



# Climate Change Report FY21

ABN 57 002 594 872

**Thriving communities | Global force**

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# Thriving communities Global force

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## Our Values

Safety

Family

Empowerment

Frugality

Stretch targets

Integrity

Enthusiasm

Courage and  
determination

Generating ideas

Humility

Fortescue's unique Values drive our performance in a way that sets us apart from others

## Culture

Fortescue is a values-based business with a strong, differentiated culture.

We believe that by leveraging the unique culture of our greatest asset, our people, we will achieve our stretch targets





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# Message from the Climate Change Committee

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**Fortescue Metals Group Ltd (Fortescue) is committed to open, transparent and meaningful engagement with its stakeholders**

**CEO and Climate Change Committee Chair, Elizabeth Gaines**

**Driven by our industry-leading target to be carbon neutral by 2030, Fortescue is committed to leading the heavy industry's battle against global warming**

Climate change is the most pressing issue facing our generation.

If we are to meet the Paris Agreement target to keep the global temperature rise this century to well below 2 degrees Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. To meet this target, the broader energy transition needs to happen far more rapidly than by the middle of the century.

It is heartening to see many governments and businesses accelerating their emissions reduction targets.

This year, Fortescue signalled our intention to join the global battle to defeat climate change. Building on our proud history of setting stretch targets, we announced our boldest and most important target yet – to achieve carbon neutrality by 2030.

This target is underpinned by a pathway to decarbonisation which is focused on investing in renewable energy and eliminating the use of diesel in our mining fleet.

Critical to our decarbonisation strategy is our 100 per cent renewable green energy and industry company, Fortescue Future Industries (FFI).

FFI is establishing a global portfolio of renewable green hydrogen and green ammonia operations that will position us at the forefront of the global renewable hydrogen industry. Leveraging Fortescue's world-leading track record of innovation and infrastructure development, FFI's vision is to make renewable green hydrogen the most globally traded seaborne energy commodity in the world.

FFI will be a key enabler of Fortescue's carbon neutrality target, investing in technologies to power the green mining fleet of the future. During the year, FFI achieved significant progress on a number of heavy industry decarbonisation initiatives, including the testing of battery cells for use in our haul trucks, and the completion of design and construction of a hydrogen-powered drill rig.

Together with FFI, we will demonstrate that heavy industry can operate with renewable, environmentally friendly energy.

We are proud to be taking a leadership position in addressing climate change. On behalf of the Climate Change Committee, I would like to thank the entire Fortescue family whose passion and dedication is helping to drive sustainable change and transform Fortescue into Australia's leading resources and renewable energy company.

# FY21 highlights

Iron ore shipped

**182.2**mt

C1 costs

US\$

**13.93**/wmt

Cash on hand

US\$

**6.9**bn

Net cash

US\$

**2.7**bn

Net profit after tax

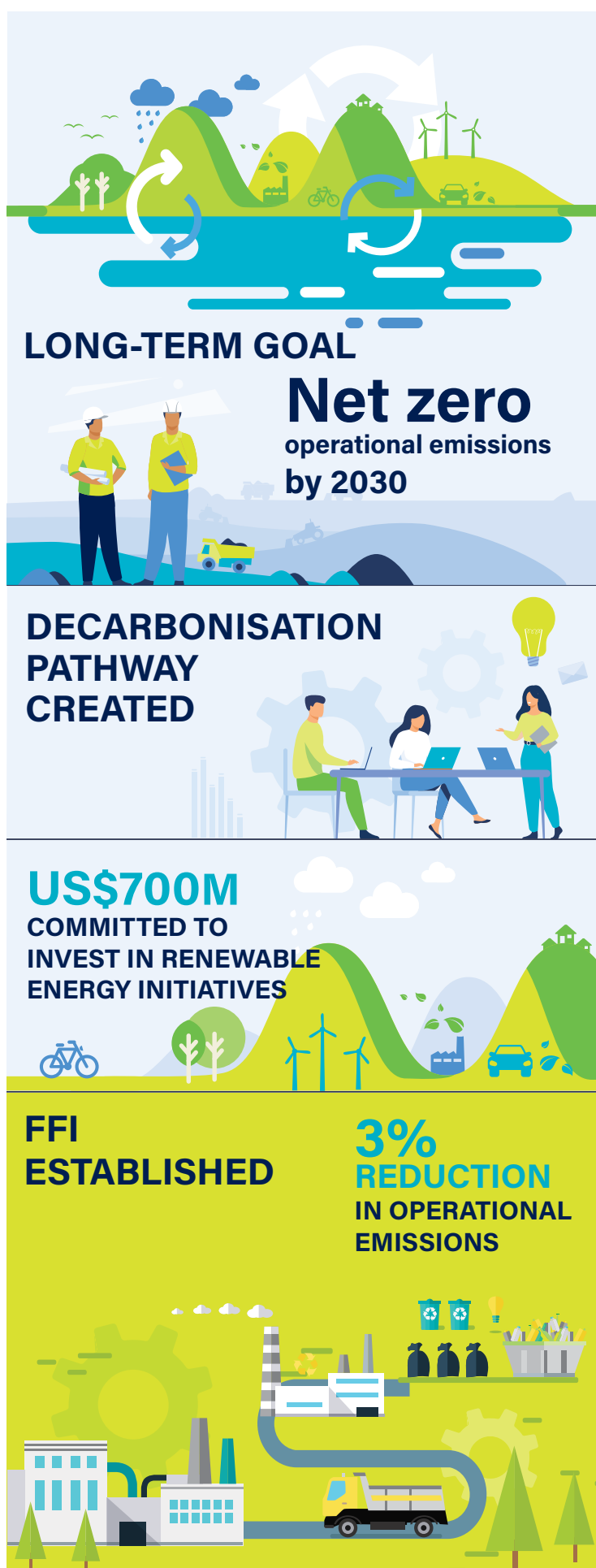
US\$

**10.3**bn

Total global  
economic contribution

A\$

**30.2**bn





# About this report



This report has been prepared for Fortescue's stakeholders and details our progress in managing climate change-related matters including risks and opportunities.

The report is part of Fortescue's annual reporting suite which also includes the FY21 Annual Report, FY21 Sustainability Report and FY21 Corporate Governance Statement, all of which are available on our website at [www.fmgl.com.au](http://www.fmgl.com.au)

The report is aligned with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), which has guided our climate change reporting since FY18.

The report captures activities within our operations, including exploration and development as well as those operated through subsidiaries and joint ventures where Fortescue has operational control. The report also highlights the work being undertaken by Fortescue Future Industries (FFI), a wholly owned subsidiary of Fortescue Metals Group Ltd.

All references to our, we, us, the Group, the Company and Fortescue refer to Fortescue Metals Group Ltd (ABN 57 002 594 872) and its subsidiaries. All references to a year are to the financial year ended 30 June 2021 unless otherwise stated.

## Assurance

Scope 1, 2 and 3 greenhouse gas emissions data included in this report is subject to assurance by KPMG.

## Feedback

We value all feedback. Please forward any comments on this report or requests for additional information to [sustainability@fmgl.com.au](mailto:sustainability@fmgl.com.au)



# About Fortescue

**Underpinned by operational excellence and balance sheet strength, we are focused on our strategic goals of building thriving communities, optimising returns from our operations through disciplined capital management and diversifying to commodities that support decarbonisation**

Together with FFI, our 100 per cent renewable green energy and industry company, we are establishing a global portfolio of green hydrogen and green product operations that will position us at the forefront of the global renewable hydrogen industry.

Our iron ore business comprises integrated mining, rail, shipping and marketing teams working together to export over 180 million tonnes of iron ore annually. Our commitment to technology and innovation ensures we remain one of the world's lowest cost iron ore producers and continues to guide our pursuit of green energy opportunities.

Our operations include three mining hubs in the Pilbara, Western Australia, which are connected to the five berth Herb Elliott Port and the Judith Street Harbour towage infrastructure in Port Hedland via 760 kilometres of the fastest heavy haul railway in the world.

Our supply chain extends to our innovative tug fleet and the eight purpose-built 260,000 tonne capacity Fortescue Ore Carriers, which have been designed to complement the efficiency of our port and maximise the safety and productivity of Fortescue's operations.

The Fortescue Hive, our expanded integrated operations centre based in our East Perth headquarters, delivers enhanced safety, productivity, efficiency and commercial benefits, and will underpin our future use of technology, including artificial intelligence and robotics.

Our longstanding relationships with customers in China have grown from our first commercial shipment of iron ore in 2008. Today, we are a core supplier of seaborne iron ore to China and have expanded into markets including Japan and South Korea.

Driven by our industry-leading target to be carbon neutral by 2030, Fortescue is committed to lead the heavy industry battle against global warming. In addition to our ongoing investments in renewable energy to power our Pilbara iron ore operations, we are also undertaking a range of initiatives to decarbonise our mobile fleet through the next phase of hydrogen and battery electric energy solutions to eliminate the need for diesel across our operations.

Fortescue was founded on the belief that the communities in which we operate should benefit from our success. Globally, we are empowering thriving communities and delivering positive social and economic benefits through training, employment and business development opportunities, including for our Indigenous employees and partners.

Fortescue is a values-based business with a strong, unique culture which celebrates diversity and inclusiveness. By empowering our people, we will continue to generate economic growth and create jobs as we take a global leadership position in the green energy transition.

As we enter this new phase of growth in our journey, our team will continue to challenge the status quo to sustain operational excellence, achieve our stretch targets, drive future success and deliver strong returns to our shareholders.



# Our approach to climate change

02

**We are committed to being a leader in addressing the global challenge of climate change**

Climate change is the most pressing challenge of our generation and a once in a lifetime opportunity for economic growth and value creation that generates a better, cleaner, more sustainable world.

We accept the scientific consensus as assessed by the Intergovernmental Panel on Climate Change (IPCC) and are taking steps to realise the Paris Agreement goal of limiting global temperature rise to well below 2°C above pre-industrial levels. We recognise that climate change may lead to catastrophic social and economic outcomes, the costs of which far exceed those associated with transitioning to a low carbon world.





**Innovation must be incentivised and rewarded by governments through strong policy frameworks that ensure a planned, managed and value creating transition to a low carbon economy**

We believe practical, technology and policy-driven solutions are key to managing the impact of climate change. We are taking strong action to address our contribution to climate change and meet the objectives of the Paris Agreement.

During FY21, we accelerated our transition from being a major fossil fuel importer to a major clean and renewable energy exporter by:

- Setting ourselves the target of carbon neutrality by 2030, which requires the net emissions across existing and future operations to reduce to zero by 2030.
- Establishing our decarbonisation pathway that focuses on applying renewable energy and battery storage to meet our stationary energy requirements, and green hydrogen, green ammonia and battery electric solutions to decarbonise our mobile fleet.

- Creating FFI to lead the global energy transition by developing a portfolio of renewable energy and green hydrogen projects that will accelerate the decarbonisation of hard-to-abate sectors such as metals processing, long-haul transport and industrial heating.
- Expanding our research, development, engagement and collaboration to reduce emissions across our downstream value chain, focusing on shipping and iron and steel production.

The transition to a net zero world presents both opportunities and risks for us, and we are implementing measures to mitigate and manage risks while maximising opportunities.





# Fortescue Future Industries

03

**Fortescue established FFI in FY21 to pursue global scale green energy opportunities through a portfolio of large-scale, renewable, low-cost hydropower, geothermal, solar and wind power resources that will support green hydrogen and green ammonia production**

FFI's vision is to supply over 15 million tonnes of green hydrogen annually by 2030 and to make green hydrogen and its carriers the most globally traded seaborne energy commodity in the world. Fortescue will be a source of demand for FFI products, given its target to achieve carbon neutrality by 2030.

Fortescue has updated its capital allocation framework to allocate 10 per cent of its net profit after tax to FFI

to support its objectives, with project funding to be separately secured.

Fortescue was established with the clear goal of transforming the global iron ore industry. We are now applying the same approach to rapidly develop FFI, by securing the best assets, building production at scale, reducing costs to increase cash flow and reinvesting in the business to expand production.





Since its establishment, FFI has focused on securing a portfolio of renewable assets to produce green hydrogen. During FY21, FFI representatives visited over 50 countries and signed deeds of agreement in multiple countries including Papua New Guinea, Indonesia, Democratic Republic of the Congo, Kenya and Ethiopia. Proposed projects and studies are now underway across Latin America, North America, Africa, Europe, Central Asia and the Middle East and Asia-Pacific Regions.

Advancing technology is key to meeting this vision and FFI has entered into a number of technology agreements, including with:

- Hyundai Motor Company and the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) to accelerate the commercialisation of metal membrane technology (MMT) and demonstrate the viability of the technology for renewable hydrogen production and vehicle fuelling in Korea.

- Kawasaki Heavy Industries and Iwatani Corporation to establish the Global Liquid Hydrogen (LH<sub>2</sub>) Consortium and develop a business model for the supply of liquid hydrogen into Japan.
- IHI Engineering Australia and IHI Corporation to investigate green ammonia supply chains between Australia and Japan.

FFI's workforce includes more than 300 employees with expertise in energy, hydrogen, project management, stakeholder engagement, international relations, finance, legal, environment and manufacturing.



# Our targets

04

## Carbon neutrality by 2030

In March 2021, Fortescue set an industry-leading target to achieve carbon neutrality within our operations by 2030. This target includes existing operations and extends to all future operations, including acquisitions.

We recognise the urgency needed to reduce emissions during this critical decade and despite our continued growth and expansion, we will reduce our net operational emissions from our FY20 baseline by at least three per cent annually and achieve carbon neutrality by 2030.

The contribution of our Eliwana and Iron Bridge projects means we will effectively reduce our net emissions to 50 per cent below our projected business-as-usual unmitigated emissions by FY25 from our FY20 baseline.

The first half of the decade will see emission reductions achieved predominantly through the increased use of renewable energy to power our sites. We will use offsets to address residual emissions where economically viable decarbonisation opportunities and technologies are unavailable. Their use will be consistent with the mitigation hierarchy to avoid, reduce and offset emissions.

Where the technology required to decarbonise our mining fleet is not readily available, we are making significant investments in research and development and partnering with others to develop the technology needed to advance in these areas.

### Scope 3 emissions

We are engaging with stakeholders and investing in solutions that can reduce emissions beyond our own operations into hard-to-abate sectors.

Through FFI, we intend to:

- Supply over 15 million tonnes of green hydrogen annually by 2030 as renewable hydrogen becomes the most globally traded seaborne energy commodity in the world.
- Progress technical solutions that use green hydrogen and green ammonia to decarbonise iron and steel making and international cargo shipping.

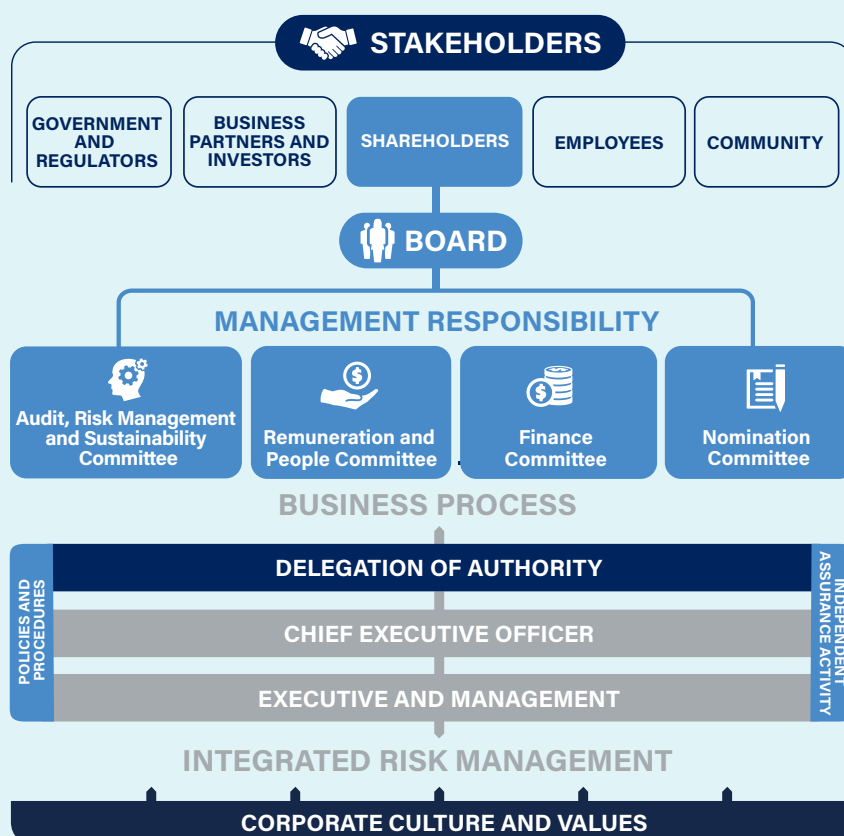
We support the United Nations Framework Convention on Climate Change, which mandates that individual nations take responsibility for emissions within their own borders. Despite the logistical challenges of reducing Scope 3 emissions that are beyond our operational control, in collaboration with our customers we will develop and trial technologies to enable the reduction of emissions from steel making and work to reduce the emissions intensity from the shipping of our iron ore.

Setting stretch targets is a core Fortescue Value and we continuously review our targets and Climate Change Strategy to ensure they remain consistent with new technologies, climate policies, evolving stakeholder expectations and our maturing understanding of physical and transitional risks.

**We will effectively reduce our net emissions to 50 per cent below our projected business-as-usual emissions by FY25 from our FY20 baseline**

# Governance

05



Fortescue recognises that good corporate governance is critical to the long-term, sustainable success of the Company and has established a governance framework to oversee strategic and financial decisions, approve policies and programs, monitor the management of risks and opportunities and report on performance.

Climate change has been identified as a critical, strategic matter and Board oversight of climate-related issues is managed through this governance framework.

Our overall approach to corporate governance is explained in the FY21 Corporate Governance Statement, available on our website at [www.fmgl.com.au](http://www.fmgl.com.au)

## The Board of Directors

Our Board of Directors (the Board) has ultimate responsibility for the oversight and approval of all strategic, risk management and financial investment decisions, including climate-related matters. The Board meets quarterly and receives updates on climate-related matters, and their impact on Fortescue's business, at each meeting.

Collectively, the Directors have a diverse and relevant range of skills, backgrounds, knowledge and experience

to ensure effective governance of the business. To the extent that any skills are not directly represented on the Board, they are augmented through management and external advisors. Specific skills and experience of the Board include understanding the business challenges, strategy and options associated with managing the risks of climate change.

Key climate-related decisions made by the Board during FY21 include:

- Bringing forward our carbon neutral target date by 10 years to 2030.
- Including climate-related KPIs within executive and management remuneration arrangements.
- Establishing FFI to lead the global energy transition by developing a portfolio of renewable energy and green hydrogen projects.
- Defining our decarbonisation pathway and approving associated expenditure.
- Setting priorities for the reduction of emissions in our downstream value chain.

The Board also provides oversight of all investment decisions, ensuring investments are aligned to our Values and business strategy. Achieving carbon neutrality by 2030 will require significant investment.

By taking a forward-looking strategic position, we are ensuring that our capital investments in decarbonisation are aligned with strategic decisions, such as fleet renewal. All capital investments align with our commitments and targets, including our target for carbon neutrality by 2030.

Our approach to capital allocation is to target a dividend payout of 50 to 80 per cent of net profit after tax (NPAT). We also intend to allocate 10 per cent of NPAT to fund renewable energy growth through FFI and 10 per cent to other growth opportunities, including within the iron ore business and other commodities.

Linking funding to NPAT provides a sound financial basis for capital allocation and will result in a varying amount made available from year to year. During FY21, Fortescue delivered a US\$10.3 billion NPAT, with an associated allocation to FFI of US\$1,029 million.

## Audit, Risk Management and Sustainability Committee

The Audit, Risk Management and Sustainability Committee (ARMSC) is a Board sub-committee consisting of a minimum of three non-executive directors, in which the Chair is an independent director and independent directors form the majority. The ARMSC is responsible for the oversight of Fortescue's response to climate change and provides advice and guidance at each quarterly Board meeting on:

- Developments within industry and regulatory and market responses to climate change.
- Fortescue's Climate Change Strategy.
- Climate change risk analysis and associated risk mitigation strategies.
- Emissions reduction targets and related metrics.
- All climate change and emissions reporting and related disclosures.
- Results of any audits or reviews related to climate change and emissions reporting.

## Remuneration and People Committee

We are committed to reducing our emissions and relevant measures with stretch targets that are formally incorporated into our Executive and Senior Staff Incentive Plan (ESSIP) and Long Term Incentive Plan (LTIP) for our CEO, executives and other senior leaders including those working on our decarbonisation program.

In FY21, the Remuneration and People Committee approved targets intended to drive the delivery of decarbonisation programs and support our industry-leading objective to achieve carbon neutrality by 2030 including:

- The reduction of Scope 1 and Scope 2 operational green house gas (GHG) emissions by at least 3 per cent annually as a pathway to a 26 per cent reduction from existing operations by 2030.
- Completion of the Chichester Solar Gas Hybrid Project and Pilbara Energy Connect (PEC) program.
- Decarbonisation of our mobile fleet and fixed plant.
- The advancement of FFI renewable energy and green hydrogen projects.

Performance against these targets will be reported annually as part of Fortescue's annual reporting suite and we will continue to incorporate carbon emissions targets into our short and long term incentives with measures and targets reviewed annually by the Board.

## Climate Change Committee

At the management level, the Climate Change Committee (CCC) is responsible for monitoring and coordinating our overall response to climate change, ensuring opportunities and risks are proactively managed and considered from a whole of business perspective. The CEO chairs the CCC which comprises executives and technical experts from across the business, including Finance, Environment, Investor Relations, Sustainability, Risk Management, FFI and Strategic Planning.

The CCC met six times in FY21 and provided updates and advice to the ARMSC at its quarterly meetings on a range of issues, including:

- Fortescue's emissions reduction target.
- Implementation of our decarbonisation strategy.
- Capital allocation for decarbonisation projects.
- Development of our offsets strategy and its role in meeting our targets.

## Day-to-day management

The management of climate change extends across the business and incorporates areas including Strategic Planning, Finance, Sustainability, Asset Management, FFI, Environment, Investor Relations and Risk Management.

Fortescue's Sustainability and Corporate Affairs team is responsible for the day-to-day management of climate change matters, including:

- Monitoring developments in global climate change policy and the regulatory landscape.
- Supporting the CCC and the business to implement Fortescue's Climate Change Strategy.
- Participating in climate risk assessments.
- Managing climate change disclosure and contributing to environmental, social and governance (ESG) assessments.

Other key areas across the business include:

- FFI, working to decarbonise our stationary power generation and pursuing renewable, green hydrogen and green ammonia opportunities globally.
- Green Fleet Development, a newly created team focused on researching and developing technical solutions to decarbonise our haul trucks, trains and other heavy mechanical equipment.
- Environment, who monitor and forecast our emissions and manage our use of offsets.
- Investor Relations, who engage with shareholders, financial organisations and ratings agencies over a wide range of issues, including how we are managing climate change risks and opportunities.
- Marketing, who engage with our customers and facilitate low emissions solutions in our products and across our downstream value chain.
- Strategy and Risk Management, who consider our climate scenarios and their implications for our risks and opportunities.



# Climate Change Strategy

06

Fortescue is committed to decarbonisation

Our Climate Change Strategy is based on the following four elements:



## 1 Reducing emissions

Decarbonising our operations to achieve carbon neutrality by 2030.

## 2 Engagement and collaboration

Working with stakeholders across our value chain to support efforts to develop and deploy low carbon solutions.

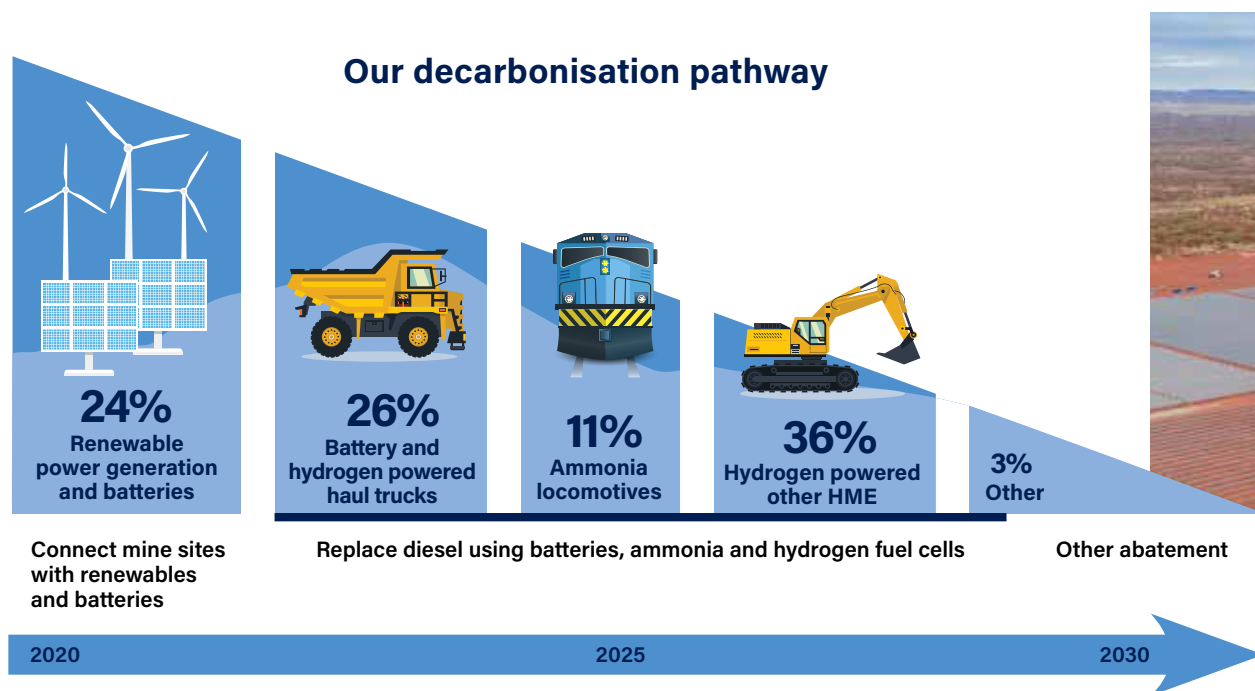
## 3 Maximising opportunities

Pioneering new low carbon solutions and diversifying the commodities we produce.

## 4 Building resilience

Working to ensure the resilience of our operations, assets, value chain and communities.





## Reducing emissions

Our pathway to decarbonisation is focused on addressing our largest sources of emissions: stationary power and our mining fleet.

We are working to replace our fossil fuel power stations with renewable power and finding alternatives to diesel, which currently fuels our mining fleet.

Key elements of our decarbonisation pathway include:

- Significant investment in renewable power generation that is supported by battery storage, to replace existing stationary diesel and gas-fired power generating facilities.
- Building transmission links between our mining operations in the Pilbara to integrate stationary energy facilities and provide a secure and reliable network to which additional renewable generation, storage facilities and electrolyzers can be added.
- Developing and trialling electric battery and green hydrogen powered haul trucks to remove our reliance on diesel fuel.
- Developing and trialling hybrid locomotives that run on green ammonia and battery storage to replace diesel fuels.
- Replacing diesel engines in other heavy mining equipment (HME), such as excavators and diggers, with electric motors and trialling hydrogen fuel cells as their power source.
- Pursuing options to reduce emissions from other sources, which include dewatering, ammonia nitrate and port operations.

Our pathway to carbon neutrality is underpinned by the following risk-based principles:

- Emissions reduction programs should drive our transition to carbon neutrality.
- The mitigation hierarchy to avoid, reduce and offset emissions should be applied to all programs and projects.
- Emissions reduction pathways that mitigate climate change transition risks should be prioritised.
- Our emissions reduction strategy should inform business strategies and provide certainty to investors and other stakeholders that we will continue to thrive in a net zero economy.

**FFI will be key to Fortescue's decarbonisation pathway through technology development and the supply of renewable energy, green hydrogen and green ammonia for our operations**



**We have committed and invested over US\$700 million in renewable energy initiatives**

## Stationary power

Stationary power generation at our mine sites accounts for approximately 24 per cent of our Scope 1 operational emissions, or 497,000 tonnes of CO<sub>2</sub>-e emissions in FY21. Sixty three per cent was generated from diesel and 37 per cent from gas. We will also continue to pursue renewable sources to replace the use of fossil fuels for purchased power.

We have an agreement with Alinta Energy to receive power from the Chichester Solar Gas Hybrid project and have committed investing over US\$700 million in the PEC project, contributing to our transition from powering our sites with diesel. Our confidence in these projects comes from a strong understanding of the risks and costs of renewable energy and battery storage.

Commissioning of the Chichester Solar Gas Hybrid project has commenced with progressive energisation during the second half of 2021. Once operational, the project will provide up to 100 per cent of daytime stationary energy requirements at our Cloudbreak and Christmas Creek mine sites and displace around 100 million litres of diesel annually.

PEC consists of:

- US\$250 million investment for the construction of a 275km high voltage transmission line linking our Solomon Hub, Iron Bridge and Herb Elliott Port.
- US\$450 million investment on 150MW of gas-fired generation, a 150MW solar photovoltaic (PV) array, and large-scale battery storage facilities.

PEC integrates Fortescue's stationary energy facilities in the Pilbara into an efficient, secure and resilient network. It reduces emissions and provides the basis to integrate additional renewable generation necessary to decarbonise our operations.

As of 30 June 2021, around 70 per cent of the transmission link between the Solomon Hub and Iron Bridge has been installed, with completion scheduled in January 2022.







**Our FFI research and testing facility in Perth will become the focal point of innovation and collaboration to accelerate the commercialisation of low emissions solutions**

## Haul trucks

Haul trucks at our mine sites account for approximately 26 per cent of our Scope 1 operational emissions or 537,000 tonnes of CO<sub>2</sub>-e emissions in FY21.

Decarbonising the mining fleet is one of the biggest challenges facing our industry. While electric light vehicles are readily available for the passenger and domestic market, there are currently no large-scale economic or technologically viable vehicles available for our haulage operations.

FFI has established our own research and testing facility in Perth, and this facility will become the focal point of innovation and collaboration to accelerate the commercialisation of low emissions solutions.

We are investigating the main alternatives to diesel, including battery electric and hydrogen fuel cell options, to ensure we capture the opportunities offered by both technologies.

### Electric battery trials

We have partnered with Williams Advanced Engineering (WAE) to design, build and integrate a battery system to power an electric mining haul truck. The bespoke battery electric powertrain will have the ability to generate power as the truck travels downhill.

WAE has begun testing the cells of a battery that will power a 240-tonne prototype haul truck before performance testing at our Pilbara mining operations.

The project also includes the development of a fast-charging unit that will harness renewable energy from PEC.

### Hydrogen powered fuel cells

FFI has also designed and constructed a demonstration green hydrogen powered haul truck, with testing now underway.

The rollout of haul trucks powered on alternative fuels is expected to commence across our operations in the second half of the decade.

While we drive this work, we will continue collaborating with a broad range of stakeholders, including original equipment manufacturers (OEMs) and research organisations such as the CSIRO.

## Rail

Emissions from transporting ore from our mines to our port in Port Hedland via rail accounts for approximately 11 per cent of our Scope 1 operational emissions or 214,000 tonnes in FY21.

This year, we commenced trials on a hybrid train that uses green ammonia and battery storage to take advantage of opportunities to generate power as our locomotives travel downhill. To date, we have successfully combusted fuel that is approximately 20 per cent ammonia, within a locomotive engine, with a pathway to combusting a fuel that exceeds 95 per cent ammonia.

## Other heavy mining equipment

Other heavy mining equipment (HME), including drill rigs and excavators, accounts for approximately 36 per cent of our Scope 1 operational emissions, or 746,000 tonnes of CO<sub>2</sub>-e emissions in FY21.

This year, we commenced trials to replace diesel engines in HME with electric motors that use hydrogen fuel cells as their power source. To date, we have begun testing a green hydrogen powered drill rig, including the important element of ensuring refuelling can occur in the mine pit.

This work will draw on learnings from our A\$32 million investment in a renewable hydrogen refuelling facility and deployment of fuel cell passenger coaches at Christmas Creek.

**We have successfully combusted fuel that is approximately 20 per cent ammonia, within a locomotive engine**

## CASE STUDY

## Fortescue advances hydrogen technology at Christmas Creek

Fortescue will replace its existing fleet of diesel coaches at our Christmas Creek operations with 10 hydrogen-powered coaches, as a first step towards decarbonising our mobile fleet.

This A\$32 million project includes:

- Commissioning HYZON Motors to custom build 10 full sized coaches.
- Installing a refuelling station that will harness renewable electricity from the Chichester Solar Gas Hybrid project to generate renewable hydrogen onsite.

This project will receive A\$2 million from the Western Australian Government's Renewable Hydrogen Fund to assist with its development.

This project builds on our partnership with ATCO Australia to build and operate the first combined hydrogen production



and refuelling facility in Western Australia, located at ATCO's Jandakot Operations Centre.

The renewable hydrogen supply will be produced on site through an electrolyser using electricity supplied by the 60MW Chichester Solar Gas Hybrid project. The facilities are expected to be completed by early 2022.

## Carbon pricing

We use shadow carbon pricing to assign a monetary value to emissions under a range of scenarios in the evaluation of projects and throughout the investment decision making process. This process provides insights into the climate-related risks and opportunities and incentivises projects which use low or negative emission technologies.

Our current shadow carbon prices fall within the range of A\$25 to A\$80. We will continue to review the appropriateness of our carbon price ranges and update as required, taking into account changing external policy and regulatory environments.

## Carbon Offsets Strategy

Fortescue follows the mitigation hierarchy to avoid and reduce emissions before using offsets. We will only use offsets to abate residual emissions where economically viable decarbonisation opportunities and technologies are unavailable at the scale or within the timeframes required to reduce operational emissions in line with our targets.

To manage the risks of offsets sourcing, the CCC has developed principles that:

- Ensure our offsetting activities effectively manage reputational risks and prioritises decarbonisation that is consistent with the objectives of the Paris Agreement.
- Prioritise high quality offset options with co-benefits that create additional value for us, as well as local stakeholders.

- Ensure a risk-based appraisal and consider sourcing offsets from both public and private markets.
- Align with the Code of Best Practice developed by the International Carbon Reduction and Offset Alliance (ICROA).

Fortescue was founded on the belief that communities should benefit from our success, and we will give preference to offsets that provide biodiversity, social and economic benefits to the communities where we operate.

We will adhere to the following offset selection criteria to ensure only offsets that meet a high standard are sourced:

- Real: result in a net reduction of emissions.
- Measurable: result in measurable reductions, supported by evidence.
- Permanent: result in a permanent reduction in emissions.
- Additional: would not have happened in the absence of the revenue associated with the transaction of carbon credits.
- Independently verified: verified by an independent third-party auditor using best practice standards and methodologies.
- Unique: only counted once and not claimed by another entity.
- Current: to the extent possible, abatement occurs within the same period that emissions were generated.

The CCC is also evaluating opportunities to directly invest in offset generation projects that can contribute towards our emission reduction objectives.

## CASE STUDY

## FFI delivers on ambitious targets



### FFI achieved its 30 June 2021 decarbonisation targets.

FFI CEO, Julie Shuttleworth AM said, "We set out to test the hypothesis that there was sufficient 100 per cent renewable green energy, hydrogen, ammonia and industrial manufacturing potential, for products such as green fertiliser, green iron and steel, to fully satisfy the world's needs. To do so, Fortescue Chairman, Dr Andrew Forrest AO, led two significant overseas expeditions alongside 50 area experts, spending more time on the road than at home in the last 12 months. As a result, the Company has confirmed that hypothesis."

FFI's specialist teams have made groundbreaking progress including:

- Successful combustion of ammonia in a locomotive fuel, with a pathway to achieve completely renewable green fuel.

- Completion of design and construction of a combustion testing device for large marine (ship) engines, with pilot test work underway and a pathway to achieve completely renewable green shipping fuel.
- Finalised design of a next generation ore carrier (ship) that will consume renewable green ammonia, with the Classification Society giving in principle design approval.
- Testing of battery cells to be used on Fortescue haul trucks.
- Design and construction of a hydrogen powered haul truck for technology demonstration complete, with systems testing underway.
- Design and construction of a hydrogen powered drill rig for technology demonstration complete, with systems testing underway.
- Successful production of high purity (>97 per cent) green iron from Fortescue ores.
- Successful initial trialling to use waste from the green iron process noted above, with other easily sourced materials.

Fortescue CEO Elizabeth Gaines said, "We are leading the heavy industry battle against global warming, transitioning from being a major fossil fuel importer to a significant green and renewable energy and product exporter. We are leading by example to decrease emissions across our operations, using our large industrial platform of operating mine sites in the Pilbara to trial and demonstrate technologies in completely renewable green hydrogen, green ammonia, and green electricity."

## Engagement and collaboration

Stakeholder engagement is at the heart of our approach to building trust and understanding, acting with integrity, generating ideas and delivering long-term benefits and outcomes.

Engagement with stakeholders, including investors, regulators, customers and industry, is a critical component of our Climate Change Strategy. This report forms an important component of our engagement by providing an update on our work and reporting performance against our voluntary emission reduction targets.

Throughout the year, we communicate with stakeholders through a range of mechanisms including at our Annual General Meeting (AGM) and via media statements, company publications, conferences, investor briefings and our website.

## Customers

We are a core supplier of iron ore to customers in China and other markets including Japan and South Korea. As the iron and steel manufacturing process generates significant emissions, we are engaging with our customers to support emissions reduction initiatives, which fall within their Scope 1 and 2, and our Scope 3 emissions. This includes collaborating to improve existing processes that reduce emissions over the short to medium-term and enhancing processes to reduce emissions over the medium to long-term.

Ambitious emission reductions in our direct operations will also allow us to offer lower emissions iron ore products, enabling both Fortescue and our supply chain partners to build competitive advantages.



### Improving existing processes

We are working with our customers to reduce emissions from iron and steel making by improving the sintering process used to prepare our iron, together with developing our Iron Bridge Magnetite project from which we can produce a higher iron content magnetite concentrate.

### Deep-bed sintering

Sintering describes the use of high temperatures to fuse a blend of iron ore fines and fluxes into a solid mass before it can be introduced into a blast furnace as part of the steel manufacturing process.

Following the introduction of the Chinese 'Blue Sky' policy, the Chinese steel industry is increasingly adopting deep-bed sintering techniques in which the height of sinter beds is increased from 750mm to up to 1,000mm. This technique can increase sinter productivity with no or minimal additional fuel consumption, thereby lowering overall sinter emissions intensity.

The crushing and screening of Fortescue's iron ore fines creates sizing and texture characteristics that are well suited to deep-bed sintering.

We are undertaking collaborative research with major Chinese steelmakers to quantify the benefits of our ore in their deep-bed sintering process. We will share the results of our research with other customers to enable them to increase their efficiencies and further reduce emissions.

### Magnetite concentrate product

Once operational, the Iron Bridge Magnetite project will deliver a magnetite concentrate product that has beneficial properties when used in sintering and pelletising.

Magnetite sintering is exothermic and provides thermal heat that is beneficial in the sinter and pellet manufacturing processes, reducing fuel consumption by five to 10 per cent, which lowers emissions intensity. The higher iron grade of magnetite concentrate also increases productivity, reducing emissions further in the iron and steel making process.

To produce the magnetite concentrate, we have invested in energy efficient process design and equipment, including a dry grinding circuit, to reduce our power consumption by approximately 30 per cent in comparison to conventional magnetite processing.

The magnetite concentrate has lower emissions when used in the steel making process.

### Enhancing processes

Through FFI, we are working to develop and commercialise new zero emissions processes to extract iron from iron ore using:

- Green hydrogen to produce heat and liberate oxygen from the iron oxide.
- Renewable electricity to liberate oxygen from the iron oxide.

To date, we have successfully produced high purity green iron at greater than 97 per cent, from Fortescue ores in a research environment.

These options produce green iron that can be processed into green steel by using renewable electricity in electric arc furnaces.

FFI's mission is to accelerate the decarbonisation of this hard-to-abate sector through the global supply of green electricity and green hydrogen in the iron and steel making process.

### Suppliers

Fortescue has a long history of developing and building strong relationships across our supply chain. We are engaging and collaborating with suppliers to develop low emissions stationary energy and mobility solutions, including the solar-gas Power Purchase Agreement (PPA) with Alinta Energy and our work with OEMs.

We intend to improve our understanding of the implications and the options for addressing climate-related issues across our supply chains and will:

- Explore options for reducing upstream emissions, such as introducing carbon-related criteria within our procurement processes.
- Ensure our supply chains remain resilient in the event of increased physical impacts of climate change, including heavy and prolonged rainfall events which can lead to the disruption of deliveries.

### Governments

We have established longstanding and positive relationships with Australian State and Commonwealth Government agencies and support the development of policy frameworks that incentivise innovation and technology development. During FY21, our Australian policy focus expanded to support the development of a local commercial-scale green hydrogen industry.

A significant amount of engagement with governments over the past 12 months has been outside Australia, as FFI negotiated opportunities to develop a range of renewable energy projects across multiple jurisdictions. More information is provided on page 11.

### Investors

We engage regularly with the investment community through quarterly briefings, our AGM, our annual reports, media statements and presentations.

Investor interest in climate change continues to grow, with particular interest during FY21 on our revised target for carbon neutrality and FFI projects.

We value opportunities to better understand the interests and concerns of our investors and are committed to ongoing engagement.

### Industry associations

Membership of a number of industry groups and associations enables us to contribute towards a coordinated approach in the development of effective policy frameworks. This engagement also facilitates the sharing of best practice and allows us to access information and gain insights on material issues including climate change.

We consider our memberships annually to ensure they continue to provide benefits and align with our Values and objectives, including our commitment to the Paris Agreement goal of limiting global temperature rise to well below 2°C above pre-industrial levels.

### During FY21, we participated in the following industry groups and associations:

Association	Purpose
Association of Mining and Exploration Companies (AMEC)	Supports increased exploration, discovery and mining opportunities in Australia.
Australia Indonesia Business Council (AIBC)	Promotes trade and investment between Australia and Indonesia.
Australia China Business Council (ACBC)	Encourages Australia-China trade and investment.
Australian Hydrogen Council (AHC)	Supports the development of the hydrogen industry.
Australian Institute of Management (AIM)	Provides innovative and industry-focused education.
Australia-Latin America Business Council (ALABC)	Encourages Australia-Latin America trade and investment.
Australian Resources and Energy Group (AMMA)	Assists with commercial and operational issues within the resource and energy sector.
Bell Bay Advanced Manufacturing Zone (BBAMZ)	Supports growth, investment and business diversification in northern Tasmania.
Business Council of Australia (BCA)	Supports sustainable economic growth and advocates for policy settings that are in the national interest.
Chamber of Commerce and Industry of Western Australia (CCIWA)	Provides advice and advocates for business on local and national policy frameworks.
Chamber of Minerals and Energy Western Australia (CME)	Contributes to policy development relevant to the mining sector, promotes the value of the sector to the community and facilitates collaboration in Western Australia.
Clean Energy Council (CEC)	Advocates the acceleration of Australia's clean energy transition.
Committee for Economic Development of Australia (CEDA)	Supports a dynamic economy, provision of world class essential services, economic and social participation and opportunity.
Committee for Perth	Champions Perth's growth and development.
Corporate Tax Association (CTA)	Advocates for an internationally competitive and robust corporate tax system where large corporates meet their tax obligations in a timely and transparent manner.
DomGas Alliance	Seeks to ensure a reliable, affordable and diverse supply of natural gas for industry and households in Western Australia.
Green Hydrogen Organisation (GH <sub>2</sub> O)	Promotes the sustainable production and use of green hydrogen.
Hydrogen Council	Supports the role of hydrogen in fostering the clean energy transition for a better, more resilient future.
International Hydropower Association (IHA)	Seeks to advance sustainable hydropower by building and sharing knowledge.
Launceston Chamber of Commerce (LCC)	Advocates on behalf of members within Launceston and northern Tasmania.

## Industry groups and associations continued

Association	Purpose
New South Wales Minerals Council	Advocates and supports mining in NSW (Membership terminated, effective 30 June 2021).
New Zealand Hydrogen Council	Supports the development and uptake of low emissions hydrogen in New Zealand.
Port Hedland Industries Council (PHIC)	Provides a forum for information sharing to minimise the impacts of industry on the Port Hedland community.
South Australian Chamber of Mines and Energy (SACOME)	Contributes to policy development relevant to the mining sector, promotes the value of the sector to the community, and facilitates collaboration in South Australia.
Supply Nation	Supports the development of policies that encourage spend with the Indigenous business sector.
Sustainable Markets Initiative (SMI) - Hydrogen Taskforce	Seeks to drive demand for and supply of clean hydrogen through company and sectoral public commitments coupled with practical, demonstrable projects.
Tasmanian Minerals, Manufacturing and Energy Council (TMEC)	Promotes the development of sustainable exploration, mining, industrial processing and manufacturing sectors within Tasmania.

## Research organisations

We are actively developing for commercialisation the technologies required to decarbonise our operations, create green hydrogen and green ammonia, and apply these solutions across hard-to-abate sectors such as shipping and iron and steel production. Given the considerable challenge in achieving these goals, we have initiated a host of partnerships with the following associations and consortiums to accelerate this work.

Organisation	Description
Australian Industry Energy Transitions Initiative	Seeks to accelerate net zero emission supply chains by 2050, focusing on: steel, aluminium, LNG, other metals and chemicals.
Clean Fuel Ammonia Association (CFAA)	Seeks to build a value chain for CO <sub>2</sub> -free ammonia.
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia's national science agency and innovation catalyst, currently partnering with Fortescue to develop metal membrane technology.
Global Liquid Hydrogen (LH <sub>2</sub> ) Consortium	A Fortescue, Kawasaki Heavy Industries and Iwatani Corporation consortium developing a business model to supply liquid hydrogen into Japan.
Green Hydrogen Consortium	Supports the use of green hydrogen to accelerate decarbonisation by connecting 'hydrogen producers' with "hydrogen users".
Heavy Industry Low carbon Transition (HILT) CRC	Aims to overcome the barriers to the low-carbon transition in hard-to-abate sectors: iron and steel, alumina, and cement and lime.
National Hydrogen Strategy Taskforce	Oversees implementation of the National Hydrogen Strategy that seeks to build a clean, innovative and competitive hydrogen industry so that Australia is a major global player by 2030.
United Nations Global Compact	Provides support and guidance to corporations on responsible and sustainable business practices.
Western Australian Renewable Hydrogen Council	Provides strategic advice on the development of the renewable hydrogen industry.



## Maximising opportunities

We are working to maximise the opportunities presented by a low carbon future.

Our approach to accelerating the market for low carbon solutions is to create both demand and supply. For example we are designing new ammonia powered cargo vessels that can operate using the green ammonia we will produce. This creates the opportunity to expedite decarbonising of global shipping and reduce emissions beyond our own value chain.

In addition to diversifying our business through supplying green hydrogen, we are also looking to produce other commodities essential to transitioning to a post carbon world.

### Ammonia fuelled cargo vessels

In FY21, the shipping of our products from the Pilbara in Western Australia to our customers around the world accounted for approximately 3.48 million tonnes of CO<sub>2</sub>-e emissions. These emissions are classified as Scope 3 emissions and are generated through the burning of diesel fuels.

The International Maritime Organisation (IMO) is responsible for developing regulations applicable to the shipping industry and has adopted a strategy to reduce GHG emissions consistent with the Paris Agreement. The IMO GHG Strategy envisages the reduction of carbon intensity across international shipping from 2008 levels by at least 40 per cent by 2030 and is pursuing efforts towards a 70 per cent reduction by 2050.

We support the IMO targets and are working closely with our shipping partners and industry participants to develop and implement strategies that will deliver on these targets. We will also continue to engage with industry to support the Australian Government's representation on the IMO Marine Environment Protection Committee.

Our fleet of eight ore carriers represented approximately 11 per cent of our shipping requirements in FY21. These ore carriers are highly efficient and require less fuel per

tonne of cargo shipped than other ships commonly used in the industry.

We are currently working with our partners to develop a new ship design that is more efficient and is powered by green ammonia. To date, we have:

- Completed the design and construction of a combustion testing device for large marine engines.
- Commenced laboratory-scale testing of marine engines using ammonia.
- Finalised the design for a next generation ore carrier that will consume green ammonia, with 'approval in principle' received from the Classification Society.

We are focused on developing vessels that consume green ammonia rather than liquified natural gas.

### Diversification of commodities

Our diversification strategy targets commodities that support decarbonisation. This includes mineral commodities (e.g. copper, lithium and cobalt), renewable energy sources (e.g. wind, solar, hydro and geothermal applications) and green industry. Our growing capability within FFI positions us to lead the transition away from fossil fuels.

Activities undertaken to deliver on this strategy include global exploration programs and business development options through joint venture arrangements or acquisitions. We are assessing a global portfolio of renewable energy and green industry opportunities. Our Tasmania project is targeting an investment decision in 2021 to develop a large-scale 250MW green hydrogen plant.

Exploration remains a core component of our diversification agenda. Currently, we are undertaking prospective copper, gold and lithium exploration in Western Australia, New South Wales, South Australia, Ecuador, Argentina and Kazakhstan as well as preliminary exploration activities on tenements that are in application in Colombia, Peru, Chile, Brazil and Portugal. We hold a significant equity interest in TSX listed Candente Copper Corporation that enables us to consider and evaluate options to jointly advance the Cañariaco copper project in Peru.

## CASE STUDY

### Green Hydrogen Plant – Bell Bay, Tasmania

FFI is studying the development of a multi-phase green hydrogen hub in Bell Bay, Tasmania, and has signed an Option Agreement with Tasmanian Ports Corporation to exclusively negotiate all land and operating access requirements for the proposed project.

Phase one of the world-leading project envisages:

- Construction of a green hydrogen plant at the Bell Bay Industrial Precinct.
- Green ammonia production of 250,000 tonnes per year for domestic use and international export.

- Powered entirely by Tasmanian renewable energy.

FFI is working to maximise employment, training and business outcomes for Tasmania from the project.

We believe this project will be a vital step in positioning Australia at the forefront of a bulk export market for green hydrogen.

This project is targeted for an investment decision by Fortescue's Board in 2021.

## Building resilience

Climate change has the potential to impact our entire value chain including our operations, assets and the communities in which we operate. Building resilience in our business strategy requires us to contemplate the effect of potential changes in climatic conditions and demand for our products.

### Transitional risks

As we shift to a low carbon world, transitional risks will emerge that can impact and change investment and consumption patterns. Under these conditions some business models will cease to be viable, new business opportunities will be created and businesses will be re-valued to reflect with their competitive advantage in a low carbon world.

### Physical risks

Physical impacts from climate change are inevitable. The rate and extent of change will depend on global decarbonisation efforts. Even the most optimistic outlook still predicts rising temperatures, changing rainfall patterns and an increased frequency of extreme weather events.

To improve our understanding of how the risks and opportunities of climate change may impact the resilience of our business, we developed three distinct future scenarios that cover a range of transitional and physical impacts.

Political, economic, social and technological developments of the past 12 to 18 months were considered in the FY21 refresh of our climate scenarios, including:

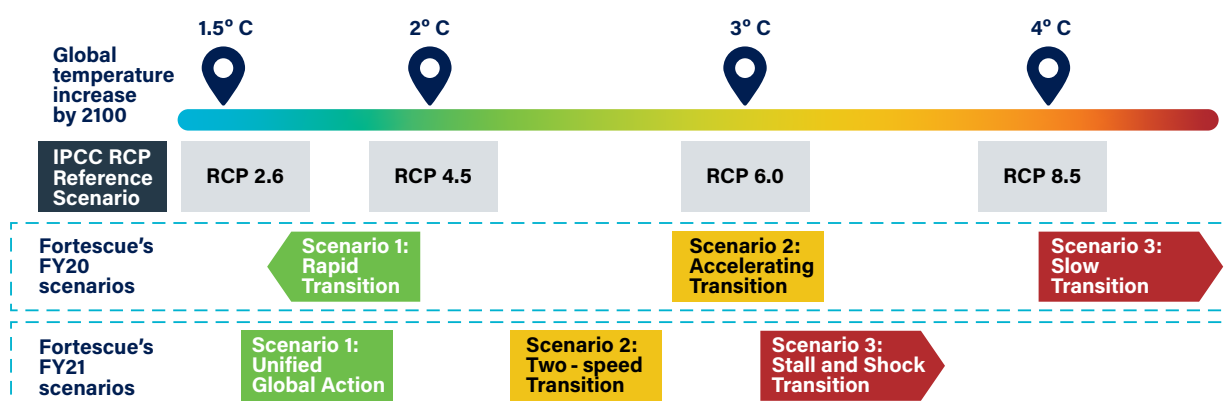
- An increase in global ambition to reduce emissions with evolving global climate policy and regulations.
- An increase in the uptake of low emissions solutions, such as renewable energy generation.
- An increase in extreme weather events.
- Increased stakeholder pressure for action on climate change.
- COVID-19 stimulus measures which support low emissions initiatives.

### Scenario update

Our refreshed scenarios are summarised below:

- **Unified Global Action**  
Coordinated global policy and behaviour shifts investment and consumption patterns, resulting in rapid decarbonisation. Global action limits the average global temperature increase to 1.5°C to 2°C by 2100.
- **Two-speed Transition**  
'Greener' leading countries move quickly towards decarbonisation while 'lagging' countries decarbonise when it becomes economical. This results in an average global temperature increase of 2°C to 3°C by 2100.
- **Stall and Shock Transition**  
Following a period of ineffective climate policy and slow decarbonisation, a climate shock results in a significant global economic contraction. The average global temperature rises to above 3°C by 2100.

## A comparison of Fortescue's previous and revised climate scenarios



The temperature outcomes in the Unified Global Action scenario are consistent with the TCFD recommendation to consider a scenario that targets a rise in temperature of no greater than 2°C.

At the time of drafting this document, the IPCC AR6 report on the physical science had not been released.

## Unified Global Action scenario (1.5°C to 2°C)

Under this scenario, coordinated global emissions reduction policy and stakeholder activism shifts investment and consumption patterns beyond the decarbonisation of electricity to the deployment of low carbon solutions in hard-to-abate sectors, including heavy transport, shipping and steel production.

Following a short period of global economic instability, there is strong demand for the commodities required to support low emission and negative emission technologies. Government policy, incentives and private sector investment drive a hydrogen and electrification revolution.

Investors demand a greater focus on the reduction of Scope 3 emissions. The decarbonisation of steel-making is led by an increase in the use of recycled steel scrap and increased investment in hydrogen-based green-steel technology and carbon capture, use and storage (CCUS).

Strong climate action results in significant transitional impacts. Those that are slow to respond are most impacted. High-emission businesses without clear adaptive strategies lose their licence to operate and find it increasingly difficult to secure capital.

The more severe physical impacts, and related economic and social disruptions, are likely averted.

### Implications for Fortescue

Fortescue's business model prospers in the Unified Global Action scenario.

#### Demand for iron ore

- Demand for iron ore remains stable with higher market prices achieved for ore that yields lower CO<sub>2</sub> emissions, including magnetite from Fortescue's Iron Bridge mine site.
- Effective blending and beneficiation increase processing costs but these costs are recouped through higher market prices.
- Fortescue is shielded from the transitional risks of policy changes that limit emissions and increase costs by its aggressive target and decarbonisation strategy.

#### Demand for green hydrogen

- Demand for green hydrogen and green ammonia grows significantly.

#### Demand for transitional commodities

- Demand for commodities needed in a low carbon world, such as lithium, copper, nickel and cobalt, increases significantly.

#### Assets and access to capital

- Any physical impacts of climate change are minimised through appropriately designed and constructed assets.
- Funding markets for decarbonisation and 'green' growth projects become more liquid and lower cost.

## Two-speed Transition scenario (2°C to 3°C)

Under this scenario, global climate action occurs at two different speeds:

- 'Greener' leading countries move quickly to decarbonise and compete for dominance in low emissions technology.
- 'Lagging' countries transition passively and decarbonise only when it becomes economical.

Diverging levels of climate action lead to both transitional and physical climate impacts. Organisations that decarbonise early and offer low carbon products and services enhance their resilience to transitional risks.

There is a weakened economic outlook with emerging demand for commodities required to support low emissions and negative emission technologies. Greener, leading countries form distinct trading blocs based on climate policy.

Despite an increase in significant climate-related physical impacts, there is no coordinated, aggressive global action to reduce emissions.

### Implications for Fortescue

Fortescue's business model remains robust in the Two-speed Transition scenario.

#### Demand for iron ore

- Demand for iron ore in greener countries remains stable, with increased demand in lagging countries.
- Greener countries pay a higher market price for ore that yields lower CO<sub>2</sub> emissions.
- Fortescue is shielded from the transitional risks of emissions reduction policy changes increased production costs by its aggressive target and decarbonisation strategy.

#### Demand for green hydrogen

- Demand for green hydrogen increases in greener countries.
- The cost to develop and deploy low carbon technologies decreases slowly, limiting large-scale global implementation.

#### Demand for transitional commodities

- Demand for commodities needed in a low carbon world, such as lithium, copper, nickel and cobalt, increases in greener countries.

#### Assets and access to capital

- Investors divest from high emission iron ore producers, those that are not addressing Scope 3 emissions, and the cost of capital increases for those that do not decarbonise.
- The physical impacts of climate change, including increased intense rainfall events, water shortages and increased temperatures, increase the risks to assets and production rates. Additional expenditure is required to minimise impacts.
- Funding markets for decarbonisation and 'green' growth projects become more liquid and lower cost.



## Stall and Shock Transition scenario (>3°C)

Continued global economic growth, ineffectual climate policy and limited decarbonisation lead to significant increases in emissions. There is minimal investment in low carbon technology and innovation is limited.

The frequency and severity of physical impacts increase and irreversible tipping points are exceeded. A climate shock eventuates in the late 2020s to early 2030s, which sees a significant global economic contraction and prompts sudden, disruptive and costly climate action. This imposes uncertain and challenging conditions across the world.

Pre-shock there is minimal change to access to capital. Post-shock, access to capital becomes more difficult and capital comes at a premium. Investment in commercialising proven technology, such as CCUS, becomes more cost effective due to strong policy action. Investors demand a greater focus on the reduction of Scope 3 emissions.

Once tipping points are exceeded, the physical impacts of climate change are significant, resulting in additional social and economic disruptions.

### Implications for Fortescue

This scenario represents the greatest challenge to Fortescue and the global community.

#### Demand for iron ore

- **Pre-shock**
  - The demand for steel and iron ore increases with global economic growth. There is no significant advantage to producing lower emissions products or green steel.
  - With no material changes to emissions reduction policy, the cost of production remains steady.
- **Post-shock**
  - The demand for higher grade iron ore products and green steel increases rapidly. Additional beneficiation of iron ore is required to meet demand, which increases production costs.

- As a result of early decarbonisation, Fortescue does not experience significant increases to the cost of production.
- Fortescue is shielded from significant post-shock transitional risks by its aggressive target and decarbonisation strategy.

#### Demand for green hydrogen

- **Pre-shock**
  - Investment and innovation in decarbonisation solutions for hard-to-abate sectors are low. The cost to develop and deploy low carbon technologies remains high, slowing large-scale implementation.
  - With limited global climate action, demand for green hydrogen and green ammonia is low, and initial investment in FFI projects is constrained by factors such as access to capital and diminished returns on investment.
- **Post-shock**
  - Demand for green hydrogen and green ammonia increases significantly.

#### Demand for transitional commodities

- Demand for commodities needed in a low carbon world, such as lithium, copper, nickel and cobalt, only increase post-shock.

#### Assets and access to capital

- **Pre-shock**
  - The physical impacts of climate change, including extreme weather events, increase and additional expenditure is required to minimise impacts to assets and production.
- **Post-shock**
  - Investors divest from high emission iron ore producers, those that are not addressing Scope 3 emissions, and the cost of capital increases for those that do not decarbonise.
  - Funding markets for decarbonisation and 'green' growth projects become liquid and very low cost.
  - Operations are impacted by the physical impacts of climate change including intense rainfall events, water shortages and increased temperatures.
  - Extreme physical impacts cause disruptions to upstream and downstream value chains.

# Risks and opportunities

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**Fortescue acknowledges that risk is inherent in its business and that the effective management of risk and opportunity is essential to success and future growth**

To ensure a consistent approach to the recognition, measurement and evaluation of risks, we apply a company-wide approach to risk management through the Fortescue Risk Management Framework (FRMF). This framework is applied to all activities over which we have operational control, including the evaluation of climate change risks and opportunities.

Our approach to risk management is underpinned by the view that management, employees and contractors are collectively responsible for managing all material business risks and there is a clear understanding of responsibility and accountability.

Critical elements of the FRMF include:

- Embedding risk management into critical business activities, processes and decisions.
- Understanding the threats and opportunities to achieve our objectives.
- Applying a structured approach to risk management.
- Using outcomes of risk assessments to drive actions that mitigate risks consistent with Fortescue's risk appetite.
- Maintaining a strong focus on the resilience of our business through a reliance on effective recovery plans for material adverse events.
- Reporting regularly to the Executive team, ARMSC and the Board on the outcomes of risk management activity.

Fortescue's CEO is accountable to the Board of Directors for ensuring risk is appropriately managed, including those related to climate change.

Fortescue has a dedicated Risk Management team who coordinate and manage the assessment and reporting of risks across the company.

Our FRMF is aligned to ISO 31000:2018 as outlined below:

- **Risk identification:** The Risk and Assurance team engages with relevant stakeholders across the organisation to update and provide clarity around developments in known and emerging risks across the business' value chain over a short, medium and long-term horizon.
- **Risk assessment:** Each risk is analysed against criteria for consequence and likelihood.
- **Respond:** Options for managing each risk include accepting the risk, avoiding the risk, transferring the risk or mitigating the risk. When reviewing controls for mitigating risks, their effectiveness is evaluated in the light of Fortescue's risk appetite.
- **Monitor:** Progress in managing High and Extreme risks is reported to the ARMSC and the Board, which meet quarterly. Fortescue's CEO chairs the CCC, which meets at least six times each year and reviews progress on managing climate-related risks.

We understand that climate change presents both risks and opportunities to our business and we undertook a climate change focused risk assessment in FY21, the outcomes of which are summarised on pages 29 and 30.

FFI is currently exploring options to pursue renewable and green hydrogen projects in over 50 countries. Part of the evaluation over whether to proceed with these projects will include an assessment of the climate risks within the relevant host country and how they may impact our operations, the supply chain and the local community.

## Transitional climate risks

Transitional risks refer to those associated with transitioning to a low carbon economy, which may be due to changes in policies, technologies and markets, and can impact reputation. These have potential implications for costs, business model, supply chain, asset values and ability to raise capital.

In FY21, we significantly increased our commitment to take action on climate change. Taking leadership in addressing climate change gives us a first mover advantage in a world transitioning from fossil to green energy, minimising our transitional risks.

Risk	Risk detail	Mitigation and opportunities
<b>Policy and regulatory changes</b>	<p>Policy and regulatory changes, including those that cap emissions, may increase operational costs.</p> <p>Policy and regulatory changes are expected to continue to evolve.</p>	<p>We are focused on reducing our emissions. Our voluntary target to achieve carbon neutrality by 2030 is expected to exceed any future policy and regulatory requirements within Australia.</p> <p>We will continue to work with industry bodies, peers, governments and communities to ensure an effective regulatory framework.</p>
<b>Technical viability of decarbonisation strategy</b>	<p>Technical challenges may impact our ability to decarbonise and meet our target to achieve carbon neutrality by 2030.</p>	<p>We have already committed to investing over US\$700 million in renewable energy to power our operations and continue to pursue opportunities for further integration of renewable energy.</p> <p>We have made significant investments to research and develop technical solutions to decarbonise our haul trucks, trains and other heavy mechanical equipment.</p> <p>Much of this work is being undertaken in partnership with key suppliers and industry experts including CSIRO and our OEMs, to ensure optimum outcomes.</p> <p>Our use of offsets will be consistent with the mitigation hierarchy to avoid, reduce and offset emissions. Offsetting will only be used to abate residual emissions where economically viable decarbonisation opportunities and technologies are unavailable.</p>
<b>Reduced demand for products</b>	<p>Demand for our products may change if market demand shifts, for example, as a result of the introduction of regulations directly impacting the steel manufacturing sector in China.</p>	<p>We will continue to engage with customers and pursue opportunities to reduce emissions from steel mills.</p> <p>As emissions reduction frameworks evolve, we will ensure the environmental performance of our products exceeds or equals that of higher iron content ore products.</p> <p>We continue to assess diversification opportunities for those commodities where demand is expected to increase in a low carbon world including undertaking low cost, early stage exploration and evaluation of commodities such as copper and lithium.</p> <p>We are also pursuing diversification options and becoming a global supplier of green hydrogen/ammonia.</p>
<b>Reputation damage</b>	<p>We may experience reputational damage if stakeholders view our action on climate change as inadequate.</p> <p>This may impact our social licence to operate, product demand and financing/ investment opportunities.</p>	<p>We have set an ambitious emissions reduction target and are implementing an aggressive decarbonisation strategy.</p> <p>We have created FFI, to become a global supplier of renewable energy and green hydrogen to assist in decarbonising hard-to-abate sectors.</p> <p>We support the Paris Agreement and work to maintain open relationships with our stakeholders. We have voluntarily aligned our climate change reporting with Task Force on Climate-related Financial Disclosures (TCFD) recommendations since 2018.</p>



## Physical climate risks

The TCFD distinguishes between acute and chronic physical impacts of climate change.

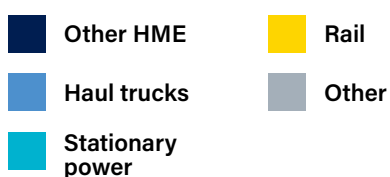
Risk	Risk detail	Mitigation and opportunities
<b>Acute physical risks</b>		
<b>Increased severity of extreme weather events</b>	<p>Increased severity of cyclones and flooding may cause material damage to assets, leading to operational disruptions, impacts to production rates and increased costs associated with asset repair.</p> <p>This risk may also impact our value chain over the long-term.</p>	<p>Fortescue's Climate Change Strategy focuses on building resilience into its operations to protect assets and minimise operational downtime from extreme weather events.</p> <p>We have constructed our port, rail and mine infrastructure to meet the highest specifications, accounting for the future risk of extreme weather events.</p> <p>All new projects assess and develop management and mitigation mechanisms to address the potential physical impacts of climate change.</p> <p>We will continue to work with the Pilbara Ports Authority and other operators to minimise impacts to ship movements during extreme weather events.</p> <p>We conduct annual risk assessments that consider the future physical impacts of climate change.</p>
<b>Increased frequency and intensity of bushfires</b>	<p>Temperature increases may increase the severity/frequency of bushfires which have the potential to cause material damage and/or production delays to our mining and rail operations.</p>	<p>We are focused on building resilience into our operations to ensure assets are protected and operational downtime from bushfires is minimised.</p> <p>We implement a Bushfire Risk Management program across all our sites, which focuses on the protection of people and key assets/infrastructure.</p> <p>The program incorporates the use of prescribed burning to reduce fuel loads and minimise the frequency, intensity and duration of bushfires.</p> <p>Engagement with Traditional Custodians is an important component of our Bushfire Risk Management program.</p>
<b>Chronic physical risks</b>		
<b>Rising sea levels and storm surge inundation</b>	<p>Global sea level rises coupled with storm surges have the potential to cause material damage to port infrastructure through inundation. Sea levels may rise due to expanding ocean volumes from temperature increases and from melting glaciers and ice sheets.</p> <p>There are a range of projections around sea level rises depending on various emissions scenarios. These range from 0.3m to 2.5m by 2100. (NOAA Climate.gov)</p>	<p>Our Climate Change Strategy focuses on building resilience into our operations to protect assets and minimise operational downtime.</p> <p>Our port infrastructure has been constructed to meet the highest specifications, accounting for the risk of extreme weather events and rising sea levels. All new projects assess and develop management and mitigation mechanisms to address the potential physical impacts of climate change.</p> <p>Our port infrastructure has been designed to an Australian Height Datum (AHD) of 6.8m. This takes into account current independent modelling on storm surge levels and potential sea level rises.</p>
<b>Changes in precipitation patterns</b>	<p>The potential for prolonged drought events or changes to precipitation patterns in the Pilbara may place increasing stress on the availability of water resources to the business. This may delay approvals and lead to more stringent controls.</p>	<p>Our Water Strategy is focused on reducing water usage across our operations. This includes adopting technological solutions and using metrics and internal performance standards to proactively manage water scarcity risks.</p> <p>Prolonged droughts will place additional stress on mine water supplies and may increase the risk of non-compliance with environmental approvals.</p>

# FY21 emissions profile

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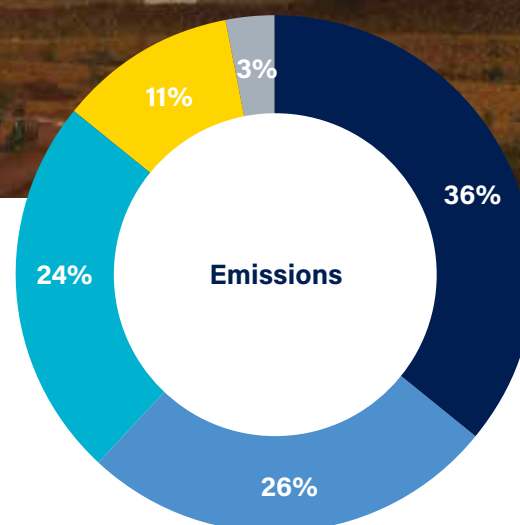
## Scope 1, Scope 2 and Scope 3 emissions

### Sources of FY21 Scope 1 emissions



### Scope 1 and Scope 2 emissions

Our FY21 Scope 1 emissions were 2.06 million tonnes of CO<sub>2</sub>-e, and our Scope 2 emissions from electricity purchases were 0.16 million tonnes of CO<sub>2</sub>-e, yielding gross emissions from our operations of 2.22 million tonnes of CO<sub>2</sub>-e. This represents a seven per cent rise in emissions from FY20, primarily due to expanding operations, including those at Eliwana, construction at Iron Bridge and increased haulage distances due to the long and shallow nature of Fortescue's ore body at the Chichester and Solomon hubs.



In line with our commitment to reduce emissions annually from our FY20 baseline, we have procured and surrendered high quality offsets to reduce our net emissions to 2.01 million tonnes, which is three per cent below our FY20 operational emissions baseline.

In FY21, 62 per cent of our Scope 1 emissions were generated from our haul trucks and other HME mining fleet and 24 per cent from stationary power. This highlights the importance of replacing the diesel used in power generation with renewable energy generation facilities and removing our reliance on diesel to fuel our haul trucks.

	FY21	FY20	FY19	FY18
<b>Greenhouse gas emissions<sup>1</sup></b>				
Total net Scope 1 and 2 emissions (million tonnes CO <sub>2</sub> -e)	2.01			
Scope 1 emissions (million tonnes CO <sub>2</sub> -e)	2.06	1.91	1.70	1.47
Scope 2 emissions (million tonnes CO <sub>2</sub> -e)	0.16	0.16	0.16	0.21
Total gross Scope 1 and 2 emissions (million tonnes CO <sub>2</sub> -e)	2.22	2.07	1.86	1.68
Offsets (million tonnes CO <sub>2</sub> -e)	0.22			
Emissions intensity in electricity generation (tonne CO <sub>2</sub> -e / million tonne processed)	3.50	3.49	3.61	3.75
<b>Energy use</b>				
Total diesel consumption (million litres)	700	641	558	497
Total natural gas consumption (million gigajoules)	3.6	3.6	3.5	3.3

<sup>1</sup> The emissions reported in this table for FY20 differ slightly from those reported in the FY20 Climate Change Report. This is as a result of adjustments made following the auditing of the final three months of FY20.

Our approach to GHG emissions reporting is compliant with the Australian Government's *National Greenhouse and Energy Reporting Act 2007* and associated regulations.

## Offsets

Offsets surrendered in FY21 include 2018 vintage Australian Carbon Credit Units (ACCUs) from Indigenous Fire Management projects in Arnhem Land and the Kimberley in northern Western Australia, and 2019 vintage Verified Carbon Units (VCUs) from a Guatemalan forestry project.

### VCUs from Caribbean Guatemala: The Conservation Coast project

This is an Avoided Unplanned Deforestation and Degradation project that protects local forests and biodiversity. The project also contributes to social and economic development in one of the poorest areas of Guatemala.

## CASE STUDY

### ACCUs from Indigenous Fire Management projects

These projects are owned exclusively by Aboriginal people with custodial responsibility for those parts of Arnhem Land and the Kimberley under active bushfire management.

Local rangers conduct controlled burns early in the dry season to reduce fuel on the ground, preventing bigger, hotter and uncontrolled wildfires later in the season. The projects provide employment and training opportunities for local rangers while supporting Aboriginal people in returning to, remaining on and managing their Country.

Communities are supported in the preservation of knowledge and the maintenance of Aboriginal languages.





## Scope 3 emissions

Scope 3 emissions are those emissions that fall within a company's value chain but are outside its operational control. Our Scope 3 estimates are informed by the international Greenhouse Gas Protocol's (GHG Protocol) Corporate Value Chain (Scope 3) Accounting and Reporting Standard. In accordance with this guidance, estimates for quantified Scope 3 emissions are provided in the table below.

Category	FY21 emissions (mt CO <sub>2</sub> -e)
Crude steel manufacturing	246.14
Shipping emissions	3.48
Purchased goods and services	1.84
Capital goods	0.52
Fuel and energy refining and transport	0.12
Employee commuting	0.06
Business travel	0.02
<b>TOTAL</b>	<b>252.17</b>

The Scope 3 emissions shown in the table above are the only GHG Protocol Scope 3 Accounting and Reporting Standard defined business activities that were determined to be material.

Details of the methodology used to estimate Scope 3 emissions can be found on our website at [www.fmgl.com.au](http://www.fmgl.com.au)

We expect that Scope 3 emissions from our customer steel mills will continue to trend downwards over time as we increase our focus on modifying the processing of our ores to maximise metallurgical performance and support our customers in adopting innovative lower emissions processes and technologies.

Engagement with our supply chain and customers, including information on the opportunities being pursued to reduce our Scope 3 emissions in steel manufacturing, are detailed on pages 20 to 21.

# 09 Corporate Directory

## Navigational index

The navigational index references the location of TCFD-aligned disclosures within our FY21 Climate Change Report.

TCFD recommendation	Disclosure	Location
<b>Governance – Disclose the organisation’s governance around climate change-related risks and opportunities.</b>		
a) Describe the Board’s oversight of climate-related risks and opportunities.	Governance	pages 13-14
b) Describe management’s role in assessing and managing climate-related risks and opportunities.	Governance	pages 13-14
<b>Strategy – Disclose the actual and potential impacts of climate-related risks and opportunities on the organisation’s businesses, strategy and financial planning where such information is material.</b>		
a) Describe the climate-related risks and opportunities the organisation has identified over the short, medium and long-term.	Risks and opportunities	pages 28-30
b) Describe the impact of climate-related risks and opportunities on the organisation’s businesses, strategy and financial planning.	Risks and opportunities	pages 28-30
c) Describe the resilience of the organisation’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	Scenario analysis	pages 25-27
<b>Risk management – Disclose how the organisation identifies, assesses and manages climate-related risks.</b>		
a) Describe the organisation’s processes for identifying and assessing climate-related risks.	Risks and opportunities	pages 28-30
b) Describe the organisation’s processes for managing climate-related risks.	Risks and opportunities	pages 28-30
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation’s overall risk management.	Risks and opportunities	pages 28-30
<b>Metrics and targets – Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.</b>		
a) Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process.	Our targets Emissions profile	page 12 pages 31-33
b) Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 greenhouse gas (GHG) emissions and the related risks.	Emissions profile	pages 31-33
c) Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.	Our targets Emissions profile	page 12 pages 31-33

# Glossary

Term	Definition
ACCUs	Australian Carbon Credit Units
CO <sub>2</sub> equivalent (CO <sub>2</sub> -e)	The universal unit of measurement to indicate the aggregate carbon dioxide equivalent emissions of carbon dioxide (CO <sub>2</sub> ), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.
Existing operations	Existing operations refers to Fortescue's operations active in FY21, which includes the Solomon, Cloudbank and Christmas Creek mines, the railway connecting the mines with the Herb Elliott Port, the port itself, offices, construction and exploration.
FFI	Fortescue Future Industries, a wholly owned subsidiary of Fortescue established in FY21 to become a global supplier of green hydrogen.
HME	Heavy mechanical equipment, such as diggers, excavators and drilling units.
ICROA	International Carbon Reduction and Offset Alliance, a non-profit organisation made up of carbon reduction and offset providers with the aim of promoting best practices in voluntary action on climate change.
GW	Gigawatt or 1 billion watts
MW	Megawatt or 1 million watts
Scope 1 emissions	Emissions from operations owned and controlled by Fortescue within Australia. These include emissions from our mining fleet and the power stations operated by us.
Scope 2 emissions	Indirect emissions generated from electricity purchased by Fortescue within Australia.
Scope 3 emissions	Indirect emissions within Fortescue's value chain (excluding Scope 2), including upstream and downstream emissions.
TCFD	The Task Force on Climate-related Financial Disclosures which the Financial Stability Board established to develop recommendations for more effective climate-related disclosures that enable a better understanding of carbon-related assets and exposures to climate-related risks.
VCUs	Verified Carbon Units, a certification standard for voluntary offsets that Verra administers.





Fortescue