thungela

CLIMATE CHANGE REPORT 2022

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Thungela's 2022 reporting suite

This report forms part of our overall suite of reporting documents for the year ended 31 December 2022, and should be read in conjunction with the *Thungela Integrated Annual Report* and its consolidated *Annual Financial Statements*, and the *Thungela Environmental, Social and Governance Report*.

About this report

This report provides our stakeholders with an open and transparent account of our approach to climate change and is aligned with the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). It is intended for investors, customers, suppliers, governments, non-governmental organisations and employees. The *Thungela Integrated Annual Report* and the *Thungela Environmental, Social and Governance Report* include additional information about the Group's management, operations, financial performance and approach to sustainable development.

Forward-looking statements
This document includes forward-looking statements.
For information regarding these, please refer to **page 32**.

Report scope

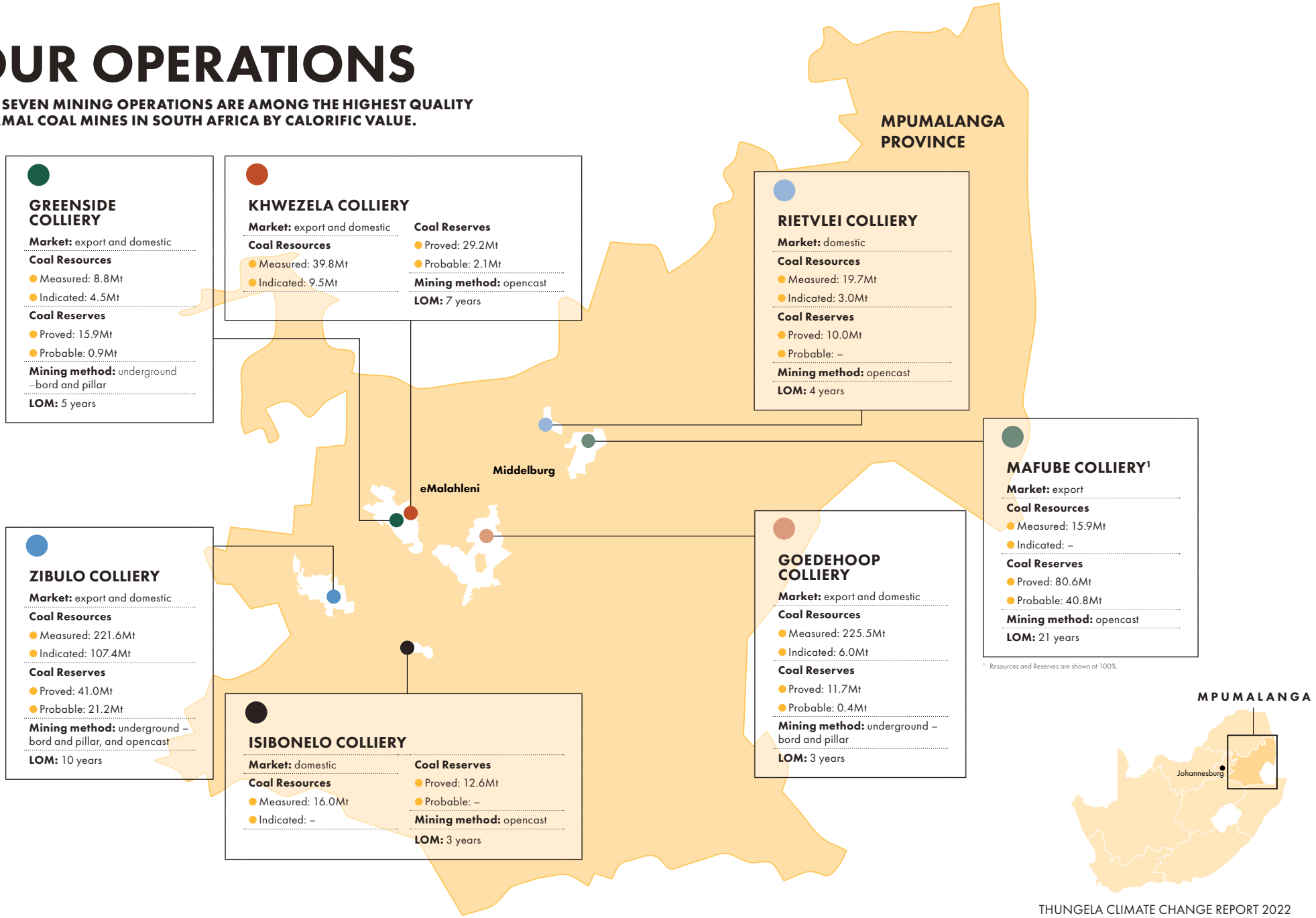
In this document we incorporate our wholly-owned operations and the joint ventures where we have management control. We also include information about operations where we do not have management control but hold a significant interest. This includes Mafube Coal Mining Proprietary Limited (Mafube Colliery), a 50% joint venture with Exxaro Mpumalanga Coal Proprietary Limited. We have accounted for 50% of Mafube's greenhouse gas (GHG) emissions and energy consumption in line with the GHG Protocol, and 100% for all other indicators. We exclude environmental, social and governance (ESG) data from other activities in which we have a shareholding but do not have operational control, such as the Richards Bay Coal Terminal, the Phola Coal Processing Plant and Rietvlei Mining Company Proprietary Limited.

Directors' responsibility

The Thungela Board of Directors acknowledges its responsibility for this report and delegated its social and ethics committee to oversee the integrity of its compilation. The board has collectively reviewed this report and confirms that it both addresses Thungela's material climate-related issues and provides a balanced and appropriate representation of the Group's climate change performance. The board approved this report on 21 April 2023.

OUR OPERATIONS

OUR SEVEN MINING OPERATIONS ARE AMONG THE HIGHEST QUALITY THERMAL COAL MINES IN SOUTH AFRICA BY CALORIFIC VALUE.



GREENSIDE COLLIERY

Market: export and domestic

Coal Resources
- Measured: 8.8Mt
- Indicated: 4.5Mt

Coal Reserves
- Proved: 15.9Mt
- Probable: 0.9Mt

Mining method: underground –bord and pillar

LOM: 5 years

KHWEZELA COLLIERY

Market: export and domestic

Coal Resources
- Measured: 39.8Mt
- Indicated: 9.5Mt

Coal Reserves
- Proved: 29.2Mt
- Probable: 2.1Mt

Mining method: opencast

LOM: 7 years

RIETVLEI COLLIERY

Market: domestic

Coal Resources
- Measured: 19.7Mt
- Indicated: 3.0Mt

Coal Reserves
- Proved: 10.0Mt
- Probable: –

Mining method: opencast

LOM: 4 years

MAFUBE COLLIERY[1]

Market: export

Coal Resources
- Measured: 15.9Mt
- Indicated: –

Coal Reserves
- Proved: 80.6Mt
- Probable: 40.8Mt

Mining method: opencast

LOM: 21 years

[1] Resources and Reserves are shown at 100%.

ZIBULO COLLIERY

Market: export and domestic

Coal Resources
- Measured: 221.6Mt
- Indicated: 107.4Mt

Coal Reserves
- Proved: 41.0Mt
- Probable: 21.2Mt

Mining method: underground – bord and pillar, and opencast

LOM: 10 years

ISIBONELO COLLIERY

Market: domestic

Coal Resources
- Measured: 16.0Mt
- Indicated: –

Coal Reserves
- Proved: 12.6Mt
- Probable: –

Mining method: opencast

LOM: 3 years

GOEDEHOOP COLLIERY

Market: export and domestic

Coal Resources
- Measured: 225.5Mt
- Indicated: 6.0Mt

Coal Reserves
- Proved: 11.7Mt
- Probable: 0.4Mt

Mining method: underground – bord and pillar

LOM: 3 years

OUR STRATEGY

Our four strategic pillars will enable us to deliver on our purpose to responsibly create value together for a shared future.

Drive our ESG aspirations

ESG is at the heart of our strategy that will inform our approach to our existing business and any new projects or initiatives as we consider "buy vs build" options.

A broader ESG perspective is required when considering the socio-economic implications as well as the timing and pace of the transition to a low-carbon future.

Maximise the full potential of our existing assets

Seeking to improve the competitive positioning and cash generation of the assets we own and operate today.

Create future diversification options

Developing a future pathway for our business by pursuing geographic diversification of coal assets where we can leverage our core skills.

We would also consider the divestment or winding down of high-cost tonnes.

Optimise capital allocation

Implement "buy vs build" strategy using investment evaluation criteria to ensure that projects compete with additional shareholder returns in the form of additional dividends and share buybacks.

OUR INVESTMENT EVALUATION CRITERIA

Our investment evaluation criteria have been designed to optimally balance responsible stewardship with the need to upgrade our portfolio and create shareholder value. They are critical to all "buy vs build" decisions, ensuring that all investments compete with additional shareholder returns. We continue to evaluate all merger and acquisition opportunities against these criteria.

Environmental	**Social**	**Governance**	**Responsible stewardship**
• Consider the impact on global carbon output • No net loss of biodiversity	• Support existing regional communities and supplier base	• Improved transparency and accountability	
Cost/margin curve	**Payback**	**Capital intensity**	**Upgrade our asset portfolio**
• Target lower half of global seaborne cost curve	• Target short payback period	• Competitive capex per tonne when compared to alternative options	
Net present value (NPV)/capex	**Internal rate of return (IRR)**	**Closure costs**	**Maximise shareholder value**
• NPV • Capital efficiency	• IRR higher than our nominal weighted average cost of capital (WACC)	• Cash flows to fund closure cost provisions beyond current LOM	

Strategic focus areas

We continue to make significant progress on the execution of our strategic focus areas.

Drive our ESG aspirations

Initiatives	Outcomes
Focus on elimination of fatalities	Zero fatalities in 2022
Reduce number of recordable injuries	Number of injuries flat year-on-year
Implement optimised rehabilitation and closure plans	Work to optimise these plans is on-going
Develop pathway to net-zero by 2050 plan and detailed climate change strategy – incorporating GHG emission reduction initiatives	Scenario-based pathway to net zero developed
Develop carbon intensity reduction plans	Plans developed to reduce carbon intensity across operations
Set the scope 1 and 2 emissions reduction targets	Targets set for existing operations: 30% reduction by 2030
Construct passive water treatment demonstration plant	Demonstration plant commissioned in July 2022
Reduce freshwater abstraction	Volume of freshwater abstracted reduced
Continue to create shared value	R896 million total contribution to the trusts based on 2022 performance

Maximise the full potential of our existing assets

Initiatives	Outcomes
Deliver productivity improvements	Progress curtailed by rail constraints
Enable an optimised cost structure	Cost containment initiatives ongoing
Optimise use of rail and port infrastructure to enhance marketing optionality	• Concluded rail agreement with a third-party to secure additional trains • Leased two additional third-party sidings • Trucking between sidings to maximise ability to rail • Completed alternate port sales
Accelerate farm-fence opportunities with a short pay-back period	Multiple farm-fence opportunities with short pay-back periods identified and reviewed
Develop and deliver production replacement and life extension projects with near term goals	• Elders production replacement project approved by the board in 2022 and construction had commenced • Zibulo North shaft life extension project to be presented for board consideration in 2023

Create future diversification options

Initiatives	Outcomes
Consider divestment of stranded resources and/or high-cost tonnes	Initiated divestment of remnant resource blocks at Umlalazi
Evaluate geographic diversification of thermal coal asset base	• Several opportunities evaluated • Executed geographic diversification through announcement of acquisition of Ensham Business in early 2023
Diversification where we have demonstrated our "right to win"	Ongoing evaluation of various options where we have demonstrated our "right to win"

Optimise capital allocation

Initiatives	Outcomes
Maintain liquidity buffer throughout cycle	Liquidity buffer enhanced in line with changing business context
Evaluate internal projects and acquisition options which could deliver superior returns over time	• Several merger and acquisition opportunities evaluated during 2022 • Ensham Coal Mine integration plan, pending completion of the acquisition in 2023
Seek shareholder approval for a potential share buyback programme	Buyback programme was tabled at 2022 AGM, but failed to pass

CHAIRMAN'S STATEMENT

SANGO NTSALUBA

The board recognises the critical importance of addressing climate change and takes ultimate responsibility for ensuring that Thungela's risks and opportunities are appropriately identified, mitigated and managed effectively.

Given the global uncertainty and volatility that we have seen in the past year, it is clear that coal will play a role in ensuring energy security in the short to medium term. Companies such as Thungela, driven by its purpose: to responsibly create value together for a shared future, will remain a preferred producer of the high-quality coal that our markets require.

That being said, we also have an obligation to play our role when it comes to climate change action and the transition to a low-carbon world. Last year, we announced our ambition to achieve a net zero target by 2050 in support of the goals of the Paris Agreement. We also committed to declaring a near-term target on this pathway. This has been set at a 30% reduction in our scope 1 and 2 emissions by 2030, from a 2021 baseline.

Following a full review of our current and projected emissions and abatement opportunities, we have taken a scenario-based approach. This allows us the flexibility to change course while advancing toward our net zero target, depending on the way the world evolves and the strategic business decisions we make in the future.

I am encouraged by the holistic approach that Thungela takes when it comes to ESG matters. There is a balance to be achieved between the need for a transition to a low-carbon economy, economic development and energy security in the regions we operate and the markets we serve.

We welcome the interest we have received from our shareholders, customers, suppliers, host communities and employees in our contribution toward mitigating climate change, and have had a number of constructive engagements with large institutional investors. Furthermore, we welcome these engagements and believe that they are crucial to the creation of value in the long-term.

Sango Ntsaluba
Chairman
26 April 2023

CHIEF EXECUTIVE OFFICER'S STATEMENT

JULY NDLOVU

> **We need all sources of energy, used in the most responsible manner to deliver an energy system that is affordable, reliable and sustainable.**

It is more than a year since the tragic outbreak of the Russia-Ukraine war that sent the world into an energy crisis, the likes of which has never been seen. The ensuing gas supply shortages, coupled with supply chain constraints, energy price surges, drought and the failure of renewables to deliver anticipated energy supplies, were some of the factors that led to coal demand reaching record highs in 2022.

The events of the last year have highlighted that the need for all three aspects of the energy trilemma: affordability, reliability, and sustainability, has never been stronger. They also shown that a disorderly energy transition is not sustainable, and that a concerted drive towards an orderly, responsible transition is needed.

As a coal producer, we are acutely aware that climate change action has never been as critical as it is today and that we have an important role to play in the transition to a low-carbon economy.

Coal will be relied upon, at least for the next two decades, to deliver sustainable and lower-cost energy security, particularly in countries where fuel choices are limited. The world continues to employ fossil fuel-based electricity generation plants at enormous scale. While in some countries these are declining, in others, coal and gas-fired power plants remain a central part of electricity systems. More than half of the two terawatts of global coal capacity has been built in the last 20 years, primarily in China, India and, increasingly in Southeast Asia. This indicates that there is an increasingly urgent need to address power sector emissions in areas where the early retirement of relatively young coal and gas plants is unlikely.

To address energy resilience, affordability and emissions – as well as the damaging implications of coal's demise to the communities and industries that rely on it for survival – there is really only one viable alternative: abated coal.

Technology is available today to abate up to 99% of coal emissions. These include high-efficiency, low-emissions coal-fired power plants, coal-to-hydrogen, and carbon capture, use and storage. Technologies which limit the emission of particulates, sulphur dioxide, nitrogen oxides and trace elements are already deployed at scale. What these technologies need to reach the required levels of deployment to truly create a low-carbon future is equitable funding as enshrined in Article 10.2 of the Paris Agreement.

This is not a coal versus renewables debate. We need all sources of energy, used in the most responsible manner, to deliver an energy system that is affordable, reliable and sustainable.

Last year, we committed to net zero by 2050, subject to the requirements of the countries we operate in and the markets we serve. We also made a pledge to announce our near-term emission reduction target and publish a report aligned with the recommendations of the TCFD.

In March we announced that we will reduce our scope 1 and 2 emissions by 30% by 2030 (relative to our 2021 emissions baseline) in line with our path to net zero by 2050.

This reduction will be achieved through the introduction of a renewable energy strategy, the closure of mines as they come to the end of their lives, and continued focus on energy efficiency at our operations to reduce our energy and carbon intensity.

This, our inaugural Climate Change Report, provides an overview of our governance of climate change matters, the risks that climate change poses to our business and how we are mitigating these, our scenario-based approach to our path to net zero, and our performance on climate-related metrics over the last year.

As our business evolves, we will continue to develop and update our climate change strategy to ensure that our commitment to net zero by 2050 is considered in all our decisions.

July Ndlovu
Chief executive officer
26 April 2023

OUR YEAR AT A GLANCE

Total GHG emissions (kt CO_2e*)

748

2021: 819

Scope 1 emissions (kt CO_2e)

308

2021: 362

Total energy consumed (million GJ*)**

3.01

2021: 3.42

Carbon intensity (kgCO_2/TTM)**

4.18

2021: 4.56

Scope 2 emissions (kt CO_2e)

440

2021: 457

Energy intensity (MJ/TTM)

16.81

2021: 19.04

Scope 3 emissions (kt CO_2e)

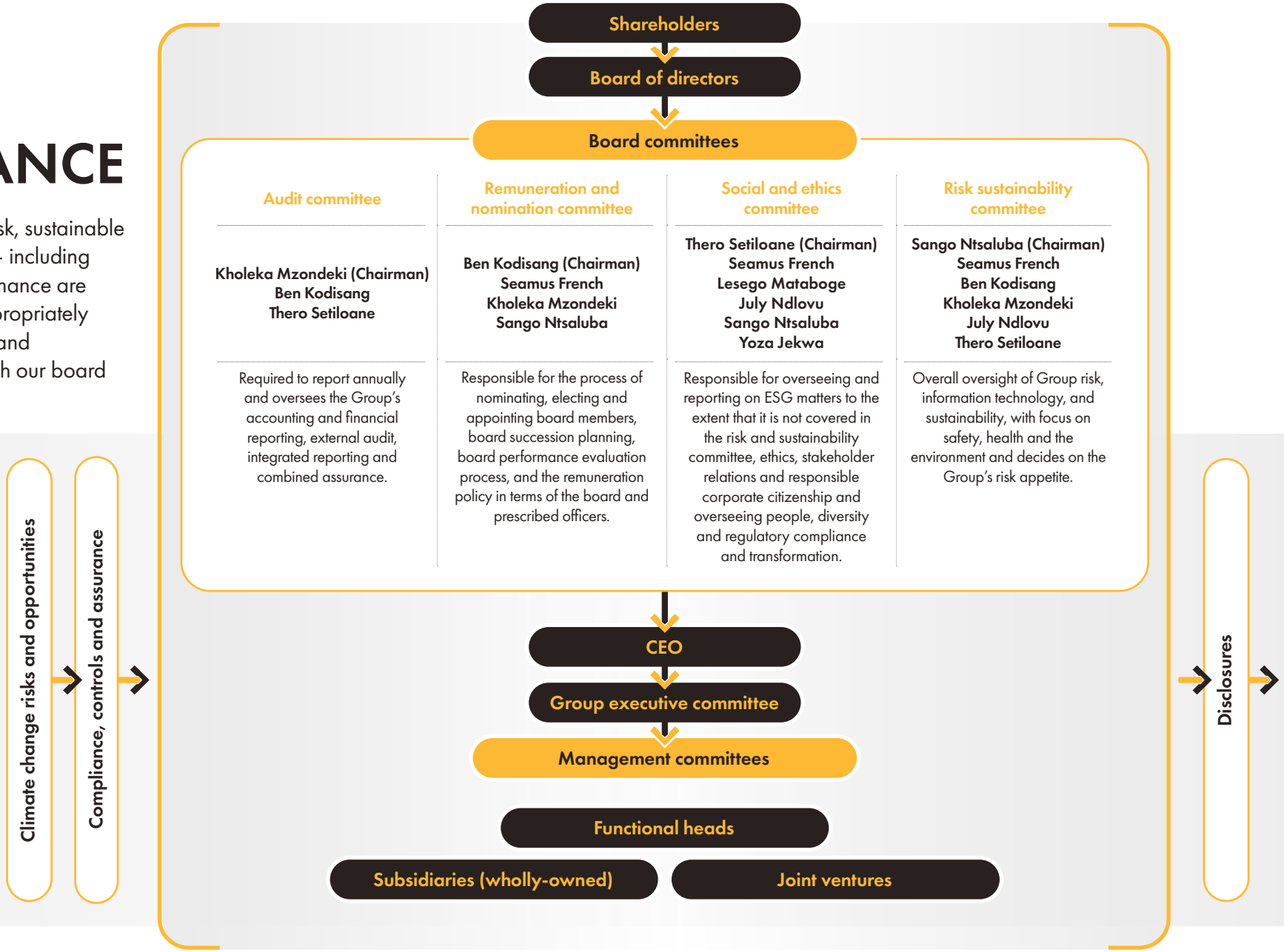
35,947

2021: 54,744

* kt CO_2e: kilotonnes carbon dioxide equivalent.
** TTM: total tonnes moved.
*** GJ: gigajoule.

GOVERNANCE

At Thungela, we ensure that risk, sustainable development considerations – including climate change – and performance are effectively integrated and appropriately managed within our strategy and management practices through our board and leadership structure.



Governance and management systems

The board bears ultimate responsibility for the Group's ESG strategy, initiatives, progress and reporting. It also assesses our exposure to material environmental and social risks and evaluates our management of these. This includes ensuring that appropriate and effective risk management and internal control systems are in place.

The board's risk and sustainability committee and social and ethics committee have been delegated overall oversight of sustainability, with focus on safety, health, social and environmental matters, and the risk and sustainability committee has a specific mandate on climate change management. The committee's work plan is informed by the risks and opportunities we face, including climate change and the decarbonisation of our operations. Matters relating to climate change are included in quarterly reports to the committee and, where necessary, as stand-alone items on the agenda. The chairman provides a summary of the committee's discussions to the board, which addresses the most material issues raised.

Please refer to **page 126** of the Integrated Annual Report for the risk and sustainability committee's report.

Sustainability governance encompasses not only being an effective board for the present, but continuously upskilling, training and interrogating new ideas and concepts and incorporating ESG into strategic decision-making.

Our ESG governance approach ensures that particular focus is given to organisational structures, processes, related risks and opportunities.

Key elements of our approach include:

- Appropriate focus on organisational structures, processes, risks and opportunities
- A clear and concise understanding of the organisation's ESG goals and objectives.
- Procedures for assessing and managing sustainability-related risks and opportunities.
- Measures for tracking and reporting on our sustainability performance.
- Training and raising awareness among employees on sustainability issues.
- The use of standards and best practices to guide our sustainability efforts.

Board discussions on climate change

March 2022

- Approved the inclusion of our commitment to net zero subject to the requirements of the countries we operate in and the markets we serve, in the company's strategic pillar: 'Driving our ESG Aspirations'.
- Approved internal carbon and energy intensity targets and project plans.
- Approved the Elders project subject to the use of renewable energy for a proportion of its electricity requirements.

May 2022

- Progress against carbon and energy intensity targets and energy efficiency project implementation.

June 2022

- Board strategy session informed by a third-party presentation on macroeconomic factors, including the war in Ukraine, the energy crisis, and the global transition to a low-carbon future.

August 2022

- Progress against carbon and energy intensity targets and energy efficiency project implementation.
- Update on energy efficiency bottom-up opportunity scoping project.

November 2022

- Progress on climate change risk assessment process.
- Progress against carbon and energy intensity targets and energy efficiency project implementation.

March 2023

- 2022 performance against carbon and energy intensity targets.
- Review of our net zero pathway.
- Update on climate risks and TCFD reporting process.

April 2023

- Special audit/social and ethics committee sitting on our approach to the compilation of the 2022 Environmental Social and Governance Report and Climate Change Report.

Management structure

Our chief executive officer (CEO), July Ndlovu, is responsible for providing direction and leadership and has oversight of the implementation of our ESG strategy and the path to net zero.

The Group executive committee is responsible for managing climate-related risks and opportunities, delivering on our strategic objectives, and providing progress reports to the relevant board committees. Reports encompass measures to control these risks, the implementation of opportunities, and proposed public disclosures.

Site general managers are delegated the responsibility for managing day-to-day ESG performance, mitigating or avoiding possible impacts from our activities, and implementing projects to reduce our carbon emissions. Frontline management teams report to the executive committee in monthly and quarterly performance reviews, as well as in a monthly safety, health and environment (SHE) steering committee which is also attended by internal subject matter experts. SHE steering committee meetings focus on deep dives into ESG topics, the governance of ESG, and operational feedback on actions relating to these.

The CEO's performance scorecard and report to the board includes performance indicators on energy and GHG emissions. The board holds regular strategic discussions on Thungela's future. These discussions are prefaced with long-term strategic context and megatrends, including the impact of climate change and the global transition to a low-carbon future.

For more details on governance, including the board and committee reports, please see the Governance section of our Integrated Annual Report from **page 88** to **97**.

Disclosure and investor engagement

We are pleased to release this, our inaugural Climate Change Report which is aligned with the recommendations of the TCFD.

A TCFD-linked index is provided on **page 30**.

We believe that the move to make TCFD disclosure mandatory in the United Kingdom and in other jurisdictions will bring greater quality and comparability to such disclosure.

We recognise investors' evolving interests and expectations on our views on climate change and have had a number of engagements with large institutional holders on matters relating to ESG over the past year. We welcome these constructive engagements and believe that they are crucial to the creation of value in the long-term.

Assurance

IBIS ESG Consulting Africa Proprietary Limited (IBIS) was commissioned to conduct an independent third-party assurance process on the information in our Environmental, Social and Governance Report for the financial year that ended 31 December 2022. Some of this data has been reproduced in this report.

The full assurance statement can be found on **page 117** of our Environmental Social and Governance Report.

IBIS issued an unqualified opinion that the subject matter, including total scope 1 and 2 emissions (measured in kt CO_2e) and total energy consumption (measured in GJ), in the scope for high assurance was supported by the evidence obtained.

Executive remuneration

We are committed to delivering on our key priorities, which is reflected in the incentive structures applied at executive level. We hold our executive team accountable for aligning our business practices with our climate change ambitions. A total of 30% of the value of their long-term incentive plan (LTIP) awards agreed by the remuneration and nomination committee for 2023 is linked to ESG metrics, 10% of which relates directly to the reduction of operational GHG emissions.

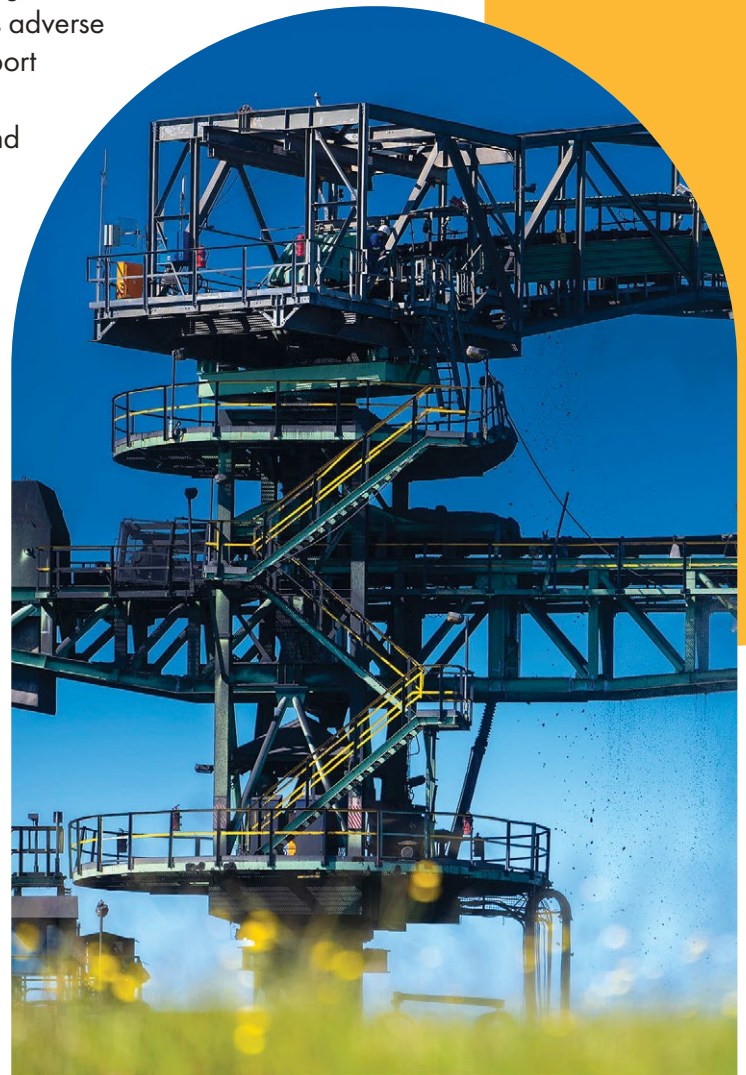
In addition, the bonus scheme outcomes for all employees is tied to the organisation's performance, which includes reducing energy intensity. This is factored into our annual short-term incentive (STI) scheme.

RISK MANAGEMENT

We recognise the reality of climate change. We also understand the trade-off between coal's adverse environmental impacts, the need to support development in communities that rely on coal for their livelihoods, and the demand for affordable, reliable power in our export markets.

Our business is exposed to a range of risks from both internal and external sources. Risk management is integrated across the organisation and embedded in critical business processes to ensure it supports day-to-day activities and executive decision-making at a corporate and operational level.

By understanding, prioritising and managing risk, we safeguard our people, assets, legal position, values, reputation and the environment. We also identify related opportunities to best serve the long-term interests of all our stakeholders.



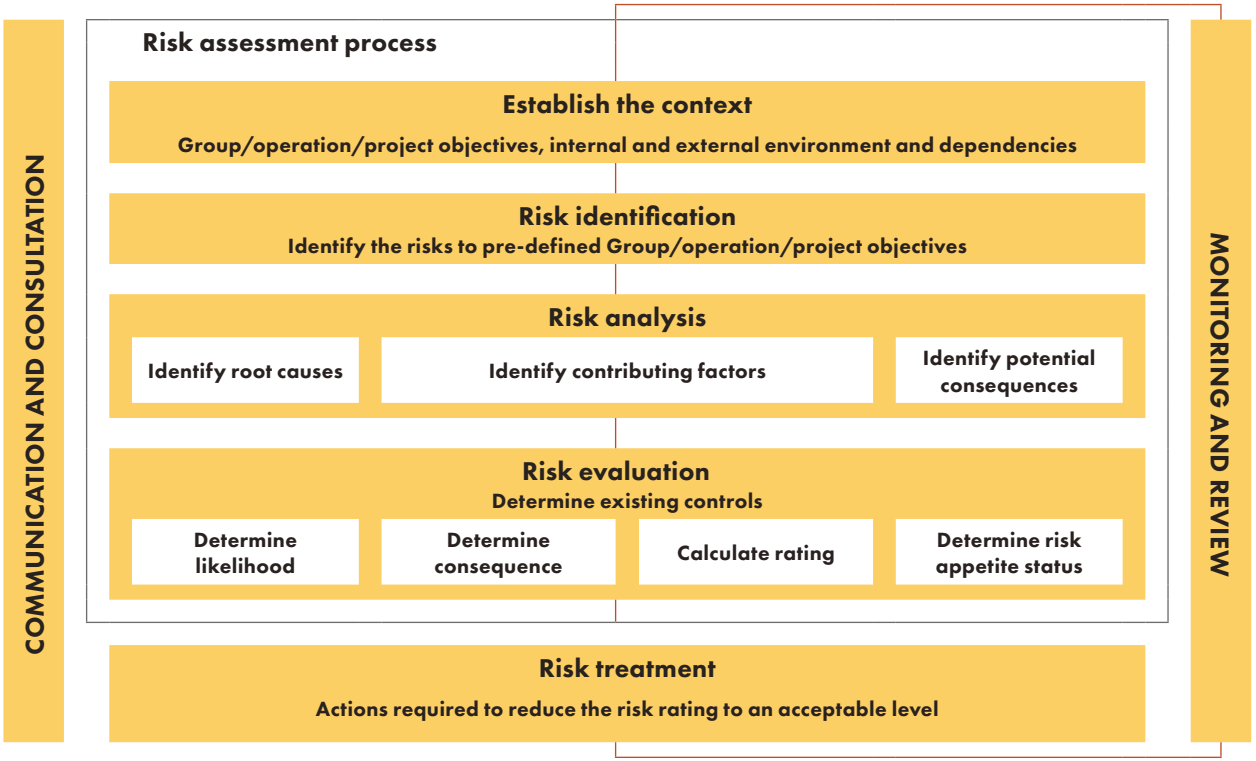
Integrated risk management

At Thungela, risk assessment entails a dynamic and iterative process of identifying and evaluating risks. This includes assessing the likelihood and consequences of an adverse event on our objectives, relative to the specified risk tolerances.

Our comprehensive risk management process, know as 'integrated risk management' (IRM), ensures that risks are identified and effectively managed, and that risk information flows throughout the organisation. A key output of IRM is an integrated risk and control register for each operation and entity. These contribute to the development of a single executive risk summary report for the business, with the principal risks being identified and assessed against risk appetite. A 'bottom-up' and 'top-down' review of all risk and control registers is undertaken to ensure that risks are properly considered throughout all levels of the organisation.

Risk management is a key duty of the board and executive committee. The IRM process, which is aligned with the International Standards Organization's ISO 31000, is also approved by the board. The risk and sustainability and audit committees are responsible for monitoring and evaluating both the process and lines of defence to make sure that risk is recognised, managed, mitigated, and reported in a timely and appropriate manner. Effective risk management provides sustainable value creation and predictable operational performance and is integral to excellent management practice.

Risk management approach



Assessing our climate change risks

In 2022, a third-party assisted with identifying climate-related risks and opportunities using a quantitative risk assessment process that involved assessing:

- Physical risks relating to relevant acute and chronic physical climate impacts
- Transition risks and opportunities relating to a lower-carbon global economy, including changes to policy and legal obligations, technological innovation, changing market demand and stakeholder expectations

The risk identification process included the review of our executive and operational risk registers and mapping of related risks to potential physical and transitional climate risks under three climate scenarios. Extensive engagement with internal subject matter experts and operational management teams was undertaken to validate the risks identified.

The approach was designed to deliver robust, structured analysis which builds the foundation for enhanced climate disclosure and embedding climate risks in the business, in accordance with the TCFDs objectives. Going forward, climate-related risks will be fully integrated into our risk management process.

Financial analysis

The potential financial impact of climate-related physical and transition risks on Thungela was evaluated under various climate scenarios over the near (2030) and long (2050) term. A financial assessment gives us a better understanding of the relevant climate change risks and their implications so that appropriate mitigation actions and response strategies can be developed. The assessment will be used to guide internal decisions in relation to climate-related impacts.

Climate change policy in South Africa

Effective public policy is essential for providing the right framework of drivers and incentives to encourage coordinated, efficient and equitable response measures by all stakeholders. Thungela is committed to providing its expertise to assist the South African government and other stakeholders in developing such public policy and regulation. We work with industry and regulatory authorities to contribute to the development and implementation of these.

Draft Climate Change Bill

In March 2022, Parliament tabled the draft Climate Change Bill for public comment. Once enacted, the Climate Change Act will support an effective climate change response and enable a long-term just transition to a more climate resilient, low-carbon economy. Thungela supports a dedicated Climate Change Act that puts forward a common vision and offers harmonisation of policies in support of this goal.

Carbon budget and pollution prevention plan

Thungela has an approved carbon budget and pollution prevention plan for the period 2021 to 2025. Our pollution prevention plan progress report was approved by the Department of Forestry, Fisheries and Environment (DFFE) in 2022. The regulations governing these instruments will fall under the Climate Change Act and will be drafted during the course of 2023. We will continue to engage with the DFFE on the development of these regulations.

Carbon tax

The cost of carbon-related emissions has been considered and incorporated into discounted cash flow models, based on enacted legislation and anticipated carbon prices obtained from the latest internal forecasts benchmarked with external sources. In 2022, we expensed a total of R4 million (2021: R3 million) in 2022 in relation to carbon tax.

The DFFE's declaration of GHGs as priority air pollutants in 2017, was followed by the promulgation of a regulatory framework for GHG emission reporting. This formed the basis for the promulgation of the Carbon Tax Act on 1 June 2019, which introduces a carbon tax on identified affected sectors based on their emissions. This penalises emitters and incentivises taxpayers' transition towards a low-carbon trajectory with a progressive increase in the carbon tax rate from 2023.

Phase 1 of the carbon tax was extended to December 2025, while several Phase 2 carbon tax proposals were announced by the Minister of Finance in the 2022 national budget review. On 5 January 2023, the Taxation Laws Amendment Bill was gazetted and includes amendments that seek to align South Africa's carbon tax rate with global carbon prices.

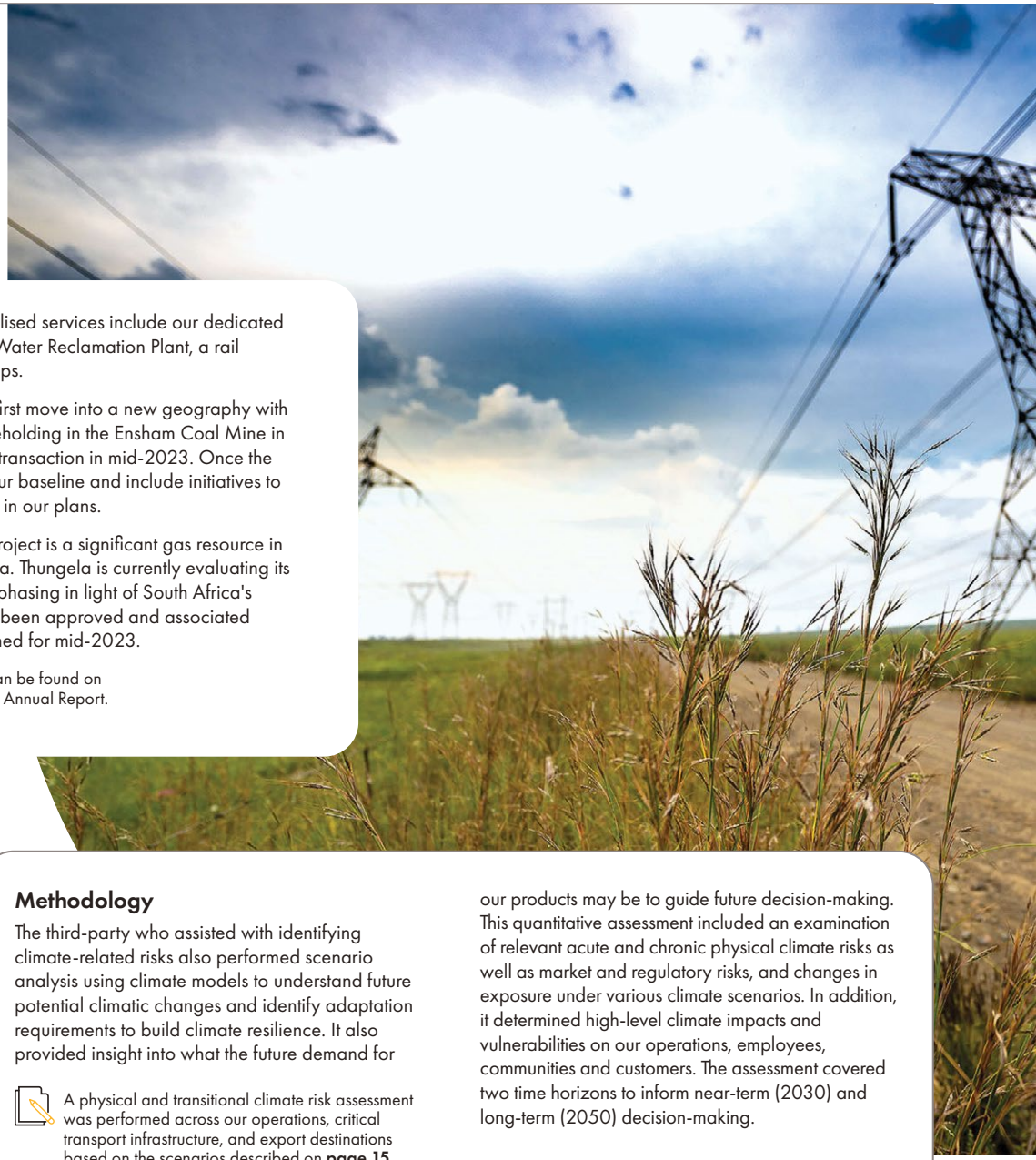
Annual carbon tax rates until 2030 (R/tCO_2e)

2023	2024	2025	2026	2027	2028	2029	2030
R159	R190	R236	R308	R347	R385	R424	R462

There is a lack of clarity on how the carbon tax and carbon budgets to be enacted under the Climate Change Act will be aligned, and this poses a risk to our business.

A carbon fuel levy was introduced under the Customs and Excise Act, as part of the current South African fuel levy regime. The fuel levy now includes a carbon levy, which applies to stationary and non-stationary mobile emissions resulting from the use of liquid fuels, mostly petrol and diesel. The levy, which came into effect on 5 June 2019, is 10c per litre and 9c per litre (2022: 9c per litre and 8c per litre), respectively. In addition, a notice published in the South African Government Gazette on 31 May 2019 provided that the carbon fuel levy be excluded from the diesel refund regime.

OUR STRATEGIC RESPONSE TO CLIMATE CHANGE



To meet our commitment to net zero by 2050, we have completed a full review of emission reduction opportunities and aim to reduce our scope 1 and 2 emissions by 30% by 2030 (relative to our 2021 emissions baseline).

Using a scenario-based approach aligned with the physical and transition scenarios described on **page 15**, together with current business projections, including life extension projects, we have determined the interventions required to achieve our path to net zero.

Several operations are currently projected to close prior to 2030, namely Isibonelo, Goedehoop, Greenside and Khwezela. The Elders project, a production replacement project for Goedehoop Colliery, was approved by the board in 2022 and will produce its first coal in late 2023. It is expected to operate for 12 years. The Zibulo North Shaft project, a life extension project for Zibulo's current underground operations, will be tabled for consideration by the board in 2023. This project will extend the existing life of the mine from 2028 to beyond 2035.

In addition to our operations, centralised services include our dedicated Highveld Hospital, the eMalahleni Water Reclamation Plant, a rail loadout facility and central workshops.

In February 2023, we initiated our first move into a new geography with the acquisition of a controlling shareholding in the Ensham Coal Mine in Australia. We expect to finalise this transaction in mid-2023. Once the transaction closes, we will update our baseline and include initiatives to decarbonise the Ensham operations in our plans.

Our Lephalale coal-bed methane project is a significant gas resource in the Limpopo province of South Africa. Thungela is currently evaluating its development options and potential phasing in light of South Africa's energy crisis. A feasibility study has been approved and associated production right application is planned for mid-2023.

More details on our operations can be found on **pages 14** to **26** of our Integrated Annual Report.

Scenario analysis

What is scenario analysis and why do we use it?

The events of the past three years have highlighted the market's volatility in the face of pandemic-related and geopolitical disruption. These events have shown us that it is not the ability to foresee change and disruption that is important, but to be agile and adaptive when they occur.

Scenarios are not forecasts or predictions and accurately foreseeing the future is challenging, even in the short term. Scenario analysis, however, helps us to identify key drivers of change, to inform decision-making, and evaluate business resilience against a set of divergent, plausible futures. It also highlights the potential risks and opportunities associated with these.

Methodology

The third-party who assisted with identifying climate-related risks also performed scenario analysis using climate models to understand future potential climatic changes and identify adaptation requirements to build climate resilience. It also provided insight into what the future demand for our products may be to guide future decision-making. This quantitative assessment included an examination of relevant acute and chronic physical climate risks as well as market and regulatory risks, and changes in exposure under various climate scenarios. In addition, it determined high-level climate impacts and vulnerabilities on our operations, employees, communities and customers. The assessment covered two time horizons to inform near-term (2030) and long-term (2050) decision-making.

A physical and transitional climate risk assessment was performed across our operations, critical transport infrastructure, and export destinations based on the scenarios described on **page 15.**

The scenarios

Three types of physical risk climate scenarios capturing low, moderate and high emission futures were used for the analysis, applying the Intergovernmental Panel on Climate Change's (IPCC) AR5 Representative Concentration Pathways (RCP) and AR6 Shared Socio-economic Pathways (SSP) reports. These scenarios align with those used for the transition risk analysis and formed the basis for the development of our approach to net zero. These are predicated on the scenarios set out in the International Energy Agency's (IEA) World Energy Outlook, 2022.

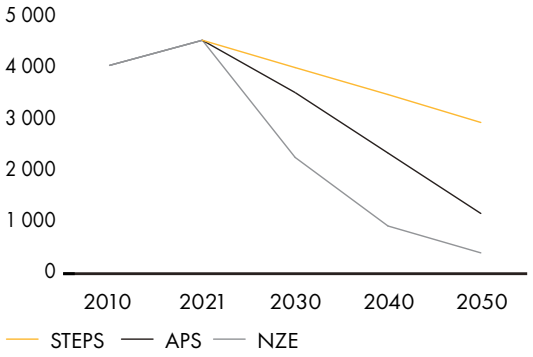
	RCP 8.5/SSP 5 ~3.2°C — 5.4°C	RCP 4.5/SSP 2 ~2.5°C — 2.7°C	RCP 2.6/SSP 1 ~1.7°C — 1.8°C
Transition scenario[1]	**Stated Policies Scenario (STEPS)**	**Announced Pledges Scenario (APS)**	**Net Zero Scenario (NZE)**
Key outcomes	**Physical risks dominate** • Emissions are curbed based on existing policies and announced national commitments to reduce emissions, but fall short of meeting the Paris Agreement • Continued use of fossil fuels and energy-intensive activities • Effects of climate change require investments in adaptation measures to protect assets, infrastructure and communities	**Insufficient decarbonisation** • Slow implementation of policies due to political, institutional and societal barriers • The transition to a low-carbon economy is disorderly, uncoordinated and delayed • Transition happens faster in certain regions and slower in others, leading to differences in regional policies and implications on the cost of doing business and global trade	**Transition risks and opportunities dominate** • Globally coordinated effort to reduce emissions to net zero around 2070 worldwide (2050 in advanced economies such as Australia) • Accelerated transition to renewables and electrification, and aggressive regulations limiting the extraction and use of fossil fuels in all major economies
Risks and opportunities	• Flood and extreme precipitation • Extreme heat and wildfires • Sea level rise • Water stress	• Carbon pricing policies • Energy policies • Litigation risks • Flood and extreme precipitation • Extreme heat and wildfires • Sea level rise • Water stress	• Carbon pricing policies • Regulatory risk • Reputational risk and opportunity • Flood and extreme precipitation • Extreme heat and wildfires • Sea level rise • Water stress
Projected coal demand	• Continued fossil fuel investments • Slow decrease in demand for fossil fuels • Slow increase in demand for renewable energy	• Continued but reduced fossil fuel investments • Modest decrease in demand for fossil fuels • Modest increase in demand for renewable energy	• No oil, natural gas and coalfields developed due to reduction in demand • Falls in fossil fuel prices due to lower demand • Rapid switch to renewable energy
Thungela position	**Extended fossil fuel market**	**Slow transition**	**Accelerated decarbonisation**

1 These transition scenarios are based on those set out in the IEA's World Energy Outlook, 2022.

IEA projections for global thermal coal demand

Regulatory decisions across the globe are likely to drive coal price and demand. The The IEA World Energy Outlook's 2022 scenarios describe what the future may hold for coal demand and electricity generation.

Scope 1 and 2 emissions by source (kt CO_2e)



Global coal demand reached record levels in 2022 owing to the energy crisis. The rate at which demand will decline in future years, depends on the stringency with which countries pursue climate targets.

In the STEPS, global thermal coal demand is projected to fall by 12% from 2021 to 2030, driven by a near 50% decline in developed countries and a slight increase in emerging economies in the same time frame. Between 2030 and 2050, demand is expected to drop by 35% as older coal-fired power plants are retired.

In the APS, thermal coal demand is projected to fall by 22% between 2021 and 2030 and by 70% between 2030 and 2050. The most rapid declines are again expected in advanced economies and more moderate reductions in developing regions, predominantly in the Asia Pacific markets.

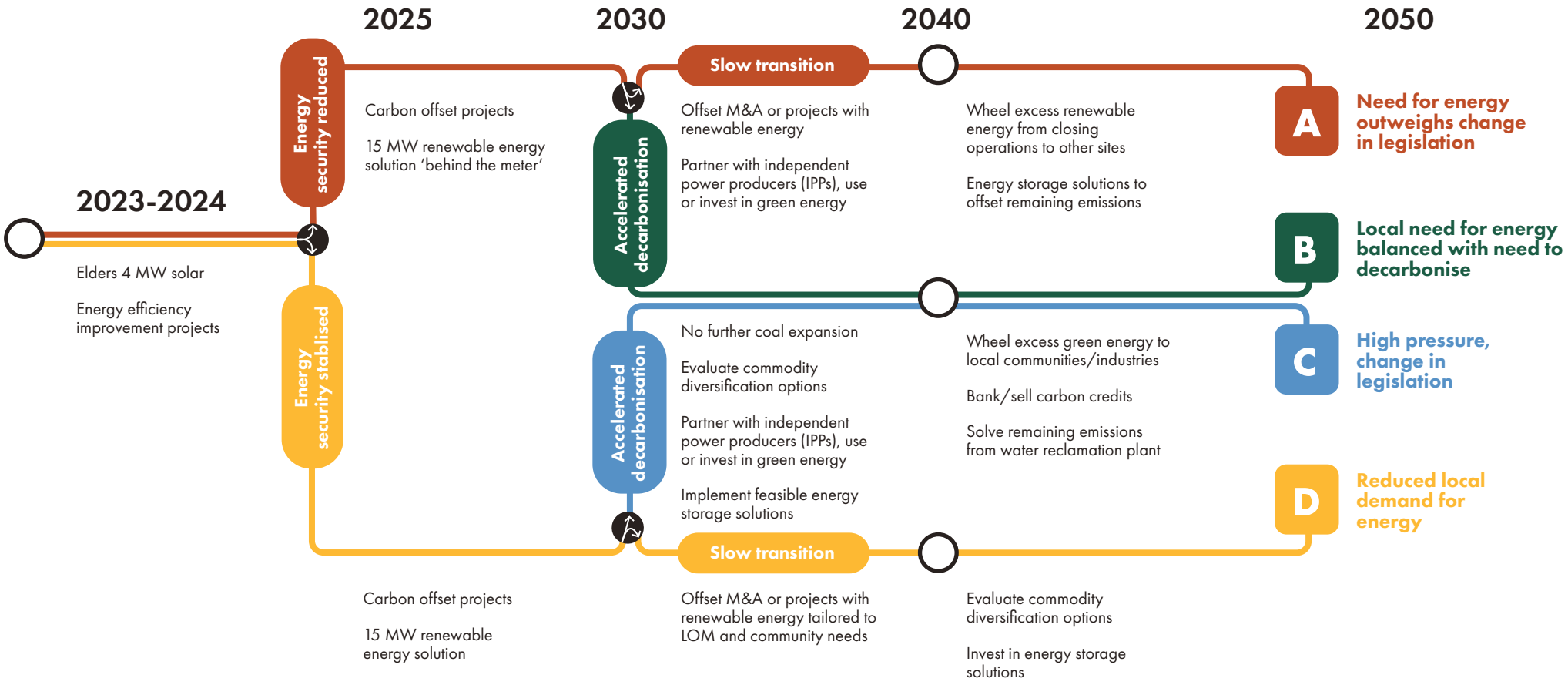
The most rapid decline is seen in the NZE where coal demand is expected to drop by 50% by 2030 and 91% by 2050. Some coal-fired power plants are retrofitted with carbon capture, utilisation and storage (CCUS) or fire coal with low-emission fuels such as bioenergy or ammonia. By 2050, unabated coal use drops by 99% and just under 90% of remaining coal-fired power stations are equipped with CCUS.

Pathways to net zero

To meet our 2050 net zero target, four distinct pathways are available and are informed by the climate scenarios. Given uncertainty over the future, these pathways provide us with a framework for decision-making based on triggers that may occur.

The route we take hinges on two critical inflection points: the security of the energy system in South Africa and the pace of decarbonisation globally.

The STEPS and APS both see coal demand declining more moderately than the net zero pathway and have been combined in our pathways as 'slow transition'. The 'accelerated decarbonisation' pathways are aligned with the NZE.



The pathways shown on page 17 give us the flexibility to adjust our approach to achieving our net zero target as the world evolves.

Reduction in scope 1 and 2 emissions of 30% by 2030

The first milestone on our journey to net zero will be to reduce our scope 1 and 2 emissions by a minimum of 30% by 2030. This target will be achieved through the implementation of a renewable energy strategy, the closure of operations as they come to the end of their lives, and energy efficiency projects.

Renewable energy strategy

Central to our net zero pathway will be the incorporation of a minimum of 19 MW of renewable electricity by 2030.

Of the 19 MW required, a 4 MW solar plant for the Elders project is currently in the feasibility stages. The strategy for the remaining renewable requirement will be evaluated to determine the most efficient and effective model for sourcing this before 2030.

Mine closures

Several operations are projected to close prior to 2030, namely Isibonelo, Goedehoop, Greenside and Khwezela. This will result in a reduction in GHG emissions associated with those operations. While rehabilitation activities will continue to take place after closure, once those have been completed, the energy consumption of those operations will be limited to that associated with ongoing maintenance and water treatment.

Energy efficiency opportunities

Thungela's standard and related guideline on energy and carbon emissions' management sets out the requirements to drive energy and carbon savings across the business.

We have undertaken an extensive review of each operation's energy and GHG profiles and identified business improvement opportunities to enhance energy efficiency and therefore energy intensity at each site. A focus is to reduce and optimise diesel and electricity consumption by large energy users. Some of the opportunities that will be prioritised in the short term include:

Underground mines	Opencast mines
Ventilation system optimisation	Shortening haul routes
Ventilation on-demand	Improving road conditions
Shuttle car payload optimisation	Reducing idle time

Passive water treatment

Our eMalahleni Water Reclamation Plant (EWRP), commissioned in 2007, and expanded to a capacity of 50 ML per day in 2015, uses reverse osmosis technology to treat mine impacted water to potable quality and will continue to do so beyond 2050. The plant supplies potable water to community members in the water-stressed eMalahleni Local Municipality. Reverse osmosis technology is energy intensive and the remaining emissions on our path to net zero are the scope 2 emissions from this plant.

We are partnering with government, academia and other mining companies in the region to trial and demonstrate passive water treatment technologies which will be more sustainable and require fewer inputs in the long term. We are working on several alternate options depending on the quality of the water that requires treatment. These include a demonstration scale plant that uses bacteria to remove sulphates, neutralise water and remove metals to create a fit-for-purpose end-product that can be used in agriculture. We are also implementing phytoremediation and the irrigation of maize with suitable mine water which has an added benefit of improving food security, and wetland restoration.

You can read more about our passive treatment projects in our Environmental, Social and Governance Report on **page 49**.

Mine closure projects and responsible social transition

Key to any mine closure plan is the social transition. The nature of mining, involving the stewardship of finite resources, means that transitions are an integral part of our work, especially with respect to mine closure. The sector has developed significant knowledge of how to best work through such transitions. The Mpumalanga region, and particularly the Highveld coalfields, is especially at risk as the region is heavily dependent on both coal mining and coal-fired power generation. Notwithstanding climate change, the coalfields and power stations have finite lives and a strategic approach to the transition in this area is needed. This transformation will involve actions and decisions by private companies, government, communities and individuals. The process by which opportunities will be maximised and risks mitigated will be complex and involve different stakeholders working closely together.

We aim to leave a positive legacy through the integration of mine closure planning with land rehabilitation, the conservation of biodiversity and the use of non-operational land for the benefit of communities and the environment. We take a holistic approach to mine closure by identifying the full spectrum of LOM opportunities, risks and liabilities at the outset and planning with the end in mind. We believe that there is an opportunity to leave a positive legacy through the repurposing of rehabilitated land.

We are investigating a wide range of post-closure land use options, with a view to developing a responsible mine closure strategy and maximising our climate change opportunities. Some of these options include the leasing of land to independent power producers for renewable energy installations, agro-industrial projects and carbon farming.

Our climate-related risks

The table below reflects our understanding of the most significant climate-related risks relevant to our business. We acknowledge that this list is not exhaustive and will continue to enhance our understanding and response to these risks.

Physical risks

Prioritised physical climate risks have been consolidated into chronic (increased average rainfall, dry days and sea level rise) and acute (storms and extreme weather events) risks, with flooding and landslides considered secondary impacts of these risk categories. The likelihood of these risks is low for operations that will reach the end of their lives before 2030 and will be higher for operations that will be in operation post-2030.

Category	Risk description	Risk responses
Physical (chronic)	Relative sea level rise could cause increased exposure to coastal inundation and storm surge which may cause delays to product transportation or damage to port infrastructure.	• Richard Bay Coal Terminal has emergency preparedness and response systems as well as early warning systems in place. • We maintain adequate stockpiles at the port and on our sites to mitigate risks.
	Increased average rainfall may cause operational disruptions due to flooding and inability to access mine workings, and increase operational costs associated with managing water.	• We have a water management strategy which considers potential climate change-related risks, based on the outcomes of the scenario analysis undertaken in 2022. • We review our water balances annually and proactively manage water on site. We also track and report site water withdrawals, consumption, discharges and reuse/recycling, and water treatment in line with the International Council on Mining and Metals (ICMM) and the Minerals Council of Australia Water Accounting Framework. • Our sites will be undertaking rain readiness reviews and developing response plans in 2023. • We undertake annual reviews and audits on our mineral residue facilities and dams.
	Increase in the number of consecutive dry days may place additional pressure on the already water-stressed catchment.	• We actively reduce freshwater consumption at our operations and have targets for the reduction of freshwater abstraction. • Water efficiency is maximised through the reuse and recycling of water in our coal processing plants using thickeners and filter presses. • The EWRP has the capacity to treat 50 ML per day of mine impacted water and provides potable water to the local municipality.
Physical (acute)	Storms and extreme weather such as high winds and severe lightening could cause damage to infrastructure and equipment and operational disruptions.	• Every site has an emergency response plan which is reviewed periodically, technical standards on managing underground inrush and extreme rainfall trigger action response plans. • We have extensive internal standards, systems and procedures to manage hazards on site, and will review these to ensure that they include potential climate change-related risks.

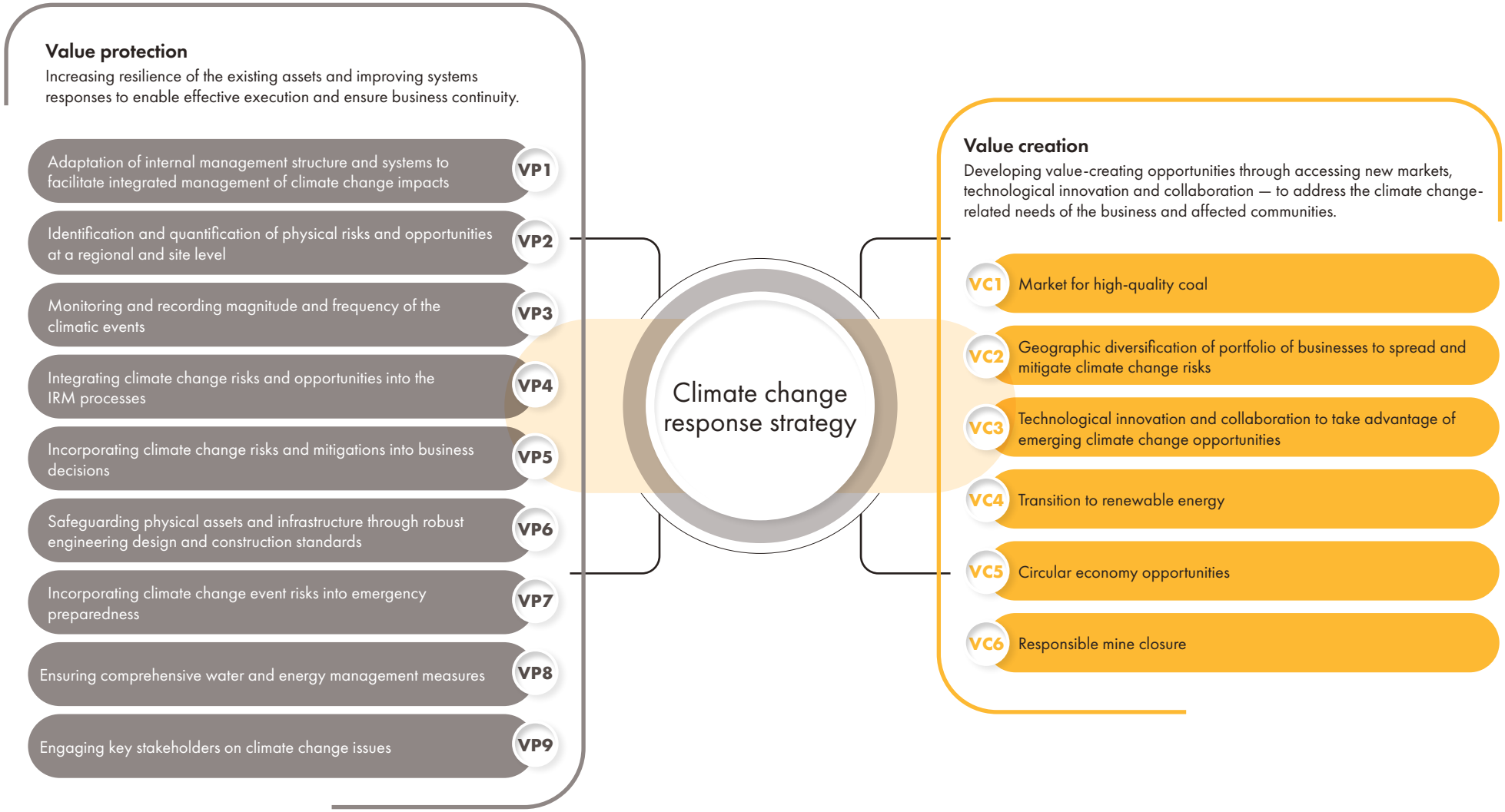
Transition risks

Category	Risk description	Risk responses
Policy and regulation changes	The introduction of new or more stringent carbon pricing mechanisms, both in our host countries and in key coal importing territories may increase the cost of production, reducing margins and therefore reducing the cost competitiveness of coal versus lower carbon alternatives. Incentives or subsidies for competing low emissions energy sources in destination markets may also make coal a less competitive option.	• We actively monitor changes in domestic and global policy relevant to carbon emissions. • We engage with policy makers, either directly or via our industry associations. • We have committed to net zero, subject to the countries we operate in and the markets we serve. • We have developed a scenario-based approach to our path to net zero, which includes the substitution of part of our electricity requirements with renewable energy.
	The Mpumalanga region is heavily dependent on coal mining for employment, both directly and indirectly. Increased carbon pricing and regulatory mechanisms as described above may impact our employees and communities through job losses and reduced total procurement spend.	• We continuously train and upskill our workforce using programmes that are recognised across the mining industry. • Our operations offer a range of mining and non-mining skills training programmes to unlock employment opportunities for young local people who do not have the financial means to further their education. These offer qualifications in, among many others, the operation of capital equipment, computer literacy, hospitality, and plumbing. Please refer to **page 71** of the Environmental, Social and Governance Report for more details. • We plan for closure using our mine closure toolbox which also takes into account social transition. • Employees and communities share in the value that we create through their participation in the Sisonke Employee Empowerment Scheme and the Nkulo Community Partnership Trust. We have contributed R448 million to each of these trusts related to 2022 performance, bringing total contributions since our listing to R1.2 billion. This will make a meaningful and lasting impact on the lives of those most important to enabling value creation – our employees and host communities.
Market drivers	Emissions reduction targets in export jurisdictions coupled with increased competitiveness of low-emission power generation technologies resulting in a structural decline in global demand for thermal coal, which may in turn drive downward pressure on global coal prices.	• Our strategy and investment evaluation criteria are designed to optimally balance responsible stewardship with the need to upgrade our portfolio and create shareholder value. Please refer to **page 3** for our investment evaluation criteria. • Our 'buy vs build' strategy using investment evaluation criteria to ensure that projects compete with additional shareholder returns. • We are positioning our portfolio on the lower half of the global seaborne cost curve to improve margins and reduce cash requirements during periods of lower prices. • A price-risk management steering committee is constituted specifically to monitor decisions and expenditure on swaps, financial instruments, and fixed price transactions.
Legal	Increased litigation for damages caused by climate change or to force greater climate action.	• We monitor legal developments in these areas and seek advice on these.
	Availability of, and access to, financing and key services such as insurance may reduce and the cost of these services may increase if the number of parties prepared to partner with the coal industry reduces significantly.	• We have implemented a self-insurance structure which will see the Group gradually reduce its reliance on the traditional insurance market. In 2022, we made an initial contribution of R1.2 billion to this structure. • In February 2023, we secured R3.2 billion in committed facilities with two South African banks with whom we have had a long-standing relationship. These facilities were arranged to further strengthen our balance sheet as we continue to migrate our capital structure in a manner that would enhance returns to shareholders over time. In addition this seeks to provide sufficient liquidity to complete our capital projects and to navigate uncertainty across a number of external factors.
Reputation	Changing stakeholder expectations and lack of acceptance over the role of high-quality coal in supporting the transition to a lower carbon future may impact our industry's reputation and delay the environmental permit approval process.	• We are committed to transparent disclosure through alignment with the recommendations of the TCFD and engage with our key stakeholders on climate change and broader ESG issues in a clear, meaningful and transparent manner. • Through our membership of the World Coal Association (WCA) and the Coal Industry Advisory Board (CIAB) to the IEA, we advocate for a technology agnostic approach to a low-carbon future, which includes coal-fired power emission abatement technologies such as high-efficiency, low-emission power plants and CCUS.

Adaptive practices to respond to potential climate-related disruptions

To further build on our resilience to the potential physical impacts of climate change, we have evaluated our existing responses and developed a systems based approach to improving our adaptive capacity to respond to transitional and physical risks. This will increase the resilience of our asset portfolio into the future.

The systemic responses below have been separated into value protection (VP) responses to mitigate climate risks, and value creation (VC) responses, to ensure that we are able to maximise the opportunities associated with climate change.



Value protection responses

We have a broad range of measures already in place to mitigate the risks of climate change. Part of the process that we undertook was to evaluate areas for improvement in our responses. These are listed below.

VP1

Adaptation of internal management structure and systems to facilitate integrated management of climate change impacts

We are undergoing an exercise to update existing processes and to ensure there is a fully integrated approach in the business to climate change, across all functions. The process includes assessing current Social and Labour Plans (SLPs), the impact on communities and responsible mine closure.

VP2

Identification and quantification of physical risks and opportunities at regional and site level

We have completed climate scenario modelling for our current operations and life extension projects. The modelling identified the reported physical and transition risks to operations, including the potential financial impact of these risks.

We identified existing mitigations and means to enhance these.

VP3

Monitoring and recording magnitude and frequency of the climatic events

Monitoring and recording data related to climatic events is critical to improving our understanding of the frequency and impact of climatic events. We have the systems in place to do this and will work on building a central repository for this data.

VP4

Incorporating climate change risks and opportunities in the IRM processes

We have a comprehensive IRM in place, which is driven both at site and corporate level. This includes a consistent view on risks and opportunities, with appropriate environmental management systems, standards and certifications in place. Our risk management system forms a strong foundation, and we are currently integrating climate change into that system to ensure a complete view of risks and opportunities are actively managed by the business.

VP5

Integrating climate change risks and mitigations into business decisions

We have a number of decision frameworks, which guide us towards our strategic ambitions. While many of these do consider climate change, we are in the process of ensuring that it is fully embedded or enhanced where necessary.

VP6

Safeguarding physical assets and infrastructure through robust engineering design and construction standards

Our fixed assets and infrastructure are designed according to national design and construction standards and in line with regulatory requirements. This is additionally enhanced through Thungela's internal standards, systems and procedures.

VP7

Incorporating climate change event risks into emergency preparedness

We have several emergency response strategies in place to protect our employees, host communities, assets and infrastructure. These emergency response procedures are comprehensive, however we will review these to ensure integration of extreme weather events.

VP8

Ensuring comprehensive water and energy management measures

We currently have water and energy management initiatives in place, which includes driving the optimisation of operation processes which leads to the reduction of water and energy usage on site. This is supported by our investment model for new/alternative technology that optimises the use of water and energy.

VP9

Engaging key stakeholders on climate change issues

We have a comprehensive stakeholder engagement plan driven by corporate affairs, using several platforms to engage with key stakeholders. Climate change concerns will be integrated into our existing process, where it is not already covered.

Value creation

It is important that in addition to understanding and managing our climate-related risks, we identify and take advantage of climate-related opportunities for our business.

A compelling opportunity is our focus on producing high-quality export coal, which is increasingly preferred over lower grades as the improved energy efficiency and lower pollutant content is better aligned with the shifting requirements of customers in our export markets. Our tier 1 assets operate in the lower half of the cost curve which, coupled with our commitment to the responsible production of a high-quality product, contributes to the resilience of our business.

VC1

Market for high-quality coal

Our focus on producing high-quality export coal with improved energy efficiency and lower pollutant content which is better suited to shifting customer needs.

VC2

Geographic diversification of portfolio of businesses to spread and mitigate climate change risks

Expanding into different geographical locations to spread and mitigate the physical climate change risks through diversification, while expanding production and capacity.

VC3

Technological innovation and collaboration to take advantage of emerging climate change opportunities

The technological innovation and collaboration we are undertaking, specifically passive water treatment technologies and water management practices and coal processing technologies, will ensure more sustainable and efficient mining into the future and beyond the life of our operations.

VC4

Transition to renewable energy

Transition to renewable energy will allow for ensuring consistent power supply and limiting business interruptions, while transitioning to a low-carbon economy.

VC5

Circular economy opportunities

We have a strong focus on waste reduction, and have set a target of a 50% reduction in waste to landfill by 2030. Introducing circular economy principles, resulting in improving resource efficiency can stabilise supply chains, reduce operating costs and improve competitiveness.

By far our largest waste stream is the mineral waste from our coal processing plants. We are actively re-mining three of our discard facilities currently, which has the dual benefit of maximising the use of our coal resource, and reducing the environmental impacts and liabilities associated with the discard facilities.

VC6

Responsible mine closure

With several of our operations approaching their end of life, there are opportunities available through intentional planning and collaboration to repurpose rehabilitated areas to create sustainable businesses, where this will not contravene our obligations for site restoration, for the benefit of the communities surrounding our mines.

METRICS AND TARGETS

Greenhouse gas emissions and energy

Thungela's GHG emissions have been calculated according to the GHG Protocol Corporate Accounting and Reporting Standard (www.ghgprotocol.org) and the IPCC 2006 Guidelines. We use the operating control approach in reporting emissions and include the following in our footprint: Greenside, Goedehoop, Zibulo, Khwezela, Isibonelo, centralised services (Highveld Hospital, central workshops and the EWRP and 50% of Mafube'semissions.

Scope 1:

Direct GHG emissions from fossil fuel (diesel and petrol) combustion in mobile mining equipment, fugitive emissions from underground mines and other process emissions (wastewater treatment and water neutralisation).

Scope 2:

Emissions from electricity purchased from Eskom.

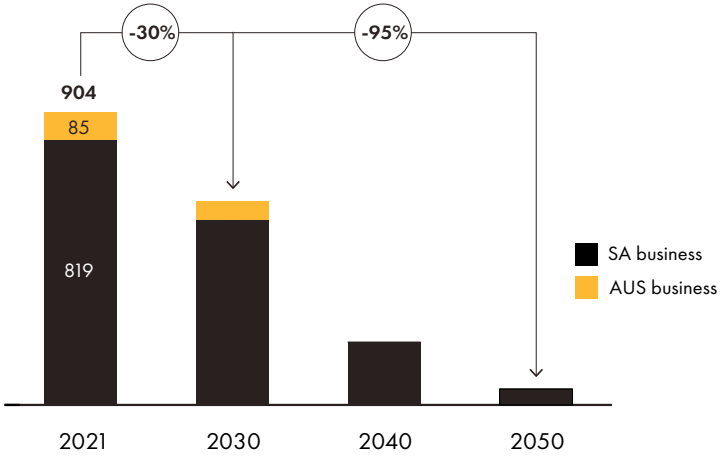
Scope 3:

Emissions were calculated using the GHG Corporate Value Chain (Scope 3 Standard) and IPCC 2006 Guidelines and emission factors. These emissions were evaluated for purchased goods and services, fuel and energy-related activities, upstream transportation and distribution, waste generated in operations, downstream transportation and distribution, use of sold products, and investments. Use of sold products accounts for 98% of our total scope 3 emissions. These emissions will be evaluated to improve our understanding of the emissions across the value chain and our reporting of these.

Our targets

Our goal is to reduce our scope 1 and 2 emissions by 30% by 2030 and reach net zero by 2050 from a 2021 baseline. We have adjusted our baseline from the previous baseline of 2016, to a baseline of 2021, as the year that Thungela listed as a standalone entity.

Thungela total scope 1 and 2 emissions (kt CO_2e)



Ensham is included for illustrative purposes, but will be fully integrated into our baseline, annual reporting and initiatives to reduce emissions from Ensham will be included in our pathways upon closure of the transaction in the next reporting cycle.

Our performance

308

Scope 1 GHG emissions (kt CO_2e)
2021: 362

440

Scope 2 GHG emissions (kt CO_2e)
2021: 457

35,947

Scope 3 GHG emissions (kt CO_2e)
2021: 54,744

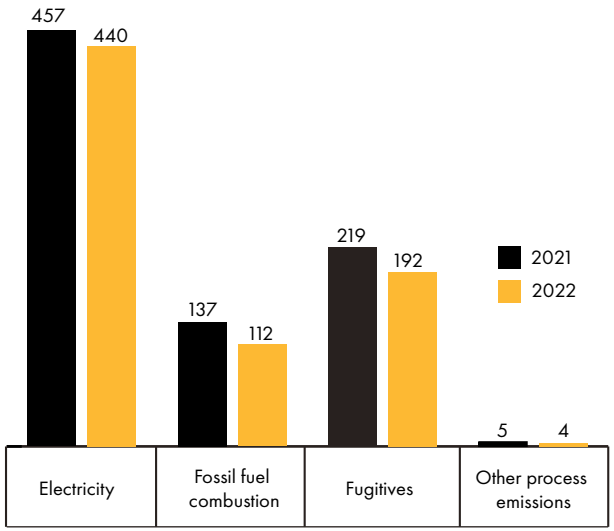
Scope 1 and 2 emissions

Total scope 1 and 2 CO_2e emissions in 2022 were 748 kt compared with 819 kt in 2021. This 8.7% reduction was driven by energy efficiency improvement projects and a reduction in production volumes due to Transnet Freight Rail (TFR) underperformance. Our carbon intensity improved 8.3% from 4.56 kg CO_2e per total tonne moved (TTM) to 4.18 kg CO_2e/TTM over the same period.

Scope 1 emissions in 2022 decreased by15% to 308 kt CO_2e (2021: 362 kt CO_2e), with a 19% decrease in GHG emissions from fossil fuel combustion and a 13% decrease in fugitive methane emissions. Our scope 2 emissions decreased by 4.2% to 440 kt CO_2e (2021: 457 kt CO_2e).

Carbon emissions from electricity consumption are the biggest contributor to our footprint (59%) followed by fugitive emissions (26%) and carbon emissions from fossil fuel combustion (15%).

Scope 1 and 2 emissions by source (kt CO_2e)



Scope 3 emissions

Scope 3 category	2022 emissions (kt CO_2e)	2021 emissions (kt CO_2e)
Category 1: Purchased goods and services	**5**	30
Category 3: Fuel-and energy-related activities	**543**	667
Category 4: Upstream transportation and distribution[1]	**163**	–
Category 5: Waste generated in operations	**5**	6
Category 9: Downstream transportation and distribution[2]	**124**	1,008
Category 11: Use of sold products[3]	**35,072**	53,031
Category 15: Investments[4]	**35**	–
Total	**35,947**	54,744

[1] Upstream shipping and transportation refers to the trucking of stock between our operations to manage our stockpiles due to TFR underperformance in 2022.

[2] Historically, emissions from shipping to export markets were included, however since our product is sold on a free on board basis, the shipping of product has been removed from our scope 3 calculations for 2022.

[3] Category 11: Use of sold products – historically the United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) emission factor for use of sold product was used. The emission factor has been updated to the IPCC 2006 factor.

[4] In an effort to improve our scope 3 reporting in 2022, we have included emissions from our joint ventures where we do not have a controlling share.

Our scope 3 emissions decreased 34% to 35,947 kt CO_2e from 54,744 kt CO_2e in 2021 due to the reduction in sales volumes (use of product sold) which account for 98% of our scope 3 emissions.

Through our memberships of the WCA and the CIAB, we advocate for a technology agnostic approach which includes the accelerated deployment of CCUS and high-efficiency, low-emission coal-fired power stations.

Energy

Thungela's total energy consumption decreased 12.5% to 3.01 million GJ (2021: 3.42 million GJ). Our energy intensity improved by 5.6% year-on-year to 16.81 MJ/TTM owing to our energy efficiency projects (2021: 19.04).

This was primarily due to energy efficiency projects such as advanced process control (APC) in our coal processing plants, reduction in machine carry back, haul road distance optimisation and condition and construction management, truck and shovel cycle time variability management, the optimisation of ventilation systems, and mine digitalisation.

APC, in particular, has generated significant energy efficiencies and emission reductions since its implementation in 2019. In 2022, savings of 6,657 t CO_2e were realised, bringing total savings to 23,432 t CO_2e over three years.

Incentivising action through executive remuneration

We hold our executive team accountable for aligning our business practices with our climate change commitments and ambitions. In total, 30% of the value of the LTIP awards agreed by the remuneration and nomination committee for 2023 is linked to ESG metrics and 10% of which is directly to the reduction of operational GHG emissions.

In addition, the bonus scheme outcomes for all employees have a variable remuneration tied to the organisation's performance relating to reducing our direct and indirect GHG emissions. This is included in our STI, which is measured annually.

Capital deployment

Thungela's path to net zero, based on the existing portfolio, plus the Elders and Zibulo North Shaft projects requires a minimum of 19 MW of renewable energy to be implemented by 2030. The Group has a balanced and disciplined approach to capital allocation and will be adequately funded to execute the path to net zero strategy.

Water

Thungela operates in a water stressed area, and our highest physical climate change risks are water related.

Our water policy and technical management standards facilitate regulatory compliance and sustained reductions in our consumption of all water resources, including municipal, groundwater and alternative natural supplies.

They also promote efficiency (reuse and recycling) and improved measures to prevent the contamination of ground and surface water across the mining lifecycle.

Our 2023 water targets:

- Reduce freshwater abstraction by 20% against a 2015 baseline
- Increase water recycling levels to 75%
- No level 3 or greater water incidents
- Water treatment 40%

The treatment target is based on reducing recharge, managing stormwater and creating sufficient storage to ensure uncontrolled discharges are mitigated by achieving a 40% treatment target.

Our performance

767

Freshwater abstracted (ML)
2021:865

96

Water reuse/recycle (%)
2021: 95

57

Water treatment (%)
2021: 57%

Performance

Goedehoop and Isibonelo collieries and, to a lesser extent, Mafube Colliery, rely on fresh water from external sources and are working towards a reduction target of 20% by 2023, using 2015's 1,015 ML as a baseline. The overall trend for 2022 indicates that the current import of water has decreased by 11% to 767 ML from 865 ML in 2021. Freshwater abstraction in 2022 was 24% lower than the 2015 baseline, thus exceeding the 2023 target.

Greenside, Khwezela and Zibulo Collieries source their water from the EWRP and are also working to reduce their consumption by 20% by the end of 2023 from a baseline of 1,997 ML in 2015. They have reduced their combined water-use from 1,730 ML in 2021, and 1,553 ML in 2022. This represents a year-on-year reduction of 10% and a reduction of 22% from the 2015 baseline.

Progress against our 2023 water targets

	Reduction in water use*	Reuse/ recycle	Treatment	Level 3 or greater incidents
Target	20%	75%	40%	Zero
Actual	24%	96%	57%	2

* These targets were set using 2015 data as a baseline.

A target was set to increase water reuse and recycling levels to 75% each year by 2023. All operations, apart from the Isibonelo Colliery – where the absence of a washing plant leaves little opportunity for recycling – have exceeded this target by driving efficiencies across their water cycles.

In an effort to improve reporting, a reconciliation of our reuse and recycling efficiency figures was conducted for several operations. Worse than expected values were noted where filter presses and thickeners at processing plants are in use. These technologies ensure that water is recycled numerous times in the coal washing process. This, however, did not reflect in our data. The calculation methodology in use was updated to disaggregate activities to sub-task level to reflect reuse and recycling in thickeners and filter presses. The new efficiency calculation falls within the confines of the Water Accounting Framework (WAF) which stipulates recommended aggregation levels.

The updated methodology resulted in a water reuse and recycling rate of 96% in 2022, up from 95% in 2021, based on the same calculations. Our 75% reuse and recycling target will be considered and updated during the course of 2023.

Our treatment target of 40% aims to reduce the accumulation of rising mine water to prevent its uncontrolled release into the environment. We have also taken steps to ensure that we manage stormwater and have sufficient storage capacity to avoid such an occurrence. An overall treatment rate of 57% was achieved in 2022, on par with the 57% we recorded the previous year.

Memberships and associations

Our climate change advocacy position

Thungela engages with policymakers and collaborates with industry associations to advocate our position on matters relating to managing climate change and our business. We engage in public policy discussions, with a view to maintaining a balanced approach as we believe that effective policy is essential for providing the right framework of drivers and incentives to encourage coordinated, efficient and equitable response measures. There may be times when our views diverge from those of our trade association partners, in which instance we aim to ensure our views are noted and recorded.

We engage in support of the Paris Agreement, and advocate for the accelerated deployment of all technologies (per Article 10.2 of the Paris Agreement), including coal abatement technologies such as high-efficiency, low-emission coal-fired power plants and CCUS. We also encourage the development of low and lower-carbon sectors such as renewables and gas respectively, as well as the development of a conducive policy and regulatory environment to encourage climate action within the confines of our national circumstances. In all our climate advocacy activities, we are committed to compliance, transparency, and accountability.

Thungela is a member of the **World Coal Association** (WCA). The association represents industry leaders who are committed to building a sustainable future for global coal. It plays an active role in achieving worldwide economic and environmental aspirations for clean coal usage, technology and innovation. WCA members seek to promote collaboration, demonstrating that the key to a clean coal industry lies in a balanced, agnostic global policy environment that is inclusive of all fuels and technologies.

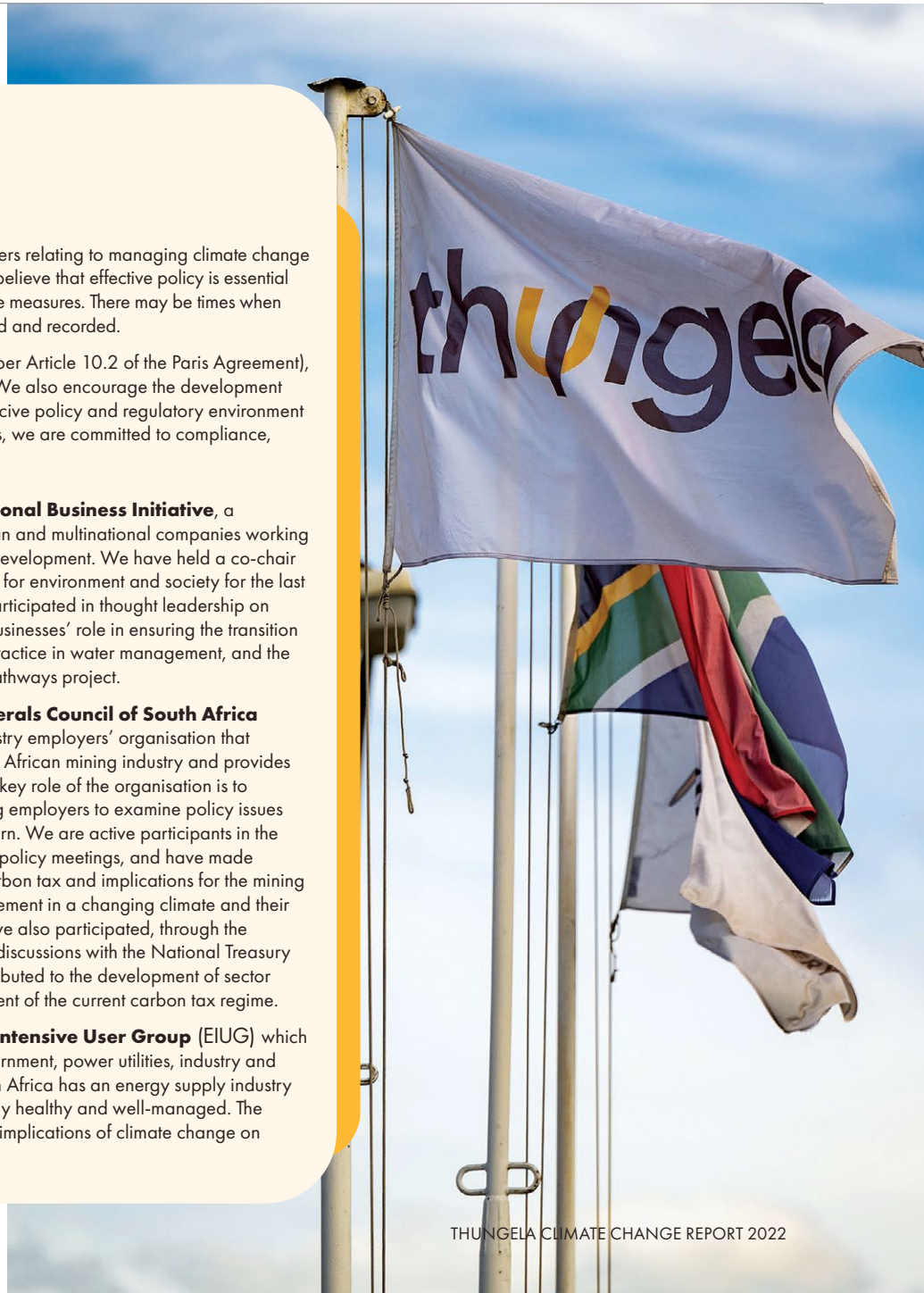
We are a member of the **Coal Industry Advisory Board** (CIAB). The board is made up of a group of high-level executives from coal-related industrial enterprises and was established by the IEA in July 1979, to provide advice on a wide range of coal-related issues. Members are drawn from 13 countries that account for just under 80% of world coal production and consumption. Members represent major coal and electricity producers, other-coal consuming industries, and coal-related organisations. Most recently, the CIAB commissioned reports on "The role of low-emission coal technologies in a net zero Asian future" and "A pathway to reducing emissions from coal power in India".

Thungela is a member of the **Industry Task Team on Climate Change** (ITTCC), a non-profit organisation aimed at undertaking technical, fact-based studies to ensure that South Africa's policies on climate change are based on the best information and best practice and prescribe real, achievable ends. The ITTCC works with various stakeholders such as government and business groups on critical matters such as climate change, South Africa's international climate change obligations, supporting the low-carbon transition, carbon price merits, collaboration and the just transition.

Thungela is a member of the **National Business Initiative**, a voluntary coalition of South African and multinational companies working towards sustainable growth and development. We have held a co-chair position on its advisory committee for environment and society for the last two years. In this role, we have participated in thought leadership on issues such as the just transition, businesses' role in ensuring the transition to a low-carbon economy, best practice in water management, and the initiative's Just Energy Transition Pathways project.

Thungela is a member of the **Minerals Council of South Africa** (Minerals Council), a mining industry employers' organisation that promotes the interests of the South African mining industry and provides strategic and advisory support. A key role of the organisation is to facilitate interaction among mining employers to examine policy issues and other matters of mutual concern. We are active participants in the Minerals Council's environmental policy meetings, and have made contributions to its work on the carbon tax and implications for the mining industry, waste and water management in a changing climate and their implications for the sector. We have also participated, through the Minerals Council, in a number of discussions with the National Treasury on the carbon tax and have contributed to the development of sector benchmarks during the development of the current carbon tax regime.

We are members of the **Energy Intensive User Group** (EIUG) which is committed to working with government, power utilities, industry and other stakeholders to ensure South Africa has an energy supply industry that is financially viable, technically healthy and well-managed. The EIUG recognises the impacts and implications of climate change on energy supply and security.



PERFORMANCE TABLES

GHG emissions (kt CO_2e)

	2022	2021	2020	2019
Scope 1▲	**308**	362	369	398
Fossil fuels	**112**	137	155	145
Fugitive emissions	**192**	219	209	248
Process emissions (wastewater treatment and water neutralisation)	**4**	5	5	4
Scope 2▲	**440**	457	514	551
Total scope 1 and 2 (kt CO_2e)	**748**	819	883	948
Scope 3 [1,2]	**35,947**	54,744	64,680	68,457
Scope 1 and 2 GHG intensity (kt CO_2/TTM)	**4.18**	4.56	4.60	4.77

Energy consumption

	2022	2021	2020	2019
Energy from electricity (million GJ)	**1.50**	1.57	1.78	1.91
Energy from fossil fuel use (million GJ)	**1.51**	1.85	2.09	1.95
Solar energy (million GJ)	**0.1**	0.38	0.36	0.96
Total energy used (million GJ)▲	**3.01**	3.42	3.87	3.86
Energy intensity (MJ/TTM)*	**16.81**	19.04	20.16	19.4
Electricity consumption (MWh)	**415,732**	494,626	434,916	415,490
Diesel consumption (kl)	**41,800**	57,838	51,285	41,815

* Intensities have been calculated on a TTM basis to account for rehabilitation.

Water

	2022	2021	2020	2019
Water withdrawals by source (1,000 m³)				
Freshwater withdrawal■	**767**	865	785	714
Potable water withdrawal from EWRP	**1,553**	1,730	1,935	2,160
Total withdrawal	**34,472**	28,444	25,861	30,926
Ground water	**25,788**	19,384	16,929	24,965
Surface water	**6,413**	6,050	5,537	3,031
Third-party water	**2,271**	3,067	3,432	2,965
Water treated (%)[1]■	**57**	57	58	
Water efficiency (reuse/recycle) (%)[1,2]■	**96**	95	66	
Water discharges (1,000 m³)				
Total water discharged[1]	**19,869**	21,835	20,347	
Treated water discharged from EWRP	**8,037**	9,489	7,640	7,603
Total consumption[1] (1,000 m³)	**12,567**	11,994	13,075	

[1] Owing to the change in water accounting and definitions, 2019 data is not available for some indicators.

[2] Water efficiency value for 2021 has been restated due to a change in the calculation methodology described on page 27.

▲ High assurance

■ Moderate assurance

TCFD INDEX

TCFD recommendation	Reference
GOVERNANCE Disclose the organisation's governance on climate-related risks and opportunities	
a) Describe the board's oversight of climate-related risks and opportunities	CCR: 8 – 9 IAR: 97 – 101, 128 – 129
b) Describe management's role in assessing and managing climate-related risks and opportunities	CCR: 8, 10 IAR:128 – 129
STRATEGY Disclose the actual and potential impacts of climate-related risks and opportunities on the organisation's business, strategy and financial planning where such information is material	
a) Describe the climate-related risks and opportunities the organisation has identified over the short, medium and long term	CCR: 19 – 20
b) Describe the impact of climate-related risks and opportunities on the organisation's business, strategy and financial planning	CCR:19 – 20
c) Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	CCR:14 – 23
RISK MANAGEMENT Disclose how the organisation identifies, assesses and manages climate-related risks	
a) Describe the organisation's processes for identifying and assessing climate-related risks	CCR:11 – 12
b) Describe the organisation's processes for managing climate-related risks	CCR:11 – 12
c) Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organisation's overall risk management process	CCR:11 – 12
METRICS AND TARGETS Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material	
a) Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process	CCR:25, 26, 27, 28
b) Disclose scope 1, scope 2 and, if appropriate, scope 3 GHG emission and the related risks	CCR:25 – 26
c) Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets	CCR:24, 27, 29

GLOSSARY

Term used	Definition
AGM	Annual general
APC	Advanced process control
APS	Announced pledges scenario
Capex	Capital expenditure
CCUS	Carbon capture, utilisation and storage
CEO	Chief executive officer
CIAB	Coal Industry Advisory Board (to the International Energy Agency)
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
Decarbonisation	Reducing the carbon emissions associated with electricity, industrial activities, and transportation
DFFE	Department of Forestry, Fisheries and the Environment
DEFRA	United Kingdom Department for Environment, Food and Rural Affairs
EIUG	Energy Intensive Users Group
ESG	Environmental, social and governance
EWRP	eMalahleni Water Reclamation Plant
Fugitive emissions	Emissions that are not produced intentionally and are not physically controlled.
GHG	Greenhouse gas
GJ	Gigajoule
Group	Thungela and its subsidiaries, joint arrangements and associates
IBIS	IBIS ESG Consulting Africa (Pty) Ltd
ICMM	International Council on Mining and Metals
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent power producer
IRM	Integrated risk management
ISO	International Organization for Standardization
KPI	Key performance indicator
kt	A measure representing 1,000 tonnes
LOM	Life of mine
LTIP	Long-term incentive plan

Term used	Definition
Mafube Colliery	Mafube Coal Mining Proprietary Limited
Minerals Council	Minerals Council of South Africa
MJ	Megajoule
ML	Megalitre
MW	Megawatt
M&A	Mergers and acquisitions
Mt	Million tonnes
Net zero	Net zero emissions is reached when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period
NPV	Net present value
NZE	Net zero scenario
ORM	Operational risk management
Paris Agreement	A legally binding international treaty on climate change that aims to limit global warming to well below 2°C, preferably to 1.5°C, compared with pre-industrial levels
RCP	IPCC AR5 Representative Concentration Pathway
RO	Reverse osmosis
ROM	Run of mine, representing the product extracted from mining operations before it is processed into saleable product
SHE	Safety, health and environment
SSP	IPCC AR6 Shared Socio-economic pathway
STEPS	Stated policies scenario
STI	Short-term incentive
t	Metric tonnes 1,000kg
TCFD	Task Force on Climate-related Financial Disclosures
Thungela	Thungela Resources Limited
TFR	Transnet Freight Rail
TRCFR	Total recordable case frequency rate
TTM	Total tonnes moved
WAF	Water accounting framework (for the mineral industry)
WCA	World Coal Association
ZAR	South African Rand

ADDITIONAL INFORMATION

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FORWARD-LOOKING STATEMENTS AND THIRD-PARTY INFORMATION

This document includes forward-looking statements. All statements included in this document (other than statements of historical facts) are, or may be deemed to be, forward-looking statements, including, without limitation, those regarding Thungela's financial position, business, acquisition and divestment strategy, dividend policy, plans and objectives of management for future operations (including development plans and objectives relating to Thungela's products, production forecasts and resource and reserve positions). By their nature, such forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Thungela, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Thungela therefore cautions that forward-looking statements are not guarantees of future performance.

Any forward-looking statement made in this document or elsewhere is applicable only at the date on which such forward-looking statement is made. New factors that could cause Thungela's business not to develop as expected may emerge from time to time and it is not possible to predict all of them. Further, the extent to which any factor or combination of factors may cause actual results to differ materially from those contained in any forward-looking statement are not known. Thungela has no duty to, and does not intend to, update or revise the forward-looking statements contained in this document after the date of this document, except as may be required by law. Any forward-looking statements included in this document have not been reviewed or reported on by the Group's independent external auditor.

The information contained within this report is deemed by the Group to constitute inside information as stipulated under the market abuse regulation (EU) No. 596/2014 as amended by the market abuse (amendment) (UK MAR) regulations 2019. Upon the publication of this report via the regulatory information service, this inside information is now considered to be in the public domain.