Minerals Council of Australia

CLIMATE ACTION PLAN

PROGRESS REPORT 2022

INSIDE

Committed to change
Industry confirms net zero by 2050 ambition

The *MCA Climate Action Plan Progress Report 2022* demonstrates the mining industry's continuing action to reduce emissions as it works towards an ambition of net zero by 2050.

The MCA and its members have continued to work on the themes, actions and activities announced in the *MCA Climate Action Plan* released in June 2020. The Plan reflects the industry's commitment to the Paris Agreement and the goal of net zero.

The confirmation of an industry ambition of net zero by 2050 was a highlight of 2021.

The announcement followed work undertaken by members and the MCA which gave the sector increasing confidence that pathways did exist, technologies were being identified and developed and that this was an achievable ambition.

This progress report also provides an update on emissions data from the federal compliance schemes – the National Greenhouse and Energy Reporting scheme (NGERs) and the safeguard mechanism.

Between FY20 and FY21, MCA member companies continued to adopt and invest in new low emissions technologies and these efforts have helped to keep emissions down with FY21 emissions reduced by 3.6 per cent, virtually level with emissions in FY18.

CLIMATE ACTION PLAN PROGRESS

93%
FULL WORK STREAM
93 per cent of Climate Action Plan measures commenced

80%
CAP PROGRESS
80 per cent of Climate Action Plan measures are on track in Year 2

3.6% ▼
SCOPE 1 EMISSIONS
Reduction in safeguard mechanism scope 1 emissions in FY21

4.7% ▼
SCOPE 1 & 2 EMISSIONS
Average reduction in NGERs scope 1 and 2 emissions in FY21

CLIMATE ACTION PLAN PROGRESS REPORT 2022

During a time when the growth of the mining industry has never been more important to the economy, emissions have been tightly managed to ensure the objective of net zero remains achievable.

The emissions performance analysis shows the industry is working hard to keep emissions as low as possible, in the face of higher demand and value growth.

During a time where the growth of Australian mining has become more important to the Australian economy, emissions have been tightly managed to ensure the ambition of net zero remains achievable.

This report provides an update on the 30 measures identified in the Climate Action Plan and how the industry is continuing to progress and take them forward.

This report also features the details of the Towards Sustainable Mining (TSM) system. MCA members will adopt the globally recognised TSM sustainability management and accountability system. The TSM protocols that MCA member companies will use to evaluate, manage and communicate their sustainability performance were finalised in 2022.

Adopting the independently verified system reinforces the sector's commitment to continual improvement in safety, environmental, social and governance performance.

A number of member climate initiatives announced during 2021-22 are also highlighted and demonstrate member commitments to emissions reduction and the vital role technology development and deployment will play in the pathway to net zero.

I commend our member companies for their support in implementing the Climate Action Plan.

Tania Constable
Chief Executive Officer
Minerals Council of Australia

KEY ACHIEVEMENTS

1. **NET ZERO BY 2050** MCA members announced industry ambition to achieve net zero emissions by 2050

2. **TOWARDS SUSTAINABLE MINING (TSM)** MCA members adopted the TSM Climate Change Protocol

3. **2030 EMISSIONS TARGET** Welcomed the certainty in government's 2030 target

Minerals Council of Australia

Recognising the challenge
A new national emissions target for 2030

In June 2022, the Australian Government lodged an updated Nationally Determined Contribution (NDC) with the United Nations Framework Convention on Climate Change (UNFCCC) secretariat.

The updated NDC:

- Reaffirms Australia's commitment to net zero emissions by 2050
- Commits Australia to reducing greenhouse gas emissions by 43 per cent below 2005 levels by 2030 – a 15 percentage point increase on Australia's previous 2030 target of 26-28 per cent below 2005 levels.

The mining industry recognises the need to reduce emissions globally, nationally and at the sites and facilities driving Australia's resources industry. Achievement of both the 2030 target and the 2050 net zero target will require close consultation with all stakeholders.

In pursuing the new target, the government has focused on two areas of policy reform – increasing renewable energy generation and reform of the safeguard mechanism.

Australia's world class resources industry is a committed partner in reducing emissions from electricity generation. Australian mining and processing will supply the minerals and metals required for this endeavour. In turn, the reduced emissions intensity of the grid will help reduce scope 2 emissions in the production of those minerals and metals.

The industry strongly supports the inclusion of technologies, such as carbon capture and storage and nuclear energy, to reach these targets in the decades ahead. These can support renewable energy in the grid, provide technology diversity and provide secure, dispatchable, zero emissions power.

The government is proposing to use changes to the safeguard mechanism to reduce scope 1 emissions. This is particularly relevant for Australia's mining sector which represents around 40 per cent of total safeguard mechanism emissions and over two-thirds of Australia's total exports.

It is vital that this reform is undertaken in consultation with critical national industries, including mining.

Changes should be managed so that industrial emissions trend towards net zero while securing the international competitiveness of Australia's world class mining industry through the steady development and take up of new technologies and processes.

Any change should ensure the costs of transitioning industries to lower emissions profiles are manageable and do not lead to premature contraction or closure and an effective shifting of emissions to other countries.

As showcased in this report, mining companies are collaborating to develop the technologies and processes to reduce direct emissions. They are supporting efforts to bring new wind and solar projects into the grid, and are collaborating with suppliers and customers to reduce emissions in the value chains.

Australian mining is committed to enabling a national and global low emissions future.

Changes should be managed so that industrial emissions trend towards net zero while securing the international competitiveness of Australia's world class mining industry.

Towards Sustainable Mining
The Australian Climate Change Protocol

The MCA achieved a milestone in 2022 with the establishment of an Australian Climate Change Protocol as part of the implementation of the Towards Sustainable Mining (TSM) reporting system.

MCA members are adopting TSM, a globally recognised accountability system which helps member companies evaluate, communicate and continually improve their environmental, social and governance (ESG) management performance. MCA members will use TSM protocols as a tool to assess the level of implementation of climate change management practices.

Established in 2004 by the Mining Association of Canada (MAC), TSM has been adopted in more than ten countries. The independently verified system reinforces the sector's commitment to continual improvement in safety and ESG performance. Performance results will be made publicly available on an annual basis, providing unprecedented transparency for industry stakeholders.

TSM comprises targeted protocols, verification and public reporting on: Communities and People, including Indigenous and community relationships, health and safety, crisis management and communication planning, and preventing child and forced labour; and Environmental Stewardship, including biodiversity conservation management, tailings management, water stewardship, and climate change.

The Climate Change Protocol will facilitate continual improvement in corporate and site-level performance, including the management of climate-related risks and opportunities, mitigation and adaptation strategies.

The Australian Climate Change Protocol will facilitate corporate and site-level management of climate risks and opportunities, mitigation and adaptation strategies.

Implementation of this protocol is intended to support companies in advancing the goals of the Paris Agreement.

The protocol aligns with the recommendations of the Task Force on Climate-related Financial Disclosures, which aim to improve the ability to appropriately assess and price climate-related risk and opportunities.

The protocol aligns with the following MCA Climate Action Plan activities:

- ACTIVITY 4.1 **Economics of net zero emissions**
- ACTIVITY 5.1 **Climate disclosure forum**
- ACTIVITY 5.2 **Align disclosure practices**
- ACTIVITY 6.1 **Assist climate planning**
- ACTIVITY 10.1 **International climate agenda**

The protocol also supports the UN Sustainable Development Goals including SDG 7 – Affordable and clean energy; SDG 9 – Industry, innovation and infrastructure; SDG 12 – Responsible consumption and production and SDG 13 – Climate action.

Emissions performance analysis
Technology helps drive emissions lower

Between July 2019 – June 2020 (FY20) and July 2020 – June 2021 (FY21), MCA member companies continued to adopt and invest in low emissions technologies. These efforts have helped keep FY21 emissions down, virtually level with FY18 emissions.

The emissions analysis uses mining-related emissions associated with MCA members' facilities under the safeguard mechanism (SGM), and reported corporate level emissions under the National Greenhouse and Energy Reporting (NGERs) scheme.

The SGM applies to facilities with scope 1 covered emissions of more than 100,000 tonnes of carbon dioxide equivalent (CO_2-e) per year.

The emissions analysis was rebased in FY21 due to changes in MCA membership. These changes were back-dated to prior reporting years to ensure consistency between reporting periods and transparent accounting for MCA membership changes.

NGERs is a single national framework for reporting and disseminating company information about greenhouse gas emissions, energy production, energy consumption and other information.

NGERs uses a facility threshold of 25,000 tonnes of CO_2-e (scope 1 and 2) and a corporate group threshold of 50,000 tonnes CO_2-e (scope 1 and 2). Additionally, there are energy production and consumption thresholds that trigger reporting.

Safeguard mechanism

During FY21, total emissions from all SGM reporting facilities including MCA members, fell by 4 per cent from 141.6 Mt in FY20 to 135.9 Mt CO_2-e. Mining-related emissions associated with MCA members fell by 3.6 per cent.

Figure 1 shows the year-on-year changes in emissions for MCA member facilities covered by the SGM for the last three financial years.

National Greenhouse and Energy Reporting scheme

During FY21, total emissions reported under NGERs fell by 3.6 per cent. This includes both scope 1 and 2 from all NGERs reporting entities, including MCA members.

For MCA members, mining activities total emissions (scope 1 and 2) fell by 4.7 per cent.

Figure 2 shows the year-on-year changes in emissions for MCA members reporting under NGERs split by emissions scope.

In FY21, member emissions fell while exports, state royalties and corporate taxes all rose significantly.

MCA members Greenhouse gas emissions

Figure 1

GHG EMISSIONS

Annual % change

Safeguard mechanism

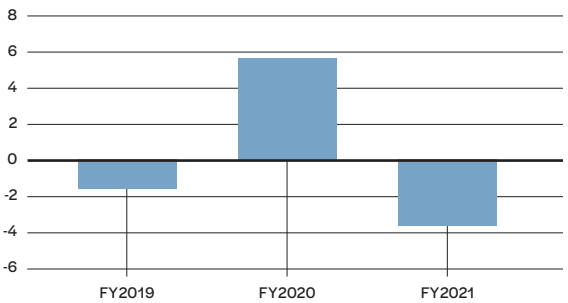
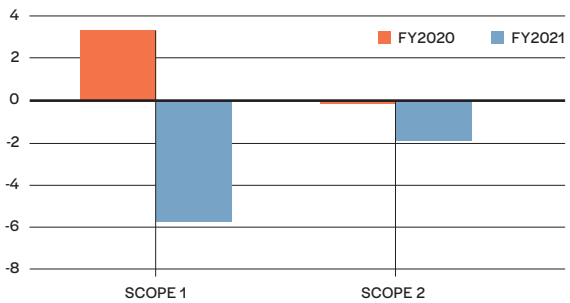


Figure 2

GHG EMISSIONS

Annual % change

NGERS



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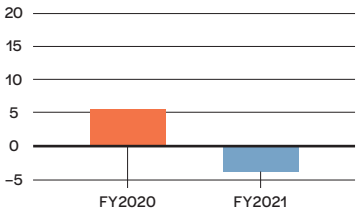
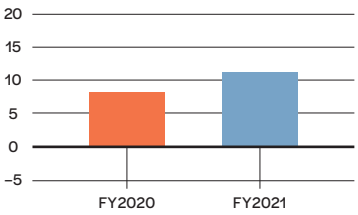
MCA member emissions & sector contribution

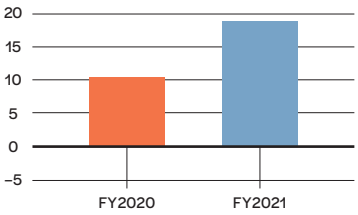
MINING EMISSIONS
Annual % change



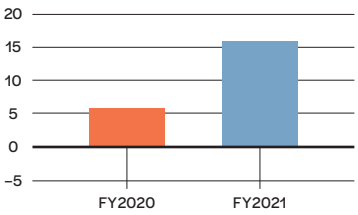
STATE ROYALTIES
Annual % change



COMPANY TAXES
Annual % change



EXPORTS
Annual % change



In FY21, MCA member emissions fell by 3.6 per cent while mining exports, state royalties and corporate taxes rose significantly.

MCA members
Sample abatement activities

Autonomous operations
(Drilling, loading, haulage)

Fuel switching
(Hybrid diesel, out of diesel)

Energy efficiency
(Lighting, motors, pumps, conveyors)

Renewable energy
(Procurement, PPAs, on-site)

Battery storage
(Energy storage, electric vehicles)

Artificial Intelligence
(Analytics, machine learning)

Digitisation
(Data processing, interfaces)

Fugitive emissions reduction
(Ventilation Air Methane, CH_4 capture and use)

Electrification
(Mine processes, transport)

Tailings management
(Emissions capture and mineral carbonation)

Water management
(Treatment technologies)

Low carbon electricity
(Renewables, CCS, SMRs)

Ore processing improvements
(Bulk processing efficiency)

Hydrogen fuel cells
(Electricity, machinery)

Other
(RD&D, grade engineering)

Progress on measures
Themes and actions

1 Developing technology pathways to achieve significant reductions in Australia's greenhouse gas emissions

ACTION 1 Enhance national and global discussions on low emissions technologies and report on the potential of innovative mitigation and adaptation technologies.

ACTION 2 Define a greater role for the minerals sector in the global and national transformation to lower emissions.

ACTION 3 Support the development of policies and technologies to achieve least-cost abatement in order to help meet the net zero emissions goal of the Paris Agreement and maintain the competitiveness of energy-intensive and trade-exposed sectors.

2 Increased transparency on climate change reporting and informed advocacy

ACTION 4 Understand the opportunities and risks of net zero emissions for the Australian minerals sector having regard to the Australian Government's commitments under the Paris Agreement and the aspirations set by the states and territories.

ACTION 5 Build the capacity of Australia's minerals sector relating to climate-related financial disclosures (including from the Task Force on Climate-related Financial Disclosure).

ACTION 6 Share member company approaches to scenario analysis and how it is strategically used within the sector to address climate-related opportunities and risks.

ACTION 7 Engage in the development of current policies, including the safeguard mechanism.

3 Knowledge sharing of the sector's responses to addressing climate change

ACTION 8 Showcase commitments and practices in mining operations.

ACTION 9 Lead discussions on the opportunities of commodity stewardship.

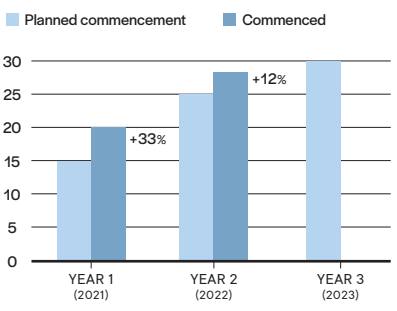
ACTION 10 Positively engage in relevant climate agendas and public consultation processes, including UNFCCC, Sustainable Development Goals (SDGs), Intergovernmental Panel on Climate Change (IPCC).

Progress at a glance Status of reported activities

ACTIVITIES STATUS

		IN YEAR 1			IN YEAR 2		
	Initial activities	On track	Slow progress	Start scheduled	On track	Slow progress	Start scheduled
YEAR 1	15	10	4	1	13	2	–
YEAR 2	10	4	–	6	8	1	1
YEAR 3	5	2	–	3	2	2	1
Total	**30**	**16**	**4**	**10**	**23**	**5**	**2**

ACTIVITIES UNDERWAY



PROGRESS
SCHEDULED TO START | COMMENCED & PROGRESS SLOW | COMMENCED & ON TRACK

1 Developing technology pathways to achieve significant reductions in Australia's greenhouse gas emissions

Encouraging substantial investment across a broad range of low-emissions technologies.

New technologies are being developed, commercialised and phased in to replace ageing equipment to support the industry's ambition to transition to net zero by 2050.

ACTION 1

Enhance national and global discussions on low emissions technologies and report on the potential of innovative mitigation and adaptation technologies.

ACTIVITY 1.1 (YEAR 1) — PROGRESS

Pursue climate partnerships

Identify domestic and international partnerships relevant to the minerals sector to advance the climate goals of the Paris Agreement.

- Established new relationships to explore carbon credit generation on mining sites
- Collaborating with other industry groups and think tanks to develop understanding and share information on policy development options.

ACTIVITY 1.2 (YEAR 1) — PROGRESS

Climate Change Advisory Panel

Establish and convene an independent panel of experts to advise the MCA on sustainable pathways to decarbonisation.

- Renewal of Climate Change Advisory Panel
- Ongoing independent advice and feedback provided on technology identification work, blockchain and mine electrification activities.

ACTIVITY 1.3 (YEAR 1) — PROGRESS

Demonstrate technologies

Support the demonstration of technologies that can help reduce fugitive emissions by collaborating with relevant organisations.

- ACARP research project to investigate potential benefits of using the latest generation of satellite imagery for mining operations
- Anglo American working with LETA to improve safe dilute VAM capture technology
- South32, CSIRO and NSW government partner to develop new technology designed to manage fugitive methane emissions.

ACTIVITY 1.4 (YEAR 1) — PROGRESS

Explore technology potential

Consider aspirational uptake rates and timeframes across a broad portfolio of low-emitting and high-abating technologies.

- Completed second phase of pathways work generating important information on possible costs of abatement technologies and technology readiness
- Industry announcement of net zero by 2050 ambition included likely critical technologies and contribution.

Companies are investing in renewable energy, water management, ore processing improvements and collaborating with equipment providers to develop and deploy zero emissions technology.

ACTIVITY 1.5 (YEAR 1) PROGRESS

National technology roadmap

Inform and help implement the government's Technology Investment Roadmap.

- Submission to federal government low emissions technology statement 2022 consultation focusing on clean hydrogen potential, CCUS and nuclear technologies, and potential of disused voids at former coal mines for low cost pumped hydro storage.

ACTIVITY 1.6 (YEAR 1) PROGRESS

Develop minerals sector roadmap

Partner with relevant organisations to develop a minerals-specific technology roadmap.

- Completed second report on technologies to reduce emissions, including indicative abatement costs
- Extensive work to understand key technologies timeframes for emissions reduction ahead of safeguard mechanism reforms and potential declining baselines.

ACTIVITY 1.7 (YEAR 2) PROGRESS

Explore low carbon opportunities

Release a statement on the opportunities associated with transforming the minerals sector in support of a decarbonised future.

- Pre-budget submissions highlight opportunities for Australian mining and minerals processing by facilitating an effective transformation to reliable, competitive, zero emissions energy
- Submissions highlighting opportunity for Australian mining in the emerging hydrogen and ammonia economies.

ACTIVITY 1.8 (YEAR 3) PROGRESS

Work with finance community

Identify innovative business models that can support the uptake of nascent low-emissions technologies.

- Ongoing constructive discussions with shareholder advocacy organisations
- Developing new relations with financial industry associations to support appropriate carbon market developments.

ACTION 2

ACTION 2

Define a greater role for the minerals sector in the global and national transformation to lower emissions.

ACTIVITY 2.1 (YEAR 2) PROGRESS

Support renewable energy

Encourage the uptake of renewable energy sources at the mine site.

- New member announcements in solar (Northern Goldfields, Weipa), wind (Nickel West) and solar-wind (Port Augusta)
- Pre-budget submission encouraged least cost abatement through promotion of zero emissions technologies including renewable energy technologies.

Nuclear energy, alongside other zero emissions energy sources can help Australia meet its commitments under the Paris Agreement.

ACTIVITY 2.2 (YEAR 3) PROGRESS

Support zero emissions

Support innovative solutions for zero emissions energy production at mine sites.

- Released report *Small modular reactors in the Australian context* encouraging early action to create options for Australia in the energy transition.

ACTIVITY 2.3 (YEAR 2) PROGRESS

Support electric vehicles

Support the uptake of electric vehicles at the mine site and promote the associated opportunities for the sector.

- Presentation by METS Ignited on mine electrification to Energy and Climate Change Committee
- Multiple collaborations announced by major members with major equipment providers for development of zero emissions haul trucks.

ACTION 3

ACTION 3

Support the development of policies and technologies to achieve least cost abatement in order to help meet the net zero emissions goal of the Paris Agreement and maintain the competitiveness of energy-intensive and trade-exposed sectors.

The global transition to low emissions technologies, such as renewables, battery storage and EVs, depends on the metals and raw materials provided by the minerals sector.

ACTIVITY 3.1 (YEAR 2) PROGRESS

Support public data repository

Work with government officials to improve mineral sector datasets, including remote power options, centralised power system costs and low emissions technologies.

- Minor progress at this time due to revised priorities
- Engagement with new Government planned for 2023.

ACTIVITY 3.2 (YEAR 1) PROGRESS

Advocate long-term policy

Longer-term policy advocacy consistent with the MCA's Climate Statement to enable the sector to decarbonise.

- Submission supporting federal government's safeguard crediting mechanism pilot
- Submission supporting the development of government's clean hydrogen certificate of origin scheme.

ACTIVITY 3.3 (YEAR 1) PROGRESS

Advocate climate programs

Advocate for programmatic support to enable deployment of mining technologies to assist in the sector's decarbonisation.

- Announcement of industry ambition to achieve net zero by 2050
- Ambition of net zero by 2050 builds on earlier commitment of support for the goals of the Paris Agreement.

Access to increased supply of credible, verified, low-cost domestic and international abatement following progress on Article 6 at the COP 26 is critical to meet net zero ambitions.

ACTIVITY 3.4 (YEAR 3) PROGRESS

Report on technology uptake

Release a biennial statement on progress towards achieving aspirational technology uptake rates suggested in Action 1.4.

- Progress contingent on Activities 1.4 (technology potentials) and 1.6 (technology roadmap)
- Looking to progress in year 3.

ACTIVITY 3.5 (YEAR 1) PROGRESS

Publicly support ARENA

Support ARENA to continue accelerating the uptake of clean energy.

- Supported ARENA's expanded remit in aluminium and steel, CCS, clean hydrogen, energy storage and soil carbon as giving the agency 'renewed impetus'.

ACTIVITY 3.6 (YEAR 1) PROGRESS

Access international abatement

Advocate for private sector access to international low-cost abatement for voluntary and compliance purposes.

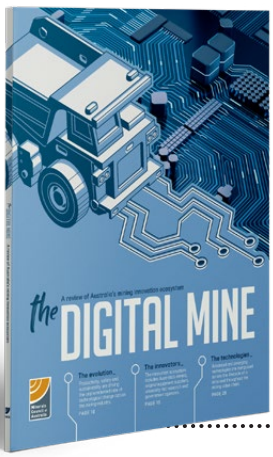
- Supported progress made on Article 6 at COP26
- Made submission to the Climate Change Authority (CCA) on International Offsets
- Increased modelling efforts on supply and demand volumes for ACCUs
- Provided input into consultation over the development of a Carbon Exchange.

ACTIVITY 3.7 (YEAR 2) PROGRESS

Review innovation systems

Periodically review the health of the national innovation system in regard to research, development and demonstration (RD&D) relevant to the minerals sector.

- Mapped the major research and innovation initiatives across industry, academia and institutes that support increased efficiency, fuel switching and improved sustainability.



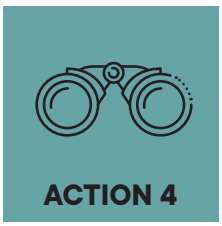
INDUSTRY RESEARCH

Breadth of work underscores importance of CAP

A number of reports have been developed in response to measures in the CAP. *SMRs in the Australian context* details how nuclear small modular reactors can be economically competitive and a benefit multiplier on the road to net zero. *The Digital Mine* reviews the mining innovation ecosystem and the significant opportunities that exist to leverage technology and innovation for enhanced safety and sustainability, emissions reduction, jobs and productivity. A blockchain report providing guidance on potential applications in mining was produced for members and a report on the opportunities around hydrogen will be released in the coming months.

2 Increased transparency on climate change reporting and informed advocacy

Providing timely, accurate and reliable information to enhance members' capacity to act.



ACTION 4

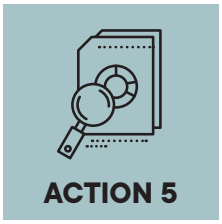
Understand the opportunities and risks of net zero emissions for the Australian minerals sector having regard to the Australian Government's commitments under the Paris Agreement and aspirations set by the states and territories.

ACTIVITY 4.1 (YEAR 2) PROGRESS

Economics of net zero emissions

Model the opportunities and costs of net zero emissions to the minerals sector consistent with national commitments under the Paris Agreement and the aspirations set by the states and territories.

- Reviewed modelling of National Electricity Market (NEM) to understand scope 2 emissions reduction potential
- Developing modelling of how changes to safeguard mechanism can impact scope 1 emissions
- Consultation with EU on impacts and implementation of CBAM.



ACTION 5

Build the capacity of Australia's minerals sector relating to climate-related financial disclosures (including from the Task Force on Climate-related Financial Disclosure).

ACTIVITY 5.1 (YEAR 1) PROGRESS

Host climate disclosure forum

Host bi-annually a climate-related financial disclosure forum to raise awareness and share knowledge.

- Member forum held December 2021 with contributions from APRA and KPMG covering COP26 developments, the APRA-RBA Network for Greening the Financial System (NGFS), CPG 200 guidance on Climate Risk, and the developing ISSB disclosure requirements
- Australian Accounting Standards Board member workshop held June 2022.

TCFD allows companies to incorporate climate-related risks and opportunities into risk management and planning.

ACTIVITY 5.2 (YEAR 2) PROGRESS

Align disclosure practices

Identify current disclosure practices amongst members to inform their alignment with TCFD recommendations.

- Adopted the Towards Sustainable Mining climate change protocol to facilitate continual performance improvements related to the management of climate-related risks and opportunities, including mitigation and adaptation strategies, target-setting and reporting.

ACTION 6

ACTION 6

Share member company approaches to scenario analysis and how it is strategically used within the sector to address climate-related opportunities and risks.

ACTIVITY 6.1 (YEAR 1) PROGRESS

Assist climate planning

Explore reputable publicly released climate scenarios and their significance for the minerals sector, and survey members to compare commitments and use of scenarios and report on key findings.

- Adoption of TSM Climate change protocol has provided members with a framework to evaluate performance and improvements
- Continuing work on economics and emissions profile of the evolving electricity system and the development of the safeguard mechanism.

ACTION 7

ACTION 7

Engage in the ongoing development of current policies including the Safeguard Mechanism.

ACTIVITY 7.1 (YEAR 1) PROGRESS

Climate policy barometer

Survey members to identify and understand the nature of climate-related policy issues and opportunities, and report on key findings to transparently set expectations on MCA advocacy priorities.

- Continued to track relevant national and international climate matters regularly and particularly leading into COP26 and the 2022 federal election.

SUPPLIER OF CHOICE

Mining is powering the next generation of EVs

Australian mining is becoming an increasingly significant player in the rapidly growing global battery industry. Glencore has entered a multi-year deal to supply cobalt from its Murrin Murrin operations to General Motors for their Chevrolet Silverado EV, GMC HUMMER EV, and Cadillac LYRIQ. BHP has inked a deal with Tesla to supply it with nickel from its Nickel West operation in Western Australia. And Rio Tinto is collaborating with Ford to jointly develop more sustainable and secure supply chains for battery and low-carbon materials to be used in Ford vehicles. Demand for nickel in batteries is estimated to grow by over 500 per cent over the next decade.

3 Knowledge sharing of the sector's responses to addressing climate change

Improving members' understanding of global climate change initiatives and partnerships.

ACTION 8

MCA member climate-related announcements can be found at **minerals.org.au**

ACTION 8

Showcase commitments and practices in mining operations.

ACTIVITY 8.1 (YEAR 1) PROGRESS

Establish online registry

Establish an online registry including minerals sector climate-related collateral (initially targeting members but could allow future public access).

- Established online registry of member emissions reduction activities on the MCA website showcasing member climate announcements.

ACTIVITY 8.2 (YEAR 3) PROGRESS

Supporting adaptation

Understand the types of adaptation investments needed in the minerals sector, especially in regard to operations, employee health, supply chains, water use, energy resources and local communities, to help minimise the adverse impacts of a changing climate.

- Made a submission to the federal government's update of the National Climate Resilience and Adaptation Strategy
- Supported and attended department facilitated workshop for industry to assist with development of the strategy.

ACTIVITY 8.3 (YEAR 3) PROGRESS

Supporting resilience

Understand and share how mining operations are assessing and managing the physical impacts of climate change on site to build operational resilience.

- Commenced discussions with consultant for report on mining industry resilience and potential to strengthen as well as share learnings with other sectors.

ACTION 9

ACTION 9

Lead discussions on the opportunities of commodity stewardship.

ACTIVITY 9.1 (YEAR 2) PROGRESS

Report on circular economy

Report on the role of the minerals sector in helping transform to a circular economy.

- Report commissioned and expected to be delivered late 2022.

ACTIVITY 9.2 (YEAR 2) PROGRESS

Report on blockchain technology

Report on the application of blockchain technology in the minerals sector.

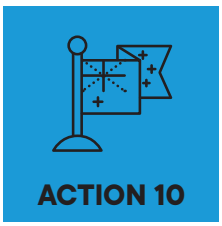
- Report commissioned, developed and delivered to members titled *Applications of blockchain as a tool supporting net zero emissions in the mining sector*.

ACTIVITY 9.3 (YEAR 1) PROGRESS

Support value-adding activities

Partner with organisations to showcase the importance of minerals extraction to their value-adding activities, including climate smart minerals and metals.

- Developed a report on the opportunities for Australian mining developing clean hydrogen and ammonia economies
- Discussions with industry associations on potential collaboration to promote value-adding to mining through additional mineral processing.



ACTION 10

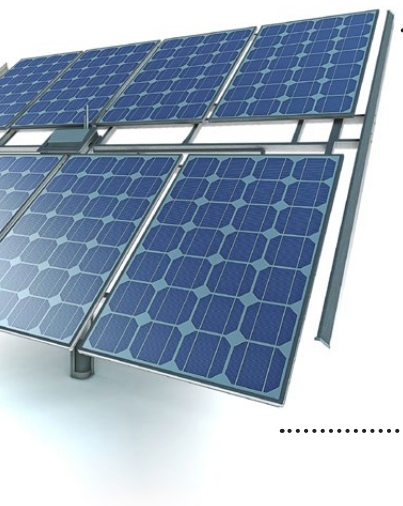
Positively engage in relevant climate agendas and public consultation processes including United Nations Framework Convention on Climate Change (UNFCCC), Sustainable Development Goals (SDGs), Intergovernmental Panel on Climate Change (IPCC), as well as collaboration with relevant organisations.

ACTIVITY 10.1 (YEAR 2) PROGRESS

International climate agenda

Engage productively in the business of the UNFCCC including the implementation of the Paris Agreement and the work of the IPCC.

- Attended COP26 virtual pending confirmation of observer status, confirmed at COP26
- On the basis of MCA UNFCCC observer status, MCA applied for IPCC observer status, which is pending
- MCA provided feedback on UNFCCC consultation on participation.



COLLABORATION

Important progress at COP26

The MCA supports the historic COP26 agreement on Article 6 market mechanisms that provides the architecture for the transfer of emissions reductions between countries while incentivising private finance in the effort. While there is still some way to go to fully operationalise Article 6, access to high integrity low cost international and domestic carbon credits are important complimentary measures that support Australian mining's considerable emissions reduction efforts. MCA members are proactively investing in, adopting and considering a range of technologies to reduce emissions. Along with developing carbon market mechanisms, these investments will be critical to achieving Australia's net zero ambition.

CLIMATE ACTION PLAN PROGRESS REPORT 2022 ...on the ground

Case studies

- Hydrogen-fuelled freight
- Electric and autonomous vehicles
- Solar plants and battery storage
- Methane capture and conversion
- CO_2 emissions tracking systems
- Renewable energy agreements
- Battery minerals contracts
- LNG-fuelled bulk carriers

Battery electric

Gold mine sets sights on electric future

Agnico Eagle's Fosterville gold mine in Victoria is investigating the feasibility of transitioning the operation to a fully electric mine. Agnico Eagle is already using Sandvik's 18 tonne electric loader, which has the highest capacity in underground loaders and the smallest emissions footprint.

Switching from diesel powered equipment to battery electric equipment substantially improves underground air quality and reduces other hazards such as heat, noise and vibration from combustion engines. When battery electric equipment is paired with renewable energy it further reduces total carbon emissions making mining more sustainable.

Anglo American and Aurizon are assessing the viability of hydrogen powered freight trains.

Hydrogen trains

Hydrogen powered freight trains on horizon for Queensland

Anglo American and Australia's largest rail freight operator Aurizon are working together to assess the introduction of hydrogen powered trains for bulk freight in Queensland.

A feasibility study will explore application of Anglo American's proprietary hydrogen fuel cell and battery hybrid power units in heavy haul freight operations. If successful, the agreement could be extended to further phases of collaboration, which could include detailed engineering and development of a hydrogen-fuelled heavy haul locomotive prototype.

Anglo American has taken a global lead in the development of green hydrogen solutions as part of its commitment to carbon neutral mines by 2040.

World leading

Anglo American launches world's largest hydrogen haul truck

Anglo American launched a prototype of the world's largest hydrogen powered mine haul truck in May 2022. The 2 MW hydrogen-battery hybrid truck generates more power than its diesel predecessor and is capable of carrying a 290 tonne payload.

Part of Anglo American's nuGen™ Zero Emission Haulage Solution, nuGen™ provides a fully integrated green hydrogen system consisting of production, fuelling and haulage, with green hydrogen to be produced at the mine site.

Autonomous haul trucks at Newmont's Boddington gold mine in Western Australia.

Autonomous trucks

Autonomous haul truck fleet a world first at Boddington

Newmont's Boddington operation in Western Australia became the world's first open pit gold mine with an autonomous truck fleet in 2021. Newmont invested $150 million in its Autonomous Haulage System (AHS) to improve safety and productivity and extend mine life.

The autonomous haulage fleet of 36 trucks – 29 new Cat 793F haul trucks and the conversion of another seven 793F vehicles already operating at the site – reduces fuel usage and associated emissions by using lower and more constant revs.

Caterpillar reports these trucks have hauled close to 68 million kilometres without a lost-time injury and in some cases boosted overall mine productivity by close to 30 per cent.

Kinetic energy

Regenerative braking on show at Komatsu

Komatsu's WE series of hybrid wheel loaders have delivered the mining industry several technological advancements since its first loader was unveiled in 2021. The Switched Reluctance Hybrid Drive system is fully regenerative which means that during braking, electrical motors become generators and feed power back into the electrical system.

The loader has the potential for fuel savings of up to 45 per cent, as well as a considerable reduction in carbon emissions per tonne – 35 per cent fewer emissions compared to conventional mechanical loaders or hydraulic excavator machines. The WE series also features real-time data monitoring and a feedback system.

BHP also recently installed the first solar panels at its Leinster nickel operation in WA.

Renewable energy

BHP secures green power deal to power nickel operations

BHP has secured enough renewable energy to cover 100 per cent of the power requirements of three of its major nickel operations in Western Australia, following the signing of a Power Purchase Agreement (PPA) with Enel Green Power.

The PPA underpins construction of Flat Rocks Wind Farm stage 1 near the town of Kojonup. The new wind farm will comprise the 18 tallest wind turbines in Western Australia at a top height of 200 metres and is expected to produce 315 GWh per annum.

The combined effect from BHP's agreements for the Flat Rocks Wind Farm, the Merredin Solar Farm and the Northern Goldfields Solar Project is expected to reduce Nickel West's total market-based Scope 2 greenhouse gas emissions by nearly 60 per cent against FY2020 baseline levels from CY2024, based on current forecast demand.

Electric trucks

Undergound electric haulage

AngloGold Ashanti Australia, in partnership with Sandvik and Barminco, is trialling the world's largest battery-electric underground mining truck at its Sunrise Dam gold mine in Western Australia.

The Sandvik TH655B prototype, which has a 65 tonne payload, is another practical step towards net zero emissions mining operations. Replacing a comparable diesel-fuelled vehicle, the new electric machine is expected to have a significant positive impact on underground productivity and air quality, a major factor in improving health and safety outcomes.

Switching to battery electric is becoming more cost competitive and has the added benefit of reducing exposure to diesel fuel price fluctuations and supply chain issues with fuel additives, such as AdBlue.

Electric trains

Battery-electric trains bound for the Pilbara

Rio Tinto will purchase four battery-electric trains for use in the Pilbara as part of its strategy to reduce carbon emissions by 50 per cent by 2030.

The locomotives will be recharged at purpose-built charging stations and be capable of generating energy in transit through regenerative braking.

Rio Tinto purchased the 7 MWh battery-electric locomotives from Wabtec Corporation, with production to start in 2023 and initial trials in 2024.

A full transition to a net zero emissions rail fleet would reduce Rio Tinto Iron Ore's diesel-related carbon emissions in the Pilbara by around 30 per cent annually.

Emissions tracking

New software tracks emissions at Whitehaven

Whitehaven has developed an internal emissions tracking system to complement existing systems and processes. The tailored software provides more frequent and granular information about emissions which further improves the accuracy of emissions forecasting.

The development of this technology allows Whitehaven to improve its understanding of emissions and energy use. Whitehaven is working with commercial partners to analyse and evaluate further opportunities to reduce operational emissions.

Overlooking the region around Whitehaven's Narrabri operation in NSW.

Methane management

Anglo American pursues solutions for ventilation air methane

Anglo American is working with industry partners to improve the technology for capturing dilute Ventilation Air Methane (VAM). The aim is to deliver effective methane abatement without compromising operational safety.

The company is exploring different technologies, as well as risk and data analytics tools, that will enable them to map emissions and better understand the flow of methane. The goal is to develop industry-accepted approaches to reduce VAM at the source, feed collected methane into existing power generation facilities and abate remaining VAM.

Low carbon steel

Partnership eyes green hydrogen for steelmaking

Rio Tinto and BlueScope have partnered to explore low-carbon steelmaking using Pilbara iron ores. Together they will research and design low emissions processes for the steel value chain, including iron ore processing, iron and steelmaking and related technologies.

Rio Tinto and BlueScope will study the use of green hydrogen at the Port Kembla Steelworks in New South Wales as a priority. This could see Pilbara iron ores directly reduced into a product that could be processed in an electric smelter to produce metallic iron suitable to be finished into steel.

Collaboration

End-to-end integration the goal for Newmont and Caterpillar

Newmont is working with Caterpillar to deliver a fully connected, automated, zero carbon emitting, end-to-end mining system. The goal is a safer and more productive operation that supports Newmont's 2030 goal of more than 30 per cent emissions reductions. Newmont's ultimate goal is net zero emissions by 2050.

Under the partnership, Caterpillar will develop its first battery electric zero emissions underground truck to be deployed at Tanami by 2026. The deployment includes a fleet of up to 10 battery electric underground haul trucks, including first-of-its-kind battery electric haulage technology for underground mining in 2024, and the introduction of battery autonomous technology in 2025.

Newmont's surface and underground mining fleets are responsible for around 40 per cent of the company's carbon emissions. This collaboration will help make Newmont's mines safer and more productive while also assisting the company reach its greenhouse gas reduction targets for 2030 and 2050.

Newmont's Tanami mill in the Northern Territory.

Electric vehicles

Glencore drives cobalt deal with General Motors

Glencore has signed a multi-year sourcing agreement to supply General Motors (GM) with cobalt from Glencore's Murrin Murrin operation in Western Australia.

Cobalt is a critical metal for the production of EV batteries. Australian cobalt will be used in GM's Ultium battery cathodes to power EVs such as the Chevrolet Silverado and GMC Hummer and Cadillac Lyric.

Glencore and GM are both members of the Responsible Minerals Initiative and Glencore's Murrin Murrin operation is conformant with the OECD-aligned Responsible Minerals Assurance Process.

Solar energy

Rio Tinto triples Weipa solar capacity and adds storage

Rio Tinto's new solar farm and battery storage at Weipa in Queensland will more than triple the local electricity network's solar generation capacity and help provide cleaner power to Rio Tinto's operations.

The new solar farm and battery storage, expected to be completed by late 2022, will complement the existing 1.6 MW solar farm at Weipa completed in 2015.

The 4 MWh battery system will be built next to the existing Weipa power station and will help provide a stable power network for Rio Tinto's Weipa operation's bauxite mines and the Weipa township.

The combined solar capacity and battery will provide about 11 GWh of energy annually and help to reduce Weipa Operations' annual CO_2 emissions by about 20,000 tonnes.

Fugitive emissions

South32 pilots VAM abatement initiative

South32 is partnering with CSIRO and the NSW Government to develop new technology designed to manage fugitive methane emissions from its Appin Mine in New South Wales.

Following a successful pilot study last year, South32 has commenced a four-year commercial-scale trial of CSIRO's VAMMIT abatement technology, which is designed to safely capture methane at low concentrations from mine ventilation air.

NSW Government is providing funding for the trial via its Coal Innovation NSW agency. If successful, this will expand the toolkit of safe and commercially feasible abatement technology in underground coal mines.

Komatsu's Greenhouse Gas Alliance turns its focus to zero emission haul trucks.

Green future

Zero emissions haul trucks the focus of Komatsu's GHG alliance

BHP and Rio Tinto are among the first companies to join Komatsu's Greenhouse Gas (GHG) Alliance, which aims to develop commercially viable zero greenhouse gas emissions haul trucks.

BHP will provide engineering and technical resources to Komatsu to support the development phase. These activities will provide BHP with real-time access to technology in development, with Komatsu drawing upon BHP's mining expertise to accelerate its path to market.

BHP plans to operate one of the first batches of zero emissions trucks upon commercial release.

Rio Tinto will conduct a pre-production trial of the new equipment with the option to purchase some of the first trucks from Komatsu once they are commercially viable.

Komatsu's GHG Alliance aims to advance Komatsu's power agnostic truck concept for a haulage truck that can run on a variety of power sources, including battery and hydrogen.

Renewable energy

Olympic Dam to halve electricity emissions by 2025

BHP plans to enter into renewable energy supply arrangements enabling Olympic Dam to reduce its reported emission position to zero for 50 per cent of its electricity consumption by 2025.

The arrangements will be supplied by Iberdrola, including from the Port Augusta Renewable Energy Park in South Australia, which will be Australia's largest solar-wind hybrid plant. BHP is to become the primary customer of this new facility.

Olympic Dam supplies vital metals for a low carbon future, including copper for electricity transmission and assorted low emissions technologies, and uranium for nuclear energy produced worldwide.

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September 2022

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