



Building climate capability
For a resilient mining sector

Contents

Introduction	1
The case for resilience	3
The current state of play	5
What is climate resilience	7
Why climate resilience is important for the mining sector?	9
What climate capabilities do miners need now and in the future?	13
What actions mining organisations need to take next	17
Jargon buster	19
Contact us	21



Introduction

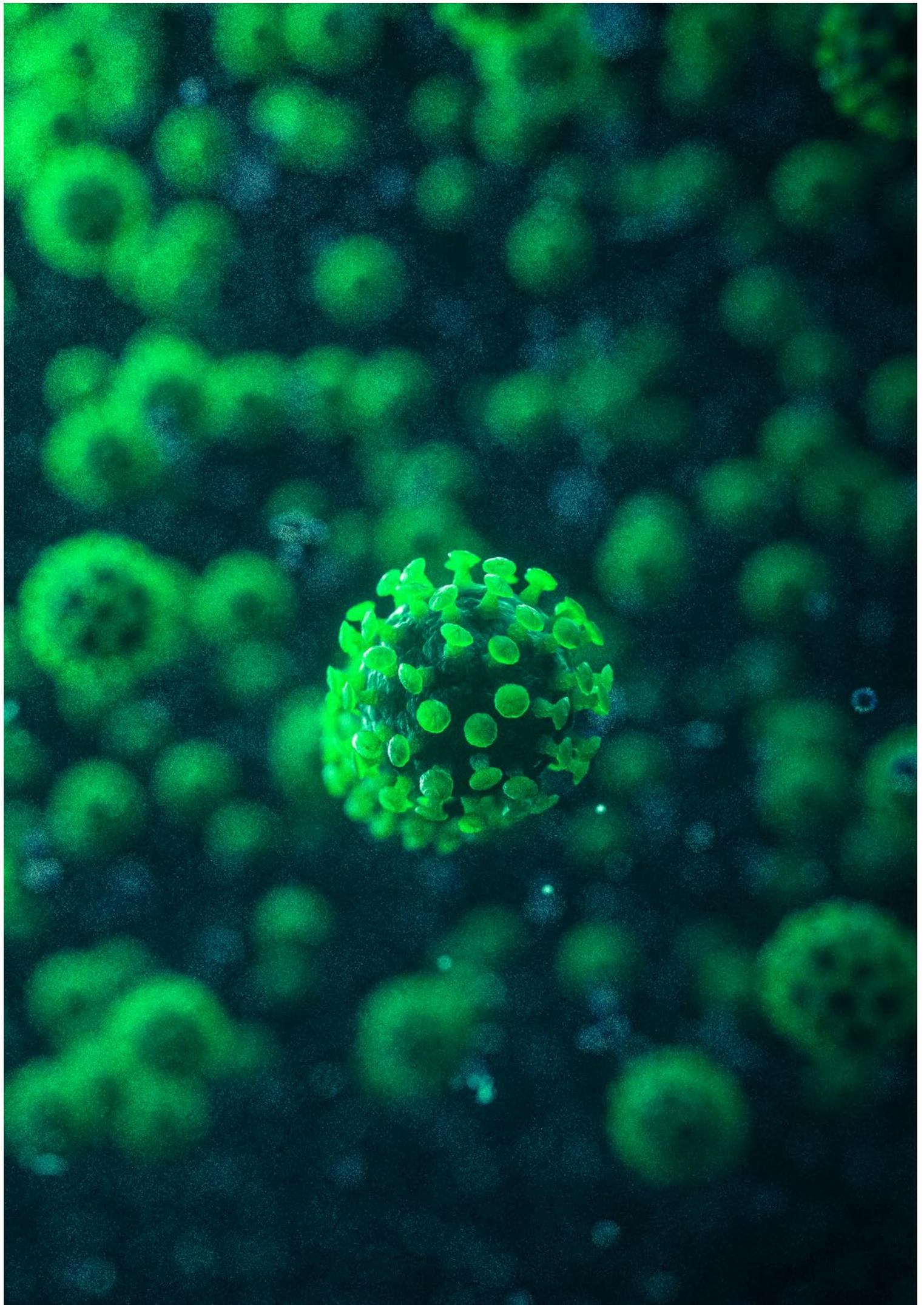
Globally, few organisations were adequately prepared for the turmoil that inundated 2020. The confluence of a global health pandemic, social and political unrest, and worsening climate events upended the private and public sectors around the world, and Western Australia was not immune. Mounting challenges during the year expanded the concept of preparedness in ways many leaders didn't anticipate and pressured them in ways many couldn't imagine.

While Australia's mining companies responded to the events of 2020 with great strength, showing enormous adaptability and resilience, the industry will continue to face many disruptive forces.

We are already seeing some of these forces at play: the impact of technology on automation in jobs, the changing expectations of investors and shareholders, the changing climate of the planet. Some of these forces may be sudden, severe storms causing a serious rock-fall event in the Super Pit in Kalgoorlie, Western Australia, or another black swan event like the pandemic.

How do Australian mining companies prepare themselves for these disruptions, be they incremental or sudden, small or catastrophic?

While nobody can predict the future with absolute certainty, looking to trends in climate science and in the changing nature of work and the workforce, we can at least ready our industry for change.



The case for resilience

Charting a course of resilience, whether for an industry or for an organisation, requires good leadership. Good leaders who steer resilient organisations share common traits: they are prepared, they are adaptable, they are collaborative, trustworthy, and responsible. Leaders that plan and invest in anticipation of disruption—whether it’s a gradual transformation or a sudden pandemic—are better positioned to adapt, rebound, and endure.

Having all lived through the events of 2020, we can’t help but play the thought experiment of what we would have done differently, had we known what was coming. Looking back, we can see the risks that were ever-present, the exposures and the concerns. We had to change the way we operated in 2020, quickly, and now we are in a fortunate position to review, rethink and replan with the benefit of relative stability and a more considered pace.

Traditionally we think about the impacts of climate change as gradual: a gradual warming of the planet, a gradual rising of the oceans. We have also

witnessed events of extreme weather such as the bushfires of December 2019 and the recent heatwave in North America that are anything but gradual. Mining organisations have the opportunity in front of them today to both prepare for the gradual and prepare for the sudden impacts of climate change.

This is not another black swan event;

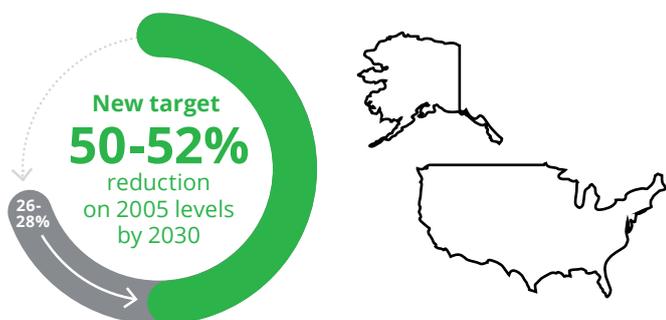
We know the risks we are facing. We have a decision to make now as to how we invest in our climate capability for a resilient mining sector.



The current state of play

Following the Leaders' Summit on Climate¹ in April 2021, a series of commitments by the world's leading economies were made to keep **average global warming to 1.5 degrees celcius**. This means that **70% of the global economy** is now covered by a net zero target.

Summary of global climate commitments



USA

New target of 50-52% reduction on 2005 levels by 2030 (up from 26-28%). Strategic alliances have been formed with the UK, Japan, China and India to accelerate the transition to a lower-carbon economy.



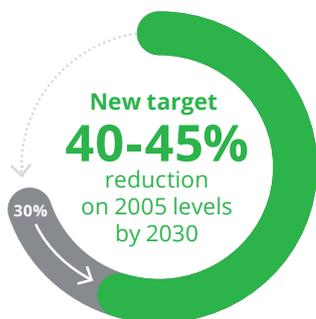
EU

55% reduction on 1990 levels by 2030 (up from 40%). A net-zero 2050 target is also to be legislated.

China

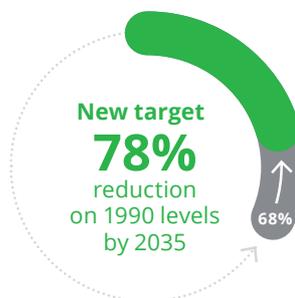
Market expectation is China will legislate and economic-wide, national emissions trading scheme in 2021. China also aims to be net zero by 2050.

¹ <https://www.state.gov/leaders-summit-on-climate/>



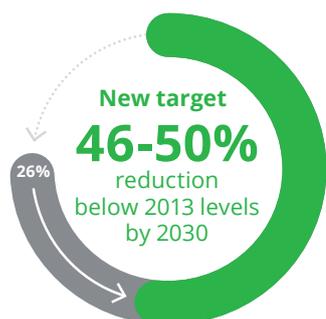
Canada

40-45% reduction on 2005 levels by 2030 (up from 30%).



UK

78% reduction on 1990 levels by 2035 (increase from 68% by 2030).



Japan

46-50% below 2013 levels by 2030 (up from 26%).



Korea

Committed to reach net zero by 2050 (announced in 2020).

Global, regional, country and local commitments have a direct and/or indirect impact on mining and metals companies, and the sector is responding.

- The top 20 miners by market cap represent ~US\$1 trillion in value
- >70% of the ~US\$1 trillion is subject to a net zero commitment
- This compares to late last decade, where the targets were mostly aspirational statements
- In the past 12 months, nearer term 2030 targets are being set by the majors including BHP and Rio Tinto and the mid-market is also making tangible commitments to decarbonise.

What is climate resilience

Whilst the recent net zero commitments from governments and organisations are truly transformational, they only tell half of the story.

Climate resilience is not just about reducing emissions.

Guidance from the Taskforce of Climate-related Financial Disclosure (TCFD) describes the concept of climate resilience.

*“... organizations developing **adaptive capacity** [the ability to adapt] to respond to climate change to better manage the associated risks and seize opportunities, including the ability to respond to transition risks and physical risks.”²*

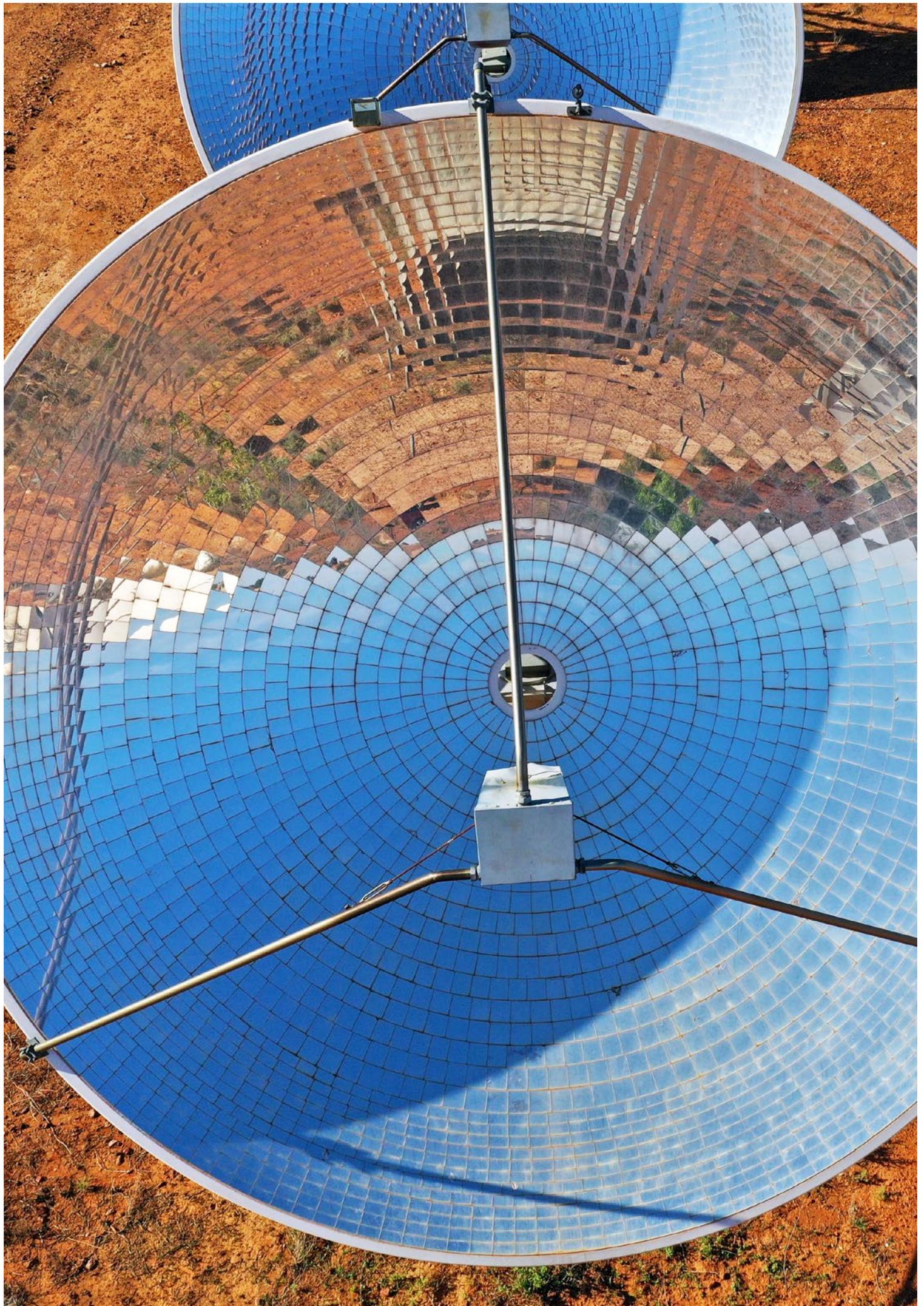
Transitional risks and opportunities are influenced from governments and markets while physical risks and opportunities refer to the impacts from the changes in the climate.

For the mining sector, this will have much broader impacts beyond the mine gate. Climate resilience moves beyond operating assets to broader value chain impacts.

- **How climate resilient is your value chain?**
- **How exposed are your off-takers or end consumers?**
- **How do you compare to your peers and competitors?**
- **Will buyers compare the emissions intensities of commodities from different mines?**
- **Will decarbonisation positively or negatively impact your overall climate resilience?**

Like with any change, opportunities and threats emerge; but there are systematic approaches to understand and plan for such issues. This paper explores what is underpinning climate resilience, why this is important to the mining sector and some practical steps for miners to consider.

² <https://www.fsb-tcfd.org/>



Why climate resilience is important for the mining sector?

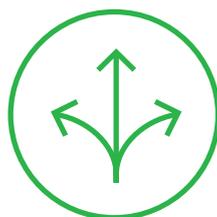
Climate resilience driving forces

The bedrock for climate resilience is climate science, and the science is getting stronger by the day. The relationship between increasing greenhouse gases in the atmosphere and increased global temperatures has been long established and is irrefutable. What we are seeing more of recently, as our climate modelling capabilities and methodologies become more sophisticated, is the clear link between human-related activities impacting the Earth's climatic system and which ultimately lead to catastrophic outcomes if not addressed.

An important scientific milestone is happening with the Intergovernmental Panel on Climate Change (IPCC) now in its sixth assessment cycle. This assessment includes deep dives into specific relevant areas of the science looking at impacts, adaptations and vulnerabilities and the associated mitigation options. A report of their findings will be released in late 2022 (the AR6 Synthesis Report). The significance of this report is the impacts that it will have politically, socially, and economically. It will be utilised by financial markets and investors, customers and communities to understand climate-related exposures and fundamentally inform strategic responses.



Climate related risk



Driving forces



Stakeholder responses

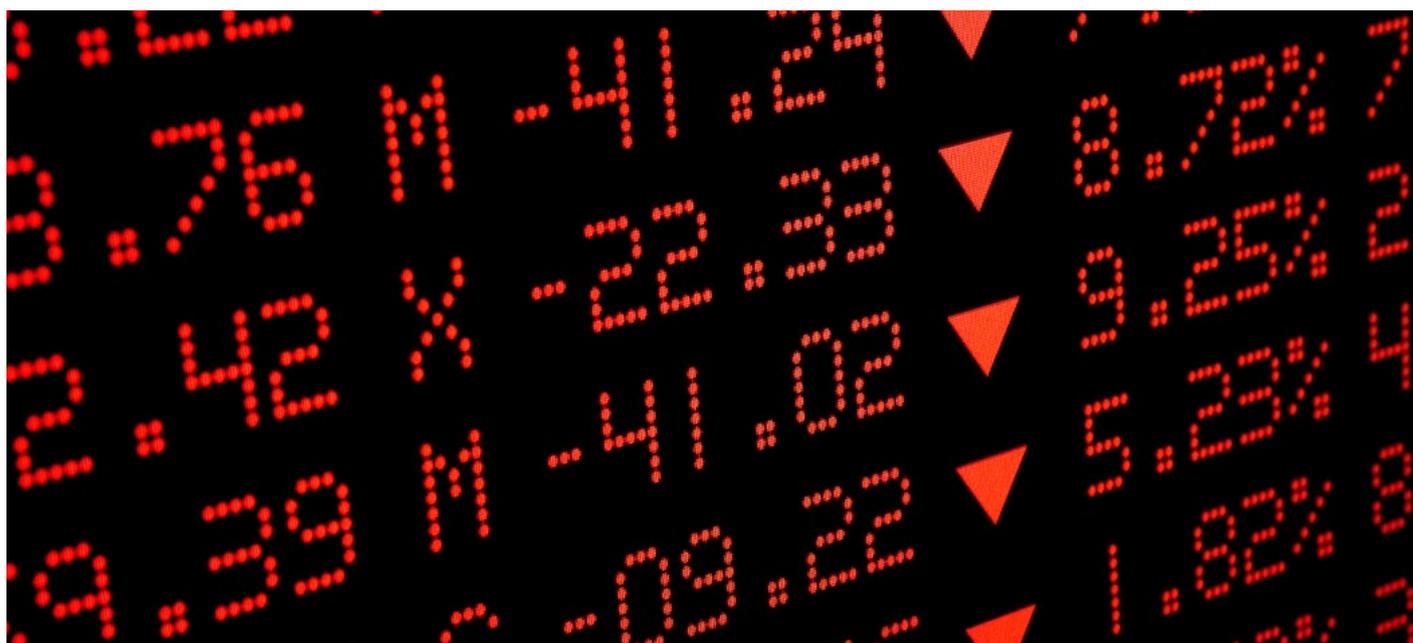
What are climate-related risks?

A detailed understanding of both physical and transitional climate risks under a variety of future scenarios is critical to understand the risks that are embedded in your current business model.

Physical risks resulting from climate change can be event driven (acute) or longer-term shifts (chronic) in climate patterns. Physical risks may have financial implications for organisations, such as direct damage to assets and indirect impacts from supply chain disruption. Organisations' financial performance may also be affected by changes in water availability, sourcing, and quality; food security; and extreme temperature changes

affecting organisations' premises, operations, supply chain, transport needs and employee safety. Transition risks are climate-related risks (e.g. policy and regulation, technology development, consumer/market preferences) resulting from mitigation challenges as societies decarbonise.

Climate resilience involves organisations developing the ability to adapt to and respond to climate change to better manage these risks and seize opportunities. The challenge of course is that the future is not certain, so developing a range of contingency plans that can be enacted as the future unfolds is critical.



Driving forces

Theme	Current view	Looking forward
Financial markets and investors	<ul style="list-style-type: none"> Investors are challenging companies to rethink their portfolios and future capital investments to reduce climate risk Financial institutions are including an assessment of climate risk as they determine the cost of capital for organisations Some financiers and insurers are adopting clean lending targets and will change their portfolios to meet those targets Investors are seeking to understand the compatibility of their investments with a carbon-constrained future. 	<ul style="list-style-type: none"> COP26 in Glasgow in November 2021 will see the launch of global frameworks for financiers to assess the emissions associated with their debt and equity – so called ‘financed emissions’ This started with the bigger mining companies, but this is now becoming an expected part of the due diligence process for the mid-market The investment community will increasingly focus on the types of models and scenarios utilised to compare across their lending portfolios Investors will want to see demonstrated progress to implement high level strategies through projects Investors seek to understand how to measure the climate resilience of their investments Financiers will benchmark commodities on emissions intensity.
Supply chain and community pressure	<ul style="list-style-type: none"> Customers are increasing their expectations around low or zero carbon commodities. This pressure will shift upstream as market expectations pivot to lower emissions products from batteries to cars to buildings to consumer goods We are already seeing the emergence of “green” nickel for batteries or carbon-neutral copper for electrification. European vehicle manufacturers are actively exploring green steel opportunities. In time this will spread to all commodities across all markets. 	<ul style="list-style-type: none"> Traceability will be critical - how do we create a traceable value chain that is tracking emissions intensity through chemical tracing, physical tracing or technology tracing? How do we account for carbon border adjustment impacts (incl. tax implications)? Low carbon products are unlikely to attract a premium price for long but will become a ‘ticket to play’ in a growing number of supply chains.

Theme	Current view	Looking forward
Policy, regulation & litigation	<ul style="list-style-type: none"> In 2015 the Paris Agreement established the long-term intent to limit global warming to well below 2 degrees Celsius. The increasing number of legal challenges to resource companies and governments, such as the ruling against Shell in the Netherlands and the ongoing action against Whitehaven in Australia COP26 – the progression of Article 6 of the Paris Agreement that focuses on the development of global carbon markets. 	<ul style="list-style-type: none"> Global carbon pricing mechanism and index Border adjustment taxes in Europe, the United States or elsewhere Alternative carbon trading mechanisms implemented within organisations, within sectors and across peers.
Technology	<ul style="list-style-type: none"> Technology is driving significant change with the learning rates, price pathways and adoption rates of clean technology increasingly challenging existing technology solutions This is providing the mining sector with options that will lead to changes in the way mines are designed and operated. These go hand in hand with automated and smarter operations. 	<ul style="list-style-type: none"> Move to adaptation and geo-engineering solutions Carbon drawdown technology such as Direct Air Capture deployed.

The climate challenge is pervasive and complex. The above future trends have considered those that are likely to unfold – it is also possible that more extreme reaction may be seen across stakeholders over the next few years. We need to make choices,

about how we make our operations and supply chains more resilient to climate change and how we mitigate emissions not only at our operations but through our value chains.

What climate capabilities do miners need now and in the future?

As the market forces and commitments intensify, it will be important to have the right climate capabilities in place. What climate capabilities are needed now and in the future? It's not just about securing talent, climate capability requires capability to be embedded within an operating model. For each area of capability, it is possible to break down the requirements into six facets:

Mission

The purpose of a capability, how it will operate, and what value it will deliver.

Insights

The decision flow, information, and analytics that drive more informed and timely decision making.

Process

An integrated and efficient set of processes and activities designed to achieve a desired outcome.

Technology

The technologies (software and hardware) and tools required to enable the capability.

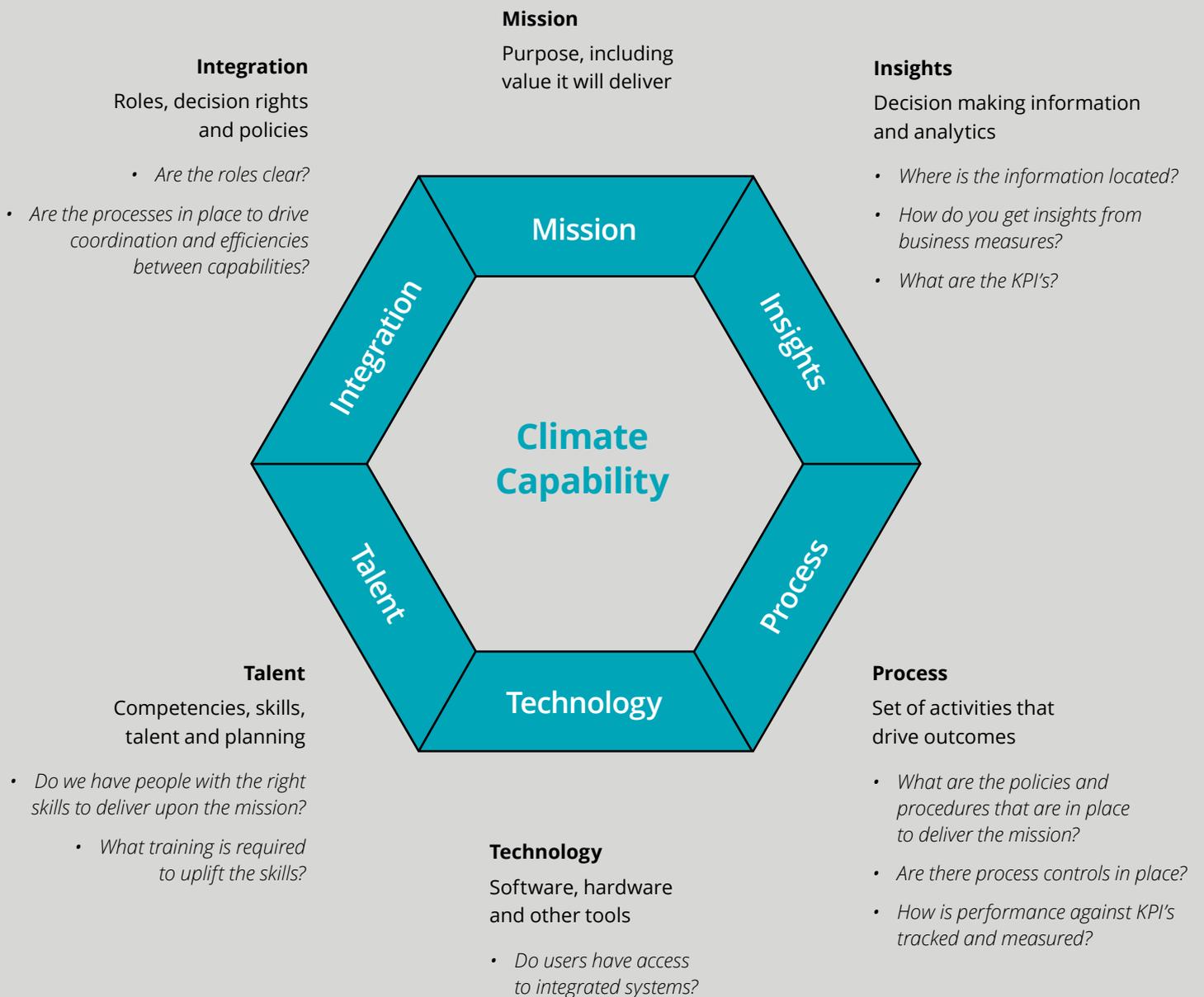
Talent

The competencies, skills, talent infrastructure and workforce planning that enable an optimal talent base to execute the capability.

Integration

Clear roles, decision rights, and policies that facilitate integration within and across other capabilities, functions and partnerships.

The Capability Hexagon™³



³ <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-sdt-think-big-business-transformation.pdf>

Whilst many companies are making good strides to implement clear emissions reduction projects such as buying renewable energy or increasing the energy efficiency of materials movement, without a broad capability build, this can often be undone by decisions made across the rest of the business.

When planning the areas of capability build that will be needed going forward, it is important to think beyond just the development of the initial strategy. Understanding climate scenarios, global trends and physical climate risks is critical and requires some very specific skills. These may be new to the company and will allow for the announcement of targets and mitigation strategies, but more still will be required to build resilience into the company's operations. For that, a broader capability building exercise is required to enable effective climate-resilient decision making across all areas of the business including areas as diverse as capital allocation, financial reporting, procurement and mine expansion planning.

A principle that needs to be driven across all aspects of company operations is that no decision will make decarbonisation harder – even if the impact of that decision is not felt for many years.

One of the big unknowns – and hence a core tenant of resilience – is the speed at which decarbonisation is going to be required by stakeholders.

By way of example, whilst a decision such as procuring new diesel mine trucks may fit nicely with a 2050 net zero strategy, it is going to become problematic if that target is forced to become 2035. Conversely, electric or hydrogen mine trucks are not yet readily available, and it remains unclear which of those technologies may end up being favoured in different mining environments. As they enter the market, maybe choosing an electric drive chain keeps options open as to whether that will eventually be powered by batteries or fuel cells. Another option might be to underwrite low or zero carbon drop-in biofuels production for the next five years until the newer technology is proven up.

Understanding the scenarios for stakeholder pressure and requirements is going to be critical in making no-regrets decisions and to maintaining optionality. A resilient mine will have a clear plan to rapidly decarbonise if its markets, financiers or regulators demand it – but does not want to needlessly invest if this pressure does not really hit for another ten years or more. It is going to be critical to have multiple options at the ready and to understand the trigger points as to when each might be best implemented as actual scenarios emerge.

Function	Areas of Capability Build	Contribution to Climate Resilience
Finance	<ul style="list-style-type: none"> Understanding the trends playing out across the global financial sector and how that is going to impact the company. 	<ul style="list-style-type: none"> Ensuring competitive cost of capital, robust valuations and strong support .
Commercial	<ul style="list-style-type: none"> Understanding the emissions profiles of major goods and services procured by the company, how that will impact the company's Scope 3 emissions and what options are available at what cost Understanding supply chain vulnerabilities from climate impacts. 	<ul style="list-style-type: none"> Providing optionality to the company to change its upstream value chain profile to ensure products are attractive to buyers Ensuring supply chain resilience to prevent negative productivity impacts.
Commercial	<ul style="list-style-type: none"> Understanding of the pressure on customers and their downstream customers and how product options might help resolve emerging issues for them. 	<ul style="list-style-type: none"> Ensuring strong buyer support for products as the company seeks to meet customer needs as they change – noting that they might change rapidly.
Operations	<ul style="list-style-type: none"> Having a clear plan to decarbonise all aspects of operations at a variety of speeds Understanding the potential needs to decarbonise some commodities ahead of others to meet market needs even if that is not the least cost abatement pathway Understanding potential risks of severe or chronic climate changes on the operability of the mine and developing contingency plans. 	<ul style="list-style-type: none"> Enables the company to react to unfolding pressures to reduce Scope 1 and Scope 2 emissions Ensuring mine operations drive productivity regardless of changes to the operating environment.
Asset Management	<ul style="list-style-type: none"> Understanding how mine planning will need to adjust to facilitate both decarbonisation and resilience to changing climate patterns Developing scenarios for different climate pathways. 	<ul style="list-style-type: none"> Building in climate resilience to design, expansion and construction decisions to ensure that the future mine can be operated in a way to meet the changing needs of stakeholders.
Strategy & Portfolio Management	<ul style="list-style-type: none"> Build a deep understanding of global decarbonisation pathways under different scenarios and how that will impact demand for commodities – both positively and negatively. Rapid decarbonisation will need significant quantities of new materials which presents very material opportunities for forward-looking miners. 	<ul style="list-style-type: none"> Building portfolio resilience that can thrive regardless of the scenario that is followed Having clear trigger points at which to make portfolio realignment decisions.

What actions mining organisations need to take next

Mining organisations wanting to build climate capability for resilience should consider working through the following checklist to ascertain their level of climate resilience.

Initially this is an exercise that can be undertaken internally to understand the capabilities within the organisation to make these assessments, with a view to partnering with subject matter experts in climate change and decarbonisation in the medium to longer-term.

For all mining organisations, but in particular smaller mid-cap miners, we would also strongly encourage collaboration and sharing between sector peers -everyone is grappling with the same challenges and will benefit from shared experiences.

While organisations that build climate capability will realise many benefits including access to more attractive financing, stronger employee recruitment and retention, and cheaper energy costs, collaboration is likely to drive better outcomes locally to increase competitiveness in global markets. As the saying goes, 'if you want to go fast, go alone; if you want to go far, go together'.

The more sharing we can do as an industry, the smaller the problem will become and the easier it will be to find and to implementation solutions.

Action areas	Assessment
Risk and opportunities	Have you completed a full risk and opportunity assessment of your operations, value chain and operations that will be impacted by the world's transition to low or zero carbon?
Physical and transitional scenario analysis	<p>Have you developed scenarios for your assets and operations that demonstrate how these risks will play out and what your optimum responses will be under each scenario?</p> <p>Have you 'war-gamed' your planned responses to scenarios to test their resilience to unexpected events?</p>
Financial impact assessment	Have you assessed the specific financial impacts for your company under different scenarios in terms of share registry composition, cost of capital, alternative sources of sustainable finance, revenue impacts?
Value chain assessment	<p>Have you assessed your value chain both upstream and downstream to understand where weaknesses or issues may emerge under different scenarios?</p> <p>Have you started to align your value chain with companies that have similar climate targets so that your Scope 3 emissions are solved by their action on their own operations' emissions?⁴</p>
Tell your story	<p>Have you built a strong narrative for all your stakeholders of how you have developed your strategy to have resilience regardless of which climate scenario emerges?</p> <p>Is your narrative robust and based in climate science and comprehensive market analysis?</p> <p>Have you clearly articulated options you might consider under different scenarios?</p>

⁴ <https://www.citivelocity.com/citigps/net-zero-club/>

Jargon buster

The jargon	Definition	Relevance
Greenhouse Gas (GHG)	GHGs absorb and emit infrared radiation in the wavelength range emitted by Earth. They include water vapor, carbon dioxide, methane, nitrous oxide, ozone, CFCs and HCFCs.	This is the starting point for any organisation – what is your contribution to the problem?
Scope 1 Emissions	Emissions released on site from combustion of fossil fuels, through processing or from leakage of GHGs.	These emissions are within your control and the direct result of your operations.
Scope 2 Emissions	Emissions released in the generation of any energy sources imported to your site – usually from electricity production.	These emissions are effectively bought so can be managed through contractual arrangements.
Operational Emissions	Scope 1 and Scope 2 emissions combined.	The focus of many current emissions reduction targets.
Scope 3 Emissions	Value chain emissions emitted in the making or transport of products you buy and the transport and use of products you sell.	These emissions are mostly not within your control but require working with others to reduce them. Likely to become the focus of future targets in time.
United Nations Framework Convention on Climate Change (UNFCCC)	The UNFCCC is the main international treaty on climate change. The objective of the UNFCCC is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human interference with the climate system.	This is the body that is guiding the global discussion and activity.
Intergovernmental Panel on Climate Change (IPCC)	Body established by the United Nations in 1988 to drive global action.	The IPCC produces reports that contribute to the work of the UNFCCC.
Paris Climate Agreement	The Paris Climate Agreement under the UNFCCC was negotiated by representatives of 196 state parties at the 21st Conference of the Parties in Paris in 2015.	This has set the standard against which your organisation will be judged – are you aiming to do your fair share of the reductions needed?

The jargon	Definition	Relevance
Taskforce on Climate-related Financial Disclosures (TCFD) framework	<p>In December 2015, the Financial Stability Board (FSB) established the industry-led Task Force on Climate-related Financial Disclosures (TCFD or Task Force) to develop climate-related disclosures that could promote more informed investment, credit [or lending], and insurance underwriting decisions and, in turn, enable stakeholders to better understand the concentrations of carbon-related assets in the financial sector and the financial system’s exposures to climate-related risks.</p>	<p>This provides you with the global financial framework to report risks to your stakeholders.</p>
Transition risk	<p>Financial risks from issues such as policy constraints on emissions, imposition of carbon tax, water restrictions, land use restrictions or incentives, and market demand and supply shifts.</p>	<p>The risks from changes driven from governments and markets.</p>
Physical risk	<p>Financial risks from issues such as the disruption of operations or destruction of property.</p>	<p>The risks from the physical changes in the climate.</p>
Climate-related opportunities	<p>Financial opportunities such as access to new markets and new technologies.</p>	<p>These are how your organisation can build a strategic competitive advantage from the changes underway.</p>



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