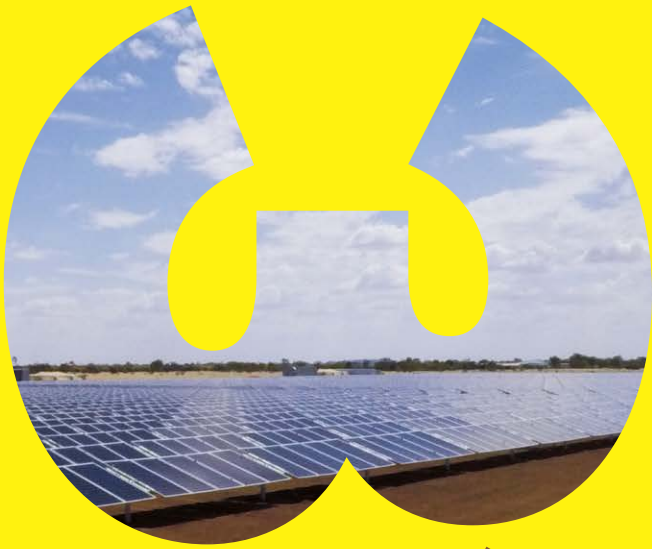
SOUTH32

OUR APPROACH TO CLIMATE CHANGE
2019



OUR PURPOSE

Our purpose is to make a difference by developing natural resources, improving people's lives now and for generations to come. We are trusted by our owners and partners to realise the potential of their resources.

WHO WE ARE

South32 is a globally diversified mining and metals company. We produce bauxite, alumina, aluminium, energy and metallurgical coal, manganese, nickel, silver, lead and zinc at our operations in Australia, Southern Africa and South America. We are also the owner of a high grade zinc, lead and silver development option in North America and have several partnerships with junior explorers with a bias to base metals.

OUR VALUES

Care

We care about people, the communities we're a part of and the world we depend on.

Trust

We deliver on our commitments and rely on each other to do the right thing.

Togetherness

We value difference and we openly listen and share, knowing that together we are better.

Excellence

We are courageous and challenge ourselves to be the best in what matters.

CONTENTS

See the rest of our 2019 annual reporting suite at *www.south32.net*.

- Annual Report
- Corporate Governance Statement
- FY19 Sustainability Performance Report
- Our Approach to Water Stewardship
- Tax Transparency and Payments to Governments Report
- Modern Slavery Statement (November 2019)

Cover image: Cannington solar photovoltaic farm

FROM THE CEO

I'm pleased to present our third report aligned to the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).

At South32, we continually challenge ourselves to be the best in what matters. This includes being responsible stewards of the environment and treating natural resources with care so they are available for future generations.

The impacts of climate change are increasingly being felt around the world through changing weather patterns, regulation and shifts in technology.

Our approach to climate change is built on three focus areas: climate change opportunity, climate resilience and emissions reduction. Each year, we commit to reporting on our progress, including the targets and goals we have set ourselves to achieve. We support the global shift towards a low carbon economy, and seek to create value through environmental and social leadership.

In FY19, we extended the physical resilience assessment to all our operations and development options, to help us understand and respond to the physical impacts of climate change.

We also reviewed the outcomes of our portfolio resilience assessment with updated forecasts and trends. In this, we didn't identify any material changes to our position. Our strong balance sheet, diversified commodity exposure and the position of our operations on the cost curve continue to support our financial resilience.

We've aligned our company decarbonisation plans with the Paris Agreement, and our long-term goal of net zero emissions by 2050 reflects this commitment.

In FY19, we completed decarbonisation concept studies for our emissions intensive, long-life operations Worsley Alumina and Illawarra Metallurgical Coal. This helped us identify potential decarbonisation initiatives, which we will progress into pre-feasibility planning during FY20.

Industry memberships provide valuable access to information, enabling us to effectively contribute to issues in the jurisdictions where we operate. This year, we completed the first formal review comparing our own climate change positions against those of our industry associations. The review provided us with a solid foundation from which to continue more detailed discussions and analysis in FY20.

It's important we share and encourage progress so others can make similar commitments to tackling climate change, and we continued to engage with investor-led groups such as Climate Action 100+.

Overall, we remain on-track to achieve our FY21 Scope 1 target to maintain emissions at or below our baseline set in FY15, with current forecasts showing our emissions will be lower than our target in FY21.

We're committed to making a pragmatic and affordable transition towards the global goal of achieving net zero carbon emissions by 2050 and we continue to review the scope and scale of our targets to ensure they align internal activities with our broader strategic goals. We'll review and ratchet our emission reduction approach every five years from 2021.

By working to avoid and manage climate change risks, as well as take advantage of the opportunities we have, we can create a more prosperous future for our business, society and future generations.

Graham Kerr
Chief Executive Officer

OUR APPROACH TO CLIMATE CHANGE

Changing weather patterns, shifts in technology, increased regulation – it's clear that the impacts of climate change are progressively being felt around the world. As this will have a financial impact, our investors, stakeholders and communities around the world expect us to manage the risks and opportunities we face.

We're actively working to avoid and manage climate change risks, as well as take advantage of the opportunities we have. In this, our aim is to build a better future for our business, society and future generations.

We support the global shift towards a low carbon economy, and we seek to create value through environmental and social leadership. To demonstrate this value to our stakeholders, we need to keep making progress, measure our performance and report transparently against our plans.

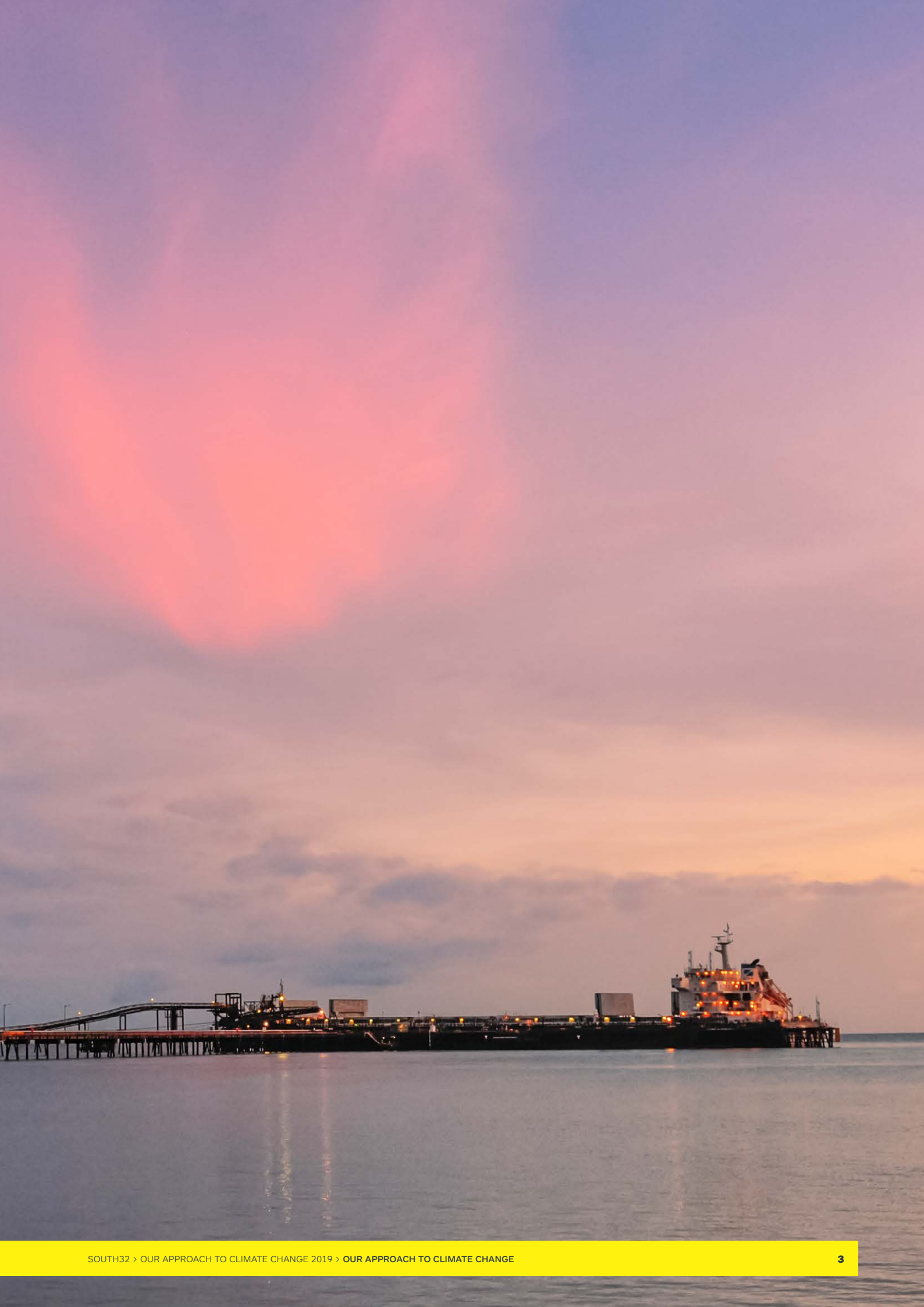
We also support the Paris Agreement objectives. This means we'll continue reviewing our climate change response in the context of the United Nations Framework Convention on Climate Change (UNFCCC) actions, as well as credible sources of climate science such as the Intergovernmental Panel on Climate Change (IPCC), and emerging national legislation.

Recent guidance from the IPCC(1) warned of the significant adverse impacts of a 1.5°C increase above pre-industrial levels. While the assumptions and parameters of scenarios consistent with 1.5°C are not as developed or widely applied as those of a 2°C scenario, we're continuing to analyse emerging scenarios and how they could impact our scenario analysis.

We believe sharing and encouraging progress is important, so that others can make similar commitments to tackling climate change, which is why we engage with investor-led groups such as Climate Action 100+(2).

(1) Greenhouse IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels - *www.ipcc.ch/sr15/*

(2) A five-year initiative led by investors to engage greenhouse gas emitters and other companies across the global economy that have significant opportunities to drive the clean energy transition and help achieve the goals of the Paris Agreement.



OUR JOURNEY TOWARDS TACKLING CLIMATE CHANGE

Since starting out, we've taken significant steps to address climate change.

FY15

On demerger, we committed to supporting the Paris Agreement objectives.

FY16

We developed our Approach to Climate Change, focusing on three areas: climate change opportunity, resilience and emissions reduction.

We set our long-term goal of achieving net zero emissions by 2050.

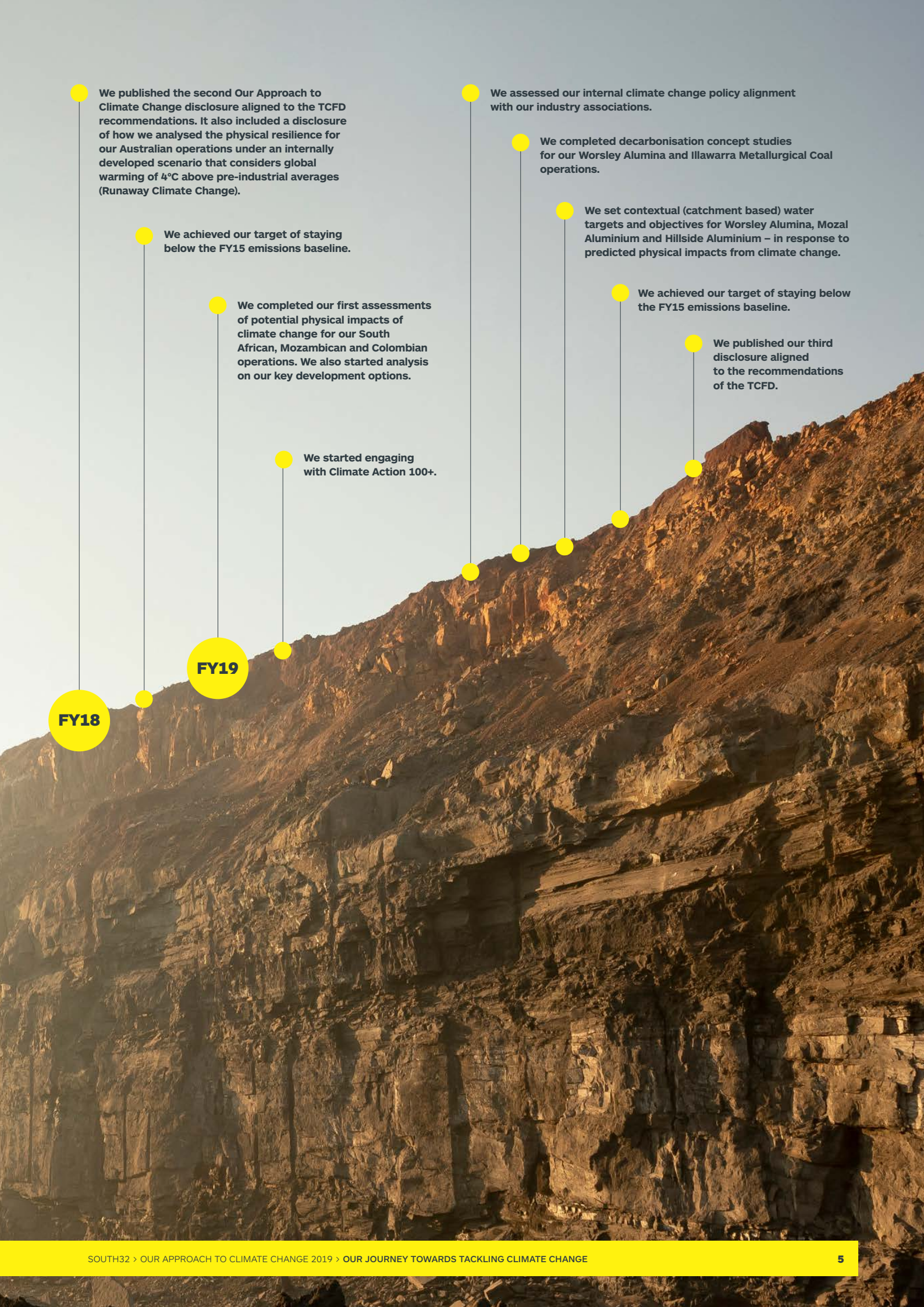
We published our five-year short-term target to have our Scope 1 emissions below the FY15 baseline by FY21.

FY17

We published the inaugural Our Approach to Climate Change disclosure. In doing so, we became one of the first companies to apply the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) to develop a detailed summary of our portfolio resilience to an internally developed low carbon scenario, under which global warming is limited to 2°C above pre-industrial averages (Global Cooperation).

We achieved our target of staying below the FY15 emissions baseline.

We started managing South Africa Energy Coal (SAEC) as a standalone business, to progress divestment plans and pivot our portfolio towards base metals.


We published the second Our Approach to Climate Change disclosure aligned to the TCFD recommendations. It also included a disclosure of how we analysed the physical resilience for our Australian operations under an internally developed scenario that considers global warming of 4°C above pre-industrial averages (Runaway Climate Change).
We achieved our target of staying below the FY15 emissions baseline.
We completed our first assessments of potential physical impacts of climate change for our South African, Mozambican and Colombian operations. We also started analysis on our key development options.
We started engaging with Climate Action 100+.
FY18
FY19
We assessed our internal climate change policy alignment with our industry associations.
We completed decarbonisation concept studies for our Worsley Alumina and Illawarra Metallurgical Coal operations.
We set contextual (catchment based) water targets and objectives for Worsley Alumina, Mozal Aluminium and Hillside Aluminium – in response to predicted physical impacts from climate change.
We achieved our target of staying below the FY15 emissions baseline.
We published our third disclosure aligned to the recommendations of the TCFD.

THE TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES (TCFD)

We developed this report in line with the recommendations of the TCFD[3].

Diagram 1 Core elements of climate-related financial disclosures

Governance

Our governance around climate-related risks and opportunities.

Strategy

The actual and potential impacts of climate-related risks and opportunities on our business, strategy, and financial planning.

Risk Management

The processes we use to identify, assess, and manage climate-related risks.

Metric and Targets

The metrics and targets we use to assess and manage relevant climate-related risks and opportunities.

MEASURING CARBON EMISSIONS

In this document, we refer to 'carbon' and 'emissions' interchangeably. These terms represent the aggregate carbon dioxide equivalent (CO_2 -e) emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6). We measure emissions according to the World Resources Institute/World Business Council for Sustainable Development Greenhouse Gas Protocol:

- Scope 1 carbon emissions refers to direct carbon emissions from our own operations, including the electricity we generate at our sites;
- Scope 2 carbon emissions refers to indirect carbon emissions from the generation of purchased electricity; and
- Scope 3 carbon emissions refers to the carbon emissions in our supply chain.

(3) *www.fsb-tcfd.org/publications/final-recommendations-report/*

OUR STRATEGY AND CLIMATE CHANGE

When we demerged in 2015, we developed our initial approach to climate change. Since then, we've been progressively implementing programs to take advantage of strategic opportunities, and mitigate or adapt to climate-related risks. Our approach is focused on three areas, which we integrate with our strategy:

1.
CLIMATE CHANGE OPPORTUNITY

2.
CLIMATE RESILIENCE

3.
EMISSIONS REDUCTION

1.

CLIMATE CHANGE OPPORTUNITY

As the world becomes more impacted by climate change, we aim to manage our portfolio in a way that ensures our products remain in demand and resilient. We're committed to:

- Keep providing the raw materials that support climate action and enable the transition to a lower carbon future; and
- Working in partnership with energy providers and other stakeholders, including finance providers, to create long-term benefits to society and the environment.

CASE STUDY:
INTERNATIONAL COUNCIL ON MINING AND METALS: INNOVATION FOR CLEANER SAFER VEHICLES

Through the International Council on Mining and Metals (ICMM), we've joined forces with 13 major suppliers of mining equipment to create the Cleaner Safer Vehicles (ICSV) initiative programme .

This will ensure mining vehicles are cleaner and safer, and help us push further in our commitment to reduce emissions.

The ICSV programme aims to introduce greenhouse gas emissions-free surface mining vehicles by 2040, minimise the operational impact of diesel exhaust by 2025, and make collision avoidance technology available to mining companies by 2025.

The project brings together ICMM members with leading equipment suppliers to accelerate innovation and uptake across the sector. With the potential for a battery-related transition becoming clearer every day, it's likely that commodities in our portfolio will be in demand.

2.

CLIMATE RESILIENCE

Working towards climate resilience for our communities and operations means we need to understand and respond to the physical impacts of climate change. We're committed to:

- Implementing 'Intelligent Land Management' projects. This means landholdings are used to create social, economic and environmental value for society and our business for years to come, through projects such as water protection and biodiversity conservation; and
- Incorporating climate change modelling in our capital allocation and investment decisions, to make our operations and host communities more resilient.

CASE STUDY:
INTELLIGENT LAND MANAGEMENT (ILM)

Through our ILM program in FY19, we continued to see new opportunities to create financial, social and environmental value from our non-operational lands and assets, as well as increase the climate resilience of our operations and host communities.

We completed strategic ILM assessments for our Worsley Alumina and Illawarra Metallurgical Coal operations. We focused on value-add opportunities that complemented our other programs. For example, projects supporting the current decarbonisation planning at these sites have been highlighted as a priority for further evaluation and development.

As we build our carbon offset planning, ILM will continue to play an important role in helping us understand the scope for carbon sink projects on existing landholdings.

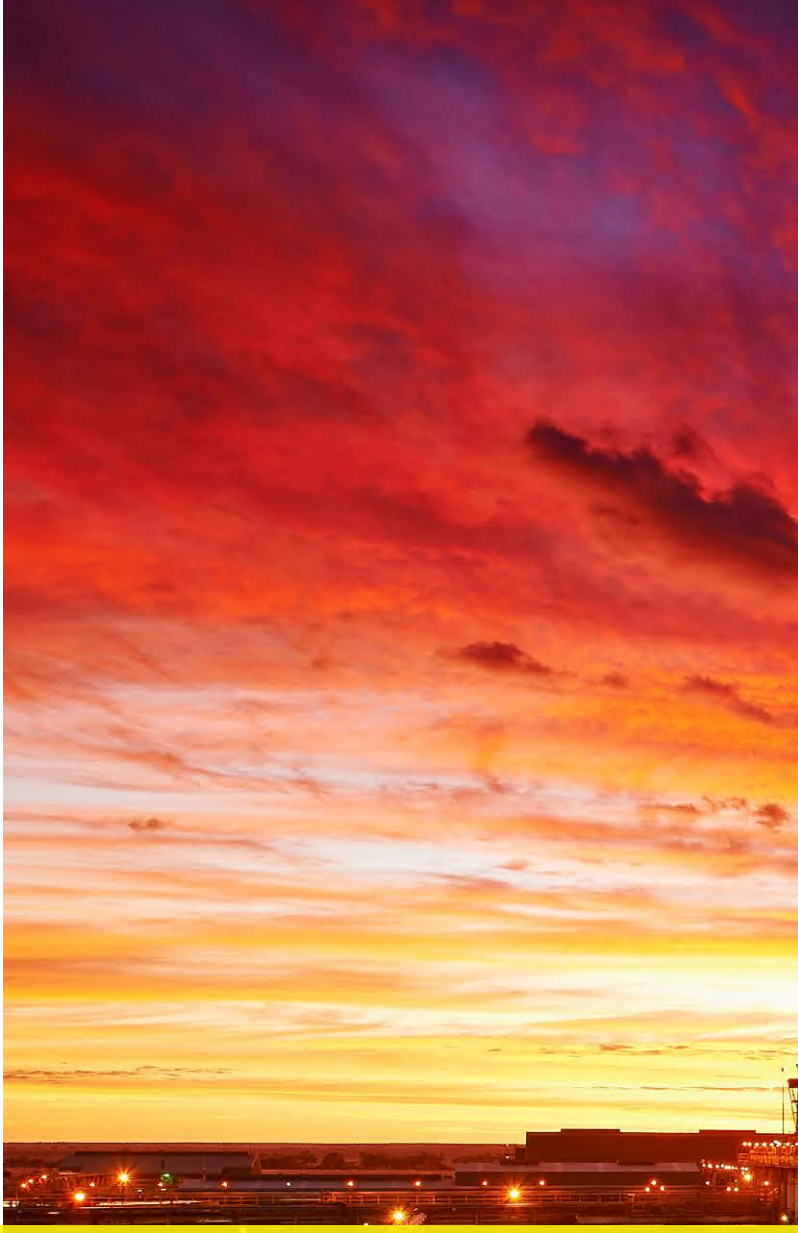
3.

EMISSIONS REDUCTION

We are committed to making a pragmatic and affordable transition towards the global goal of achieving net zero carbon emissions by 2050. We'll do this by:

- Meeting our short-term carbon emissions reduction target to stay below our FY15 Scope 1 carbon emissions baseline in FY21;
- Reviewing and increasing our carbon emissions reduction approach every five years from FY21;
- Linking our emissions reduction targets to all bonus payments and incentives, including at a Lead Team level; and
- Developing decarbonisation plans (see page 17).

We continue to review the scope and scale of our targets to ensure they align internal activities with our broader strategic goals.



CASE STUDY:
INCREASING RESILIENCE TO EXTREME WEATHER EVENTS

Several of our operations were affected by extreme weather events during the year. To us, this highlighted the ongoing importance of regularly reviewing resilience planning, and how we could help our host communities minimise the impacts of these events.

The city of Townsville, Australia, and surrounding regions experienced a severe rainfall event in February 2019, causing catastrophic flooding. Around 50 per cent of our Cannington personnel were based in the worst-affected region and we experienced direct interruptions at our mining operations, such as the suspension of road and rail transport to and from the site, as well as reduced activity at the regional port. In response, we put resilience plans in place. This included replacement truck delivery for input materials, enhanced contractor management, internal and external stockpile optimisation and alternative unloading processes. This helped us avoid significant effects to our operations.

Our GEMCO operation on Groote Eylandt in Australia was affected by Cyclone Trevor in May 2019, which forced us to evacuate staff and other local residents, and temporarily suspend our operations.

To help our local communities get back on their feet during FY19, we contributed to their emergency responses. In Townsville, we donated A$1 million to the relief effort through the St Vincent de Paul Society Queensland. A further A$250,000 was donated to the local communities surrounding Cannington affected by the floods, as well as deployment of employees and equipment to support flood recovery efforts. As a result of the devastating effects of Cyclones Idai and Kenneth in Northern Mozambique, we also donated US$250,000 to support specific recovery efforts aimed at minimising food and water shortages in the short-term and restoring infrastructure in affected areas.

OUR EMISSIONS PROFILE

SCOPE 1 AND 2 EMISSIONS

Approximately 85 per cent of our total Scope 1 and 2 emissions come from four operations (Hillside Aluminium, Worsley Alumina, Illawarra Metallurgical Coal and Mozal Aluminium). In FY19, our total Scope 1 emissions were 10.5 million tonnes (Mt) CO_2 -e. Scope 1 emissions (direct emissions) are influenced by our Illawarra Metallurgical Coal and Worsley Alumina operations, which account for approximately 55 per cent of our global Scope 1 footprint. Our smelting operations make up a further 25 per cent.

We continue our progress towards our five-year emissions reduction target, currently forecast to be lower than FY15 baseline in FY21.

Our Scope 2 emissions (imported electricity) are primarily associated with our Hillside Aluminium and Metalloys Manganese operations, which account for approximately 90 per cent of our global Scope 2 footprint.

In FY19, our Scope 2 emissions were 13 Mt CO_2 -e. This increase was influenced by higher emissions at our Mozal Aluminium smelter, due to a shortfall in delivery of third-party contracted hydropower, which resulted in greater consumption of coal powered electricity.

As a result of increased production at Illawarra Metallurgical Coal and the decreased availability of hydropower at Mozal Aluminium, our FY19 emissions forecast for Scope 1 and Scope 2 increased from FY18. However, for FY19 our Scope 1 and Scope 2 emissions were below our FY19 forecast of 24.3 Mt CO_2 -e.

SCOPE 3 EMISSIONS

Scope 3 emissions are indirect emissions (not included in Scope 2) that occur in our value chain. The majority of our Scope 3 emissions are associated with the downstream processing of our coal product by our customers. The other significant portion of our Scope 3 emissions comes from the processing of sold products related to our manganese and aluminium operations. In the current product stewardship environment, we understand that in order to reduce Scope 3 emissions, we need to work together with our customers to support the transition.

In FY19, our Scope 3 emissions were 116 Mt CO_2 -e. We calculate our Scope 3 emissions using Greenhouse Gas Protocol endorsed methodologies.[4] A breakdown of our Scope 3 emissions, including the calculation methodology, can be found on page 15 and at *www.south32.net*.

Understanding our Scope 3 emissions helps us identify potential carbon emissions risk in our value chain. High carbon products may be exposed to substitution, or the cost of products and services we buy and sell could increase because of pricing carbon.

Approximately 46% of our Scope 3 emissions come from our South African Energy Coal (SAEC) operations. In line with the South African government's transformation agenda, we're moving forward with the divestment of SAEC, with the intention that it becomes sustainable, black-owned and operated.

CARBON OFFSETS

While reducing emissions is our main priority, it's likely that residual emissions will remain at our operations due to technology constraints. And unless there's a significant breakthrough in technology, we'll need carbon offsets to reach our goal of net zero emissions by 2050.

Our plan for carbon offsets will look at both local and international carbon credits and how the land that we hold can develop carbon offsets through emissions reduction projects. This includes, but isn't limited to, offsets such as:

- Verified Carbon Standard (VCS);
- Reducing Emissions from Deforestation and Forest Degradation (REDD);
- The Gold Standard (GS);
- National Carbon Offset Standard (NCOS); and
- Australian Carbon Credit Units (ACCUs).

Our ILM function will also play a key part in understanding what land could be used for carbon credit projects.

In Australia, carbon offsets are developed through emissions reduction projects approved by the Clean Energy Regulator. This can include projects such as savanna fire management, energy efficiency and reforestation. Once these projects are developed, they produce ACCUs, which can be used to offset emissions for liable entities or voluntary reporters.

At our Illawarra Metallurgical Coal operation, we currently have an emissions reduction project that has developed ACCUs. This involved installing and operating additional flaring devices to capture and combust the methane component of coal mine waste gas from the mine. This project has generated approximately 240,000 ACCUs. We'll continue to reduce emissions with this project when operating conditions allow us to do so.

(4) The Greenhouse Gas Protocol: Scope 3 Calculation Guidance: *www.ghgprotocol.org/scope-3-technical-calculation-guidance*

Diagram 2 South32 Scope 1 Emissions FY19

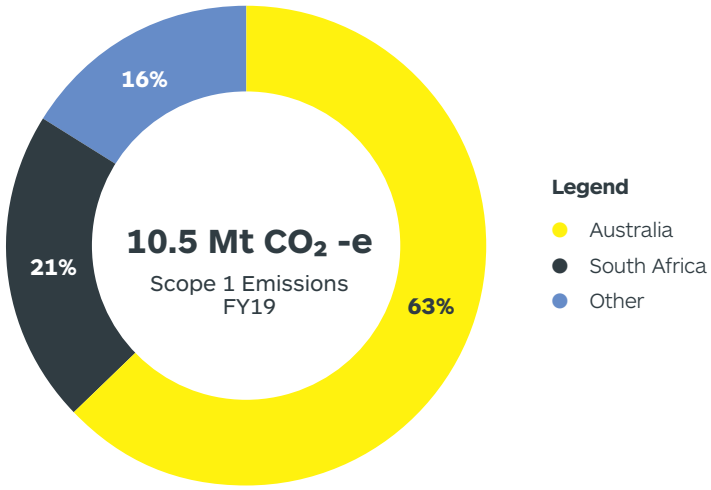


Diagram 3 South32 Scope 2 Emissions FY19

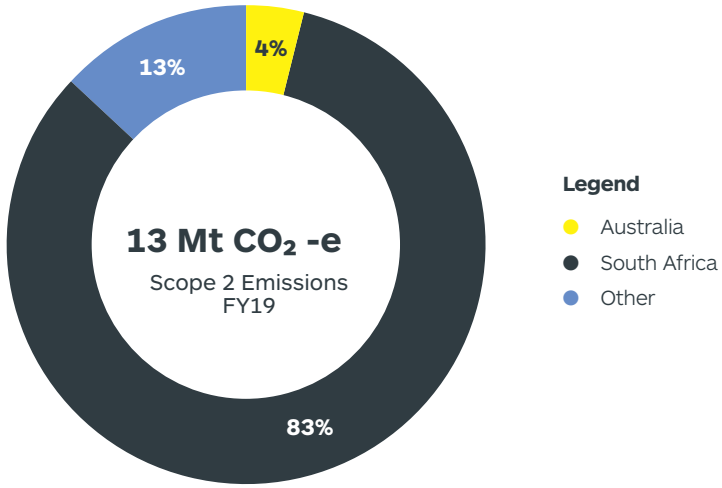
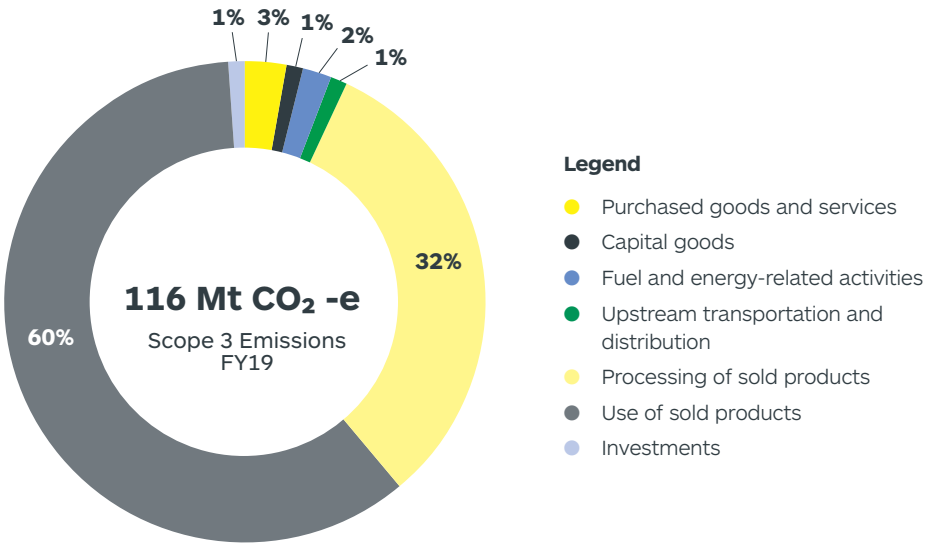


Diagram 4 South32 Scope 3 Emissions FY19



LINKING EMISSIONS REDUCTION TO REMUNERATION

The goal of our remuneration approach is to make sure our employees are focused on what they can influence. Our Short-Term Inventive (STI) outcomes reflect performance over the financial year and our Long-Term Incentive outcomes reflect performance over a four-year period.

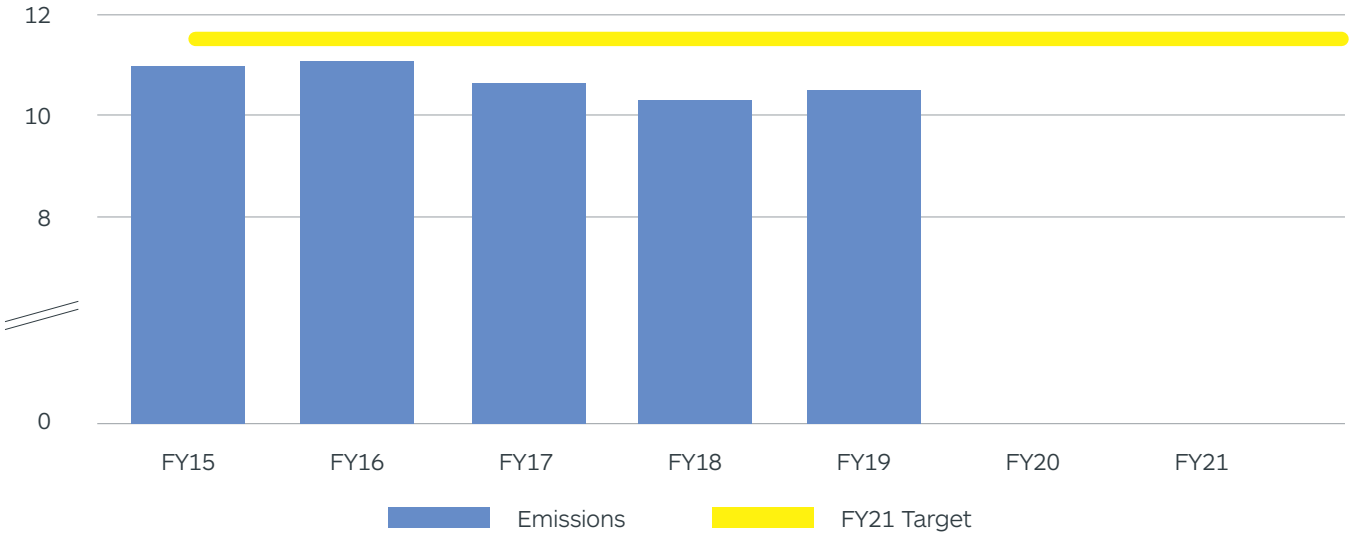
In determining the Short-Term Incentive (STI) outcomes for FY19, our Board looks at a range of factors set out in our balanced Scorecard. These non-financial measures are in line with our Breakthroughs and our values including safety and health, environment, community, risk management and leadership. Twenty-five percent of these outcomes are based on sustainability measures including our greenhouse gas emission targets.(5)

As part of our annual planning process for each facility, we set realistic forecasts for our emissions. We base these on several factors, including forecast production volumes and market analysis. As a result, our Scope 1 and 2 emissions totalled 23.5 Mt CO_2 -e, which was well below our FY19 forecast of 24.3 Mt CO_2 -e.

Update on FY21 Scope 1 Emissions Target

Our five-year target is based on Scope 1. That's because it includes a significant portion of emissions generated from our own energy sources, particularly in Australia. We're still on track to achieve our FY21 public target (maintain emissions at or below FY15 levels) with an abatement surplus of approximately 578 kilotonnes (kt) CO_2 -e. We'll reset this target to reflect recent portfolio changes, including the current divestment process at SAEC, once the transactions and transfer processes have been completed.(6)

Diagram 5 FY21 Scope 1 Target(7)



(5) To read more about our Remuneration, please see page 58 of our FY19 Annual Report at *www.south32.net*

(6) The carbon emissions reduction target is based on absolute Scope 1 carbon emissions and in the event of any mergers, acquisitions or divestments the FY15 baseline will be recalculated.

(7) The FY15 baseline number has been updated to incorporate material changes in energy and emission factors, which have come into effect in the 5 year period.

OUR DECARBONISATION STUDIES

We've aligned our company decarbonisation plans with the Paris Agreement. This means we're committed to follow the emissions trajectory of a world well below two degrees of warming in 2100 (compared with pre-industrial levels from 1950). We strongly believe it's in our business' best interests to reach this goal in a realistic and affordable manner, minimising economic and social disruption as much as possible. We also see reducing our own emissions as a key responsibility, and recognise other important decarbonisation benefits, such as:

- The mitigation of carbon liability risk;
- Energy security;
- Promotion of transition technologies;
- Continuing market share; and
- Stakeholder acceptance.

Our long-term goal of net zero emissions by 2050 reflects this commitment. Developing decarbonisation pathways for our long life, high emissions facilities is a cornerstone activity in our progress. In FY19, we did the planning and assessment work that was needed for concept level decarbonisation studies, which helped us identify potential decarbonisation initiatives. In FY20, we'll progress these initiatives into pre-feasibility planning.

CONCEPT LEVEL DECARBONISATION STUDIES

At Worsley Alumina and Illawarra Metallurgical Coal, we generate approximately 55 per cent of our total Scope 1 emissions, which is why we selected them for our initial focus.

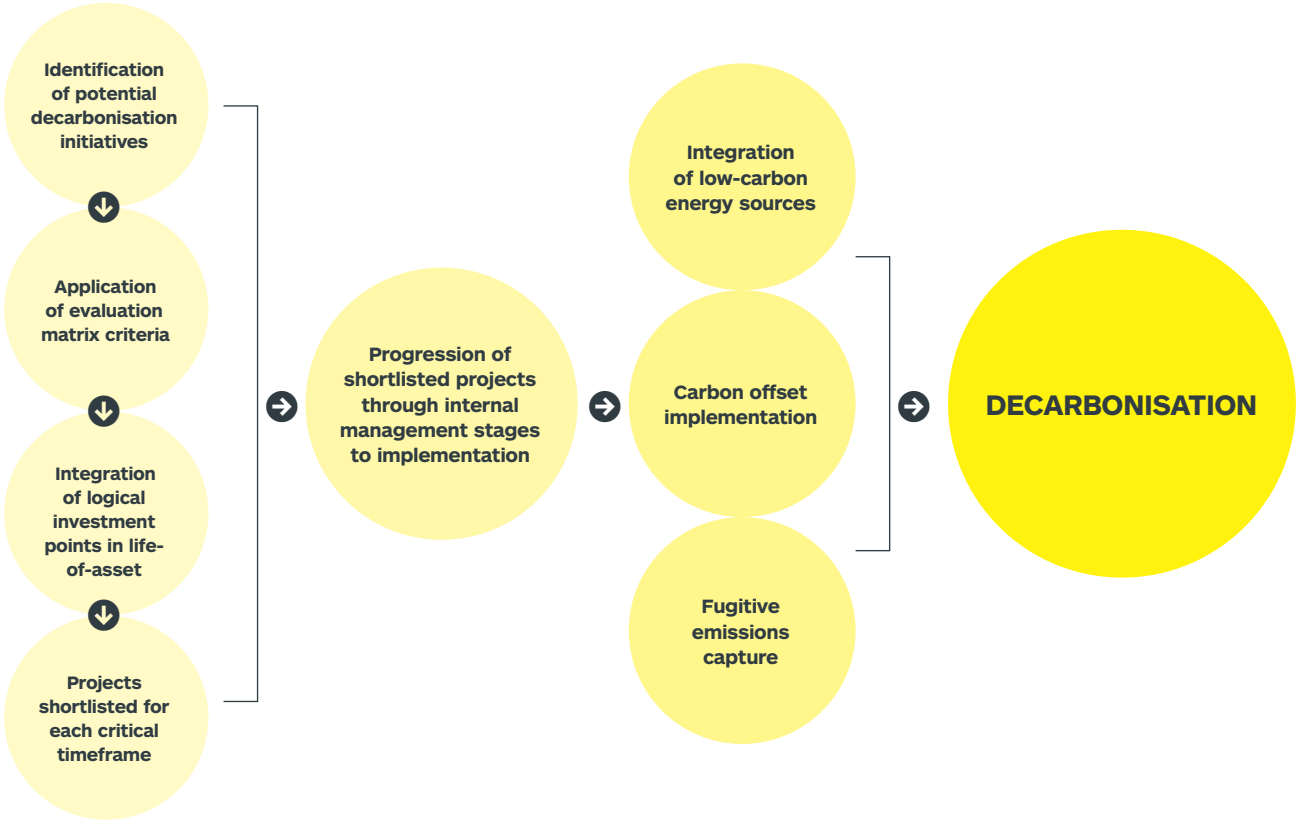
Because parts of these facilities have been operating for over 35 years, we ran into significant retrofitting and adaptation challenges. Consulting with a range of experts, we identified over 80 potential decarbonisation projects.

We looked into both energy efficiency and fuel replacement opportunities. Some projects included an increase in biomass use at Worsley, while others involved improving gas drainage efficiency at Illawarra. We applied a tailored evaluation matrix, which meant overlaying additional considerations such as project delivery impacts and risks, community, regulatory and reputational issues, operational considerations and financial synergies with other activities.

We identified logical investment points for the implementation of material retro-fitting/adaptation projects. These included times when major equipment would near end-of-life, or new infrastructure would be needed to sustain future production. We selected our top initiatives for a range of timeframes: short (under 3 years), medium (3 to 8 years), medium to long (8 to 18 years) and long (18+ years).

We'll continue to evaluate and integrate the shortlisted initiatives into our business and project planning process in FY20, coming up with completion targets for a pre-feasibility assessment of each. Our energy team will keep assessing feasible options for lower carbon energy sources and further fugitive emissions capture at Illawarra Metallurgical Coal, while our carbon offset planning will progress to offset residual long-term emissions.

Diagram 6 Our decarbonisation pathway planning



Just Transition to Decarbonisation: Worsley Alumina Refinery

When looking at the large-scale adaptation activities needed to decarbonise an emissions intensive facility, we're mindful that there will be both social and economic impacts on the regions and people surrounding our operation. In Worsley's case, the Collie community has a strong employment link to the coal industry and associated local services – and moving away from coal as a fuel source within our facility could have an impact on the surrounding community.

"The "Just Transition for All" concept introduced by the International Trade Union Confederation is about bringing together workers, communities, employers, and government in dialogue to drive plans, policies, and investments needed for a fast and fair transformation." – World Bank, 2018.

Social and economic factors require considered management to minimise impacts on the local community. To facilitate a just transition, understand the scope of the challenges, and create opportunities for the region, we need to focus on long-term planning, working alongside key stakeholders in the industry, government and community.

We've already begun working with stakeholders to understand the scope of the challenge and how we can contribute to a just transition and we will look to progress this engagement further in FY20.

GOVERNANCE AND RISK MANAGEMENT

GOVERNANCE

Our Sustainability Committee (Committee) represents and assists the Board in managing climate-related opportunities and risks – and their work is supported by our Lead Team.

The Committee is responsible for reviewing and approving our Sustainability Policy, which includes this position: "To meet the challenge of climate change, we work to reduce our greenhouse gas emissions. We continually assess our risks and opportunities to protect and create value, and monitor our impact to ensure we do not compromise the ecosystems which provide resilience against climate change for our host communities."

When it comes to climate change, the Committee also:

- Reviews and approves reporting, including disclosures of material climate-related risks;
- Recommends to the Remuneration Committee key performance indicators for the greenhouse gas emissions component of the annual incentive plan (for the Chief Executive Officer and the Lead Team), and determines the outcome for referral to the Remuneration Committee;
- Reviews and endorses our public climate-related targets and goals; and
- Reports to our Risk and Audit Committee on material climate-related risks.

At a management level, our Chief Sustainability Officer (CSO) is accountable for our climate-related responsibilities, managing our strategy implementation, and providing progress reports to the Committee at least twice a year on the control of risks and implementation of opportunities.

RISK

We identify and assess climate-related risks as part of our risk management framework. We also disclose and manage material climate-related risks in the same way we manage all other risks to our operations and long-term strategy.

Our risk management framework details how we identify, monitor and manage our material risks.

Our Risk and Audit Committee helps our Board carry out its role in overseeing our risk management and audit practices, which is supported by our Lead Team.

We apply our risk management framework to the activities of all our employees, Directors, contractors and subsidiaries.

To find out more about our governance and risks, visit: *www.south32.net/who-we-are/corporate-governance*.

> **"To meet the challenge of climate change, we work to reduce our greenhouse gas emissions. We monitor our impact to avoid compromising the ecosystems which provide resilience against climate change for our host communities."**
>
> *South32 Sustainability Policy*

WORKING TOGETHER ON CLIMATE CHANGE

To truly tackle climate change, we need to work together. That's why we collaborate with a wide range of stakeholders, including government and shareholders. We also engage regularly with investor groups and industry associations to drive beneficial outcomes for all our stakeholders over the short, medium and long-term.

Climate Action 100+[8] is one of the largest investor-led initiatives on climate change and was established in 2017 to ensure the world's major greenhouse gas emitters take necessary action on climate change. They engage with companies that have significant opportunity to drive the clean energy transition and help achieve the goals of the Paris Agreement. Climate Action 100+ is calling on companies to improve governance on climate change, curb emissions and strengthen climate-related financial disclosures. We've been actively sharing information on our progress with Climate Action 100+ since 2018.

In FY19, we responded to the Dow Jones Sustainability Index, and reported in accordance with the Global Reporting Initiative (GRI) Standards. We submitted responses to environmental, social and governance (ESG) ratings agencies and proxy advisors.

We understand that to meaningfully tackle climate change, we need to collaborate across sectors. We do this by:

- Using our influence to create and share knowledge, as well as align approaches;
- Providing transparent disclosures; and
- Providing updates and learnings as we progress.

CLIMATE CHANGE AND HUMAN RIGHTS

At South32 we recognise that respect for human rights and climate change are inextricably linked. The United Nations outlined that climate change has the potential to directly and indirectly threaten a range of human rights throughout the world, including the rights to life, water and sanitation, food, health, housing, self-determination, culture and development. We are working to mitigate human rights risks and social impacts across our operations and supply chains, including through human rights impact assessments and social performance management.

(8) Climate Action 100+ - About Us: *www.climateaction100.wordpress.com/about-us/*

INDUSTRY ASSOCIATIONS

South32 actively participates in a number of industry associations.

Membership of these associations provides valuable access to information, insight and industry influence, helping us make more informed decisions and positive contributions to industry-wide issues in the jurisdictions we operate in. We regularly monitor our memberships' positions on key issues such as climate change, and engage and collaborate to facilitate alignment with South32's interests and positive industry outcomes.

We retain the right to express an alternative position and do so when appropriate. It is often beneficial to discuss and debate these alternative positions to facilitate positive outcomes. Where alternative positions are irreconcilable, we are prepared to withdraw from any industry association we deem necessary. In relation to climate change specifically, a key trigger for further engagement and potential withdrawal is action by any of our associations that directly contradicts achievement of the Paris Agreement objectives.

We understand that there is significant interest from many stakeholders in the advocacy role played by industry associations, particularly relating to climate change. In FY19, we sought to more deeply understand and make transparent the consistency of our internal policy positions on climate change and those of our membership organisations.

An independent third party was engaged to conduct a detailed assessment of our global membership organisations that hold active positions on climate change, including the following:

- Arizona Mining Association;
- Business Council of Australia;
- Carbon Market Institute;
- Chamber of Minerals and Energy – Western Australia;
- Colombian Mining Association (ACM);
- ICMM;
- Minerals Council South Africa;
- New South Wales Minerals Council;
- Queensland Resources Council; and
- South African National Energy Association.

This assessment focused on 12 climate change policy areas as detailed in Diagram 7.

Diagram 7 South32 Climate Change-related Policy Positions

Acceptance of climate science	**Restricting global warming to two degrees**	**Paris Agreement**	**Price on carbon**
Domestic carbon pricing or carbon tax	**Equal prioritisation of the energy trilemma**	**Technology neutral energy policy**	**Emissions reduction targets**
Carbon capture and storage	**High efficiency low emissions coal**	**Renewable energy technology**	**Emissions Reduction Fund / Safeguard Mechanism**

Each member organisation was tested for departures from South32's position on these policy areas to identify areas of material divergence or concern. Information on industry association positions was sourced from all forms of publicly-available information, including submissions, news articles and social media sites.

At the completion of the analysis, we engaged directly with member organisations where potential divergent views existed to update and deepen our understanding of their current views and clarify differences.

From this assessment, we concluded that despite divergence in some areas, no material departures existed that would cause us to exit any associations at this time. Policy areas where potential differences exist were highlighted to the relevant associations for further analysis and engagement.

We continually review our industry association memberships, both at the time of joining and at renewal periods. We will continue this practice relating to association positions taken on climate change and other relevant policy issues.

The work carried out in FY19 represents the first formal review comparing our own climate change positions against those of our industry associations. It has provided us with a solid foundation in which to continue more detailed discussions and analysis in FY20.

CLIMATE CHANGE RISKS AND OPPORTUNITIES

The climate change risks we've outlined in this document aren't listed in order of significance, nor are they meant to be exhaustive. They reflect the most significant risks currently identified for our company.

These risks and opportunities will change over time, depending on how the world responds to the range of climate change variables – from the political and economic (such as regulatory emissions restrictions to technological developments and litigation) to the physical (such as the behaviour of the Earth's feedback loops).

If we can pull together to mitigate climate change and two degrees of warming, there'll be many opportunities, and many risks, that emerge from how this transition is managed. We look at this under our portfolio resilience assessment.

Globally, if we exceed more than two degrees of warming, the physical risks of climate change become more prevalent. These include both acute risks (e.g. from extreme weather events) and chronic risks (e.g. droughts or heatwaves), which could harm the health of society and ecosystems. We look at this under our operational resilience assessment.

Importantly, we're continuing to analyse emerging scenarios, such as the IPCC 1.5°C report and the UNPRI Inevitable Policy Response, as well as developments in best practice using stress-testing and scenario planning.

OUR CLIMATE-RELATED RISKS, MITIGATION OPTIONS AND OPPORTUNITIES

Table 1 summarises the most significant climate-related risks, mitigation options and opportunities relevant to our business today, both in a future that exceeds, and in a future that avoids, more than two degrees of warming.

Where internal or external progress has been made since last year's assessment, we've reflected these changes in the table. Our scenarios have been used to identify likely risks and opportunities relevant to that scenario. You can find more information on our scenarios from page 28.

Table 1 Climate-related risks and opportunities

Topic	Time horizon[9]	Most relevant scenario	Risks	Mitigation and opportunities
Policy	Short, medium and long-term Medium and long-term	Global Cooperation Runaway Climate Change	Carbon pricing policies including carbon taxes, cap and trade systems and any other regulatory carbon pricing mechanisms may increase costs for companies with liable carbon emissions. Policy uncertainty and sudden changes in policy may limit the business' capacity to prepare for a structured transition. This could result in increased costs and disruption to the business. This may also have an effect on the demand dynamics for some of our commodities, such as metallurgical coal and aluminium.	We include a global carbon price from FY25 in all our capital allocation and investment evaluations. A local carbon price is applied before FY25 if country specific legislation is in place or deemed to be likely. This helps us make effective and well-informed decisions to manage risks beyond current pricing policies. You can find more details on page 27. Plus, our voluntary carbon emissions reduction targets help us identify, evaluate and implement a range of operational emissions reduction projects on an ongoing basis. Both of these internal policies (as well as ongoing modelling of impacts of prospective new government policies) allow us to adjust rapidly to external regulatory developments. We continue to engage with state and federal governments both directly and indirectly through the relevant associations, to better understand potential changes in policy and how it affects us.
	Short, medium and long-term	Global Cooperation	As our stakeholders, including customers and suppliers, are likely to experience similar changes in policy, we may face changing commercial requirements to meet regulatory changes in jurisdictions outside of our own operating environments. This may involve pass on costs from an upstream perspective, but also have a downstream risk due to the relative competitiveness and demand for some of our products.	Our scenario analysis incorporates potential policy-based impacts on our supply chain to test resilience of our portfolio to these risks. We use the insights we gain from this in our ongoing strategic plans. We've also calculated and disclosed our annual Scope 3 emissions to ensure that we're aware of the scale and sources of our supply chain emissions. You can find more details on page 14. Both of these internal policies (as well as ongoing modelling of impacts of prospective new government policies) allow us to adjust rapidly to external regulatory developments. We continue to engage with state and federal governments both directly and indirectly through our relevant associations, to better understand potential changes in policy and how it affects us.
	Short, medium and long-term Medium and long-term	Global Cooperation Runaway Climate Change	As pollution concerns or scarcity pressures increase, water and biodiversity regulation may become stricter.	Through our focus on innovation and technology, we're working to reduce our land requirements, biodiversity impacts, waste, carbon and water usage over time. As our internal voluntary performance standards drive resource efficient operations, our aim is to be ahead of policy change and avoid the risk that stricter future policies could pose.

(9) In this context, we consider short-term, medium-term and long-term as the next 3-5 years, 6-10 years and 11-50 years respectively.

Topic	Time horizon[9]	Most relevant scenario	Risks	Mitigation and opportunities
Legal	Short, medium and long-term	Global Cooperation and Runaway Climate Change	Increased litigation against governments, companies and directors, either seeking to oppose greenfields developments or operational expansion. Compensation for damages caused to them because of climate change impacts, or to force greater action on climate change.[10]	We have a proactive approach to climate-related risk assessment, risk management and disclosure. Along with our diversified portfolio, this helps us minimise our relative exposure to climate change-related litigation. However, we monitor legal developments in this space and seek advice on major developments when we need to.
Reputation	Short, medium and long-term	Global Cooperation, Patchy Progress and Runaway Climate Change	If we don't implement strategies to address climate-related risks, our reputation with a range of stakeholders may suffer. This could make it harder for us to get and maintain our social licence to not just operate at existing sites, but also to build and invest in new operations (including access to finance and insurance). Skilled staff may not want to work with us because of our exposure to climate change.	To manage reputational risks, we provide clear and comprehensive information to stakeholders on our business position, policies, risks and mitigation actions. We're always ready to support a globally competitive and broad-based price on carbon, and we've set voluntary short and long-term carbon reduction targets in line with the Paris Agreement. These targets are linked to all bonus payments and incentives, including to our Lead Team. We regularly review our industry group memberships to make sure their positions on climate change and energy policy are aligned with our interests (see page 21). We have an opportunity to improve our reputation with some investors by achieving net zero emissions by 2050. We also have the opportunity to be a preferred investment if we maintain above average climate change risk and opportunity management. By leading the way on climate change, we can attract the best talent, which will benefit our business performance over the long-term.
Shareholder action	Short, medium and long-term	All	When it comes to climate change, shareholders are increasingly focused on companies' disclosure, responsiveness and lobbying activities. Being negatively targeted could damage our reputation and potentially impact our capacity to secure investment capital, insurance, development or expansion permissions and partners.	We prioritise regular and open dialogue with our shareholders on climate change and broader ESG issues – to better understand what they need and expect. We were early adopters of the TCFD voluntary reporting framework. Reporting transparent climate change disclosures is becoming increasingly more important to our stakeholders. We recognise the value of this and we will keep doing this to make sure our stakeholders are always informed about our progress.

(10) Please see *www.climatecasechart.com for a list of recent climate change litigation cases*.

Topic	Time horizon[9]	Most relevant scenario	Risks	Mitigation and opportunities
Technology changes	Short, medium and long-term	Patchy Progress and Global Cooperation	The difficulties in integrating new technologies with existing systems – and the cost and unproven nature of new technology – could reduce productivity and profit margins. There are also risks around the disruptive nature of new technologies, which may change demand for our products (see 'market changes'). Decreased demand in resources may occur due to changes in technology or substitution of resources. e.g. metallurgical coal.	We've developed an integrated approach to innovation. It focuses on opportunities to improve productivity and safety through technology and innovation, while reducing costs, risks and the environmental and social footprint of what we do. This includes decarbonisation and the minimisation of water and other resources' use and impact.
Market Changes	Medium and long-term	All	The supply and demand for our commodities may change as technology changes (including potential substitution of some resources) and consumer demands shift. Markets are increasingly directing money towards greener products and solutions, which creates a risk of lower or more competitive access to finance, investment and insurance. As governments and other companies act on climate change, there's a chance we could be exposed to higher costs for the products which we rely on, such as electricity, coking coal or water.	So that we can quickly respond to change, we monitor the global environment, conduct detailed assessments of commodity markets and regularly update our supply and demand forecasts. For long-term changes, our scenario analysis incorporates potential technology-based impacts on product demand to test our portfolio resilience and evaluate new opportunities. We want to be in a position to satisfy customer needs, which includes providing lower carbon products. We believe several of our portfolio commodities would benefit from a transition to a low carbon economy, and we see opportunities to create value by focusing our business on these commodities.

Topic	Time horizon[9]	Most relevant scenario	Risks	Mitigation and opportunities
Physical risks (acute and chronic)	Short, medium and long-term	All, increasing severity in Runaway Climate Change	We mine geologically bound ore bodies, connected by rail, road, ports and sea. These may experience production and logistics delays because of extreme weather events (e.g. bushfires, cyclones and flooding). Droughts, heat extremes or unseasonal weather variability could also create water stress, or contribute to worker ill-health and the spread of disease. This could impact our operations.	One of the core objectives of Our Approach to Climate Change (see page 7) is to build our operational resilience. By doing this, we can quickly adapt to a changing climate and get back on track following extreme weather or other acute events. During FY19, we expanded the scope of our scenario analysis to start testing operational resilience of our South African, Mozambican and Colombian operations to physical impacts. We're using the outcomes to better understand any future adaptation requirements. You can find more details on page 45.
	Short, medium and long-term	All, increasing severity in Runaway Climate Change	The physical impact of climate change may increase rehabilitation and/or closure liabilities. It may also impact the terms or availability of external finance or insurance.	The two main ways to build physical resilience in our Climate Change Strategy are: 1. ILM – an integrated social, environmental and economic approach to achieving climate resilience. 2. Climate modelling – of changes in weather, including rainfall, to better predict the physical risks we may be exposed to and to proactively mitigate or adapt to them. We use the World Resources Institute Aqueduct tool to screen our operations for water scarcity and oversupply risks.
	Short, medium and long-term	All, increasing severity in Runaway Climate Change	Physical risks can turn into social risks, such as conflict over access to natural resources. Regions with poorly developed social support systems could be more vulnerable to the physical impacts of climate change. This can lead to decreased food and water security, and create a challenging operating environment.	We make contributions to development programs – to help communities build resilience against the impacts of climate change.

CASE STUDY:
POLICY RISK MITIGATION: CARBON PRICING

Our aim is to sustainably transition to a low carbon economy – and we support policies that help us do this. We also consider the potential cost of inaction and resulting policy change to be a risk.

Carbon pricing has been proven to efficiently reduce carbon emissions. We support carbon pricing that's globally competitive and broad-based, covering all industry sectors and all possible carbon emission sources. We would like to see the money raised from carbon pricing used to support the transition to a low carbon future.

We update our view on carbon price as part of our annual planning cycle using:

- Recent and predicted developments in carbon policy in economies relevant to our operations and markets;
- Carbon price forward curves; and
- Benchmarking including existing national or regional carbon markets, publicly disclosed carbon prices in companies from comparable sectors and forecasts by research agencies.

On this basis, we have a near-term view that reflects existing or imminent carbon markets in our countries of operation (e.g. the Safeguard Mechanism in Australia, the fossil fuels in Colombia and the South Africa carbon tax). Longer-term, our carbon price has now increased to a global average of US$25/tonne from FY25 onwards.

We also use scenario analysis to stress-test our planning and investment decisions. As an example, we apply a carbon price of US$100/tonne in the Global Cooperation scenario.

HOW WE USE SCENARIOS

The better we understand the impact climate change could have on our business, the better we can protect and create value for our stakeholders. This will also help us make sure our portfolio remains competitive.

Through scenario analysis, we've assessed both our portfolio resilience to transition risks, and our operational resilience to physical risks. The three scenarios we've developed are:

4°

RUNAWAY CLIMATE CHANGE

Limited global progress towards reducing emissions. **This is the scenario we use to stress-test physical resilience at each operation.**

3°

PATCHY PROGRESS

Reflects current trends and technology development, with limited additional climate change mitigation measures. **This is our base case scenario for valuation purposes.**

2°

GLOBAL COOPERATION

Proactive and collaborative approach by major governments, industries and society to reduce carbon emissions. **This is the scenario we use to plan the transition and stress-test the portfolio.**

We've now completed this analysis for all our operations and provided the details of our scenarios and the outcomes of these assessments in the following sections.

Using the Task Force on Climate-related Financial Disclosures (TCFD) voluntary guidelines, we've followed a staged process (Diagram 8) to stress-test our portfolio and operations against plausible and evidence-based, yet divergent, scenarios.

Working with industry experts and stakeholders, we developed three scenarios:

(1) Runaway Climate Change.

(2) Patchy Progress (South32 base case for valuation scenarios).

(3) Global Cooperation.

These scenarios combine elements from distinct scenarios set out by international agencies including IPCC, IEA and WEO (see Glossary for more detail).

Building these customised scenarios gave us a comprehensive view of the various climate change-driven impacts which may affect our business, including social dynamics, market behaviours and physical impacts.

These scenarios are both qualitative and quantitative in approach and intentionally extreme, to provide a sharp contrast between potential futures.

In the future, we may see a combination of the different scenarios or none. Either way, they're designed to give us insights, and help us recognise trends, identify possibilities and act quickly on the opportunities we see. We'll regularly revisit and update the drivers within the scenarios – to show our progress against signposts and triggers.

In stress-testing against these scenarios, we've focused on indicators that can be used to support internal decision-making, while also informing stakeholders of our position. We'll keep reviewing and refining our resilience measures as our analysis evolves over time, including options to incorporate more quantitative information.

In FY19, we revisited our three climate change scenarios (first developed in FY17) to update internal and external assumptions. One change was an update to forecast uptake rates needed for renewable technologies under the Global Cooperation scenario.

Diagram 8 Our approach to stress-testing our portfolio and operations

What is a scenario?

Put simply, a scenario describes a path of development leading to a particular outcome. Scenarios aren't intended to represent a full description of the future. Rather, their aim is to highlight the main elements of a possible future and to draw attention to the key factors that will drive future developments. It's important to remember that scenarios are hypothetical; they're not forecasts or predictions, or sensitivity analyses. Scenario analysis is a tool to enhance critical strategic thinking.[11]

(11) TCFD Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities (June 2017).

RUNAWAY CLIMATE CHANGE SCENARIO

Scenario snapshot

Little meaningful progress made in reducing global carbon emissions.

Global temperature increase reaches four degrees Celsius by the end of the century.

Greatest risks for our business result from physical climate change impacts and large-scale social disruption.

Reference scenarios:

International Energy Agency-World Energy Outlook November 2018[12], Current Policies scenario and the Intergovernmental Panel on Climate Change Representative Concentration Pathway 6.0 and 8.5 scenarios.

In this scenario, the development of new industries is hindered by a slowdown of capital allocation to low carbon products, renewable energy, and research and development (R&D). No global carbon price emerges, global sentiment largely repeals existing climate policy, and there is a stagnation of efforts by political leaders to make meaningful progress in reducing carbon emissions – at a local and national level.

In this scenario, global Gross Domestic Product (GDP) would experience incremental gains until around 2035, supported by incremental productivity improvement. Long-term economic growth would vary across the globe and be dependent on the resilience of countries to the increasing physical impacts of climate change (such as water insecurity and disease).

Between now and 2035, those nations that can rebuild, recover and/or adapt to the physical impacts would increase the demand for raw materials, which includes many of the commodities in our portfolio. For example, the need to build more resilient cities and the rebuilding required following acute weather events could increase the demand for steel making materials, including manganese. However, the ability of many developing nations to recover will be limited, reducing the scope of potential demand growth.

From 2035, the pressure on ecosystems would begin to affect the supply of food and water, harming economic growth and geo-political stability. With many nations struggling to meet their basic needs, the consumption of commodities is likely to decline. In this scenario, there are likely to be large numbers of displaced people crossing borders and conflicts over natural resources, as well as a breakdown in the rule of law and global security from 2040.

The greatest risks and opportunities for our portfolio come from the physical impacts of climate change. And there is some incremental demand growth from the world's investment in adaptation and resilience.

Relative to the other scenarios, our own operations would be at greater risk from the physical impacts, both acute and chronic. This could lead to negative effects on our supply chain and production, and ultimately reduce our profit margins. The physical impacts in this scenario indicate that a world exceeding more than two degrees of warming is anticipated to be less favourable to long-term global prosperity than a scenario of two degrees or less.

CASE STUDY:

HOW WE'RE INTEGRATING OUTCOMES INTO OUR STRATEGIC AND OPERATIONAL SCENARIO PLANNING: WORSLEY ALUMINA TO WELLINGTON DAM PIPELINE INVESTMENT

In 2018, we published our physical resilience assessment against the extreme 'Runaway Climate Change' scenario.

It gives our investors a summary of the information we use to stress-test our ongoing water risk management approach. This modelling goes beyond the boundaries of the business case for step change investments to managing risks, and takes into account longer term implications for the business and the wider catchment.

An example is the Worsley Alumina operation, which has experienced water shortages due to significant changes in precipitation patterns. Based on risk assessments using long-term climate change forecasts, we found that the exposure to water supply risk was likely to be ongoing and potentially increase materially over time. We identified a number of possible long-term adaptation options, including water efficiency, climate independent water sources and/or developing processes that don't need water.

In April 2017, we used these outcomes to invest in the construction of a pipeline from Wellington Dam to the Worsley Alumina refinery, to strengthen the reliability of current and future water supply. Studies have shown us high levels of salinity in the dam water, resulting in limited suitability for other industrial uses. This pipeline significantly reduced our reliance on purchased water volumes from Harris Dam, which also supplies the wider community.

Alongside water supply changes, we continue to pursue projects to increase water efficiency through the development of a long-term water use reduction plan. We identified a suite of projects based on existing technologies to implement over an eight-year period. The design of the first project will start in 2019, with implementation starting in 2020. We're also exploring new and emerging technologies which can further reduce the refinery's water consumption in the long-term.

PATCHY PROGRESS SCENARIO (SOUTH32 BASE CASE)

Current trends and technology development continue.

Global temperature increase limited to three degrees Celsius.

Large regional divergence and volatile swings in climate change policy result in an unpredictable operating environment.

Transition impacts create both opportunities and risks across our business.

Physical risks are less severe than in the Runaway Climate Change scenario.

Reference scenarios:

International Energy Agency – World Energy Outlook November 2018[12], New Policies scenario.

The Patchy Progress scenario is our base case for scenario analysis. It largely reflects current trends and developments in technology, with limited additional climate change mitigation measures or policy changes beyond 2019.

This scenario assumes that concerns over loss of industries due to carbon leakage will deter some countries from implementing policy that would help mitigate climate change risks. This means fossil fuel and agricultural groups will protect business as usual arrangements.

This scenario is also characterised by large regional divergence and volatile swings in climate change policy.

While the national commitments[13] in the Paris Agreement are put in place, some countries with high emissions fail to meet their current targets. Others will continue to adopt stricter goals in line with the policy framework. Overall, this means the pace and scale of decarbonisation will vary by region and sector.

Existing energy trends continue. Renewable energy gains more share of the energy mix, as costs fall and utilities adopt battery storage as the technology improves. Nonetheless, an uncertain policy environment slows renewable energy penetration and allows high carbon land-use (such as continued clearing of old growth forests and peatlands) to continue. This means the transition isn't fast enough to meaningfully reduce global carbon emissions and avoid more than two degrees of warming.

In this scenario, the physical risks of climate change to our operations are still significant, even though they are less severe than in the Runaway Climate Change scenario. Transition risks, including volatile swings in climate change policy, will create both opportunities and risks for us.

GLOBAL COOPERATION

Collaborative action drives rapid decarbonisation.

Global temperature increase limited to two degrees Celsius.

Risks to our business largely related to transition and regulatory impacts.

Reference scenarios:

International Energy Agency – World Energy Outlook November 2018[12] Sustainable Development scenario, the IEA Energy Technologies Perspectives two degree scenario, and the Bloomberg New Energy Finance, New Energy Outlook 2018[14] modelling.

In this scenario, there is a proactive and collaborative approach by major governments, industries and society to reduce carbon emissions. This joint effort is enough to stabilise global temperature to two degrees or below by 2100, relative to pre-industrialisation (1950) temperatures.

Global carbon emissions will peak around 2025 before entering a sustained decline, fully in line with the trajectory needed to achieve the objectives of the Paris Agreement.

Climate change mitigation and adaptation policies are introduced, they have an immediate and meaningful impact on business, and significant nations and sub-regions introduce incentives to avoid further deforestation and phase out fossil fuel subsidies.

We see a global carbon market emerging from FY30. The global carbon price rises to more than US$100 a tonne after cheaper, first round carbon emissions reduction projects are put in place. The global carbon price stays high enough to ensure emissions continue to fall, though market forces and significant incentives (such as low-cost lending for green products) play a greater role in changing behaviour than carbon penalties in this scenario. Governments and private business fund extensive R&D and green investments.

The rapid development of new green industries more than offsets the loss of businesses that can't survive when potable water, biodiversity and carbon emissions are priced appropriately. This scenario shows that global collaboration to protect natural resources can lead to the development of emerging economies, and an increase in the consumption of low carbon services and sustainable products.

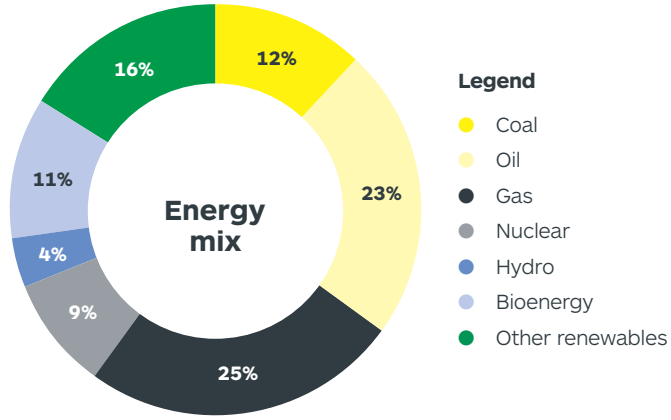
In this scenario, the transformation of the global energy system occurs. Large investments are made on both demand and supply-side to improve energy efficiency, electricity access and low-carbon energy supply. The share of non-fossil fuel in the total primary energy supply increases from the current 20 per cent to 40 per cent by 2040. The proportion of electricity in total final consumption rises from 20 per cent today to almost 30 per cent in 2040. In the power sector, renewables such as solar and wind gain a material share to provide low-carbon generation.

Solar (mostly photovoltaics) accounts for 28 per cent of the total energy mix, wind accounts for 13 per cent and energy coal and natural gas account for 12 per cent and 15 per cent, respectively. Hydro, nuclear, oil and renewables (other than solar or wind) combined, account for the remainder in 2040[15].

The commercialisation of battery storage provides cheap, reliable, green energy on demand, allowing renewables to displace fossil fuel generation. This scenario assumes limited uptake of Carbon Capture and Storage (CCS), given the relative immaturity of the technology in 2018. CCS would only be used where there are limited options to transition energy or industrial capacity to lower carbon alternatives.

Although the transformation of the energy sector is crucial, it won't be enough by itself to limit the temperature increase to less than two degrees.

Diagram 9 Energy mix by 2040 in the Global Cooperation scenario



Source: IEA World Energy Outlook Sustainable Development Scenario[12]

In this scenario, a range of societal and political drivers all help the world avoid two degrees of warming, such as:

- Changes to consumer and industrial behaviour that promote commodity recycling to its technical limits;
- The deployment of technologies which increase productivity through efficiency;
- A reduction in deforestation and an increase in reforestation and afforestation brought about by better designed and planned urbanisation; and
- Smarter agricultural practices and much lower consumption of meat products, which reduces the need for land clearing.

(12) Reference updated to IEA SDS (previously Bloomberg New Energy Finance, New Energy Outlook) to reflect potential for more aggressive renewables penetration rates.

(13) Commitments are the intended Nationally Determined Contributions made by each nation.

(14) *www.about.bnef.com/new-energy-outlook/*. Other efforts such as land-use change, reforestation, some carbon capture and storage are necessary to avoid two degrees of warming.

(15) Hydro, nuclear, oil and renewables other than solar or wind combined.

LOOKING AT OUR RESILIENCE

The way we act going forward will depend on how the world comes together to deal with climate change over the long-term.

We've selected our scenarios to represent the most extreme, yet plausible, potential for impact.

In FY19, we reassessed our resilience to transition risks that may come about from climate change. We originally developed this in FY17.

What are transition risks? We define them as non-physical risks arising from the structural shift towards a low-carbon energy system – mostly to do with policy, technology, legal and market change. In our analysis, we used the Global Cooperation scenario to compare commodity performance against our base case (Patchy Progress scenario).

In FY18, we started assessing our operations' resilience to the physical impacts of climate change. In this, we chose to use the Runaway Climate Change scenario, as it presents the most chronic and acute physical impact scenario.

As we're committed to transparency and information sharing, we disclosed the results of our Australian operations' assessment first.

In FY19, we've extended this assessment to our South African, Mozambican and Colombian operations, as well as beginning to assess our development options.

OUR PORTFOLIO RESILIENCE TO TRANSITION RISKS

How our portfolio looks will depend on future prices and the opportunities that emerge over time. This scenario analysis and modelling gives us, and our stakeholders, an outlook for each commodity in our current portfolio under the Global Cooperation scenario.

In this, we didn't identify any material changes to our position. Plus, our diversified commodity exposure, position of our assets on the cost curve within their industries, and our strong balance sheet continue to support our financial resilience.

SCENARIO USED: GLOBAL COOPERATION SCENARIO[16]

We built our methodology around the existing valuation models and scenario-based analysis used in our strategic planning process. This takes into account major variables such as:

- The outlook for commodities;
- The development of technology;
- The needs of societies;
- Consumer behaviour; and
- The ability of the environment to continue providing the natural resources and ecosystem services that the world needs to keep thriving.

Our first step in evaluating comparative portfolio resilience was to apply the main supply and demand drivers to our existing global commodity models. This helped us determine if the commodity would be advantaged or disadvantaged by the rapid transition involved, relative to the base case. This was a qualitative step to frame the next company-specific assessment.

We then did a quantitative analysis to assess the scale of this directional impact on our specific products and operations. In this, we factored in relative demand for our products compared to competitors (e.g. based on chemical composition and supply location) and our position on the cost curve for each of our unique value chains.

Comparing outcomes between the base case and the Global Cooperation scenario drivers, we found that comparisons of net present value or earnings forecasts didn't provide us with meaningful insights on broader portfolio resilience. Largely, this was due to the variability of other underlying factors (particularly commodity price forecasts) overshadowing the impacts of the climate scenario related inputs.

Instead, we decided to use a fit-for-purpose resilience metric (Table 2), which focused on the demand for each commodity from each operation in our portfolio. We determined our resilience by assessing whether the supply and demand balance increased or decreased (10 per cent either way) or materially increased or decreased (20 per cent either way), relative to our base case forecasts out to 2040.

(16) This section refers to South32's resilience under the Global Cooperation scenario. As such, the descriptions of resilience here are not South32 forecasts, but describe what we have assessed could happen if the world's development progressed in line with the Global Cooperation scenario.

Through our analysis, we can see that the commodity diversification of our portfolio gives us strategic resilience in a Global Cooperation scenario. To make sure we maintain a strong understanding of our resilience, we'll regularly review our assumptions and assessment approach. We've provided a summary of our resilience in Table 2 and a more detailed explanation to follow.

Diagram 10 Resilience scale (percentage change compared with base case between 2015-2040)

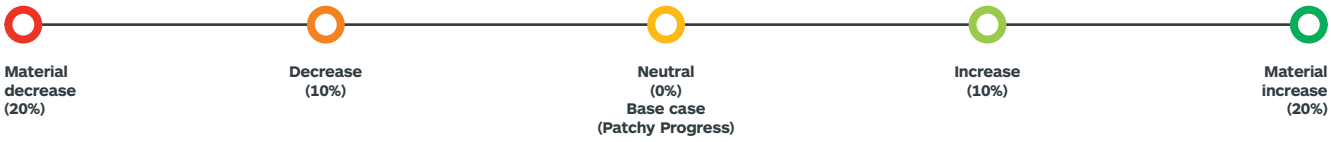
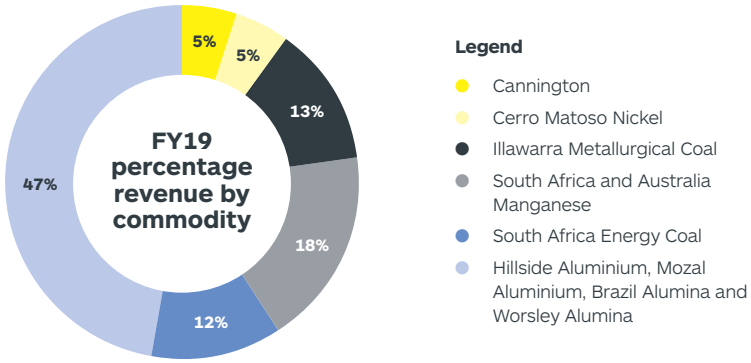


Table 2 Summary of portfolio resilience

Operation and commodity	Resilience in Global Cooperation Scenario compared with our base case (Patchy Progress)
Cannington	
Lead	
Silver	
Zinc	
Cerro Matoso Nickel	
Illawarra Metallurgical Coal	
South Africa and Australia Manganese	
South Africa Energy Coal	
Hillside Aluminium, Mozal Aluminium and Worsley Alumina	

Diagram 11 FY19 percentage revenue by commodity



This diagram shows FY19 percentage revenue received from each of our commodities.

CANNINGTON

SILVER

In the Global Cooperation scenario, around two-thirds of the electricity generated in 2040 would come from renewables, of which about a quarter comes from solar energy. Silver is used in solar panels for its reflective qualities as it helps generate electricity by reflecting sunlight into collectors.

There is also likely to be additional demand from the construction industry. Insulated silver coated glass reduces the need for heating and cooling and will play an important role in reducing the energy use in buildings.

This scenario also results in more rapid innovation. The growing use of robotics, monitoring and hand-held devices are also expected to boost silver demand relative to the base case.

LEAD

Lead is primarily used in the starter batteries in conventional vehicles. In the Global Cooperation scenario, we assume over half of global car stock is electric by 2040, with around one billion electric vehicles in use.

The conventional vehicle ownership model would come under pressure, as less resource intensive transport options emerge and urban populations grow. These include public transport, car or ride-sharing options driven by a rise in autonomous vehicle technologies.

With greater recycling of batteries, and the emergence of non-lead batteries in cars, primary demand growth from the automotive sector would peak in the short- to medium-term (2020 to 2025) and decline after this. The level of sustained demand for lead acid batteries from conventional vehicles could be met through closed loop recycling. As a result, the demand for lead in new batteries decreases, and lead isn't resilient in the Global Cooperation scenario.

The Global Cooperation scenario might not be favourable for lead demand, but the positive outlook for zinc and silver are likely to see lead produced globally as a by-product – and this will create a resilient lead supply.

ZINC

Zinc galvanised steel materials are used extensively in transport, construction and appliance manufacturing, due to their insulation and anti-corrosive properties. Zinc weatherproofs steel against corrosion via galvanisation, but this protection is lost over time due to environmental degradation. Therefore, it needs to be constantly replaced.

There will also be a positive impact on zinc demand from the increased use of lightweight steel alloys in the automotive sector, as designs are changed to meet the strict carbon emissions targets and avoid the carbon prices. As a result, zinc demand will benefit from steel demand growth.

Our Cannington operation in Australia produces lead and zinc concentrates, both of which contain silver. All concentrates are sold to smelters which extract the silver and other by-products, such as copper, and then refine the product into a London Metals Exchange deliverable form.

As part of our business development strategy, we've considered the likely increase in demand, relative to our base case for zinc and silver in the Global Cooperation scenario.

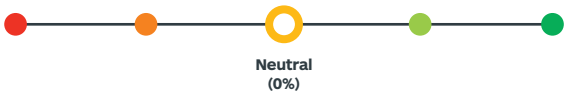
CERRO MATOSO

Nickel is primarily used in stainless steel, alloys and plating. Many of its properties will be more valuable in the Global Cooperation scenario. It's anti-bacterial, has high corrosion resistance, and is used in batteries that support both renewables and electric vehicles.

The use of nickel intensive stainless steel, relative to other stainless-steel grades, have been more closely linked to technical standards and GDP growth than energy use. We don't see these factors changing, so nickel demand is unlikely to be hampered.

Our Cerro Matoso operation in Colombia produces ferronickel (an alloy of nickel and iron), which is sold almost exclusively to stainless steel producers. It has traditionally been known for its low impurities and stable nickel content. The nickel we produce is likely to benefit from increased global demand and is resilient in the Global Cooperation scenario.

ILLAWARRA METALLURGICAL COAL



Metallurgical coal, also known as coking coal, forms high strength coke primarily used in the integrated steel making process. There are three main types of metallurgical coal of which hard coking coal is the most sought after by steel producers.

In the Global Cooperation scenario, steel (and, therefore, metallurgical coal) benefits from the substitution for cement, which has a more energy and carbon emissions intensive production process. There is much more steel scrap collected and reused in this scenario, and this scrap steel will be made available to meet the growing global steel demand as the world continues to urbanise and industrialise.

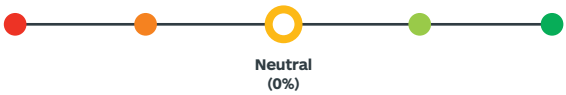
However, as an outcome of the increase in available steel scrap, an increasing proportion of steel demand will be met through Electric Arc Furnace (EAF) production. This doesn't require metallurgical coal. In this scenario, we expect that steel produced by blast furnaces (the alternative to EAF production and that does use metallurgical coal) will fall from approximately 75 per cent in 2018 to approximately 40 per cent in 2030.

This scenario also assumes that, due to changes in consumer behaviour, there will be much more steel scrap in the future than currently available, most notably in China as the economy matures.

Around 80 per cent of Illawarra Metallurgical Coal's production is premium mid volatility hard coking coal. It's recognised as a valuable input in steel making blends and is sold all around the world. As steel scrap alone won't meet market demand in the Global Cooperation scenario, demand for high quality metallurgical coal exports will remain resilient on the back of demand from major steel producing countries. This will depend on non-arc furnace technology remaining in India and Brazil. Our assessment assumes that this long-term residual blast furnace market will increasingly preference high quality feeds, such as that sourced from Illawarra Metallurgical Coal, and broader supply will tighten. We're closely monitoring trends in this area and the potential for decrease in demand resilience under the two degree scenario.

Illawarra Metallurgical Coal is in a good position to benefit from a high globally consistent and equally applied carbon price. Carbon pricing policy incentives are likely to support an expansion of the operation's gas capture and energy conversion operations, which would enhance its position on the cost curve relative to other producers and support margins.

SOUTH AFRICA AND AUSTRALIA MANGANESE



Manganese ore is inextricably linked to the global steel industry. Over 90 per cent of manganese ore is converted to a manganese alloy, which is used to remove sulphur, de-oxidise and strengthen steel. These unique characteristics make it a strong commodity in the Global Cooperation scenario.

Although other alloys can strengthen and harden steel, only manganese can remove sulphur and deoxidise in a cost-efficient manner. As these steps are important to reduce pollution and the public health risk of steel production, manganese is unlikely to be substituted for another product.

The increase of steel scrap recycling has a limited impact on manganese demand compared with other steel raw material inputs. This is because manganese is largely lost in the recycling process and needs to be continually replaced. In the Global Cooperation scenario, energy efficient urbanisation including high-rise buildings, public transport, water, power, and all other infrastructure requiring steel are significant drivers of demand. We also expect growth in manganese demand as low carbon products, such as electric vehicle battery technologies, achieve deeper penetration.

Although manganese is relatively abundant, the resources in major steel producing countries, like China and India, are relatively low grade. This means higher grade imports are necessary to achieve the right blend.

We mostly produce high-quality grade manganese. We also supplied approximately 25 per cent of the manganese ore traded in the seaborne market in 2018. In this scenario, we're in a good position to take advantage of continued demand for high quality manganese.

SOUTH AFRICA ENERGY COAL

Energy coal is primarily used in electricity generation, with the remainder used in areas such as cement production and heating. Its future in the global energy mix is tied to public opinion, the relative competitiveness of renewable energy technologies, developments in battery storage technology and its economics, and the technical and economic feasibility of CCS technology.

Public acceptance of energy coal continues to diminish, as climate change and concerns around the impact of air pollution on public health makes it politically risky to support new energy coal power stations or mines.

Although CCS is used in the Global Cooperation scenario, with some plants fitted with the technology by 2025, it's deployed much more slowly than renewables, reducing energy coal's ability to take part in the transition to a low carbon future. As a result, the seaborne trade for energy coal would continue to decline to 2040.

Energy coal demand is more resilient in South Africa, Russia and Southeast Asian nations, with centralised energy coal operations built between 2000 and 2025. In these areas, coal use is likely to largely focus on integrated operations with low cost deposits near power plants. In this scenario, there is no scope for the development of greenfield energy coal mines.

Any investment would be focused on small incremental projects in well-established mining regions.

Although the supply-demand balance for energy coal drops by around 20 per cent in the Global Cooperation scenario, we believe the demand is likely to be resilient in the domestic markets we supply.

SAEC produces energy coal for both the South African domestic market and export markets. They supply the domestic South African market under long-term contracts to Eskom, the national power provider (which delivers 90 per cent energy coal powered generation) and seaborne export markets.

The domestic market in South Africa for our energy coal is likely to be relatively resilient. As the seaborne export market for energy coal would decline, it's likely that we can divert this product to opportunities in the domestic market.

In line with the South African government's transformation agenda, we're moving forward with the divestment of SAEC, with the intention that it becomes sustainable, black-owned and operated.

Illawarra Metallurgical Coal produces a by-product energy coal stream (approximately 20 per cent of product mix), which is exported to countries with electricity provided by large centralised energy coal operations built between 2000 and 2025.

HILLSIDE ALUMINIUM AND WORSLEY ALUMINA

Aluminium is often referred to as the metal of the future. It can be recycled with no loss of mass or quality, and is highly corrosion resistant.

Construction, packaging and transport sectors will continue to create demand for aluminium, making it relatively resilient against substitution risks in the key end-use sectors. Examples of how aluminium can be used in a two degree world include building light-weight transport options, offering durability and design flexibility in building construction, and substituting fossil fuel based plastics in packaging.

In this scenario, the demand for aluminium increases relative to the base case. Aluminium recycling is advanced to technical limits. Alumina inputs (and consequent bauxite demand) will still be needed to meet primary aluminium demand expectations.

Aluminium smelters are energy intensive and can produce significant carbon emissions, especially when using coal-fired energy. In the Global Cooperation scenario, renewable energy becomes an increasingly important fuel source for smelters. However, we anticipate that a large portion of the world's energy coal powered aluminium smelters remain in use for their technical life to meet the forecast increase in demand.

In the Global Cooperation scenario, these smelters are all subject to the global carbon price of US$100 per tonne from 2030. Since a large portion of the supply base (energy coal powered) will be impacted by the carbon cost, and despite some uncertainty in renewable power uptake at other smelter locations, we still anticipate a net increase in renewable uptake.

We own the Hillside Aluminium smelter in South Africa and operate the Mozal Aluminium smelter (47.1 per cent share) in Mozambique. The Hillside Aluminium smelter is dependent on power generated from energy coal, while Mozal Aluminium purchases green power from hydro sources. In the Global Cooperation scenario, Hillside Aluminium is expected to remain competitive and Mozal Aluminium is likely to benefit from its lower carbon position.

In Australia, we operate the Worsley Alumina refinery which sources bauxite from its Boddington mine. Worsley Alumina benefits from a lower energy intensive bauxite (Gibbsite) compared to the higher energy intensity domestic bauxite used in most Chinese refineries (Boehmite/Diaspore).

As such, the additional carbon cost impost per tonne of alumina produced at our Worsley Alumina refinery will be relatively low for the alumina sector.

OUR RESILIENCE TO THE PHYSICAL IMPACT OF CLIMATE CHANGE[17]

SCENARIO USED: RUNAWAY CLIMATE CHANGE SCENARIO[18]

Nearly every sector of the economy faces risks from the short- and long-term physical impacts of climate change. These impacts are classified as either chronic or acute.

Chronic impacts are those that incrementally develop over time, such as air temperature, or decreasing rainfall trend. Acute impacts are the sudden shock events, such as flooding, bushfire and cyclones.

When faced with these impacts, our resilience will depend on the scale and pace of global temperature rise and associated climatic trends such as precipitation, sea level rise, humidity, temperature and the frequency and intensity of extreme weather events.

We used the Runaway Climate Change scenario to test our strategic risks and opportunities for physical impact, as this presents the most chronic and acute modelled physical impacts.

This analysis gives us, and our stakeholders, insights on where we may experience material impacts due to physical climate change, beyond those incorporated into our base case. Importantly, it also provides drivers, or signposts, for adapting on time.

We started with our Australian operations in FY18 and in FY19 we did similar assessments for our Southern African, Mozambican and Colombian operations. We also started analysis on our key development options over the course of FY19.

We built our methodology around climate data projections that aligned with the Runaway Climate Change scenario. These were largely sourced from the Mining Climate Assessment (MiCA) tool available through the ICMM database (using linear extrapolation from 2035 as a proxy for 2040). We also used other sources, such as:

- The Bureau of Meteorology;
- Commonwealth Scientific and Industrial Research Organisation;
- South African Weather Service;
- Instituto de Hidrología, Meteorología y Estudios Ambientales; and
- The National Oceanic and Atmospheric Administration.

Based on these resources, we developed projections for several key measures, such as temperature increase and precipitation, at the locations of each operation. We'll plausibly operate/manage these through to 2040, based on their reserve lives and post-closure rehabilitation activities. We used a range of technical resources and methodologies to develop a fit-for-purpose approach to this analysis. You can find a worked example on page 42.

We considered each operation separately, and assessed resilience across three key impact categories: asset integrity and production continuity, maintaining supply chain and logistics, and worker health. We also considered several drivers to give a range of possible outcomes to 2040. These included:

Exposure: A rating of exposure to acute and chronic physical climate change projected for an operation's location;

Sensitivity: A rating to reflect financial or other critical impacts that consider existing operational design, infrastructure and supply chain factors; and

Adaptive Capacity: A rating to reflect an operation's capacity to adapt to avoid the critical impacts, based on an understanding of availability, current technology or other adaptation options.

Looking at the results, we found where we need to reprioritise our attention for designing and planning for resilience. We'll use these results in our ongoing planning process, as we assess signposts for realising this or other scenarios.

This includes making timely and pragmatic decisions on future infrastructure investments we need to preserve the value of our operations, as well as to help us avoid maladaptive investments.

(17) This section refers to South32 operational resilience under the Runway Climate Change scenario. As such, the descriptions of resilience here are not South32 forecasts, but describe what we have assessed could happen if the world's climate progressed in line with the Runaway Climate Change scenario, as described on page 30.

(18) Projected change in global mean surface temperature for the late 21st century, relative to the 1986–2005 period – IPCC 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

ASSESSMENT EXAMPLE: MOZAL ALUMINIUM RUNAWAY CLIMATE CHANGE SCENARIO AT 2040

Table 3 Mozal Aluminium Runaway Climate Change Scenario at 2040

Climate stressor	Examples of impacts considered for all South32 operations	Relative assessment of resilience in 2040 Runaway Climate Change scenario – Mozal Aluminium
Changes in extreme weather patterns	Containment failure in dams following intense rainfall	Moderate resilience
	Containment failure in facilities following intense rainfall	Moderate resilience
	River flooding affects mine and processing operations	High resilience
	Cyclones or storms affect port and rail operations	Moderate resilience
Warmer temperatures and lower rainfall	Bushfires affect operations	Very high resilience
	More dust created by our mining and processing activities	Moderate resilience
	Droughts affect water supply to operations	Moderate resilience
	Droughts affect hydroelectric power supply to operations	Low resilience
Warmer temperatures and more frequent heatwaves	Hotter weather affects how we manage gas levels in underground mines and in processing facilities	Very high resilience
	Heat interrupts flight operations	Not applicable
	Heat interrupts rail operations	Not applicable
	Power supply to operations interrupted	Low resilience
	Heat affects worker health and safety	High resilience
Warmer temperatures and more rainfall	Conditions affect where and when our locations are receptive to malaria	Very high resilience
	Water and food-borne diseases affect worker health	Moderate resilience

Impact category key

- **Asset integrity and production continuity:** Impacts which could directly affect the operation's capacity to operate safely and maintain planned production levels (e.g. direct damage from severe storms, flooding from intense rainfall events, productivity decline from increasing dust creation).
- **Maintaining supply chain and logistics:** Impacts which could materially affect access to critical inputs and delivery of products to key locations (e.g. storms affecting port and rail integrity, drought affecting hydroelectric power supply, heat interrupting flight operations).
- **Worker health:** Impacts on the health and safety of our employees (e.g. heat-related illness, increased malaria risk due to regional climate changes).

Resilience key

- **Very high resilience** has been attributed where, under this scenario, our operations have been assessed as highly unlikely to be impacted in 2040 for this driver.
- **High resilience** has been attributed where, under this scenario, our operations have been assessed as unlikely to be impacted in 2040 for this driver.
- **Moderate resilience** has been attributed where, under this scenario, our operations have been assessed as may be impacted in 2040 for this driver.
- **Low resilience** has been attributed where, under this scenario, our operations have been assessed as likely to be impacted in 2040 for this driver.
- **Very low resilience** has been attributed where, under this scenario, our operations have been assessed as highly likely to be impacted in 2040 for this driver.

CASE STUDY:
MOZAL ALUMINIUM DESALINATION

Our Mozal Aluminium smelter in Mozambique was experiencing water shortages during FY17. Our recent climate resilience assessment for Mozal showed an increasing likelihood of drought conditions in the future.

As a short- to medium-term solution, we leased a desalination plant while exploring alternative long-term water supply options. This decision led us to invest in a modular desalination plant, which meant we could secure a reliable source of water for the operation. This also had the added benefit of reducing the need to draw freshwater from the Umbeluzi River – otherwise used by local communities during times of water stress.

The new desalination plant became operational from FY18, and in FY19 was fully integrated into our operational infrastructure. Located at the port facility, water is currently trucked from the desalination plant to our smelter. This is the second desalination plant we've integrated into our African operations to mitigate climate change risk since FY16, the first being built at our Hillside Aluminium smelter in FY17. We recently commenced a feasibility study to assess the most efficient long-term approach to transporting these volumes.

We're also continuing to focus on developing sustainable water sources and strategies for our Mozal Aluminium operation. This year we set a contextual water target that is centred around catchment-based water management. The following qualitative target has been developed:

> *"We will develop an integrated and catchment-wide water management plan by the end of FY20, with the expectation that the plans will be fully implemented by FY23."*

To read more about our contextual water targets, please see Our Approach to Water Stewardship report at *www.south32.net*

POTENTIAL PHYSICAL IMPACTS FOR OUR OPERATIONS USING THE RUNAWAY CLIMATE CHANGE SCENARIO

GEMCO (manganese)

Adaptation focus indicated under the Runaway Climate Change scenario

- More cyclone events may severely damage port infrastructure. *Adaptation options include designing for greater tolerances, or infrastructure that can be installed and reinstated quickly.*

Worsley Alumina

Adaptation focus indicated under the Runaway Climate Change scenario

- Drier conditions may lead to increased dust. *Adaptation options include additional dust suppression methods not involving water; and*
- Drought affects water supply to operations. *Adaptation options include water efficiency, climate independent water sources and/or developing processes that do not require water.*

Cannington (silver, zinc and lead)

Adaptation focus indicated under the Runaway Climate Change scenario

- Extreme weather at Townsville may affect access to the airport, port and rail. *Adaptation options involve considering third party adaptation efforts, as well as alternative railing and shipping to allow for disruption;*
- Drier conditions may lead to increased dust. *Adaptation options include additional dust suppression methods not involving water; and*
- Drought may affect water supply to operations. *Adaptation options include water efficiency, climate independent water sources and/or developing processes that do not require water.*

Illawarra Metallurgical Coal

Adaptation focus indicated under the Runaway Climate Change scenario

- *The scenario analysis showed that Illawarra Metallurgical Coal has no material requirement for adaptation in the current assessment.*

TEMCO (manganese)

Adaptation focus indicated under the Runaway Climate Change scenario

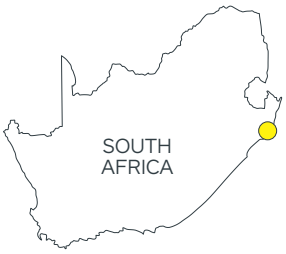
- *The scenario analysis showed that TEMCO has no material requirement for adaptation in the current assessment.*

POTENTIAL PHYSICAL IMPACTS FOR OUR OPERATIONS USING THE RUNAWAY CLIMATE CHANGE SCENARIO

Hillside Aluminium

Adaptation focus indicated under the Runaway Climate Change scenario

- Power supply to operations may be interrupted during heatwaves. *Adaptation is heavily reliant upon the power provider to enhance reliability and capacity of generation, transmission and distribution facilities.*



Mozal Aluminium

Adaptation focus indicated under the Runaway Climate Change scenario

- Power supply to operations may be interrupted during heatwaves or drought conditions. *Adaptation is heavily reliant upon the power provider generation, transmission and distribution facilities.*

South Africa Manganese

Adaptation focus indicated under the Runaway Climate Change scenario

- Drought may affect water supply to operations. *Adaptation options include water efficiency, climate independent water sources and/or developing processes that do not require water.*

Cerro Matoso (nickel)

Adaptation focus indicated under the Runaway Climate Change scenario

- *The scenario analysis showed that Cerro Matoso has no material requirement for adaptation in the current assessment.*

GLOSSARY OF TERMS

Alumina

Alumina is produced from bauxite in the Bayer refining process. It is then converted (reduced) in an electrolysis cell to produce aluminium metal.

Bauxite

Principal commercial ore of aluminium.

Biodiversity Banking and Offsets Scheme

The New South Wales Government in Australia introduced the Biodiversity Banking and Offsets Scheme (BioBanking scheme) to help address the loss of biodiversity values, including threatened species, due to habitat degradation and loss.

BioBanking enables 'biodiversity credits' to be generated by landowners and developers who commit to enhance and protect biodiversity values on their land through a BioBanking agreement. These credits can then be sold, generating funds for the management of the site. Credits can be used to counterbalance (or offset) the impacts on biodiversity values that are likely to occur because of development.

The credits can also be sold to those seeking to invest in conservation outcomes, including philanthropic organisations and the government.

Carbon Capture and Storage (CCS)

Carbon capture and storage is about mitigating global warming by capturing carbon dioxide from large point sources, such as fossil fuel power plants, and storing it instead of releasing it into the atmosphere.

Carbon emissions

For our reporting purposes, these are the aggregate carbon dioxide equivalent (CO_2 -e) emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). We measure emissions according to the World Resources Institute/World Business Council for Sustainable Development Greenhouse Gas Protocol.

- Scope 1 carbon emissions –refers to direct carbon emissions from operations
- Scope 2 carbon emissions – refers to indirect carbon emissions from the generation of purchased electricity
- Scope 3 carbon emissions – refers to the carbon emissions in our supply chain

Coking coal

Used in the manufacture of coke, which is used in the steelmaking process by virtue of its carbonisation properties. Coking coal can also be referred to as metallurgical coal.

Electric vehicles

Vehicles that use one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off- vehicle sources, or may be self-contained with a battery, solar panels or a generator to convert fuel to electricity. Vehicles include road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft.

Electric Arc Furnace (EAF)

A furnace that heats charged material by means of an electric arc (an electrical breakdown of a gas that produces an ongoing electrical discharge).

Energy coal

Used as a fuel source in electrical power generation, cement manufacture and various industrial applications. Energy coal is also referred to as steaming or thermal coal.

ESG

Environmental, social and governance

GC

Global Co-operation climate change scenario (two degrees).

Gross Domestic Product (GDP)

The total value of goods produced, and services provided in a country for one year.

Greenfield

Greenfield development refers to a new venture or operation, without any association or proximity to a current operation.

Intergovernmental Panel on Climate Change (IPCC)

The IPCC is the international body for assessing the science related to climate change. The IPCC was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Program (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.

International Energy Agency (IEA) The IEA is a collaborative organisation of 30 member countries. Its aims include energy security and economic development. It develops and publishes a range of reference materials including the WEO and IEA Market Reports.

Metallurgical coal

This refers to all coal used in the process of steelmaking. It can also be referred to as coking coal.

Paris Agreement

A global climate agreement that was agreed under the United Nations Framework Convention on Climate Change (UNFCCC) at the 21st Conference of the Parties (COP21) in Paris (30 November to 12 December 2015). The Paris Agreement sets in place a durable and dynamic framework for all countries to take climate action from 2020, building on existing international efforts in the period up to 2020.

Portfolio resilience

Financial resilience of our commodity portfolio to the range of climate-related transition risks which may arise.

PP

Patchy Progress climate change scenario (three degrees and base case for scenario analysis).

RCC

Runaway Climate Change scenario (four degrees).

Renewable energy

Renewable energy is produced using natural resources that are constantly replaced and never run out.

Risk Management Framework

A framework that sets out the overall approach to risk management of South32 Limited and its subsidiaries (the Company). It applies to all employees, Directors and contractors of the Company. You can find this on our website at: *www.south32.net/who-we-are/corporate-governance*

SAEC

South Africa Energy Coal.

Task Force on Climate-related Financial Disclosures (TCFD)

The Task Force on Climate-related Financial Disclosures (TCFD) produced guidance for voluntary climate-related financial disclosures that are consistent, comparable, reliable, clear, and efficient, and provide decision-useful information to lenders, insurers, and investors.

Transition Risks

TCFD defines these as non-physical risks arising from the structural shift towards a low-carbon energy system, most significantly policy, legal, technology, and market changes.

Depending on the scope and pace of these changes, varying levels of financial and reputational risk may arise for organisations.

World Energy Outlook (WEO) Energy analysis and long-term projections published by the International Energy Agency based on current policy, markets and technologies.

World Resources Institute Aqueduct Tool

A global water risk mapping tool that helps companies, investors, governments and other users understand where and how water risks and opportunities are emerging worldwide. The tool uses a peer reviewed methodology and the best-available data to create maps of water risk

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