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# Climate Change



35%

Target Reduction in absolute Scope 1 & Scope 2 Emissions by 2030

788kt CO<sub>2</sub>-e

Scope 1 GHG Emissions in FY24

455kt CO<sub>2</sub>-e

Scope 2 GHG Emissions in FY24

665kt CO<sub>2</sub>-e

Scope 3 GHG Emissions in FY24

## Our Approach

Northern Star's continued alignment with the Task Force on Climate-related Financial Disclosures (TCFD) has assisted us to understand and build resilience and capability in our business in relation to the physical and transitional risks and opportunities posed by climate change.

As part of our risk mitigation strategy, Northern Star has continued to focus on:

- assessing and reducing our greenhouse gas (GHG) emissions footprint;
- analysing the physical and transitional risks and opportunities arising out of the effects of climate change on our Operations, and ensuring control measures are incorporated into our business practices;
- quantifying potential financial implications of climate change on our business through modelling; and
- maintaining our strong climate change governance processes.

Demonstrate tangible, sustainable Scope 1 and Scope 2 carbon Emissions Reductions of

100kt CO<sub>2</sub>-e

between 1 July 2021 and 30 June 2025, where 1 July 2021 represents business as usual baseline levels (includes 50 kt CO<sub>2</sub>-e by 30 June 2024 and 50 kt CO<sub>2</sub>-e by 30 June 2025)

Demonstrate tangible, sustainable Scope 1 and Scope 2 carbon Emissions Reductions of

150kt CO<sub>2</sub>-e

between 1 July 2021 and 30 June 2026, where 1 July 2021 represents business as usual baseline levels (includes 50 kt CO<sub>2</sub>-e by 30 June 2024, 50 kt CO<sub>2</sub>-e by 30 June 2025, and 50 kt CO<sub>2</sub>-e by 30 June 2026)

Demonstrate tangible, sustainable Scope 1 and Scope 2 carbon Emissions Reductions of

200kt CO<sub>2</sub>-e

between 1 July 2021 and 30 June 2027, where 1 July 2021 represents business as usual baseline levels (includes 50 kt CO<sub>2</sub>-e by 30 June 2024, 50 kt CO<sub>2</sub>-e by 30 June 2025, 50 kt CO<sub>2</sub>-e by 30 June 2026, and 50 kt CO<sub>2</sub>-e by 30 June 2027)

Demonstrate tangible, sustainable Scope 1 and Scope 2 carbon Emissions Reductions of

250kt CO<sub>2</sub>-e

between 1 July 2021 and 30 June 2027, where 1 July 2021 represents business as usual baseline levels (includes 50 kt CO<sub>2</sub>-e by 30 June 2024, 50 kt CO<sub>2</sub>-e by 30 June 2025, 50 kt CO<sub>2</sub>-e by 30 June 2026, 50 kt CO<sub>2</sub>-e by 30 June 2027, and 50 kt CO<sub>2</sub>-e by 30 June 2028)

As disclosed in our 2017-FY23 Sustainability Reports, the Company has completed scenario analysis studies, see Appendix A for more information. These determined that a proactive effort scenario, which limits the average global temperature increase to below 2°C, would be most advantageous for reducing the impacts of climate change on our business and the planet. Progressing on from these findings, we announced an ambition to achieve Net Zero by 2050 and our planned pathway to reduce Scope 1 and Scope 2 Emissions by 35% by 2030.

## Northern Star's position on Climate Change

**We** accept the science of climate change as reported by the Intergovernmental Panel on Climate Change.

**We** are committed to the Paris Agreement and a net-zero carbon future, on a 1.5°C pathway.

**We** acknowledge the invitation made to the private sector by the United Nations to scale up efforts and support actions to reduce emissions and/or build resilience and decrease vulnerability to adverse effects of climate change.

**We** understand the importance of understanding and adapting to climate change related risks.

Our Climate Change Policy commits Northern Star to developing and implementing a climate change strategy that:

- focusses our activities in reducing Scope 1 and Scope 2 Emissions;
- aligns our operations with the 1.5°C Ambition;
- use our influencing capability to reduce Scope 3 Emissions; and
- contributes to the 1.5°C Ambition beyond our business by influencing government and funding business relevant projects to help remove or avoid emissions.

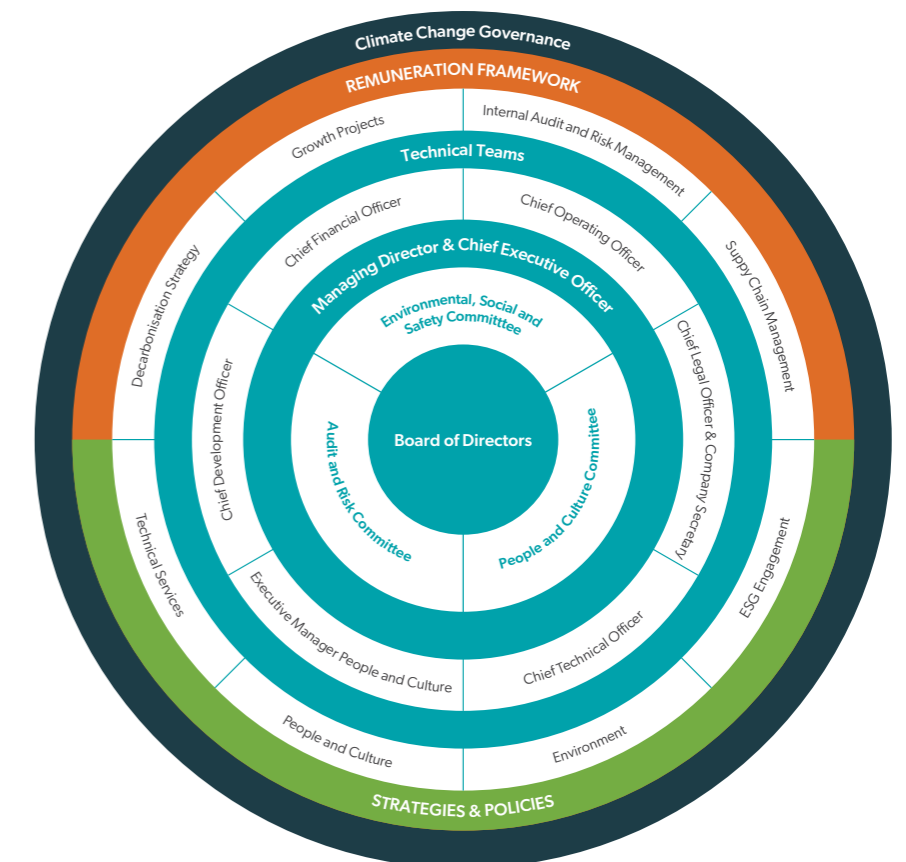
## Climate Change Governance

Northern Star's Board has oversight of the physical and transitional risks posed by climate change assisted by the ESS Committee's oversight of environmental and social performance risks, and climate change related risks and the Audit & Risk Committee's oversight of the Company-wide risk management framework.

The Company's climate change related governance structure is shown in Figure 1. Climate change related matters are considered quarterly by the Board through its ESS Committee meetings.

Northern Star's Chief Technical Officer who reports to the Managing Director & CEO is responsible for developing and implementing the Company's clean energy transition projects. The Company's Chief Legal Officer & Company Secretary has climate change related disclosure responsibilities within her portfolio.

Figure 1 Climate Change Governance



## Restatements of Information

The following items are restated from our FY23 Sustainability Report:

- Increase in Scope 1 Emissions at Carosue Dam Operations for FY23 by 40 t CO<sub>2</sub>-e (from 118,958 t CO<sub>2</sub>-e to 118,998 t CO<sub>2</sub>-e) due to oil and grease reconciliations
- Increase in Scope 1 Emissions at Thunderbox Operations for FY23 by 2 t CO<sub>2</sub>-e (from 160,145 t CO<sub>2</sub>-e to 160,147 t CO<sub>2</sub>-e) due to oil and grease reconciliations
- Decrease in Scope 3 Emissions for Category 1: Purchased Goods and Services for FY23 by 13,718 t CO<sub>2</sub>-e (from 358,413 t CO<sub>2</sub>-e to 345,235 t CO<sub>2</sub>-e) due to an error in the US EPA factors applied.
- Increase in Scope 3 Emissions for Category 3: Fuel and Energy for FY23 by 59 t CO<sub>2</sub>-e (from 207,580 t CO<sub>2</sub>-e to 207,639 t CO<sub>2</sub>-e) due to updated fuel data from final NGERs totals.
- Increase in Energy Consumed at Pogo Operations for FY23 by 52,372 GJ (from 1,116,336 GJ to 1,168,708 GJ) due to a calculation error on Heating Oil combusted (does not affect emissions).
- Increase in Energy Consumed at Pogo Operations for FY22 by 46,866 GJ (from 1,064,880 GJ to 1,111,746 GJ) due to a calculation error on Heating Oil combusted (does not affect emissions).

## Our Planned Pathway to 2030

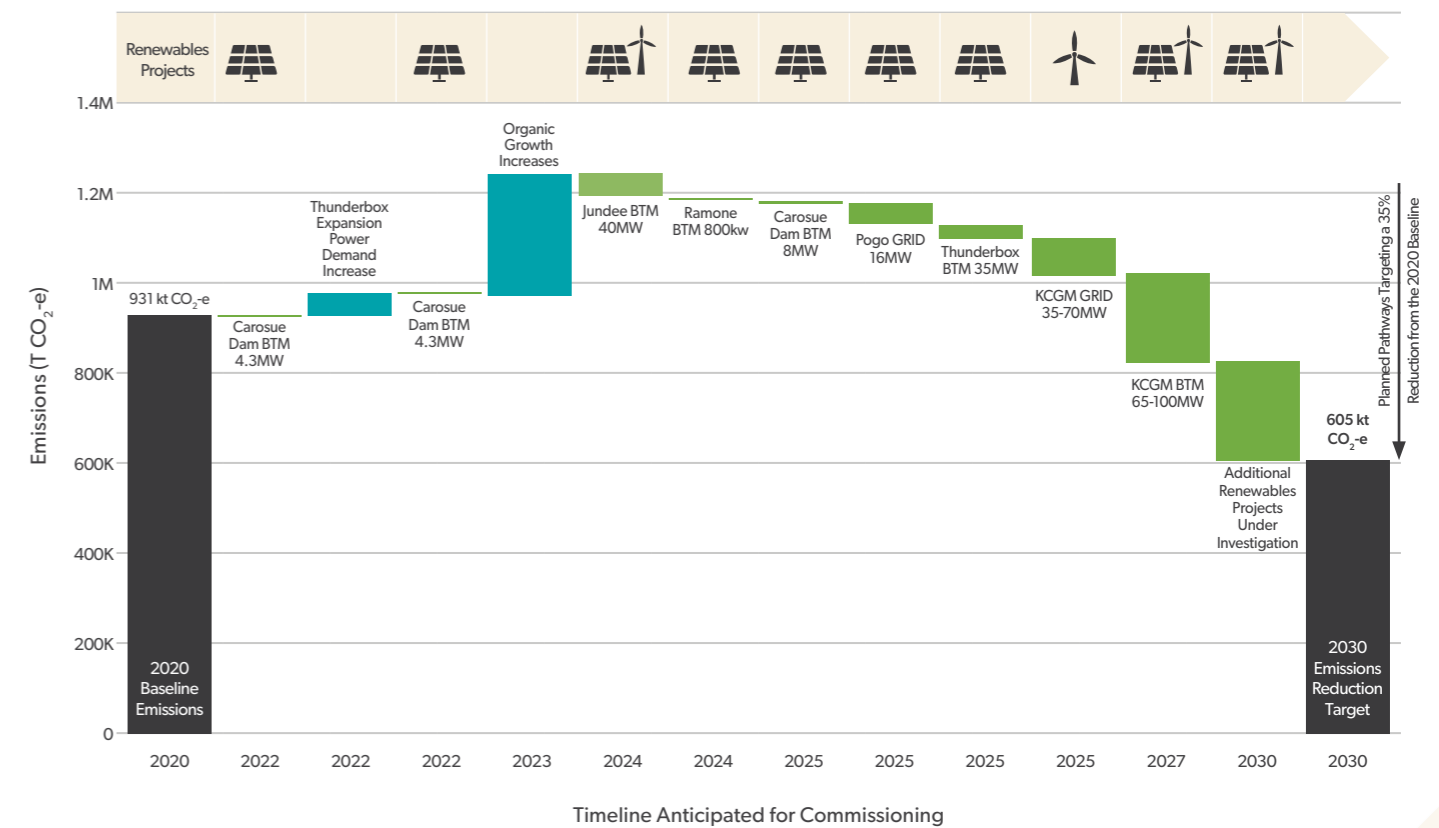
At Northern Star we are continuing our journey to meet our commitment of a 35% reduction in Scope 1 and Scope 2 Emissions by 2030. Achieving this target will see a reduction in greenhouse gas emissions from our baseline (1 July 2020) of 931kt CO<sub>2</sub>-e down to approximately 590 kt CO<sub>2</sub>-e.

On our path towards our 2030 goal, our focus continues to be on the transition away from self-generated and purchased diesel or gas-generated electricity, which is the biggest contributor to our Scope 1 and 2 Emissions.

Northern Star believes we can achieve our electricity transition goal using known and available technologies such as solar, wind and battery electric storage systems. We are progressing our projects using configurations of these three technologies as we believe they are feasible, timely, and cost effective, while still providing us with security of supply and lower overall power costs.



**Figure 2** Northern Star's Planned Pathways targeting 35% Emissions Reduction by 2030



## Climate Change Commitment

Northern Star remains committed to the Paris Agreement and a Net Zero carbon future, on a 1.5°C pathway.

Since announcing our [Net Zero Ambition on 22 July 2021](#), we have outlined our decarbonisation pathway for achieving our 2030 Emissions Reduction Targets of 35% reduction in Scope 1 and Scope 2 Emissions on the way to achieving Net Zero operational Emissions by 2050. This is updated periodically as we progress existing projects and identify new projects.

We have continued to:

- engage with investors on our decarbonisation strategy;
- align with the Task Force on Climate-related Financial Disclosures (TCFD);
- work on Emissions Reduction projects and future modelling programs;
- improve our Scope 3 accounting;
- integrate climate change risks and opportunities in our operational risk registers; and
- complete financial quantitative analyses of material physical and transition risks and opportunities identified in our TCFD reporting.



As we approach 2030 and address our transition to 2050, Northern Star has recognised that emissions abatement will become more challenging, and we are actively planning the pathway from 2030 to 2050 by investigating the following areas:

### Maximum Green Power

We understand that maximising our renewable energy penetration will require more energy storage in order to assure reliability of energy supply. We have identified opportunities for medium- to long-duration energy storage technologies and are actively engaging with researchers, developers and suppliers to understand the capabilities, costs and constraints of storage technologies.

### Transition to a Green Fleet

As another significant contributor to our Scope 1 Emissions, we recognise that the diesel vehicle fleet is another important area of focus and we need to identify, assess and plan for the inevitable transition from diesel to electric vehicles for our specific Operations. This transition will challenge us with constraints in vehicle availability, operability and the significant increase in power demand that we will experience as we transition. Northern Star is engaging with subject matter experts that can model our forecast future power demand and original equipment manufacturers who are developing their range of electric fleet. Once a solution has been identified and conceptually modelled, we will begin to forecast this transition into our decarbonisation pathway.

### Energy Efficiency Opportunities

Renewable energy deployment and supply to our Operations must be balanced with a thorough understanding of our energy demand profiles, involving a robust assessment of any areas for improvement in existing and new assets. The importance of this challenge will become more apparent as we balance growth in energy demand with the deployment of clean energy to meet that demand.

### Emerging technologies

We are excited by the rapidly evolving landscape of low-carbon technologies and are open to considering any technology that will help us decarbonise our business. The technologies that we have already deployed at Northern Star, such as wind, solar and batteries, were once considered exceptional and uneconomical. While not aspiring to be first-movers, Northern Star is a fast-follower and keen to incorporate technology that is safe, secure, cost effective and low-carbon. We are investigating a range of options, such as human-induced regeneration projects, simple drop-in biofuels, dynamic charging of heavy-duty electric mining vehicles and green hydrogen for vehicles, energy storage or fuel.

## Progressing Our Decarbonisation Pathway

During FY24 Northern Star progressed towards our target of a 35% reduction in Scope 1 and 2 Emissions (from a 1 July 2020 baseline of 931 kt CO<sub>2</sub>-e) by 2030. We implemented several renewable energy projects which will contribute to our sites transitioning away from being solely reliant on diesel or gas-generated electricity. Figure 2 shows our current planned pathways targeting 35% emissions reduction by 2030.

Northern Star's progress during the year included:

- entering into a 15-year Power Purchase Agreement (PPA)<sup>1</sup> with Zenith Energy for supply of electricity to the Jundee Operations (refer to highlight on page 8);
- entering into a Power Purchase Agreement (PPA) with Aggreko<sup>2</sup> for supply of electricity to our Porphyry Operations incorporating 4 MW of solar generation and a 4MW BESS. This solar generation was integrated into the existing gas power station network (operated by Aggreko) and has achieved total RE penetration of 28% and reduced carbon emissions by over 5 kt CO<sub>2</sub>-e/a. The project was completed successfully and energised at the end of January 2024.
- successfully completing and energising the Ramone solar and battery renewable project<sup>3</sup>. It consists of 800kW of solar generation and 300kW/445kWh of battery storage. This project achieves a renewable energy penetration of approximately 13% and, in addition to a cost saving from decreased diesel usage, saves approximately 1.5 kt CO<sub>2</sub>-e/a.
- entering into a Power Purchase Agreement (PPA) with Pacific Energy<sup>4</sup> for supply of electricity to the Carosue Dam Operations incorporating 8 MW of solar generation. Site works have begun and the new 8MW of solar is forecast to be energised by the end of March 2025 (refer to page 9 for more information).

These projects will be taken into account when measuring our performance against climate change related remuneration key performance indicators (refer to Figure 7).

In addition to progressing the projects in our Decarbonisation Pathway, Northern Star is continuously investigating the feasibility of other projects, large and small. Potential projects are evaluated and ranked based on key variables that help to evaluate the risk and opportunity they present, including economic viability, timeline to energisation, operational integration, and the amount of carbon reduction they are expected to achieve.

## Highlight – Jundee Wind, Solar and BESS Project

In June 2023 Northern Star entered into a 15 year Power Purchase Agreement (PPA) with Zenith Energy for supply of electricity to the Jundee Operations. The PPA included the provision of 24MW of wind, 16MW of solar energy and a 12MW/13.4MWh BESS. Once operational the renewable energy is expected to achieve a renewable penetration of almost 58% and reduce Jundee Operations' carbon dioxide emissions by over 51 kt CO<sub>2</sub>-e/a.

The Jundee Operations project is progressing well, with solar and BESS energised in late FY24. The wind turbines erection has commenced and they will be progressively commissioned in H1 FY25.

**Figure 3** Wind turbine blades in laydown yard at Jundee Operations



**Figure 4** Completed solar farm at Jundee Operations



<sup>1</sup> 16th June 2023

<sup>2</sup> 17th October 2023

<sup>3</sup> 1st August 2023

<sup>4</sup> 21st February 2024



### Highlight – Carosue Dam Operations Solar Project (Stage 3)

In February 2024 Northern Star entered into a Power Purchase Agreement (PPA) with Pacific Energy for supply of electricity to the Carosue Dam Operations (CDO) incorporating 8 MW of solar generation. This solar generation will be integrated into the existing gas power station network (operated by Pacific Energy) and is in addition to the 6MW of solar generation capacity that is already operational at CDO (operated by Nomadic Energy).

The new 8MW plant will bring the total renewable energy penetration at CDO from 6.5% to 13.5% and is expected to reduce carbon emissions by over 8 kt CO<sub>2</sub>-e/a. Site works have begun and the new 8MW of solar is forecast to be energised by the end of March 2025.

**Figure 5** Clearing has been completed for the new 8MW solar plant at Carosue Dam Operations (existing solar farm adjacent)



**Figure 6** Existing solar array at Carosue Dam Operations

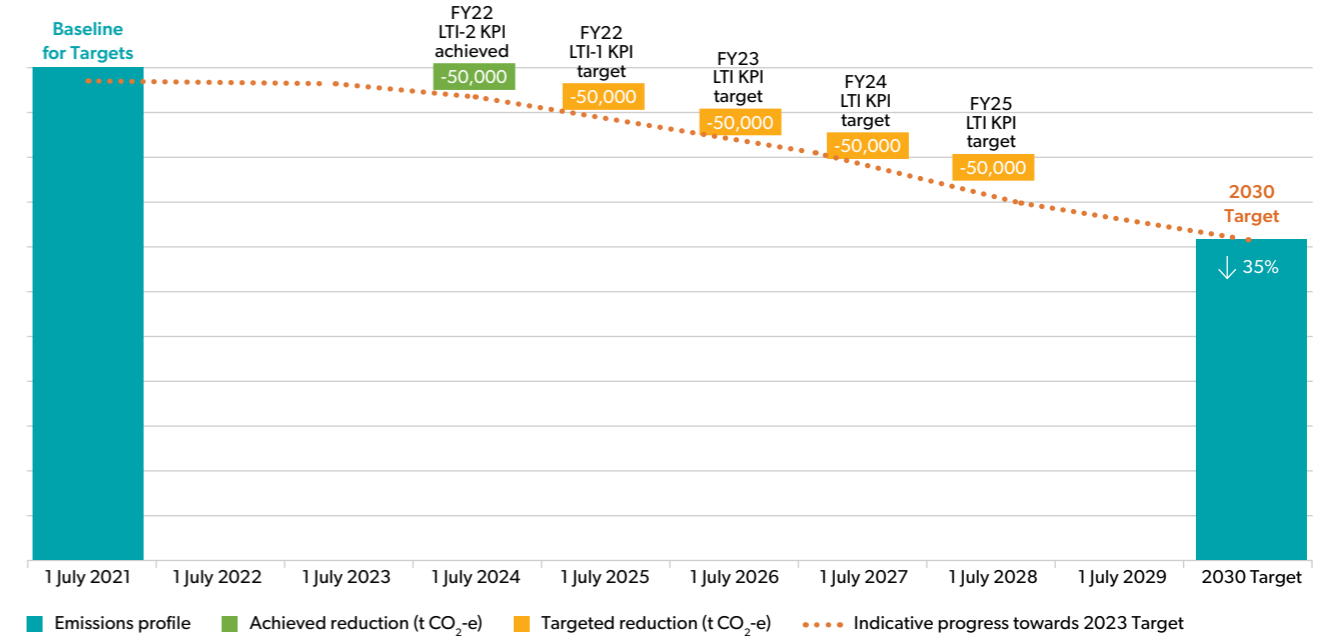


### Emissions Reductions Achieved So Far

Northern Star is pleased to report that our FY22 key performance indicator of demonstrating tangible, sustainable Scope 1 and Scope 2 carbon Emissions Reductions of 50kt CO<sub>2</sub>-e between 1 July 2021 and 30 June 2024 (where 1 July 2021 represents business as usual baseline levels) was measured as at 30 June 2024 and achieved.

Note that our remuneration-related key performance indicators are measured relative to a 1 July 2021 business as usual baseline. In contrast, our commitment to achieve a 35% reduction in Scope 1 and 2 Emissions is measured relative to our 1 July 2020 baseline of 931kt CO<sub>2</sub>-e for Scope 1 and 2 Emissions.

**Figure 7** Scope 1 & 2 Emissions Reduction Remuneration-Related Key Performance Indicators



This KPI has been achieved through the delivery of the following projects and their anticipated impact:

- The KCGM Operations purchases power from the South West Interconnected System (SWIS) electricity grid, for the purposes of operating the Fimiston processing facility<sup>5</sup>. Emissions from these activities are classed as Scope 2 emissions under the NGER Act. Northern Star acquired the KCGM Operations from Newmont in 2020, and the Newmont power business from Newmont in 2021. Northern Star was a party to a power supply agreement whereby excess power supplies contracted by Boddington Gold Mine from the Bluewater coal fired power generators, were supplied to KCGM Operations. In January 2022 Northern Star gave notice to Newmont Boddington Gold to exit the agreement with effect on 25th July 2022 and instead received supply at the lower CO<sub>2</sub>-e rate per unit of electricity provided by the SWIS average.
- The connection of our South Kalgoorlie Operations underground operations to the SWIS grid;
- The operation of our Carosue Dam solar array (Stages 1, 2A and 2B) providing renewable energy to offset the use of power generated through our onsite liquid natural gas/diesel power station.
- The construction and commissioning of our Jundee Solar Stage 1 array providing renewable energy to offset the use of power generated through our onsite natural gas power station.

**Table 1** Projects at 30 June 2024 and Their Anticipated Impact on Scope 1 and 2 Carbon Emissions Reductions

Production Centre	Operation	Project	Abatement (t CO <sub>2</sub> -e/annum)
Kalgoorlie Production Centre	Carosue Dam Operations	CDO Solar Stage 1	872
		CDO Solar Stage 2A	3,216
		CDO Solar Stage 2B	1,879
	South Kalgoorlie Operations	UG to SWIS Grid	385
	KCGM Operations	SWIS Greening FY23	38,782
Yandal Production Centre	Jundee Operations	Jundee Solar Stage 1	13,952
<b>TOTAL</b>			<b>59,086</b>

<sup>5</sup> Electricity imported from the grid is generated by third parties, and Northern Star has no control over the emissions profile of the generation of that electricity but can accept the SWIS supply (with the associated average emissions intensity) or enter contracts with specific suppliers (with specific emissions intensities representative of the source of generation)



## Climate Change Related Disclosures - IFRS & ASRS Alignment

Northern Star’s alignment with SASB, TCFD, and GRI Standards has positioned us well to report against the International Sustainability Standards Board’s IFRS S1 and S2 Standards. Key areas of focus across our disclosures include: materiality, governance, strategy, risks and opportunities, consideration of our value chain, risk management, metrics and targets, and continuous improvement.

We have implemented external assurance processes on our data and disclosures since FY22. We commenced with Limited Assurance on selected metrics. Since that time, we

have also commenced increasing the level of assurance being applied, such as our step up to Reasonable Assurance on our Scope 1 and Scope 2 emissions in FY24.

Northern Star is also preparing for the implementation of the Australian Sustainability Reporting Standards (ASRS), as they become a feature of the Australian reporting landscape. Our ESR disclosure suite for FY24 and beyond will support our future ASRS Sustainability Reporting as part of our annual reporting processes, including an audited climate change related mandatory report within our future Annual Reports.

## TCFD Alignment

Northern Star is committed to understanding how both the physical impacts of climate change and the transition to low carbon operations might continue to affect our business. We understand the importance of continuing our alignment

with the TCFD recommendations, and the need for Northern Star to progress its commitment to a low-carbon economy in advancing our Emissions Reduction projects.

**Figure 8** Our Phased Alignment with TCFD Recommendations

Metrics and Targets	Risk Management	Strategy	Governance
<p>The metrics and targets are used to assess and manage relevant climate-related risks and opportunities where such information is material</p> <p><b>FY24 Commitments Satisfied:</b> Ongoing disclosure of progress against targets. Demonstrating a tangible and sustainable reduction in our Scope 1 and 2 greenhouse gas emissions in line with our FY22 remuneration key performance indicator</p> <p><b>Planned Action (1-5 years):</b> Ongoing disclosure of progress against targets, and consideration of future metrics and targets</p>	<p>How the organisation identifies, assesses, and manages climate-related risks</p> <p><b>FY24 Commitments Satisfied:</b> Integration of climate related risks in our enterprise risk and assurance system CGR, and ongoing review of risks and controls in accordance with our Risk Management Standard</p> <p><b>Planned Action (1-5 years):</b> Ongoing reviews of climate-related risks and controls</p>	<p>Actual and potential impacts of climate-related risks and opportunities on the organisation’s businesses, strategy, and financial planning where such information is material</p> <p><b>FY24 Commitments Satisfied:</b> Development of more detailed forward looking emissions modelling scenarios, in conjunction with external resources to incorporate into long term planning</p> <p><b>Planned Action (1-5 years):</b> Integrate implications of scenario analysis into long term strategic planning</p>	<p>The organisation’s governance around climate-related risks and opportunities</p> <p><b>FY24 Commitments Satisfied:</b> Continued oversight of meeting TCFD recommendations</p> <p><b>Planned Action (1-5 years):</b> Ongoing oversight of governance in relation to climate-related risks and opportunities</p>

We continue to utilise both inhouse and external capabilities to model our sites’ power and energy demand, wind efficiency and timing, and solar efficiency and timing.

Through this work, we continue to progress and optimise our renewables programs in line with our planned pathway in Figure 2.



Wind turbine in position at Jundee Operations  
**Photo Credit:** Hayden Lindsay, Senior Environmental Advisor  
 Jundee Operations, Yandal Production Centre, Western Australia



## Climate Related Risks & Opportunities

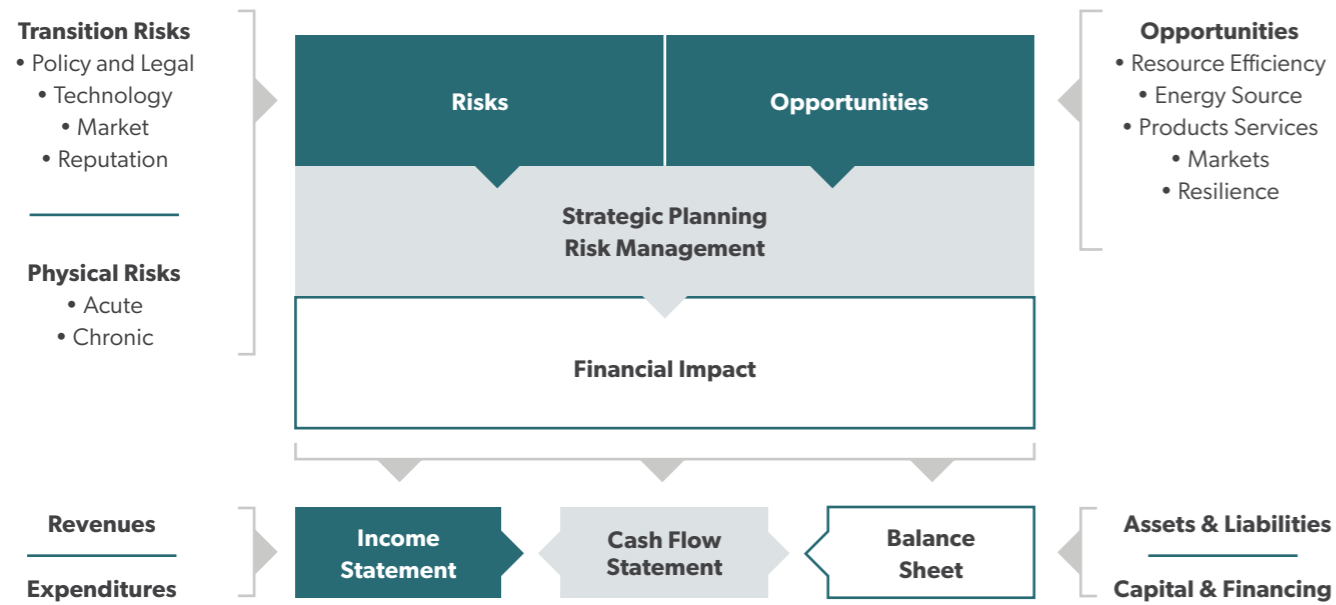
Climate related risks and opportunities are discussed regularly as part of the standing agenda of the ESS Committee meetings. During the year the ESS Committee and Audit and Risk Committee reviewed ESS and climate related risks and opportunities as part of the standard corporate risk review processes.

The ESS Committee also completes an annual ESS strategy review and an annual ESS benchmarking review, both

include the consideration of Northern Star's responses to climate related risks and opportunities. The Corporate Risk Review processes ensure consideration of climate related risks and controls at site, regional, functional and Company-wide levels

Figure 9 below, demonstrates the relationships within Northern Star's business between climate change related risks and opportunities.

**Figure 9** Climate Change Related Risks, Opportunities and Financial Impact



Pogo Operations in winter  
 Photo Credit: Arkadiusz Turołski, Geologist - Exploration,  
 Pogo Operations, Pogo Production Centre, Alaska

**Table 2** Northern Star's Highest Residual Climate Change Related Risks

High Residual Climate Change Related Risks	How We Manage the Risk
Hotter average conditions and/or increased frequency of extreme temperature (hot or cold) days or heatwaves	<ul style="list-style-type: none"> <li>• Extreme temperatures and hot working conditions are captured in our critical risk standards, site-based management plans and critical risk assessments.</li> <li>• Working in adverse temperature guidelines includes regular hydration testing of workforce.</li> <li>• Onsite buildings, mobile plant and vehicles fitted with enclosed cabins for heating and air conditioning provisions.</li> </ul>
Flooding caused by more frequent and higher intensity storm events <sup>6</sup>	<ul style="list-style-type: none"> <li>• Flooding is captured in our critical risk standards, site-based management plans and critical risk assessments.</li> <li>• Risk assessments for new developments and potential mergers or acquisitions considered current and future flooding risks.</li> <li>• Surface water management infrastructure, water pond and weather monitoring.</li> </ul>
Tailings dam failure caused by more frequent and higher intensity storm events.	<ul style="list-style-type: none"> <li>• Tailings management standard, independent expert design and Engineer of Record for each facility ensures appropriate design and management.</li> <li>• Annual third-party audits of active facilities.</li> <li>• Risk assessments for new developments, expansions, and potential mergers or acquisitions consider failure analysis and/or high rainfall events.</li> </ul>
Increased frequency and severity of storms, including cyclonic events	<ul style="list-style-type: none"> <li>• Severe storm events are captured in our critical risk standards, site-based management plans and critical risk assessments.</li> </ul>
Stakeholder activism (divestment, corporate litigation) from lack of climate action	<ul style="list-style-type: none"> <li>• Net zero ambition with clear 2030 targets and decarbonisation pathway. Progress is reported annually through our GRI aligned ESR disclosures.</li> <li>• Continued engagement with stakeholders through Investor Relations function.</li> </ul>

**Table 3** Key examples of Northern Star's Climate Related Opportunities

Climate Change Related Opportunities (Key Relevant Examples)	
Products & Services	<ul style="list-style-type: none"> <li>• Low emissions mining</li> </ul>
Energy Sources	<ul style="list-style-type: none"> <li>• Diversification of energy sources</li> <li>• Energy price volatility resilience</li> </ul>
Resource Efficiency	<ul style="list-style-type: none"> <li>• Electrification of selected operations</li> <li>• Increased operating efficiency</li> </ul>
Resilience	<ul style="list-style-type: none"> <li>• Improved social licence to operate</li> <li>• Reinforcing assets to increase resilience to physical impacts</li> </ul>
Markets	<ul style="list-style-type: none"> <li>• Action and disclosure to increase stakeholder confidence</li> <li>• Incorporating climate change criteria in decision making</li> </ul>

<sup>6</sup> Refer to the scenario findings in Appendix B: Financial Quantification Modelling.

### Energy Production, Consumption & Efficiency

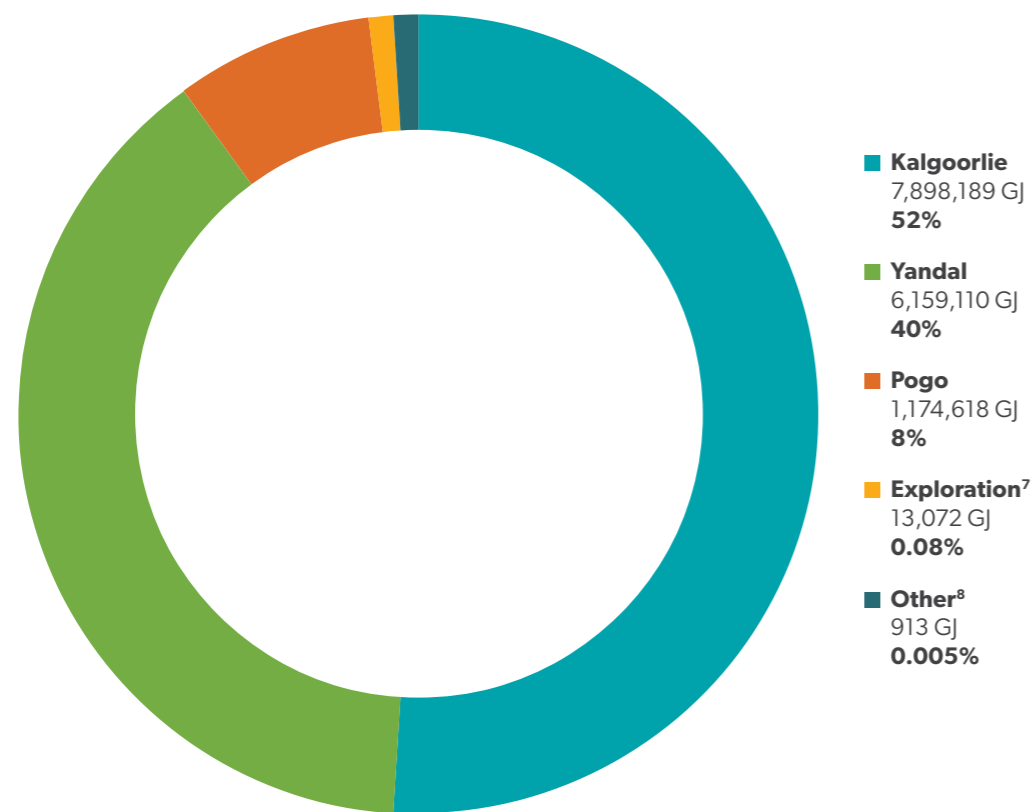
Energy production at our Operations comprises electricity physically produced on our sites, in accordance with the definition set out in the NGER Act.

Power stations located at our Carosue Dam, Jundee and Thunderbox sites use a combination of gas and diesel to generate power through turbines and generator sets.

In FY24 our net energy consumption remained relatively steady, only increasing slightly from 15.11 M GJ in FY23 to 15.24 M GJ.

Net energy consumed on our Operations comprises all energy consumed by our facilities, including site produced, grid purchased electricity and fuels burnt, less any power generated.

**Figure 10** Energy Consumption by Production Centre , Exploration and Other



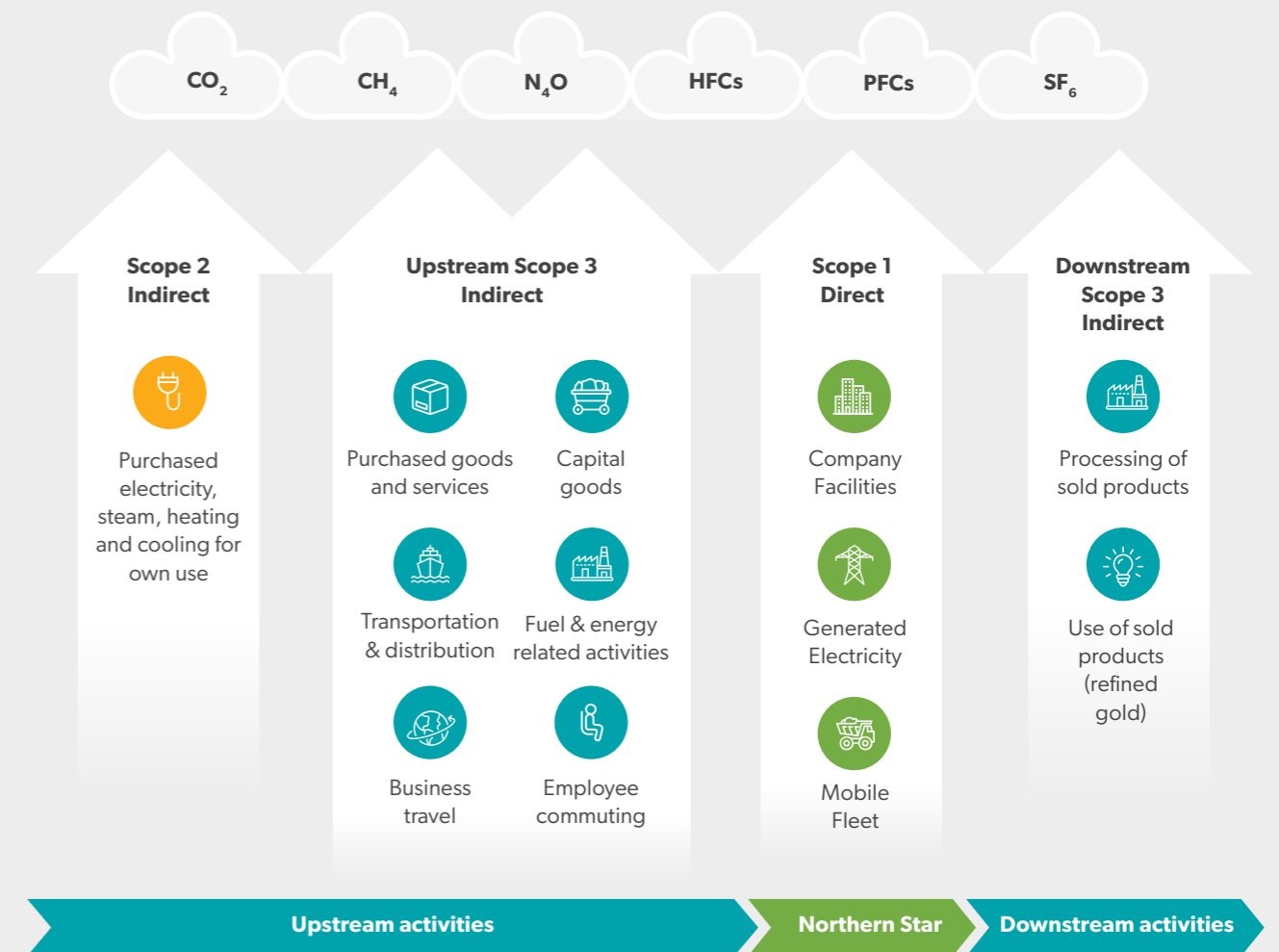
<sup>7</sup> Exploration in this instance refers to Tanami.  
<sup>8</sup> Other in this instance refers to Corporate Office.

### Carbon Footprint

Northern Star's carbon footprint for FY24 combines our Scope 1, Scope 2 and Scope 3 Emissions totalling 1.9 Mt CO<sub>2</sub>-e as depicted in Figure 12 on page 17, overleaf.

The proportional contribution of emissions from our three Production Centres to our total emissions is provided in our Climate Change Performance Metrics on page 20.

**Figure 11** Overview of Northern Star's GHG Emissions Footprint (Refer to the Climate Change Performance Metrics on page 20 and Appendix C for Northern Star's FY24 Scope 3 methodologies)





### Scope 1 Emissions

In FY24, our total Scope 1 GHG Emissions remained relatively steady, but did reduce from 789,320 t CO<sub>2</sub>-e in FY23 to 788,136 t CO<sub>2</sub>-e.

Scope 1 GHG Emissions are calculated in accordance with the Australian Government methodology required by the NGER Act.

Emissions associated with our Pogo Operations in Alaska are calculated using the same method to ensure consistency in our emissions reporting.

### Scope 2 Emissions

In FY24, our total Scope 2 GHG Emissions increased from 413,081 t CO<sub>2</sub>-e in FY23 to 445,594 t CO<sub>2</sub>-e.

Scope 2 GHG Emissions are calculated in accordance with the Australian Government methodology required by the NGER Act.

Emissions associated with our Pogo Operations in Alaska are calculated using the same method to ensure consistency in our emissions reporting.

### Scope 3 Emissions

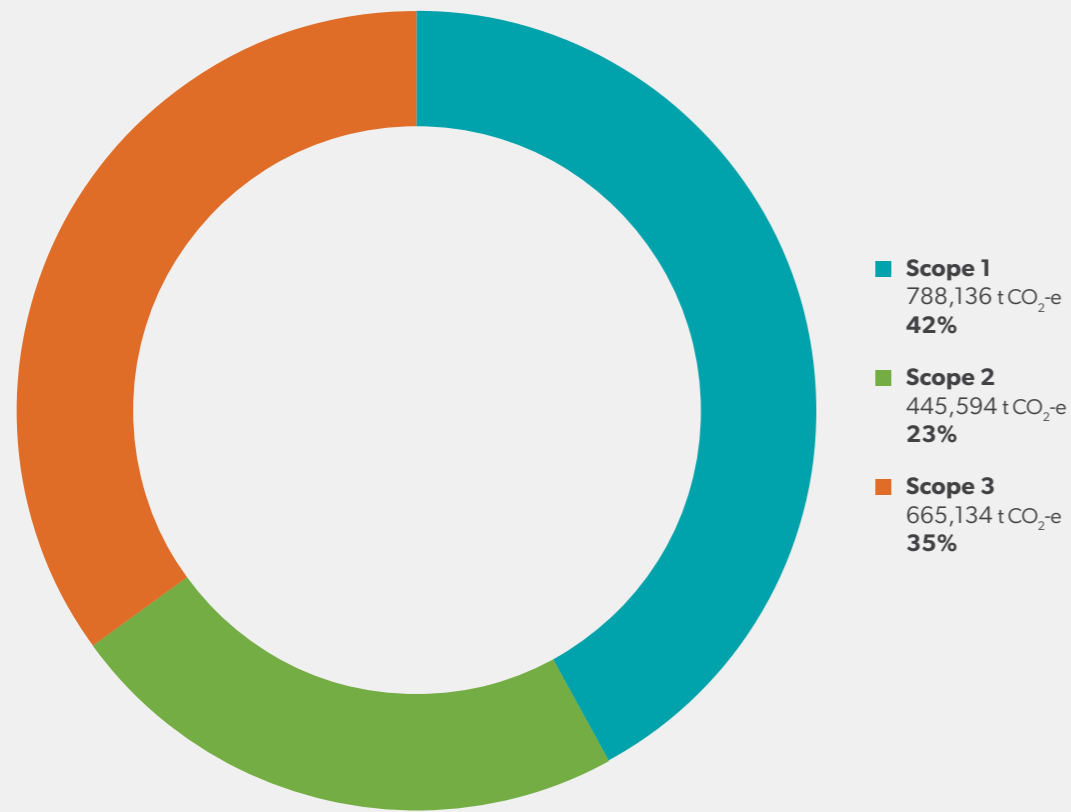
Northern Star has continued to evolve our measurement and analysis of our Scope 3 Emissions in line with the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and supported by Greenbase's environmental accounting team.

In FY24 we elected to assess all of our suppliers based on a supplier spend methodology. We also continued to calculate the Scope 3 emissions from our directly chartered

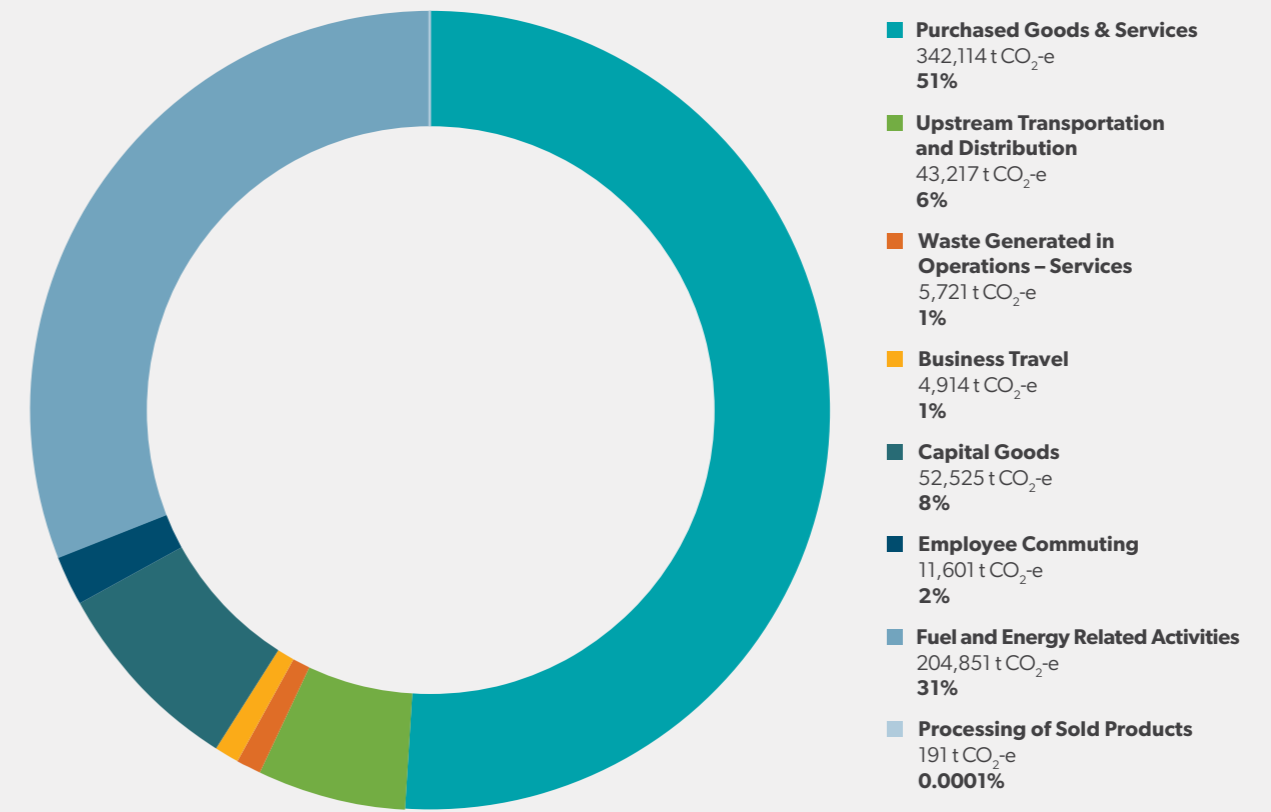
flights and buses to and from our operations, and utilising our business travel reports. More information on our Scope 3 methodology is provided in Appendix C.

As in previous years, the highest areas of contribution to our Scope 3 emissions are from purchased goods and services, fuel and energy related activities, capital goods and upstream transportation and distribution.

**Figure 12** Northern Star's FY24 GHG Emissions Profile (Scope 1, 2 and 3)



**Figure 13** Northern Star's FY24 Scope 3 GHG Emissions by Source



### Scope 1 and 2 Emissions Intensity

During FY24, emissions intensity (total emissions generated per tonne of ore processed) decreased slightly from 0.0453 t CO<sub>2</sub>-e to 0.0449 t CO<sub>2</sub>-e



## Safeguard Mechanism

On 1 July 2023, the Safeguard Mechanism Rule (Rule) came into effect which aims to reduce emissions at Australia's largest industrial facilities.

Four of Northern Star's Operations fall under the Safeguard Mechanism:

- KCGM Operations (Kalgoorlie Production Centre)
- Jundee Operations (Yandal Production Centre)
- Thunderbox Operations (Yandal Production Centre)
- Carosue Dam Operations (Kalgoorlie Production Centre)

Under the Rule, all facilities which were subject to the Safeguard Mechanism (Safeguard facilities) were required to submit Emissions Intensity Determinations (EID) to the Clean Energy Regulator (CER).

Northern Star's EID applications were accompanied by external auditor reports. The CER assessed the applications

and determined emission intensities (EI) for each of our Safeguard facilities.

Carosue Dam Operations has come to the conclusion of a three-year multi-year monitoring period in an excess emissions scenario of Scope 1 Emissions. Carosue Dam Operations is obligated under the Safeguard Mechanism rule to surrender ACCU's, equivalent to its excess emissions scenario to the Clean Energy Regulator by Q1 2025.

The four Safeguard facilities reported Scope 1 emissions during FY24 as shown in the Climate Change Performance Metrics overleaf.



KCGM Operations,  
Kalgoorlie Production Centre, Western Australia

## Climate Change Performance Metrics

		FY24	FY23	FY22*
<b>Energy Produced</b>				
<b>Kalgoorlie Production Centre</b>	Carosue Dam Operations (GJ)	517,689	579,882	580,933
	Kalgoorlie Operations (GJ)	-	49,664	73,745
	KCGM Operations (GJ)	-	-	-
<b>Yandal Production Centre</b>	Jundee Operations (GJ)	698,047	707,178	679,315
	Bronzewing Operations (GJ)	-	-	-
	Thunderbox Operations (GJ)	735,863	629,598	418,078
<b>Pogo Production Centre</b>	Pogo Operations (GJ)	-	-	-
	<b>Total (GJ)</b>	<b>1,951,599</b>	<b>1,966,322</b>	<b>1,785,953*</b>
<b>Net Energy Consumed</b>				
<b>Kalgoorlie Production Centre</b>	Carosue Dam Operations (GJ)	2,249,147	2,479,457	2,425,475
	Kalgoorlie Operations (GJ)	876,320	972,856	1,156,809
	KCGM Operations (GJ)	4,772,721	4,791,641	4,259,143
<b>Yandal Production Centre</b>	Jundee Operations (GJ)	2,577,416	2,651,864	2,533,097
	Bronzewing Operations (GJ)	583,784	401,102	39,365
	Thunderbox Operations (GJ)	2,997,911	2,745,340	1,816,520
<b>Pogo Production Centre</b>	Pogo Operations (GJ)	1,174,618	1,168,708	1,111,746
<b>Exploration</b>	Tanami (GJ)	13,072	13,165	8,849
<b>Other</b>	Corporate (GJ)	913	728	643
	<b>Total (GJ)</b>	<b>15,245,902</b>	<b>15,224,862</b>	<b>13,381,207*</b>
<b>Scope 1 Emissions</b>				
<b>Kalgoorlie Production Centre</b>	Carosue Dam Operations (t CO <sub>2</sub> -e)	137,263	151,888	151,520
	Kalgoorlie Operations (t CO <sub>2</sub> -e)	23,412	32,869	40,300
	KCGM Operations (t CO <sub>2</sub> -e)	229,822	228,801	192,368
<b>Yandal Production Centre</b>	Jundee Operations (t CO <sub>2</sub> -e)	144,622	148,143	141,252
	Bronzewing Operations (t CO <sub>2</sub> -e)	40,173	27,305	2,784
	Thunderbox Operations (t CO <sub>2</sub> -e)	174,100	160,147	108,459
<b>Pogo Production Centre</b>	Pogo Operations (t CO <sub>2</sub> -e)	37,826	39,243	37,865
<b>Exploration</b>	Tanami (t CO <sub>2</sub> -e)	918	924	621
<b>Other</b>	Corporate (t CO <sub>2</sub> -e)	-	-	-
	<b>Total (t CO<sub>2</sub>-e)</b>	<b>788,136</b>	<b>789,320</b>	<b>677,225*</b>
<b>Scope 2 Emissions</b>				
<b>Kalgoorlie Production Centre</b>	Kalgoorlie Operations (t CO <sub>2</sub> -e)	69,836	62,280	95,043
	KCGM Operations (t CO <sub>2</sub> -e)	219,274	211,889	261,171
<b>Pogo Production Centre</b>	Pogo Operations (t CO <sub>2</sub> -e)	156,350	138,808	130,074
<b>Other</b>	Corporate (t CO <sub>2</sub> -e)	134	103	121
	<b>Total (t CO<sub>2</sub>-e)</b>	<b>445,594</b>	<b>413,081</b>	<b>486,410*</b>
<b>Scope 3 Emissions</b>				
<b>Upstream (refer to Figure 11)</b>	Purchased Goods & Services (t CO <sub>2</sub> -e)	342,114	345,235	232,952
	Capital Goods (t CO <sub>2</sub> -e)	52,525	22,659	27,896
	Fuel & Energy Related activities (t CO <sub>2</sub> -e)	204,851	207,639	55,254
	Upstream Transportation & Distribution (t CO <sub>2</sub> -e)	43,217	37,180	35,521
	Waste Generated in Operations (t CO <sub>2</sub> -e)	5,721	4,783	-
	Business Travel (t CO <sub>2</sub> -e)	4,914	1,460	840
	Employee Commuting (t CO <sub>2</sub> -e)	11,601	10,677	25,529
<b>Downstream</b>	Processing of Sold Products (t CO <sub>2</sub> -e)	191	183	210
	<b>Total (t CO<sub>2</sub>-e)</b>	<b>665,134</b>	<b>629,816</b>	<b>378,203</b>
<b>Emissions Intensity</b>				
	<b>Total Scope 1 &amp; 2 Emissions Intensity (t CO<sub>2</sub>-e / t ore processed)</b>	<b>0.045</b>	<b>0.045</b>	<b>0.044</b>

\* data includes sites no longer owned or operated by Northern Star Resources, but disclosed for continuity of reporting



## Appendix A: Scenario Analysis Process<sup>9</sup>

### Climate-related scenario analysis

Northern Star’s business may be affected by both the physical impacts of climate change and the transition to a low carbon economy with the most significant effects likely to play out over the medium to long term.

Both physical and transitional risk are affected by a wide range of factors – including public policy, technology, and market change - that are hard to forecast accurately. Scenarios help Northern Star consider how these variables may plausibly impact the company’s operations over time.

During CY2020, to build our capacity in relation to climate-related strategy, we conducted scenario workshops together with our external consultants, requiring and enabling critical strategic thinking and the testing of business-as-usual assumptions underpinning Northern Star’s business strategy. Since that time, we have continued to progress our TCFD journey.

This is evidenced by the disclosure of scenario analysis information and disclosing plausible ways in which climate-related factors could affect our operations on a geographical basis.

### Scenario Selection

In line with the Paris Agreement to reduce greenhouse gas emissions and accelerate the transition to a lower carbon economy (“holding the increase in the global average temperature to well below 2°C above preindustrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels”), consistent with the TCFD Recommendations and in order to provide comparable information, Northern Star has used a 2°C scenario (a pathway and an emissions trajectory consistent with limiting the average global temperature increase to a temperature range around 2°C above pre-industrial levels with a certain probability). The 2°C scenario

We disclosed the potential high-level impacts on our operations, and we confirmed our aspirations to consider the benefits of quantitative modelling of key climate risks to estimate financial impacts on our operations. We have continued to develop our planned pathways to 2030, completed financial quantification modelling, commenced construction of new renewables projects, and integrated our climate-related risks and opportunities into our operational and strategic risk registers.

Scenario analysis is a strategic planning and risk management tool which allowed Northern Star to:

- assess the potential financial effect of climate-related change on Northern Star’s Operations;
- test whether our business strategy is flexible and adequately accommodates these climate-related risks and opportunities; and
- test how resilient that strategy is, and where necessary identify options for increasing our strategic and business resiliency to plausible climate-related risks

was selected as it has greater data availability than the 1.5°C scenario.

Two other scenarios most relevant to Northern Star have also been used; a 2-3°C scenario and a >4°C scenario. These scenarios were selected to be included as they were commonly used by our peers, which increases the comparability of results for our external Stakeholders. These two scenarios illuminate our future exposure to climate-related physical and transitional risks and opportunities in relation to gold production and demand for gold up to 2050.

The temperature scenarios were rounded out with the inclusion of Shared Socio-Economic Pathways

and opportunities, by adjusting strategic and financial plans, under a given set of assumptions, according to a range of plausible but challenging hypothetical future constructs.

Key for Northern Star was to use the scenario analysis to improve our critical strategic thinking – to test whether current business as usual assumptions are the correct assumptions on which to base a business strategy which is resilient to climate-related change. By resilient, we mean whether our business strategy can tolerate disruptions or adapt to changes or uncertainties in the business environment that might affect Northern Star’s performance, and to remain effective under most situations and conditions.

Commencing this scenario analysis work in CY2020 allowed us time to develop and improve on that capability, to ensure Northern Star may better identify and disclose how its strategy may need to change and develop to accommodate potential climate-related risks and opportunities.

(SSP) to develop three robust scenarios of the future that could be used to understand the resilience of our operations and business strategy, to 2030 and 2050. The 2°C scenario was combined with SSP1 as it has a narrative that aligns most closely to a low emissions trajectory. The >4°C scenario was combined with SSP5 as it is the only possible option for this temperature scenario. Finally, the 2-3°C scenario was combined with SSP3 as it provided divergence in economic growth and ensured we were testing our business with three distinct scenarios.

### Scenarios and their impacts

Northern Star drew on TCFD recommendations as well as internal priorities established through workshops to define criteria for the development of three scenarios concerning future likely global emissions levels and socioeconomic conditions (Figure 14).

Executives including the CEO, CFO and COO and other senior management who were previously involved in the multi-disciplinary workshops in CY2019 to validate physical and transitional risks, reconvened twice during CY2020 in workshops facilitated by our external consultants.

The outcomes of the workshops and follow up meetings were consensus on the quantity and choice of scenarios, and an agreed prediction of how Northern Star’s operations

would be likely to respond to each scenario. There was discussion of how our strategy could adapt in response to each scenario. Options were grouped into ‘no regret’ options (which could be beneficial under all three scenarios) and ‘watch and wait’ options (that would be more relevant to some but not all three scenarios).

In addition, throughout CY2020 the ESS Committee of the Board discussed climate risk outlook in Australia and trends in regulator, investor, and financier expectations, following direct engagement with our investors and proxy advisors.

Updates and progress in relation to climate related risks, opportunities and strategy remain a feature of our ESS Committee and Board discussions.

Figure 14 Key Scenario Parameters

TCFD Criteria	Northern Star’s Criteria
<ul style="list-style-type: none"> <li>• Provide diversity of potential future climate states</li> <li>• Explore relevant transition and physical climate-related risks and opportunities</li> <li>• Represent plausible outcomes</li> <li>• Include challenging futures that significantly diverge from business as usual</li> <li>• Include a low emissions scenario (2°C or less)</li> </ul>	<ul style="list-style-type: none"> <li>• Include a scenario that tests resilience to international trade challenges</li> <li>• Be relevant to Northern Star operations and the gold sector</li> <li>• Data underpinning scenarios to come from credible sources</li> <li>• Align with industry best practice</li> <li>• Demonstrate leadership</li> </ul>

The selected scenarios focused particularly on transition risk, to complement the results of Northern Star’s initial physical climate risk assessment conducted in CY2019. Multiple factors influencing gold mining

and demand for gold were considered within each scenario. All scenarios present significant challenges and opportunities, but the sources of these differ considerably across each scenario.

<sup>9</sup> This information was previously disclosed in our CY2020 Sustainability Report



**Figure 15** Northern Star’s Alternative Climate Change Scenario Narratives

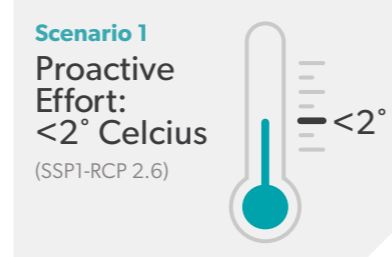
**Scenario 1**

Environmental degradation and accumulating impacts from climate-related events lead to increased environmental awareness and concern. An increased focus on managing climate change risk and capturing opportunity influences investors, business, governments, and public opinion. This drives more sustainable policy, practices, and investments, both in terms of environmental and social outcomes.

As the world embraces the scale of the transformation required, large investments are made into research and development, facilitating innovation, and helping to commercialise low

emissions technology more rapidly. Consumption patterns shift as the population becomes less materialistic and may impact the retail demand for gold. Gold’s role as a portfolio diversifier and hedge in times of uncertainty remains, with limited potential for growth. However, there would be increased opportunities for sustainable gold for environmental and medical technologies.

There is a strong focus on reducing emissions, minimising environmental footprints, and improving rehabilitation practices in the mining sector. Investors become increasingly selective, backing companies with clear and transparent pathways



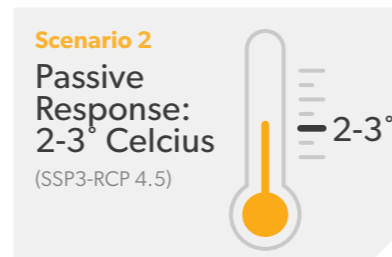
towards decarbonisation and increasing engagement with the outliers. There may be consolidation of mining sector companies in these conditions, as newer and smaller entrants find it more difficult to compete in the face of relatively stable gold demand and high public and investor expectations.

**Scenario 2**

Financial crises in major economies reinforce and spread distrust in globalisation. Protectionist and national security issues slowly take priority over environmental protection. Demand for local goods increases, putting upward pressure on inflation. In the longer term, more stringent regulation comes into play, including climate policy, to safeguard national resources. The mining sector becomes affected by decreased globalisation and policy which aims to protect upstream supply chains and retain a greater share of returns in Australia.

In this anaemic economic environment, there may be greater turnover of existing gold assets as holders liquidate their investment to cash as economic conditions

become more challenging. Stunted per capita wealth may reduce retail demand for newly produced gold and, as technology investment is reduced, the potential and breadth of gold applications may be lower in this scenario. However, global population growth is high (particularly in Asia), becoming the main driver of jewellery and technology demand. Additionally, in an environment of greater uncertainty and with inflationary pressures, gold is likely to be increasingly sought for hedging purposes. Central banks may diversify their monetary reserves, accumulating gold. Overall, these diverging pressures may contribute to a larger range of gold prices as volatility increases.



In addition to growing regulatory red tape and climate impacts, there is a widespread push for producers to lower costs and hedge output. Lower tendency to extend life of mine to minimise the risk exposure due to gold price volatility. Increased geopolitical tensions may increase international shipping costs. Companies are evaluated on their contribution to local GDP and their compliance with regulation.

**Scenario 3**

Connections across a greater portion of the population in developed and emerging economies through the digital revolution increasingly facilitate access to education and enable discourse and collaboration. In this highly globalised society, investments in health and education are favoured to support human capital and drive innovation and economic growth. With equality and comfort pursued at all costs and no environmental focus, there is a global exploitation of fossil fuel resources and a widespread adoption of resource and energy intensive lifestyles. Regulation is minimised so as not to shackle progress.

The retail market and technology applications become increasing sources of gold demand, particularly as the global population and

economic growth thrive. With increases in wealth and with inflationary pressures present in the economy, there may be an increase in demand for gold as a store of value. While the gold price may be relatively lower in this scenario, it may be more stable due to global integration and focus on growth.

In this free-for-all world, large companies take over and maximise new developments. The burden of adaptation and safety measures is increasing, with implications for existing mining companies’ reputation, while also presenting barriers to entry for new market entrants. A focus is placed on automation and digitisation to enhance safety and convenience and compete with peers.



Native vegetation at Thunderbox Operations Yandal Production Centre, Western Australia



**Table 4** Summary of impacts on key supply and demand factors for gold as a commodity, by scenario

		Scenario 1 Proactive effort	Scenario 2 Passive response	Scenario 3 Regressive action
Mining	Energy mix and use	Rapid electrification of energy systems, including in the transport sector.	Fossil fuel dependency persists, although Australia increasingly focuses on harnessing local sources of energy, including renewables.	Exploitation of fossil fuel resources continues, and growth enables widespread adoption of resource and energy-intensive lifestyles.
	Technology	Innovation focuses on renewable energy and environmental technologies. Digitalisation of mining enables process optimisation.	Investment constraints hinder advancements. Innovation focuses on short-term cost minimisation.	Innovation and automation prioritise production, convenience, and safety.
	Environmental protection	Stakeholder pressure drives a gradual shift toward improving environmental conditions, beyond impact mitigation.	Resources are extracted at lowest cost, resulting in environmental degradation. Climate policy is limited or delayed.	Environmental problems are managed rather than mitigated. Control measures become more extreme over time and may include geo-engineering.
	Policy	Policy mandates deep decarbonisation, impacting asset values and operational costs. New developments need to be designed for net zero emissions.	Countries become increasingly nationalistic, and policy prioritises domestic interests and concerns ahead of the global commons.	Policy supports human capital development and economic growth. Institutional barriers are gradually removed, and regulation minimised.
	Mining company characteristics	Successful companies invest in sustainability innovation and resource efficiency to meet ambitious emission reduction targets.	Volatile conditions keep average life of mine shorter. Physical climate impacts impose greater production costs.	Leading companies capitalise on innovation. Costs of adaptation and high safety standards gradually rise, leading to industry consolidation.
Gold	Demand profile	Applications for gold in medicine and environmental technologies grow. There may be emerging demand from retail buyers of gold products for sustainably mined gold with reduced demand for gold per capita, due in part to repair and reuse of electronic products.	Gold is sought for hedging purposes. As physical climate impacts increase and livelihoods are affected, gold demand in Asia may begin to stall.	High demand for gold as a store of value and status signifier, and for use in hi-tech consumer applications.
	Recycled gold	Electronic waste is increasingly repurposed as part of circular economy practices. This does not noticeably impact key gold producers.	There may be greater turnover of existing gold assets as holders liquidate their investment to cash as economic conditions become more challenging.	Recycled gold is only likely to grow in demand if technology improvements do not deliver enough newly mined gold.
	Price volatility	Moderate	High	Moderate
	Labour retention	Companies with sustainable reputations can attract motivated and high-quality staff.	Teams may be trimmed to reduce costs, but job security concerns minimise staff turnover.	Increased practices in poaching of key staff by larger competitors.
	Investors	Investors prefer companies with credible pathways towards decarbonisation.	Investors prefer blue chip gold producers, limiting investments in gold explorers/juniors.	Investors back companies with the largest gold reserves.

### What the scenarios each mean for Northern Star and its business strategy

In Scenario 1, the Proactive Effort scenario, Northern Star's underground mining expertise may be more valued, due to its lower environmental impacts. Our Tier 1 assets and continued work on transparent climate-related disclosure and action may enhance our reputation as a sustainable gold miner.

The Proactive Effort scenario would involve the most challenging transition period compared to the other two scenarios. However, it is the scenario which is most aligned with Northern Star and is likely to be most advantageous for our business.

In Scenario 2, the Passive Response scenario, our existing focus on increasing and maintaining performance of the existing fleet and machinery positions us well for cost minimisation, while our gold processing plant expansions place us at an advantageous position to capitalise on periods of higher gold demand and prices. However, cost and regulatory pressures could become more challenging over time and highly price volatility could make new expansions less compelling.

In Scenario 3, the Regressive Action scenario, there is potential for higher consolidation in the mining sector as demand grows, expansion is easier, and globalisation is high. Northern Star has increasing opportunity to capitalise on our distinctive expertise in underground mining.

The physical impacts of climate change are of higher concern under scenarios 2 and 3, either due to our potentially limited ability to adapt due to higher overall costs (Passive Response) or through increasing uncertainty linked with global ability to manage growing impacts and safety concerns related to operating at higher temperatures (Regressive Action).

All scenarios would require some adaptation to the physical impacts of climate change. However, the burden and cost of adaptation would be greatest in Scenario 3, the Regressive Action scenario, to 2050, and beyond.

Opportunities to enhance Northern Star's resilience were identified, including "no regrets options", representing actions that are beneficial across all scenarios, and "watch and wait options", which are actions that are advantageous under only one or two scenarios.



### Opportunities out of the scenario analyses

Understanding the potential effects climate change may have on our business allows Northern Star to identify opportunities as well as potential risks.

We are taking actions to address the risks and leverage potential opportunities in three key focus areas.

- Understanding our energy mix and altering this mix where available. Implementation of renewable energy opportunities like modular, transportable power hybrids for short-life operations.
- Leveraging energy efficiencies across our business such as the existing practice of regularly changing out operational fleet.
- Water usage and recycling opportunities for our Australian assets, including the installation of thickeners.

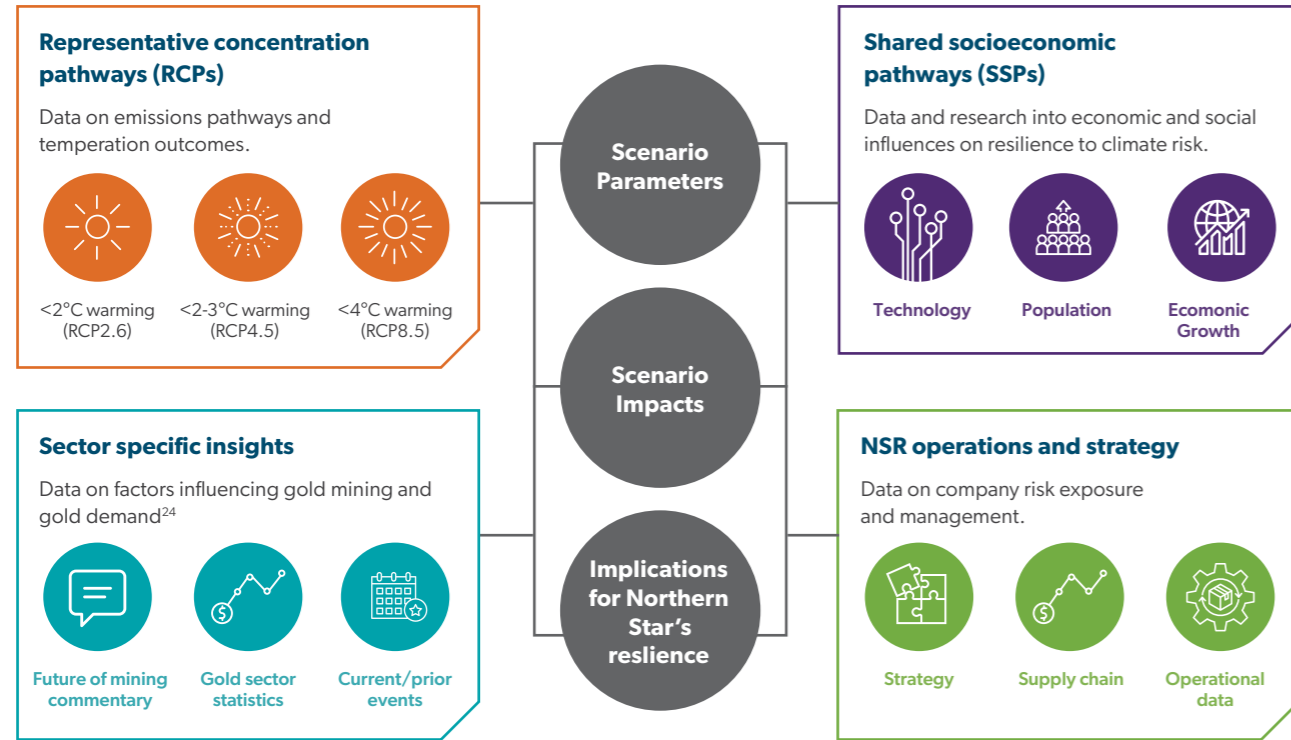


**Development of the Scenarios: methodological approach and data sources**

The three scenarios used by Northern Star were anchored by global greenhouse gas emissions levels (Representative Concentration Pathways (RCPs)), which provide emissions constraints and physical outcomes, and Shared Socio-Economic Pathways (SSPs), which provide social and economic context for climate related actions. The use and choice of RCP-SSP combinations drew on international

research undertaken for the IPCC 6th Assessment Report. Additional data was drawn from sector-specific research and expertise, and from Northern Star’s internal operations and insights. Figure 16 summarises the contribution made by each of these inputs and Table 5 outlines some key parameters stemming from the chosen IPCC pathways.

**Figure 16** Information sources used to construct Northern Star’s climate-driven scenarios



**Table 5** Key scenario parameters

		Scenario 1 Proactive effort	Scenario 2 Passive response	Scenario 3 Regressive action
Reference Point	Representative concentration pathway	RCP 2.6	RCP 4.5	RCP 8.5
	Socio-economic path-way	SSP1	SSP3	SSP5
	Basis for use	Investigates a <math><2^{\circ}\text{C}</math> pathway aligned with the Paris Agreement goal and TCFD requirements.	Explores mid-range emissions and warming broadly aligned with countries' current emission pledges, in context of depressed GDP growth and geopolitical challenges	Investigates a pathway consistent with worst-case climate change outcomes
Key Parameters	Global temperature increase (2100)	<math><2^{\circ}\text{C}</math>	<math>2\text{-}3^{\circ}\text{C}</math>	><math>4^{\circ}\text{C}</math>
	Australian temperature increase (2050)	~<math>1^{\circ}\text{C}</math>	~<math>1.5^{\circ}\text{C}</math>	~<math>2^{\circ}\text{C}</math>
	Projected Australian GDP (2050)	~5 trillion	~2.8 trillion	~8.8 trillion
	Projected global population (2050)	8.5 billion	9.9 billion	8.6 billion
	Projected Australian population (2050)	36.6 million	28.5 million	44.2 million



View across the Mt Charlotte headframe to the City of Kalgoorlie-Boulder. KCGM Operations, Kalgoorlie Production Centre, Western Australia



## Appendix B: Financial Quantification Modelling<sup>10</sup>

In FY23 Northern Star engaged Foresight Consulting Group (FCG) to assist with the development of a climate risk financial quantification model, designed to assist the business to better understand potential financial impacts that climate change related risks could have on the Company's operational effectiveness and financial position.

FCG indicated that Northern Star's quantitative climate risk model represented a step forward within the mining industry in FY23 for assessing the potential financial impacts of climate change, with approaches until then being mostly limited to qualitative scenario-based climate risk and opportunity assessments.

With increasing expectations from stakeholders for more detailed disclosures, and as Northern Star seeks ways to better understand and manage climate change related risks, the quantitative climate risk model provides a valuable tool for understanding and providing greater transparency on potential climate change related financial impacts on Northern Star.

More importantly, it also provides our leadership and management teams with useful climate risk intelligence to help guide our response to the challenges of transitioning to a Net Zero economy and our changing climate. The quantitative climate risk model was developed over four stages:

- The model logic was developed including the causal and mathematical relationships between risks and opportunities and their potential financial impacts.
- Climate scenarios were selected that represent the range of potential future climate states.
- Data was collected for Northern Star's assets and the climate scenarios including climate parameter and carbon price projections.
- The quantitative climate risk model was developed, and the financial impact modelled using the data collected.

The modelling work was undertaken on four priority climate-related risks that were identified as part of Northern Star's ongoing climate-related risk and opportunity assessment processes. These four risks comprised:

- Physical Risk: Water Security
- Physical Risk: Extreme Temperature
- Physical Risk: Extreme Rainfall and Flooding
- Transitional Risk: Emission Management

The development of the model was an extensive process involving engagement of key personnel throughout Northern Star, data gathering and validation both internally and externally, development of mining value chain mapping applicable to all Operations, development and testing of the model logic, and integration of business, financial and climate scenario processes.



**Figure 17** Scenarios modelled in the Northern Star Climate-Related Risk Financial Quantification

High emissions RCP & 5	Moderate emissions below 2°C & RCP 4.5	Low emissions divergent Net Zero
<ul style="list-style-type: none"> <li>• Used to assess the potential impacts of unmitigated climate change</li> <li>• High atmospheric concentration of GHGs aligned to global warming of between 3°C and 5.4°C by 2100</li> </ul>	<ul style="list-style-type: none"> <li>• Used to assess the impacts of moderate transition to a low carbon economy and moderate degree of climate change</li> <li>• Policies are introduced immediately and become more stringent with time with net zero emissions achieved by 2070. Aligned to a 50% chance of keeping global warming below 2°C</li> </ul>	<ul style="list-style-type: none"> <li>• Used to assess the impacts of rapid transition to a low carbon economy</li> <li>• Divergent policies introduced across sectors with a quick phase-out of fossil fuels and net zero achieved by 2050 at high costs. Aligned to a global warming of 1.5°C</li> </ul>

<sup>10</sup> This information was previously disclosed in our FY23 Sustainability Report

### Scenario Alignment

The quantitative model assessed risks for two transition scenarios and two physical scenarios. These were the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathways (RCPs) and the Network for Greening the Financial System (NGFS) scenarios.

For the purpose of modelling financial impacts in totality (physical and transition combined) NGFS and IPCC RCP scenario were aligned.

- Divergent Net Zero is a transition scenario developed by the NGFS. The scenario reaches Net Zero by 2050 but with higher costs due to divergent policies introduced across sectors and a quicker phase out of fossil fuels. The modelling indicates that this scenario would have a negative financial impact on the business by 2050 due to the scenario requiring sudden and early cessation of diesel use, significant and very high carbon price imposition, and

the difficulty of being able to source technologies and equipment in the short term. This scenario has a low probability and was used to stress test a theoretical worst case for Northern Star.

- Below 2°C and RCP 4.5 are the scenarios most closely aligned to Northern Star's ambition for Net Zero by 2050, our decarbonisation pathway and our alignment with the intent of the Paris Agreement. These scenarios both had an overall positive impact on our financial models.
- RCP 8.5 is the least desirable climate scenario where global temperatures increase significantly due to ineffective or delayed actions to combat greenhouse gas emissions reductions and sequestration of carbon. This scenario only had a very minor negative impact on the business by 2050 due largely to the existing resilience built into our Operations.

**The model demonstrated that with the implementation of Northern Star's planned pathways targeting 35% Emissions Reduction in Scope 1 and 2 Emissions by 2030, the financial risk is not only mitigated but is estimated to potentially have a considerable positive financial benefit through costs savings made from decarbonisation intervention measures.**

<sup>11</sup> Refer to Table 2 for more information on climate change related risks

### Scenario Findings

Emissions management was found to have the most material financial impact across Northern Star's assets.

Physical risks<sup>11</sup> were estimated to have a relatively lesser financial impact across Northern Star's assets, with potential impact being most prominent when ore processing is disrupted, as opposed to interruptions to physical mining activities. This is predominately due to the existing mine planning and engineering controls that Northern Star already has in place, which mitigate the potential financial impact.

Extreme rainfall and flooding were found to be the most financially significant physical risk, with potential financial impacts arising due to disruptions to the supply of critical reagents and ore to the processing plants. While these interruptions would typically be acute in nature (and may or may not occur within the life of an asset), they could result in deferred revenue under certain conditions. Northern Star will continue to work through the recommendations arising from the financial quantification modelling, with the model now being integrated into our business processes for ongoing financial climate-risk related strategy and planning.



## Appendix C: Scope 3 Methodology

Northern Star has continued to evolve our measurement and analysis of our Scope 3 Emissions in line with the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and supported by Greenbase's<sup>12</sup> environmental accounting team.

In FY23 we completed a review of our supply chain and increased the number and type of suppliers surveyed. All suppliers to Northern Star during FY23 were assessed for materiality by spend and supplier categories. Supplier activities that were already being captured under our existing Scope 1 and 2 processes were excluded from the Scope 3 assessment to avoid duplication.

In FY24 we elected to assess all of our suppliers based on a supplier spend methodology. We also continued to calculate the Scope 3 emissions from our directly chartered flights and buses to and from our operations, and our business travel reports.

Of the fifteen Scope 3 categories listed in the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard, the following were considered applicable to Northern Star and included in our FY24 assessment:

- Purchased goods and services
- Capital goods
- Fuel and energy related activities
- Upstream transportation and distribution
- Waste generated in operations
- Business travel
- Employee commuting
- Processing of sold products

The following categories were assessed as not applicable to Northern Star's current Operations during FY24:

- Upstream leased assets – no currently leased upstream assets not already considered in Scope 1 or 2 Emissions
- Downstream transport – elected reporting boundary is the safe in the gold room. We aspire in the future to capture Scope 3 Emissions involved from the collection of the doré from each gold room and secure transportation to the refinery then the refining process up until point of sale of the metal.
- Use of Sold Products – the majority of gold sold globally is retained as gold bars. It is not possible to quantify how much of Northern Star's gold sold is retained as gold bars or converted into alternate uses such as jewellery, medical devices, technology and so forth.
- End of life treatment of sold products – gold requires no end-of-life treatment as it does not have an expiration date, and requires no special treatment being inert and non-allergenic.
- Downstream leased assets – no currently leased downstream assets not already considered in Scope 1 or 2 Emissions
- Franchises – no franchises.
- Investments – no investments not already considered in Scope 1 or 2 Emissions

### Emission Calculation Methodology

In FY24 Northern Star has elected to apply spend data calculation to our suppliers as a result of ongoing low levels of data submissions over previous years from a large proportion of our suppliers.

We also continued to calculate the Scope 3 Emissions from our directly chartered flights and buses to and from our operations, and our business travel reports.

### Scope 3 Emissions Reduction Targets

While Northern Star does not have a Scope 3 Emissions Reduction target, we continue to be focused on being able to assess and understand our Scope 3 Emissions sources so that we may be in a position to develop a baseline and target in the future.

We anticipate that our suppliers will also be pursuing their own decarbonisation plans and may collaborate with Northern Star on targets that align with our own commitments to reducing our emissions. These supplier specific targets should also assist in contributing to a reduction in our overall Scope 3 Emissions and allow us to consider additional opportunities.

**Table 6** Scope 3 Supplier Methodologies

Scope 3 Category <sup>13</sup>	Calculation methodology options in accordance with the GHG Protocol	Our approach in preference order and factors utilised
<b>Category 1: Purchased Goods and Services</b>	Supplier specific method	Not utilised
	Hybrid Method	Not utilised
<b>Category 2: Capital Goods</b>	Average Data Method	Not utilised
	Spend Based Method	1. Spend data – total spend and generic emission factor (US EPA Factors)
<b>Category 3: Fuel and Energy Related Activities</b>	Supplier specific method	1. NGER data – actual fuel consumed by Northern Star (NGA Factors)
	Average Data Method	Not utilised
<b>Category 4: Upstream Transportation and Distribution</b>	Fuel based method	Not utilised
	Distance based method	Not utilised
	Spend based method	1. Spend data – total spend and generic emission factor (US EPA Factors)
<b>Category 5: Waste Generated in Operations</b>	Supplier specific method	Not utilised
	Waste type specific method	1. ESG data – total waste generated by Northern Star (NGA Factors & UK Factors)
	Average data method	Not utilised
<b>Category 6: Business Travel</b>	Fuel based method	Not utilised
	Distance based method	1. AMEX & InFlight extracts – passenger flights and emissions factors (US EPA factors included in the generated reports)
<b>Category 7: Employee Commuting</b>	Spend based method	Not utilised
<b>Category 8: Processing of Sold Products</b>	Site specific method	Not utilised
	Average data method	Not utilised
	Spend based method	Spend data – total spend and generic emission factor (US EPA Factors)

<sup>12</sup> Greenbase are a reporting and consulting service that provides sustainability reporting and environmental accounting services. They are also a licensed software and tools partner with GRI.

<sup>13</sup> Excludes the following categories as referenced on page 31: 8, 9, 11, 12, 13, 14 and 15.



## Appendix D: Assumptions Used to Support Net Zero Ambition and Scope 1 and 2 Emissions Reduction

- Renewable energy technology cost assumptions utilise:
  - reports commissioned by the Australian Energy Market Operator (Aurecon – 2024) and CSIRO (GenCost 2023-24);
  - specialist industry advisors; and
  - commercial offerings from technology providers.
- Renewable energy projects installed on Northern Star sites are to be registered for the purpose of generating green products, for the benefit of or use by Northern Star.
- Grid emission intensity factors published by the Australian Clean Energy Regulator for grid supplied sites.
- Northern Star's wholly owned subsidiary GKL Properties Pty Ltd has been assessed for eligibility for Human Induced Regeneration projects.
- Renewable energy resources modelling uses a combination of publicly available data (weather satellites) and site-specific measurements.
- Scope 1 Emissions reductions based on modelled reduction in fossil fuel requirements from renewable energy projects (Wind, Solar and Battery Energy Storage Systems) installed at Northern Star Operations using original equipment manufacturer (OEM) performance curves.
- Scope 2 Emissions will be reduced through a combination of grid greening and contracting for electricity from renewable generators.



Using solar energy for portable lighting towers at Thunderbox Operations, Yandal Production Centre, Western Australia





## About This Disclosure

Northern Star has reported in accordance with the GRI Standards for the period 1 July 2023 to 30 June 2024. This disclosure supports the Northern Star Annual Report FY24 in relation to environment and social responsibility.

Management has sought independent, third-party assurance by Bureau Veritas of all data relating to GRI core and material disclosures in this disclosure. These disclosures are identified in our GRI, SASB and UN SDG Alignment Index. Where partial assurance received, or a topic note assured, that information has been included in the Index.

A copy of the assurance statement is provided on Northern Star's website at: [Environment & Social Responsibility \(ESR\) Reporting](#)

This disclosure was reviewed and approved by Northern Star's Board of Directors and published on 22 August 2024. Monetary amounts in this Report are reported in Australian dollars unless otherwise stated.

## Feedback

We welcome feedback and invite readers to send any comments or enquiries about this disclosure to us at [esgperformance@nstrld.com](mailto:esgperformance@nstrld.com)

## Disclaimer

This disclosure contains forward-looking statements, including statements of current intention and expectation. These forward-looking statements are based on information available at the date of this disclosure.

While these forward-looking statements discuss Northern Star's expectations at the date of this disclosure, they are not guarantees or predictions of future performance, and by their nature, are subject to significant uncertainties, many of which are beyond Northern Star's control. Actual results and developments may differ materially from those expressed in this disclosure and Northern Star cautions readers against reliance on any forward-looking statements or guidance.

There are also limitations with respect to scenario analysis, and it is difficult to predict which, if any, of the scenarios might eventuate. Scenario analysis is not an indication of probable outcomes and relies on assumptions that may or may not prove to be correct or eventuate. Except as required by applicable laws or regulations, Northern Star does not undertake to publicly update or review any forward-looking statements, whether as a result of new information or future events.

## Assumptions

Refer to Appendix D.

## FY24 ESR Disclosure Suite

This disclosure, and our supplementary website disclosures, form part of a suite of documents that provide information and updates on Northern Star's FY24 environment and social responsibility disclosures and should be read as a supporting accompaniment to the Northern Star Resources Ltd FY24 Annual Report, FY24 Modern Slavery Statement and FY24 Corporate Governance Statement.

Throughout this disclosure there are references to supporting information on our website which the reader is encouraged to read. The Northern Star website contains significant additional supporting information including our annual ESR Performance Data Tables, GRI Index and references to our previous disclosures.



# Glossary

## ABN

Australian Business Number

## ASX

Australian Securities Exchange, trading as ASX

## ASX Corporate Governance Council Principles and Recommendations

Principles and Recommendations (4th edition) of the ASX Corporate Governance Council on the corporate governance practices to be adopted by ASX listed entities and which are designed to promote investor confidence and to assist listed entities to meet shareholder expectations

## Au

The chemical symbol for gold

## Audit & Risk Committee (ARC)

Audit and Risk Sub-Committee of the Board

## B or bn

Billion

## BESS

Battery Energy Storage System

## Board

Board of Directors

## CMP

Contract Management Plan

## CO<sub>2</sub>

Carbon dioxide

## CO<sub>2</sub>-e

Carbon dioxide equivalent

## Company

Northern Star Resources Ltd  
ABN 43 092 832 892

## contractors

Externally employed contracted workers engaged by the Company to support operations

## Corporations Act

*Corporations Act 2001* (Cth)

## Decarbonisation Pathway

Refer to figure 2 for our current planned pathway targeting 35% Emissions Reduction by 2030

## Director

A director of the Company duly appointed under the Corporations Act

## Emissions Reduction

The mitigation or abatement of greenhouse gas or airborne contaminant emissions

## employees

Total number of employees of the Group including permanent, fixed term and part-time. Does not include contractors

## ESG

Environment, Social & Governance

## ESR

Environment and Social Responsibility

## ESS Committee

Environmental, Social & Safety sub-Committee of the Board

## FY

Financial Year ending 30 June

## GHG

Greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, and nitrogen trifluoride)

## GRI

Global Reporting Initiative

## Group

Northern Star Resources Ltd and all of its wholly owned subsidiaries

## IPCC

Intergovernmental Panel on Climate Change

## K or k

Thousand

## KCGM

KCGM means Kalgoorlie Consolidated Gold Mines Pty Ltd, a wholly owned subsidiary of the Company, which operates the Super Pit and Mt Charlotte Underground Mines and Fimiston Processing Plant

## Kg or kg

Kilogram

## kl

kilolitre; one thousand litres

## KMP

Key Management Personnel

## KPI

Key Performance Indicator

## Limited Assurance

Audit and assurance undertaken by an external auditor on whether the data or statements made in this report have been prepared in accordance with GRI

## M or m

Million

## MW

megawatt; one million watts

## Net Zero

Net Zero refers to achieving a balance between the amount of operational Scope 1 and Scope 2 greenhouse gas Emissions produced and those removed

## Net Zero Ambition

Net Zero Ambition is our ambition to achieve Net Zero by 2050, as expressed in our Climate Change Policy

## NGA Factors

Australian National Greenhouse Accounts Factors

## NGER

*National Greenhouse and Energy Reporting Act 2007*

## NGFS

Network for Greening the Financial System

## NSMS

Northern Star Mining Services

## Officer

An officer of the Company defined under the Corporations Act

## Oz

Ounce

## Paris Agreement

Paris Agreement refers to the legally binding international treaty on climate change which was adopted by 196 Parties at the 21st session of the United Nations Conference of the Parties, in Paris on 12 December 2015, and entered into force on 4 November 2016

## PPA

Power Purchase Agreement

## RCP Representative Concentration Pathway

Greenhouse gas concentration trajectories which provide Emissions constraints and physical outcomes in Climate Change Scenario Analysis

## RE

renewable energy

## SASB

Sustainability Accounting Standards Board

## Scope 1 Emissions

Emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level

## Scope 2 Emissions

Emissions released to the atmosphere from the indirect consumption of an energy commodity

## Scope 3 Emissions

Indirect greenhouse gas Emissions other than Scope 2 Emissions that are generated in the wider economy. They occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business

## shareholder

A shareholder of Northern Star Resources Ltd

## stakeholders

An individual, group or organisation that is impacted by the Company, or has an impact on the Company. Examples of stakeholders are investors, employees, suppliers and local communities

## STARR Core Values

Northern Star's Core Values of Safety, Teamwork, Accountability, Respect and Results

## T or t

Tonnes; one thousand kilograms

## TCFD

The Financial Stability Board's Task Force on Climate-related Financial Disclosures

## TNFD

The Taskforce on Nature-related Financial Disclosures

## UN SDGs

The United Nations Sustainable Development Goals

## US or USA

United States of America

## WA

Western Australia

## \$

Australian dollars, unless the context states otherwise. All A\$ to \$US currency conversions used in this ESR Disclosure Suite are at \$0.6556





# Contact Information

## Northern Star Resources Ltd

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<b>ASX Code</b>	NST
<b>Share Registry</b>	MUFG Corporate Markets (formerly known as Link Market Services)

## Additional Website ESR Disclosures:

- Environment & Social Responsibility Approach
- People & Culture at Northern Star
- Safety & Critical Risk Control at Northern Star
- Community Engagement & Support at Northern Star
- Supply Chain Management at Northern Star
- Environmental Management at Northern Star
- Climate Change at Northern Star
- Water Security at Northern Star
- Waste & Tailings Management at Northern Star
- FY24 Performance Data Tables
- FY24 GRI, SASB and UN SDG Alignment Index
- FY24 Tailings Disclosure Report
- FY24 Biodiversity Values

**Cover Image:** Steffi Milling, Geologist and James Thomas, Project Geologist  
Carosue Dam Operations, Kalgoorlie Production Centre, Western Australia

