understandably, these groups are also concerned with the potential environmental and cultural impacts our operations may have.

We regularly engage with our communities and host governments on a wide range of topics, including employment opportunities, taxes and royalties, environmental protection and local procurement. In our Pilbara iron ore business, for example, we conduct an annual survey – called Local Voices – that provides real-time insights to inform decision-making.

We actively engage in dialogue around global social issues and the environment, including climate change. For example, this year we announced a partnership in China to explore ways to improve environmental performance across the entire steel value chain, in which our iron ore business plays an important part.

Investors

Our investors include global investment funds, pension funds and corporate bondholders, as well as tens of thousands of individuals, all of whom have trusted us with their capital and wish to earn a financial return.

They are interested in understanding how we run our business: our strategy, our focus on operational excellence and sustainability, the views of our leadership, including on capital allocation – and the performance that results from the confluence of these. We are often also asked about the purpose, values and culture of the Group, as well as the threats and opportunities that affect delivery of our strategy.

We aim to deliver superior returns to our investors throughout the commodity cycle, and we have a comprehensive communication and engagement programme in addition to our annual general meetings (AGMs) in the UK and Australia. In 2018, for example, in addition to our usual programme of meetings and engagement, we held two investor seminars focused on sustainability; and in late 2019, we held a seminar to update investors on our progress against our strategy.

Our strategy

Our strategy is to create superior value for shareholders by meeting customers' needs, maximising cash from our world-class assets and allocating capital with discipline.

Our strategy comprises four key areas:

Portfolio

Low-cost, long-life assets that deliver attractive returns

People

Building capability to drive performance

Performance

Safety, operational and commercial excellence drive superior margins and returns

Partners

Working with others for future success

Portfolio

Our portfolio of low-cost, long-life assets delivers attractive returns through the cycle. After a significant portfolio reshaping, we are invested in commodities with strong, long-term fundamentals and material growth opportunities.

Investing in our business

To sustain the strength and resilience of our business, in 2019 we continued to invest in high-return projects. For example, in December, we announced a \$1.5 billion investment at our Kennecott copper mine in Utah, in the US, which will serve to extend operations to 2032. In November, we announced a \$749 million investment in our Greater Tom Price operations, in the Pilbara region of Western Australia, to help sustain the production capacity of our iron ore business. In April, we announced we would sustain current capacity and extend the life of our Richards Bay Minerals (RBM) operation, in South Africa, through the investment of \$463 million in the Zulti South project. Construction is currently on hold after a number of security incidents – we will assess a restart after normalisation of operations at RBM.

Also in April, we committed \$302 million of additional expenditure to advance the Resolution Copper project in Arizona, in the US, to fund additional drilling, ore body studies, infrastructure improvements and permitting activities as the project moves to the final stage of permitting. And in March, we completed the commissioning of our \$1.9 billion Amrun bauxite mine on the Cape York Peninsula in Queensland, Australia. The mine and associated processing and port facilities will replace production from our depleting East Weipa mine and increase annual bauxite export capacity by around 10 million tonnes.

\$5.5bn

invested to grow and sustain the strength of our business

Employees at Oyu Tolgoi, where 93% of our employees are Mongolian.

People

Attracting, developing and retaining the best people is crucial to our success. We continue to strengthen our technical and commercial capabilities through our Centres of Excellence, and are committed to building an inclusive and diverse workforce across our global business.

Recognising and promoting technical expertise

We launched an initiative – RioExcel – to recognise the important role our technical experts play in delivering our strategy, including safety, growth and operational excellence. The programme supports the career progression and development of technical experts – in fields ranging from geology to process engineering to asset management and data and optimisation – who wish to remain in technical roles, rather than become operational or line leaders. It provides those recognised as experts with a platform for further career and development opportunities and exposure across the Group.

In 2019, 50 people across our technical disciplines were recognised as experts – individuals whose unique contributions help our company challenge the status quo, introduce innovative solutions for safely managing our technical risks, and deliver productivity gains.

RioExcel delivers a deeper pool of technical expertise for our business – a source of competitive advantage, a more engaged and collaborative technical workforce and safer, more productive and future-ready operations.

50+

men and women recognised via RioExcel

Performance

Safety is our number one priority. We look to generate value from mine to market and also to prioritise value over volume in our investment decisions. We work to maximise value in other ways – for example, by developing new markets for our materials, including as part of the transition to a low-carbon economy. We focus on operational excellence to improve efficiency.

Progressing safety

We ended 2019 with strong performance in safety, improving our process safety and recording our first fatality-free year since we began operations, almost 147 years ago. While we recognise the efforts, Group-wide, that led to this performance, we know we cannot be complacent. And we again pledge to do everything we can to continually improve, and send everyone home safe and healthy.

In 2019, we introduced our safety maturity model (SMM) to expand on our successful critical risk management (CRM) programme. SMM incorporates a holistic approach to risk, work planning and execution, as well as learning, improvement and leadership engagement, including the continued focus on CRM and learning from potentially fatal incidents (PFIs). Our operations completed an initial self-assessment to familiarise themselves with the model. This was then followed by a baseline assessment and an end-of-year assessment led by Group HSE, and supported by an independent operational leader. We were pleased that they demonstrated a strong improvement over their baseline assessments, particularly in leadership and engagement. Across the Group, using a nine-point scale, we saw improvement to an average maturity of 4.5 (classified as evolving) from a baseline of 3.4 (classified as basic).

AIFR 0.42

down from 0.44 in 2018, marking a strong performance in safety

Partners

Partnerships and collaboration are essential to the long-term success of our business. We work closely with technology partners, local suppliers, governments, community groups, industry leaders and NGOs at all stages of the mining lifecycle, from exploration to rehabilitation and closure. We believe this gives us a competitive edge and also allows us to work more thoughtfully and responsibly, and to deliver real benefits to all our stakeholders.

Partnering to address climate change

We have long recognised the reality of climate change and its potential to affect our business, our communities and our world. However, we also recognise that no business can make a meaningful contribution on its own. To that end, this year we continued to form partnerships to help address the climate change challenge.

In September, we signed a memorandum of understanding (MOU) with China Baowu Steel Group and Tsinghua University to develop and implement new methods to reduce carbon emissions and improve environmental performance across the steel value chain. The MOU will enable the formation of a joint working group tasked with identifying a pathway to reducing carbon emissions across the entire steel value chain, which accounts for 7-9% of the world's carbon emissions.

In November, we partnered with the Natural Sciences and Engineering Research Council of Canada (NSERC) to fund a new Industrial Research Chair in Climate Change and Water Security at the University of Northern British Columbia. The C\$1.5 million from NSERC and Rio Tinto support research by Dr. Stephen Déry to quantify the roles of climate variability, climate change and water management in the Nechako River basin's water supply. Our Kitimat aluminium smelter is located in British Columbia, with clean hydropower supplied by the Nechako reservoir.

C\$1.5m

in research funding from NSERC and Rio Tinto

Key performance indicators

The Board uses a range of financial and non-financial metrics, reported periodically, to measure Group performance against the four key areas of our strategy (portfolio, people, performance and partners).

This year we reviewed our key performance indicators (KPIs) and made the following changes:

- We have added return on capital employed (ROCE). This measures how efficiently we generate profits from our assets, reflecting our strategy of investing in a portfolio of low-cost, long-life assets that deliver attractive returns throughout the cycle.
- We have added free cash flow, which measures net cash returned by the business after investment in sustaining and growth capital expenditure.
- We have removed capital expenditure as a standalone key performance indicator as this is a component of the new free cash flow metric.

Non-financial metrics for measuring the people strategic pillar have been developed, including the development in 2019 of a culture and values scorecard. In 2020, we will consider which of these internal metrics will be used as published KPIs in future annual reports.

Key performance indicator definition

All injury frequency rate (AIFR)

The number of injuries per 200,000 hours worked by employees and contractors at operations that we manage. AIFR includes medical treatment cases, restricted workday and lost-day injuries.

Strategic pillar

People Performance Partners

Relevance to strategy & executive remuneration

Safety is our number one priority, one of our core values and an essential component of everything we do. Our goals are to maintain zero fatalities, prevent catastrophic events and reduce injuries. We continually reinforce our safety culture, in part by improving leadership and simplifying tools and systems.

Link to executive remuneration

Included in the short-term incentive plan (see page 113 [AB](#)).

Associated risks

- HSE
- Operational and people

Five-year trend

All injury frequency rate (AIFR) per 200,000 hours worked

2015	<div></div>	0.44
2016	<div></div>	0.44
2017	<div></div>	0.42
2018	<div></div>	0.44
2019	<div></div>	0.42

Performance in 2019

We experienced no fatalities in 2019 and overall delivered strong safety performance. We reduced our AIFR slightly to 0.42 (from 0.44 in 2018) and continued to improve our catastrophic event prevention through a step-change in managing process safety and more assurance over major hazard risks. Over the past five years, our AIFR performance has been strong.

Forward plan

We will:

- Continue to implement our critical-risk management programme and safety maturity model
- Strengthen our safety leadership and coaching programmes
- Work more closely with contractors and joint-venture partners to improve our safety record
- Continue to implement our major hazard standards, including process safety, water and tailings, with strong assurance processes
- Simplify critical safety tools

Key performance indicator definition**Total shareholder return (TSR)¹**

Combination of share price appreciation (using annual average share price) and dividends paid and reinvested to show the total return to the shareholder over the preceding five years.

Underlying earnings and underlying EBITDA

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. These items are explained in note 2 of the financial statements.

Underlying EBITDA represents profit before tax, net finance items, depreciation and amortisation. It excludes the EBITDA impact of the items mentioned above.

Strategic pillar**Portfolio Performance****Relevance to strategy & executive remuneration**

Our strategy aims to maximise shareholder returns through the commodity cycle, and TSR is a direct measure of that.

Link to executive remuneration

Reflected in long-term incentive plans, measured equally against the EMIX Global Mining Index and the MSCI World Index (see page 113 ^{AR}).

Portfolio Performance

These financial KPIs measure how well we are managing costs, increasing productivity and generating the most revenue from each of our assets.

Link to executive remuneration

Underlying earnings is reflected in the short-term incentive plan; in the longer term, both measures influence TSR, which is the primary measure for long-term incentive plans (see page 113 ^{AR}).

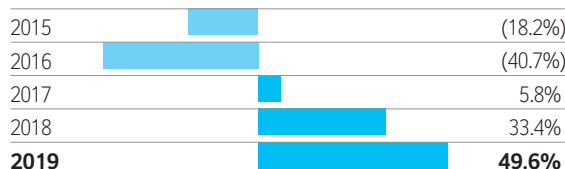
Associated risks

- Market
- Strategic
- Communities and other key stakeholders

- Market
- Communities and other key stakeholders
- Operational and people

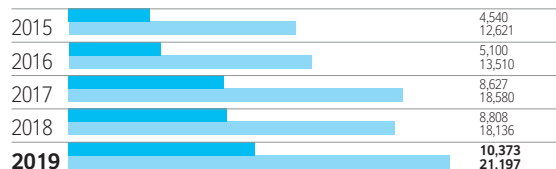
Five-year trend**Total shareholder return (TSR)**

measured over the preceding five years (using annual average share price)

**Underlying earnings and underlying EBITDA**

\$ millions

■ Underlying EBITDA ■ Underlying earnings

**Performance in 2019**

The share prices of Rio Tinto plc and Rio Tinto Limited reached new highs in 2019. TSR performance over the five-year period was driven principally by movements in commodity prices and changes in the global macro environment. Rio Tinto significantly outperformed the EMIX Global Mining Index over the five-year period, and slightly outperformed the MSCI World Index.

Underlying earnings of \$10.4 billion were \$1.6 billion higher than in 2018. Underlying EBITDA of \$21.2 billion was \$3.1 billion higher than 2018. The 17% increase in underlying EBITDA resulted from higher iron ore prices, partly offset by lower prices for aluminium and copper, higher costs and the absence of contributions from assets divested in 2018.

Forward plan

We will continue to focus on generating the free cash flow from our operations that allows us to return cash to shareholders (short-term returns) while investing in the business (long-term returns).

We will continue to drive superior margins and returns through a focus on operational and commercial excellence and our value over volume approach.

¹ The TSR calculation for each period is based on the change in the calendar year average share prices for Rio Tinto plc and Rio Tinto Limited over the preceding five years. This is consistent with the methodology used for calculating the vesting outcomes for Performance Share Awards (PSA). The data presented in this chart accounts for the dual corporate structure of Rio Tinto.

Key performance indicators

continued

Key performance indicator definition

Return on capital employed (ROCE)

Underlying earnings before interest divided by average capital employed (operating assets before net debt).

Net cash generated from operating activities

Cash generated by our operations after tax and interest, including dividends received from equity accounted units and dividends paid to non-controlling interests in subsidiaries.

Strategic pillar

Portfolio Performance

Portfolio Performance

Relevance to strategy & executive remuneration

Our portfolio of low-cost, long-life assets delivers attractive returns throughout the cycle and has been reshaped significantly in recent years. ROCE measures how efficiently we generate profits from investment in our portfolio of assets.

Link to executive remuneration

Underlying earnings, as a component of ROCE, is included in the short-term incentive plan. In the longer term, ROCE also influences TSR, which is included in long-term incentive plans.

This KPI measures our ability to convert underlying earnings into cash.

Link to executive remuneration

Included in the short-term incentive plan; in the longer term, the measure influences TSR which is included in long-term incentive plans (see page 113 [AB](#)).

Associated risks

- Market
- Strategic
- Financial
- Operational and people

- Market
- Communities and other key stakeholders
- Operational and people

Five-year trend

Return on capital employed (ROCE)

%

2015		9%
2016		11%
2017		18%
2018		19%
2019		24%

Net cash generated from operating activities

\$ millions

2015		9,383
2016		8,465
2017		13,884
2018		11,821
2019		14,912

Performance in 2019

ROCE increased five percentage points to 24% in 2019, reflecting the increase in underlying earnings driven by higher iron ore prices combined with the restructuring of our portfolio through divestments and investment in growth.

Net cash generated from operating activities of \$14.9 billion was 26% higher than 2018. This was primarily due to higher iron ore prices and favourable working capital movements, partly offset by higher taxes paid in 2019 relating to the 2018 coking coal disposals.

Forward plan

We will continue to focus on maximising returns from our assets over the short, medium and long term. We will also maintain our disciplined and rigorous approach and invest capital only in projects that we believe will deliver returns that are well above our cost of capital.

We will focus on effectively converting earnings into cash, underpinned by operational and commercial excellence, including our careful management of working capital.

Key performance indicator definition	Free cash flow Net cash generated from operating activities minus purchases of property, plant and equipment and payments of lease principal, plus sales of property, plant and equipment.	Net debt Net borrowings after adjusting for cash and cash equivalents, other liquid investments and derivatives related to net debt (see note 24 of the financial statements).																														
Strategic pillar	Portfolio Performance	Portfolio Performance																														
Relevance to strategy & executive remuneration	<p>This KPI measures the net cash returned by the business after the expenditure of sustaining and growth capital. This cash can be used for shareholder returns, reducing debt and other investment.</p> <p><i>Link to executive remuneration</i> Included in the short-term incentive plan; in the longer term, the measure influences TSR which is included in long-term incentive plans (see page 113 ^{AR}).</p>	<p>This measures how we are managing our balance sheet and capital structure. A strong balance sheet is essential for giving us flexibility to take advantage of opportunities as they arise, and for returning cash to shareholders.</p> <p><i>Link to executive remuneration</i> Net debt is, in part, an outcome of free cash flow, which itself is reflected in the short-term incentive plan. In the longer term, net debt influences TSR which is reflected in long-term incentive plans (see page 113 ^{AR}).</p>																														
Associated risks	<ul style="list-style-type: none"> – Market – Strategic – Financial – Communities and other key stakeholders – Operational and people 	<ul style="list-style-type: none"> – Market – Strategic – Financial – Communities and other key stakeholders – Operational and people 																														
Five-year trend	Free cash flow \$ millions <table> <tr><td>2015</td><td></td><td>4,795</td></tr> <tr><td>2016</td><td></td><td>5,807</td></tr> <tr><td>2017</td><td></td><td>9,540</td></tr> <tr><td>2018</td><td></td><td>6,977</td></tr> <tr><td>2019</td><td></td><td>9,158</td></tr> </table>	2015		4,795	2016		5,807	2017		9,540	2018		6,977	2019		9,158	Net cash/(net debt) \$ millions <table> <tr><td>2015</td><td></td><td>(13,783)</td></tr> <tr><td>2016</td><td></td><td>(9,587)</td></tr> <tr><td>2017</td><td></td><td>(3,845)</td></tr> <tr><td>2018</td><td></td><td>255</td></tr> <tr><td>2019</td><td></td><td>(3,651)</td></tr> </table>	2015		(13,783)	2016		(9,587)	2017		(3,845)	2018		255	2019		(3,651)
2015		4,795																														
2016		5,807																														
2017		9,540																														
2018		6,977																														
2019		9,158																														
2015		(13,783)																														
2016		(9,587)																														
2017		(3,845)																														
2018		255																														
2019		(3,651)																														
Performance in 2019	Free cash flow increased by \$2.2 billion to \$9.2 billion in 2019, primarily due to the increase in net cash generated from operating activities. This was partially offset by lower proceeds from sales of property, plant and equipment. Capital expenditure was in line with 2018.	Net debt increased by \$3.9 billion from net cash of \$255 million to net debt of \$3.7 billion. This reflects \$11.9 billion of cash returns to shareholders in 2019 through dividends and share buy-backs and a \$1.2 billion non-cash increase from the implementation of IFRS 16 “Leases”, partly offset by free cash flow of \$9.2 billion.																														
Forward plan	We aim to continue our focus on free cash flow generation through the cycle. We expect capital expenditure to be approximately \$7 billion in 2020 and \$6.5 billion in both 2021 and 2022.	We believe that a strong balance sheet is a major competitive advantage and essential in a cyclical business. We will therefore continue to manage net debt carefully.																														

Key performance indicators

continued

Key performance indicator definition

Total greenhouse gas (GHG) emissions intensity

Total GHG emissions from managed operations, expressed in metric tonnes of carbon dioxide equivalent (tCO₂e), per unit of commodity production relative to the 2008 base year. Emissions include direct emissions, plus emissions from imports of electricity and steam, minus electricity and steam exports.

Strategic pillar

Performance Partners

Relevance to strategy & executive remuneration

Climate risks and opportunities have formed part of our strategic thinking and investment decisions for over two decades. We now have a portfolio that is well positioned for the transition to a low-carbon economy.

Link to executive remuneration

Our Chief Executive's performance objectives are reflected in his short-term incentive plan (STIP), which includes delivery of the Group's strategy on climate change consistent with the new 2030 targets. These are cascaded down into the annual objectives of relevant members of the Executive Committee and other members of senior management.

Associated risks

- Market
- Strategic
- Climate change
- Communities and other key stakeholder
- Operational and people

Five-year trend

Emissions intensity of our managed operations (intensity, 2008 = 100)

2015	<div></div>	79.7
2016	<div></div>	74.4
2017	<div></div>	72.9
2018	<div></div>	71.6 ¹
2019	<div></div>	70.6

Performance in 2019

In 2019, the emissions intensity of our managed operations fell to 70.6 (2008 = 100) and the percentage of our electricity consumption from renewable sources rose from 71% to 76%. We shut our coal power plant and purchased renewable energy certificates at our Kennecott copper operations. This reduces the operation's annual carbon footprint by as much as 65%, or the equivalent of more than a million tonnes of carbon dioxide.

Forward plan

Our ambition is to reach net zero emissions by 2050 across our operations. Our 2030 targets are to reduce our emissions intensity by 30% and our absolute emissions by 15%, compared with our 2018 equity baseline.

We plan to spend approximately \$1 billion over five years on emissions reduction projects, research and development, and activities to enhance the climate resilience of our business.

Climate change is a global challenge and will require action across nations, across industries, and by society at large. We want to play our part.

¹ Number adjusted from previous years to ensure comparability over time.

Chief Financial Officer's statement



Underlying EBITDA

\$21.2bn

17% increase

Net cash generated from operating activities

\$14.9bn

26% increase

Net debt

\$3.7bn

At 2019 year-end

Our high-quality portfolio of long-life, competitive assets has consistently generated superior returns and cash flow.

Strong financial results, supported by price

We increased our revenues by 7% to \$43.2 billion (\$45.4 billion including equity accounted units), primarily due to higher iron ore prices. This more than compensated for lower copper and aluminium prices and the absence of revenues from our divestments in 2018, primarily the coking coal assets.

Our underlying EBITDA of \$21.2 billion increased by 17% compared with 2018, and the underlying EBITDA margin was 47%. Higher prices and weaker local currencies, compared with the US dollar, were the principal drivers of the increase, adding around \$4.9 billion in aggregate to EBITDA. Our iron ore shipments were 3% lower in 2019 following weather disruptions and operational challenges in the first half of the year. However, we were able to offset this impact following a strong second half for Iron Ore, higher bauxite volumes, improved aluminium product mix and an increase in by-products from our copper mines, mainly gold and molybdenum.

We saw a \$0.5 billion increase in cash operating costs, which we present on a unit cost basis. This was primarily comprised of higher Iron Ore unit costs driven by first half challenges in the Pilbara, partly offset by reduced operating costs in aluminium from lower input prices and productivity improvements.

The movement from 2018 to 2019 underlying EBITDA also reflects the absence of approximately \$1.2 billion of contributions from assets divested in 2018, primarily the coking coal business in Australia and the Grasberg copper mine in Indonesia.

Making disciplined investments for the future

Our capital allocation framework is well defined. We will continue to invest in safely managing our assets and improving their performance. This means that sustaining capital expenditure is always a priority, reflected in our decision at the half year to lift our sustaining investment to approximately \$2.5 billion per year going forward.

Our investment decisions are carried out with considerable rigour and diligence. I believe this provides the best assurance for our shareholders that we will only invest in opportunities that create value.

In 2019, our capital expenditure was \$5.5 billion, reflecting our commitment to invest through the cycle. This comprised \$2.6 billion of development capital, of which \$1.2 billion was replacement capital, and \$2.9 billion of sustaining capital. Our most significant growth project remains the Oyu Tolgoi copper-gold underground project in Mongolia, where we invested \$1.3 billion in 2019 on a 100% basis, as we fully consolidate Oyu Tolgoi. And we are ramping up our investments over the coming years with the replacement of iron ore production in the Pilbara, where we have commenced construction of the Koodaideri and Robe River sustaining mines.

Chief Financial Officer's statement continued

A strong balance sheet creates resilience and optionality

We ended 2019 with net debt of \$3.7 billion, an increase of \$3.9 billion since 2018. This is due to the \$4.8 billion of shareholder returns we paid in 2019 from divestment proceeds received in 2018, as well as the adoption of IFRS16 "Leases" on 1 January 2019, which increased net debt by \$1.2 billion.

Our world-class assets, combined with a strong balance sheet, support our ability to provide superior cash returns to our shareholders. They also enable us to manage the business through the cycle – allowing us to act counter-cyclically and providing us with optionality. Our strong balance sheet is particularly valuable in the current volatile environment, which has been compounded by the Covid-19 virus. We are evaluating the current situation, and all our operations are looking at opportunities to adjust to any changes in market conditions.

Our pay-out ratio continues to exceed the returns policy

We implemented our returns policy in 2016, committing to total cash returns to shareholders, through the cycle, of 40 – 60% of underlying earnings, on average. Since its implementation, we have consistently paid out well above this range each year.

2019 was no exception – we are returning 70% of underlying earnings to shareholders. This includes the final ordinary dividend of 231 US cents per share which brings total dividends for the year to 443 US cents, or \$7.2 billion.

As we look to the future, I am confident our high-quality portfolio will continue to generate superior returns over the short, medium and long term.



Jakob Stausholm
Chief Financial Officer
26 February 2020

Our world-class assets, combined with a very strong balance sheet, support our ability to provide superior cash returns to our shareholders. It also enables us to manage the business through cycles – allowing us to act counter-cyclically and providing us with optionality.

Financial review

Non-GAAP measures

In addition to IFRS measures, management uses non-GAAP measures internally to assess performance. Full reconciliations are provided in the notes to the financial statements. These measures are highlighted with the symbol: •

At year end	2019	2018	Change
Net cash generated from operating activities (US\$ millions)	14,912	11,821	26%
Capital expenditure ¹ (US\$ millions)	5,488	5,430	1%
Free cash flow ² (US\$ millions) •	9,158	6,977	31%
Underlying EBITDA ³ (US\$ millions) •	21,197	18,136	17%
Underlying earnings ³ (US\$ millions) •	10,373	8,808	18%
Net earnings (US\$ millions)	8,010	13,638	(41)%
Underlying earnings ³ per share (US cents) •	636.3	512.3	24%
Ordinary dividend per share (US cents)	382.0	307.0	24%
Total dividend per share (US cents)	443.0	550.0	(19)%
Net (debt)/cash ⁴ (US\$ millions) •	(3,651)	255	
Return on capital employed (ROCE) ⁵ •	24%	19%	

Our financial results are prepared in accordance with International Financial Reporting Standards (IFRS). Footnotes are set out on page 31.

- Strong safety performance in 2019, with no fatalities and a slightly improved all injury frequency rate, coming from a strong base. Continued improvement in prevention of catastrophic events through a step-change in process safety management.
- \$14.9 billion operating cash flow was 26% higher than 2018 and \$9.2 billion free cash flow² was 31% higher than 2018. Both are presented after \$0.9 billion tax paid in 2019 relating to the 2018 coking coal disposals.
- \$5.5 billion capital expenditure¹ was consistent with 2018. In late 2019, we announced the approval of two further investments, at Greater Tom Price (iron ore, \$0.8 billion) and Kennecott (copper, \$1.5 billion).
- \$21.2 billion underlying EBITDA³ was 17% above 2018, primarily driven by higher iron ore prices, with an underlying EBITDA margin⁷ of 47%.
- \$10.4 billion underlying earnings were 18% above 2018. Taking exclusions into account, net earnings of \$8.0 billion were 41% lower than 2018, mainly reflecting \$1.7 billion⁸ of impairments in 2019, primarily the Oyu Tolgoi underground project, consistent with our 2019 interim results, and the Yarwun alumina refinery. This compared with \$4.0 billion of gains on disposals in 2018.
- Strong balance sheet with net debt⁴ of \$3.7 billion, a rise of \$3.9 billion, mainly reflected \$11.9 billion of cash returns to shareholders in 2019 through dividends and share buy-backs, and a \$1.2 billion non-cash increase from the implementation of IFRS 16 “Leases”, partly offset by free cash flow of \$9.2 billion.
- \$7.2 billion full-year dividend, equivalent to 443 US cents per share and 70% of underlying earnings, includes \$3.7 billion record final ordinary dividend (231 US cents per share).

Stronger revenues and underlying EBITDA

- \$43.2 billion consolidated sales revenue (\$45.4 billion including our share of equity accounted units) was 7% higher than 2018, primarily driven by higher iron ore prices. This was partially offset by lower copper and aluminium prices and the absence of revenues from assets divested in 2018.
- \$21.2 billion underlying EBITDA³ was 17% higher than 2018, reflecting the higher iron ore price and the recovery from the operational challenges earlier in the year. This more than compensated for higher unit costs and the absence of underlying EBITDA from assets divested in 2018.
- 30% effective tax rate on underlying earnings³ – one percentage point higher than in 2018, primarily reflecting increased profits in Australia.
- \$8.0 billion net earnings – 41% lower than 2018, mainly reflecting the impairments of Oyu Tolgoi and Yarwun alumina refinery in 2019, which compared with gains on disposals in 2018. See table on page 34.

\$7.2 billion of dividends declared for 2019

	US\$ billion	US cents per share
Ordinary dividend		
Interim ordinary dividend paid in September 2019	2.5	151
Final ordinary dividend to be paid in April 2020	3.7	231
Full-year ordinary dividend	6.2	382
Additional returns		
Special dividend paid in September 2019	1.0	61
Combined total is 70% of 2019 underlying earnings	7.2	443

Financial review continued

Strong cash flow from operations drives free cash flow

	2019 US\$m	2018 US\$m
Net cash generated from operating activities	14,912	11,821
Capital expenditure ¹	(5,488)	(5,430)
Sales of property, plant and equipment	49	586
Lease principal payments	(315)	–
Free cash flow²	9,158	6,977
Disposals*	(80)	7,733
Dividends paid to equity shareholders	(10,334)	(5,356)
Share buy-backs	(1,552)	(5,386)
Non-cash impact from implementation of IFRS 16 “Leases” from 1 January 2019	(1,248)	–
Other	150	132
(Increase)/decrease in net debt⁴	(3,906)	4,100

* Net disposal proceeds include a cash outflow representing Rössing’s cash balance at the date of the sale. See page 34. See page 31 for other footnotes.

- \$14.9 billion in cash generated from operating activities, after \$0.9 billion tax paid relating to the 2018 coking coal disposals. This was 26% higher than 2018 and was driven primarily by higher underlying EBITDA from higher iron ore prices and the ongoing management of working capital.
- \$5.5 billion capital expenditure¹ comprised of \$2.6 billion of development capital, of which \$1.2 billion is replacement capital, and \$2.9 billion of sustaining capital.
- \$10.3 billion of dividends paid in 2019 comprised of the 2018 final and special dividends paid in April 2019 (\$6.8 billion) and the 2019 interim and special dividends paid in September 2019 (\$3.5 billion).
- \$1.6 billion paid for 28.4 million share repurchases under the Rio Tinto plc on-market share buy-backs announced in 2018, with the remaining \$0.2 billion purchases to be completed no later than 28 February 2020.
- The implementation of IFRS 16 “Leases” on 1 January 2019 increased net debt by \$1.2 billion (non-cash movement).
- As a result of the above, and \$0.2 billion of other movements, net debt⁴ increased by \$3.9 billion since the end of 2018 to \$3.7 billion.

Continued investment in growth projects and development

- Greenfield success with further encouraging drill results released in August 2019 at the Winu project in Western Australia. Extensive drilling and geophysical testing programme completed: geotechnical, hydrology, mining, processing and basic engineering studies are well advanced. Targeting first production in 2023, subject to regulatory approvals and consents.
- \$624 million spent on exploration and evaluation. This 28% rise was mostly driven by higher greenfield expenditure to underpin future growth projects, as well as increased activity at the Resolution copper project in Arizona, for which we committed \$302 million (\$166 million our 55% share) in future expenditure.
- \$2.6 billion Koodaideri replacement iron ore mine progressed, with key construction activities on schedule. Koodaideri will have a 43 Mt annual capacity underpinning production of our Pilbara Blend™, with first tonnes in late 2021.
- \$1.5 billion investment at Kennecott approved in late 2019. Phase 2 of the south wall pushback is expected to extend copper operations to 2032.
- At the Oyu Tolgoi underground copper/gold mine in Mongolia, we completed the primary production shaft in October 2019, a key milestone. Work continued on the mine design and, overall, we remain within the cost and schedule ranges announced in July 2019. We continue to expect to complete the mine design in the first half of 2020 and the definitive estimate⁹ of cost and schedule in the second half of 2020.
- \$463 million investment in the Zulti South project at Richards Bay Minerals (RBM) in South Africa approved in 2019 to sustain current capacity and extend mine life. Construction is on hold after a number of security incidents – we will assess a restart after normalisation of operations at RBM.

Total cash returns to shareholders declared

	2019 US\$ billion	2018 US\$ billion
Ordinary dividend		
Interim	2.5	2.2
Final	3.7	2.9
Full-year dividend	6.2	5.1
Additional returns		
Share buy-back announced in August 2018, completed by 27 February 2019	n/a	1.0
Special dividend announced in August 2019, paid in September 2019	1.0	n/a
Total cash returns from operations	7.2	6.1
Combined total as % of underlying earnings	70%	72%
Supplementary returns of post-tax divestment proceeds in 2018		
Off-market buy-back in Rio Tinto Limited, completed in November 2018	n/a	2.1
On-market buy-back in Rio Tinto plc from 28 February 2019 to 28 February 2020	n/a	1.1
Special dividend of 243 US cents per share paid in April 2019	n/a	3.9
Total supplementary returns	n/a	7.1
Total cash returns to shareholders declared for each year	7.2	13.2

Total dividends paid in 2019 in respect of 2018 differ from the 2018 declaration of \$13.5 billion due to the impact of exchange rates and the share buy-back.

Total cash returns paid to shareholders

	2019 US\$ billion	2018 US\$ billion
Previous year's final ordinary dividend paid in April of each year	2.9	3.2
Special dividend announced in February 2019, paid in April 2019	3.9	n/a
Interim ordinary dividend paid in September of each year	2.5	2.1
Special dividend announced in August 2019, paid in September 2019	1.0	n/a
Share buy-backs	1.6	5.4
Total cash returns paid to shareholders	11.9	10.7

- 1 Capital expenditure is presented gross, before taking into account any cash received from disposals of property, plant and equipment (PP&E) and excludes capital expenditure for equity accounted units.

The following financial performance indicators – which are non-GAAP measures – are those management uses internally to assess performance. We therefore consider them relevant to readers of this document and present them here to give more clarity around the underlying business performance of our operations.

- 2 Free cash flow is defined as net cash generated from operating activities less purchase of PP&E, plus sales of PP&E less lease principal payments, following the adoption of IFRS 16 "Leases" in 2019.
- 3 Net and underlying earnings relate to profit attributable to the owners of Rio Tinto. Underlying EBITDA and earnings are defined on page 254 ⁴⁹. Underlying earnings is reconciled to net earnings on page 35.
- 4 Net debt / cash is defined and reconciled to the balance sheet on page 188 ⁴⁹.
- 5 Net gearing ratio is defined as net debt divided by the sum of net debt and total equity at the end of each period.
- 6 Return on capital employed (ROCE) is defined as underlying earnings excluding net interest divided by average capital employed (operating assets before net debt).
- 7 Underlying EBITDA margin is defined as the Group's underlying EBITDA divided by Product Group total revenues per the financial information by business unit on page 252 ⁴⁹. Product Group total revenues is defined as consolidated sales revenue plus share of equity accounted unit sales and intra-subsidiary/equity accounted unit sales.
- 8 See page 173 ⁴⁹ for a pre-tax analysis of impairment charge.
- 9 Refer to the 16 July 2019 market release "Update on Oyu Tolgoi underground project".

Financial review continued

Underlying EBITDA and underlying earnings by product group

	2019 US\$m	2018 US\$m	Change	Change %
Underlying EBITDA				
Iron Ore	16,098	11,378	4,720	41%
Aluminium	2,285	3,095	(810)	(26)%
Copper & Diamonds	2,073	2,776	(703)	(25)%
Energy & Minerals	1,762	2,140	(378)	(18)%
Other operations	(77)	(70)	(7)	10%
Reportable segment total	22,141	19,319	2,822	15%
Inter-segment transactions	(9)	–	(9)	–
Product group total	22,132	19,319	2,813	15%
Central pension costs, share-based payments and insurance	59	(128)	187	(146)%
Restructuring, project and one-off costs	(183)	(272)	89	(33)%
Other central costs	(496)	(552)	56	(10)%
Exploration and evaluation	(315)	(231)	(84)	36%
Total	21,197	18,136	3,061	17%
Underlying earnings				
Iron Ore	9,638	6,531	3,107	48%
Aluminium	599	1,347	(748)	(56)%
Copper & Diamonds	554	1,054	(500)	(47)%
Energy & Minerals	611	995	(384)	(39)%
Other operations	(89)	(102)	13	(13)%
Reportable segment total	11,313	9,825	1,488	15%
Inter-segment transactions	(3)	–	(3)	–
Product group total	11,310	9,825	1,485	15%
Central pension costs, share-based payments and insurance	60	(90)	150	(167)%
Restructuring, project and one-off costs	(94)	(190)	96	(51)%
Other central costs	(550)	(410)	(140)	34%
Exploration and evaluation	(231)	(193)	(38)	20%
Net interest	(122)	(134)	12	(9)%
Total	10,373	8,808	1,565	18%

Underlying EBITDA is a key financial indicator which management uses internally to assess performance. It excludes the same items that are excluded in arriving at underlying earnings. See page 252 [🔗](#) for more detail and a reconciliation to profit on ordinary activities before finance items and tax.

Commentary on financial results

To give 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
2018 underlying EBITDA	18,136
Prices	4,382
Exchange rates	529
Volumes and mix	(20)
General inflation	(303)
Energy	75
Operating cash cost movements	(523)
Higher exploration and evaluation spend	(136)
One-off items	(16)
Absence of underlying EBITDA from assets divested in 2018, including coking coal	(1,246)
Non-cash costs/other	319
2019 underlying EBITDA	21,197

Significant momentum from higher iron ore prices

Commodity price movements in 2019 increased underlying EBITDA by \$4,382 million compared with 2018. This was primarily driven by the strength in the iron ore price and was partly offset by lower prices for copper and aluminium. We have included a table of prices and exchange rates on page 298 [AR](#).

The Platts index for 62% iron fines was 39% higher on average compared with 2018 on a free on board (FOB) basis, driven by supply disruptions in the seaborne market and strong demand following record Chinese steel output.

Average London Metal Exchange (LME) prices for copper and aluminium were 8% and 15% lower, respectively, compared with 2018, as global manufacturing activity slowed. The gold price was 10% higher.

The 10% tariff on US imports of aluminium from Canada, in place from 1 June 2018, was removed on 19 May 2019, following agreement between the US and Canadian governments. The midwest premium for aluminium in the US averaged \$320 per tonne - 24% lower than in 2018.

Underlying EBITDA benefits from weaker A\$

Compared with 2018, on average the US dollar strengthened by 7% against the Australian dollar, by 3% against the Canadian dollar and by 9% against the South African rand. Currency movements increased underlying EBITDA by \$529 million relative to 2018.

Volumes flat overall

Underlying EBITDA decreased by \$20 million compared with 2018 from movements in sales volumes and changes in product mix. A 3% decline in iron ore shipments from the Pilbara, where we experienced weather disruptions and operational challenges at some of our mines in the first half of 2019, were mostly offset by increased bauxite shipments, improved aluminium product mix and higher by-product volumes (gold and molybdenum) from Kennecott and Oyu Tolgoi.

Energy prices marginally lower

Average movements in energy prices compared with 2018 improved underlying EBITDA by \$75 million, mainly due to lower diesel prices.

Continued cost pressures

Our cash operating costs rose by \$523 million compared with 2018 (on a unit cost basis), primarily reflecting an increase in iron ore unit costs, driven by the first half challenges. There was some respite on cost inflation for certain raw materials for Aluminium, in particular caustic soda and petroleum coke. However, this was partly offset by inflationary pressures on other costs.

Advancing our options through increased exploration spend

We spent \$136 million, or 28%, more on exploration and evaluation compared with last year. This went to our highest value projects, particularly on evaluating the Resolution copper project in Arizona, advancing our Winu copper/gold deposit in Australia and progressing our Falcon diamond project in Canada.

One-off items

One-off items aggregated to be \$16 million less than in 2018. 2019 underlying EBITDA includes the impact of a \$199 million charge at Escondida to reflect the cancellation of existing coal power contracts, a \$68 million impact from the curtailment of operations at Richards Bay Minerals (RBM) and \$68 million for operational challenges faced at our ISAL and Kitimat aluminium smelters.

In 2018 we suspended operations for two months at Iron Ore Company of Canada before reaching a new labour agreement (\$236 million impact). We also suspended production at Rio Tinto Iron & Titanium, following a fatality at our Sorel-Tracy plant and labour disruptions at RBM (\$132 million impact).

\$1.2 billion lower underlying EBITDA following divestments in 2018, primarily coal

The significant divestments in 2018 generated \$1,246 million of underlying EBITDA in 2018, primarily the coking coal business and the Grasberg copper mine. Movements in our non-cash costs and other items lowered underlying EBITDA by \$319 million compared with 2018. Following implementation of IFRS 16 "Leases" on 1 January 2019, a large proportion of our lease expense comprises charges for depreciation and interest and is not included in cash operating costs. In 2019, there was a consequent benefit to underlying EBITDA of approximately \$320 million from this change in treatment.

Financial review continued

Net earnings, underlying earnings and underlying EBITDA

In order to provide additional insight into the performance of its business, Rio Tinto reports underlying EBITDA and underlying earnings. The differences between underlying earnings, underlying EBITDA, and net earnings are set out in this table.

Net earnings

\$8.0bn

Net earnings

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

	US\$m
2018 net earnings	13,638
Total changes in underlying EBITDA	3,061
Increase in depreciation and amortisation (pre-tax) in underlying earnings	(366)
Decrease in interest and finance items (pre-tax) in underlying earnings	32
Increase in tax on underlying earnings	(1,011)
Increase in underlying earnings attributable to outside interests	(151)
Total changes in underlying earnings	1,565
Changes in exclusions from underlying earnings:	
Movement in net impairment charges	(1,554)
Movement in gains on consolidation and gains on disposals	(4,287)
Movement in exchange differences and gains/losses on derivatives	(904)
Other	(448)
2019 net earnings	8,010

Depreciation and amortisation, net interest and tax

Our depreciation and amortisation charge was \$0.4 billion higher than 2018. This was primarily due to the inclusion of depreciation on leases brought on to the balance sheet on adoption of IFRS 16 and completion of the Amrun bauxite mine. The increase was partly offset by the impact of the weaker Australian and Canadian dollars against the US dollar, along with assets divested in 2018.

Interest and finance items (pre-tax) were broadly in line with 2018. This was mainly due to the bond tender we completed in 2018, which reduced our gross debt by \$1.9 billion equivalent and incurred \$0.1 billion in early redemption costs in 2018. In 2019, there was also a lower level of average net debt and an increase in capitalised interest. This was offset by the inclusion of interest expense on leases following adoption of IFRS 16 "Leases" in 2019.

The 2019 effective corporate income tax rate on underlying earnings, excluding equity accounted units, was 30%, compared with 29% in 2018. The effective tax rate on underlying earnings in Australia was 31% in 2019 compared with 30% in 2018. We anticipate an effective tax rate on underlying earnings of approximately 30% in 2020.

Items excluded from underlying earnings

Net impairment charges increased by \$1.6 billion compared with 2018, primarily related to the Oyu Tolgoi underground project in Mongolia and the Yarwun alumina refinery in Queensland, Australia.

On 16 July 2019, we announced that completion of the definitive estimate for the Oyu Tolgoi underground project would be delayed until the second half of 2020. We also indicated that first sustainable production could be delayed by 16 to 30 months compared with the original feasibility study guidance in 2016 and that development capital spend may increase by \$1.2 billion to \$1.9 billion over the \$5.3 billion previously disclosed. These matters were identified as an impairment trigger, so we carried out an assessment of the recoverable amount of the project as at 30 June 2019. This resulted in an impairment charge of \$0.8 billion, after tax and non-controlling interests, which was included in our 2019 interim results. On page 173 [AR](#) there is a detailed explanation of the impairment process.

In 2019, we recognised a \$0.8 billion impairment charge (after tax) related to the Yarwun alumina refinery. In prior years, for accounting purposes, the value of Yarwun was considered in aggregate with Queensland Alumina and the Weipa bauxite mine. The ramp-up of the Amrun expansion at Weipa resulted in increased bauxite exports to the extent that Weipa is now considered to generate cash inflows largely independent from the downstream alumina operations.

In 2018, we recognised \$0.1 billion of after tax charges, mainly relating to the carrying value of the ISAL aluminium smelter in Iceland following its reclassification to assets held for sale. In 2019, we recognised a further \$0.1 billion post-tax charge as these assets were reclassified back out of assets held for sale.

Gains on disposals were \$4.3 billion lower than 2018. In 2019, we recognised a \$0.3 billion loss (after tax) from the sale of Rössing Uranium, including a non-cash adjustment for historical foreign exchange losses. In 2018, we realised net gains of \$4.0 billion (after tax), primarily from the sale of our Hail Creek and Kestrel coking coal businesses in Australia, the sale of our interest in the Grasberg copper mine in Indonesia and the formation of the ELYSIS joint venture in Canada. We created this joint venture in May 2018 with Alcoa, supported by Apple and the governments of Canada and Quebec, to develop a carbon-free aluminium smelting process and recognised a gain of \$0.1 billion (post-tax) on forming the joint venture.

Exchange differences and gains/losses on derivatives were \$0.9 billion lower than 2018. In 2019, these gave rise to a \$0.2 billion after tax loss. This compared with gains of \$0.7 billion in 2018 - 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 exchange gains are largely offset by currency translation losses recognised in equity. The quantum of US dollar debt is largely unaffected and we will repay it from US dollar sales receipts.

There were \$0.4 billion in other changes in items excluded from underlying earnings. In 2019, we recognised a \$0.2 billion loss (after tax) related to provisions for obligations in respect of legacy operations. In 2018, we recognised a \$0.6 billion gain on sale of surplus land at Kitimat and a \$0.3 billion increase in the closure provision at the Argyle diamond mine.

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 2019 was \$8.0 billion (2018: \$13.6 billion). We recorded a profit after tax in 2019 of \$7.0 billion (2018: \$13.9 billion) of which a loss of \$1.0 billion (2018 profit: \$0.3 billion) was attributable to non-controlling interests.

Net earnings, underlying earnings and underlying EBITDA

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

	2019 US\$m	2018 US\$m
Underlying earnings	10,373	8,808
Items excluded from underlying earnings		
Impairment charges	(1,658)	(104)
Net (losses)/gains on consolidation and disposal of interests in businesses	(291)	3,996
Foreign exchange and derivative (losses)/gains on net debt and intragroup balances and derivatives not qualifying for hedge accounting	(200)	704
Losses from increases to closure estimates (non-operating and fully impaired sites)	–	(335)
Gain relating to surplus land at Kitimat	–	569
Other exclusions	(214)	–
Net earnings	8,010	13,638

The explanation of excluded items is on page 170 [AR](#). On page 170 [AR](#) there is a detailed reconciliation from underlying earnings to net earnings, including pre-tax amounts and additional explanatory notes. The differences between underlying EBITDA, EBITDA and net earnings are set out in this table.

	2019 US\$m	2018 US\$m
Underlying EBITDA	21,197	18,136
Net (losses)/gains on consolidation and disposal of interests in businesses	(291)	4,622
(Losses)/gains on embedded commodity derivatives not qualifying for hedge accounting (including exchange)	(260)	279
Gain on sale of wharf and land in Kitimat, Canada	–	602
Change in closure estimate	–	(376)
Change in other exclusions	(171)	–
EBITDA	20,475	23,263
Depreciation and amortisation in subsidiaries excluding capitalised depreciation	(4,272)	(3,909)
Impairment charges	(3,487)	(132)
Depreciation and amortisation in equity accounted units	(653)	(650)
Finance items in subsidiaries	(648)	(33)
Taxation in subsidiaries	(4,147)	(4,242)
Taxation and finance items in equity accounted units	(296)	(372)
Less loss/(profit) attributable to non-controlling interests	1,038	(287)
Net earnings	8,010	13,638

Financial review continued

Balance sheet

Our net debt of \$3.7 billion increased by \$3.9 billion in 2019, reflecting final, interim and special dividend payments of \$10.3 billion and \$1.6 billion of share buy-backs, partly offset by our strong free cash flow. It also reflects a non-cash increase of \$1.2 billion following the implementation of IFRS 16 "Leases" from 1 January 2019. The introduction of IFRS 16 also resulted in a benefit to underlying EBITDA of approximately \$320 million as a large proportion of lease payments are no longer charged to cash operating costs. There was no significant impact on net earnings, after the increase in depreciation and interest on leases.

Our net gearing ratio (net debt to total capital) increased to 7% at 31 December 2019 (31 December 2018: negative 1%).

Our total financing liabilities at 31 December 2019 (see page 188 [AR](#)) were \$14.3 billion (31 December 2018: \$13.0 billion) and the weighted average maturity was around 10 years. At 31 December 2019, approximately 76% of these liabilities were at floating interest rates (84% 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 \$10.6 billion in cash and cash equivalents plus other short-term cash investments at 31 December 2019 (31 December 2018: \$13.3 billion).

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 dividends with additional returns to shareholders in periods of strong earnings and cash generation.

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 2019 final dividend was converted at exchange rates applicable on 25 February 2020 (the latest practicable date before the dividend was declared). ADR holders receive dividends at the declared rate in US dollars.

Ordinary dividend per share declared

	2019 dividends	2018 dividends
Rio Tinto Group		
Interim (US cents)	151.00	127.00
Final (US cents)	231.00	180.00
Full-year (US cents)	382.00	307.00
Rio Tinto plc		
Interim (UK pence)	123.32	96.82
Final (UK pence)	177.47	135.96
Full-year (UK pence)	300.79	232.78
Rio Tinto Limited		
Interim (Australian cents)	219.08	170.84
Final (Australian cents)	349.74	250.89
Full-year (Australian cents)	568.82	421.73

Special dividend per share declared

	2019 dividends	2018 dividends
Rio Tinto Group		
Declared with 2019 interim results (US cents)	61.00	–
Declared with 2018 full year results – from divestment income (US cents)		243.00
Rio Tinto plc		
Declared with 2019 interim results (UK pence)	49.82	–
Declared with 2018 full year results – from divestment income (UK pence)		183.55
Rio Tinto Limited		
Declared with 2019 interim results (Australian cents)	88.50	–
Declared with 2018 full year results – from divestment income (Australian cents)		338.70

The 2019 final 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 16 April 2020, we will pay the 2019 final dividend to holders of ordinary shares and holders of ADRs on the register at the close of business on 6 March 2020 (record date). The ex-dividend date is 5 March 2020.

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 24 March 2020.

We will operate our Dividend Reinvestment Plans for the 2019 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 24 March 2020. 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.

Portfolio management

We have a programme of high-quality projects across a broad range of commodities

In 2019, 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.

Capital projects

Projects (Rio Tinto 100% owned unless otherwise stated)	Total approved capital cost (100% unless otherwise stated)	Status/ Milestones
Completed in 2019		
Investment in the Compagnie des Bauxites de Guinée (CBG) bauxite mine in Guinea, West Africa, to expand capacity	\$0.3bn (RT share)	Approved in 2016. We produced first ore in the fourth quarter of 2018. When the ramp-up is complete the project will increase annual capacity from 14.5 to 18.5 million tonnes.
Ongoing and approved		
Iron ore		
Investment in West Angelas and the Robe Valley in the Pilbara region of Western Australia to sustain production capacity	\$0.8bn (RT share)	Approved in October 2018, the investments will enable us to sustain production of our Pilbara Blend™ and Robe Valley products. All major environmental approvals have been received with the exception of the Mesa H approval. All other procurement and construction activities are progressing to plan. First ore is expected in 2021.
Investment in Koodaideri, a new production hub in the Pilbara region of Western Australia, to sustain existing production in our iron ore system	\$2.6bn	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 first production in late 2021. Once complete, the mine will have an annual capacity of 43 million tonnes.
Investment in the Greater Tom Price operations to help sustain production capacity	\$0.8bn	Approved in November 2019, the investment in the Western Turner Syncline phase 2 mine will facilitate mining of existing and new deposits. It includes construction of a new crusher and a 13-kilometre conveyor. Pending final government approvals, construction will start in the first half of 2020 with first ore from the crusher expected in 2021.
Aluminium		
Investment in a second tunnel at the 1000MW Kemano hydropower facility at Kitimat, British Columbia, Canada	\$0.5bn	Approved in 2017. Project completion is now set for 2021 (previously late 2020). Cost forecasts remain on budget. The project will ensure the long-term reliability of the power supply to the modernised Kitimat smelter and de-risks the hydropower facility.
Copper & Diamonds		
Investment to extend mine life at Rio Tinto Kennecott, US from 2019 to 2026	\$0.9bn	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 and is expected to be complete in 2021.
Further investment to extend mine life at Rio Tinto Kennecott, US by a further six years to 2032	\$1.5bn	Approved in December 2019, the investment will further extend strip waste rock mining and support additional infrastructure development in the second phase of the south wall pushback project. This will allow mining to continue into a new area of the orebody between 2026 and 2032.
Development of the Oyu Tolgoi underground mine in Mongolia (Rio Tinto 34%)	\$5.3bn*	The project was approved in May 2016. A number of mine design options are under consideration which have different cost and schedule implications. These options have been defined to a level of accuracy associated with a Conceptual Study or Order of Magnitude Study. First sustainable production could be achieved between May 2022 and June 2023 (includes up to eight months contingency). Preliminary estimates for development capital are \$6.5 billion to \$7.2 billion.
*Subject to the outcomes of the definitive estimate		
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	Approved in April 2019, the investment will underpin RBM's supply of zircon and ilmenite over the life of the mine. Construction is on hold after a number of security incidents – we will assess a restart after normalisation of operations at RBM.

Material acquisitions and divestments

Asset	Consideration \$m	Status
Divested in 2019		
Rössing Uranium	6.5 ^(b)	Sold to China National Uranium Corporation Limited
Divested in 2018		
Hail Creek	1,550 ^{(a)(c)}	Sold to Glencore
Kestrel	2,250 ^(a)	Sold to a consortium consisting of EMR Capital and PT Adaro Energy Tbk
Aluminium Dunkerque	500 ^(a)	Sold to Liberty House
Grasberg	3,500 ^{(a)(d)}	Sold to PT Indonesia Asahan Aluminium (Persero) (Inalum)
Divested in 2017		
Coal & Allied Industries Limited	2,690 ^(a)	Sold to Yancoal Australia Limited

(a) Before working capital and completion adjustments.

(b) Gross cash sales proceeds, excluding cash held by Rössing included within the transaction and transaction costs. Excludes the contingent payment of up to US\$100 million linked to uranium spot prices and Rössing's net income during the next seven calendar years.

(c) Excluding proceeds related to sale of Valeria coal development project of \$150m (before working capital adjustments).

(d) Including a payment received of \$107 million in respect of our share of Grasberg's copper and gold revenues, net of our capital contribution for the year.

Over the last three years, we have made no material acquisitions.

Further information on acquisitions and divestments is included in note 37 to the financial statements on page 212 [AR](#).

Iron Ore

Fe

Overview

In the Pilbara region of Western Australia, we operate a fully integrated network of 16 iron ore mines, four port terminals, a 1,700 kilometre rail network and related infrastructure.

Our Iron Ore product group includes Dampier Salt, also in Western Australia; with three solar salt operations, we are the world's largest exporter of seaborne salt. Our portfolio of quality assets, highly valued product suite, fully integrated system and committed people and partners are key pillars of

our value over volume strategy. Together, these set our business apart from others in the industry and allow us to export our products, including our flagship Pilbara Blend™, to our customers safely, reliably and efficiently.

Snapshots from the year

0.66

AIFR
(2018: 0.63)

\$24.1bn

gross sales revenue
(2018: \$18.7bn)

72%

underlying free
on board (FOB)
EBITDA margin
(2018: 68%)

\$11.4bn

Net cash generated
from operating
activities
(2018: \$8.3bn)

Strengthening our iron ore business

We continued to invest in our Pilbara iron ore assets in 2019. Projects with a combined value of \$4.6 billion are under construction with \$450 million spent across projects at Koodaideri, West Angelas and the Robe Valley.

We also announced a \$749 million investment in Western Turner Syncline Phase 2 (WTS2) this year. Part of our existing Greater Tom Price operations, WTS2 will produce high-quality Brockman ore, which will support our flagship Pilbara Blend™, the preferred baseload product for China's steel mills. With a capital intensity of about \$25 per tonne of production capacity, the mine is expected to deliver an attractive internal rate of return. The haul truck fleet at WTS2 will also use Autonomous Haulage System (AHS) technology from 2021, which, across our Pilbara operations, has delivered significant safety benefits, enhanced productivity and lowered costs.

Construction of WTS2 will begin in the first quarter of 2020, with first ore from the crusher expected in 2021. At its peak, the construction workforce is expected to exceed 1,000.

Our partnership with Western Australia

In 2019, to help Western Australians develop the skills they need to succeed in a rapidly changing world, our Iron Ore product group invested \$10 million in education programmes at a wide range of universities, schools, governments and non-profits. One of our flagship programmes is our partnership with the government of Western Australia and South Metropolitan TAFE (Technical and Further Education) to develop the first

nationally recognised qualifications in automation. Alongside other states, Western Australia will also benefit from the Future Minds Accelerator, our \$7 million programme, developed and launched in partnership with leading start-up accelerator BlueChilli and Amazon Web Services. The programme will work with school-age learners across Australia to fast-track the development of skills needed for the digital future.

In 2019, we continued to strengthen local procurement. We awarded our 400th scope of work to businesses based in the state; in total, we partnered with more than 1,900 businesses based in Western Australia. For example, we awarded Mondium, a company based in Perth, an approximate \$280 million contract for the design and construction of our WTS2 mine. This contract is expected to create 450 jobs starting in the first quarter of 2020.

We also engaged with nearly 50 Pilbara Indigenous-owned businesses, and in 2019, awarded more than \$42 million to such businesses to help develop Koodaideri – our most technologically advanced mine. We also awarded a landmark \$14 million contract to Yurra Pty Ltd., which is majority owned by the Yindjibarndi Aboriginal Corporation, to provide civil maintenance services on and around our Pilbara rail network.

Pilbara Iron Ore in figures

16

integrated mines in Western Australia

5

mainstream iron ore products

4

port terminals

1,700km

automated rail network, including AutoHaul™

11.9%

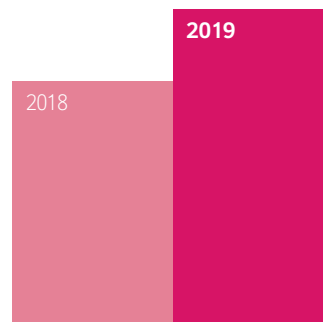
of residential workforce who are Pilbara indigenous people*

12,300

employees (includes temporary employees and 100% of joint venture operations)

*Includes all indigenous people who live in the Pilbara and all members of our Traditional Owner groups who have signed Rio Tinto's Regional Framework Deed, regardless of where they live.

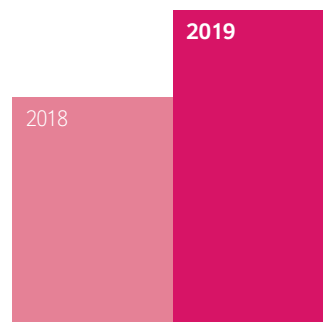
Gross sales revenue



\$24.1bn

(2018: \$18.7bn)

Net cash generated from operating activities



\$11.4bn

(2018: \$8.3bn)

Iron Ore continued

2019 year end results	2019	2018	Change
Pilbara production (million tonnes – 100%)	326.7	337.8	(3)%
Pilbara shipments (million tonnes – 100%)	327.4	338.2	(3)%
Salt production (million tonnes – Rio Tinto share) ¹	5.4	6.2	(12)%
Gross sales revenue (US\$ millions)	24,075	18,731	29%
Underlying EBITDA (US\$ millions)	16,098	11,378	41%
Pilbara underlying FOB EBITDA margin ²	72%	68%	
Underlying earnings (US\$ millions)	9,638	6,531	48%
Net cash generated from operating activities (US\$ millions)	11,420	8,349	37%
Capital expenditure (US\$ millions) ³	(1,741)	(1,302)	34%
Free cash flow (US\$ millions)	9,601	7,045	36%
Return on capital employed ⁴	67%	42%	

1 To reflect a change in management responsibility, Dampier Salt is now reported within Iron Ore and we have restated prior year numbers accordingly. 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 before net debt).

Underlying EBITDA 2018 vs 2019 (\$ million)

2018 underlying EBITDA	11,378
Price	5,475
Exchange rates	247
Energy	51
Inflation	(73)
Flexed 2018 underlying EBITDA	17,078
Volumes and mix	(426)
Cash costs	(560)
Other	6
2019 underlying EBITDA	16,098

Safety

In 2019, our Iron Ore operations experienced no fatalities, and recorded an all injury frequency rate (AIFR) of 0.66. While slightly higher than the 2018 rate of 0.63, the number of significant near miss incidents was approximately 50% lower, year on year.

Our ongoing commitment to reducing material risk exposure – including implementing engineering and elimination controls to address vehicle and driving risks – resulted in a significant reduction in repeat serious incidences. We also continued our focus on major hazard risk reduction this year, including proactive management of our water storage and tailings facilities in line with the Group standard.

Our strong commitment to safety includes an emphasis on mental health and wellbeing, with a range of initiatives in place, including our industry-leading peer support programme.

Financial performance

In 2019, we benefited from robust demand for our high-quality products driven by strong demand from China and constrained seaborne supply. Iron ore shipments were down 3% on 2018, but recovered strongly in the second half of 2019 after disruptions earlier in the year, which included weather events, a screen house fire at one of our ports and operational challenges.

Underlying EBITDA of \$16.1 billion was 41% higher than 2018, reflecting higher prices which were partially offset by higher unit costs. The Platts index for 62% iron fines on an FOB basis was 39% higher, on average, compared with 2018. This increased underlying EBITDA by \$5.4 billion relative to 2018.

2019 Pilbara unit cash costs were \$14.4 per tonne (2018: \$13.3 per tonne). The fire and weather-related events in the first half of the year reduced shipments by 14 million tonnes (100% basis), increasing unit costs by around \$0.5 per tonne. We incurred approximately \$50 million in additional costs in 2019 (\$0.2 per tonne) to address the mine operational challenges. Higher salaries, rising fuel prices and cyclical maintenance in 2019 compared with 2018 were mostly offset by a weaker Australian dollar.

We expect Pilbara unit cash costs to be \$14-15 per tonne in 2020 (assumes a 0.67 Australian dollar exchange rate). Increased volume efficiency compared with 2019 is expected to be offset by longer haul distances and increased maintenance activity. Koodaideri is on track for first ore in late 2021. Once fully ramped up it will provide new volumes at a lower cost.

We have continued investing in productivity and automation, and 50% of our truck fleet in the Pilbara is now fully autonomous. We have a pathway that will see a large majority of the fleet being automated by the end of 2022. AutoHaul™, the world's first automated heavy-haul, long-distance rail network, was fully operational in 2019.

Our Pilbara operations delivered an underlying FOB EBITDA margin of 72%, compared with 68% in 2018.

We price the majority of our iron ore sales (76%) by reference to the average index price for the month of shipment. In 2019, we priced approximately 16% 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 68% of sales including freight and 32% on an FOB basis.

Underlying FOB EBITDA margin**72%**

(2018: 68%)

Pilbara shipments

(million tonnes – 100% basis)



We achieved an average iron ore price of \$79.0 per wet metric tonne on an FOB basis (2018: \$57.8 per wet metric tonne). This equates to \$85.9 per dry metric tonne (2018: \$62.8 per dry metric tonne).

The gross sales revenue for our Pilbara operations included freight revenue of \$1.7 billion (2018: \$1.7 billion).

Net cash generated from operating activities of \$11.4 billion was 37% higher than 2018, driven by the same trends as underlying EBITDA.

The \$9.6 billion of free cash flow was 36% higher than 2018, reflecting the strong realised pricing partly offset by royalties, taxes and higher capital spend. This included sustaining capital as well as the construction of Koodaideri.

Review of operations

Our Pilbara mines in Western Australia produced 327 million tonnes (our share is 271 million tonnes) in 2019 – 3% lower than 2018. Overall material moved in 2019 was the highest on record. Our increased focus on waste material movement and pit development will continue in 2020 to improve mine performance and pit sequencing.

In the first half of 2019, shipments were affected by weather events, a screen house fire at one of our ports and mine operational challenges. Our second half performance was strong, with both production and shipments exceeding the same period in 2018, despite a planned, extended rail maintenance shutdown which limited rail capacity for 12 days. In October 2019 we commenced trials of portside trading. We maintain some inventory at Chinese ports and can also handle material from third parties and from Iron Ore Company of Canada.

New projects and growth options

We are progressing our \$2.6 billion Koodaideri 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 expect first ore in late 2021. Once fully commissioned, the initial mine development will have an annual capacity of 43 million tonnes. This will increase the lump to fines ratio of the entire portfolio from an average of 35% to 38% and will increase the annual capacity of our Pilbara system to 360 million tonnes.

We have multiple project scopes under study for Koodaideri Phase 2, following board approval for a \$44 million pre-feasibility study. Ultimately, the capacity of the Koodaideri 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 major environmental approvals, with the exception of Mesa H, and procurement and construction activities are progressing well. We anticipate first ore from these projects in 2021.

In late 2019, the board approved the \$749 million investment in the Western Turner Syncline Phase 2 mine, part of the Greater Tom Price operations. This will facilitate mining of new deposits and includes construction of a new crusher and a 13-kilometre conveyor. Pending final government approvals, construction will start in the first half of 2020 with first ore expected in 2021.

Greenhouse gas emissions

In 2019, Iron Ore greenhouse gas emissions intensity was ~1% higher than the baseline target set in 2008, a rise driven by increases in diesel emissions resulting from longer-than-anticipated haul distances and increased movement of materials.

We have established strategies for the management of greenhouse gas emissions in our Pilbara operations. Subject to government approvals, construction of the company's first solar plant at the new Koodaideri mine will start in 2020. This 34 megawatt plant will be complemented by a new 12MW/h battery energy storage system that will help power our entire Pilbara network.

Aluminium is used in everything from electric cars to smartphones – and ours is made with a carbon footprint 60% lower than the industry average.

Aluminium

AL

Overview

We are a global leader in aluminium, with large-scale, high-quality bauxite mines and alumina refineries and, in Canada, Australia and New Zealand, smelters producing aluminium certified as responsible.

Through our integrated portfolio of mines, refineries and smelters, we produce bauxite, alumina and aluminium. Managing the process from start to finish allows us to deliver quality products to our customers efficiently. These are carefully calibrated to meet their specific and changing needs – from high-grade bauxite for the global seaborne trade to sustainably sourced aluminium to new, lighter alloys for the automotive industry.

Our Canadian operations are in the first decile of the industry cost-curve and produce aluminium using clean, renewable hydropower. In 2016, we launched RenewAl™, the world's first certified low carbon aluminium. We were the first producer to offer Aluminium Stewardship Initiative (ASI)

certified, responsible aluminium through a “chain of custody” spanning the Gove bauxite mine in Australia to our alumina refinery, aluminium smelters and casthouses in Quebec, Canada. In 2019, we received further ASI certifications for our BC Works and Kemano sites in Canada, our Amrun and Weipa bauxite mines, Yarwun alumina refinery, and our Bell Bay and NZAS smelters in Australia and New Zealand.

We also established ELYSIS, a partnership with Alcoa supported by Apple and the governments of Canada and Quebec, to develop smelting technology free of direct carbon emissions. Across our aluminium operations, our greenhouse gas emissions intensity is 60% lower than the industry average.

Snapshots from the year

0.46

AIFR
(2018: 0.40)

\$10.3bn

gross sales revenue
(2018: \$12.2bn)

26%

underlying EBITDA
margin from integrated
operations
(2018: 32%)

\$2.2bn

net cash generated
from operating
activities
(2018: \$2.3bn)

A step-change in productivity for our Australian operations

In 2017, to strengthen productivity across RTA, we launched an initiative to operate our bauxite mines and our Pacific assets in a more integrated way. We first put this programme to the test at our Weipa mine and, in September 2019, achieved a key milestone with the commissioning of our Brisbane-based Bauxite Integrated Operations Centre (BIOC). Today, the BIOC runs 24 hours per day, seven days a week, and allows us to remotely monitor, control and operate our Weipa, Gove and Amrun mines.

Our vision is to have our people and our business operate to their full potential, to plan with the best information available and to exceed our customers' needs. To this end, the BIOC team collects large amounts of data from every mine, enabling us to gain a complete view across the mine's entire supply chain. Then, using new technologies and real-time reporting, we can make quicker, more accurate and agile decisions to optimise operations.

Key to this step change was leveraging experience from our aluminium and iron ore operations' centres in Canada and Western Australia, respectively. In 2019, the BIOC delivered over \$50 million of additional value through grade optimisation, better resource allocation and quality improvements.

An alloy with customer needs in mind

Through discussions with our customers, we are seeing increasing demand for specialised alloys offering improved mechanical properties. We have a long and successful track record of developing such products, and our three research and development centres have always played a key role.

In 2019, we launched Revolution-Al™, a new aluminium alloy that unlocks design potential for car wheels. Created by our team at the Arvida Research & Development Centre in Canada, Revolution-Al™ is 15-20% stronger than a traditional alloy, enabling a 7% weight reduction versus standard wheels. This new product provides opportunities to reduce carbon emissions and tyre wear as well as improve vehicle performance, handling and visual appeal.

Our tests also show that Revolution-Al™ can increase our customers' productivity. It can be cast in existing facilities, reduces production time and can be easily recycled.

We received our first order in September 2019 and, as manufacturers compete to make lighter, more efficient cars, this alloy could soon be used to reduce the weight of other car parts, such as chassis parts or suspension components.

Aluminium in figures

4

bauxite mines in Australia, Brazil and Guinea

4

alumina refineries in Australia, Brazil and Canada

14

aluminium smelters in Canada, Australia, New Zealand, Iceland and Oman

7

hydropower plants in Canada supplying 100% of the electricity we use there

3

research and development centres in Canada, France and Australia

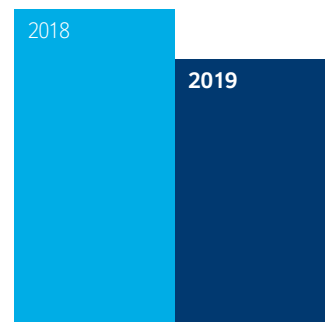
22

sites certified responsible by the Aluminium Stewardship Initiative (ASI)

14,000

employees

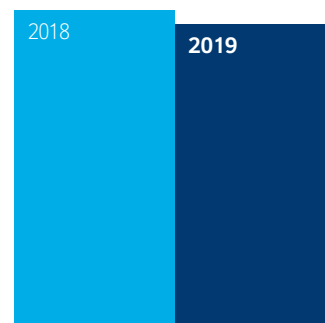
Gross sales revenue



\$10.3bn

(2018: \$12.2bn)

Net cash generated from operating activities



\$2.2bn

(2018: \$2.3bn)

Aluminium continued

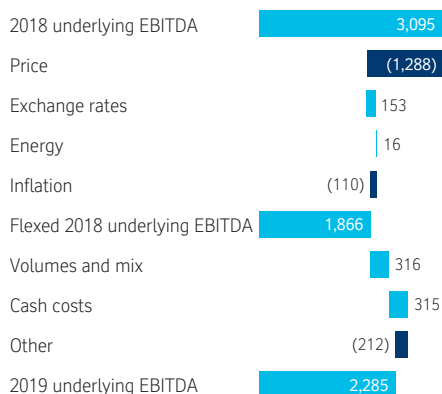
2019 year end results	2019	2018	Change
Bauxite production (000 tonnes – Rio Tinto share)	55,105	50,421	9%
Alumina production (000 tonnes – Rio Tinto share)	7,744	7,980	(3)%
Aluminium production (000 tonnes – Rio Tinto share) ¹	3,171	3,231	(2)%
Gross sales revenue (US\$ millions)	10,340	12,191	(15)%
Underlying EBITDA (US\$ millions)	2,285	3,095	(26)%
Underlying EBITDA margin (integrated operations)	26%	32%	
Underlying earnings (US\$ millions)	599	1,347	(56)%
Net cash generated from operating activities (US\$ millions)	2,183	2,331	(6)%
Capital expenditure – excluding EAUs ² (US\$ millions)	(1,316)	(1,683)	(22)%
Free cash flow (US\$ millions)	821	638	29%
Return on capital employed ³	4%	8%	

1 To allow production numbers to be compared on a like-for-like basis, we have excluded production from asset divestments completed in 2018 from our share of prior year production data. The financial data above includes the results of divested assets up to the date of sale.

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 before net debt).

Underlying EBITDA 2018 vs 2019 (\$ million)



Safety

2019 marked a fifth consecutive fatality-free year for Rio Tinto Aluminium (RTA), and we finished the year with an AIFR of 0.46, a slight increase compared to 2018 (0.40).

We continued improving the safety maturity across our sites with a strong emphasis on leadership safety coaching and critical risk management, completing over 232,000 verifications on fatality-risk critical controls. We also initiated a project to increase vehicle-pedestrian segregation, including the introduction of a pedestrian detection system in our smelters.

We further enhanced our management of major hazards, reducing the number of process safety incidents and strengthening the way we manage critical risks in process safety and tailings. This resulted in a 50% reduction in the number of Tier 1 process safety incidents from 2018 to 2019.

Our strong commitment to safety extends to mental health and wellbeing. We continued to provide training and raise awareness on mental health to better support our employees and their families.

Financial performance

In 2019, our aluminium business benefited from a 21% increase in third-party bauxite sales, productivity improvements and lower raw material costs, but was affected by significant price declines, particularly for alumina and aluminium metal. Despite the challenging market environment, we maintained our position as the leading business in the sector, with an underlying EBITDA margin of 26% from integrated operations.

Underlying EBITDA of \$2.3 billion declined by 26% compared with 2018, primarily driven by the weaker pricing environment. This reduced underlying EBITDA by \$1.3 billion, including the impact of alumina legacy contracts, and was partly offset by \$0.5 billion of improvements. Operating costs

improved by \$0.3 billion through productivity gains, including raw material efficiencies at the refineries and lower input prices, primarily for caustic soda and petroleum coke. We also benefited from \$0.2 billion of gains from increased bauxite volumes and grade optimisation, supported by the successful ramp-up of our new Amrun mine in Queensland following its completion in late 2018.

We achieved an average realised aluminium price of \$2,132 per tonne (2018: \$2,470 per tonne). This comprised the LME price, a market premium and a value-added product (VAP) premium. The cash LME price averaged \$1,791 per tonne, 15% lower than 2018. In our key US market, the midwest premium dropped 24% to \$320 per tonne on average in 2019. VAP represented 51% of the primary metal we sold (2018: 54%, excluding the Dunkerque smelter which we sold in 2018) and generated attractive product premiums averaging \$234 per tonne of VAP sold (2018: \$227 per tonne). We paid a 10% tariff on our Canadian aluminium exports to the US under Section 232 until the tariff was removed on 19 May 2019.

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 2019, the opportunity loss reduced to \$0.2 billion, compared with \$0.5 billion in 2018 when there was significant escalation in the alumina index caused by industry supply disruptions.

Despite the significantly weaker market environment, we generated \$2.2 billion in net cash from operating activities with free cash flow increasing by 29% to \$0.8 billion. This was underpinned by productivity improvements, lower costs, favourable movements in working capital and lower capital expenditure, following completion of the Amrun project.

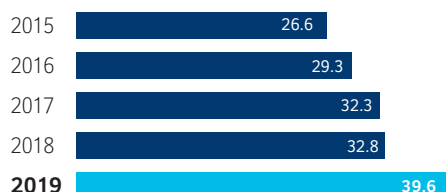
Underlying EBITDA margin (integrated operations)

26%

(2018: 32%)

Third-party bauxite shipments

(million tonnes – Rio Tinto share)



Aluminium production

(thousand tonnes – Rio Tinto share)



Review of operations

Bauxite production was 9% higher than 2018 at 55 million tonnes. In Australia, production at the Pacific managed mines was up by 11% on 2018, underpinned by the successful ramp-up of Amrun. Production at the non-managed joint ventures (CBG in Guinea and MRN in Brazil) was 1% higher than 2018, but was constrained by the ramp-up of the expansion project at CBG being slower than planned.

Our production performance enabled us to increase shipments of bauxite to third parties by 21% to 40 million tonnes. Over the past five years, we have increased our third-party bauxite sales by 16 million tonnes (70%), maintaining our position as a leading global supplier in the seaborne bauxite trade.

In 2019, gross revenue for bauxite increased 6% to \$2.5 billion – this includes freight revenue of \$464 million (2018: \$371 million).

At 7.7 million tonnes, our alumina production was 3% lower than 2018, primarily due to major maintenance activities at the Pacific refineries including a planned five-year maintenance shutdown to service the cogeneration plant at Yarwun.

At 3.2 million tonnes, our aluminium production was 2% lower than 2018, primarily due to lower volumes at ISAL from a safety-related preventive pot-line outage in the third quarter and at Kitimat, due to earlier than planned pot-lining replacement. Excluding the non-managed Becancour operation where a lock-out constrained operations, the Quebec and Pacific smelters performed well, with aluminium production for 2019 up 1% on 2018, reflecting continued productivity improvements. The restart of Becancour is underway, with full ramp-up expected by mid-2020.

The aluminium industry continues to face challenging conditions in global markets and policy uncertainty, reflected in low industry profitability. We continue to actively work on enhancing the competitiveness of our smelters, including discussing energy pricing with stakeholders, to ensure the sustainability and global competitiveness of our smelters in Australasia and in Iceland. We announced strategic reviews of our interests in the Tiwai Point smelter in New Zealand in October 2019, and in the ISAL smelter in Iceland in February 2020. The strategic reviews will determine the ongoing viability and competitive position of these operations and will consider all options, including curtailment and closure.

New projects and growth options

The \$1.9 billion Amrun bauxite mine on the Cape York Peninsula in north Queensland achieved its design capacity rate of 22.8 million tonnes a year in the fourth quarter of 2019, supporting higher third party sales and replacing the depleting Weipa mines.

In 2019, production from the Sangaredi bauxite mine in Guinea was constrained by a slower than planned ramp-up of the \$0.7 billion expansion project (our share is \$0.3 billion). When this ramp-up is complete, the annual capacity of Compagnie des Bauxites de Guinée (CBG) will increase from 14.5 to 18.5 million tonnes (100% basis, our share of production is 45%).

At the \$0.5 billion Kemano project in Kitimat, British Columbia, where we are constructing a second tunnel to de-risk our 100% owned hydropower facility, we had excavated 2.7 kilometres of the tunnel by the end of 2019. Progress has been slower than expected and completion is now expected in 2021 (previously late 2020).

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 2019, ELYSIS started construction of its new Research and Development Centre, which will be located at Rio Tinto's Complexe Jonquière in the Saguenay, Quebec. We expect it to be fully operational in the second half of 2020. ELYSIS also announced that Apple had purchased the first commercial batch of aluminium produced using our carbon-free smelting process.

Greenhouse gas emissions

From 2008 to 2019, RTA's greenhouse gas emissions intensity has improved by 38%. Using our self-generated hydropower, the emissions from our Canadian smelters are 2.15 tCO₂eq. per tonne of aluminium, well below the industry average, while our Vaudreuil alumina refinery has the lowest carbon footprint in the world today.

Copper and Diamonds

Cu

Overview

Our copper and diamond businesses have rich expertise in underground mining processes and technology. Combined with our strong people focus, this allows us to relentlessly prioritise safety and continue to be a profitable, future-ready, sustainability-driven business.

Copper

Global demand for copper is set to grow, driven by urbanisation, industrialisation, digital communications and increasing use of renewable energy: copper plays a key role in electrification and power production.

Our operations around the world are at various stages in the mining lifecycle, from exploration to programme rehabilitation. Alongside copper, we also produce gold, silver, molybdenum and other materials such as rhenium. We supply customers in China, Japan and the US.

Diamonds

In diamonds, we are a global exploration, mining and sales and marketing business. As one of the world's largest producers of rough diamonds from our two mines, Argyle in Australia and Diavik in Canada, we supply a full range of sizes, qualities and colours to established and emerging consumer markets.

Snapshots from the year

0.29

AIFR
(2018: 0.46)

\$5.8bn

gross sales revenue
(2018: \$6.5bn)

41%

underlying EBITDA
margin (product
group operations)
(2018: 47%)

\$1.5bn

net cash generated from
operating activities
(2018: \$2.1bn)

Reducing our carbon footprint

As an essential component in electric vehicles and in solar, hydro and wind energy, copper is helping to build a more sustainable future. And at our Kennecott copper mine, in Utah, in the western US, we are taking sustainability one step further.

In 2019, we permanently shut the coal-fired power plant supplying the mine. Together with our purchase of renewable energy certificates, this will reduce Kennecott's annual carbon footprint by as much as 65%. The mine's electricity needs are now paired with 1.5 million megawatt hours of renewable energy certificates, supplied by Rocky Mountain Power, which will reduce carbon emissions associated with our operation by over one million tonnes.

Sustainability is not new to Kennecott, however; since 2005, the mine has been incorporating scrap metal, such as old copper wiring, into its smelting process. In 2019, we processed more than 210,000 pounds of copper from this recycled scrap metal – roughly equivalent to the electrical wiring of 6,500 new homes.

Diamonds to wildlife: life after the Argyle closure

Our Argyle diamond mine, located in the Kimberley region of Western Australia, is due to close at the end of 2020. To help our employees plan for their post-Argyle future, we launched a programme to help them find new opportunities at Rio Tinto or beyond. Some employees will remain with the mine for closure activities like decommissioning and rehabilitation. A number have already transferred to our iron ore mines in Western Australia, while others looking for a change are preparing for a whole new career with targeted training.

Blair, a safety support officer at Argyle, illustrates the success of the programme:

"I've been at Argyle for over a decade now, but we're heading towards closure and so we need to start thinking about what our life will be like after mining finishes. My passion outside of work is filming wildlife. I've been very lucky to work in the mining industry and be able to travel all over the world: I've been to Africa a dozen times, and I've been to some very remote islands diving and filming sharks of all sorts.

The beauty of the support I have been given is that it's allowed me to go out and get my full commercial drone operator certificate. That means that, after Argyle closes, I'm going to be able to have a real crack at filming wildlife as my career. It's pretty exciting!"

Copper and Diamonds in figures

3

copper operations in the US, Mongolia and Chile

2

copper growth projects in the US and Mongolia

1 million

tonnes of carbon emissions avoided by moving our Kennecott copper mine to renewable energy certificates

2

diamond operations in Canada and Australia

1st

mining company to be certified by the Responsible Jewellery Council

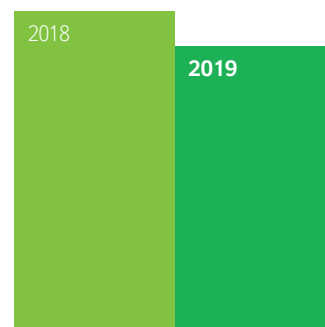
210,000

pounds of copper scrap recycled at our Kennecott copper mine in the US

7,400

employees

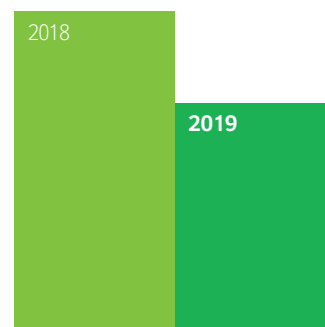
Gross sales revenue



\$5.8bn¹

(2018: \$6.5bn)

Net cash generated from operating activities



\$1.5bn¹

(2018: \$2.1bn)

¹ Includes the results of divested assets up to the date of sale.

Copper and Diamonds continued

2019 year end results	2019	2018	Change
Mined copper production (000 tonnes – Rio Tinto share) ¹	577.4	607.6	(5)%
Refined copper production (000 tonnes – Rio Tinto share)	259.6	274.8	(6)%
Diamonds production (000 carats – Rio Tinto share)	17,030	18,427	(8)%
Gross sales revenue (US\$ millions)	5,815	6,468	(10)%
Underlying EBITDA (US\$ millions)	2,073	2,776	(25)%
Underlying EBITDA margin (product group operations)	41%	47%	
Underlying earnings (US\$ millions)	554	1,054	(47)%
Net cash generated from operating activities (US\$ millions) ²	1,505	2,114	(29)%
Capital expenditure – excluding EAUs ³ (US\$ millions)	(1,772)	(1,848)	(4)%
Free cash flow (US\$ millions)	(284)	266	(207)%
Return on capital employed ⁴	5%	9%	

1 To allow production numbers to be compared on a like-for-like basis, we have excluded production from asset divestments completed in 2018 from our share of prior year production data. The financial data above, however, includes the results of divested assets up to the date of sale.

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

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

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

Underlying EBITDA 2018 vs 2019 (\$ million)

2018 underlying EBITDA	2,776
Price	(196)
Exchange rates	43
Energy	22
Inflation	(48)
Flexed 2018 underlying EBITDA	2,597
Volumes and mix	73
Cash costs	(77)
Escondida power contract charge	(199)
Grasberg disposal	(281)
Other	(40)
2019 underlying EBITDA	2,073

Safety

This year, we recorded overall improvement in safety at our Copper and Diamond operations, driven by an unrelenting focus on safety fundamentals, including emphasis on caring and visible leadership and coaching, on embedding existing safety initiatives and on using problem solving techniques and engagement with front-line employees. 2019 was also a year free of fatalities, permanent disabling injuries and significant process safety incidents. The all injury frequency rate (AIFR) was 0.29, an improvement from 0.46 in 2018. Copper & Diamonds met our critical-risk management targets as well as our injury reduction targets: the number of injuries declined to 40 in 2019 (from 65 in 2018). We also saw a significant reduction in contractor-related incidents as a result of an increased focus on contractor management.

Financial performance

In 2019, our operational performance was affected by lower grades at all operations, partly offset by higher throughput and productivity improvements.

Our average realised copper price decreased by 7% to 275 US cents per pound, which compared with an 8% decline in the LME price to 273 US cents per pound.

At \$2.1 billion, underlying EBITDA was \$0.7 billion (25%) lower than 2018. This was the result of \$0.2 billion in unfavourable pricing impacts, a \$0.2 billion non-cash charge at Escondida in 2019 relating to the cancellation of existing coal power contracts to be replaced with lower cost renewable power, \$0.1 billion from lower volumes at Escondida, and the divestment of Grasberg, which contributed \$0.3 billion to underlying EBITDA in 2018. Our operating assets delivered on their productivity and improvement programmes,

partially offsetting the above impacts, resulting in lower overall production costs compared with 2018. Our copper unit costs, at 93 cents per pound in 2019, were 15% lower than in 2018, with higher by-product credits and cost reduction programmes offsetting the impact of lower copper grades.

We generated \$1.5 billion in cash from our operating activities in 2019, 29% lower than 2018, driven by the 25% reduction in underlying EBITDA described above, as well as \$0.1 billion lower dividends from our 30% equity holding in Escondida. Free cash flow of \$(0.3) billion reflected the lower operating cash flow and a sustained level of capital investment (\$1.8 billion), mainly relating to activities at the Oyu Tolgoi underground project.

Review of operations

Mined copper production was 5% lower than 2018, primarily attributable to lower copper grades at all three operations, partly offset by higher throughput and productivity improvements. Refined copper production, at 6% lower, largely reflected the reduced copper concentrate availability at Escondida and our Kennecott smelter.

Kennecott

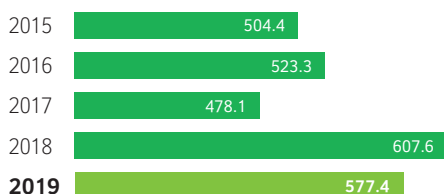
Mined copper production was 8% lower than 2018, mostly due to increased grade variability, with grades on average 11% lower. This grade impact was partially offset by a 4% improvement in ore processed since 2018. Grades will continue to be lower through 2020 before increasing from the first quarter of 2021, with the transition from east wall to south wall mining. Refined copper production was 5% lower than 2018. This reflected the reduced availability of copper concentrate, a planned smelter shutdown and additional unplanned maintenance impacting furnace online time.

Underlying EBITDA margin**41%**

(2018: 47%)

Mined copper production

(000 tonnes – Rio Tinto share)

**Escondida**

Copper production at Escondida was 3% lower than 2018. This was mainly due to grade declines, which were 8% lower than last year, partly offset by higher throughput.

Following the signing of renewable power agreements, Escondida has raised a provision related to the cancellation of existing coal contracts. We have recognised a charge of approximately \$0.2 billion against 2019 underlying EBITDA, reflecting our 30% share.

In addition to the renewable power agreements, the Escondida water supply expansion project was successfully completed in December 2019 and the water requirements of the operation are now fulfilled entirely by desalinated water production.

Oyu Tolgoi

As anticipated, mined copper production from the open pit was 8% lower than 2018 as mining activity moved to lower grade areas. Grades were 11% lower for the year, and were partly offset by productivity improvements.

Diamonds

Diamond production was 8% lower than 2018. At Argyle, carat production was down by 8% due to a lower recovered grade – this was partially offset by record underground mining and processing rates. At Diavik, carats recovered were down by 8% due to lower ore availability and grade from the underground operations – this was partly offset by higher tonnes and grade from the A21 open pit.

Oyu Tolgoi underground project

During the fourth quarter of 2019, we took the decision to remove two of the three mid-access drives at Oyu Tolgoi. We will retain one mid-access drive on the apex level of the mine design of Panel O. The removal of these mid-access drives has an unfavourable impact on schedule; overall, the underground project remains within the range announced in July 2019 of a 16 to 30 month delay in schedule and an increase of \$1.2 to \$1.9 billion¹ in development capital costs.

We continue the detailed work on mine design, which we still expect to complete in the first half of 2020, with a definitive estimate in the second half of 2020, as previously disclosed. This will include the estimate of development capital costs and schedule for the underground project based on the updated design of Panel O.

Decisions on other key underground design elements such as the location of the ore handling system and options for panel sequencing will be taken in the first half of 2020. These will take into consideration the consequential impacts on cost, schedule and other key variables such as ore reserves, project ramp-up profile and peak production, together with improvements in productivity.

Productivity improvements resulted in increased underground lateral development during the fourth quarter, to an average monthly rate of 1,607 equivalent metres (eqm) compared with 1,214 eqm in the third quarter. Completion of shaft 2, a key milestone, occurred in October 2019. Construction is progressing on shafts 3 and 4 to enable commencement of main sinking operations for both shafts during the first half of 2020.

Under the Power Source Framework Agreement signed in 2018, Oyu Tolgoi continues to work with the government of Mongolia to secure a long term power solution for the project. Different power sourcing options are currently under evaluation and discussion with the government of Mongolia to identify the lowest cost and reliable option for Oyu Tolgoi. In February 2020, Oyu Tolgoi submitted a feasibility study to the government of Mongolia for the Tavan Tolgoi Power Plant. This envisages a 300 MW coal power plant with a project cost estimate of around \$924 million. We are also progressing alternative options to source domestic power, including a renewable power component.

Other new projects and growth options

At Kennecott, we continue to progress stripping activities on the \$0.9 billion phase 1 south wall pushback project. Grades are expected to increase in 2021 with the transition from east wall to south wall mining.

In late 2019, we announced the approval of a \$1.5 billion investment in Kennecott, extending operations to 2032. The investment will further extend strip waste rock mining and support additional infrastructure development in the second phase of the south wall pushback project, allowing mining to continue into a new area of the ore body between 2026 and 2032 and generate attractive returns.

At our Resolution Copper project in Arizona, deepening of the existing shaft 9 continues, as well as work on the underground characterisation study to increase ore body knowledge. Permitting and studies are progressing well, following the release of the independently prepared draft Environmental Impact Statement (EIS) for the project in August 2019. A plan is in place with the US Forest Service to address comments received on the study to maintain schedule on the final EIS in 2020. The Land Exchange title transfer will be completed within 60 days of final EIS publication.

In April 2019, we approved \$302 million (\$166 million our share) of additional expenditure for Resolution, to fund additional drilling, orebody studies, infrastructure improvements and permitting activities, as we progress the project to the final stage of the permitting phase.

Greenhouse gas emissions

Copper and Diamonds decreased emissions intensity by 33.3% since 2008. We discontinued the use of a coal-fired power plant at Kennecott and are also working to reduce our environmental footprint at both of our diamonds operations. At Diavik, in Canada, our windfarm continues to reduce diesel usage through leading-edge cold-climate technology. At Argyle, in Western Australia, the hydropower scheme reduces our diesel usage for electricity. And as a product group, our sustainability strategy continues to focus on carbon and water.

¹ As described above, and as disclosed in a Notice to the ASX/LSE on 16 July 2019, and our 2019 interim financial results, the level of accuracy of these estimates is preliminary in nature and subject to a range of variables. These estimates are at a confidence level associated with a Conceptual or Order of Magnitude Study; more work is needed between now and the second half of 2020 to refine the mine design options and study them to a level of confidence and accuracy associated with Feasibility Study quality estimates.

Energy and Minerals

Ti, B, Fe

Overview

The products from our diverse portfolio of high-quality mining, refining and marketing operations are part of people's everyday lives and play an important role in the technology and cutting edge materials of the future.

The Energy and Minerals (E&M) portfolio includes titanium dioxide; rutile and zircon; borates; iron ore concentrate and pellets; and uranium. Our products are used in everything from touch screens and hearing aids to high-strength steel and corrosion resistant coatings, and in industries such as aerospace, healthcare, and low-carbon energy.

As a key global supplier of borates, we meet approximately 25% of global demand – and have mining, processing, commercial and research facilities. Our Iron and Titanium business is a major global producer of high-grade titanium dioxide feedstock. The Iron Ore Company of Canada (IOC) is a leading producer of premium iron ore pellets

and high-grade concentrate with low levels of impurities. We continue our study at the Jadar lithium-borate project in Serbia. We also own interests in a uranium business – Energy Resources of Australia – and a uranium project in Canada.

In 2019, we completed the sale of our entire interest in the Rössing Uranium mine in Namibia, formerly part of E&M.

The Rio Tinto Ventures team, also part of E&M, is exploring partnerships and other opportunities that will allow us to expand into metals critical to a low-carbon economy, with a strong focus on battery materials.

Snapshots from the year

0.43

AIFR
(2018: 0.55)

\$5.2bn

gross sales revenue
(2018: \$5.5bn)

37%

underlying EBITDA
margin (product
group operations)
(2018: 41%)

\$1.4bn

net cash generated
from operating
activities
(2018: \$1.2bn)

Pioneering a new source of lithium

As the world moves to electric vehicles, demand for lithium, for the vehicles' rechargeable batteries, is expected to increase to 1.3 million metric tonnes – over five times today's levels.

In 2019, we announced a \$10 million investment to pilot the production of commercial grade lithium at our Boron operations in California. The lithium, discovered in nearly century-old borates tailings, creates additional value from existing waste rocks and as such, does not need to be mined.

The pilot could potentially produce 10 tonnes per year of lithium-carbonate, needed in rechargeable batteries for electric vehicles and consumer electronics. In the coming year, we will consider an additional \$50-million investment to build an industrial-scale lithium plant with capacity for 5,000 tonnes per year, or enough to make batteries for approximately 15,000 electric vehicles.

The discovery of lithium in borates waste is significant, and could one day make our current boron operation the largest domestic producer of battery-grade lithium in the US.

"Unthinkable" performance improvements

In 2019, the Iron Ore Company of Canada (IOC) successfully trialled an electric autonomous drilling system and continued to develop its Integrated Operations Centre.

In the harsh climate of northern Canada, where electrical storms, blizzards and temperatures below -30°C are common, autonomous drills continue to work in all conditions, including those unsafe for manned crews. One operator is able to control multiple drill rigs remotely, replacing on-the-ground teams operating a single rig. The autonomous drill trial demonstrated a 30% improvement in productivity over standard rigs.

The autonomous drilling system is one element of the mining and production process that has been brought together in IOC's Integrated Operations Centre. The centre houses control and monitoring systems for the equipment in the five operating pits, ore delivery system, concentrator, pellet plant, 418km rail line, and port. Housing these systems together has improved communication and decision-making, as operators who previously worked in different locations spread over hundreds of kilometres now sit next to each other.

At IOC, new technology is enabling performance improvements in ways that would have been "unthinkable" only a few years ago.

Energy and Minerals in figures

6

mining sites

7

processing plants

Operations in

6

countries

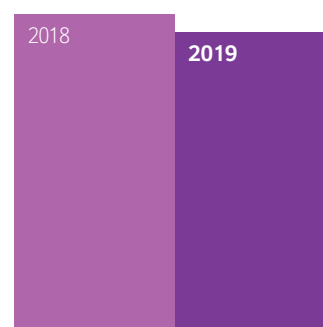
8,600

employees

400,000

trees planted in Madagascar

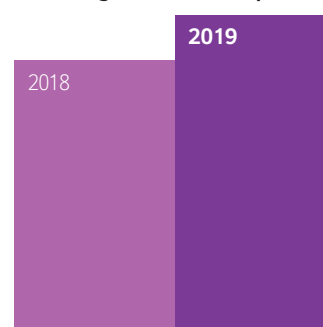
Gross sales revenue



\$5.2bn

(2018: \$5.5bn)

Net cash generated from operating activities



\$1.4bn

(2018: \$1.2bn)

Energy and Minerals continued

2019 year end results	2019	2018	Change
Iron ore pellets and concentrates production ¹ (million tonnes – Rio Tinto share)	10.5	9.0	18%
Titanium dioxide slag production (000 tonnes – Rio Tinto share)	1,206	1,116	8%
Borates production (000 tonnes – Rio Tinto share)	520	512	2%
Uranium production (000 lbs – Rio Tinto share)	4,754	6,764	(30)%
Gross sales revenue (US\$ millions)	5,150	5,451	(6)%
Underlying EBITDA (US\$ millions)	1,762	2,140	(18)%
Underlying EBITDA margin (product group operations)	37%	41%	
Underlying earnings (US\$ millions)	611	995	(39)%
Net cash generated from operating activities (US\$ millions)	1,387	1,245	11%
Capital expenditure (US\$ millions) ²	(551)	(442)	25%
Free cash flow (US\$ millions)	817	796	3%
Return on capital employed ³	15%	20%	

- 1 To reflect a change in management responsibility, Dampier Salt is now reported within Iron Ore and we have restated prior year numbers accordingly. Iron Ore Company of Canada and the Simandou iron ore project in Guinea continue to be reported within Energy & Minerals.
- 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.
- 3 Return on capital employed (ROCE) is defined as underlying earnings excluding net interest divided by average capital employed (operating assets before net debt).

Underlying EBITDA 2018 vs 2019 (\$ million)

2018 underlying EBITDA	2,140
Price	327
Exchange rates	72
Inflation	(75)
Flexed 2018 underlying EBITDA	2,464
Volumes and mix	29
Cash costs	(118)
Coal disposals	(893)
One-off items	281
Other	(1)
2019 underlying EBITDA	1,762

Safety

Our E&M operations made significant improvements across all key safety metrics this year. The all-injury frequency rate, for example, was down to 0.43 (from 0.55 in 2018), the result of increased rigour and focused implementation of our safety programmes across our operations, made possible by the leadership and engagement of our employees. While 2019 was a fatality-free year, at our IOC operations, one of our employees experienced a permanent disabling injury. Our thoughts remain with him and his family; we continue to share the analysis and resulting lessons learned across the Group to ensure everyone takes all possible steps to prevent such incidents in the future.

Process safety incidents were also more than halved in 2019 following our implementation of a targeted improvement plan. We are particularly proud of the performance of QMM operations in Madagascar, which had one recordable injury and an all-injury frequency rate of 0.04. Four other E&M sites in Havre-Saint-Pierre, Suzhou, Simandou and Jadar ended the year with no recordable injuries.

In 2020, we will continue to implement the Rio Tinto safety maturity model, supported by lessons learned and best practices from 2019. The implementation of the process safety standard will also continue to be a key focus in 2020.

Financial performance

A recovery in volumes at both Rio Tinto Iron & Titanium and Iron Ore Company of Canada (IOC) following the disruptions in 2018, along with higher prices for iron ore pellets and concentrate and titanium dioxide feedstocks, contributed to our strong financial performance in 2019.

Underlying EBITDA of \$1.8 billion was 18% lower than 2018, but was 41% higher excluding the coal assets we divested in 2018. Volumes were boosted by an improved operational performance at our titanium dioxide operations, and the return to normal operations at IOC following a two-month strike in 2018. The higher price environment, in particular for iron ore pellets and concentrate and titanium dioxide feedstocks, added \$0.3 billion to underlying EBITDA compared with 2018.

We generated net cash of \$1.4 billion from our operating activities and \$0.8 billion of free cash flow, reflecting the higher volumes and stronger pricing environment. These were 11% and 3% higher than 2018, respectively, despite there being no contribution from the coking coal assets which we divested in 2018.

Review of operations

Energy

Uranium production was 30% lower than 2018. While Energy Resources of Australia (ERA) continued to process existing stockpiles, production was 12% lower than 2018, reflecting lower grades. We have reported production from Rössing Uranium up to the date of completion of divestment to China National Uranium Corporation Limited on 16 July 2019.

In late 2019, we announced our support for ERA's plans for a renounceable entitlement offer to raise \$324 million for the rehabilitation of the Ranger Project Area in Australia's Northern Territory.

Iron Ore Company of Canada (IOC)

Iron ore pellets and concentrate production at IOC was 18% higher than 2018, when operations were impacted by a two-month strike.

Minerals

Titanium dioxide feedstock production was 8% higher than 2018, reflecting improved operational performance and the restart of furnaces.

Production at the end of 2019 was affected by the curtailment of operations at Richards Bay Minerals (RBM) in South Africa. Operations were slowed in mid-November, following an escalation in violence in the communities surrounding the operations, and curtailed at the beginning of December. A phased restart began at the end of December.

All nine furnaces at Rio Tinto Fer et Titane (RTFT) are in operation, with three of four furnaces in operation at RBM. We will decide to idle furnaces or re-start the remaining idled furnace to match market demand.

Borates production was in line with 2018 and aligned with market conditions.

New projects and growth options

The \$463 million Zulti South construction project at RBM is on hold after a number of security incidents – we will assess a restart after normalisation of operations.

We are continuing our pre-feasibility study at the Jadar lithium-borate project in Serbia – this will establish the economic business case for the project and include environmental and socioeconomic impact assessments.

We continue to work with our joint-venture partners, Chinalco and the government of Guinea, to explore ways to optimise, develop and fund the world-class Simandou iron ore deposit and the trans-Guinean infrastructure needed to support the mine. We own 45.05%, Chinalco owns 39.95% and the government of Guinea owns a 15% stake in this project.

Greenhouse gas emissions

Compared with 2018, E&M's absolute GHG emissions were 11% lower, driven by the sale of our uranium asset in Namibia. There was a 5% improvement in E&M's overall GHG intensity compared to the 2008 baseline year.

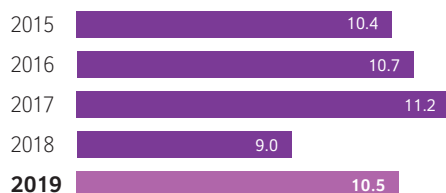
Underlying EBITDA margin

37%

(2018: 41%)

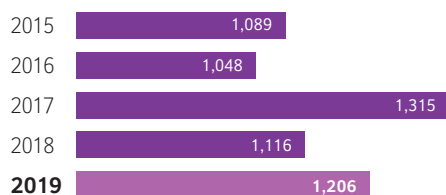
Iron ore pellets and concentrate production

(million tonnes – Rio Tinto share)



Titanium dioxide slag production

(thousand tonnes – Rio Tinto share)



Growth and Innovation

Whether exploring or building assets, we use advanced technology and some of the best minds in the business to maximise value across the lifecycle of our operations.

Our success, today and in the future, will be predicated upon using cutting-edge technology as well as data and artificial intelligence to establish new and more efficient ways of finding, building, running and closing our operations. This is the mandate of our G&I group.

Safety

Since G&I's inception in 2016 there have been no work related fatalities¹ and our all-injury frequency rate was 0.28. We have shown safety is our number one priority by continually learning from potentially fatal incidents, focusing on controls to prevent injury and illness, continuing to automate risky manual tasks and preventing catastrophic events, particularly in relation to tailings and process safety.

Industry-leading innovation

As an industry, we tackle some of the greatest engineering and technical challenges on the planet, and we have a long, proud history of meeting these challenges head on.

In exploration, for example, we are using advanced technology to mine data to improve our targeting, which lets us uncover resources that others may have missed – this was true of our Winu copper-gold exploration project, in Western Australia, which was announced in 2019.

In studies and construction, innovation and digital design is helping strengthen safety, reduce cost, and find new ways to improve waste and water management. We are also looking at more agile ways to build new mines: starting small, building quickly and safely, and embedding optionality for growth.

Technology also has an important role to play in helping us increase productivity and tackle critical industry challenges, such as tailings, energy and carbon reduction initiatives. In 2019, machine learning helped us unlock productivity improvements. For example, at our Kennecott copper mine in Utah, in the US, we used artificial intelligence to optimise the concentrator's recovery of minerals from the varying types of ore fed into the plant.

¹ Health fatality reported in 2017 was reclassified as non-work related.

Exploration

This year, we explored for seven commodities in 17 countries and generated more opportunities than at any other time in our history. Expenditure on exploration and evaluation was \$624 million. Of this, \$315 million was for the exploration and evaluation of greenfield programmes and \$309 million was for brownfield programmes in our product groups, mostly copper.

We had some early success in copper exploration at Winu, Western Australia, and assessment and interpretation of existing data is ongoing.

The majority of our projects this year are in the early stages of drilling. Projects at a more advanced stage are listed in the table below.

Projects

In 2019, the projects team in G&I, responsible for building our mines and other operations, delivered a significant volume of work safely, on time and on budget – or better. We were recognised for our work, winning multiple awards for our Amrun bauxite mine in Queensland, Australia, which officially opened in March, two months ahead of schedule and under budget. Amrun achieved its production rate of 22.8 million tonnes in the fourth quarter of 2019, much earlier than planned. Its Chith Export Facility received the 2019 Australian Construction Achievement Award, Institute of Civil Engineers Brunel Medal, and Management Innovation & Excellence Award for Operational Improvement. Our local and Indigenous participation strategy also received the Best Company Indigenous Procurement Initiative.

AutoHaul™, the world's first automated heavy-haul rail network, was handed over to our Iron Ore business in April and received a 2019 Freight Rail Excellence Award. Construction of Koodaideri, our intelligent mine in the Pilbara, Western Australia, began in 2019: the project remains on budget and first ore is expected in late 2021. We are leading the construction of a new crusher and 13 kilometre conveyor at the Western Turner Syncline Phase 2 project at our Greater Tom Price iron ore operations. We completed bulk earthworks for the Robe Valley sustaining project's wetplant area and poured the foundation for the West Angelas Deposit C&D primary crusher facility, both in the Pilbara.

Advanced stage exploration projects

Project	Commodity	Country	Type	Stage
Sudi	Mineral Sands	Tanzania	Greenfield	Project of Merit
FalCon	Diamonds	Canada	Greenfield	Order of Magnitude
Pilbara	Iron ore	Australia	Brownfield	Project of Merit
Oyu Tolgoi	Copper	Mongolia	Brownfield	Project of Merit
Bingham Canyon	Copper	US	Brownfield	Project of Merit
Winu	Copper	Australia	Greenfield	Order of Magnitude
Kalindi	Copper	Zambia	Greenfield	Project of Merit
Korgantas	Copper	Kazakhstan	Greenfield	Project of Merit
Janice Lake	Copper	Canada	Greenfield	Project of Merit
Pribrzhniy	Copper	Kazakhstan	Greenfield	Project of Merit

Project of Merit – Preliminary evaluation of orebody size, quality and potential.

Order of Magnitude – Judging whether an opportunity will be economical to develop.

The underground copper project at Oyu Tolgoi, in Mongolia, achieved a significant milestone with the completion of construction of Shaft 2, which enables the acceleration of work on the underground development. Shaft 2, a 10-metre diameter shaft sunk to approximately 1.3 kilometres, is a critical piece of infrastructure and will enable a step change in delivering the underground mine. Shaft 2 can carry 300 people per cage cycle versus a maximum of 60 people per cage cycle through Shaft 1. The 48-tonne capacity cage can now be used to support logistics, transporting supplies and components for development of the mine. This shaft also has a production component, which hoists 60 tonnes of rock at about 60 kilometres per hour. Completing Shaft 2 provides additional momentum as we continue to progress detailed work on the mine design, which we expect to complete in the first half of 2020, with a definitive estimate for the development of this world-class ore-body in the second half of 2020. Other facilities completed in 2019 include the mine dry facility, a new underground operations control room and the central heating plant expansion.

At our Resolution Copper project in Arizona, in US, we deepened Shaft 9 further, reaching 1,600 metres below ground in 2019. Working with our aluminium business at our Kitimat smelter in British Columbia, Canada, we progressed the construction of a second tunnel to safeguard our hydroelectric power supply. While our tunnel boring machine productivity was lower than expected, we reached 2,731 metres at the end of 2019.

Introducing Group Technical

This year, we introduced Group Technical as the organisation housing G&I's eight Centres of Excellence – Analytics, Automation, Asset Management, Energy and Climate Change, Ore Body Knowledge, Processing, Surface Mining and Underground Mining – representing our most critical technical capabilities. Group Technical also provides an added layer of assurance in managing our major hazard risks and supports the replication of best practices in productivity Group-wide.

G&I in figures

0.28

AIFR
(2018: 0.19)

2,600

people

+13,400

contractors

8

Centres of Excellence – Analytics, Asset Management, Automation, Energy and Climate Change, Ore Body Knowledge, Processing, Surface Mining, Underground Mining

Exploring for

7

different commodities in 17 countries

\$2.1bn

spent on capital projects in 2019

In 2019, we delivered a step-change in the way we value data. Our Integrated Data Platform, which pools operational and external sources of data into a 200 terabyte lake, reduced operating expenses associated with data sourcing by 70-80%.

G&I worked with our Iron Ore product group to award \$1.3 billion in contracts to local or Indigenous businesses for capital projects in the Pilbara, Western Australia.

Commercial

The Commercial group puts the company's value over volume approach into practice.

Our Commercial group encompasses our global sales and marketing, procurement, and marine and logistics teams. We maximise the value of our physical flows to improve both our business and that of our customers. We link our customers and markets with our operations in a way that informs production and future investment decisions. We ensure that both the amount and the types of products that we produce meet our customers' needs and manage the trade-off between volumes, quality, cost and capital expenditure.

Safety

We are committed to the safety, health and wellbeing of our employees and contractors. We face a diverse range of risks across multiple geographies in our global sales and marketing, procurement and activities. Our primary focus has been implementing Group standards and critical-risk management fatality prevention programmes across our areas of greatest exposure, primarily marine and logistics, and procurement. We have also worked closely with our suppliers and contractors to embed safety into the equipment we procure and our approach to contractor management. In 2019, we had zero fatalities and a 0.04 all-injury frequency rate. In 2020, we intend to build on this and share our focus on safety, health and wellbeing through our daily interactions with our customers and suppliers.

Commercial strategy

Our Commercial strategy is built around four key pillars.

First, deepening our understanding of the value chain. We do this by improving the way we collect, organise and monetise information – solving our customer challenges and continuously generating value.

Second, building commercial excellence. We are taking what we do today and doing it better. We aim to sell every tonne we produce to the customer that values it the most, and rigorously measure and improve our performance.

Third, expanding our commercial activities into new areas. Moving from simple risk avoidance to an approach where we can better identify, quantify, and manage our risks.

Fourth, optimising our end-to-end value chain. We have an integrated approach to matching our production to the changing demand patterns of the market that seeks to ensure the real-time needs of the market can inform our decision-making.

Market insight and outlook

Global economic conditions remained uncertain throughout 2019 due to escalated trade tensions and heightened geopolitical instability. Global GDP growth is estimated to have slowed to 2.6% vs 3.2% in 2018. China's GDP growth was approximately 6.1% in 2019 vs 6.6% in 2018. And this gradual deceleration is expected to continue despite the near-term challenges and volatility created by the advent of Covid-19. In the longer term, the trend of income growth in emerging markets, including those in ASEAN countries and India, will continue to drive global commodity demand. In China, strong commodity demand will be increasingly driven by a large and evolving manufacturing sector, the need to modernise commercial and residential buildings, and the evolving trends of electrification in a low carbon world.

Iron Ore

Despite overall weakness in global macro conditions, demand for the quality iron ores we produce remained strong in 2019. This was mainly driven by a combination of seaborne supply disruptions and record Chinese steel output, which drove prices for the benchmark 62% iron ore on a free on board (FOB) basis up 39% in 2019 from the average 2018 price. Approximately 90% of our Pilbara products are priced with reference to the 62% index.

Global steel production increased by about 1.3% in 2019 compared to 2018. Record Chinese steel production of around 970 million tonnes (MT), more than offset lower steel output outside of China. Among other major steel-producing regions, India, the world's second largest steel producer, experienced a 2% growth in steel production. Meanwhile, Japan's output was down 3.7%, due to operational issues, natural disasters and other weather-related disruptions.

2019 seaborne iron ore supply decreased 30MT compared to 2018, with the cumulative impact of lower shipments following the Brumadinho dam failure and significant weather-related disruptions in the first quarter affecting Pilbara suppliers. China's domestic supply growth helped meet the supply shortfall in 2019, after overcoming improved environmental and safety standards, and financing availability. Scrap use in China increased in 2019, and we expect moderate growth to continue, albeit limited by availability, and the economics of collection and use.

Aluminium

The market for primary aluminium contracted by 1% in 2019 due to lower car production, durables output, and soft demand from construction. Chinese output growth continued to weaken in 2019, with capacity reductions of around 3.6MT due to lower prices and disruptions. In addition, there were 0.5MT of environmental winter curtailments. China permanently curtailed around 2MT of capacity in 2019. We expect aluminium demand to improve in 2020, as the transport sector recovers, but political and recessionary risks remain.

Alumina prices declined in 2019 on the back of increased output, weaker demand and lower caustic soda prices.

China continued to drive strong growth in seaborne bauxite demand in 2019, primarily as a result of the depletion of domestic, inland bauxite reserves and declining quality. To date, this demand has primarily been met by exports from Australia, Guinea and Indonesia.

Copper and Diamonds

A number of factors reduced the price of copper in the second half of 2019, primarily changing macroeconomic growth expectations and volatility in equity markets. Longer term demand is expected to remain robust as a result of urbanisation, industrialisation and electrification in China and emerging economies.

Mined supply contracted 1% in 2019 amid enhanced supply-side risks. Disruptions in Latin America and the African copper belt accounted for over 75% of global disruptions in 2019 as these regions faced environmental, social and governance challenges and regulatory disruptions respectively. These, and other challenges, are expected to persist in the coming years.

Weak diamond jewellery sales during late 2018 and early 2019 resulted in weak orders by retailers in 2019.

Energy and Minerals

Underlying titanium dioxide pigment demand weakened in 2019 resulting in lower sales volumes of paint. Against this, pricing of titanium dioxide feedstock strengthened due to structural shortages of rutile supply. In 2020, we anticipate a continuation of the demand trends of 2019 cushioned by feedstock supply shortages.

Medium to long-term demand for borates is tied to increases in wealth and living standards and associated requirements for the agricultural sector. In 2019, stronger demand in China was offset by weaker demand elsewhere, while trade restrictions and tariffs in India and China impacted the market, a situation we expect to moderately improve in 2020.

Seaborne iron ore pellet demand stayed robust in the beginning of 2019 due to tight fundamentals and supply disruptions. In the second half of 2019, reduced mill profitability, lower scrap prices outside China, and deterioration of developed market steel demand saw pellet prices fall. However, we expect a recovery through 2020.

Commercial in figures**0.04**AIFR
(2018: 0.18)**1,300**

employees

Singapore Commercial Hub

with satellite offices in Chicago and Frankfurt and offices in China, Japan and South Korea

Approximately

2,000

customers across 96 countries

>230

contracted ships managed at any one time

37,000

suppliers managed in more than 120 locations

Sustainability

Our values, experience and history tell us we must work in a way that delivers real, lasting benefits.

We must care for our employees, respect and care for the environment when we explore, build and operate, and repurpose or rehabilitate the land when our operations come to an end. We must contribute our fair share to local and national economies, including through the payment of taxes and royalties.

We therefore apply high standards to the sustainability issues that are material to our business, our employees, the communities that host us and the customers that buy and use our products. Our goal is to achieve consistent, high-quality social and environmental performance across all of our operations and to increase our stakeholders' knowledge of how we work through meaningful disclosures and transparency. We have also made an effort to better understand, engage and partner with our key stakeholders to create sustained, mutual value. We support the 2030 development agenda and contribute to the UN Sustainable Development Goals.

Our portfolio is also an important part of our sustainability strategy. In 2018, we became the only major player in our industry to have a portfolio free of fossil fuel production. Today, our portfolio comprises commodities with solid long-term fundamentals, including those critical for the transition to a low-carbon economy.

In 2018, we became the only major player in our industry to have a portfolio free of fossil fuel production.

Our approach to United Nations' Sustainable Development Goals (SDGs)

We continue to examine our approach to the UN SDGs in line with our integrated sustainability strategy.



Integrated sustainability strategy

Our strategy is expressed in three pillars.

Running a safe, responsible and profitable business

Running a safe, responsible and profitable business is the foundation of our approach, because safety and profitability allow us not only to manage risks, but also to invest in the future of our company and our communities – and in partnership with others, pioneer new ways to have a lasting positive impact. This pillar also includes the responsible, transparent and reliable management of our operational impacts.

Safety is our top priority. The health and safety of our workers and contractors is fundamental to the way we work. In 2019, we delivered positive safety performance across the business, and had no fatalities. Our performance on safety can still improve; we must continually work to improve safety across the Group. But we recognise the achievements made by thousands of our employees this year. Safety extends beyond personal safety, so we also have robust standards, processes and tools embedded across our business to protect the environment and ensure respect for the communities in which we operate.

Other activities that help us meet our obligations also sit in this first pillar: our commitment to our employees' rights and wellbeing, the ethics and integrity of our business and supply chain, and respect for the environment. Transparency underpins all of our efforts, including through our support of global initiatives like the Extractive Industries Transparency Initiative (EITI).

Collaborating to enable long-term benefits where we operate

Building on the first pillar, the second focuses on the success of our communities and our contribution to governments and partners, including Indigenous groups.

Agreement-making has always characterised our intent to partner for the long term, while respecting rights, and it still lies at the heart of our community engagement. For example, this year we signed a historic agreement in Quebec with the Innu community of Ekuanitshit to generate economic development opportunities associated with our operation in Havre-St-Pierre.

We also began revising our approach to communities and development this year, in alignment with the UN Sustainable Development Goals and with global technological, economic and social changes in mind. For example, we are looking at more holistic ways to contribute, including by improving our partnerships with the development arms of national, state and provincial governments, as well as international institutions such as the World Bank Group.

We are also investing in skills training for the future of work. For example, we have partnered with the government of Western Australia and South Metropolitan TAFE (Technical and Further Education) to develop three nationally recognised qualifications in automation.

We also recognise that our business is, in many of the 36 countries in which we work, a major source of jobs and opportunity – and we take this responsibility seriously. However, the employment opportunities we create go far beyond our own business. For example, in 2019, we spent \$17.2 billion with suppliers around the world.

Pioneering materials for human progress

The third pillar encompasses activity that contributes to a sustainable, low-carbon future, including the materials we produce and the innovations we bring to market.

The materials we produce help support economic growth and facilitate social development because they are used to build bridges, hospitals, schools and are used in environmentally friendly solutions, such as wind turbines and electric vehicles.

For more information about how our materials will support the transition to a low-carbon economy and our approach to climate change, please see our climate change report, developed in line with the Task Force on Climate-Related Disclosures, on [riotinto.com](https://www.riotinto.com).

Innovation extends to other parts of our aluminium business. We also continued to look for ways to manage waste. In September, Queensland Alumina Limited (QAL) – an independently managed joint venture between Rio Tinto and Rusal – along with the University of Queensland's Sustainable Minerals Institute, received an award for research into technologies that could turn red mud – a waste product created during alumina refining – into soil able to grow plants.

The closure of our operations is also critical to the sustainable future of our communities. Today, we plan the design and construction of our operations with closure in mind. We progressively rehabilitate the land as we mine in places like Richards Bay Minerals, our operations in KwaZulu-Natal, South Africa, and our bauxite mines in Queensland, Australia. The Diavik diamond mine, in the Northwest Territories, Canada, was designed with closure in mind: the buildings on site can be removed and, when mining ends, the embankments will be reclaimed and the open pits will be filled with lake water.

Sustainability continued

2019 performance against targets

Goals	Performance
To reach zero fatalities, and to eliminate workplace injuries and catastrophic events	Zero fatalities at managed operations <ul style="list-style-type: none"> All injury frequency rate (AIFR) at 0.42 (target: 0.38), reduced 5% from 2018 (0.44) 1.42 million CRM verifications
All businesses will identify at least one critical health hazard material to their business and will demonstrate a year on year reduction of exposure to that hazard	Reduction: 64.6% (38.5% airborne and 26.1% noise) <ul style="list-style-type: none"> Participation: 11 sites (167 exposed employees and contractors)
24% reduction in total greenhouse gas emissions intensity between 2008 and 2020	29.4% decrease in greenhouse gas emissions intensity since 2008
To reduce the rate of new occupational illnesses each year	<ul style="list-style-type: none"> 34% decrease in the rate of new occupational illnesses since 2018
To disclose for all managed operations by 2023, their permitted surface water allocation volumes, their annual allocation usage and the estimated surface water allocation catchment runoff from average annual rainfall	<ul style="list-style-type: none"> Target statements defined and approved by our Sustainability Committee, a sub-committee of our Board. Assurance milestone schedules have been developed for the water target period (2019–23) and performance against these milestones will be tracked and assured annually.
To achieve local water stewardship targets for selected sites by 2023	
To demonstrate local economic benefits from employment and procurement of goods and services by reporting yearly against a locally defined target	90% of assets are on track to achieve their 2020 significant complaints target <ul style="list-style-type: none"> 70% of assets are on track to achieve their 2020 local employment target 84% of assets are on track to achieve their 2020 local procurement target 80% of assets are on track to achieve their 2020 repeat complaints target
To be effectively capturing and managing community complaints and reducing repeat and significant complaints each year	<p>Note: 'On track' means 75% or greater progress towards 2020 targets</p>
To improve diversity in our business by: <ul style="list-style-type: none"> Increasing women in senior management¹ by 2% each year Aiming for 50% women in our graduate intake, with 30% from places where we are developing new businesses 	25% of our Executive Committee were women, consistent with 2018 <ul style="list-style-type: none"> 22.6% of senior management¹ were women, consistent with 2018 18.4% of our workforce were women, up 0.7% from 2018 54% of our graduate intake were women, 4% above target and up 18% from 2018 11.1% of Board roles were held by women. With the new non-executive director appointments announced in February 2020, this percentage has increased to 33% 19% of our graduate intake were from places where we are developing new businesses²
Improving our employee engagement and satisfaction	12-point increase in our employee net promoter score (eNPS³) <ul style="list-style-type: none"> 3-point increase in employee satisfaction score (eSAT⁴) 4-point increase in our recommend score 37% of Yammer members engage on a monthly basis, on average

¹ We define senior management as general managers, Group advisers and chief advisers as well as employees in leadership roles who report directly to Executive Committee members.

² Identifying with a nationality is not mandatory. Over 48% of our graduates have not formally reported a nationality.

³ eNPS is a measure of "how likely an employee is to recommend Rio Tinto to a friend or colleague". It is calculated by subtracting the proportion rating 0-6 from the proportion rating 9 and 10 (on a 0-10 scale).

⁴ eSat is a measure of "how happy an employee is to work at Rio Tinto". It is calculated by averaging the responses on the 1-7 scale and expressing this out of 100.

Our reporting

While we have made progress across various sustainability areas – from water to climate change, communities to transparency – stakeholders tell us they are most interested in hearing about certain themes:

- Safety
- Tailings
- Climate change
- Communities
- Water

These themes are addressed in the pages that follow. Progress against our targets is set out on pages 63 to 67.

2019 also saw us progress in other important areas, many of which are integral to our business as well as the way we work. For more information on these topics, please see pages 68 to 70.

zero
fatalities

48%

reduction in all injury
frequency
rate over ten years

Safety

Nothing is more important than the safety and wellbeing of our employees, contractors and communities. Safety is also one of our core values, and part of who we are and the way we work, every shift, every day.

Today, we believe all incidents and work-related health risks are preventable, so we concentrate on identifying, understanding, managing and, where possible, eliminating these. In 2019, we had no fatalities. Still, we know we must do better.

Over the past ten years, both the severity of injuries and our all injury frequency rate have fallen significantly (from 0.81 in 2009 to 0.42 in 2019).

We closely monitor leading indicators of injuries, incidents, occupational illnesses and fatalities. In 2019, we continued to focus on eliminating fatalities from our potential fatal incidents (PFIs) and our critical risk management (CRM) programme.

Eliminating fatalities

In an effort to move further towards leading indicators, we expanded critical risk management to include the safety maturity model (SMM), also adding it to the Group's 2019 short-term incentive plan. SMM is a tool that captures the key elements of our safety management system, including CRM, and builds a roadmap that describes a fully mature safety culture. Our model was introduced in 2019 and each site was assessed using the tool and given a baseline score, which averaged 3.4 across the Group, using a 9-point scale. Group performance measures were then set at 3.4 for threshold, 4.4 for target, and 5.7 for outstanding. At the end of the year the sites were reassessed by our internal auditors and an operations line leader. All sites involved showed strong improvement, and across the Group, the average score advanced from the baseline of 3.4 to the end of year 4.5, demonstrating SMM helped each site strengthen its focus on proactive actions to improve safety.

The SMM was well received across our business both as a roadmap to improve safety performance and as a way to increase employee engagement. The assessments gave us valuable insight into the effectiveness of key safety management controls. We are committed to zero fatalities and a zero harm work environment, and have maintained our focus

on CRM to verify that critical controls are in place. We also continue to report, investigate and learn from our potential fatal incidents (PFIs). These processes also form part of our SMM model. As part of SMM implementation and focus on leadership, in 2019 we also introduced the cascaded coaching framework to build safety leadership capability across leadership. This replicates the programme from Boyne Smelters, Australia, which has been a leader in safety for many years due to strong safety capability among its leadership.

Managing major hazards

Running a safe, responsible and profitable business requires us to manage major hazard risks and do everything we can to prevent catastrophic events, including those involving tailings and water storage facilities, chemicals, underground mining and process safety. We identify major hazard risks (low probability, high consequence events) and manage them by verifying controls, conducting external reviews and requiring compliance with standards and procedures – such as our tailings and water storage facilities' management standard. Standards and procedures provide a consistent approach that is then implemented across our managed operations around the world. We audit every operation against our standards, and require our businesses to meet their health and safety performance requirements and targets. We remain committed to the reduction of our process safety risks and continue to run our Occupied Buildings Programme, which will eliminate, or mitigate, the total process safety exposure to our people occupying buildings.

Using data to improve health and safety

By looking for trends in data, we can help keep our employees and contractors safe. We track health and safety performance to identify patterns – for example, using additional controls to prevent incidents at times of the day when they are more likely. We have started to look beyond traditional health and safety metrics – bringing factors like weather and workers' accommodation into the picture – to identify the leading indicators of injuries, incidents, occupational illnesses and fatalities. We are factoring our learnings into revised health and safety practices in key parts of our business.

Safety and health performance¹ 2015-19

	2019	2018	2017	2016	2015
Fatalities at managed operations	0	3	1	1	4
All injury frequency rate (per 200,000 hours worked)	0.42	0.44	0.42	0.44	0.44
Number of lost-time injuries	230	228 ²	199	206	220
Lost time injury frequency rate (per 200,000 hours worked)	0.27	0.27	0.25	0.26	0.25
New cases of occupational illness (per 10,000 employees)	20	30 ²	25	47	32
Number of employees ³	46,000	47,500	47,000	51,000	55,000

¹ Data relating to fatalities, all-injury frequency rate and lost-time injury frequency rate includes all employee and contractor exposure hours and incidents. New cases of occupational illness are reported for employees only.

² Numbers adjusted from previous years to ensure comparability over time.

³ Includes our share of joint ventures and associates (rounded to the nearest thousand).

Sustainability continued

95

active tailings
storage facilities (TSF)

**Member of the
International Council of
Mining & Metals (ICMM)
tailings working group
since 2016.**

Tailings

We manage tailings storage facilities (TSFs) at 25 sites around the world, with a further five non-managed operational sites and 12 closed and legacy sites. Most of these sites have multiple storage facilities, so we have a total of 95 active TSFs, with 40 more facilities that are closed or under rehabilitation. We aim to protect the health and safety of people who live and work near our TSFs as well as safeguard the surrounding environment, including water.

Of these 95 active TSFs, 22 had the last raise as upstream construction. And of these 22 facilities, 15 are managed by our joint-venture partners and seven by Rio Tinto. We also operate a number of large water storage facilities. Our website lists tailings and water storage facilities reflecting any operational and ownership changes. Our facilities have been regulated, permitted and managed for many years; and they comply with local laws, regulations, permits, licences and other requirements. In 2015, we introduced a Group safety standard for all tailings and water storage facilities. Our assurance processes verify that our managed facilities around the world operate in accordance with this standard.

For our non-managed operational sites with tailings facilities, we actively participate in technical committees in an advisory capacity with our joint-venture partners. Each of the technical committees has a Tailings Steering Committee, or equivalent, to support the effective management of tailings.

There have been no external wall failures at our TSFs operations for more than 20 years. We are dedicated to continuous improvement in tailings management and seek to enhance our governance systems and processes while lifting our operational capability and practices.

In 2016, we joined the International Council on Mining & Metals (ICMM) tailings working group, which develops tailings management guidance for member companies. Our work helped inform its 2016 position statement, identifying the six elements of TSF governance. Our own Group-wide safety standard is consistent with these six key elements:

1. Accountability, responsibility and competency
2. Planning and resourcing
3. Risk management
4. Change management
5. Emergency preparedness and response
6. Review and assurance

Tailings management has been listed on our Group-level risk register since 2010. Since establishing our Group safety standard for tailings in 2015 and working with the ICMM committee in 2016, we have:

- Established the Surface Mining Centre of Excellence Tailings team to pool and provide technical expertise, own the technical content of the Group tailings safety standard and act as a second line of assurance, conducting technical risk reviews of our facilities.
- Introduced seven training modules that include leading practices for safe tailings management as regular training for our tailings facility operators.
- Implemented internal and independent third-party reviews of all designs and major studies for operational tailings facilities. Our Surface Mining Centre of Excellence completed technical risk reviews at each of our managed and non-managed tailings facilities (with the exception of Mineração Rio do Norte, which will be completed in the first quarter of 2020). The reviews found that while our tailings facilities are well managed, we still have an opportunity to improve. We are currently working on implementing improvement plans.
- Developed a Group procedure to more consistently implement the safety standard, and updated the procedure and the safety standard to reflect learnings from our tailings review.
- Supported the ICMM as a co-convenor of the independent Global Tailings Review, alongside the UN Environment Programme and the Principles for Responsible Investment, and provided feedback on drafts of the proposed standard.
- Joined the Minerals Council of Australia Tailings Working Group.
- Participated in the preparation of the International Commission on Large Dams Tailings Dam Design – Technology Update (ICOLD bulletin), and in the Australian National Committee on Large Dams – Guidelines on Tailings Dams: Planning, Design, Operation and Closure Revision 1.

Our ambition**zero**

net emissions by 2050

Our targets**15%**

reduction in absolute emissions by 2030

30%

reduction in emissions intensity by 2030

underpinned by

\$1bn

spend on climate-related projects over the next five years

Climate change

Climate risks and opportunities have formed part of our strategic thinking and investment decisions for over two decades. We now have a portfolio well positioned for the transition to a low-carbon economy, and we are the only major diversified company in the industry not involved in fossil fuel extraction. While we are uniquely positioned, like many other businesses, we still face significant challenges in meeting our climate change ambition and delivering tangible outcomes.

In addition, each of the commodities we produce has a role to play in the transition to a low-carbon economy – aluminium for electric vehicles, copper for wind turbines, iron ore for critical infrastructure, and minerals for rechargeable batteries, including lithium.

This year, we have set a new ambition to reach net zero emissions by 2050. While there is no doubt we will face many challenges in achieving this ambition, and we do not yet have a clear pathway to get there, we will focus on reducing emissions across our operations, partner with others to develop new technology solutions and look for ways to improve the quality of our products.

In 2019, we looked at our operations in detail to identify emission reduction opportunities and develop marginal abatement cost curves. This comprehensive work informed our 2030 targets for our managed and non-managed operations: to reduce our emissions intensity by 30% and absolute emissions by 15% compared to our 2018 baseline (equity basis). And our overall growth between now and 2030 will be carbon neutral.

This will be underpinned by approximately \$1 billion spend over five years on climate-related projects, research and development, and activities

to enhance the climate resilience of our business. For example, in early 2020, we announced a \$98 million (A\$144 million) investment to build a 34MW solar plant at our new Koodaideri iron ore mine in the Pilbara, alongside a lithium-ion battery energy storage system. The plant and battery will limit our annual carbon dioxide emissions by approximately 90,000 tonnes (compared to conventional gas-powered generation).

We support the use of market mechanisms and the establishment of stable regulatory frameworks that support investment in low-carbon technology. Effective climate policies must prevent “carbon leakage” by avoiding the negative unintended consequence of transferring industrial production to countries with weaker regulations.

We also test our portfolio against a range of scenarios mapping the policy and technology pathways necessary to limit global temperature rises. Our analysis indicates that the diversity of our portfolio enhances our resilience, including in a scenario in which the global average temperature increase is below 2°C; consistent with the goals of the Paris Agreement.

Climate change will only be successfully addressed through collective action by governments, business and consumers around the world. We are working on innovative partnerships to stimulate action with customers and other partners across our value chain. In September, we signed a Memorandum of Understanding with China's largest steel producer, China Baowu Steel Group, and Tsinghua University, one of China's most prestigious and influential universities, to develop and implement new methods to reduce carbon emissions and improve environmental performance across the steel value chain.

Task Force on Climate-related Financial Disclosures

We have provided disclosures in line with this framework in our climate change report, which can be found on [riotinto.com](https://www.riotinto.com).

Greenhouse gas and energy performance 2015-2019

	2019	2018	2017	2016	2015
Greenhouse gas emissions intensity (indexed relative to 2008)	70.6	71.6 ¹	72.9	74.4	79.7
Total energy use (petajoules)	407	425 ¹	440	458	433

¹ Numbers adjusted from previous years to ensure comparability over time.

Commentary

Sources of greenhouse gas emissions	Net purchases electricity and steam 35.2%; fuel 36.4%; anodes and reductants 24.8%; process gases 3.0%; net land management 0.6%
Primary sources of energy used ¹	Coal 32.2%; hydro 31.1%; natural gas 19.6%; diesel 12.6%; nuclear 0.5%; fuel oil 2.4%; other renewable 1.6%; other 0.0%
Sources of electricity used ¹	Hydro 72%; coal 14.8%; natural gas 8.1%; diesel 0.9%; other 4.2%

¹ Due to rounding, the sum may not total 100%.

Sustainability continued

\$36m*

in community investment

\$5.5 billion

spent with Western Australian businesses – including Pilbara Indigenous-owned businesses

Communities

We plan our business for the long term and aim to play a positive role in society, as well as in the communities in which we operate, where many of our employees and their families live. We engage communities in ways that are inclusive, respecting dignity, rights, culture and way of life. We aim to maximise social and economic development and minimise potential issues, such as noise and dust. Our vision is to strengthen communities so they can sustain and drive their own progress.

As we continue to automate our operations, we have scaled up our investment in education partnerships that help develop skills for the future. This year, for example, we announced a A\$10 million, four-year partnership focusing on skills for the digital future with leaders in Australia's education and innovation sectors, including leading start-up accelerator BlueChilli and Amazon Web Services.

We also recognise that we have a role to play promoting and supporting regional economic development. This requires dialogue and coordination with other stakeholders, including governments, international organisations, civil society, communities and other businesses. In Madagascar, for example, our QMM team funds business skills training to support local agricultural cooperatives. In Quebec, Canada, we support local projects and businesses, including the creation of the "Centre en entrepreneuriat multi-ressources". Established in 2019, the centre supports entrepreneurs in the natural resources sector, helping them to run more efficient, sustainable and profitable businesses. We are also looking at ways to deploy financial tools, including social impact investments, and to amplify the impact of our own community investments. In 2019, we were pleased to make more than \$36 million of community investments in health, education, local business development, vocational skills training, environment, culture, community infrastructure and services. We consider Indigenous people to be

important stakeholders. In 2019, we supported the Uluru Statement from the Heart, which seeks to enshrine an Indigenous voice in the Australian Constitution. We won the 'Best Company Indigenous Procurement Initiative Award' at the Queensland Resources Council Indigenous Awards in recognition of our work at our Amrun bauxite mine. When we work with land-connected groups, we want to understand their physical, spiritual and cultural connection with the local environment. As such, we seek their active engagement in monitoring and managing cultural heritage impacts. For example, at our Cape Lambert operation in the Pilbara region of Western Australia, our turtle monitoring programme, a partnership with the Department of Biodiversity, Conservation and Attractions, has been expanded to become a collaboration between operational teams, local communities, regulators and the Ngarluma Aboriginal Corporation. This proactive management was acknowledged with an Excellence in Environmental Management award at the 2019 Australian Mining Prospect Awards.

Our impact on communities extends beyond our operational sites. For example, we work with suppliers in more than 120 locations, supporting the employment of many thousands of people. In 2019, we spent \$17.2 billion with these suppliers; in Mongolia we spent more than \$366 million with local suppliers. In Western Australia, we awarded our 400th scope of work through our local procurement portal in 2019, and spent A\$5.5bn with over 1,900 Western Australian businesses – including Pilbara Indigenous-owned businesses. Our direct economic contribution is the total value of operating costs, employee wages and benefits, payments to providers of capital, payments to government by country, development contributions, payments to landowners and community investments during the year. In 2019, it was \$45.1 billion.

Direct economic contribution 2015-19 (US\$ million)

	2019	2018	2017	2016	2015
Value add ¹	27,841	30,504	27,734	20,065	18,888
Payments to suppliers ²	17,245	17,231 ³	16,471 ³	15,812 ³	17,968 ³
Community contributions*	*	192	176	168	187

***Note:** In 2019, we adopted new definitions and data collection processes for reporting discretionary community investments, non-discretionary development contributions, management costs and payments to landowners to align with GRI Reporting Standards. As a result of these changes, 2019 data is not comparable with previous years.

1. Sum of payment to employees, governments and returns on capital invested in operations.
2. Includes our share of joint ventures and associates.
3. Numbers restated from those originally published to ensure comparability over time.

	2019
Community investment ¹	36.4
Development contributions ²	13.0
Payment to landowners ³	147.3

1. Community investments are voluntary financial commitments, including in-kind donations of assets and employee time, made by Rio Tinto to third parties to address identified community needs or social risks.
2. Development contributions are defined as non-discretionary financial commitments, including in-kind donations of assets and employee time, made by Rio Tinto to a third party to deliver social, economic and/or environmental benefits for a community, which Rio Tinto is mandated to make under a legally binding agreement, by a regulatory authority or otherwise by law.
3. Payment to landowners are non-discretionary compensation payments made by Rio Tinto to third parties under land access, mine development, native title, impact benefit and other legally binding compensation agreements.

By 2023, we will disclose:

- permitted surface water allocation volumes
- annual allocation usage
- estimated catchment runoff from average rainfall

Water

In some regions we work in environments where water is scarce, like the Gobi Desert in Mongolia, and others where rainfall can vary greatly from year to year, such as Weipa in Queensland, Australia. Many of our sites are also experiencing changes in rainfall and water availability due to climate change.

Whatever the context, we see ourselves as water stewards. We take this commitment seriously, as water is essential not just for human life, health, and the environment, but for economic prosperity. Our processing plants, refineries, smelters and mines use water to process ore, manage dust and promote rehabilitation. In some instances, water is used to produce hydroelectricity to power our operations. In places like Tom Price, one of our Pilbara iron ore mines, we also supply drinking water to the surrounding communities.

We aim to balance our operational water needs with those of local communities, Traditional Owners and ecosystems. We avoid degrading water resources like lakes, streams and groundwater aquifers, and to control the quality and quantity of the water we use and return to the environment. We also try to use water as efficiently as possible in the design and operation of our sites.

To this end, we now consider water risk against the following four themes: water resource, quantity and quality, dewatering and long-term obligations. This framework allows us to identify, assess, manage and communicate water risk both internally and to the communities where we operate.

We support the new ICMM position statement on water stewardship and, from 2020, will report our practices against the commitments outlined in the statement:

- To apply strong and transparent water governance
- To manage water at operations effectively
- To collaborate to achieve responsible and sustainable water use

Our new water targets

Water targets remain at the heart of our integrated water management approach. To be more transparent about our water usage and our water risk profile, management and challenges, our new water targets consist of one Group target and six site-based targets. These will help us improve the datasets we need to drive good water stewardship; they will also improve our performance over the next five years through a programme of risk awareness and response.

Our Group target

By 2023, we will disclose for all managed operations:

- Permitted surface water allocation volumes
- Annual allocation usage
- Estimated catchment runoff from average annual rainfall

Our site-based targets, which were developed in line with our ICMM commitments, will help us to focus on the right issues using appropriate resources at operational sites where water is a recognised risk.

At Oyu Tolgoi, in Mongolia, we will maintain our average water use efficiency at 550L/tonne of ore at the concentrator. We are focused on optimising the use of the scarce water resources and taking a stewardship approach to ensure the long-term future of the mine, the environment and the livelihoods of local herders.

QIT Madagascar Minerals (QMM) operations present a significant risk from a water and broader environmental perspective due to their location, the nature of the surrounding environment and the mining process. So we have committed to reviewing our current practices and infrastructure to develop and implement an improved site water management approach by 2023.

Fresh water used 2015-19

	2019	2018	2017	2016	2015
Fresh water used (billion litres)	448	401	465	467	460

Sustainability continued

2019 also saw us progress in other important areas, many of which are integral to our business as well as the way we work.

Biodiversity and ecosystems

In 2017, we announced a new approach to ensure we are able to mitigate specific material risks and impacts at each of our managed sites. To do this, our sites aim to first avoid, then minimise and restore impacts, implementing offsets if impacts remain significant. This is a positive and practical evolution of our approach, based on 15 years of operational experience and engagement with external stakeholders, including UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), BirdLife International, the International Union for Conservation of Nature, Fauna & Flora International, The Biodiversity Consultancy, Hardner & Gullison and others.

This year, we began auditing the new standard covering biodiversity protection and natural resource management across our operations. Our first step was to work with experts from the (UNEP-WCMC) to assess and rank the biodiversity sensitivity of the footprint of each operation using the best available global information and data. This baseline analysis, along with our internal assurance framework, will help us implement robust biodiversity management programmes. It also encourages our sites to find more ways to work with host communities and conservation organisations to ensure long-term stewardship of the lands and waters where we operate. In Queensland, Australia, for example, we work with the Australian Wildlife Conservancy, the University of Queensland and the Queensland Department of Environment & Science to help protect Australia's rarest bird of prey – the red goshawk. Working with these partners, we have refined our tracking and trapping techniques to gain invaluable information which will contribute to conserving this threatened species nationally.

We progressively rehabilitate our operations. In 2019, our total land holding was 153,287 square kilometres (sq km), of which 3,622 sq km has been disturbed (2.4%). In 2019, we rehabilitated 490 sq km.

Closure

We operate with closure in mind, incorporating it into the design of every asset and new project. All of our existing operations have a closure plan and align with our asset closure framework, ensuring closure is considered throughout the lifecycle of the asset.

We will be transitioning a number of assets into closure over the next five years, including our Argyle diamond mine in Western Australia, which is set to close in late 2020, as well as the Ranger uranium mine, in the Northern Territory, Australia, set to close in 2021.

With this in mind, in 2019, we intensified both our closure planning and the resources dedicated to it. For example, today, we have a dedicated team conducting closure studies as well as a team supporting closure planning at our assets. We also developed a closure readiness framework this year, which helps sites nearing closure transition effectively, ensuring that all risks are well managed and opportunities realised where possible. We continue to engage stakeholders of our sites nearing closure – governments, Traditional Owners, employees and local communities, for example – to keep them apprised of progress and planning, which helps them plan their futures. Such engagement also helps us transfer the land in a way that optimises its use after mining comes to an end.

As we consider the growing importance of closure to our business, we remain focused on understanding, planning and optimising for any long-term management obligations, such as water treatment, and repurposing and/or remediating the land. Over the last year, as we continued our planning and studies, the associated costs, risks and opportunities related to closure became clearer; at the end of 2019, closure provisions on our balance sheet totalled \$11.1 billion (compared with \$10 billion in 2018).

Ethics and integrity

Integrity is one of our five core values. We have clear standards around competition, data privacy, bribery and corruption, conflicts of interest, benefits, sponsorships and donations and fraud. Our code of conduct, *The way we work*, provides clear guidance on how we should conduct our business, no matter where we work or where we are from. We reinforce these standards with ongoing training, reviews and – where necessary – disciplinary action.

Activities during the year in this area included:

- Focusing resources in areas such as enhanced business integrity risk assessments and increased on-site compliance reviews to better support our core assets and business activities
- Reaching more than 4,400 people in 15 countries with face-to-face training on how to spot and manage business integrity dilemmas
- Reviewing 805 incidents reported either through Talk to Peggy, our confidential, independently operated whistleblowing programme, compliance managers or team leaders, up roughly 19% on last year. 34% of reported incidents were substantiated.

Political integrity

As a company, we do not favour any political party, group or individual, or involve ourselves in party political matters. Nor do we make any payments to political parties or candidates.

We do not offer, pay or accept bribes, no matter where we operate, what the situation is, and who is involved. Nor do we allow our agents or intermediaries to do so. We also have strict guidelines on giving and receiving benefits.

We engage on public policy on issues that affect or could affect our business, including by contributing relevant information and sharing experiences that help create robust public policy. Our Business Integrity Standard includes strict guidelines for dealing with government officials and politicians, including whether they can be appointed to company positions or engaged as consultants.

We join industry associations where membership provides value to our business, investors and other stakeholders. We publish the principles that guide our participation in industry associations, and the way we engage them, as well as a list of the top five industry association memberships by fees paid. We also track and disclose how we engage on climate policy issues, disclosing when industry association positions are significantly different to our own.

Transparency

We are founding members of the Extractive Industries Transparency Initiative (EITI) and signatory to the B Team Responsible Tax Principles. We believe greater transparency leads to greater accountability; both are key to building trust and achieving better social and economic outcomes over the long term.

To that end, where they are not subject to confidentiality restrictions, this year we disclosed our minerals development contracts with governments – and we continue to encourage governments to allow such disclosures. We also disclosed information about the beneficial owners of our joint ventures in line with EITI standards and expectations. Both sets of disclosures are available on riotinto.com.

We are also transparent about our taxes paid and payments to governments. In 2020, we will publish additional country by country disclosures relating to our taxes paid in 2018. We are also working closely with governments and the Organisation for Economic Co-operation and Development (OECD) on new tax reporting codes and policies to ensure consistency in our reporting procedures. And we endorse the B Team Responsible Tax Principles, which support fairer, more sustainable tax systems and global standards of responsible tax practices.

Land footprint 2015-19

	2019	2018	2017	2016	2015
Land footprint – disturbed (square kilometres)	3,622	3,595	3,616	3,696	3,629
Land footprint – rehabilitated (square kilometres)	490	485	497	541	533

Human rights

We respect all internationally recognised human rights, prioritising action around salient issues where our operations or business relationships could have the most severe impact on people. These issues include security, land access and resettlement, indigenous people's rights, environmental issues (such as access to water), labour rights and in-migration (such as access to health services). We have human rights due diligence processes in place to identify, prevent and mitigate the adverse effects of our own operations and business relationships. This is a core consideration in our social risk analysis and impact assessment processes and is embedded in our human rights policy.

Engaging our stakeholders and getting feedback, including complaints, is a vital part of our approach to respecting human rights. It helps us to provide effective remedies where we identify that we have caused or contributed to harm. It also helps us to improve the way we run our operations, and is a crucial part of our understanding of systemic issues. All of our sites are required to have in place a complaints, disputes and grievance mechanism, in line with the Criteria of Effectiveness for Non-Judicial Grievance Mechanisms outlined in the UN Guiding Principles on Business and Human Rights (UNGPs).

We have committed to following core business and human rights-related standards, are members of relevant multi-stakeholder initiatives and also support other key international human rights instruments, including:

- Voluntary commitments to the OECD Guidelines for Multinational Enterprises, the UN Global Compact and the Voluntary Principles on Security and Human Rights (VPSHR)
- Supporting and implementing the UN Guiding Principles on Business and Human Rights Supporting the UN Declaration on the Rights of Indigenous Peoples
- Striving to obtain the free, prior and informed consent of Indigenous peoples and other affected communities to access land and natural resources, in line with the International Finance Corporation Performance Standard 7 and the International Council on Mining and Metals position statement on Indigenous peoples and mining.

Our actions and achievements on human rights in 2019 include:

- Ranking second overall, and as the top company within our sector, in the 2019 results for the Corporate Human Rights Benchmark
- Supporting Indigenous Australians and the Uluru Statement
- Having open conversations with investors, global civil society organisations and

community members on a variety of human rights issues including security, land access, an open civic space and labour rights including modern slavery. This included roundtables with global civil society organisations

- Publishing our second annual report on implementation of the VPSHR, also available on voluntaryprinciples.org, and our third modern slavery statement
- Implementing a modern slavery clause in our global standard contract for suppliers
- Continuing to screen suppliers for human rights-related risks including modern slavery, and taking action where necessary
- Actively participating in certification schemes (such as the Aluminium Stewardship Initiative) and other voluntary initiatives to validate company performance on human rights

People

Employee engagement

We aim to create a workplace that is supportive, inclusive, empowering and engaging. This year, our Chief Executive visited 17 sites, engaged in small group discussions at more than 20 locations and held more than 30 town halls. He also regularly has conversations with employees around the world on our internal Yammer platform, which more than 30,000 of us use.

We saw a 12-point increase in our employee Net Promoter Score (eNPS) over the past 12 months. This measures how employees feel about the company, its leadership and its future.

Inclusion and diversity

We aim to recognise and respect diverse cultures, communities and points of view, and to treat each other with fairness and dignity.

We employ people on the basis of job requirements and do not discriminate on any grounds. We do not employ forced, bonded or child labour. We employ people with disabilities and make considerable efforts to offer suitable alternative employment and retraining to employees who become disabled and can no longer perform their regular duties.

Our graduate programme continues to help us bring new perspectives into the organisation, challenging our current practices with new ways of working. This year's graduate cohort comes from 29 countries, represents 20 nationalities and most speak at least two languages. We also increased our intake of female graduates by 18%, to 54% of the total intake.

Sustainability continued

At the end of 2019, our equal pay gap was less than 2% and our gender pay gap was less than 1%. Equal pay is at the core of our approach to pay equity. This means making sure that men and women employed by the same company in the same location and performing work of equal value receive the same pay. Unlike equal pay, the gender pay gap is also influenced by the relative seniority of men and women. It is a measure of the difference between average earnings across the Group, regardless of roles – and is expressed as a percentage of men's earnings. In 2019:

- We partnered with universities to build a diverse pipeline and, through targeted primary and high school programmes, attracted students into the fields of science, technology, engineering and mathematics
- Women in operational roles decreased by 3%, to 12% overall
- The overall percentage of female employees increased by 0.7% to 18.4% (7,337 women; 32,628 men)
- 22.6% of senior management roles were held by women (112 women; 385 men)
- 11.1% of the Board roles were held by women. With the new non-executive director appointments announced in February 2020, this has increased to 33%.

We define senior management as general managers, Group advisers and chief advisers as well as employees in leadership roles who report directly to Executive Committee members. The numbers of employees quoted above excludes contractors.

Our approach to sustainability

Governance, materiality and assurance

The Sustainability Committee of our Board of directors reviews our approach to ensure consistency with our purpose and values, the effective management of material sustainability risks and our contribution to sustainable development.

We conduct a sustainability materiality assessment to ensure that we report on topics that matter most to our stakeholders as well as to our business. Materiality in sustainability, as opposed to financial materiality, is the threshold at which an issue or topic becomes important enough to be reported externally, taking into account the impact and level of perceived importance from stakeholders.

In 2019, we updated our materiality assessment based on a wider engagement with stakeholders, providing us with a richer dialogue and pool of information.

We engaged an independent external assurance organisation, PricewaterhouseCoopers LLP, to provide the directors of Rio Tinto with assurance on selected sustainability subject matters. From 2020, we will be engaging KPMG to complete the independent external assurance for future reports.

PricewaterhouseCoopers LLP's assurance statement satisfies the requirements of subject matters 1 to 4 of the ICMM assurance procedure. See page 102 [AR](#) of the Governance report for more information on our external auditors and internal assurance.

Notes on data

The data summarised in this sustainability section relates to calendar years. Unless stated otherwise, parameters are reported for all managed operations without adjustment for equity interests. Where possible, we include data for operations acquired before 1 October of the reporting period. Divested operations are included in data collection processes up until the transfer of management control.

We report against GRI standards and the requirements of other select reporting frameworks, and reflect the ten principles of the ICMM and the mandatory requirements in the ICMM position statements within our policies, standards and procedures. For more about our data definitions, our reporting of GRI disclosure requirements and our alignment with the ICMM, see the sustainability section of [riotinto.com](https://www.riotinto.com).

Non-financial information statement

This section (pages 60 to 70) provides information as required by regulation in relation to:

- Environmental matters
- Our employees
- Social matters
- Human rights
- Corruption and bribery

Other related information can be found as follows:

- Our business model – page 14
- Principal risks and how they are managed – pages 74 to 80
- Non-financial key performance indicators – pages 22 and 26

Risk management

At Rio Tinto, creating shareholder value is the reward for taking and accepting risk responsibly.

Effective management of risk provides confidence to all our stakeholders in the Group's ability to meet strategic objectives in alignment with our values – Safety, Teamwork, Respect, Integrity and Excellence.

Risk can manifest as opportunities (upside) or threats (downside) that can affect our business performance.

At Rio Tinto, creating shareholder value is the reward for taking and accepting risk responsibly through effective risk management.

Emerging risks

As we enter a new era of complexity, we expect to experience increasing uncertainty from the interplay of three global forces: geopolitics, technology and society.

There remain significant implications for the Group that arise from ever-growing geopolitical tensions impacting market sentiment. Rising trade tensions between global centres of demand and supply, geopolitical frictions such as the Hong Kong crisis, and deteriorating corporate balance sheets have the potential to slow global growth and impact demand for our products. This in turn could affect Group earnings. Additionally, as not all societies have benefited equally from globalisation, there is an increasing focus on resource nationalism. Global economic conditions remained uncertain throughout 2019 due to escalated trade tensions and heightened geopolitical instability. This combination created market volatility.

Advances in technology bring both opportunities and threats in the medium term. Digital connectivity, and intelligent systems supported by advance analytics and artificial intelligence, are expected to drive the fourth stage of industrialisation. We are focused on being at the frontier of mining technology, implementing industry-leading innovation to sustain our leading cost positions, tackle critical industry challenges, deploy emerging technologies and deliver economic growth options through exploration and orebody optimisation. As we continue to integrate automation in our operations, we are working to position and prepare our workforce for the future through regular training programmes. We are also investing in closing the skills' gap in Australia's future workforce through a four-year national programme that fast-tracks development of skills needed for the digital future. We are acutely aware that with increasing reliance on technology comes a necessity to continue to enhance our cyber security. In 2019, we implemented monitoring technology to enable us to identify malicious activity at our most critical operating assets, and we continue to build on these capabilities.

In the longer term, we see societal expectations around the impact of our business on the local economy, communities and environment continuing to rise. There has also been an increase in focus by investment firms on environmental, social and governance (ESG) issues when considering their investment criteria. Climate change constitutes an important part of the ESG framework. Climate risks and opportunities have formed part of our strategic thinking and investment decisions for over two decades. Our climate change report explains our approach to governance and risk management in this area and sets out our 2030 targets and our ambition to reach net zero emissions by 2050 across our operations. We continue to enhance our monitoring and management of greenhouse gas emissions, water and land use, and rehabilitation. Additionally, we have established partnerships across our value chain to explore solutions to climate change. These include the International Council on Mining and Metals (ICMM), Climate Smart Mining, Elysis, Baowu Steel and Tsinghua University.

In 2019, we further improved our controls for managing operational risks. In particular, we have strengthened how we manage the risks of major hazards through the introduction of Centre of Excellence (CoE) teams, in geotechnical, underground, process safety, tailings, energy and climate change and asset management. Our partner-to-operate strategy also supports the value creation and maintenance of mutually beneficial partnerships with key stakeholders, including host governments, communities, customers and suppliers.

Assessing our risks

With the help of management, the Board has carried out a robust bottom-up assessment of the emerging and principal risks of the business. They have also tested the Group's financial plans for severe but plausible scenarios related to certain principal risks materialising. Our principal risks are discussed on the following pages.

There remain certain threats, such as natural disasters and pandemics where there is limited capacity in the international insurance markets to transfer such risks. We monitor closely such threats, and develop business resilience plans. We are currently closely monitoring the potential short and medium-term impacts of the Covid-19 virus, including for example supply-chain, mobility, workforce, market demand and trade flow impacts, as well as the resilience of global financial markets to support recovery. Any longer-term impacts will also be considered and monitored, as appropriate.

We also seek to bring a commensurate level of rigour and discipline to our managed and non-managed joint-ventures as we do to our wholly-owned assets, through engagement and influence, subject to applicable laws.

Risk management continued

How we manage risk

Our risk policy and standards commit us to manage risks in a proactive and effective manner. At Rio Tinto, effective risk management requires:

- Identifying and evaluating risks that matter most in achieving strategic objectives, so resources can be prioritised in the most efficient and effective way
- Effective communication of risk management information to decision makers across the Group, so we can respond at the right level of the organisation

- Embedding risk awareness into all decision-making processes to support leaders in managing risks proactively and effectively to improve business performance by either creating or protecting value
- Clearly defined roles and responsibilities for risk management.

Our process for identifying, evaluating, planning, communicating, and managing material business risks is designed to manage uncertainty and, where appropriate, to accept a degree of risk to generate returns. We have an enterprise-wide risk management information system where all material risks, controls and actions are documented and kept current for managing and reporting purposes.

All of our employees and business leaders are responsible for identifying, evaluating and managing risks. Risk management is a key accountability and performance area for our leaders. Our Risk team supports the understanding and management of risks at all levels of the business. They provide a framework for managing and reporting material risks and support the Risk Management Committee in escalating key issues to the Executive Committee or to the Board, if appropriate.

Longer-term viability statement

Our long-term planning reflects our business model of running our business in ways that are safer, smarter and more sustainable. Our business planning processes include preparing a one-year detailed financial plan and a longer-term life of asset outlook. We develop our strategy and make capital investment decisions based on an assessment of cash flows and risk over this multi-decade horizon. We assess our financial investment capacity regularly to ensure capital commitments can be funded in line with our disciplined approach to capital allocation.

Our planning process includes modelling a series of macroeconomic scenarios and using a range of assumptions considering both internal and external factors. As part of our robust Risk Management Framework, we closely track, monitor and mitigate principal risks to our business plan and our business model, both in the near and longer term. The key assumptions underpinning our long-term plan include:

- Long-term economic growth and commodity demand in major markets such as China
- Continued access and economic viability of resources and reserves to support organic and inorganic growth programmes
- Pathways to reduce carbon footprint
- No significant industry-wide disruptive technology or productivity enhancement to unlock very low-cost supply
- No operational risks materially impacting the long-term plan

Our business plan and macroeconomic forecast have the greatest level of certainty in the underlying assumptions in the first three years. This enables a detailed analysis of potential impacts of severe but plausible risks materialising in quick succession, and enables directors to assess Rio Tinto's capacity to exercise financial levers available to maintain the Group's viability.

Therefore, our longer-term viability assessment examines in detail the first three years (2020–22) of the business plan, analysing a number of 'severe but plausible' scenarios contemplated within our Group's principal risks and uncertainties.

The principal risks and uncertainties included in our longer-term viability assessment are as follows.

Market risk: A global economic crisis triggered by a disrupting factor, such as geopolitical tensions or a pandemic event, that could generate global recessionary conditions and lead to an economic downturn. Our stress testing includes modelling a large negative pricing shock assumed in 2021 followed by a recovery in most commodities by 2024.

Operational risk: A "one-off" catastrophic event resulting from a major operational failure, such as a tailings and water storage event, underground event or a geotechnical event, resulting in multiple fatalities, operation cessation and significant financial impact.

Stakeholder risk: An adverse action by stakeholders resulting in a cancellation or non-performance in offtake obligations impacting sales revenue for a prolonged period.

The expected financial impact for each risk is quantified based on our internal macroeconomic and business analysis, and internal and external benchmarking on similar risks. A probabilistic approach to quantify risks and impacts is applied where relevant. Although the likelihood of more than one principal risk materialising in close succession is unlikely, the stress test assumes these risks materialise individually and in combination to create 'severe but plausible' scenarios which could threaten the Group's viability.

Applying these scenarios, the first three years of the Group's business plan is stress tested for the impact on the Group's longer-term viability, including whether additional financing facilities will be required. In addition to liquidity and solvency, the assessment also considers a set of metrics over the period related to financial performance, cash flows, debt capacity and credit rating, as well as dividend payments. These metrics are subject to robust stress tests and reverse stress tests.

Taken in isolation, the materialisation of each risk does not threaten the viability of the Group's business model. The main impact from each risk on the Group is a significant decrease in free cash flow, with consequent reduction in the level of the dividend. The Group has levers to maintain adequate levels of liquidity, including reducing discretionary capital expenditure and accessing lines of credit.

The most 'severe' scenario, albeit unlikely, considers the combination of the financial impact of all three risks materialising in a single year. The occurrence of this scenario creates an immediate severe impact on the Group's financial performance with an estimated negative free cash flow of \$7 billion. The Group has a suite of management actions available to preserve resilience, including accessing lines of credit, reducing capital expenditure, the sale of assets, and raising debt while maintaining the shareholder return policy. Our financial flexibility could potentially be limited during the trough of the crisis. However, the Group's economic and operational recovery is estimated to be within 18 months with business model integrity maintained. The viability of the Group under all the severe but plausible scenarios tested remained sound.

Therefore, taking into account the Group's current position and the robust assessment of principal risks, the directors have assessed the prospects of the Group over the next three years (until 31 December 2022) and have a reasonable expectation that we will be able to continue to operate and meet our liabilities as they fall due over that period.

Roles and responsibilities for risk management in Rio Tinto

Oversight	Board	<ul style="list-style-type: none"> – Determines the nature and extent of risks that the organisation is willing to take in order to meet our strategic objectives. – Oversees the risk management process and confirms that management's strategies are within the Board's risk appetite and tolerances.
	Board committees	<ul style="list-style-type: none"> – Monitor and review the maturity and effectiveness of our risk management framework. – Review management reports on the strategies and controls applied to any material business risks identified within the committees' scope.
Third line	Group Internal Audit	<ul style="list-style-type: none"> – Provides independent and objective assurance of the effectiveness of the risk management framework.
Second line (Group level)	Executive Committee	<ul style="list-style-type: none"> – Sets and reviews risk management strategies for risks to the Group's business strategy, planning and investment decisions. – Defines the Group's risk tolerances around key business objectives and seeks Board endorsement of those tolerances. – Reviews the Group-level risks at least three times per year and approves material provided to the Board and its committees. – Approves new or revised Group-level controls (policies, standards and procedures) that support the management of material risks.
	Risk Management Committee	<ul style="list-style-type: none"> – Monitors and reviews the effectiveness of the risk management framework across the Group's operations and functions on behalf of the Executive Committee and Board. – Provides oversight for the management of material Group-level risks and associated management responses.
	Risk function	<ul style="list-style-type: none"> – Coordinates and supports Group-level risk management activity and reporting. – Embeds risk management into core business processes, such as planning and capital allocation. – Builds risk management capability and a risk-aware culture throughout the Group.
	Group's standard-setters	<ul style="list-style-type: none"> – Develop, maintain and communicate Group-level controls, including policies, standards and procedures. – Assure management's (product groups and Group functions) compliance to Group-level controls and the control effectiveness in managing risk.
First line (Operational level)	Senior leadership in product groups and functions	<ul style="list-style-type: none"> – Manage material risks and critical controls within their business activities, escalating when appropriate. – Embed risk analysis and management into their business strategy, planning and investment decisions. – Provide oversight of performance in their area of accountability through Risk, Assurance and Compliance forums.
	Operational management	<ul style="list-style-type: none"> – Identifies, assesses and manages risks in areas in which management is accountable. – Executes line and functional management responsibilities for implementing and monitoring performance of actions and controls.
	Risk community of practice	<ul style="list-style-type: none"> – Supports alignment, consistency and continuous improvement of risk management.

Our risk management framework sets out the organisational foundations for designing, implementing, monitoring, reviewing and continually improving risk management throughout the organisation.

A key element of this framework is our Risk Management Standard. Together with the Group's Risk Policy, the standard outlines the expected outcomes from risk management, the roles and responsibilities associated with implementing risk analysis and management effectively, and the minimum requirements that must be met.

The framework also defines the oversight responsibilities of the Board and the Executive Committee, supported by Group Internal Audit, the Risk Management Committee and central support functions across our business.

The risk management framework lays out a "three lines of defence" approach to managing risks and controls:

- First line assurance is the role of risk owners and business leaders. Oversight by senior leadership teams through the Risk, Assurance and Compliance forums chaired by product group chief executives and heads of functions.

- Second line assurance is provided by our central support functions and technical Centre of Excellence teams eg Underground Mining. As our Group standard-setters, their assurance activities are planned and managed by the Integrated Assurance Office (IAO). Management oversight of this assurance over material Group-level risks is supported by a quarterly Risk Management Committee meeting chaired by the Rio Tinto Group Chief Executive.
- Third line assurance is conducted by Group Internal Audit (GIA) to provide independent assurance that the risk management and internal controls are effective to the Board and its sub-committees.

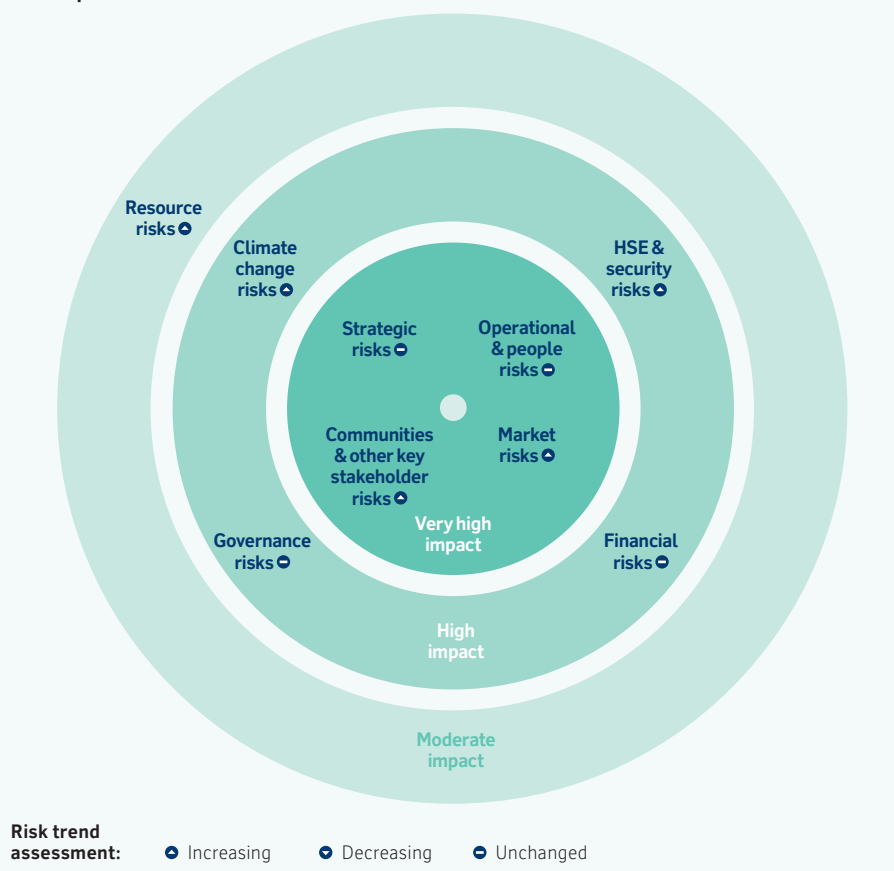
Principal risks and uncertainties

The principal risks and uncertainties outlined in this section reflect the risks that could materially affect Rio Tinto, or its ability to meet its strategic objectives, either directly or by triggering a succession of events that in aggregate become material to the Group.

Our business units and functions assess the potential economic and non-economic consequences of their respective risks using the framework defined by the Group's Risk Management Standard. Once identified, each principal risk is reviewed and monitored by the relevant internal experts and by the Risk Management Committee and, as appropriate, by the relevant Board committees and the Board.

We deliver our strategy through *The way we work*, which focuses on the "4Ps": portfolio, people, performance and partners. The principal risks, uncertainties and trends outlined in this report should be considered as forward-looking statements, and are made subject to the cautionary statement on page 300 ^{AR}.

Risk impact and trend assessment



Market risks

We operate in global markets and accept the value impact of exchange rate movements and market-driven prices for our commodities, and pursue a value over volume approach.

Commodity prices: risk and uncertainty

Commodity prices, driven by demand for and supply of the Group's products, vary and may not be as expected over time. Exchange rate variations and geopolitical issues may offset or exacerbate this risk.

Potential impact

- Business model value
- Future financial performance
- Solvency
- Liquidity
- Group reputation

Strategy delivery:

Portfolio **People**

Opportunities

A rise in commodity prices, or favourable exchange rate movements, generates more cash flow from operations, enabling the Group to pursue growth options or capital expansions, pay down debt and/or increase returns to shareholders.

Capturing above-planned returns from commercial insights relating to market movements would deliver additional cash flow to the Group.

Threats

Falling commodity prices, or adverse exchange rate movements, reduce cash flow, limiting profitability and shareholder returns. These may trigger impairments and/or impact rating agency metrics. Extended subdued prices may reflect a longer-term fall in demand for the Group's products, and the reduced earnings and cash flow streams resulting from this may limit investment and/or growth opportunities.

Failure to deliver planned returns from commercial insights would negatively impact cash flows for the Group.

Market risks continued

China development pathway: risk and uncertainty

China's growth pathway could impact demand for the Group's products outside of expectations. China is the largest market for our products.

Potential impact

- Business model value
- Future financial performance
- Solvency
- Liquidity
- Partnerships

Strategic delivery:

Portfolio **People**

Opportunities

Strong growth, positive policy decisions and reforms drive demand for commodities, resulting in rising commodity prices that may justify capital expansion and increased shareholder returns in the short to medium term.

Threats

An economic slowdown in China, and/or a material change in policy, could result in a slowdown in demand for our products and reduced earnings and cash flow for the Group.

Mitigating actions include:

- Pursue low-cost production, allowing profitable supply throughout the commodity price cycle.
- Maintain a diverse portfolio of commodities across a number of geographies.
- Maintain a global portfolio of customers and contracts.
- Monitor multiple leading indicators and undertake detailed industry analysis to inform our forecasting assumptions.
- Leverage market-facing sales, marketing and trading resources in the Group.
- Apply strong governance reflecting relevant regulatory frameworks and jurisdictions.
- Comply with the Group's financial risk management practices outlined in the Group's Treasury policy and standard.

Strategic risks

Rio Tinto enforces disciplined capital and risk allocation to the best opportunities (organic and inorganic) for shareholders returns.

Execution of acquisitions and divestments: risk and uncertainty

Our ability to secure planned value by successfully executing divestments and acquisitions may vary.

Potential impact

- Business model value
- Future financial performance
- Solvency
- Liquidity
- Group reputation

Strategy delivery:

Portfolio **People** **Partners**

Opportunities

Proceeds realised from divested assets are greater than planned, allowing more capital to be returned to shareholders or redeployed into higher-returning or more productive uses. The Group is successful in acquiring and integrating businesses on acceptable terms that provide sustainable future cash flow and/or future growth optionality.

Threats

Divestment and acquisition activity incurs transaction costs that cannot be recouped. Such activity may result in value destruction by realising less than fair value for divestments, or paying more than fair value or failing to integrate successfully for acquisitions. The Group may also be liable for the past acts or omissions of assets it has acquired that were unforeseen or greater than anticipated at the time of acquisition. The Group may also face liabilities for divested entities if the buyer fails to honour commitments or the Group agrees to retain certain liabilities.

Principal risks and uncertainties continued

Strategic risks continued

Capital project development: risk and uncertainty

Large capital investments require multi-year execution plans and are complex. The Group's ability to deliver projects to baseline plan, principally in terms of safety, cost and schedule, may vary due to changes in technical requirements, law and regulation, government or community expectations, or through commercial or economic assumptions proving inaccurate through the execution phase.

Potential impact

- Future financial and operational performance
- Health, safety, environment and security (HSE&S)
- Solvency
- Liquidity
- Group reputation

Strategic delivery:

Portfolio **Performance**

Opportunities

An ability to develop projects safely, on time and within budget enhances the Group's cash flows, its licence to operate and investor confidence. Effective implementation of optimisation programmes reduces cost and accelerates development schedules resulting in higher returns earlier.

Threats

A delay or overrun in a project schedule and/or a significant safety or process safety incident could negatively impact the Group's profitability, cash flows, ability to repay project-specific debt, asset carrying values, growth aspirations and relationships with key stakeholders.

Strategic partnerships: risk and uncertainty

Strategic partnerships play a material role in delivering the Group's growth, production, cash and market positioning, and these may not always develop as planned.

Potential impact

- Business model value
- Future financial and operational performance
- HSE&S
- Group reputation

Strategic delivery:

Portfolio **Performance** **Partners**

Opportunities

Joint ventures and partnerships offer opportunities to access resources, increase shareholder returns, and reduce political, portfolio and operational risks. We seek to bring a commensurate level of rigour and discipline to our managed and non-managed joint-ventures as we do to our wholly-owned assets, through engagement and influence subject to applicable laws.

Threats

The capacity or financial circumstance or business disposition of our joint venture partners may present barriers to investment decisions and/or to the realisation of full value for the joint venture(s). For non-managed operations, the decisions of the controlling partners may cause adverse impacts to the value of the Group's interest in the operation, or to its reputation, and may expose it to unexpected financial liability.

Mitigating actions include:

- Complete detailed, objective due diligence on all material divestments and acquisitions.
- Undertake rigorous third-party due diligence and assurance.
- Involve business unit leaders early in process to recognise integration planning and synergies, or separation of threats and opportunities.
- Undertake post-investment reviews on divestments and acquisitions to identify key learnings to embed into future initiatives.
- Consistently approach development of large-scale capital projects through a specialised projects division.
- Follow rigorous project approval and stage-gating process, including monitoring and status evaluation, as articulated in the Project Evaluation Standard and Guidance.
- Ensure effective stakeholder management in project development.
- Approach investments and partnerships with a view to long-term development of relationships rather than short-term transactional advantage.
- Maintain strong focus on contractor management.
- Actively participate within the governance structures of joint ventures to promote, where possible, alignment with the Group's policies and strategic priorities.

Financial risk

We maintain a strong balance sheet and liquidity position to preserve financial flexibility through the cycle.

Liquidity: risk and uncertainty

External events and internal capital discipline may impact Group liquidity.

Potential impact

- Future financial performance
- Solvency
- Liquidity
- Group reputation

Strategic delivery:

Performance

Opportunities

Favourable market conditions and strong internal capital discipline could increase Group liquidity and/or balance sheet strength and allow the Group to pursue investment or growth opportunities, pay down debt and/or enhance returns to shareholders.

Threats

The Group's ability to raise sufficient funds for planned expenditure, such as capital growth and/or mergers and acquisitions, as well as the ability to weather a major economic downturn, could be compromised by a weak balance sheet and/or inadequate access to liquidity.

Mitigating actions include:

- Comply with the Group's Treasury policy and standard, which outlines the fundamental principles that govern the Group's financial risk management practices.
- Maintain a prudent gearing ratio and other financial metrics commensurate with a strong investment-grade credit rating.
- Manage the liquidity and financing structure of the Group using forecasts and sensitivity analysis tools to actively monitor, determine and enable access to the appropriate level, sources and types of financing required.
- Subject funds invested by the Group to credit limits and maturity profiles based on Board-approved frameworks to promote diversification and maintain appropriate liquidity.
- Maintain accurate financial reporting and tracking of our business performance.
- Report financial performance monthly to senior management and the Board.
- Seek Board approval of the financial strategy, long-term planning and cash flow forecasting.
- Apply a shareholder returns policy which allows shareholder returns to adjust with the cycle.

Resources risks

We invest to accurately identify new deposits and develop orebody knowledge accurately, which underpin our operations and projects, as well as our projections for the financial performance of the business.

Exploration and resources: risk and uncertainty

The success of the Group's exploration activity and estimates of Ore reserves and resources may vary.

Potential impact

- Business model value
- Future financial and operational performance
- Group reputation

Strategy delivery:

Portfolio Performance

Opportunities

The discovery of a new viable orebody can significantly improve future growth options.

The volume of ore in reported reserves/resources numbers is based on the geological, commercial and technical information available at the date of the report and is, by its nature, incomplete. As new information comes to light, the economic viability of some Ore reserves and mine plans can be restated upwards. As a result, projects may be more successful and of longer duration than initially anticipated.

Threats

A failure to discover new viable orebodies could undermine future growth prospects.

If new information comes to light, or operating conditions change, the economic viability of some Ore reserves and mine plans can be restated downwards. As a result, projects may be less successful and of shorter duration than initially anticipated, and/or the asset value may be impaired.

Mitigating actions include:

- Comply with the Group's resources and reserves standard.
- Establishment of the Orebody Knowledge Centre of Excellence, as part of Group Technical.
- Recruit and retain skilled and experienced exploration and evaluation personnel.
- Provide stable funding for exploration activities.
- Continually review the prospects of opportunities in the exploration portfolio, and prioritise spend accordingly.
- Utilise new technologies where appropriate for exploration and evaluation of reserves/resources.
- Develop, leverage and manage third-party partnerships.

Principal risks and uncertainties continued

Health, safety, environment and security risks

Our operations are inherently hazardous. We seek to achieve operational excellence to ensure that our employees and contractors go home safe and healthy, and that there are no adverse impacts on the communities and the environment where we operate.

Health, safety, environment and security: risk and uncertainty

Our operations and projects are inherently hazardous, with the potential to cause illness or injury, damage to the environment, disruption to a community or a threat to personal security.

Potential impact

- Future financial performance
- HSE&S
- Communities and social performance
- Group reputation

Strategic delivery:

Portfolio **People** **Performance** **Partners**

Opportunities

Delivering leading performance in health, safety, environment and communities is essential to our business model and our success as a Group. Meeting or exceeding our commitments in these areas contributes to sustainable development for both Rio Tinto and our partners, and underpins our continued access to resources, capital and a diverse workforce to sustain the organisation.

Good performance in closure and legacy management of closed sites can enhance our reputation with stakeholders and enable us to maintain access to land, resources, people and capital, so we can continue to establish new projects with the support of local communities.

Threats

Failure to manage our health, safety, environment or community risks could result in a catastrophic event or other long-term damage that could in turn harm the Group's financial performance and licence to operate.

Mitigating actions include:

- Continued focus on HSE&S as a core priority at all operations and projects, overseen by the Sustainability Committee and supported by the Group's Risk Management Committee, as well as second and third line assurance activities.
- The second line assurance is provided by our central support functions and technical Centre of Excellence (CoE) teams to verify compliance with Group HSE&S strategy, policy and performance standards.
- Regularly review and audit HSE&S processes, training and controls to promote and improve effectiveness at managed and (where practicable) non-managed operations.
- Monitor monthly HSE&S performance at the Group level.
- Report, investigate, and share learnings from HSE&S incidents.
- Build safety targets into personal performance metrics to incentivise safe behaviour and effective risk management (see Remuneration report).
- Develop mutually beneficial partnerships with local communities and establish appropriate social performance targets.
- Report annually on performance on greenhouse gas emissions, water, and land use and rehabilitation, among others.
- Focus on fatality elimination through implementation of a programme to verify safety risk controls.

Climate change

We provide essential materials for human progress and a low-carbon future. By collaborating with our partners across the value chain, we aim to do this in a sustainable way and help address climate change challenges.

Climate change: risk and uncertainty

Climate change is a systemic challenge and will require coordinated actions between nations, between industries and by society at large. It requires a long-term perspective to address both physical climate change and low-carbon transition risks and uncertainties.

Potential impact

- Business model value
- Future financial and operational performance
- Group reputation

Strategic delivery:

Portfolio **Partners**

Opportunities

Climate change has formed part of our strategic thinking and investment decisions for over two decades. Each of the commodities we produce has a role to play in the transition to a low-carbon economy – aluminium in electric vehicles, copper in wind turbines, iron ore for critical infrastructure and minerals for rechargeable batteries, such as lithium.

Threats

Current and emerging climate regulations have the potential to result in increased costs, change supply and demand dynamics for our products and create legal compliance issues and litigation, all of which could impact the Group's financial performance and reputation. Our operations also face risk due to physical impacts of climate change, including extreme weather.

Mitigating actions include:

- Partnering to reduce the carbon footprint across the value chain. This includes the development of new partnerships to explore pathways with our customers to improve the environmental performance of our product value chains.
- Enhancing our resilience to physical climate impacts. We consider climate risks over the life of our operations, from the way we design and develop new projects through to closure and beyond. Supported by the new Energy and Climate Change Centre of Excellence (CoE), we use scenarios to assess further medium- and long-term risks.
- Implementation of a series of controls to manage the threat of extreme weather, including structural integrity programmes across all critical assets, emergency response plans and flood management plans. These controls keep our people safe and help our operations return to normal capacity as quickly as possible.
- Increasing the supply of the materials essential to building a low-carbon economy.
- Setting targets to reduce our emissions (on an absolute and intensity basis) over the short, medium and long term.

Communities and other key stakeholder risks

We recognise the value of positive engagement with a range of stakeholders, and seek to develop collaborative and mutually-beneficial partnerships through our partner-to-operate strategy.

Sovereign: risk and uncertainty

The Group's operations are located across a number of jurisdictions, which exposes the Group to a wide range of economic, political, societal and regulatory environments.

Potential impact

- Business model value
- Future financial and operational performance
- Group reputation
- Communities and social performance

Strategic delivery:

Portfolio Performance Partners

Opportunities

Proactive engagement with governments, communities and other stakeholders can increase access to new resources, support stable and predictable investment frameworks and operational environments, and shape mutually-beneficial policies and legal/regulatory frameworks.

Threats

Adverse actions by governments and other stakeholders can result in operational/project delays or loss of licence to operate. Other potential actions can include expropriation, changes in taxation, and export or foreign investment restrictions, which may threaten the investment proposition, title, or carrying value of assets. Legal frameworks with respect to policies such as energy, climate change and mineral law may also change in a way that increases costs.

Closure, reclamation and rehabilitation: risk and uncertainty

Planning for the future of our sites after they cease their operating life is a core business function governed by our Closure Steering Committee. Estimated costs and liabilities are provided for, and updated annually, over the life of each operation. However, estimates may vary due to a number of factors that either create opportunities or challenges.

Potential impact

Business model value
Future financial and operational performance
Group reputation

Strategic delivery:

Portfolio Performance Partners

Opportunities

We are actively assessing opportunities to find solutions to repurpose and reuse sites for future economic or social benefit through working collaboratively with our stakeholders. For all new asset developments, we incorporate closure into the design of our assets, as well as how to optimise decommissioning, remediation and any long-term management obligations. For existing operations, where possible, we progressively rehabilitate land throughout the life of the operations.

Threats

Plans and provisions for closure, reclamation and rehabilitation may vary over time due to changes in stakeholders' expectations, legislation, standards, technical understanding and techniques. In addition, the expected timing of expenditure could change significantly due to changes in the business environment and orebody knowledge that might vary the life of an operation.

Mitigating actions include:

- Comply with Group policies and standards which provide guidance concerning risk management, communities and social performance. This is overseen by our Sustainability Committee, and Closure Steering Committee.
- Collaborate with key stakeholders, and participate in strategic partnerships and/or governance structures to create opportunities and mitigate threats.
- Develop long-term relationships with a range of international and national stakeholders.
- In relation to sovereign risk, maintain geographically diverse portfolio to reduce concentration of exposure to changes in particular locations.
- Monitor jurisdictional risks, including sovereign risks, and take appropriate action.

Principal risks and uncertainties continued

Governance risks

Our employees operate in compliance with *The way we work* (our global code of business conduct), Group delegation of authorities, and all other Group policies, standards and procedures.

Regulation and regulatory intervention: risk and uncertainty

The Group's reputation and regulatory licences are dependent upon appropriate business conduct and are threatened by actual or perceived breaches of law, reputation and our code of conduct.

Potential impact

- Potential impact
- Business model value
- Future financial performance
- Group reputation

Strategic delivery:

People Partners

Opportunities

Good corporate citizens are acknowledged to operate to a high ethical standard, thus attracting talent and securing access to resources and investment opportunities.

Threats

Fines may be imposed on Group companies for breaching anti-trust rules, anti-corruption legislation, or sanctions or for human rights violations, or for other inappropriate business conduct.

A serious allegation or formal investigation by regulatory authorities (regardless of ultimate finding) could result in a loss in share price value and/or assets or loss of business. Other consequences could include the criminal prosecution of individuals and/or Group companies, imprisonment, fines, legal liabilities and reputational damage to the Group.

Mitigating actions include:

- Comply with Group policies, standards and procedures that provide guidance to our businesses and drive compliance with regulatory obligations.
- Identify and meet our regulatory obligations and respond to emerging requirements.
- Dedicate legal and compliance teams to assist Group businesses in complying with regulatory obligations and internal standards and procedures.
- Maintain appropriate oversight and reporting, supported by training and awareness, to drive compliance with regulatory obligations.
- Continue to develop and deploy training across relevant sectors of the workforce.

Operational and people risks

We seek to achieve operational and commercial excellence through the engagement of our workforce and the deployment of effective standards, processes and systems.

Operational and commercial excellence: risk and uncertainty

Accessing, developing and retaining talent as Rio Tinto and our industry evolves presents a constant challenge. The Group's ability to maintain its competitive position is dependent on the services of a wide range of internal and external skilled and experienced personnel and contracting partners.

Potential impact

- Future financial and operational performance
- Liquidity
- HSE&S
- Communities and social performance
- Group reputation

Strategic delivery:

People Performance

Opportunities

Enhance productivity and business resilience through building operational and commercial excellence.

Threats

Business interruption or underperformance may arise from a lack of capability in people, standards, processes or systems to prevent, mitigate or recover from an interruption (for example, a significant weather event), which results in a material loss to the Group.

Mitigating actions include:

- Development of Centres of Excellence for key technical capability in major hazard and asset management.
- Continue to provide leadership, technical and commercial development opportunities.
- Comply with slope geotechnical, tailings management, underground mining and process safety technical and safety standards, supported by subject-matter experts and audit protocols, reducing the risk of operational failure.
- Comply with the Acceptable Use of Information and Electronic Resources standard, supported by periodic reviews of IT infrastructure and security controls by dedicated cyber-security team.
- Undertake business resilience planning and execution exercises for plausible and severe scenarios.

Five-year review

Selected financial data

The selected consolidated financial information below has been derived from the historical audited consolidated financial statements of the Rio Tinto Group. The selected consolidated financial data should be read in conjunction with, and qualified in their entirety by reference to, the 2019 financial statements and notes thereto. The financial statements as included on pages 146 to 246 ^{AR} have been prepared in accordance with IFRS as defined in note 1.

Rio Tinto Group

Income statement data

For the years ending 31 December Amounts in accordance with IFRS	2019 US\$m	2018 US\$m	2017 US\$m	2016 US\$m	2015 US\$m
Consolidated sales revenue	43,165	40,522	40,030	33,781	34,829
Group operating profit ^(a)	11,466	17,687	14,135	6,795	3,615
Profit/(loss) for the year	6,972	13,925	8,851	4,776	(1,719)
Basic earnings/(losses) for the year per share (US cents)	491.4	793.2	490.4	256.9	(47.5)
Diluted earnings/(losses) for the year per share (US cents) ^(b)	487.8	787.6	486.9	255.3	(47.5)

Dividends per share

Dividends declared during the year					
US cents					
– interim	151.0	127.0	110.0	45.0	107.5
– interim special	61.0				
– final	231.0	180.0	180.0	125.0	107.5
– special		243.0			
UK pence					
– interim	123.32	96.82	83.13	33.80	68.92
– interim special	49.82				
– final	177.47	135.96	129.43	100.56	74.21
– special		183.55			
Australian cents					
– interim	219.08				
– interim special	88.50	170.84	137.7	59.13	144.91
– final	349.74	250.89	228.5	163.62	151.89
– special		338.70			
Dividends paid during the year (US cents)					
– ordinary	635.0	307.0	235	152.5	226.5
Weighted average number of shares basic (millions)	1,630.1	1,719.3	1,786.7	1,797.3	1,824.7
Weighted average number of shares diluted (millions) ^(b)	1,642.1	1,731.7	1,799.5	1,808.6	1,824.7

Balance sheet data

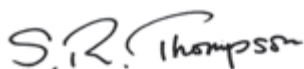
Total assets	87,802	90,949	95,726	89,263	91,564
Share capital/premium	7,968	8,000	8,666	8,443	8,474
Total equity/Net assets	45,242	49,823	51,115	45,730	44,128
Equity attributable to owners of Rio Tinto	40,532	43,686	44,711	39,290	37,349

(a) Group operating profit or loss includes the effects of charges and reversals resulting from impairments (other than impairments of equity accounted units) and profit and loss on disposals of interests in businesses. Group operating profit or loss amounts shown above excludes equity accounted operations, finance items, tax and discontinued operations.

(b) The effects of dilutive securities has not been taken into account when calculating diluted loss per share for the year ended 31 December 2015, in accordance with IAS 33 "Earnings Per Share".

Directors' approval statement

This Strategic report is delivered in accordance with a resolution of the board, and has been signed on behalf of the board by:



Simon Thompson
Chairman
26 February 2020

Independent Limited Assurance Report to the Directors of Rio Tinto plc and Rio Tinto Limited



The Board of Directors of Rio Tinto plc and Rio Tinto Limited (together “Rio Tinto”) engaged us to provide limited assurance on the selected subject matter described below and set out in the Sustainability sections of the Rio Tinto Annual Report 2019 and the Rio Tinto Strategic Report 2019 for the year ended 31 December 2019.

Our conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the selected subject matter within the Sustainability sections of the Rio Tinto Annual Report 2019 and the Rio Tinto Strategic Report 2019 for the year ended 31 December 2019 has not been prepared, in all material respects, in accordance with the Reporting Criteria.

This conclusion is to be read in the context of what we say in the remainder of our report.

Selected Subject Matter

The scope of our work was limited to assurance over the selected subject matter within the Sustainability sections of the Rio Tinto Annual Report 2019 and the Rio Tinto Strategic Report 2019 for the year ended 31 December 2019 (the “selected subject matter”).

The selected subject matter and the Reporting Criteria against which it was assessed are summarised below. Our assurance does not extend to information in respect of earlier periods or to any other information included in the Rio Tinto Annual Report 2019 or the Rio Tinto Strategic Report 2019.

Selected subject matter

- Rio Tinto’s assertion that it has incorporated the requirements of the International Council on Mining and Metals (ICMM) 10 Principles for sustainable development, and the mandatory requirements set out in the ICMM Position Statements, into its own policies, strategies and standards.
- Rio Tinto’s assertions regarding the approach that it has adopted to identify and prioritise its material sustainable development risks and opportunities set out in the Sustainability sections of the Rio Tinto Annual Report 2019 and the Rio Tinto Strategic Report 2019.
- Rio Tinto’s assertions regarding the existence and status of implementation of systems and approaches used to manage the following selected sustainable development risk areas:
 - Safety
 - Greenhouse gas emissions
 - Energy use
 - Health
 - Business Integrity
- The following Rio Tinto performance data related to the selected sustainable development risk areas:
 - Number of fatalities
 - All injury frequency rate
 - Lost time injury frequency rate
 - Number of lost time injuries
 - New cases of occupational illness
 - Number of incidents reported either through Talk to Peggy, compliance managers or team leaders
 - Total greenhouse gas emissions
 - Greenhouse gas emissions intensity
 - Total energy use

Understanding reporting and measurement methodologies

The selected subject matter needs to be read and understood together with the Reporting Criteria, which Rio Tinto is solely responsible for selecting and applying. The absence of a significant body of established practice on which to draw to evaluate and measure non-financial information allows for different, but acceptable, measurement techniques and can affect comparability between entities and over time. The Reporting Criteria used for the reporting of the selected subject matter are the ICMM Sustainable Development Framework: ICMM Principles (Revised 2015) and the definitions and approaches within the Basis of reporting glossary which will be presented at <https://www.riotinto.com/sustainability/sustainability-reporting> as at 27 February 2020.

Professional standards applied and level of assurance

We performed a limited assurance engagement in accordance with International Standard on Assurance Engagements 3000 (Revised) *Assurance Engagements other than Audits and Reviews of Historical Financial Information*, and, in respect of the greenhouse gas emissions, in accordance with International Standard on Assurance Engagements 3410 *Assurance engagements on greenhouse gas statements*, issued by the International Auditing and Assurance Standards Board.

A limited assurance engagement is substantially less in scope than a reasonable assurance engagement in relation to both the risk assessment procedures, including an understanding of internal control, and the procedures performed in response to the assessed risks.

Our Independence and Quality Control

We applied the Institute of Chartered Accountants in England and Wales (ICAEW) Code of Ethics, which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

We apply International Standard on Quality Control (UK) 1 and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Our work was carried out by an independent and multi-disciplinary team with experience in sustainability reporting and assurance.

Work done

We are required to plan and perform our work in order to consider the risk of material misstatement of the selected subject matter. In doing so, we:

- made enquiries of relevant management of Rio Tinto regarding the processes and controls for capturing, collating and reporting the performance data within the selected subject matter, and evaluated the design and effectiveness of these processes and controls;
- validated the operation of controls over the accuracy of injury and illness classification and assessed the final injury and illness classification applied for a sample of injuries and illnesses reported during the year ended 31 December 2019;
- tested the arithmetic accuracy of a sample of calculations of performance data within the selected subject matter;
- assessed the appropriateness of the greenhouse gas emission factors applied in calculating the Total greenhouse gas emissions and Greenhouse gas emissions intensity;
- tested performance data, on a selective basis, substantively at both an operational and corporate level, which included testing at a selection of 8 operations from across Aluminium, Growth & Innovation, Copper & Diamonds, Energy & Minerals, and Iron Ore;
- undertook analytical procedures over the selected subject matter; and
- made enquiries of relevant management and reviewed a sample of relevant management information and documentation supporting assertions made in the selected subject matter.

Rio Tinto's responsibilities

The Directors of Rio Tinto are responsible for:

- designing, implementing and maintaining internal controls over information relevant to the preparation of the selected subject matter that is free from material misstatement, whether due to fraud or error;
- establishing objective Reporting Criteria for preparing the selected subject matter;
- measuring and reporting the selected subject matter based on the Reporting Criteria; and
- the content of the Rio Tinto Annual Report 2019 and the Rio Tinto Strategic Report 2019.

Our responsibilities

We are responsible for:

- planning and performing the engagement to obtain limited assurance about whether the selected subject matter is free from material misstatement, whether due to fraud or error;
- forming an independent conclusion, based on the procedures we have performed and the evidence we have obtained; and
- reporting our conclusion to the Directors of Rio Tinto.

Restriction on use

This report, including our conclusions, has been prepared solely for the Board of Directors of Rio Tinto in accordance with the agreement between us, to assist the Directors in reporting Rio Tinto's sustainability performance and activities. We permit this report to be disclosed in the Rio Tinto Annual Report 2019 and the Rio Tinto Strategic Report 2019 for the year ended 31 December 2019, to assist the Directors in responding to their governance responsibilities by obtaining an independent assurance report in connection with the selected subject matter. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Board of Directors and Rio Tinto for our work or this report except where terms are expressly agreed between us in writing.



26 February 2020

PricewaterhouseCoopers LLP
Chartered Accountants
1 Embankment Place, London
WC2N 6RH, United Kingdom

Annual Statement by the Remuneration Committee Chairman

The Committee's overarching purpose is to ensure the remuneration structure and policies reward fairly and responsibly.

A train runs along the Iron Ore of Canada (IOC) rail line, taking some of the world's highest-quality iron ore to market.

On behalf of the Board, I am pleased to introduce our 2019 directors' remuneration report (Remuneration report).

This year we have further simplified the format of our Remuneration report by using more charts and tables. The Remuneration report is in two parts. Our "Remuneration At a glance" section provides a summary of our Remuneration Policy (Policy), which was approved by shareholders in 2018, and other key information and performance highlights from 2019. Our full Policy remains available on the company website. The main part of the Remuneration report sets out how the Policy was applied in 2019 and related remuneration outcomes (Implementation report) for which we seek your support at our Annual General Meetings (AGMs).

We will also be seeking shareholder approval for a resolution relating to potential termination benefits that may apply to a departing executive. This resolution seeks to renew existing approvals previously granted by shareholders in accordance with Australian requirements. We are not proposing any material changes to the previously granted approvals, nor any increase in the amounts we pay on termination to any departing executive.


Remuneration Policy

The Committee's overarching purpose is to ensure the remuneration structure and policies reward fairly and responsibly with a clear link to corporate and individual performance, aligning remuneration outcomes with the delivery of long-term strategy and value. We aim to provide competitive rewards that attract, retain and motivate executives based on policies which are competitive in the market and are appropriately stretching and incentivise the right behaviours. We also ensure that there is alignment between executive remuneration and wider company pay policies, with a particular focus on gender pay differential and general pay equity.

During 2019, I met with several shareholders and institutions for discussions related to governance and broader executive remuneration. In preparation for our Policy review in 2020, I took this opportunity to explore initial views on what role alternative pay models such as restricted stock might play in the compensation mix as we seek to balance the challenges associated with a cyclical business with the need to provide long-term incentives for our senior executive team. It is quite clear that shareholder perspectives on directors' remuneration continue to vary not only by investor but also geographically between our UK and Australian investor bases. I look forward to continuing this dialogue in preparation for an updated Policy for approval at the 2021 AGMs.

The Committee continues to monitor closely the evolving governance landscape and investor views. From a UK perspective, we recognise shareholder sentiment around aligning executive pension contributions with those of the broader employee population. Current contribution levels for our UK-based Executive Directors are slightly below 25% and are broadly consistent with the majority of our UK employees. We will consider this aspect further as part of a holistic review of the arrangements as we develop our next Policy.

Climate change represents perhaps the greatest long-term threat to our business and we are determined to be part of the solution. The Committee will be including climate change-related objectives for our Executive Directors in the 2020 Short-Term Incentive Plan (STIP).

With respect to post-employment shareholding, our current long term incentive plans ensure that our Executive Directors are materially aligned and exposed to the shareholder experience for a number of years after leaving the company. A five-year vesting period applies under the Long-Term Incentive Plan (LTIP) and a three-year vesting period under our bonus deferral plan. Vesting is not accelerated for eligible leavers whilst awards lapse for ineligible leavers. In addition, effective from 1 January 2020, Executive Directors will be required to continue to meet their shareholding requirement for a period of two years after ceasing employment. Further details are set out on pages 114 and 117 .

2019 remuneration outcomes in the context of broader business performance

In 2019 we had zero fatalities. The implementation of critical risk management (CRM) across all our operations and increased sharing and deeper analysis of incidents that have the potential to result in a fatality has been the foundation of this.

In an effort to move towards leading indicators, the safety maturity model (SMM) framework included in the 2019 STIP expands on CRM to include a more holistic inclusion of our safety management system. In 2019, all of our safety performance indicators improved, resulting in a Group STIP safety result above target at 64% of maximum.

Despite a number of challenges on the operational side, our value over volume strategy, good capital discipline, and strong markets for some of our key commodities enabled us to deliver a robust financial performance in 2019. This resulted in a combined adjusted earnings and cash flow result of above target. Significant adjustments related to the unbudgeted early cancellation of a power purchase agreement at Escondida, which was replaced with a lower cost and carbon footprint energy source, and an increase in remediation provisions for water management at Kennecott in the US. During the year, iron ore shipments were impacted by several tropical cyclones across north West Australia which significantly exceeded previous experience and 2019 plan assumptions. Using the standard methodology for calculating the weather adjustment (which has in the past resulted in both upward and downward adjustments), the outcome would have been 56%. The Committee agreed that the impact of these weather events could not have been further mitigated in 2019. Nevertheless, in view of the rising frequency of extreme weather events and the need to increase resilience to climate change, the Committee exercised downward discretion, reducing the post-adjustment outcome to 51%.

From a shareholder perspective, over the five-year performance period of the 2015 performance share award (PSA), Rio Tinto outperformed both the EMIX Global Mining Index and the MSCI World Index. Over the same period, the share price for Rio Tinto plc increased by 50% and for Rio Tinto Limited by over 70%, reaching its highest ever level during 2019. The estimated vesting for the 2015 award, combining the two TSR and EBIT margin portions is 67.9% of maximum. This includes an estimate for the EBIT margin measure as the reported data for all the comparator companies is not currently available.

In the context of the Group's overall performance during the five-year performance period and the shareholder experience over that timeframe, the Committee concluded that the vesting of awards was justified. Accordingly, the portion of the award relating to TSR will vest on 27 February 2020. The Committee will make a final determination of the relative improvement in EBIT margin measure when the final EBIT margin performance of the comparator group companies becomes available in May 2020. If applicable, this portion of the award will vest on 31 May 2020.

2020 remuneration decisions

With effect from 1 March 2020, the annual base salary for Executive Directors has been increased by 2.11%. This is in line with the UK consumer price index (CPI) and below the salary increase budget applied to UK employees which was in excess of 3%. The increases reflected country CPI for half of the Executive Committee, and a modest market adjustment for the remaining half. The approach used by the Committee to assess the level and appropriateness of these increases was consistent with that applied to the broader employee population taking account of, among other factors, an assessment of market competitiveness against relevant peer companies and pay equity, in particular gender pay, considerations.

The maximum opportunity for our executives under the STIP remains unchanged. For the 2020 safety measures, the weighting of SMM and all injury frequency rate (AIFR) will become 40% and 20% respectively (30% and 30% in 2019). The adjustment in weighting strengthens the holistic focus on improving our safety culture and performance. The applicable targets are disclosed on page 126 ^{AR}. We expect to disclose the 2020 financial and individual targets retrospectively in the 2020 Implementation report. The level of PSAs, as a percentage of base salary, to be granted in March 2020, is unchanged from 2019 for the Chief Executive and will be 410% for the Chief Financial Officer. Awards to other Executive Committee members vary from between 375% and 410% of base salary.

Pay in the broader context

During 2019, the Committee materially expanded its review of reward structures and outcomes across the Group covering all elements of pay. In addition, as part of the broader employee engagement at board level, we visited a range of operational sites across three continents, and held our 2019 employee AGM in Montreal. These are valuable channels of engagement between the Board, the Committee and our employees on a broad range of topics including pay. As we review our Policy this year, we will remain sensitive to and cognisant of this broader context to ensure the Policy we put forward in 2021 continues to have all the desired attributes of fairness, transparency, simplicity, proportionality, alignment to culture and a robust risk adjustment framework.

The CEO pay ratio of 66:1 is primarily driven by the percentage of total remuneration for the Chief Executive that is performance related and reflects the slightly higher STIP pay-out and the estimated 24 percentage point increase in the LTIP vesting outcome for 2019 compared to 2018. As most of the variable compensation for the Chief Executive is delivered in company shares, the ratio is also impacted by changes in the share price which provides alignment to the shareholder experience. The Committee continues to be mindful of the relationship between executive remuneration and that of our broader employee population.

During 2019 and as part of the 2020 remuneration review, gender pay continued to be a key focus at all levels of the organisation. The Committee monitors both equal pay and the gender pay gap across our employee population, and maintains a focus on the gender diversity in senior management roles as a means to address the gender pay gap across the Group. We are pleased with the broader initiatives being implemented across the Group in this area and note that the Group-wide equal pay and gender pay gaps remain at less than 2% and 1% respectively. Further details, together with the steps we are taking in this area, are provided on page 69 of this report.

As always, I welcome shareholder feedback and comments on the 2019 Remuneration report. I look forward to engaging further with shareholders during the course of 2020 for the review of our next Policy.

Yours sincerely



Sam Laidlaw
Remuneration Committee Chairman
26 February 2020

Summary Remuneration report

	Base salary
	Short-Term Incentive Plan
	Long-Term Incentive Plan

Single total figure of remuneration for executive directors (£'000)

Executive Director (£'000)	Year	Base salary	Benefits	Pension	Total fixed	Bonus – STIP payment		Value of LTIP awards vesting		Total variable	Single total figure	% change
						Cash	Deferred shares	Face value	Share price appreciation			
Jean-Sébastien Jacques (Chief Executive)	2019	1,133	71	280	1,484	850	851	1,984	627	4,312	5,796	27.4%
	2018	1,105	68	274	1,447	778	778	1,114	434	3,104	4,551	-
Jakob Stausholm ^(a) (Chief Financial Officer)	2019	775	62	172	1,009	436	437	0	0	873	1,882	86.9%
	2018	258	440	57	755	126	126	0	0	252	1,007	-

(a) The details for 2018 reflect remuneration for the period 3 September to 31 December 2018

Single total figure remuneration for non-executive directors

Stated in US\$'000 ^(a)		Fees and allowances ^(b)	Non-monetary benefits ^(c)	Single total figure of remuneration ^(d)	Currency of actual payment
Chairman					
Simon Thompson ^(e)	2019	932	2	934	£
	2018	844	8	852	£
Non-executive directors					
Megan Clark	2019	263	21	284	A\$
	2018	303	29	332	A\$
David Constable	2019	252	23	275	£
	2018	289	34	323	£
Ann Godbehere ^(f)	2019	108	9	117	£
	2018	304	12	316	£
Moya Greene ^(g)	2019	107	3	110	£
	2018	70	–	70	£
Simon Henry	2019	241	4	245	£
	2018	215	9	224	£
Sam Laidlaw	2019	270	3	273	£
	2018	229	8	237	£
Michael L'Estrange	2019	188	13	201	A\$
	2018	256	19	275	A\$
Simon McKeon	2019	250	14	264	A\$

Notes to table 1b – Non-executive directors' remuneration

- (a) The remuneration is reported in US\$. The amounts have been converted using the relevant 2019 average exchange rates of £1 = US\$1.27661 and A\$1 = US\$0.69531 (1 January to 31 December 2019 average).
- (b) "Fees and allowances" comprises the total fees for the Chairman and all non-executive directors, and travel allowances for the non-executive directors (other than the Chairman). The payment of statutory minimum superannuation contributions for Australian non-executive directors is required by Australian superannuation law. These contributions are included in the "Fees and allowances" amount disclosed for Australian non-executive directors.
- (c) "Non-monetary benefits" include, as in previous years, amounts which are deemed by the UK tax authorities to be benefits in kind relating largely to the costs of non-executive directors' expenses in attending board meetings held at the company's UK registered office (including associated hotel and subsistence expenses) and professional tax compliance services/advice. Given these expenses are incurred by directors in the fulfilment of their duties, the company pays the tax on them.
- (d) Represents disclosure of the single total figure of remuneration under Schedule 8 of the Large and Medium-sized Companies and Groups (Accounts and Reports) Regulations 2008 (as amended) and total remuneration under the Australian Corporations Act 2001 and applicable accounting standards.
- (e) The amounts reported for Simon Thompson in 2018 reflect the period when he was a non-executive director from 1 January to 4 March 2018 and then Chairman of the Board from 5 March to 31 December 2018.
- (f) The amounts reported for Ann Godbehere reflect the period when she was an active member of the Board from 1 January to 9 May 2019.
- (g) The amounts reported for Moya Greene reflect the periods when she was an active member of the Board from 1 January to 26 June in 2019 and 17 September to 31 December in 2018.

Further details in relation to aggregate compensation for executives, including directors, are included in note 38 ^(b) (Directors' and key management remuneration).

Contact details

Registered offices

Rio Tinto plc
6 St James's Square
London
UK
SW1Y 4AD
Registered in England No. 719885
Telephone: +44 (0)20 7781 2000
Website: riotinto.com

Rio Tinto Limited
Level 7
360 Collins Street
Melbourne
Victoria 3000
Australia
ABN 96 004 458 404
Telephone: +61 (0) 3 9283 3333
Fax: +61 (0) 3 9283 3707
Website: riotinto.com

Rio Tinto's agent in the US is Cheree Finan,
who may be contacted at
Rio Tinto Services Inc.
80 State Street
Albany
US
NY 12207-2543

Shareholders

Please refer queries about shareholdings to
the investor centre of the respective registrar.

Rio Tinto plc
Computershare Investor Services PLC
The Pavilions
Bridgwater Road
Bristol
BS99 6ZZ
UK
Telephone: +44 (0)370 703 6364
Fax: +44 (0)370 703 6119
UK residents only
Freephone: +44 (0)800 435021
Website: computershare.com

Holders of Rio Tinto American depositary
receipts (ADRs)
Please contact the ADR administrator if
you have any queries about your ADRs.

ADR administrator
JPMorgan Chase & Co
PO Box 64504
St. Paul
MN 55164-0854
US
Telephone: +1 (651)453 2128
US residents only, toll free general:
+1(800) 990 1135
US residents only, toll free Global invest direct:
+1 (800) 428 4267
Website: adr.com
Email: jpmorgan.adr@eq-us.com

Rio Tinto Limited

Computershare Investor Services Pty Limited
GPO Box 2975
Melbourne
Victoria 3001
Australia
Telephone: +61 (0) 3 9415 4030
Fax: +61 (0) 3 9473 2500
Australian residents only, toll free: 1800 813 292
New Zealand residents only, toll free:
0800 450 740
Website: computershare.com

Former Alcan Inc. shareholders

Computershare Investor Services Inc.
8th Floor
100 University Avenue
Toronto, ON
Canada
M5J 2Y1
Telephone: +1 514-982-7555
North American residents only,
toll free: +1 (800) 564-6253
Website: computershare.com

Shareholder information

Financial calendar

2020		
17	January	Fourth quarter 2019 operations review
26	February	Announcement of results for 2019 and date of 2019 Annual report (published on 27 February (GMT))
28	February	Form 20-F publication
5	March	Rio Tinto plc and Rio Tinto Limited ordinary shares and Rio Tinto plc ADRs quoted “ex-dividend” for the 2019 final dividend
6	March	Record date for the 2019 final dividend for Rio Tinto plc and Rio Tinto Limited ordinary shares and Rio Tinto plc ADRs
10	March	Notices of AGM
24	March	Final date for elections under the Rio Tinto plc and Rio Tinto Limited dividend reinvestment plans and under facilities for dividends to be paid in alternative currency for the 2019 final dividend
7	April	Dividend currency conversion date (Rio Tinto plc holders electing to receive Australian dollars and Rio Tinto Limited holders electing to receive pounds sterling)
8	April	Annual general meeting for Rio Tinto plc, London
16	April	Payment date for the 2019 final dividend to holders of ordinary shares and ADRs
17	April	First quarter 2020 operations review
7	May	Annual general meeting for Rio Tinto Limited, Brisbane
17	July	Second quarter operations review 2020
29	July	Announcement of half-year results for 2020
6	August	Rio Tinto plc and Rio Tinto Limited ordinary shares and Rio Tinto plc ADRs quoted “ex-dividend” for the 2020 interim dividend
7	August	Record date for the 2020 interim dividend for Rio Tinto plc and Rio Tinto Limited ordinary shares and Rio Tinto plc ADRs
26	August	Final date for elections under the Rio Tinto plc and Rio Tinto Limited dividend reinvestment plans and under facilities for dividends to be paid in alternative currency for the 2020 interim dividend
10	September	Dividend currency conversion date (Rio Tinto plc holders electing to receive Australian dollars and Rio Tinto Limited holders electing to receive pounds sterling)
17	September	Payment date for the 2020 interim dividend to holders of ordinary shares and ADRs
16	October	Third quarter 2020 operations review
2021		
	January	Fourth quarter 2020 operations review
	February	Announcement of results for 2020
	April	Annual general meeting for Rio Tinto plc, London
	April	First quarter 2021 operations review
	May	Annual general meeting for Rio Tinto Limited, Sydney
	July	Second quarter 2021 operations review
	August	Announcement of half-year results for 2021
	October	Third quarter 2021 operations review

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 are levels of actual production during any period, levels of demand and market prices, the ability to produce and transport products profitably, the impact of foreign currency exchange rates on market prices and operating costs, operational problems, political uncertainty and economic conditions in relevant areas of the world, the actions of competitors, activities by governmental authorities such as changes in taxation or regulation and such other risk factors 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.

Produced by Superunion

www.superunion.com

Printed by Park Communications on FSC® certified paper.

Park is an EMAS certified company and its Environmental Management System is certified to ISO 14001.

100% of the inks used are vegetable oil based, 95% of press chemicals are recycled for further use and, on average, 99% of any waste associated with this production will be recycled.

This document is printed on GalerieArt Matt, a paper containing fibre sourced from well managed, responsible, FSC® certified forests, and other controlled sources. The pulp used in this product is bleached using an elemental chlorine free (ECF) process.



riotinto.com



Cover image: Every IMW wind turbine uses three tonnes of copper. Rio Tinto is building high-value copper growth options.