exxaro

POWERING POSSIBILITY

Exxaro Resources Limited
Consolidated Mineral Resources and Mineral Reserves report 2019

Foreword

Exxaro Resources continuously strives to enhance the level of estimation and reporting of Mineral Resources and Mineral Reserves. The group is committed to the principles of transparency, materiality and competency in reporting its Mineral Resources and Mineral Reserves.

The information in this report is aligned with the JSE Listings Requirements (section 12) and encapsulates information on reporting governance, competence, tenure, risk, liabilities and assurance as well as auxiliary descriptions of applicable projects, operations and exploration activities.

Mineral Resources and Mineral Reserves were estimated by competent persons on an operational or project basis, and in line with the South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2016 edition (SAMREC Code 2016) for African properties (coal), except for Vedanta's base metal property, and the Australasian Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2012 edition (JORC Code) for Australian (coal) and Vedanta's properties.

For Coal Resources and Coal Reserves under Exxaro management's control, estimation is in line with the South African National Standard: South African guide to the systematic evaluation of Coal Resources and Coal Reserves (SANS 10320:2004). Resource and Reserve estimates are quoted in full, irrespective of Exxaro shareholding. The report primarily encapsulates all aspects relating to Exxaro's coal estimation and reporting, and we therefore predominantly use the terminology of Coal Resources and Coal Reserves throughout the report. We do, however, apply the terminology of Mineral Resources and Mineral Reserves where the content collectively refers to coal and base metal estimates.

Exxaro reports mineral estimates that are directly under its management's control and includes estimates for entities in which we hold a 25% interest or more. For 2019, we have excluded Tronox Mineral Sands estimates because of the decrease in Exxaro shareholding. Supplementary descriptions are provided for projects and operations directly under our management's control. For projects and operations referred to in the report but in which Exxaro does not have management's control, the reader is referred to that company's website, shown below, for supplemental information. This approach ensures maximum compliance with the principles of materiality and transparency.

Anglo American Coal operations and projects:
www.angloamerican.com/investors/annual-reporting

Kumba Iron Ore:
www.angloamericankumba.com/investors.aspx

Tronox:
www.investor.tronox.com/secfiling.cfm

Vedanta Resources base metal operations and projects:
www.vedantaresources.com/investor-relations/

Feedback

We welcome feedback from stakeholders. Please send your suggestions to:

Hanno Olinger

Manager: Integrated reporting and ESG
Tel: +27 12 307 3359
Mobile: +27 83 609 1094
Fax: +27 12 307 5327
Email: hanno.olinger@exxaro.com
www.exxaro.com

Certification by group company secretary and legal

In terms of section 88(2)(e) of the Companies Act, 2008 (Act 71 of 2008), as amended (Companies Act), I, Saret van Loggerenberg, in my capacity as group company secretary and legal, confirm that, to the best of my knowledge, for the year ended 31 December 2019, Exxaro Resources Limited (Exxaro) has filed with the Companies and Intellectual Property Commission all such returns and notices as required of a public company in terms of the Companies Act and that all such returns and notices appear to be true, correct and up to date.

SE van Loggerenberg
Group company secretary and legal

Pretoria

20 April 2020

Certification by competent persons

The Exxaro lead competent persons are appointed by the Exxaro executive management team.

The Exxaro lead Mineral Resource competent person is Henk Lingenfelder, a member of the Geological Society of South Africa and registered (400038/11) with the South African Council for Natural Scientific Professions. He has a BSc (Hons) in geology and 24 years of experience as a geologist in coal, iron ore and industrial minerals.

The person in Exxaro designated to take corporate responsibility for Coal Resources, Henk Lingenfelder, the undersigned, has reviewed and endorsed the reported estimates.

The Exxaro lead Mineral Reserve competent person is Chris Ballot, a mining engineer registered (20060040) with the Engineering Council of South Africa. He has 23 years of experience in iron ore, mineral sands and coal in various technical and management roles. His qualifications include BEng (mining), GDE and MBA.

The person in Exxaro designated to take corporate responsibility for Mineral Reserves, Chris Ballot, the undersigned, has reviewed and endorsed the reported estimates.

JH Lingenfelder
BSc geology (Hons)
Pr Sci Nat (400038/11)
Group manager: geoscience

263 West Avenue, Die Hoewes
Centurion 0163

South African Council for Natural Scientific Professions
Private Bag X540
Silverton 0127
Gauteng
South Africa

CC Ballot
BEng (mining)
ECSA 20060040
Group manager: mining processes

263 West Avenue, Die Hoewes
Centurion 0163

Engineering Council of South Africa
Private Bag X691
Bruma 2026
Gauteng
South Africa

Both parties are in the full-time employment of Exxaro, Henk Lingenfelder as the group manager: geosciences and Chris Ballot as the group manager: mining processes. Both parties have consented to the inclusion of Resources and Reserves estimates in the integrated report 2019. Exxaro has written confirmation from the competent persons (Table 82) that the reporting is compliant with the SAMREC Code, the relevant portions of Table 1 and the JSE section 12 requirements, and they consent to the publication of the report.

Contents

List of figures

List of tables

Performance at a glance

We continuously strive to unlock maximum value in our Coal Resources and Coal Reserves. The drive towards the utilisation of breakthrough technology to improve our processes and techniques throughout the value chain is a critical aspect to sustain, grow and optimally exploit our mineral assets. We review, test and implement the applicable technology solutions at operational and functional level as part of our strategy.

Exxaro broke ground on its **R3.3 billion**, first-of-its-kind **digital mine** on 5 July 2018. Since then **Belfast Coal** has made significant progress in its construction programme and is already producing high-grade thermal coal six months ahead of schedule. As a truly digital and connected mine, Belfast will contribute to Exxaro being a thriving coal business in the region and demonstrate Exxaro's purpose to power better lives in Africa and beyond.

The **ECC Dorstfontein West** underground operational life beyond the exhaustion of 2 coal seam is premised on the exploitation of 4 (lower) coal seam. In 2019, the **4 seam** was successfully accessed from existing 2 seam underground infrastructure. Two parallel 7m-wide and 2m-high inclines with a slope of six degrees, connected by six crosscuts, were developed by the **Dorstfontein** drill-and-blast stone development team, allowing for continuous exploitation of the Exxaro Coal Central (ECC) Resource.

Operations	Product	2019 (Mt)	2018 (Mt)
Grootegeluk	Thermal coal	25.68	27.38
Grootegeluk	Metallurgical coal	2.07	2.32
Matla	Thermal coal	5.99	6.61
Exxaro Coal Central (ECC)	Thermal coal	4.24	3.80
Leeuwpan	Thermal coal	4.4	4.22
Belfast	Thermal coal	1.03	–
Mafube	Thermal coal	1.87	0.99

Overview of Coal Resource and Coal Reserve estimates

Our strategy

The Coal Resource and Coal Reserve strategy is focused on sustaining, developing and growing the mineral asset base through the employment of responsible and innovative technical management. The value extracted from the mineral assets is continuously challenged through mine planning, considering the evolving knowledge of the mineral asset geological complexities and the opportunities. Our competent persons are the custodians of the mineral asset and are therefore accountable not only to ensure the integrity but also to apply pioneering technology in combination with trusted knowledge to optimise the exploitation thereof.

Our projects, operations and expansion initiatives are built on trusted and assured Coal Resources and Coal Reserves, creating the platform for the life of mine (LoM) from which the annual business plans are derived. The Mineral Resource managers of each operation are the custodians of the LoM and ensure the professional execution of the business plans, stimulating profitability and return on investment while guarding against irresponsible exploitation.

Exxaro has a world-class coal resource portfolio, comprising fully owned operations and projects, and a number of jointly owned operations and projects, in South Africa and Australia. The fully owned operations and projects in South Africa are located in the large and highly prospective Waterberg Coalfield in Limpopo, and the more mature Highveld and Witbank Coalfields in Mpumalanga. Since inception in 2006, Exxaro's total attributable Coal Resource and Coal Reserve figures have been relatively stable. This trend can primarily be ascribed to the relatively large Waterberg coal deposits, particularly the remarkable Grootegeluk complex. Estimated to contain 40% to 50% of South Africa's remaining Coal Resources, the Waterberg is viewed as the future of South African coal mining. Exxaro holds an estimated three billion tonnes of Measured and around 1.8 billion tonnes of Indicated Coal Resources in the Waterberg, primarily at Grootegeluk mine and the adjacent Thabametsi mining right. The Grootegeluk complex provides thermal Coal Reserves to Eskom's Matimba and new Medupi power stations, and produces semi-soft coking and metallurgical coal through eight beneficiation plants.

The Grootegeluk complex is continuously evolving, illustrated by several large value-unlocking projects. While these projects underline the resourcefulness of our people, they also demonstrate the successful implementation of innovative breakthrough technology. To an extent, the size of the Grootegeluk complex obscures changes in Coal Resource and Coal Reserve figures from events in the smaller Witbank and Highveld coalfields. In 2014, divestment from the new Clydesdale Colliery, closure of Inyanda mine and incorporation of Total Coal South Africa (renamed Exxaro Coal Central or ECC), as well as divestment from the Eloff project in 2017, affected Exxaro's reported figures in recent years.

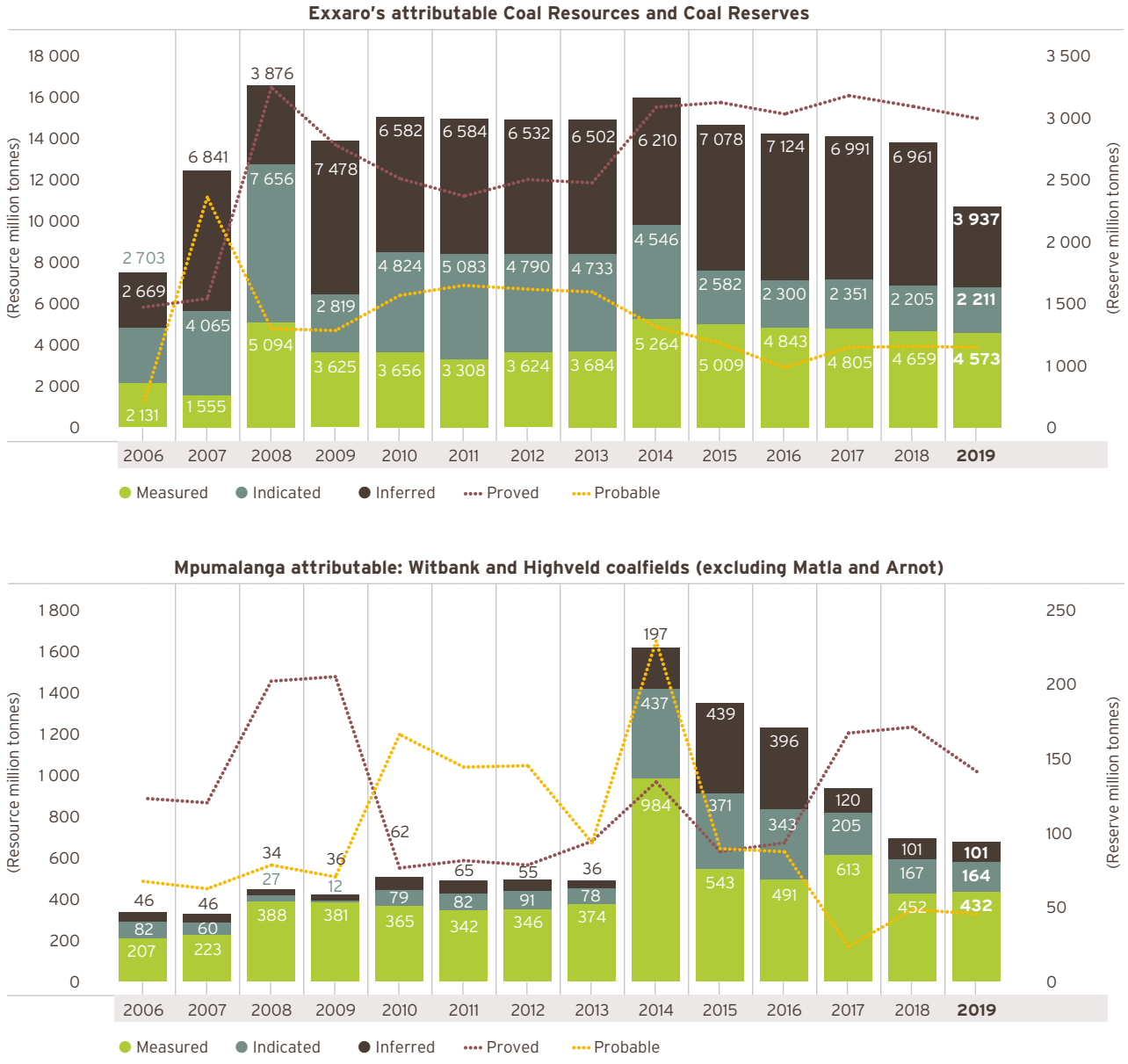
Figure 1: Locations of our coal operations and projects

Overview of Coal Resource and Coal Reserve estimates

continued

The significant change in Coal Resources from 2018 to 2019 is the result of the decision to relinquish the Waterberg North and South prospecting rights.

Figure 2: Exxaro estimates over time



Notes

- *Resource estimations are based on the latest available geological models, which incorporate new validated geological information and, if applicable, revised seam, Resource definitions and Resource classifications. For the 2019 reporting cycle, estimates reported are derived from actual mining up to the end of October, incorporating the planned estimates for November and December.*
- *Resource and Reserve estimates in our statements are quoted in full, irrespective of Exxaro shareholding. Exxaro attributable tonnage is clearly presented in Table 4 and, when used in our report, always clearly defined as such.*
- *Rounding off of figures quoted may result in minor computational discrepancies although it is not deemed significant.*

During 2018, Exxaro cautioned the market that the group was considering options relating to four prospecting rights grouped into two projects, namely Waterberg North and South. The projects are located approximately 30km north of Grootegeluk, and consist of 2 147Mt and 869Mt of Inferred Coal Resources respectively.

This year, following in-depth discussions concerning the strategic alignment of these prospecting rights, a decision was taken to relinquish them, resulting in the Exxaro total attributable Coal Resource decreasing by approximately 22%. The prospecting rights are in closure and we are responsibly conducting all activities to ensure we fulfil the necessary closure requirements.

Furthermore, during the course of the year, total Exxaro attributable Coal Reserves decreased by approximately 3%. The Coal Reserve for the Forzando operation, which forms part of the ECC Complex, decreased by approximately 37% for the reporting year. The most significant contributors to the decrease are mining, review of macro-economic assumptions and areas excluded due to unfavourable floor gradients.

Changes in Coal Reserves larger than 10% (material) are also reported at the Matla and Leeuwpan operations. The approximate 13% decrease at Leeuwpan is primarily the result of mining whereas the 14% decrease at Matla is due to mining and the disposal of mining areas related to unfavourable stooping conditions in close proximity to surface infrastructure. For all other operations, other than normal LoM depletion, no material changes to Mineral Resource and Mineral Reserve estimates are reported.

Unlocking value

In 2019, we continued to focus on unlocking value at our operations. We are acutely aware that our success as a mining company is built on the integrity of our Coal Resources and the effectiveness with which we convert these resources to Coal Reserves, and then the exploitation and extraction of these Reserves.

Increasing level of geoscientific knowledge and confidence

Considering mining, metallurgical, processing, infrastructural, economic, marketing, legal, environmental, social and governmental modifying factors

Coal Resources	UNLOCKING VALUE	Coal Reserves
Continuously improving our level of geoscientific understanding, minimising risk and unlocking opportunities	Modifying factors and our ability to extract our Mineral Resources. Increasing extraction through innovation and knowledge	Optimising our plans to create the best fit-for-market use. Optimised LoM plans
Executing integrated exploration plans at the Dorstfontein, Forzando, Matla, Belfast, Grootegeluk and Leeuwpan mines	Application of a geometallurgical approach to multi-bench mining at Grootegeluk	Update of LoM for Matla, Belfast and Leeuwpan mines
Update of geological and structural models at the Matla, Grootegeluk and Leeuwpan mines	Implementation of the autonomous drilling strategy at Grootegeluk	Initiation of Matla north-west access incline and decline projects
Consideration of geological risk in conditional-based mine planning at Matla and ECC		

INNOVATION

Optimising centrally managed geological and hydrogeological databases	Continuous radar scanning for slope stability monitoring	Implementation of the opencast coal solution (OCCS) and the underground coal solution (UGCS) for the development of mine layouts and mine schedules
Pit scanning for the use of geotechnical and structural interpretations	Terrestrial lidar scanning of pit faces to enhance reconciliation and Resource use	
Surveying holes using optical televiewer (OTV), acoustic televiewer (ATV) and sonic to obtain geotechnical information on the rock mass		

GOVERNANCE

From 2017, we aligned our reporting with SAMREC 2016 and JSE 2016 amendments for minimum contents of annual reports and have subsequently updated our LoM mineral assets policies and estimation procedures. We have updated our internal competent persons reports (CPRs) for 2017, 2018 and 2019 to accommodate the SAMREC 2016 "if not, why not" principle. We have also reviewed and updated our functional procedures and created an overarching exploration standard for all operations and projects under Exxaro management.

ASSURANCE

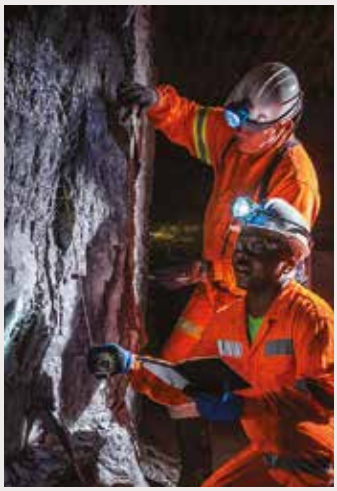
We have conducted tier 1 Resource reviews at Grootegeluk (in process), Matla and Leeuwpan as well as reviews on LoM plans of Matla, Belfast and Leeuwpan. Tier 2 technical reviews were conducted on Matla Mine 1 Relocation, Matla Mine 2 Incline, Matla Mine 3 Decline and the Dorstfontein East underground projects. We have conducted tier 3 (third-party) reviews at corporate centre and Matla mine. The outstanding external 2018 findings were resolved, and corporate centre and Matla received no findings in 2019. The CMRR report was peer reviewed for reporting compliance.

Overview of Coal Resource and Coal Reserve estimates

continued

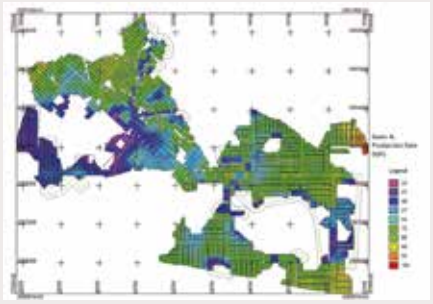
Unlocking value through innovative thinking and technology

Case study: ECC's Dorstfontein West underground operation



The Dorstfontein West underground future operational life beyond the exhaustion of number 2 coal seam (S2) is premised on the exploitation of number 4 (lower) (S4L) coal seam. The S4L has an average seam height of 3m, which allows for higher run-of-mine (RoM) production rate per section compared with mining from the lower seam heights of the S2 albeit with somewhat lower coal qualities. A project was initiated in 2019 whereby the S4 was successfully accessed from existing S2 underground infrastructure. Two parallel 7m-wide and 2m-high inclines with a slope of six degrees, connected by six crosscuts, were developed by the Dorstfontein drill-and-blast stone development team. A 500 tonne bunker was developed between S4 and S2 to provide RoM coal surge capacity for the higher RoM coal production rate and to feed onto the existing conveyor systems from S2 infrastructure to surface. A concurrent expansion of the coal washing plant was implemented to accommodate the consequential higher RoM coal production rates levels of ~1.8Mtpa from the three continuous miner sections. This entails retaining a bypass of ~15% of the fine RoM coal directly to product but segmenting the coarser coal flow by size fraction between a new small coal plant and the existing drum and cyclone plants. The new small coal plant consists of cyclone and spiral modules. The higher production rates required upgrading of the load-out area including a stacker, roads and weighbridge as well as an extension of the discard storage facilities. We thus unlocked a significant S4 Coal Resource and associated Coal Reserve. The project was successfully implemented and the operation is currently extracting coal from the newly developed mine infrastructure.

Case study: Geological risk considered for conditional-based mine planning



ECC operations are characterised by areas that have been greatly affected by dolerite activity, which present in the form of dykes and sills. In addition, floor undulations and steep gradients present challenges, especially in the underground operations. These features tend to be more prevalent along paleo highs and near dolerite structures, and pose a risk to safety and effective coal extraction. ECC employs an exploration strategy to proactively and accurately predict the extent of these challenging geological features. The exploration strategy adopts an integrated approach with the investigation, identification and delineation of possible challenging features associated with the future exploitation of Coal Reserves.

Identified features applicable to Resource accessibility, mine-ability (roof/floor conditions) and Coal Resource characterisation (coal seam thickness and quality variability) are captured in our risk and opportunity domain analysis (RODA). Areas are identified and assigned higher geological loss through the application of querying and modelling techniques within the GIS-based RODA. The RODA is then considered during mine planning, influencing the orientation of mining layouts, mining tempos, production volumes, cutting rates, and associated mining and rehabilitation costs aligned with the identified risks or restricted zones. Areas perceived as low risk, if not already defined as Reserves, are highlighted and investigated as opportunities for inclusion in the future.

Case study: Optimisation of proactive mine planning

For the development of LoM plans, the mining department is transitioning from Runge's Xpac to the new Runge software solutions, namely OCCS and UGCS for the development of mine layouts and mine schedules. These tools shorten the development time and reduce the need to convert information from one software package to another, thus enabling the department to develop more scenarios than in the past, improving the selection process when finalising the LoM plans. The OCCS software has been implemented at Belfast coal mine and test work is being done with the UGCS to determine if this product can address the needs of the organisation. The test work has shown positive results and further development is currently being rolled out.

Case study: Seamless data management of geological information

Exxaro has embarked on establishing a centralised geological system (acQuire) to ensure the integrity and security of our geoscientific data. The solution offers improved integration between the various geoscientific disciplines (geology, geotechnical and geophysical information) and the potential to have almost real-time information. Similarly EQuIS software has successfully been implemented for the monitoring and management of geohydrological information, and it will be fully autonomous. Both systems are cloud-based with web integration and the capability for direct field capturing. The majority of the validations are at the point of capture to ensure compliance with established business rules. The principle is that the databases form a single source for all business decisions relating to geoscientific information going forward.

Unlocking value in the estimation process

The purpose of LoM planning underlying our Resource and Reserve estimation is to unlock maximum value from the coal in the ground for Exxaro, taking margin and net value into consideration. Each orebody has a unique mining methodology, processing parameters and targeted market segment that deliver maximum value to shareholders. This is impacted by updated Resource information, developments in mining and processing technology and changes in market dynamics.

Consequently, the optimum exploitation strategy needs to be continually reviewed to ensure applicable Resources reach the most lucrative markets. This ongoing iterative process is illustrated below. A relentless drive to reduce the environmental footprint of operations is embedded in the process, and the continuous impact of the evolving legislative landscape is reflected in designs.

Figure 3: Resource-to-market model

Our consolidated Mineral Resource and Mineral Reserve report

The content of this report is compiled from detailed independent reports received from appointed competent persons at our various operations and projects, and available on request from the group company secretary. The reported Coal Resources and Coal Reserves presented are therefore summarised versions of these reports.

The information in the Consolidated Mineral Resource and Mineral Reserve Report (CMRR) is aligned with the JSE Listings Requirements (section 12) and includes information on reporting governance, competence, tenure, risk, liabilities, exploration and assurance as well as auxiliary descriptions of applicable projects, operations and exploration activities.

In addition, each operation and project maintains an individual competent person's report (CPR) that encapsulates the systematic and detailed estimation process conducted or supervised by that person. These reports are aligned with the checklist and guideline of the reporting and assessment criteria of the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC 2016), and scrutinised and updated when required. Exxaro continuously examines various aspects of the Coal Resource and Coal Reserve estimation process and we have revised and aligned our reporting with the guidelines of SAMREC 2016.

Our reporting principles

Exxaro is committed to the principles of materiality, transparency and competence, and continuously strives to enhance the level of estimating and reporting of Coal Resources and Coal Reserves.

We provide all **relevant information** that **investors** and their **professional advisers** would reasonably require, and expect to find, to make a **reasoned and balanced judgement**

We provide **sufficient**, **clear** and **unambiguous information**

We have **qualified** and **experienced competent persons** who are subject to an **enforceable professional code of ethics**

How we report

The annual estimation and reporting process is managed through the Exxaro geosciences policy and associated Coal Resource and Coal Reserve reporting and LoM procedures. The documents dictate technical requirements for estimation and reporting, and include guidelines on methodologies, templates and assurance.

The policy and procedures are aligned with the guidelines of the SAMREC Code 2016 and, for South African coal reporting, SANS 10320:2004. Processes and calculations associated with the estimation process have been audited by internal competent persons and external consultants when deemed applicable. For mines or projects in which Exxaro does not hold the controlling interest, figures have been compiled by competent persons from the applicable companies and are not audited by Exxaro.

Resource estimations are based on the latest available geological models, which incorporate all new validated geological information and, if applicable, revised seam, Resource definitions and Resource classifications. For Exxaro operations and projects, we use a systematic review process that measures the level of maturity of exploration work done, extent of geological potential, mineability, licence-to-operate considerations and associated geological risks/opportunities to establish eventual extraction. We have enhanced our methodology to ensure that all factors for reasonable and realistic prospects for eventual and economic extraction, as outlined in Table 1 (4.3) of SAMREC 2016, have been reasonably considered.

For Exxaro's Coal Resources, the location, quantity, quality and continuity of geology are known to varying degrees of confidence and continuously tested through exploration activities such as geophysical surveys, drilling and bulk sampling. Coal Resources are classified into Inferred, Indicated or Measured categories, based on the degree of geological confidence. Distribution of points of observation (drilling positions and trenches, among others), quality assurance and quality control in sample collection and evaluation of structural complexities are considered in classifying Resources. An annually compiled exploration strategy outlines activity planned to investigate areas of low confidence and/or geological or structural complexities to ensure Resources of a high level of geological confidence are considered for mine planning.

Coal Reserves are estimated using relevant modifying factors at the time of reporting (mining, metallurgical, processing, infrastructure, economic, marketing, legal, environmental, social and governmental requirements). Modifying factors are reviewed before and after Reserve estimation by the persons responsible for ensuring all factors are timeously and appropriately considered. Signed-off Reserve fact packs that record losses, recoveries/yields, cost, commodity prices, exchange rates and other required factors applied, are documented in each LoM plan and independent competent person's report.

Reported Coal Reserves are derived from Indicated and Measured Coal Resources although limited Inferred Resources may be included in the LoM plan at the discretion of the competent person but not converted to Coal Reserves. These inclusions are scrutinised, tested, documented and their impacts are known.

Environmental management, including applicable authorisations that support our estimates, closure plans, allocated funding and associated risks are discussed in detail in the Exxaro ESG report at https://www.exxaro.com/investor/integrated-reports2019/esg/index.php.

Our Mineral Resources and Mineral Reserves statement

The Mineral Resources and Mineral Reserves summarised on pages 12 to 15 are reported as those remaining on 31 December 2019 and compared with the corresponding estimates reported on 31 December 2018. Mineral Resources are reported including Mineral Resources that have been converted to Mineral Reserves and at 100% Exxaro ownership, irrespective of the individual operation or project's attributable shareholding. We do, however, also report Mineral Resources that fall within our LoM plan to enhance transparency. An exception is our reporting for Gamsberg and Black Mountain as Base Metal figures from Vedanta Resources represent Resources excluding those Mineral Resources converted to Mineral Reserves.

It is important to note that reported estimates are not an inventory of all mineral occurrences identified but a reasonable estimate of those which, under assumed and justifiable technical, environmental, legal and economic conditions, may be economically extractable at present (Mineral Reserves) and eventually in future (Mineral Resources).

Mineral Resources and Mineral Reserves are estimated on an operational or project basis and in line with the SAMREC Code for African properties, except for Vedanta's property, and the JORC Code 2012 for Australian and Vedanta properties. For Coal Resources and Coal Reserves under Exxaro management's control, estimation is in line with the South African National Standard: South African guide to the systematic evaluation of Coal Resources and Coal Reserves (SANS 10320:2004).

Comprehensive information on each operation under Exxaro management's control that supports the Coal Resource and Coal Reserve estimates is provided in the ancillary section of this report.

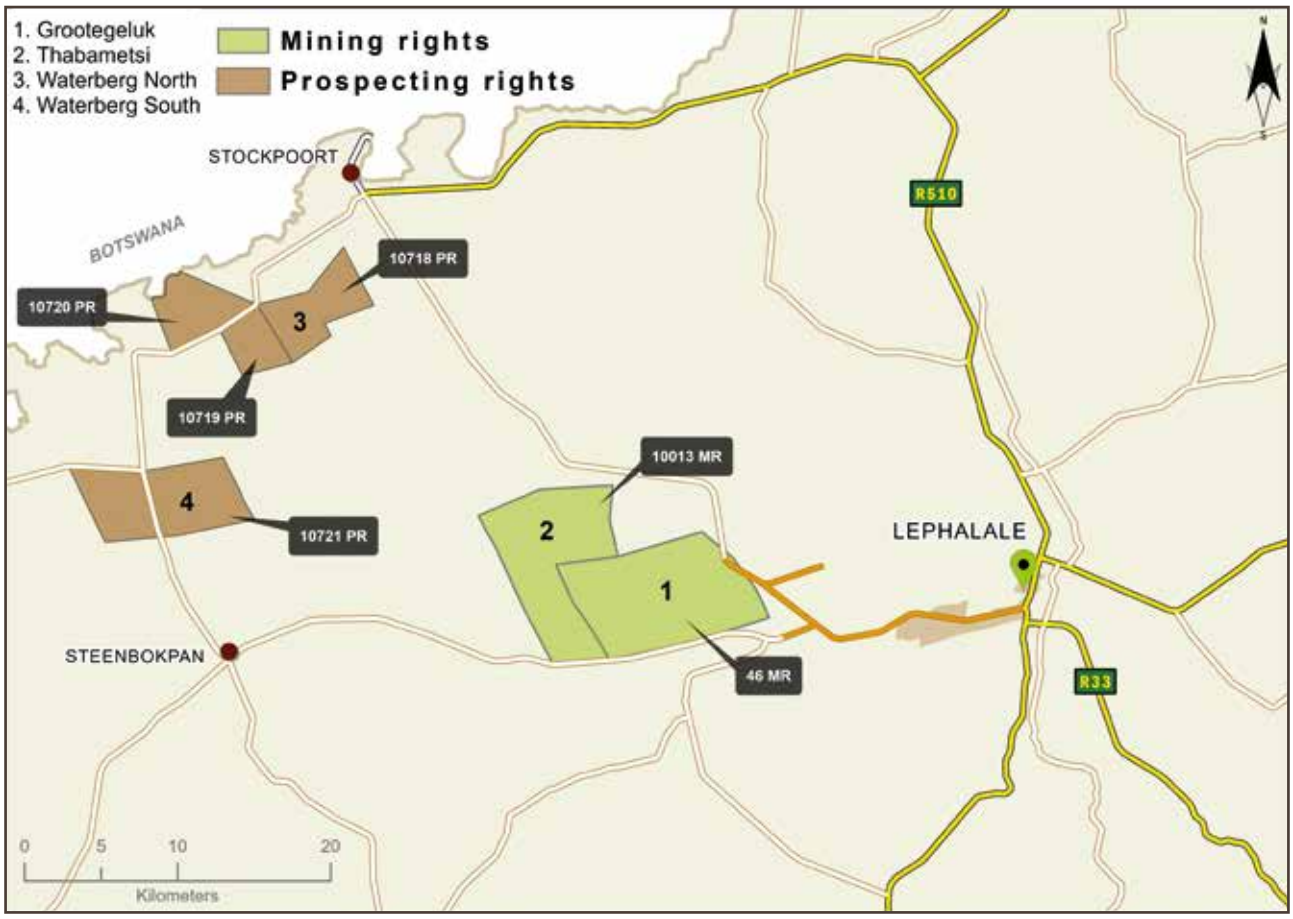
Limpopo

Grootegeluk coal mine: At Exxaro's flagship open-pit coal mine producing power-station coal, variously sized metallurgical coal products as well as semi-soft coking coal to local and international customers, there is no material change in the 2019 reporting period.

Thabametsi coal project: At the Thabametsi mining right, an area adjacent to the Grootegeluk operation is earmarked to produce power-station coal to supply a mine-mouth feed independent power producer (IPP) plant. Exxaro is currently ensuring that all compliance actions are executed hence no changes to the Coal Resource or Coal Reserve estimates are reported.

Waterberg North and Waterberg South projects: Four prospecting rights that constitute the two projects areas are in closure and we are conducting all activities in a responsible manner to fulfil the closure requirements.

Figure 4: Exxaro's mining and prospecting rights in the Waterberg



Supplementary notes

The Grootegeluk surface coal-mining operation consists of a series of parallel benches advancing progressively across the deposit via a process of drilling, blasting, loading and hauling with truck and shovel fleets. The mining bench definitions in the Vryheid and overlying Volksrust formations coincide with the geological boundaries, resulting in 14 mining benches for saleable products and waste. Mining during the reporting year is reported as 56.2Mt RoM of which approximately 2.4Mt consists of semi-soft coking coal, 1.6Mt metallurgical coal and largest portion of power-station coal (approximately 24.5Mt) dispatched to the Matimba and Medupi power stations.

Geological challenges, as already noted in 2018, are increasing as the mine advances to the west. The upper top benches are thinning and will eventually discontinue due to weathering with only a small portion of bench 2 remaining in the next few years. Weathering is highly irregular, specifically in faulted areas, and impacts mining as well as disrupting downstream beneficiation plant throughput. An increase in faulting, in offset and frequency, is observed within but also to the south and north of the current pit. For the first time, a fault-defined graben structure was encountered within the pit, which presents a risk to the execution of the short-term mine plan and for the routing of the correct RoM to the appropriate coal-handling facilities. Continuous pit mapping, downhole geophysical surveys of all holes, including blast holes, as well as close-spaced infill drilling are employed to target these geological challenges. This high-resolution information enabled the operational team to proactively plan and largely mitigate the geological challenges. During 2019, a significant number of openholes were also drilled, roughly 100m apart and positioned on 250m-spaced north-south profile lines in front of the advancing pit. The aim of the holes was to intersect the overburden as well as the full succession of the Vryheid (multi-seam) and Volksrust (thick-interbedded) coal formations to supplement the existing exploration information. The results delivered significant value regarding overburden characterisation and increased the level of confidence of the geological structures, and the accuracy of our bench/seam definitions in the two formations. The profile drilling will continue in 2020 and beyond, based on the success of the results achieved.

The geological model of Grootegeluk is updated every second year, and information from drilling campaigns in 2017/2018 was included in a geological model update, which is currently being used for the review of the Grootegeluk exploitation strategy. The strategy is considering several potential optimisation scenarios, including a review of the current pit turnaround and backfill strategies as well as the bench definitions to optimise bench height for floor control and decreasing mining losses. The Grootegeluk integrated water use management strategy is progressing well in addressing all water-related aspects to provide a strategy for the optimal use of water throughout the value chain. This project will integrate with the exploitation strategy and is expected to enhance water use and water accumulation within the pit significantly. A study initiated in 2018 to review mining of the significant amount of overburden is in progress. The project investigated a number of options to replace the existing load-and-haul mining method with a more cost-effective alternative by considering mining and transporting overburden material via a bulk-materials handling system. The prefeasibility study is still under way to identify the preferred alternative.

Mpumalanga

Arnot coal mine: In closure, consent has been received for cession of the mining right.

Matla coal mine: An Eskom-tied underground mine, approvals have been received to execute three expansion projects, namely Matla Mine 1, Mine 2 Incline and Mine 3 Decline to access the large remaining 4 seam and 2 seam underground Coal Reserves. The decline at Matla 3 is in progress and Matla Mine 1 relocation was initiated with first coal expected in the fourth quarter of 2022.

Leeuwpan coal mine: Mining of the OI open-pit reserve area is progressing well.

Belfast coal mine: Early coal was produced in the second quarter, commissioning of the coal-handling facility in the third quarter and the first export coal product in early September of the reporting year.

ECC: The Dorstfontein West Mine Incline to access 4 seam Coal Reserves from existing mining infrastructure has been completed. Mining of 4 seam is progressing well. A study was successfully completed at Dorstfontein East to obtain access to 4 seam lower Coal Reserves through five portals in the current pit 2 open area.

Supplementary notes

Arnot, an Eskom-tied mine, is in closure after the coal-supply agreement (CSA) with Eskom ended on 31 December 2015. The mine produced thermal coal for over 40 years, using various mining methods, predominantly bord-and-pillar (currently mechanical), opencasting and shortwalling between 1995 and 2005. Exxaro received consent in May 2019 for cession of the mining right to a consortium that will benefit its former employees. Exxaro has reasonable expectation that the transfer will be completed in the first quarter of 2020.

Matla, an Eskom-tied underground operation, extracts coal through three underground mines. Matla extracts 2 seam select and the lower-quality but somewhat thicker 4 seam in a specific scheduled relationship to blend and honour the volume and quality requirements of the Eskom agreement. It is therefore of the utmost importance to have adequate access to quality Coal Reserves to ensure the correct volumes are scheduled for the short, medium and long-term strategies. Both coal seams' mineable Reserves are rapidly diminishing within mines 2 and 3 and the unfortunate closure of Mine 1 due to pillar instability in 2015 placing a burden on the operation to comply with contractual expectations. However, Exxaro has, since closure of Mine 1, accelerated exploration and outlined 2 seam and 4 seam Coal Resources that will be accessed through either new or existing infrastructure.

During this time, annual mining targets were supplemented by the identification of additional potential mineable areas, prioritising exploration activities, and through innovative and adaptable mine planning extract the additional required Coal Reserves. Exploitation of the Mine 3 low coal seam is a clear example of this successful undertaking.

The outcome of the studies to secure long-term Coal Resources resulted in a number of expansion projects. The first was the completion of a relocation investigation that entails developing a new box-cut and tunnels to access the remaining Mine 1, 4 seam Coal Reserves. The study was approved and is currently under construction, expecting first coal in the fourth

Our Mineral Resources and Mineral Reserves statement

continued

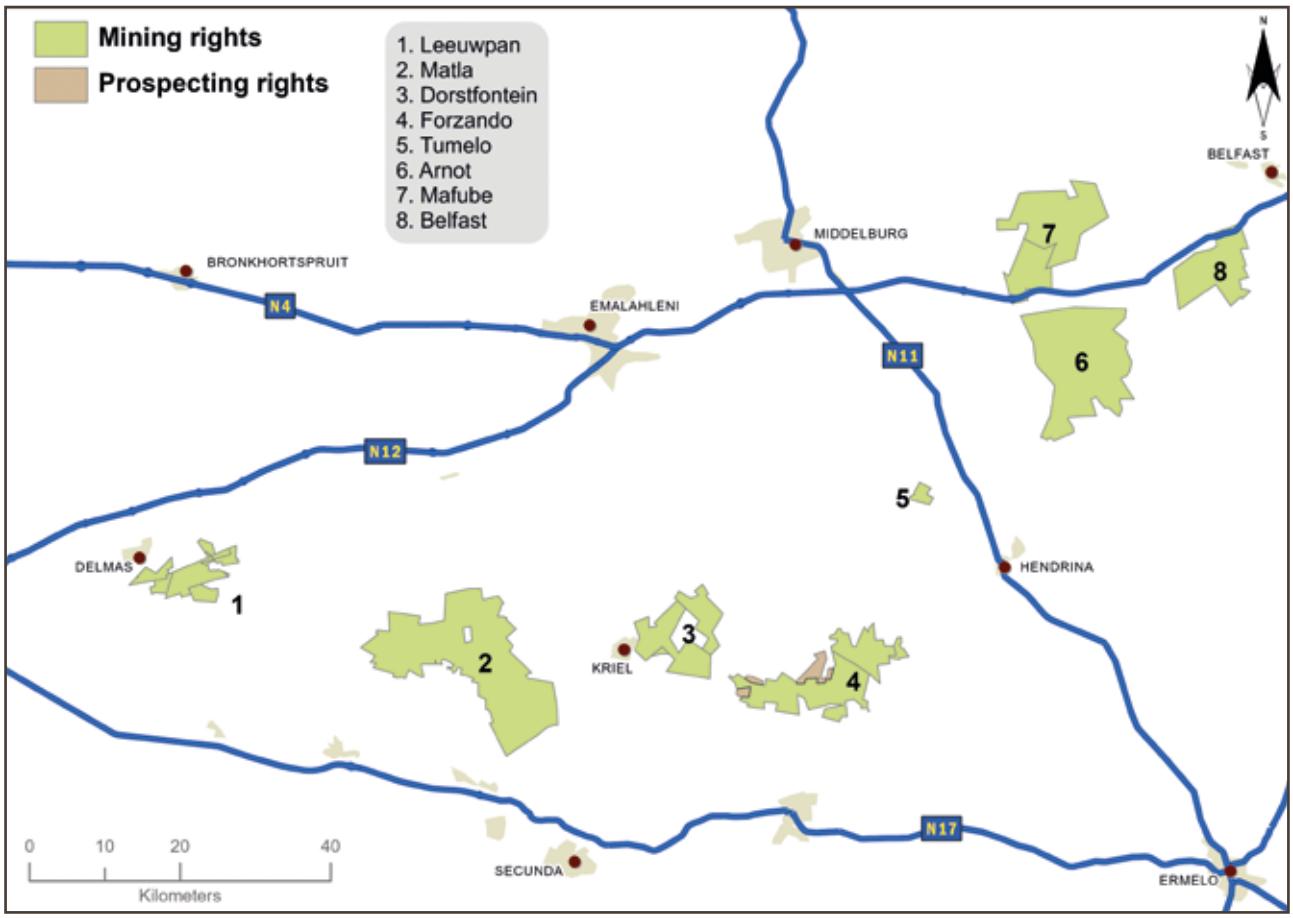
quarter of 2022. The 4 seam shows consistent continuity in thickness and quality although a number of geological challenges relating to faulting, associated dolerite intrusions and seam floor undulation were identified within the larger project area. The challenges were investigated and subsequently considered during mine planning. The geological challenges will be further investigated through vertical and incline drilling with supplementary surface geophysical surveys in 2020. An important activity to highlight is the continuous assessment of geotechnical accessibility to ensure that all Coal Resources can be accessed in future and successfully converted to Coal Reserves.

Two additional expansion projects, consisting of a decline and incline (respectively) below and above current workings at mines 2 and 3 were approved by Eskom, unlocking seams 2 and 4 Coal Reserves. The decline at Mine 3 with the associated vent shaft, is under construction and first coal is expected in the second quarter of 2020. Matla accesses Coal Reserves under challenging geological and mining conditions. Thinning coal seams, variability in coal quality and roof conditions due to the impact of intrusive dykes and sills, as well as geological faulting, present challenges for coal extraction in a number of mining sections. Focused exploration activities, including surface and downhole geophysical surveys and vertical and horizontal drilling, are employed to proactively outline the impacts on mine planning. Directional surface to seam drilling will be implemented for the first time to investigate a number of prominent geological faults in the Mine 2 Incline project area. The drill rig will be located on two positions where it will drill a number of trails to specifically derisk the planned main developments. The geological model was updated during the reporting year resulting in minor Coal Resource changes. These changes, mining depletion and the disposal of stooping areas to protect surface infrastructure were the primary contributors to Coal Reserve changes. A submission for the renewal of the Matla mining right was submitted on time during the reporting year and Exxaro has reasonable expectation that the approval will be granted.

In line with Exxaro's commitment to unlock value, an expansion project to extend the LoM of **Leeuwpan**, an open-pit operation in Delmas, Mpumalanga, by 10 years was implemented in 2018. The updated plan incorporates changes in the price structure of the export market with higher prices for lower-energy products leading to higher yields. The road relocation and box-cut of the expansion project were successfully concluded and mining was conducted from the OI pit during the reporting year. An investigation surrounding the OI Reserve resulted in unlocking additional Coal Resources (~2.7Mt) included as Probable Reserves in the LoM until all environmental approvals are secured.

Detailed infill geological investigations and mine planning at the new **Belfast** coal mine resulted in the successful opening of two box-cuts from which coal was extracted from early March in the reporting year. Results from infill drilling successfully outline the depth of weathering and minimised

Figure 5: Exxaro's mining and prospecting rights in Mpumalanga



RoM coal losses during box-cut development. In addition, RoM coal qualities corresponded very well with the predicted coal qualities underpinning the importance of adequate infill drilling during box-cut positioning and design. Additional drilling was conducted to define the depth of weathering along the mine plan edges as well as to confirm a number of seam variability anomalies. Coal Resources occur within most of the mining right whereas the Coal Reserve is limited to the southern mining right area aligned with the existing LoM plan. A project was initiated in 2019 to review the exploitation strategy, including investigation of the economic viability of the northern area.

The dense medium separation plant was successfully implemented in the third quarter of the reporting period, producing the first export coal product in early September. The Belfast operation is earmarked for RoM of 3.25Mpta, increasing to 4.1Mpta in 2023. The operation is focused on a digital and connected approach, resulting in an integrated and focused workforce driving key work packages for successful early commissioning of the operation.

The **ECC complex** comprises the Dorstfontein, Forzando and Tumelo operations (Figure 5). The complex comprises DCMW (West), an underground mine, and DCME (East), an opencast operation, as well as Rietkuil (Vhakoni), an adjacent project awaiting approval. The DCMW 4 seam Incline project was implemented in 2018, unlocking 4 seam's lower (S4L) Coal Reserves through an incline in existing mine infrastructure. After the successful development of the incline, mining of the 4 seam coal began and is progressing well. Coal extraction from DCME was executed from open-pits 1 and 2 during the reporting year. A study was initiated to access the substantial 4 seam Coal Resource to the west of the open-pit areas through underground mining. All technical and legal aspects, to obtain access through five portals in the current pit 2 open-pit area, have been addressed and implementation has begun.

The Forzando complex (FZO), part of ECC, is 10km north of Bethal, and just south of the Dorstfontein complex. FZO comprises two underground mines, Forzando North (FZON) and Forzando South (FZOS), and both mining rights were executed in 2013 for a period of 16 years. In 2018, some historical workings were successfully accessed at FZON (under care and maintenance since 2014) to add to the overall product mix. However, adverse macro-economic assumptions, as well as areas excluded due to unfavourable floor gradients negatively impacted the Coal Reserve and the LoM plan. Mining in general is affected by geological faulting and dolerite (sill and dyke) activity, resulting in poor roof conditions and restricting access to potential Resource areas. However, these challenges are thoroughly investigated through focused infill drilling and effective grade-control, and results are accommodated in future mine planning.

Prospecting and mining tenement information

Coal Resources and Coal Reserves quoted for Exxaro-managed assets fall within existing Exxaro mining or prospecting rights.

Rights are of sufficient duration (or convey a legal right to convert or renew for sufficient duration) to enable all Reserves to be mined in line with current production schedules. The only exceptions are Grootegeluk (granted in April 2009 for 30 years), Thabametsi (granted in 2016 for 30 years), Matla (granted in November 2009 for 10 years), Dorstfontein (granted in December 2006 for 30 years) and Forzando (granted in November 2011 for 16 years) where adequate Coal Reserves exist for life-of-mine (LoM) plans extending well beyond the period for which they were granted. Exxaro prospecting and mining authorisations are managed to ensure reporting compliance as required by the Mineral and Petroleum Resources Development Act and the National Environmental Management Act, 1998 (Act 107 of 1998).

The status of prospecting and mining rights indicating the right type, name, reference number, status, expiry date and ownership (percentage attributable to Exxaro) is presented in Table 79 and Table 80 (Appendix A). The prospecting and mining right boundaries are also outlined in the discussion of individual operations and projects in the ancillary section.

Mpumalanga

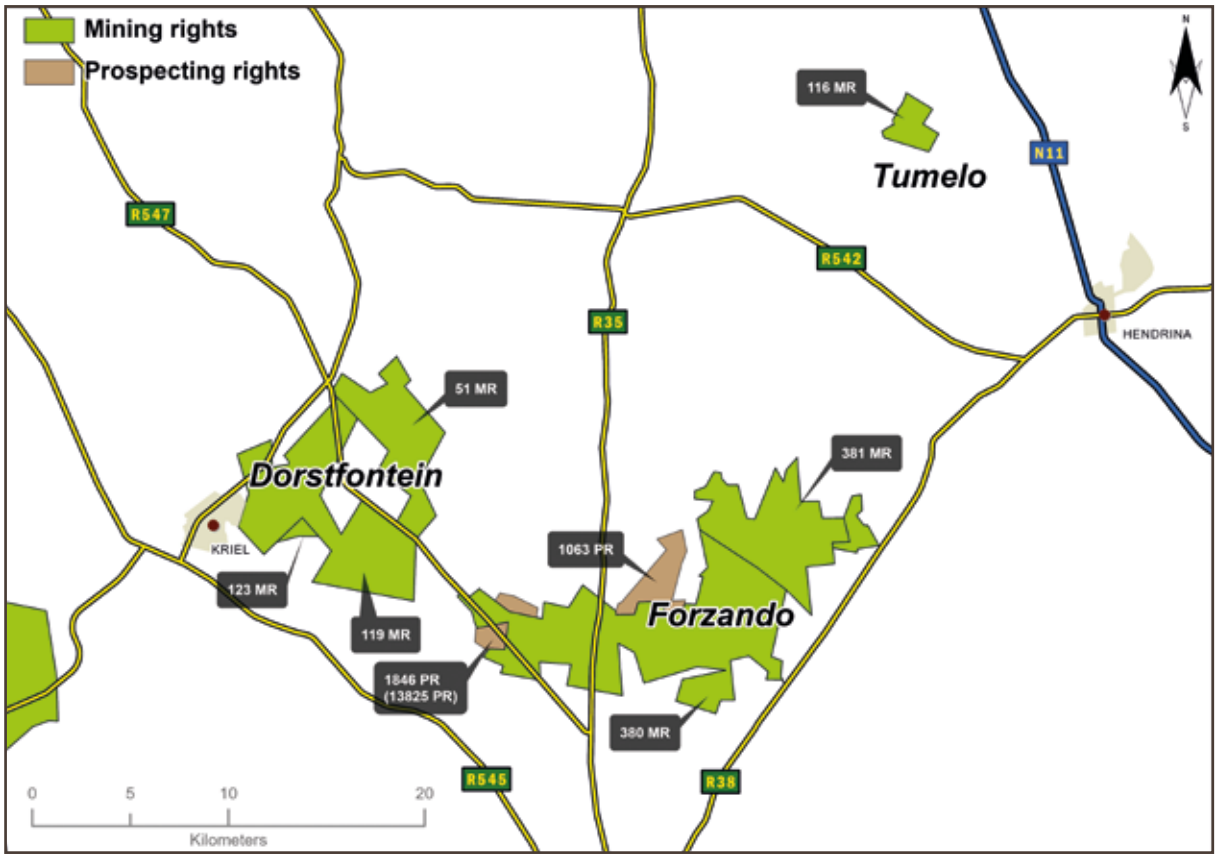
Exxaro manages several operations in Mpumalanga (Figure 5 on page 14).

Arnot is currently under care and maintenance. The converted mining right is executed but registration is pending. The right was timeously submitted for registration but referred to correct historical property-naming conventions. The corrections were made, and the right was resubmitted for registration. In May 2019, Exxaro received consent from the Minister of Mineral Resources and Energy, in terms of section 11 of the Mineral and Petroleum Resources Development Act, for cession of the mining right for the Arnot coal mine to a consortium that will benefit its former employees following the expiry of the CSA with Eskom in 2015. The transfer of the mining right has not yet been completed as some conditions precedent are in the process of conclusion. Exxaro has reasonable expectation that the outstanding conditions will be achieved in the first quarter of 2020.

Matla's mining right lapsed in November 2019 and a fully compliant mining right renewal application was timeously submitted in August 2019. Exxaro has reasonable expectation that the right will be granted.

The converted mining right and adjacent new mining right at **Leeuwpan** mine have been executed and registered. Approval of ministerial consent (section 102 of the Mineral and Petroleum Resources Development Act) submitted to amalgamate the two rights has been granted, and execution is pending.

Figure 6: Locality map for ECC mining and prospecting rights



The **ECC complex** comprises the Dorstfontein, Forzando and Tumelo operations.

The Dorstfontein complex comprises three mining rights. The mining rights of Dorstfontein West (123MR executed in June 2012), Dorstfontein West and Vlakfontein (119MR executed in June 2012) and Dorstfontein East (51MR executed in December 2006) were granted for 30 years. The prospecting right of Rietkuil Vhakoni (1916PR) is currently under review.

The Forzando complex comprises two mining rights, Forzando South (380MR) and Forzando North (381MR), both granted in November 2011 for 16 years. Applications to renew the prospecting right of Legdaar (1846PR) and Vlaklaagte (1140PR) were timeously submitted and approvals are pending. The Kalabasfontein prospecting rights (1170PR and 1035PR) are currently under review.

ECC also holds a 49% interest in the prospecting right of Schurvekop (1063PR) with Mmakau Coal as the majority owner. A mining right was submitted by Mmakau Coal in 2016 and approval is pending.

The Tumelo mining right was registered in January 2013 and lapsed in 2015. A renewal was timeously submitted, approval was granted in early 2019 and executed in August 2019.

Limpopo

Exxaro manages the **Grootegeluk complex**, which includes Grootegeluk and the adjacent Thabametsi mining rights (Figure 4 on page 12).

The converted Grootegeluk mining right (46MR) was executed in March 2011 and registered in May 2012 for a period of 30 years.

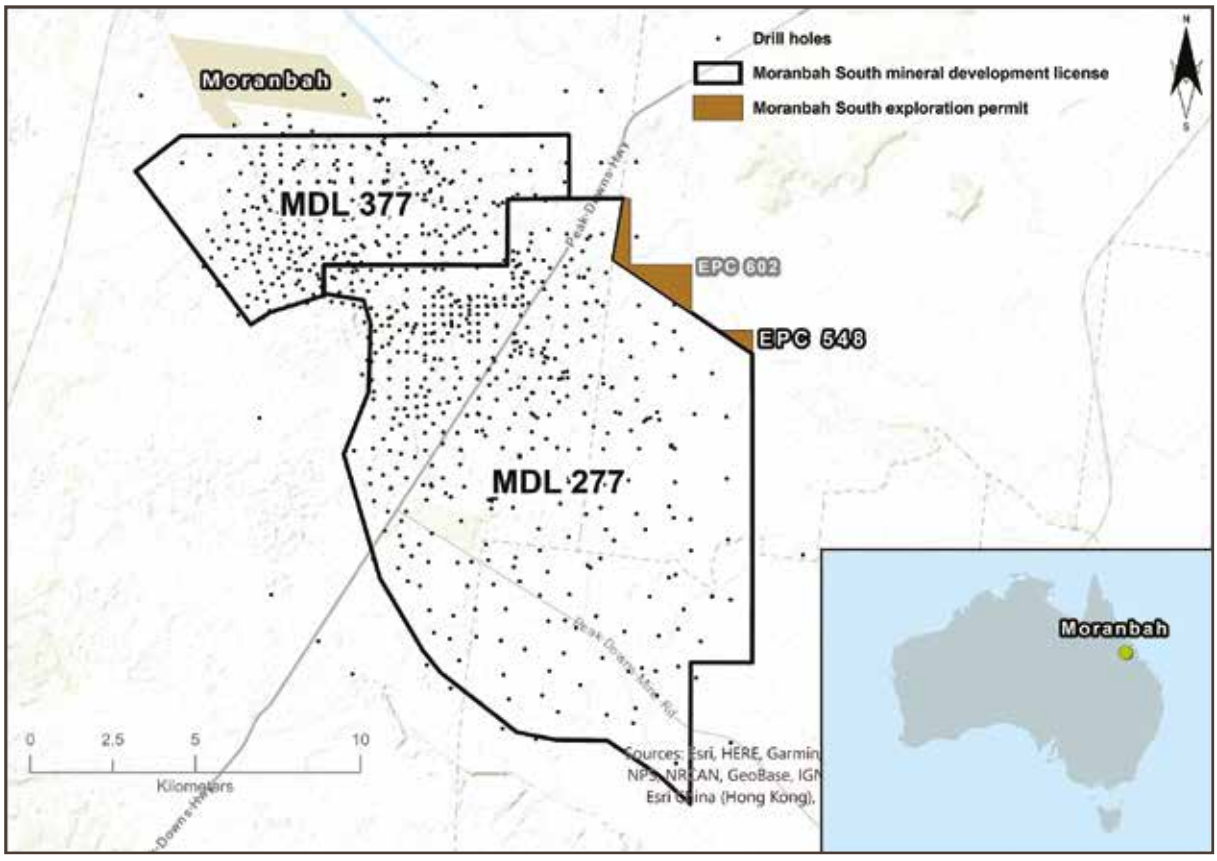
An approval for ministerial consent (section 102 of the Mineral and Petroleum Resources Development Act) was submitted in September 2017 to include two mine dump areas that currently fall outside the mining right. This consent has been granted and execution is pending. Thabametsi, a development adjacent to Grootegeluk, was granted a mining right (10013MR) for 30 years. The mining right was executed in June 2016 and registered in July 2016.

The Waterberg prospecting rights are grouped in two projects: Waterberg North and Waterberg South. All the Waterberg North prospecting rights (Pentonville: 10719PR, Carolina: 10718PR and Dartmoore: 10720PR) as well as the Waterberg South prospecting right (Swelpan: 10721PR) have been granted. Exxaro has, however, relinquished the rights and these projects are in closure.

Australia

The Moranbah South project area in Australia includes two mineral development licences (MDLs 277 and 377) and one exploration permit for coal (EPC 548). MDL 277 will expire in July 2021, MDL 377 in September 2023 and EPC 548 in February 2022. The Moranbah South project also previously included EPC 602. Renewal of EPC 602 was refused by the Department of Natural Resources, Mines and Energy and as a result expired on 31 December 2018. Since the granting of the MDLs, on-site exploration activities (drilling and seismic, among others) have focused within the areas of the MDLs. The area solely subject to EPC 602, deemed less prospective and not required for mining infrastructure, was not subject to on-site exploration activity or significant expenditure. Non-renewal of EPC 602 does not affect the Coal Resource estimate as tonnes were only reported within the MDLs.

Figure 7: Locality of the Australian MDLs and EPCs



Governance

The Exxaro annual estimation and reporting process is managed through the Exxaro geosciences and LoM policies and associated Coal Resource and Coal Reserve reporting and estimation procedures. Both policies and procedures are aligned with the guidelines of JSE section 12, SAMREC Code 2016 and, for South African coal reporting, SANS 10320:2004.

The policy and procedures dictate technical requirements for estimation and reporting, and include guidelines on methodologies, processes and deliverables. Procedures are also implemented for the geophysical, rock engineering, geotechnical, structural geology, tenure management, hydrogeological, exploration and mine-planning disciplines that prescribe methodologies and minimum standards for compliance.

To align with the SAMREC 2016 code, Exxaro has updated its internal competent persons' reports (CPRs) in 2017, 2018 and again in 2019. No material changes, as defined in the Code, have occurred but we considered the introduction of the "if not, why not" principle as significant enough to warrant the updates. The reports followed guidelines under Appendix A of SAMREC 2016.

Table 1: Exxaro reporting structure

Regulatory	Governance	Deliverables	Assurance
JSE Listings Requirements (section 12)	Geosciences policy	Annual Resource and Reserve estimation schedule	Annual review and update of procedures
2016 amendments to "minimum contents of annual report, point 12.13" were considered	*2018 update to align with our functional model strategy was considered*	*2019 estimation schedule for operations under Exxaro control was followed*	*2018 procedures and the 2019 updated exploration procedure were considered*
SAMREC Code (2016) Table 1	Exxaro Mineral Resource and Mineral Reserve reporting procedure	Mineral Reserve fact packs	Competent persons register update and review
2016 updated Table 1 was considered	*2019 update to include audit findings and recommendations*	*ECC, Matla, Grootegeluk and Leeuwpan fact packs containing all modifying factor considerations were updated*	*Updated for 2019*
SANS 10320:2004	Exxaro Mineral Resource estimation procedure	Annual operation/project Mineral Resource and Mineral Reserve report	Consolidated Mineral Resource and Mineral Reserve report review and lead competent person sign-off
SANS guidelines were considered	*2019 update to include audit recommendations*	*Competent persons reports were updated for operations under Exxaro management's control*	*Peer reviewed and corrections made*
JORC Code (2012)	Exxaro Mineral Reserve estimation (LoM) procedure	Consolidated Mineral Resource and Mineral Reserve report	Applicable competent person and technical team sign-off
	2019 update was considered	*Updated and incorporated 2019 review findings*	*Included in individual competent persons reports available on request*
		When required: Mineral Resource and Mineral Reserve competent person's report(s)	Internal review and external audit process
		Competent persons reports were updated for 2019 reporting period	*A number of internal and external audits were conducted in the reporting period. No material findings noted. The audits are discussed in the Risk and Assurance chapter*

Comments on 2019 estimation shown in italics

Competent persons

Exxaro applies three levels of "competency" to estimating Coal Resources and Coal Reserves:

- Competent person (as defined in the SAMREC and JORC codes) at each operation who officially take responsibility for estimating and reporting Coal Resources and/or Coal Reserves at operational or project level. These competent persons have been appointed and acknowledged acceptance of accountabilities. Names, qualifications, affiliations and relevant experience are included in the independent operational and project reports in the form of a competent persons' certificate.
- Technical specialists who contribute in any way to estimating Mineral Resources and/or Mineral Reserves are named in each operation's Mineral Resource and Mineral Reserve statement. Technical specialists could include geologists, mining engineers, geohydrologists, geotechnical engineers, financial experts and economists, among others. Technical specialists who contributed to estimating the operation's Coal Resources and Coal Reserves are included in the original competent persons' report documentation with their contributions specified, as well as their names and signatures.
- Person(s) designated to take corporate responsibility for the Mineral Resource and Mineral Reserve estimates presented in the consolidated report are clearly differentiated from the competent person at an operational level who takes overall corporate responsibility for the Mineral Resource and Mineral Reserve estimates presented in this report.

Exxaro's Coal Resources and Coal Reserves have been estimated or supervised by the competent persons listed in Table 82 (name, affiliation and relevant experience) on an operational basis in accordance with the SAMREC Code 2016 for South African properties and the JORC Code 2012 for Australian properties. All competent persons have sufficient relevant experience in the style of mineralisation, type of deposit and/or mining method(s) under consideration and/or being mined, and for the activity under their responsibility, to qualify as "competent persons", as defined in the applicable codes at the time of reporting.

The appointed competent persons have signed off their respective estimates in the original Mineral Resource and Mineral Reserve statements for the various operations, and consent to the inclusion of the information in this report in the form and context in which it appears in the consolidated Mineral Resource and Mineral Reserve report. Technical specialists who contributed to estimating the operation's Mineral Resources and Mineral Reserves are included in the original documentation where their contributions are specified, as well as their names and signatures.

The various appointed competent persons are either full-time employees at the operation (resident geologist or mineral resource manager) or, in the case of projects, the competent persons have conducted appropriate site visits to the mineral property being evaluated. All operations under Exxaro's control have been visited by the applicable competent persons.

Exxaro's lead competent persons are appointed by the management team. The Exxaro lead Mineral Resource competent person is Henk Lingenfelder, a member of the Geological Society of South Africa and registered (400038/11) with the South African Council for Natural Scientific Professions. He has a BSc (Hons) in geology and 24 years of experience as a geologist in coal, iron ore and industrial minerals.

The Exxaro lead Mineral Reserve competent person is Chris Ballot, a mining engineer registered (20060040) with the Engineering Council of South Africa. He has 23 years of experience in iron ore, mineral sands and coal in various technical and management roles.

Assurance

Tier 1

Mineral Resource and Mineral Reserve estimation is undertaken as per Exxaro's governance framework. Sign-offs are required at each stage and the process is **concluded** in a **formal sign-off session** by a panel comprising Exxaro lead **Mineral Resource and Mineral Reserve competent persons, competent persons, domain experts and technical specialists**. Technical **assurance** is managed in terms of **dedicated standards**.

Tier 2

Internal reviews are scheduled in a **three-year cycle**. The intention is to **verify compliance** with Exxaro's **governance framework** while **ensuring accountability** and **consequence management**.

Tier 3

External audits are scheduled in a **three-year cycle** or at the discretion of the lead competent persons and entail a **full review** of the **Mineral Resource and Mineral Reserve estimation process** from **borehole logging** to Mineral Reserve **evaluation**.

Assurance is implemented in terms of a three-tier system, aligned with the guidelines of Exxaro Mineral Resource and Mineral Reserve reporting procedure, summarised as follows.

In 2019, **tier 1** assurance was undertaken for the Matla and Leeuwpan coal mines. The Mineral Resource fact packs indicated that an update of the Coal Resource estimate was required either due to additional information being available or as recommended by previous audits. Geological data validation, data analysis and subsequent updating of geological and structural models were concluded in the reporting period for the two operations and the models were signed off by the applicable competent persons and their supporting technical teams. Conversely, the review of the exploitation strategy utilising the 2018/19 updated geological model at Grootegeluk mine is progressing. All aspects captured in the Coal Reserve fact pack were reviewed and signed off, and the review and subsequent update of the LoM plan is under way. All the Mineral Reserve fact packs were reviewed in the reporting year. The Matla and Leeuwpan LoM plans were reviewed and updated. In addition, the Belfast operation was reviewed, leading to optimisation of the Belfast LoM plan.

On **tier 2**, technical assurance on the Matla Mine 2 Incline and Matla 3 Decline and associated vent shaft as well as Matla Mine 1 were conducted in the reporting year. Detailed findings on definition level of the project were communicated and corrected. Findings resulted in the satisfactory updating of geotechnical studies in Mine 2 and Mine 3 development areas. The actions to address outstanding findings regarding specialist blasting, enhancing roof stability, at Mine 3 Decline and drilling to define geological faulting at Mine 2 Incline are under way and tracked. The implementation of the directional surface in seam drilling at Mine 2 forms part of this corrective measure.

The update of the geological structure model as well as the geotechnical study of the five portals that will be used to access S4 from pit 2 at Dorstfontein East were concluded, which signals finalisation of the outstanding Resource finding requirements. Recommendations on capital estimate and technical design were updated to Exxaro standards.

Assurance on the Grootegeluk in-pit crushing and conveyor project was concluded in the second quarter of 2019. A number of findings, including the accuracy level of the base-case truck requirements, benefits case and technical risks were highlighted, which resulted in rescoping of the project to consider the benefits of including coal and overburden in the study. The conclusion of this investigation is expected during the first quarter of 2020.

A review of the Belfast's Coal Resource, including exploration strategy, standards and procedures, data management, geological modelling, Resource estimation (including classification and reconciliation) and reporting, was conducted. No findings were noted that could materially impact (>10%) the reported Mineral Resource estimates. A number of minor findings related to SAMREC 2016 requirements, in terms of sampling chain of custody, were however documented. A response plan to address findings is being executed.

Table 2: Findings, impact and corrective measure for Belfast tier 2 review

Business unit		Finding	Impact	Risk	Corrective measure
Belfast	1	Unclear distinction between percussion boreholes and cored boreholes	Borehole information	Low	Address in 2019 by changing percussion borehole names
	2	Seam interpretations from downhole geophysical logs clearly indicated	Borehole information	Low	Will be addressed by clearly indicating adjusted borehole lithologies and seam interpretations
	3	Closely spaces boreholes used for modelling	Resource modelling	Low	An investigation will be undertaken in 2020 to determine the effect of the closely spaced boreholes and to consider when the model is rebuilt
	4	Anomalous quality values	Resource modelling	Low	Anomalous quality values will be investigated with an update of the geological model
	5	Difference between borehole collar elevation and DTM	Resource modelling	Low	An investigation will be undertaken in 2020 to verify and/or correct the collar information on some holes
	6	Consider faulting the geological model	Resource modelling	Low	The impact of faulting the geological model will be investigated and addressed according to the outcome
	7	Constrain Resource classification to existing Resource extent	Resource estimation	Low	Implemented with the updated geological model
	8	Small changes needed for the competent persons report to be fully SAMREC-compliant	Resource reporting	Low	It will be addressed in the 2020 competent persons report

On **tier 3**, in 2018, process audits were done by EY for the ECC, Grootegeluk and Forzando operations with 28 audit findings documented. We noted that none of the findings were critical (constitutes a material risk for the company). Most of the findings were concluded in early 2019 with the last findings, regular contact and discussions with coal analysis laboratories, correction of the competent persons' report template to reflect cross-referencing and coal-analysis quality assurance, quality-control protocols, concluded in the second part of the year. The introduction of coal analysis quality assessment/quality control (QA/QC) resulted in an update of the exploration standard.

A Coal Resource and Coal Reserve estimation process audit by EY was conducted in 2019 for Matla mine. All controls were thoroughly tested and found to be in compliance with policies, procedures and standards. The audit accessed three categories, namely governance and reporting, Coal Resource and Coal Reserve estimation (Table 3). No material findings were reported while some improvements have been implemented.

Table 3: 2019 Coal Resource and Coal Reserve estimation process audit categories

No	Category
1	**Governance and reporting:** Ensuring that reporting of Coal Resources and Coal Reserves is consistently and appropriately executed (Mineral Resource and Mineral Reserve report, compliant Mineral Resource and Mineral Reserve reporting to the JSE, document management, Mineral Resource and Mineral Reserve reporting process management and strategy, competent persons' appointment and internal review of the geological model and LoM plan)
2	**Coal Resources estimation:** Ensuring that the Coal Resources estimation process is adequately executed (geological data validation and sign-off, geological modelling as per schedule, Mineral Resource classification compliance and Mineral Resource estimation considering RPEEE)
3	**Coal Reserves estimation:** Ensuring that the Coal Reserves estimation process is adequately executed (LoM policy compliance, geological model hand-over effectiveness, signed-off LoM fact pack, mine optimisation based on technical and economical parameters, mine design and scheduling considering production scheduling constraints and accurate Mineral Reserve estimation)

A decision to conduct similar audits on an annual basis from 2019 onwards was approved. Results will add to the existing independent review of our estimation and reporting process, and result in continuous improvement of activities.

Summarised group Mineral Resource and Mineral Reserve estimates

The Mineral Resources and Mineral Reserves remaining as at 31 December 2019 are indicated in this document. Mineral Resource and Mineral Reserve figures are not an inventory of all mineral occurrences drilled or sampled but a realistic record of those which, under assumed and justifiable technical and economic conditions, may be economically extractable currently and in future.

Mineral Resources and Mineral Reserves are reported inclusive of Mineral Resources that have been converted to Mineral Reserves. An exception is reporting for Gamsberg and Black Mountain Mining because figures received from Vedanta (JORC Code) represent Mineral Resources excluding those Mineral Resources converted to Mineral Reserves.

Exxaro includes all estimates directly under its management control and estimates of entities in which Exxaro holds a 25% interest or larger. Mineral Resources and Mineral Reserves are reported at 100% irrespective of the percentage attributable to Exxaro.

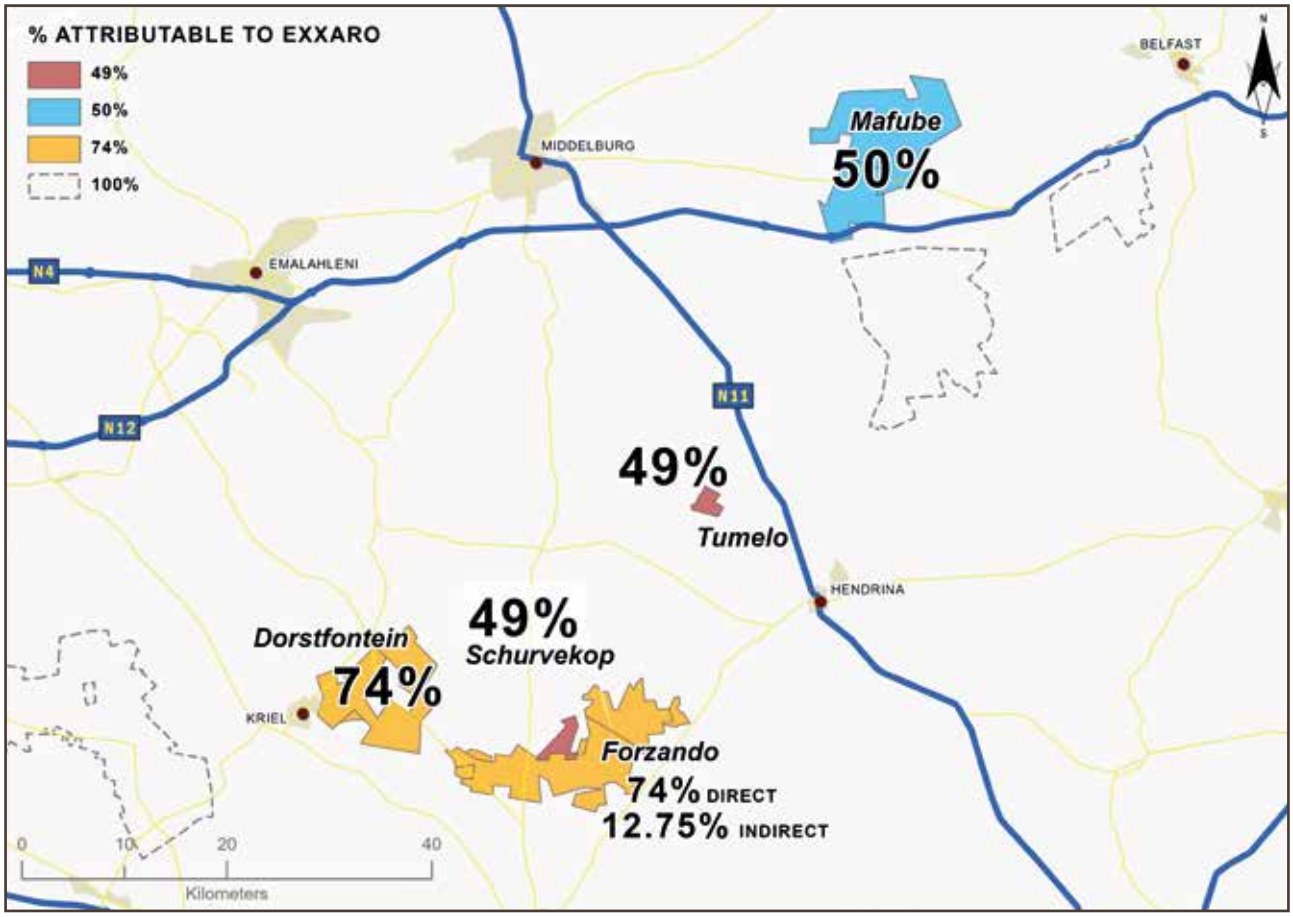
The percentage attributable tonnage (only coal) can be deduced from the attributable ownership (Figure 8) stated in the Coal Resources and Coal Reserves tables and the summarised tonnages are shown in Table 4.

Explanations for material changes in year-on-year movements are provided as footnotes in the Mineral Resources and Mineral Reserves tables.

Table 4: Attributable Coal Resource and Coal Reserve tonnages

Commodity: Coal	Resource Category	2019 MTIS (Mt)
Exxaro attributable tonnes	Measured	4 573
	Indicated	2 211
	Inferred	3 937
	Total Coal Resources	10 721
	Proved	2 917
	Probable	757
	Total Coal Reserves	3 675

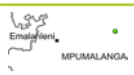
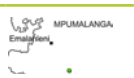
Figure 8: Coal joint venture operations in Mpumalanga



Coal Resources

The table below details the total inclusive Coal Resources estimated as at 31 December 2019.

Table 5: Coal Resources and qualities

			2019						2018					
			Tonnes and quality[4]						Tonnes and quality[4]					
Operation[1]	**Location[3]**	**Resource category**	**Tonnes (Mt)**	**CV MJ/kg**	**% Ash**	**% IM**	**% VM**	**% S**	**Tonnes (Mt)**	**CV MJ/kg**	**% Ash**	**% IM**	**% S**	**% change in tonnes[5]**
Arnot mine[6] (OC) (in closure) Mpumalanga 100% attributable to Exxaro[2]		Measured	20.2	24.2	26.6	4.0	26.6	1.0	20.2	24.2	26.6	4.0	1.0	
		Indicated	18.9	24.5	26.7	3.8	26.7	0.9	18.9	24.5	26.7	3.8	0.9	
		Inferred	8.8	24.0	26.7	3.9	26.7	0.8	8.8	24.0	26.7	3.9	0.8	
		Total	47.9	24.3	26.7	3.9	26.7	1.0	47.9	24.3	26.7	3.9	1.0	
		Resources inside LoM plan												
Arnot mine[6] (UG) (in closure) Mpumalanga 100% attributable to Exxaro[2]		Measured	118.3	23.6	22.0	4.0	23.6	1.0	118.3	23.6	22.0	4.0	1.0	
		Indicated	45.4	23.4	22.6	4.2	22.5	0.9	45.4	23.4	22.6	4.2	0.9	
		Inferred	12.5	23.8	21.4	4.3	22.0	0.9	12.5	23.8	21.4	4.3	0.9	
		Total	176.2	23.5	22.1	4.1	23.2	1.0	176.2	23.5	22.1	4.1	1.0	
		Resources inside LoM plan												
Matla mine (UG) (captive market) Mpumalanga 100% attributable to Exxaro[2]		Measured	705	20.2	30.6	4.5	22.0	1.0	713	20.2	30.6	4.5	1.0	(1)
		Indicated	105	21.1	27.6	4.3	22.1	0.9	97	20.8	28.1	4.4	0.9	8
		Inferred	232	19.6	30.8	4.5	21.3	0.9	240	19.6	30.9	4.5	0.9	(3)
		Total	1 043	20.1	30.4	4.5	21.8	1.0	1 050	20.1	30.4	4.5	1.0	(1)
		Resources inside LoM plan	311	21.2	27.6	4.7	22.9	1.0	327	21.1	27.7	4.7	1.0	(5)
Leeuwpan mine (OC) (commercial market) Mpumalanga 100% attributable to Exxaro[2]		Measured	92.8	20.1	31.3	3.0	18.1	1.1	101.1	20.1	31.3	3.2	1.1	(8)
		Indicated	2.6	20.7	29.1	2.8	21.1	1.2	2.6	20.7	29.1	2.8	1.2	
		Inferred	3.6	21.0	32.3	2.3	14.0	1.1	3.6	21.0	32.3	2.3	1.1	
		Total	99.0	20.2	31.3	2.9	18.0	1.1	107.3	20.1	31.3	3.2	1.1	(8)
		Resources inside LoM plan	64.6	20.0	31.1	2.7	18.9	1.2	71.7	20.0	31.1	3.1	1.2	(10)
Mafube mine[7] (OC) (commercial market) Mpumalanga 50% attributable to Exxaro[2]		Measured	117.6	21.5	26.9	3.8	22.4	1.0	124.5	21.5	26.9	3.8	1.0	(6)
		Indicated	9.7	21.9	25.9	3.9	22.6	0.9	10.1	22.0	25.7	3.9	0.9	(4)
		Inferred												
		Total	127.3	21.5	26.8	3.8	22.4	1.0	134.7	21.6	26.8	3.8	1.0	(5)
		Resources inside LoM plan	56.5	21.9	25.6	3.7	22.7	1.0	61.7	21.9	25.6	3.7	1.0	(8)
Belfast mine (OC) (mining right) Mpumalanga 100% attributable to Exxaro[2]		Measured	74.6	24.9	18.5	3.6	23.3	1.1	81.1	24.8	18.7	3.6	1.1	(8)
		Indicated	20.1	22.4	25.2	3.6	22.0	1.1	22.4	21.6	26.9	3.7	1.1	(10)
		Inferred	34.1	21.6	26.8	3.4	20.9	0.8	34.4	20.0	31.2	3.4	1.0	(1)
		Total	128.8	23.6	21.7	3.5	22.5	1.0	137.8	23.1	23.2	3.6	1.1	(7)
		Resources inside LoM plan	45.7	25.0	18.3	3.5	23.6	1.2	47.1	25.2	17.6	3.6	1.2	(3)
Dorstfontein complex[8] (OC/UG) (commercial market) Mpumalanga 74% attributable to Exxaro[2]		Measured	149.1	19.8	33.6	2.9	20.0	1.1	156.4	19.9	33.3	2.9	1.1	(5)
		Indicated	135.5	19.3	34.4	3.1	19.8	1.2	137.5	19.3	34.2	3.2	1.2	(1)
		Inferred	52.1	19.3	34.4	2.9	19.3	1.1	52.8	19.3	34.6	2.9	1.1	(1)
		Total	336.7	19.5	34.0	3.0	19.8	1.1	346.7	19.6	33.9	3.0	1.1	(3)
		Resources inside LoM plan	102.2	20.0	32.5	3.0	20.2	1.1	117.9	19.9	32.7	3.0	1.1	(13)
Forzando complex[9] (OC/UG) (commercial market) Mpumalanga 86.74% attributable to Exxaro[2]		Measured	85.5	21.6	29.1	2.8	23.3	1.1	81.5	21.6	29.1	2.8	1.1	5
		Indicated	36.3	22.2	27.6	2.8	22.7	1.3	35.9	22.3	27.5	2.8	1.2	1
		Inferred	26.4	21.2	30.2	2.9	20.6	1.2	25.8	21.3	30.1	2.9	1.2	2
		Total	148.2	21.7	28.9	2.9	22.6	1.2	143.2	21.8	28.9	2.8	1.2	3
		Resources inside LoM plan	43.3	21.2	30.1	2.8	22.9	1.1	70.3	21.2	30.0	2.8	1.1	(38)
Forzando projects (prospecting right) Mpumalanga 86.74% attributable to Exxaro[2]		Measured	0.2	21.3	30.7	2.5	19.6	0.5	0.2	21.4	30.6	2.5	0.5	8
		Indicated	2.1	21.6	29.5	2.7	18.0	0.7	1.6	21.6	29.3	2.7	0.7	26
		Inferred	0.5	18.0	38.5	3.1	16.6	0.6	0.4	17.7	39.3	3.1	0.6	16
		Total	2.8	20.9	31.1	2.8	17.9	0.6	2.3	20.8	31.2	2.8	0.6	22

Summarised group Mineral Resource and Mineral Reserve estimates continued

***Table 5: Coal Resources and qualities** continued*

Operation[1]	Location[3]	Resource category	2019 Tonnes (Mt)	2019 CV MJ/kg	2019 % Ash	2019 % IM	2019 % VM	2019 % S	2018 Tonnes (Mt)	2018 CV MJ/kg	2018 % Ash	2018 % IM	2018 % S	% change in tonnes[5]
			2019 Tonnes and quality[4]						2018 Tonnes and quality[4]					
Schurvekop 1063 PR[10] (prospecting right) Mpumalanga 49% attributable to Exxaro[2]		Measured	35.5	20.1	31.9	3.3	22.0	1.2	35.0	20.2	31.7	3.3	1.2	1
		Indicated	6.5	20.1	31.9	3.3	21.0	1.2	5.6	20.1	31.7	3.3	1.1	16
		Inferred	0.2	19.6	32.6	3.8	21.7	0.8	0.2	19.7	32.3	3.8	0.8	
		Total	42.2	20.0	32.2	3.3	21.9	1.2	40.8	20.1	31.7	3.3	1.2	3
Tumelo mine[10] (UG) Mpumalanga 49% attributable to Exxaro[2]		Measured	8.4	21.6	29.9	2.5	21.6	1.5	8.7	21.7	29.7	2.5	1.5	(3)
		Indicated	0.2	20.6	32.8	2.5	21.1	1.6	0.2	20.6	32.8	2.5	1.6	
		Inferred	1.8	21.4	31.0	2.4	19.4	1.8	1.8	21.4	31.0	2.4	1.8	
		Total	10.4	21.5	30.1	2.5	21.2	1.6	10.7	21.6	29.9	2.5	1.6	(3)
Grootegeluk mine (OC) (commercial market) Limpopo 100% attributable to Exxaro[2]		Measured	2 786	16.7	47.8	1.7	20.3	1.5	2 844	16.7	47.8	1.7	1.5	(2)
		Indicated	1 017	16.5	48.4	1.6	20.0	1.4	1 017	16.5	48.4	1.6	1.4	
		Inferred	653	16.5	48.0	1.8	20.1	1.5	653	16.5	48.0	1.8	1.5	
		Total	4 455	16.7	48.0	1.7	20.2	1.5	4 514	18.2	48.0	1.7	1.5	(1)
	Resources inside LoM plan		3 722	16.3	48.8	1.7	20.2	1.5	3 780	16.3	48.8	1.7	1.5	(2)
Thabametsi project[11] (OC/UG) (mining right) Limpopo 100% attributable to Exxaro[2]		Measured	270	13.0	52.3	1.9	20.0	1.2	270	13.0	52.3	1.9	1.2	
		Indicated	749	12.6	53.1	1.8	19.8	1.1	749	12.6	53.1	1.8	1.1	
		Inferred	2 916	12.7	52.7	1.9	19.3	1.3	2 916	12.7	52.7	1.9	1.3	
		Total	3 935	12.7	52.7	1.9	19.7	1.3	3 935	12.7	52.7	1.9	1.3	
	Resources inside LoM plan		133	12.0	54.7	1.9	20.0	1.0	133	12.0	54.7	1.9	1.0	
Waterberg North project[12] (prospecting) Limpopo 100% attributable to Exxaro[2]		Measured	Relinquished											
		Indicated												
		Inferred							2 147	13.3	49.7	2.5	1.2	
		Total							2 147	13.3	49.7	2.5	1.2	
Waterberg South project[12] (prospecting) Limpopo 100% attributable to Exxaro[2]		Measured	Relinquished											
		Indicated												
		Inferred							869	15.9	39.6	2.9	1.7	
		Total							869	15.9	39.6	2.9	1.7	
Moranbah South project[13] (UG) (prospecting) Australia 50% attributable to Exxaro[2]		Measured	482	26.7	23.7	2.6	18.5	0.6	482	26.7	23.7	2.6	0.6	
		Indicated	222	27.3	21.7	2.6	17.9	0.6	222	27.3	21.7	2.6	0.6	
		Inferred	28	28.5	18.9	2.7	17.0	0.5	28	28.5	18.9	2.7	0.5	
		Total	732	27.0	22.9	2.6	18.3	0.6	732	27.0	22.9	2.6	0.6	

Rounding of figures may cause computational discrepancies

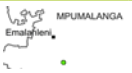
- *All changes more than 10% are explained. Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt.*
- *Coal Resources and qualities (raw coal) are quoted on a mineable tonnage in-situ (MTIS) and air-dried basis.*
- *Coal Resources are quoted inclusive of Coal Resources that have been modified to Coal Reserves unless otherwise stated.*
- *Resources inside LoM plan refer to total MTIS Resources in LoM plan layout.*

[1] *Operation refers to operating mine or significant project. The mining methods are opencast (OC) and underground (UG).*
[2] *Figures are reported at 100% irrespective of percentage attributable to Exxaro and refer to 2019 only.*
[3] *Locality maps are for illustrative purposes only. Detailed maps are provided in the ancillary section.*
[4] *Raw coal qualities (air-dried basis). CV: calorific value (gross), IM: inherent moisture, S: total sulphur and VM: volatile matter.*
[5] *The percentage difference between 2019 reported MTIS and 2018 reported MTIS with brackets signifying a negative.*
[6] *Mine is in closure. The remaining Coal Resources have reasonable prospects for eventual economic extraction.*
[7] *Estimates are received from Anglo American Coal Proprietary Limited and not audited by Exxaro.*
[8] *The complex comprises the East (opencast) and West (underground) operations. In 2018 the Resources inside LoM plan were erroneously stated as 228.8Mt and this was corrected to 117.9Mt. The change in Resources inside LoM is the result of layout outline refinement.*
[9] *The complex comprises the North (underground) and South (opencast and underground) operations. The decrease reflects the change in Coal Reserves.*
[10] *Estimates are received from Mmakau Mining, the majority (51%) owner of the project.*
[11] *The project is adjacent to the operating Grootegeluk mine.*
[12] *The projects were relinquished after careful consideration of the strategic fit of the four prospecting rights. The projects are in closure.*
[13] *Estimates are received from Anglo American Metallurgical Coal Proprietary Limited and not audited by Exxaro.*

Coal Reserves

The table below details the total Coal Reserves estimated as at 31 December 2019.

Table 6: Coal Reserves reported

Operation[1]	Location[3]	Life of mine (years)[4]	Category	2019 RoM and saleable tonnes[5] RoM (Mt)	RoM moisture %	Export (Mt)	Thermal (Mt)	Metal-lurgical (Mt)	2018 RoM and saleable tonnes[5] RoM (Mt)	RoM moisture %	Export (Mt)	Thermal (Mt)	Metal-lurgical (Mt)	% change in RoM[6]
Matla mine[7] (UG) (captive market) 100% attributable to Exxaro[2]		4+	Proved	145.3	7.7		145.3		171.6	7.8		171.6		(15)
			Probable	15.6	9.7		15.6		16.3	6.3		16.3		(4)
			Total	160.9	7.9		160.9		187.9	7.6		187.9		(14)
			Inferred Resources inside LoM plan	27.2					25.6					6
Leeuwpan mine[8] (OC) (commercial market) 100% attributable to Exxaro[2]		11	Proved	45.9	3.1		33.2		53.7	3.2		38.8		(14)
			Probable	6.1	2.7		3.2	1.3	6.2	2.7		2.3	0.4	(1)
			Total	52.1	3.1		36.4	1.3	59.8	3.1		41.0	0.4	(13)
			Inferred Resources inside LoM plan											
Mafube mine[9] (OC) (commercial market) 50% attributable to Exxaro[2]		11	Proved											
			Probable	56.7	8.4	36.9			62.0	8.3	26.5	13.9		(9)
			Total	56.7	8.4	36.9			62.0	8.3	26.5	13.9		(9)
			Inferred Resources inside LoM plan											
Belfast mine (OC) (commercial market) 100% attributable to Exxaro[2]		12	Proved	42.2	3.3	30.8	6.9		45.7		35.3	8.1		(8)
			Probable	1.4	3.0	0.7	0.6							100
			Total	43.6	3.3	31.6	7.5		45.7		35.3	8.1		(5)
			Inferred Resources inside LoM plan	0.7					0.5					40
Dorstfontein complex[10] (OC/UG) (commercial market) 74% attributable to Exxaro[2]		17+	Proved	46.5	3.3	14.3	14.0		54.3	2.7	29.4			(14)
			Probable	41.5	3.3	13.3	13.3		40.5	3.1	24.6			2
			Total	88.0	3.3	27.6	27.4		94.8	2.9	54.0			(7)
			Inferred Resources inside LoM plan	0.9	3.3	0.3	0.2		5.7	2.8	2.8			(84)
Forzando complex[11] (OC/UG) (commercial market) 86.74% attributable to Exxaro[2]		8+	Proved	23.9	2.7	13.8			38.6	2.2	19.9			(38)
			Probable	10.7	2.9	6.4			15.9	2.8	9.3			(33)
			Total	34.6	2.8	20.2			54.5	2.4	29.2			(37)
			Inferred Resources inside LoM plan	0.1	2.9				7.5	2.5	4.0			(99)
Waterberg Complex														
Grootegeluk mine (OC) (commercial market) 100% attributable to Exxaro[2]		20+	Proved	2 520	3.0	146	1 015	70	2 576	3.0	149	1 039	72	(2)
			Probable	645	3.0	60	398	26	645	3.0	60	398	26	
			Total	3 165	3.0	206	1 413	96	3 221	3.0	209	1 437	98	(2)
			Inferred Resources inside LoM plan	510					510					
Thabametsi project (OC) (IPP market) 100% attributable to Exxaro[2]		26+	Proved	109.0	3.0		107.0		109.0			107.0		
			Probable	21.0	3.0		20.0		21.0			20.0		
			Total	130.0	3.0		127.0		130.0			127.0		
			Inferred Resources inside LoM plan											

Rounding of figures may cause computational discrepancies.

- *Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt.*
- *Inferred Resources inside LoM plan refer to Inferred Resources considered for the LoM plan. These Resources have not been converted to Reserves.*
- *Coal Reserves are quoted on a RoM Reserve tonnage basis, which represents tonnages delivered to the plant at an applicable moisture and quality basis.*
- *Saleable Reserve tonnage represents the product tonnes of coal available-for-sale on an applicable moisture basis.*
- *All changes more than 10% are explained.*

[1] *Operation refers to operating mine or significant project. Mining method: opencast (OC) or underground (UG).*
[2] *Figures are reported at 100% irrespective of percentage attributable to Exxaro and refer to 2019 only.*
[3] *Locality maps are for illustrative purposes only. Detailed maps are provided in the ancillary section.*
[4] *The + symbol is used in instances where the scheduled LoM plan extends beyond the expiry of the mining right. In each instance, Exxaro has a reasonable expectation that the mining right will be renewed.*
[5] *Export refers to export thermal coal except at Grootegeluk mine where it refers to semi-soft coking coal suitable for the export and inland markets.*
[6] *The percentage difference between 2019 reported RoM and 2018 reported RoM, and the percentage difference between 2019 reported total saleable tonnes and 2018 reported total saleable tonnes. Brackets signify a negative.*
[7] *The decrease is primarily the result of mining as well as the disposal of mining panels related to unfavourable stooping conditions. Stooping areas where the surface rights are not secured are reported as Probable.*
[8] *The decrease is primarily the result of mining depletion (~6.1Mt) and the disposal of areas due to dolerite occurrence (~1.4Mt).*
[9] *Estimates are received from Anglo American Coal Proprietary Limited and not audited by Exxaro.*
[10] *The decrease in RoM tonnes reflects the exclusion of S2 Reserves from DCMW due to the operation migrating to S4L and the incorporation of RODA in the reporting of tonnages. Note that DCME has since migrated to a domestic, thermal Eskom market from last year's export market.*
[11] *The most significant contributors to the decrease are mining depletion (~2.9Mt), macro-economic assumptions (~11.4Mt) as well as areas excluded at FZON due to unfavourable floor gradients, consideration of geological complexities (dykes) and the disposal of mining blocks due to excessive methane encountered (~4.3Mt).*

Summarised group Mineral Resource and Mineral Reserve estimates continued

Table 7: Coal Reserve qualities in 2019

		THERMAL saleable (Proved and Probable)						METALLURGICAL saleable (Proved and Probable)						COKING saleable (Proved and Probable)					
Operation	**Seam/ layer**	**Tonnes (Mt)[1]**	**CV MJ/ kg**	**% VM**	**% Ash**	**% S**	**Yield %**	**Tonnes (Mt)**	**CV MJ/ kg**	**% VM**	**% Ash**	**% S**	**Yield %**	**Tonnes (Mt)[1]**	**CV MJ/ kg**	**% VM**	**% Ash**	**% S**	**Yield %**
Matla mine	2 seam	52.0	26.0	23.6	26.2	0.8	100												
	4 seam	109.0	19.3	21.3	30.5	0.9	100												
Leeuwpan mine	TC[2]	15.2	22.6	19.2	26.9	0.8	65												
	BC[2]	21.2	23.6	23.4	22.8	1.0	79	1.3	28.0	8.4	15.1	0.9	63						
Mafube mine	Middlings	12.6	22.0	21.6	25.0	0.6	22												
	Export	24.3	26.5	26.2	13.6	0.4	43												
Belfast mine	Thermal	7.5	23.1	21.7	24.5	1.2	100												
	Export	31.6	26.1	23.9	15.3	0.6	87												
Dorstfontein complex	All seams	55.0	24.2	21.9	21.3	0.6	62												
Forzando complex	All seams	20.2	24.7	26.6	20.4	1.1	58												
Grootegeluk mine	All seams	1 413	21.0	23.8	33.1	1.5	41	95.9	28.9	23.9	13.7	0.6	56	206.3	29.1	35.1	11.7	1.2	13
Thabametsi[3] project	T1	64.0	12.7	20.0	53.9	1.1	98												
	T2	63.0	11.3	19.0	55.7	1.0	98												

Rounding of figures may cause computational discrepancies.
• Volatile matter (VM), sulphur (S) and gross calorific value (CV).
• Saleable Reserve tonnage represents the product tonnes of coal available-for-sale on an applicable moisture and air-dried quality basis.
[1] Saleable product tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt.
[2] Top coal (TC) and bottom coal (BC).
[3] Based on Thabametsi bench configuration as defined in phase 1 of the feasibility study.

Base Metal Resources

The table below details Base Metal Resources (exclusive) as at 31 March 2019.

Table 8: Base Metal Resources (exclusive) reported

		2019					2018					
		Tonnes and grade					Tonnes and grade					
Operation[1]	Category	Tonnes (Mt)	% Zn	% Pb	% Cu	Ag g/t	Tonnes (Mt)	% Zn	% Pb	% Cu	Ag g/t	% change in tonnes
BMM Deeps mine[3] Northern Cape (UG) (zinc, lead, copper and silver) 26% attributable to Exxaro[2]	Measured	5.6	2.9	3.2	0.3	37.0	4.0	3.1	3.4	0.3	38.1	41
	Indicated	9.1	2.6	2.2	0.5	27.0	6.6	2.8	2.7	0.5	32.7	37
	Inferred											
	Total	14.6	2.7	2.6	0.4	31.0	10.6	2.9	3.0	0.4	34.7	38
BMM Swartberg mine[3] Northern Cape (UG) (zinc, lead, copper and silver) 26% attributable to Exxaro[2]	Measured											
	Indicated	57.3	1.3	3.2	0.3	53.0	35.7	0.8	3.7	0.3	57.0	61
	Inferred	14	1.2	3.4	0.3	48.0	26.5	2.2	3.0	0.2	50.2	(47)
	Total	71.3	1.3	3.2	0.3	52.0	62.2	1.4	3.4	0.3	54.1	15
BMM Big Syncline project[4] Northern Cape (OC) (zinc) 26% attributable to Exxaro[2]	Measured											
	Indicated											
	Inferred	151.7	2.5	1.0		13.0						100
	Total	151.7	2.5	1.0		13.0						100
Gamsberg North mine[5] Northern Cape (OC) (zinc) 26% attributable to Exxaro[2]	Measured	35.1	6.5	0.6			43.3	6.6	0.6			(19)
	Indicated	35.8	6.6	0.6			54.6	5.9	0.5			(34)
	Inferred	17.9	6.7	0.5			32.1	5.8	0.5			(44)
	Total	88.8	6.6	0.6			130	6.1	0.5			(32)
Gamsberg East[6] Northern Cape (project) (zinc) 26% attributable to Exxaro[2]	Measured											
	Indicated											
	Inferred	42.2	9.0	0.6			32.3	9.8	0.6			31
	Total	42.2	9.0	0.6			32.3	9.8	0.6			31

Rounding of figures may cause computational discrepancies.
- *Percentage zinc (% Zn), percentage copper (% Cu), percentage lead (% Pb), grams per tonne silver (Ag g/t), percentage manganese (% Mn) and percentage sulphur (% S).*
- *Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt.*
- *Estimates as received from Vedanta Resources at 31 March 2019 and not audited by Exxaro.*
- *All changes more than 10% are explained.*
- *Tonnages are reported on a dry basis.*

[1] *Operation refers to the Black Mountain Mining operating mine or significant project. Mining method: opencast (OC) or underground (UG).*
[2] *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
[3] *The increase is mainly the result of using higher input metal prices, which allowed for a greater increase in economical tonnes as well as updating the geological model with new mapping and drilling information.*
[4] *Big Syncline is a brownfields exploration project. This is a high-volume, low-grade Zn deposit.*
[5] *The decrease is mainly the result of the implementation of standardised guidelines on reporting of potential for eventual economic extraction resulting in higher cut-off grades.*
[6] *The increase is mainly the result of updating the geological model with new borehole information.*

Base Metal Reserves

The table below details Base Metal Reserves as at 31 March 2019.

Table 9: Base Metal Reserves reported

			2019					2018					
			Tonnes and grade					Tonnes and grade					
Operation[1]	Life of mine (years)	Category	RoM (Mt)[3]	% Zn	% Pb	% Cu	Ag g/t	RoM (Mt)[3]	% Zn	% Pb	% Cu	Ag g/t	% change in RoM
BMM Deeps mine Northern Cape (UG) (zinc, lead, copper and silver) 26% attributable to Exxaro[2]	4	Proved	1.6	2.9	3.6	0.3	37.0	1.3	3.0	4.0	0.3	43.3	
		Probable	3.5	2.9	1.4	0.7	21.0	4.3	3.0	1.7	0.7	23.8	
		Total	5.1	2.9	2.1	0.6	26.0	5.6	3.0	2.2	0.6	28.2	(9)
	Inferred Resources inside LoM plan												
BMM Swartberg mine[3] Northern Cape (UG) (zinc, lead, copper and silver) 26% attributable to Exxaro[2]	4	Proved											
		Probable	2.6	0.7	3.4	0.5	28.0	2.3	0.6	3.3	0.5	30.8	
		Total	2.6	0.7	3.4	0.5	28.0	2.3	0.6	3.3	0.5	30.8	12
	Inferred Resources inside LoM plan												
Gamsberg North mine Northern Cape (OC) (zinc) 26% attributable to Exxaro[2]	13	Proved	50.3	6.8	0.5			44.5	6.8	0.5			
		Probable	3.4	5.8	0.5			8.7	6.0	0.5			
		Total	53.7	6.7	0.5			53.2	6.6	0.5			1
	Inferred Resources inside LoM plan							0.4					

Rounding of figures may cause computational discrepancies.
- *Percentage zinc (% Zn), percentage copper (% Cu), percentage lead (% Pb), grams per tonne silver (Ag g/t), percentage manganese (% Mn) and percentage sulphur (% S).*
- *Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt.*
- *Reserves are quoted on a RoM Reserve tonnage basis, which represents tonnages delivered to the plant at applicable moisture and quality.*
- *Inferred Resources in LoM plan refer to Inferred Resources considered for LoM plan.*
- *Estimates as received from Vedanta Resources at 31 March 2019 and not audited by Exxaro.*
- *All changes more than 10% are explained.*

[1] *Operation refers to the Black Mountain Mining operating mine or significant project. Mining method: opencast (OC) or underground (UG).*
[2] *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
[3] *The increase is primarily due to design changes of longhole stooping as well as implementation of additional stopes and declines.*

Estimation methodology summary

Coal Resources

The estimation process is summarised below and applies to all coal operations and projects under Exxaro management's control. The Resource competent person is actively involved throughout the process and no data is included/excluded without their consent.

The Resource estimation process for Coal Resources under Exxaro's control is governed by the group's Resource estimation procedure and aligned to the SAMREC Code 2016 and SANS 10320:2004 standard. The data used for Resource estimation is managed by separate commodity-specific procedures through which core recovery and logging, sampling, quality assurance and control, relative density determination and wireline logging standards are enforced. These standards were updated in 2018 to comply with SAMREC 2016 and SANS 10320:2004 but aspects aligning with the SANS 10320:2017 draft standard are considered where applicable.

The core recovery standard (>95% in coal seams for valid points of observation), as stipulated in SAMREC 2016 and SANS 10320 standard, is not always empirically enforced due to unavailability of digital core recovery data for pre-2017 boreholes. However, Exxaro's competent persons confirm that there is high confidence in core and sample recovery for all boreholes used for Resource estimation purposes and any deviation is managed by increased geological losses within geological loss domains, downgrading Resource classification, and/or redrilling boreholes. Core recovery is continuously reviewed and any shortcomings are actively addressed through downhole geophysical surveys, seam validations and redrilling.

For Coal Resources, relative density (air-dried) is determined by accredited laboratories using the Archimedes method in all instances, except for Grootegeluk mine and the Thabametsi project where relative density is determined using an on-site mine laboratory application of the Archimedes method and results are continuously used to validate core recovery. A comparative study between the field and laboratory methods was undertaken in 2015 and results indicated no significant difference.

A formal, annually compiled, integrated and signed-off exploration strategy outlines planned activities to investigate areas of low confidence and/or geological or structural complexities to ensure Resources with a high level of geological confidence are considered for mine planning. Exploration plans are available as supplementary information to the competent persons' report.

Table 10: Summary of estimation considerations

Item	Description
Resource fact pack	Lists new information since last estimation together with a reconciliation between predicted MTIS and actual RoM with recommendations from internal/external audits
Technical data validation	Technical validation of data to be used for Resource estimation, including collar validation, gaps and overlaps checks and data distribution, among others
Data analysis	Entails a review and analysis of the geological integrity and continuity of data in a spatial and geostatistical sense with domaining and structural interpretations
Data modelling	Geovia Minex is used for coal modelling and the Minex growth algorithm is the preferred interpolation technique with ESRI ArcGIS used for modelling structural features. acQuire or Minex is used for coal compositing and, in both instances, representative substitute values are used for unsampled non-coal material. The geological model and structural interpretation are presented by the Resource competent person, aided by relevant technical specialists, to a panel comprising Exxaro's lead competent person and domain experts for sign-off and approval. Concept-level geological models, where applicable, are compiled for alternative interpretations and these risks are evaluated during sign-off. Feasibility-level and/or LoM plan-level geological models are based on reviewed and signed-off interpretations
Resource classification	Resource classification follows the Exxaro estimation procedure and is aligned with SANS 10320:2004 and considers RODA. Anomalous borehole data and structurally complex areas are accounted for and Resource classification is used to control the adequacy of borehole data. Separate confidence zones are determined for structural features, based on a matrix approach. The effect of extrapolation is controlled by Resource classification in which classification domains are not extrapolated beyond half the average borehole spacing for the classification category. Only points of observation with applicable quality data are used for classification
Estimation and reporting	Resource reporting uses approved cut-offs and geological loss domains, followed by completion of all necessary reports and audit trails. Exxaro currently uses a systematic and integrated review process that measures the level of maturity of exploration work done, the extent of geological potential, licence-to-operate and associated geological risks to establish the eventual extraction. The criteria for assessing reasonable prospects for eventual economic extraction (RPEEE) are shown in Table 11 Reporting includes technical information that requires subsequent calculations to derive subtotals, totals and weighted averages. Such calculations may involve a degree of rounding and consequently introduce an error. Where such errors occur, Exxaro does not consider them material
Review and consolidation	Individual reports are reviewed and corrections are effected if necessary. Reports are endorsed by management and used to compile the consolidated Coal Resources and Coal Reserves report

Estimation methodology summary continued

Table 11: Exxaro considerations for RPEEE

Item	Criteria	Considerations
Geological data	Data validated and signed off by competent person	Seam depth and extent, seam thickness, structure and seam quality (cut-off)
Geological model	Geological model considered and signed off	
Structural model	Structure model considered and signed off	
Mining	Mining assumptions considered and defined	Mining method, inputs from metallurgist, rock engineer and hydrogeologist
Assurance	Minimum tier 1 assurance as per Exxaro governance and assurance framework	As per tier 1 requirement
Economic evaluation	Concept-level exploitation and economic evaluation quantifies economic potential based on economic and mining assumptions including geotechnical and geohydrological assumptions	Preliminary appraisal of layout, cost and profit
Environmental	Assessment of potential impediments and, if any exist, a reasonable expectation of resolution with reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national legislation	
Tenure	Formal tenure must be demonstrated and, if any potential impediments exist, there must be reasonable expectation of resolution or, if a prospecting right, there should be reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national legislation	
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence, and any potential impediments should have a reasonable expectation of resolution, considering power, water and transport	
Market	Potential market for product that is planned to be extracted from the Resource with a reasonable assumption that this market is sustainable	

"Reasonable prospects for eventual economic extraction should be demonstrated through the application of an appropriate consideration of Mineral Resources. Such a consideration should include a reasoned assessment of the geological, mining engineering, processing, metallurgical, legal, infrastructural, environmental, marketing, socio-political and economic assumptions which, in the opinion of the Competent Person, are likely to influence the prospect of economic extraction. All of the issues listed in Table 1, under 'reasonable prospects for eventual economic extraction' should be discussed at the level appropriate for the specific investigation." SAMREC, 2016 edition

We have enhanced our current process to consider all aspects as per SAMREC 2016 (Table 1, 4.3) to establish reasonable prospects for our operations and projects. The RPEEE of each operation or project is presented in the ancillary section. We continuously examine our criteria to review the probability of extraction, and to identify any areas where potential risk may exist.

Coal Reserves

Coal Reserves are estimated using the relevant modifying factors at the time of reporting (mining, metallurgical, economic, marketing, legal environmental, social and regulatory requirements). Modifying factors are signed off before Reserve estimation by the persons responsible for ensuring that all factors are timeously and appropriately considered. Comprehensive modifying factor sign-off and Reserve fact packs that record losses, recoveries/yields and other factors applied are documented in each independent competent persons' report.

Exxaro is keenly aware of the importance of its mineral assets, for the short-term profitability of its operations and the sustainability of the company. The optimisation of mineral assets beyond what is generally referred to as Mineral Resource management is being driven as a priority. Changes in the resources market, increased awareness of protecting the natural environment, and changing legislation and statutory requirements demand a change in the utilisation strategy and execution of mining operations. Exxaro continuously assesses the various LoM strategic plans to consider the best way to address these challenges.

For Coal Reserve estimates to comply with LoM policy, the following supporting inputs are required for all Reserve estimates: survey, rock engineering, infrastructure, legal, processing, social, political and environmental as well as a Reserve estimation scoping report.

The following outputs are generated after successfully completing the procedure: validation and verification report, mining block model, exploitation strategy report, mining schedule and equipment strategy report, and Reserve estimation report.

At the start of the estimation process, the applicable Reserve competent person must compile, for every operation, a Reserve fact pack report, outlining the standards and norms of that operation as well as all relevant planning standards. All standards, norms and planning parameters, the geological model, infrastructure and environmental plans together with the structural plan, geotechnical review report, among others, are also considered. The market strategy, supply contracts and planned volumes drive the schedule. All operation standards must be signed off by the applicable mine management and Reserve competent person. A similar procedure is followed for projects, with the project steering committee fulfilling the role of mine management.

Reserve estimation may be conducted either as required (in a project-stage evaluation, for example) or as part of the annual Mineral Resource and Mineral Reserve estimation process. The data conversion, validation and verification report are the first outputs of this procedure.

On receipt of the geological model, the validation procedure is conducted and the model is converted into a mining model. A report is then compiled with possible geological model anomalies, and a comparison of volumes in the geological model and mining model to confirm data conversion has been conducted correctly. This information is signed off as acceptable by the Resource competent person and manager: strategic mine planning and design.

The following components are included in the LoM plan and Reserve estimation: exploitation strategy, operational methodology and pit shell.

The exploitation strategy needs to broadly demonstrate the pit/mining economics in terms of Resource boundaries, legal and other, such as servitudes. For example, when converting the Resource to Reserve, explain the economics, in terms of stripping ratio, underground versus open-pit, among others. Lastly, the extraction sequence of mining different areas in terms of access, economics or other criteria deemed most appropriate.

Operational methodology considers:

- Material flow explains the flow of material over time, such as open-pit (ex-pit, horizontal and vertical distances and underground), geographical expansion versus stooping and deep pit (push-back strategy, minimum and maximum stripping curves).
- Equipment explains the size and type of equipment for the design, including life of equipment, major interventions and/or major changes (such as open-pit to underground) over the life of the Resource.
- Waste dumps (size and position), rehabilitation (main issues and interventions) together with legal and other indicate licences obtained and required
- Pit shell is the final delineation or envelope of the Resource that will be converted to a Reserve. The LoM plan pit shell is the foundation of the business case and, as such, is based on the most accurate information available.
- Measured and Indicated Resources are used as basis for conversion. The first five years of the LoM plan must be covered by at least 80% Measured Resources.

Resource volumes/tonnages are converted to Reserve tonnages by applying the following mining modifying factors:

- Mining efficiency losses as per average cut thickness is applied to account for net losses of Reserves due to mining equipment selection and mining method. The efficiency factor also accounts for the thickness of the selected RoM and waste horizons relative to selected mining equipment.
- Layout losses account for the loss of Reserves due to actual mining activities not reaching the defined Reserve boundary or due to the geometry of the Reserve block.
- RoM extraction accounts for losses incurred using the selected mining method.
- Contamination accounts for waste or inter-burden material unintentionally added to the mining horizon as a result of mining operations and equipment used.
- Free moisture accounts for the change in the Reserve tonnage due to the addition of moisture from bench-mining operations.

The Reserve classification methodology for Coal Reserves under Exxaro's control is governed by the Exxaro Coal Reserve estimation procedure, as described in the LoM plan policy, and aligned with the SAMREC 2016 and SANS 10320:2004 standard. In general, Measured Resources are converted to Proved Reserves and Indicated Resources are converted to Probable Reserves. If an operation or project has additional constraints, such a supply agreement that has not been finalised or a sales/marketing strategy that limits the profitability of the mine, the Measured Resources can be downgraded to Probable Reserves. In situations where this has been applied, it is clearly stated in the footnotes for the Reserves tables.

Where Inferred Resources were considered for LoM plans, the amount (Mt) and effect is always clearly stated. When Inferred Resources are included in the LoM plan, these tonnages are never scheduled in the first five years of mine life. The rationale for considering Inferred Resources inclusion is explained and actions to address this issue are stated. Exxaro generally attempts to limit Inferred Resources to less than 15% of total Resources to be considered for LoM plans. Any inclusion of Inferred Resources must be tested, reported and modifying factors and assumptions that were applied to the Indicated and Measured Resources to determine the Coal Reserves must be equally applied to the Inferred Resources. However, Inferred Resources are not converted to Coal Reserves and are not stated as part of the Mineral Reserve. The amount of Inferred Resources considered for the reported LoM plan is included in the Reserve statement.

Ancillary Resource and Reserve information by operation

Supplementary descriptions are provided for projects and operations directly under Exxaro's management control.

For projects and operations included in the Exxaro Mineral Resource and Mineral Reserve statement but in which Exxaro does not have management control, the reader is referred to that company's website for supplementary information (refer to foreword).

Arnot mine

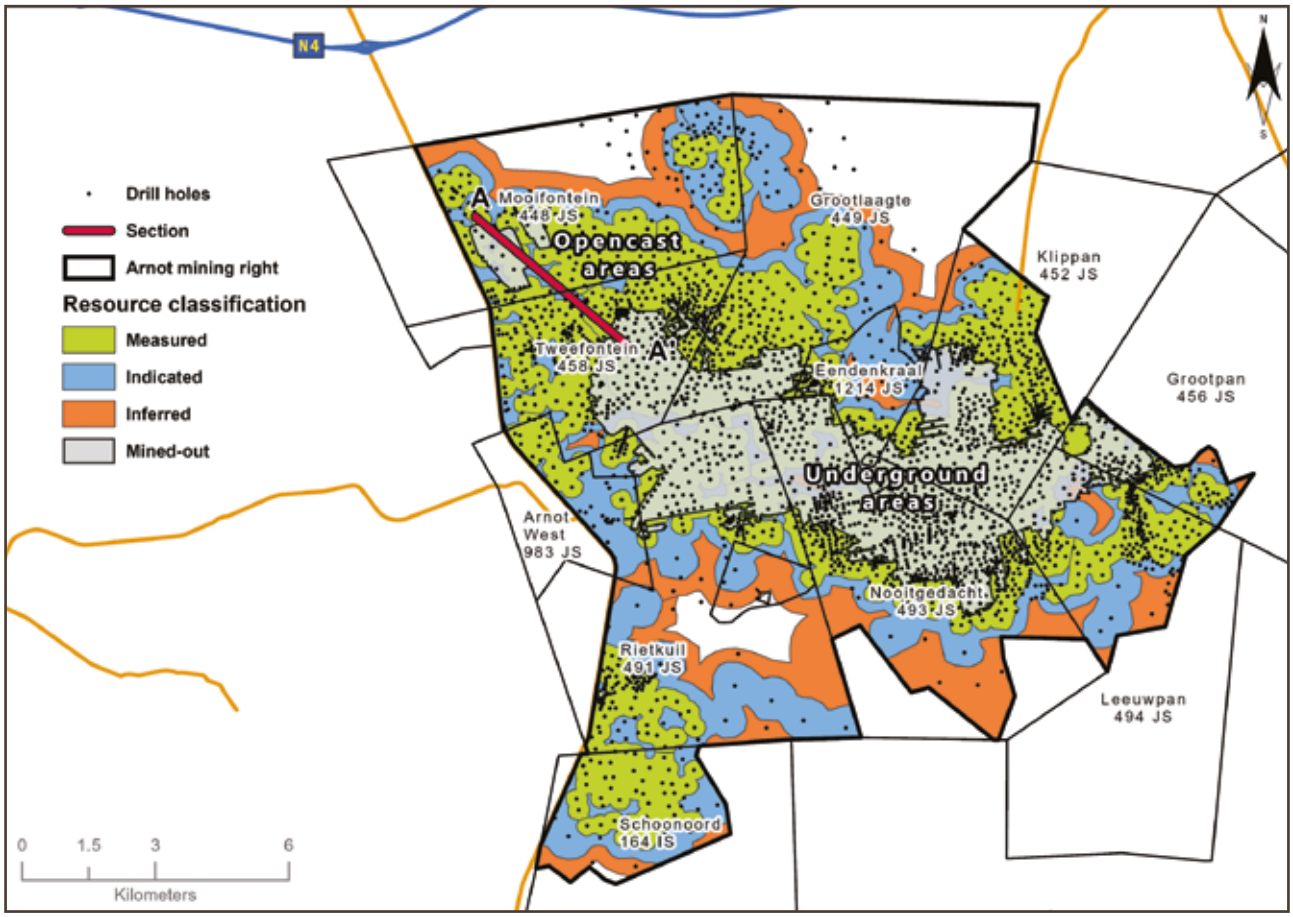
Arnot overview

Arnot mine is situated roughly midway between the towns of Middelburg and Carolina in Mpumalanga province, South Africa. Arnot was acquired from Eyesizwe Coal with the creation of Exxaro Resources in 2006. The mine is 43km by road from Middelburg, 65km by road from Carolina and 25km from Hendrina, and is surrounded by a number of projects and active operations. Tenure from Umsimbithi Mining and the Wonderfontein coal operation as well as Mafube coal mine, a joint venture between Anglo American and Exxaro, is situated towards the north of Arnot. Universal Coal's large Arnot South project is to the south of Arnot and the in-closure Exxaro operation of Strathrae is adjacent to the east.

Arnot was contracted to supply coal to the nearby Eskom Arnot power station until 31 December 2015. This was achieved by extracting 2 seam lower (S2L) from two underground shafts, 8 and 10, using mechanised mining equipment (bord-and-pillar extraction) while Mooifontein opencast used conventional truck-and-shovel, roll-over mining method to extract S2L and 1 seam (S1). One beneficiation plant handles around 14% of the RoM and the mine is served by several good access roads, gravel and paved. The mining right area is 15 021.21 hectares and annual production in 2014 and 2015 was 1.44Mt and 1.40Mt respectively. Arnot has a mining right (MP325MR) that is executed and lapses December 2038. The operation was in closure after the coal-supply agreement lapsed.

In May 2019, Exxaro received consent from the Minister of Mineral Resources and Energy in terms of section 11 of the Mineral and Petroleum Resources Development Act 2002 (Act 28 of 2002), for cession of the mining right for the Arnot coal mine to a consortium, which will benefit its former employees following the expiry of the coal-supply agreement (CSA) with Eskom in 2015. The transfer of the mining right has not yet been completed as some conditions precedent are in the process of conclusion. Exxaro has reasonable expectation that the outstanding conditions will be achieved in the first quarter of 2020.

Figure 9: Arnot mine



Arnot history

Arnot mine produced thermal coal for over 40 years, using various mining methods, predominantly bord-and-pillar (currently mechanical), opencasting and shortwalling between 1995 and 2005. Arnot had a 40-year CSA with Eskom, supplying the adjacent Arnot power station, which ended on 31 December 2015. A prefeasibility study on the commercial viability of Arnot in 2016 found several areas that can be profitably mined for the thermal coal market. However, due to the absence of a confirmed CSA, no Reserves have been declared.

Arnot's Coal Resource has been extensively drilled from 1964 by various companies using a combination of openhole, wireline logged and cored methods as well as various other prospecting techniques. Diamond coring was predominantly conducted using a smaller diameter drill bit (TNW) but large (HQ3)-diameter drilling was also employed specifically for specialised coal quality, geotechnical, geohydrological and gas-sampling investigative work. Openhole (percussion) wireline logged drilling was used for in-fill grade-control purposes to investigate the outline of geological structures and to test coal-seam structure continuity within areas already classified as Measured Resources.

Drilling was first recorded in 1964 and 6 072 vertical exploration boreholes have been drilled to date. A significant amount of historical boreholes have no known drilling information as no hard-copy or database information could be traced hence exclusion from any estimation processes. No drilling was undertaken since 2015.

Arnot geology

The Arnot operation lies close to the eastern edge of the Witbank coalfield, close to the margin of the Main Karoo Basin in which the stratigraphic column is reduced to 80m but still contains coal seams correlating to the five classical (#1-5) Witbank coalfield seams. The pre-Karoo basement topography consists of felsites and diabase intrusives associated with the Transvaal Supergroup and Bushveld Igneous Complex respectively. The Vryheid Formation is conformably deposited on top of the reworked glacio-fluvial tillite of the Dwyka Group.

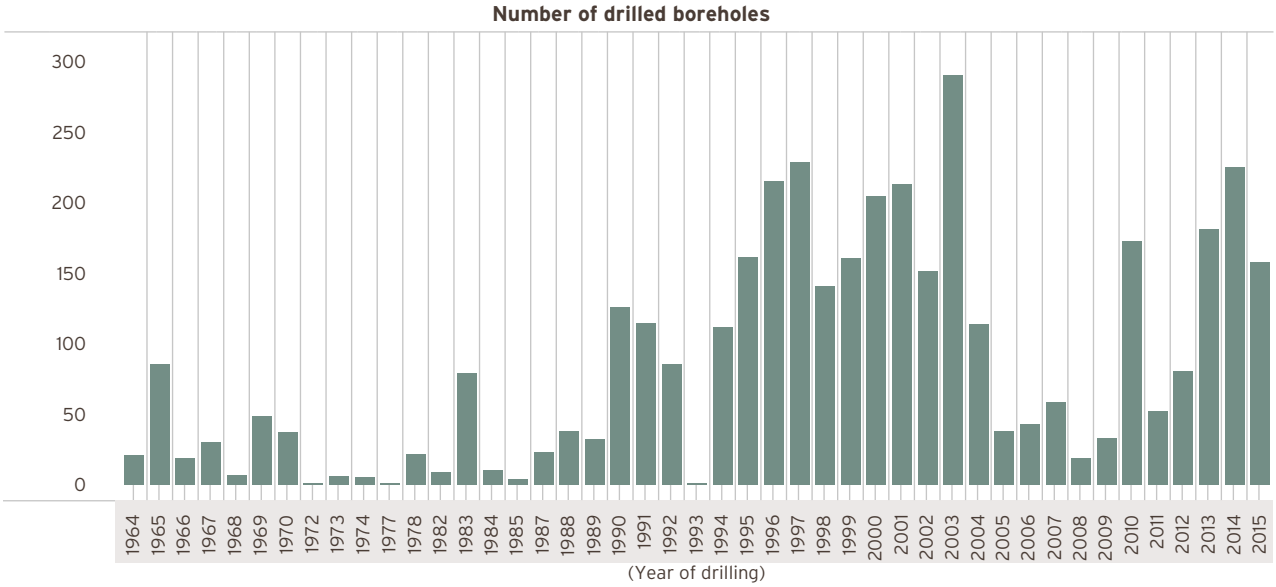
Seam 1 (S1) and seam 2 (S2) are the only coal seams of economic interest in the Arnot mining right area, and these correlate with the typical Witbank coalfield seams. The S1 is well-developed across the entire underground and opencast Resource areas. It is intersected at an average depth of over 50m in the underground areas, and the depth and undulation render it unfeasible for exploitation. It does, however, occur at shallower depths of at least 23m in opencast areas and remains a good prospect in these areas.

The S2 is the main, well-developed coal seam of economic importance at Arnot. The depth to the top of S2 depends largely on local surface topography and reaches a maximum depth of 80m along the eastern boundary of the mine lease area, and pinches and thins out in the eastern parts of the mining section due to local, pre-Karoo basement palaeo highs. This seam is generally intersected at an average depth of 44m in underground Resource areas and at average depths of 20m in opencast Resource areas. It is continuous across the Arnot mine lease area and varies from <1m to 4.5m in thickness with an average of 3.1m. S2 is site-specifically subdivided into the seam 2 lower (S2L), seam 2 upper (S2U) and seam 2A (S2A) marked by two in-seam partings, namely P2 and P3 respectively. The S2L is the only coal seam being mined in the underground Resource areas and consists of dull to lustrous coal with several bright coal bands and occasional stone partings. It has an average of 23.28MJ/kg (adb) calorific value in the underground Resource area and a 24.22MJ/kg (adb) in the opencast area, and constitutes about two-thirds of the mineable in-situ Coal Resource in the Arnot mining area.

The seam 4 (S4) occurs erratically across the mining area with an average thickness of 0.5m. The seam is often split by internal clastic partings into S4L and S4U. The seam is overlain by interlaminated units of siltstone and shale with the seam 5 (S5) sporadically developed in small areas.

A number of faults trend roughly north-east south-west with displacement of 1m to 3m are present in the Arnot mining

Figure 10: Arnot drilling history



Ancillary Resource and Reserve information by operation

continued

right. However, one large pertinent thrust fault (L9) separates the southern Coal Resource area from the main Resource. Accessibility through this fault is problematic and will require specialist mining intervention. A limited number of dolerite dykes are known to have intruded the Karoo sediments in the area. Dykes in general lack magnetic signature and are not responsive to geophysical method of detection. The presence of dolerite dykes and sills has a devolatising effect on the S2L coal seam. The intersected dykes are generally thin (0.3m to 1.5m), discontinuous and sub-parallel to a sill in an east-west direction. This sill is well-developed (about 5m to 40m thick) and overlies the S2L coal seam along the south-eastern Resource boundary.

Arnot Resource evaluation

All data collection (geological logging, description, interpretation, sampling, validation and capturing of borehole cores information) is undertaken by qualified, trained and competent geologists on-site and aligned with Exxaro standards. A well-trained grade-control and geological mapping team undertake mapping and reconciliation. Mapping captures intrusions, devolatilised coal, channel sandstones/in-seam partings, slumping structures, faults, joints, guttering, slabbing and floor rolls as well as measurements of mined heights, contamination and dilution. Dips and dip directions of all geological features and structures are measured, recorded and digitalised into Bentley MicroStation v8i. Surface mapping was only conducted where outcrops were observed.

Core loss for coal-seam intersections is recorded and a recovery of <95% through coal (by volume) is deemed unsatisfactory. Anomalies were investigated and redrilled, if required. Wireline logging results are only available for more recent boreholes. Underground boreholes at Arnot are bull-nose boreholes. A diamond drill bit is used to produce chips instead of core and changes in lithology are easily detected by changes in penetration rates. In addition, 1.5m core samples are taken every 20m to confirm the lithology in this regard.

Logging is conducted by recording lithology down to centimetre scale according to the classification of the various coal "lithofacies"/coal type zones or ply (shale-coaly, coal-shaly, coal dull, coal mixed/mainly dull, coal mixed, coal mixed/mainly bright and coal bright) based on the discernible visible lithofacies change and identified marker horizons, particularly through coal zones. All holes were captured in Micromine Geobank© SQL geological database information system but migrated in 2017 to acQuire Technology Solutions Proprietary Limited.

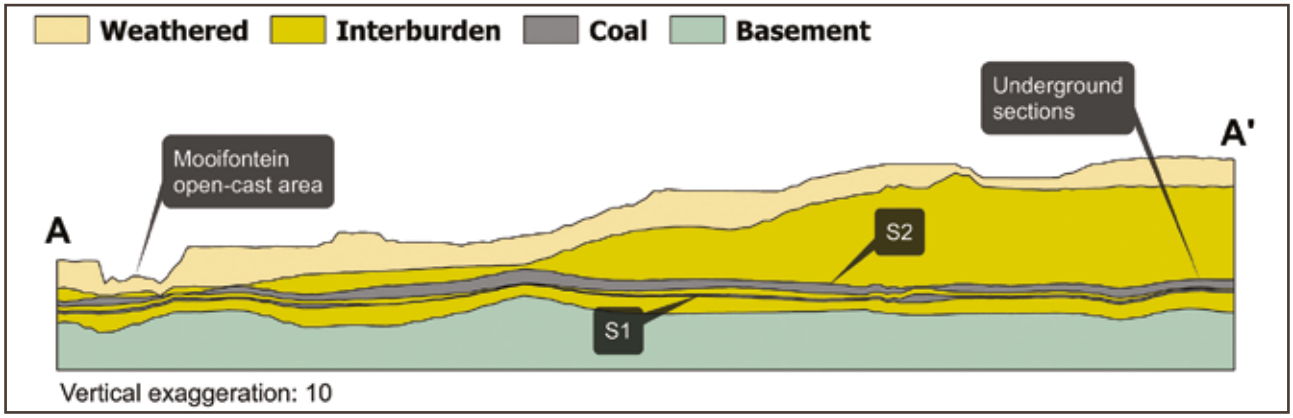
All core sampling is done at the drill sites. The samples are selected according to their respective coal seam boundaries after a thorough correlation. In-seam partings made seam and sample correlation challenging and the geologist applied discretion to ensure best correlation and sampling fit. A general rule of >0.5m seam sample thickness cut-off is applied but evaluated in-field where necessary. In addition, the proposed mining method, mining equipment and sample mass (chemical and physical analysis required) are also considered. In-seam partings are sampled together with the coal zone samples, especially the PL parting (after considering thickness) in the S2L zone.

Two distinct horizons are sampled in the S2L, and these are often distinguished by the variable and discernible vitrinite content and/or the PL parting. Each sample is assigned a unique sample number, bagged and tagged separately for each seam interval to minimise contamination or errors. The samples are dispatched to the coal assay laboratory within three days to minimise moisture loss and variation and another possible coal-property deterioration.

All bore samples (up to 2015) are sent to Siza Coal Services Laboratory, a Middelburg-based SANAS-accredited testing laboratory with a full ISO/IEC 17025:2005 certification (last samples submitted in 2014). Arnot and the applicable laboratory reviewed the Yanka round-robin system (to ensure that the laboratory's proficiency testing schemes are still in line with other independent laboratories on reproducibility and repeatability of results).

Drill core samples are dried in an oven before being crushed and screened at -13mm, +0.5/-0.5mm size fractions for physical analysis, and down to -212↔m for chemical analysis. The collected sample is divided into two: one half is for physical analysis (for example, ad hoc abrasive index testing) and the other half is for chemical analysis (such as proximate analysis and calorific value). Float and sink analyses (washabilities) of the screened -13mm and +0.5mm particle size distributions are then performed at five relative densities (RDs), namely 1.40g/cm^3, 1.50g/cm^3, 1.60g/cm^3, 1.70g/cm^3 and 1.80 g/cm^3. Full proximate, calorific value and total sulphur analyses are performed at each RD fraction. Reference samples are stored for at least three months before disposal.

Figure 11: Typical north-south (A-A) section through Arnot geological model



The reported estimation is based on the 2015 geological model, which was the last updated model when operations stopped. Some 2 458 boreholes with applicable analysis were selected from the extensive database based on specific criteria and used for Resource estimation, using Minex general gridding. Coal-quality compositing was conducted in Geovia Minex™ on a weighted average basis and signed-off substitute values were used for unsampled in-seam material. The average estimated raw relative density was used for tonnage estimation. In general, a 10% geological loss was applied but the loss factor may vary depending on the consideration of structural complexity, intrusions and level of weathering (application of RODA).

The Resource classification methodology, although fundamentally based on SANS 10320, is based on a matrix approach that incorporates borehole spacing, type of boreholes and structural complexity in the Resource.

Table 12: Arnot Coal Resource reporting criteria

Thickness cut-off (reporting and extraction height considerations)	Quality cut-offs (adb)	Geological loss
OC <1.0m	Ash >50%	Applied per domains ~10% (RODA)
UG <1.8m	Ash >50%	

Table 13: Arnot Coal Resource estimation criteria

	Item	Description
Database	**Borehole database**	acQuire
	Data datum	Cape LO29
	Number of boreholes used for Resource estimation	2 458
	Validation	Range of standard queries to test seam structure and quality
	Data compositing and weighting	Geovia Minex™
Model	**Previous model date**	2014
	Last model update	2015 (ARN 2015)
	Geological modelling software	Geovia Minex™
	Last peer review	2015
	Estimation technique	Growth algorithm
	Grid mesh size	25m x 25m
	Scan distance	2 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering and topography/collar Lower: basement/Dwyka
	Model outputs	Roof, floor and thickness grids generated for structure Raw quality grids
	Changes to modelling process	None

Table 14: Arnot Coal Resource classification criteria

Category	Type of boreholes	Borehole spacing	Structurally complex areas
Measured	Cored boreholes with applicable coal qualities	0m – 350m	May be more conservative after consideration of RODA
Indicated	Cored boreholes with applicable coal qualities	350m – 500m	May be more conservative after consideration of RODA
Inferred	Cored boreholes with applicable coal qualities	500m – 1 000m	May be more conservative after consideration of RODA

Ancillary Resource and Reserve information by operation

continued

Table 15: Arnot Resource statement

Category	2019 (Mt) (OC)	2019 (Mt) (UG)	2018 (Mt) (OC)	2018 (Mt) (UG)	Difference (%)
Measured	20.2	118.3	20.2	118.3	—
Indicated	18.9	45.4	18.9	45.4	—
Inferred	8.8	12.5	8.8	12.5	—
Total Coal Resources	47.9	176.2	47.9	176.2	—

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: opencast (OC) or underground (UG).*
- *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
- *The tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt. Coal Resources are quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources are reported on a MTIS basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources are quoted inclusive of Coal Reserves.*

Table 16: Arnot RPEEE considerations

Item	Criteria	Considered	Arnot-specific comment
Geological data	Data validated and signed off by competent person	Yes	2015 version
Geological model	Geological model considered and signed off	Yes	Geological structure and depositional extent, seam thickness >1.80m (UG) and >1.0m (OC), <50% ash content with coal qualities reported on an air-dry basis
Structural model	Structure model considered and signed off	Yes	2015 version
Mining	Mining assumptions considered and defined	Yes	Underground and opencast
Assurance	Minimum tier 1 assurance (Exxaro governance)	Yes	2015
Economic evaluation	A concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	Prefeasibility study conducted for mineral rights area
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Done	The dispute in the Exxaro/Eskom coal-supply agreement for the shortfall in the rehabilitation provision fund was resolved by arbitration with an award in favour of Exxaro. Exxaro further made the arbitration award an order of court
Tenure	Formal tenure must be demonstrated with reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national governmental legislation	Yes	Compliant mining right while mine is in closure
Infrastructure	Assumptions should be reasonable and within known/assumed tolerances or have examples of precedence	Done	Current infrastructure
Market	Potential market for product with reasonable assumption that it is sustainable	Done	Good quality Coal Resource with reasonable understanding between mining operator and Eskom to unlock any potential challenges and lead to coal extraction

Arnot mine known risks

No Coal Reserves are declared because of the absence of a CSA. Known occurrence of dykes, geological faults, weathering and seam thickness and quality variability are known. The occurrence and thickness of in-seam partings are highly variable and create significant challenges in underground mining sections. Continuous and focused infill openhole wire-logged drilling in panels is employed to address these risks.

Belfast mine

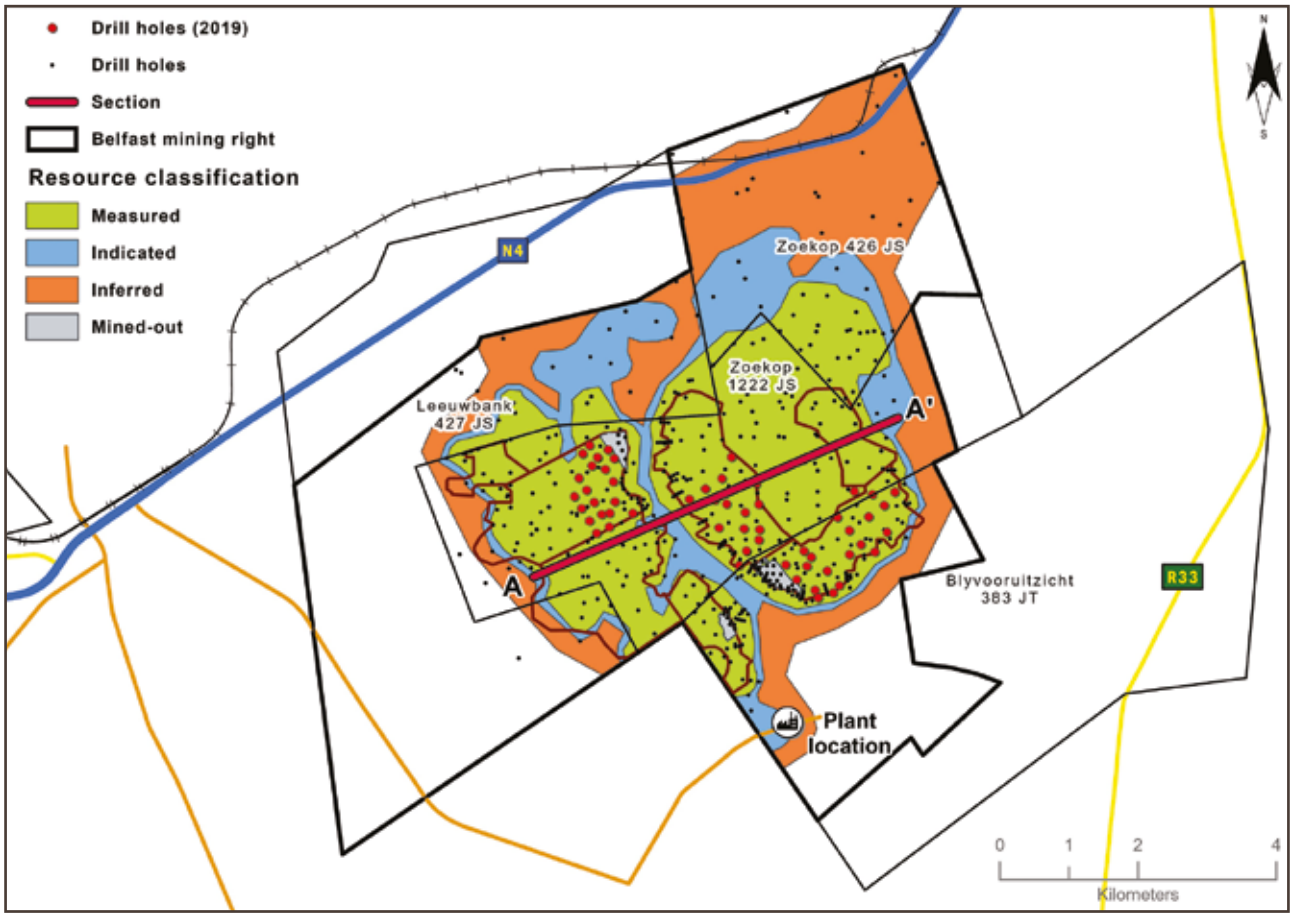
Belfast overview

The Belfast mine is located some 10km south-west of the town of Belfast in Mpumalanga, South Africa, on the far eastern edge of the Witbank coalfield. The coalfield extends about 190km east-west between the towns of Springs and Belfast, and about 60km in a north-south direction between the towns of Middelburg and Ermelo. The mineral tenure areas of Umsimbithi Mining and Universal Coal (Paardeplaats) are to the north of Belfast with the Umsimbithi Mining Wonderfontein coal mine to the far west.

The Belfast mine is adjacent to the N4 highway connecting Pretoria and Maputo, and can be accessed from the N4 via two district roads, namely D1110 and D1770. The mine is also adjacent to the railway line to Maputo. Nearby loading facilities connect the railway line to Richards Bay. Once fully developed, the mine will have seven opencast pits. There are prospects for additional opencast pits and an underground mining section.

Thermal coal is beneficiated in a two-stage dense medium separation plant to produce a primary product of 6 000kcal/kg net as received (NAR) and a secondary product of 21.6MJ/kg. Both products are suitable for the export market but the secondary product can also be sold in the domestic market. Mobile crush-and-screen plants may be brought on-site as needed. Existing Eskom power lines are on the property for electricity supply. The mining right has been approved and all environmental appeals have been favourably addressed. Mining operations began in the first quarter of 2019 and will ramp up in 2020. Coal Resources occur within most of the mining right whereas the Coal Reserve is limited to the southern mining right area aligned with the existing LoM plan. A project was initiated in 2019 to review the current exploitation strategy, including testing economic viability (macro-economic outlook) of the northern area considering both open cut, and underground mining scenarios.

Figure 12: Belfast mine



Ancillary Resource and Reserve information by operation

continued

Belfast history

Belfast Coal has an approved mining right that covers 7 198ha. The geological model incorporates 616 boreholes. The geological database also includes 113 boreholes outside the mining right area.

Table 17: Belfast operation history

Date range	Company	Material notes
1967	Fuel Research Institute of South Africa (FRI)	25 boreholes
1969	Trans-Natal Steenkoolkorporasie Beperk (TNS)	10 boreholes
1975 – 1983	Gold Fields Mining and Development (GFM&D)	43 boreholes
2001 – 2003	Eyesizwe	155 boreholes
2008 – 2009	Exxaro	153 boreholes to refine classification and potential box-cut positions
2010 – 2019	Exxaro	133 boreholes to enable detailed box-cut designs and five-year mine plan infill drilling

Belfast geology

The Witbank coalfield has up to five coal seams in the middle Ecca group sediments of the Karoo supergroup. The Karoo sequence in the area is represented by the Dwyka formation and the middle Ecca with little or no lower Ecca development. The middle Ecca sequence of coal horizons interbedded with sediments is highly truncated due to erosion with only very minor areas where the full sequence is developed. Locally, there are mainly three seams being targeted, seams 2 (S2), 3 (S3) and 4 (S4). Seam 5 (S5) was intersected in only two boreholes in the northern part of the project area. S2 the most prevalent seam is consistently developed, except in areas where it has been eroded, and has an average thickness of 2.8m dipping gently to the south. Both S3 and S4 are sporadically developed due to erosion and both have an average thickness of 0.6m. Due to the proximity of the northern edge of the Witbank Basin, the primary control of the coal development is the current weathering surface. The deposit is therefore divided by a perennial stream into two Resource blocks under two distinct spurs in the surface topography. There is no indication of pertinent faulting from the borehole information but potential intrusions of dolerite dykes are outlined by regional airborne magnetics, indicating the possible occurrence of regional north-south trending dykes.

There are no known geological structures that may affect the geology or coal seam continuity.

Belfast Resource evaluation

The geologist in charge supervises all borehole drilling, and is responsible for logging and sampling in compliance with Exxaro's logging and sampling standards as well as standard operating procedures. Sampling of boreholes is only conducted after the stratigraphy has been correlated. All samples collected and bagged are registered in a sample sheet, which is also used as a dispatch sheet. The dispatch sheet is signed by the receiving laboratory personnel after ensuring that the number and sample ID on the dispatch sheet matches that of the actual samples to be analysed. Once the laboratory receives and signs the dispatch sheet, it is responsible for safekeeping and storage of that batch of samples.

All coal analysis was conducted at an accredited Bureau Veritas ISO/IEC 17025:2005 laboratory. Great emphasis is placed on ensuring data integrity though rigorous procedures and supervision while processing. As part of the assurance and control process, audits are performed internally and externally. Bureau Veritas is SANAS-accredited for analytical work and participates in monthly local and international round-robins.

The Coal Resource classification methodology is fundamentally based on SANS 10320 and considers borehole spacing, type of boreholes and structural complexity of the Resource.

Figure 13: Belfast west-east cross-section

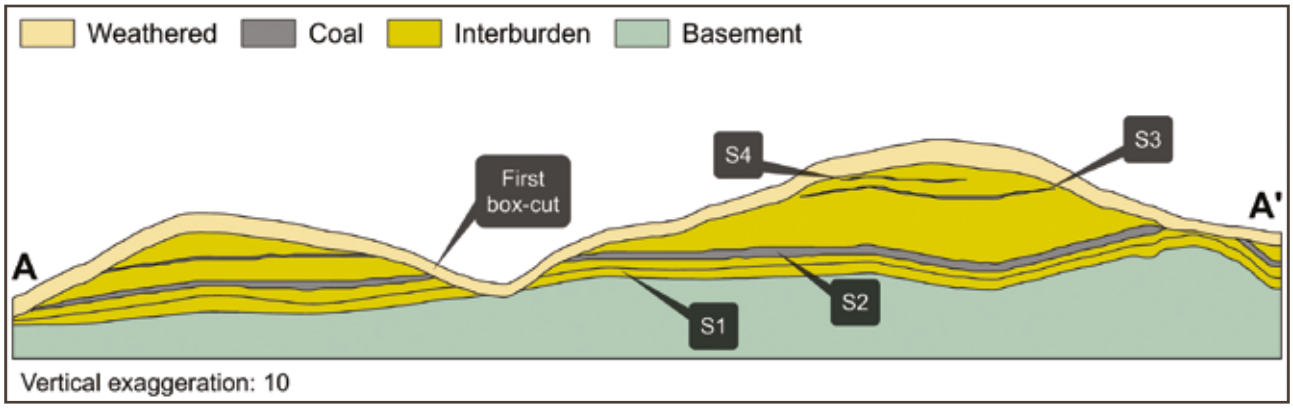


Table 18: Belfast Coal Resource reporting criteria

Thickness cut-off (thickness and extraction height considerations)	Quality cut-offs (adb)	Geological loss
Opencast ≤0.5m Underground ≤1.2m*	Ash >50%	5%

** Current proposed underground exploitation plan was used as a baseline for underground minimum thickness cut-off.*

Table 19: Belfast Coal Resource estimation criteria

	Item	Description
Database	Borehole database	acQuire
	Data datum	Cape LO29
	Number of boreholes used for Resource estimation	616
	Validation	Conducted using queries in acQuire Excel
	Data compositing and weighting	acQuire
Model	Previous model date	2012
	Last model update	2018
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm
	Grid mesh size	25m x 25m
	Scan distance	3 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering and topography/collar Lower: basement/Dwyka
	Model outputs	Roof, floor and thickness grids generated for structure Raw quality grids
	Changes to modelling process	None

Table 20: Belfast Coal Resource classification criteria

Category	Type of boreholes	Borehole spacing	Structurally complex areas	BH/ha
Measured	Cored boreholes with applicable coal qualities	0m – 350m	May be more conservative after consideration of RODA	0.08
Indicated	Cored boreholes with applicable coal qualities	350m – 500m	May be more conservative after consideration of RODA	0.04
Inferred	Cored boreholes with applicable coal qualities	500m – 1 000m	May be more conservative after consideration of RODA	0.01

Ancillary Resource and Reserve information by operation

continued

Table 21: Belfast Resource and Reserve statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)	Reason for change
Measured	74.6	81.1	(6.5)	(8)	Mining depletion (1.4Mt). Methodology change from a 0.5m to 1.2m thickness cut-off in the current exploitation area is mainly impacting S3 (5.1Mt)
Indicated	20.1	22.4	(2.3)	(10)	Methodology change from a 0.5m to 1.2m thickness cut-off in the current exploitation area is mainly impacting S3 (1.3Mt) with barrier disposals accounting for the remaining (1Mt) decrease
Inferred	34.1	34.4	(0.3)	(1)	Change in Resource classification
Total Coal Resources (OC/UG)	128.8	137.8	(9)	(7)	
Proved	42.2	45.7	(3.5)	(8)	Decrease is the result of mining (1.3Mt) and change in Resource classification (2.2Mt)
Probable	1.4		1.4	100	Change in Resource base inside LoM
Total Coal Reserves (OC)	43.6	45.7	(2.1)	(5)	

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: opencast (OC).*
- *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
- *The tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt. Coal Resources are quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources are reported on a mineable in-situ (MTIS) basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources are quoted inclusive of Coal Reserves.*

Table 22: Belfast RPEEE considerations

Item	Criteria	Criteria met (Y/N)	Comment
Geological data	Data has been validated and signed off by competent person	Yes	Geological structures and depositional extent are considered as well as seam thickness <0.5m (OC) and <1.2m (UG), >50% ash content with coal qualities reported on an air-dry basis
Geological model	Geological model has been considered and signed off	Yes	
Structural model	Structural model was considered and signed off	Yes	2018
Mining	Mining assumptions considered and defined	Yes	Opencast and underground
Assurance	Exxaro internal audits and external audit conducted	Yes	External audit in 2015 and internal review in 2019
Economic evaluation	Exploitation study with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	Belfast exploitation strategy over mining right (2018)
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Yes	Environmental management plan, integrated water-use licence and National Environmental Management Act licences in place and compliant
Tenure	Formal tenure must be demonstrated with reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national governmental legislation	Yes	Mining right in place and land acquisitions will be done with expansions
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Yes	Existing infrastructure adequate or can be upgraded with new required infrastructure under construction
Market	A potential market for the product with a reasonable assumption that this market is sustainable	Yes	Primary product qualities suitable for A-grade export market and middlings suitable for domestic power generation

Belfast Reserve estimation

Scheduling of the Reserve is determined using mining scheduling applications from XPAC, which is the same software used to develop the LoM plan schedule. The geological 3D model used for the Resource statement is referred to as the Reserve geological 3D model.

The geological model is supplied to mining processes in the form of Minex™ grids. The grids and DXF files are then converted by mining processes to Surpac files. The methodology used by mining processes is to initially validate the geological information received by checking the integrity of the geological structure and that quality and wash-table values are consistent.

Indicated Resources are generally converted to Probable Reserves and Measured Resources to Proved Reserves after consideration of all applicable modifying factors. If one or more of the modifying factors have not been fulfilled, Measured Resource is either not converted or the Measured Resource is converted but downgraded to Probable and the associated risk is clearly stated. Inferred Resources are not converted to Coal Reserves.

Some 0.7Mt of Inferred Resources are included in the LoM plan, representing 1.5% of the LoM plan, and are not considered material. The area with Inferred Resources, on the western edge of the pit, will only be reached towards the end of LoM.

Table 23: Belfast production figures

	Actual 2018	FC 2019	Actual 2019	FC 2020	FC 2021
RoM (Mt)	N/A	1.29	1.08	3.25	3.5

Table 24: Belfast modifying factors considered in converting Coal Resources to Coal Reserves

Modifying factors	Value
Geological loss	5%
Average thickness cut-off	0.8m
Quality cut-offs	No quality cut-offs, economic cut-offs
Mining loss	0.1m
Boundary pillar	0
Dilution	0%
Contamination	0.1m
Mining recovery efficiency	100% (already accounted in mining loss)
Planned average slope angles	0
Practical plant yield	88.11%
Strip ratio cut-off	0
Environmentally sensitive areas	100m
Legal	Applicable mining right considered
Social	Applicable communities considered
Geohydrological	Applicable surface and groundwater models considered

Belfast known risks

Weathering impacting on coal seam continuity is a continuous risk, which is managed through strict grade control and infill drilling practices.

Currently, all modifying factors are based on the company's knowledge of the Mpumalanga coal field due to the fact that this operation does not have any historic information on which to base the factors. As the mine continues to operate and mine-specific information is gathered, these factors will be reviewed and, if necessary, adjusted to actual performance. We do not know of any pertinent risks or other material conditions that may impact the company's ability to mine or explore, including technical, environmental, social, economic, political and other key risks.

Belfast operational excellence

Although every effort was made to include all value-adding opportunities in the project, it is inevitable that some opportunities still exist. If the macro-economic outlook, in terms of prices and exchange rates, improves significantly, a large portion of the orebody, currently excluded, could be added to the Coal Reserve, and subsequently extend the LoM. Opportunities exist to substitute some of the current mining equipment with other production haul trucks that could reduce the operating cost of the haul fleet.

Purchasing of the farms to the north of the current mine layout could potentially, after the review of the exploitation strategy and economic viability extend the LoM and add to the Coal Reserve.

Ancillary Resource and Reserve information by operation

continued

Grootegeluk mine

Grootegeluk overview

Grootegeluk mine is on the southern margin of the Waterberg coalfield, south of the Daarby fault on the shallow opencastable portion of the coalfield. The mine is 25km west of the town of Lephalale in the Lephalale magisterial district of Limpopo, South Africa. Grootegeluk can be reached from Lephalale via the hard-topped Nelson Mandela Drive, which is linked to the R510 road connecting Lephalale to the town of Vaalwater to the south and the Stockpoort border post between South Africa and Botswana to the north.

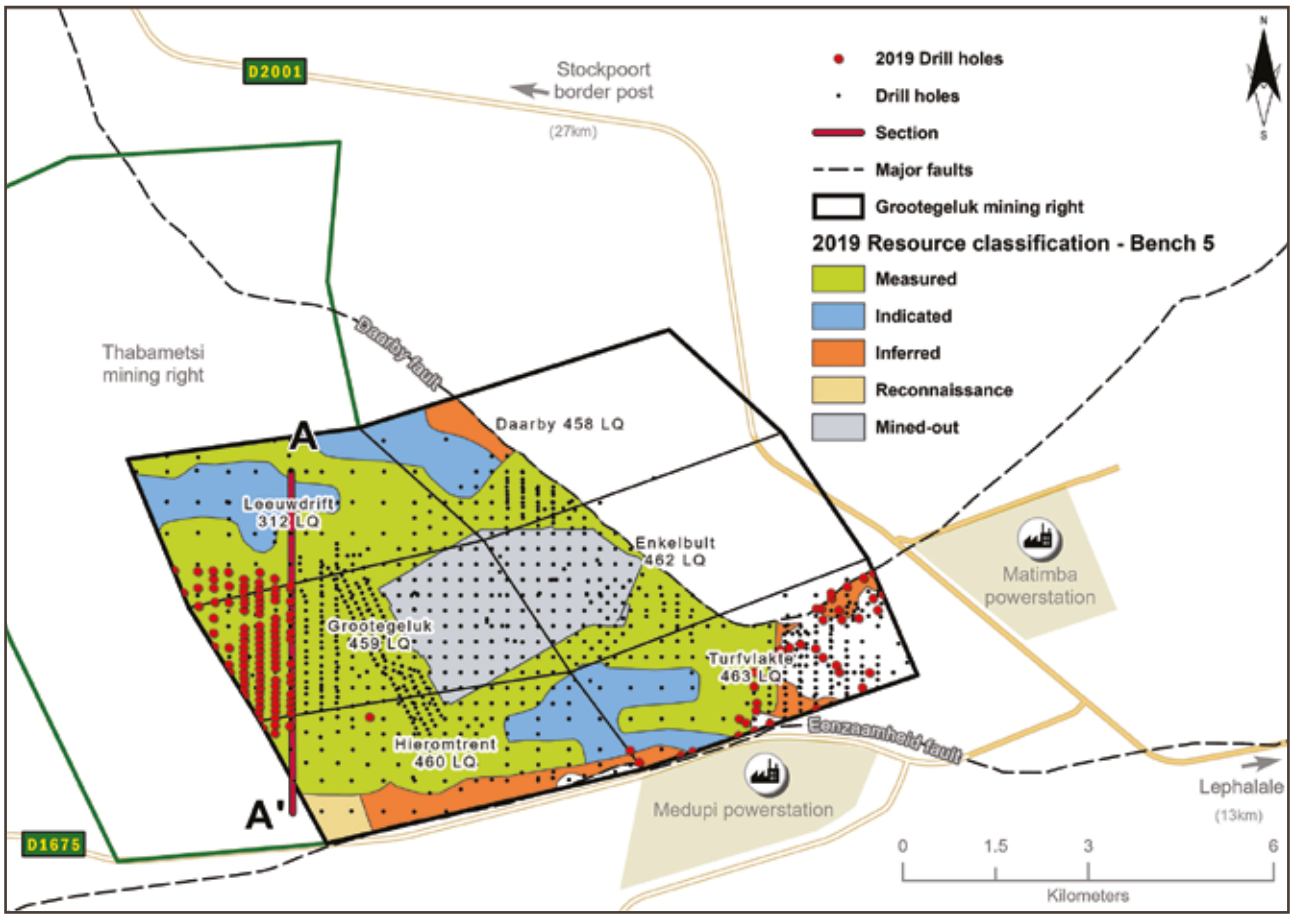
Grootegeluk comprises one open-pit mine which includes two overburden benches, nine RoM benches and three interburden benches. RoM is transported to the Grootegeluk beneficiation complex via hauling trucks and conveyor belts. The beneficiation complex consists of eight plants producing several different coal products to client specifications. Beneficiation plant discard is backfilled into the mined-out portion of the open pit while slimes are pumped to a specially designed cyclic pond system from where it is later reclaimed and blended in low quantities with the power-station coal produced.

The mine is linked to the suburb of Onverwacht, the town of Lephalale and neighbouring towns, as well as nearby border posts with Botswana via the R510 road.

Power supply to the mine is obtained directly from the power station, via two 133kV lines that supply the mine's 40MVA transformers, which in turn distribute 33MV through two measuring points to the plant and mining operations. A portion of the mine's product is railed from site to a range of customers by a single-gauge railway line that extends southward to Thabazimbi where it links into the main railway network. Most coal exports are shipped via Richards Bay Coal Terminal (710km south-east of Grootegeluk) and the rest from the Durban harbour (760km south-east of Grootegeluk). Raw water is delivered to the mine, and to a water-treatment plant on the farm Zeeland by the 700mm-diameter Hans Strijdom pipeline. The pipeline originates at Mokolo Dam, in the Waterberg Mountains, 39km south-east of Grootegeluk. Potable water from the Zeeland water-treatment plant (11km south-south-east of Grootegeluk) is in turn routed to the mine and local communities.

Coal is beneficiated via eight different plants that produce power-station coal (thermal coal) at 35% ash, variously sized metallurgical coal products at different quality specifications and semi-soft coking coal. Thermal coal is sold to Eskom in terms of long-term coal-supply agreements to supply feed coal to the Matimba and Medupi power stations via conveyor belts. Variously sized metallurgical coal products at 15% ash and 11.25% ash, semi-soft coking coal at 10.3% ash, as well as steam coal at 12.5% ash are railed to various customers and shipped to international clients via an export harbour. A small portion of the total product is sold on-site to smaller customers and dispatched by road.

Figure 14: Grootegeluk mine



Grootegeluk history

Table 25: Grootegeluk operation history

Date range	Company	Material notes
1960s – 1980	Yskor – Iscor – Iscor Mining – Kumba Resources	Drilling exploration holes before mine commissioning took place (221 boreholes drilled)
1980 – 2019	Kumba Resources – Kumba Coal – Exxaro Resources	Continued exploration drilling post mine commissioning (1 121 boreholes drilled)

Since beginning exploration activities at Grootegeluk, the company has changed its name and/or unbundled several times without selling the asset to new owners. Through all these changes, exploration drilling continued in the same way.

Small-diameter boreholes (HQ/TNW size core) were drilled on a 500m x 500m grid when the initial exploration project at Grootegeluk started. The suite of analyses performed at that time was analysed only per coal sample and the amount of core obtained from the boreholes was adequate for all the required analysis. Over time, gradual subdivision of coal zones into smaller units or "samples", as well as added relative density fractions to the suite of analysis, resulted in insufficient sample material in some samples and some relative density fractions for the required suite of analyses.

To accommodate the new sample subdivision and in order to have sufficient material available from each sample for the required suite of analyses to relative densities of 2.20g/cc, it was decided to change the size of exploration boreholes from small to large-diameter (123mm-diameter drill core). The large-diameter boreholes were drilled in between the existing 500m x 500m grid of small-diameter boreholes. The reason for this placement of large-diameter boreholes was that analysis of samples from the large-diameter boreholes could be used to supplement analysis of existing small-diameter boreholes where samples and density fractions were absent.

Grootegeluk executes its exploration strategy across the Coal Resource. Boreholes furthest from the open-pit are spaced 3 000m x 3 000m and, closer to the pit, infill holes are drilled to reduce borehole spacing to 1 000m x 1 000m. For the area in front of the open-pit (10 years ahead of planned pit-advance direction), drilled boreholes form a grid of 500m x 500m. In addition, infill holes are also drilled on a 350m x 350m spacing to cover the area that will be mined in the next five years and percussion boreholes are drilled in geologically complex areas to complement the structural interpretation.

Grootegeluk geology

Regionally, Grootegeluk is in the southern portion of the Limpopo depression, a relatively small corridor between the Limpopo River in the west and the Palala-Pietersburg plateau in the east. Fundamentally, it is a re-exposed post-Waterberg topographical feature on which Karoo sediments were deposited, followed by tectonic activity, which was the primary element responsible for the development of the depression.

The Zoetfontein fault forms the boundary of the Waterberg coalfield in the north while the Eenzaamheid fault forms the boundary in the south. The Daarby fault, with a throw of some 350m, divides the coalfield into a deep north-eastern portion and a shallow south-western portion. The first fresh coal in the shallow south-western portion is on average 20m below surface. The lowermost coal seam (zone 1) occurs at a depth of about 130m in the shallow portion of the coalfield but this may vary depending on the local structure (Figure 16). The predominantly horizontal coal-bearing formations have a very gentle dip to the south-east near Grootegeluk. Only a few dolerite dykes outcrop in the south-eastern portion of the Waterberg coalfield and no sills have been encountered in any exploration boreholes drilled in the mine right area to date.

The upper part of the coal deposit, the Volksrust formation (±60m thick), comprises intercalated mudstone or carbonaceous shale and bright coal layers. It displays such a well-developed repetition of coal-shale assemblages that it can be subdivided into seven discrete sedimentary cycles or zones (zone 11 – zone 5). Smaller subcycles (samples) were chosen within these zones and sampled individually in the exploration phase. This subdivision of coal seams into smaller lithological units is necessary to cater for numerous mining bench definitions and/or product specifications. The terms "zone" and "sample" are used at Grootegeluk instead of "seam" and "ply" due to the site-specific intercalated nature of the coal and shale. The Volksrust formation is classified as a thick interbedded seam deposit type.

The Volksrust formation zones typically start with bright coal at the base. The ratio of coal to shale decreases from the base of each zone upwards. The basal zone (zone 5) is an exception because of a more homogeneous distribution of coal and shale throughout this zone. The Volksrust formation shale shows an increase in carbon content with depth and varies from a massive bluish-grey mudstone to carbonaceous shale towards the base. Although the thickness and coal quality of the Volksrust formation are reasonably constant across the coal field, a large variation in the yield of semi-soft coking coal and total sulphur content occurs vertically in the coal succession.

The Vryheid formation (±55m thick) forms the lower part of the coal deposit and comprises carbonaceous shale and sandstone with interbedded dull coal seams varying in thickness from 1.5m to 9m. It is therefore classified as a multiple-seam deposit type.

There are five coal zones that consist of predominantly dull coal with some bright coal developed at the base of zones 2, 3 and 4 in the Vryheid formation. Due to lateral facies changes and variations in the depositional environment, these zones are characterised by a large variation in thickness and quality. It is noted in the mine lease area that these zones depreciate in development and coal quality in a westward direction due to sedimentological facies changes. Zone 3 is the best-developed dull coal zone in the mine lease area and reaches a maximum thickness of 8.9m. The basal portion of this zone yields some semi-soft coking coal. Zone 2, on average 4m thick, reaches a maximum thickness of 6m in the mine lease area. The basal portion of this zone also exhibits semi-soft coking coal properties. Zone 2 exhibits the most consistent thickness of all the Vryheid coal zones across the entire Waterberg coalfield. Zone 1, the basal Vryheid coal zone,

Ancillary Resource and Reserve information by operation

continued

has an average thickness of 1.38m. Zone 1 contains the best-quality metallurgical coal at Grootegeluk and is suitable to produce char but is not included in the mine plan due to the high stripping ratio given a 12m thick overlying interburden sandstone seam. Due to previous mining activity, over 5Mt of high-quality low-phosphorous content metallurgical coal from zone 1 has been sterilised to date by the pit backfill operation.

Grootegeluk Resource evaluation

All exploration boreholes are logged and sampled by experienced on-site geologists, aligned and in compliance with logging and sampling standards and standard operating procedures. Samples are selected according to seam coal and shale contacts, visual variation in the vitrinite content, assisted by a suite of downhole geophysical logs, and non-coal material present in the seam boundaries. Large-diameter core (123mm) boreholes are drilled for Coal Resource purposes.

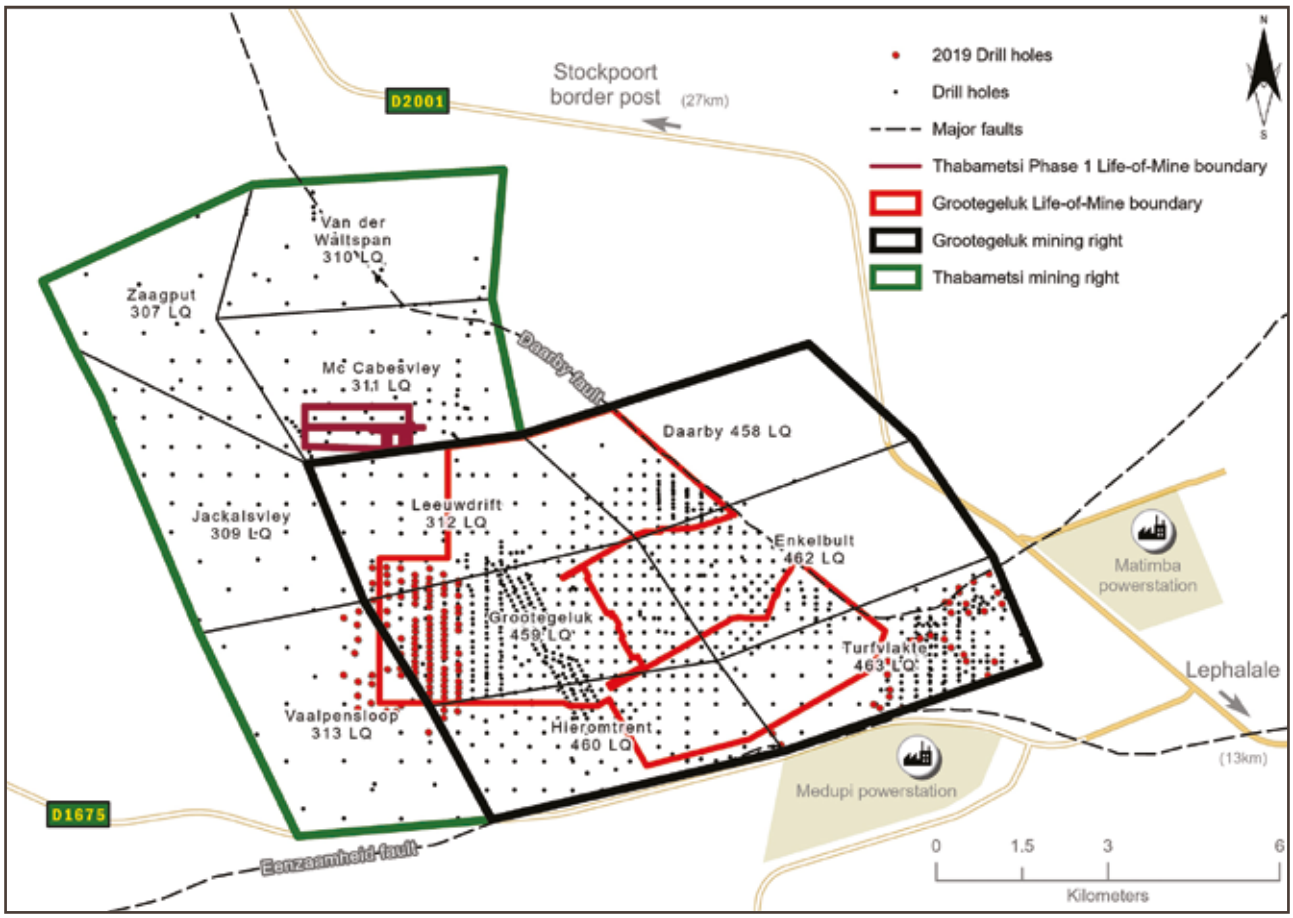
Core loss for coal seam intersections is recorded and a recovery of <95% through coal (by volume) is deemed unsatisfactory. Anomalies were investigated and redrilled if required. Wire-line logging results are available for all boreholes. Logging is conducted by recording lithology down to centimetre scale according to the classification of the various coal "lithofacies"/coal type zones or ply (shale-coaly, coal-shaly, coal dull, coal mixed/mainly dull, coal mixed, coal mixed/mainly bright and coal bright) based on the discernible lithofacies change and identified marker horizons, particularly through coal zones.

Sampling of boreholes is only conducted after the stratigraphy has been correlated. The geologist in charge supervises all borehole drilling and is responsible for logging and sampling. Each sample submitted to the laboratory is accompanied by a unique sample number for validation and tracking as well as a submission list that serves as a sample advice sheet with instructions for analysis. The delivery or turnaround time is calculated as the time from which the laboratory receives the samples to the time when the last batch of analysis is reported. Once the laboratory has received and signed the dispatch sheet, the safekeeping and storage of that batch of samples lies with the laboratory.

Grootegeluk uses Bureau Veritas laboratory for its exploration borehole sample analyses. Bureau Veritas acquired Advanced Coal Technology (ACT) in 2013, which had performed Grootegeluk's analysis of exploration borehole samples since the early 1960s. ACT was an outsourced company formed from the old Iscor pilot plant laboratories and has been a continuation of services previously provided by Iscor.

The only form of subsampling conducted at Grootegeluk is the separate sampling of coal and shale layers of the Volksrust formation sample units for analyses. The composited coal and shale samples per sample interval are weighed to determine the samples' relative densities and percentage core recovery.

Figure 15: Grootegeluk mine and the adjacent Thabametsi project area



Relative density measurements are carried out at Grootegeluk using the "mass in air versus mass in water" method.

Current sample intervals as per exploration borehole are, in certain cases, subintervals of historic sample intervals. For instance, samples 22A, 22B, 22C, 22D and 22E are subdivisions of sample 22 as it was sampled in historic boreholes hence the nomenclature. When compositing these relevant subintervals, it is fully representative and can be used in conjunction with historic boreholes to describe the same geological unit.

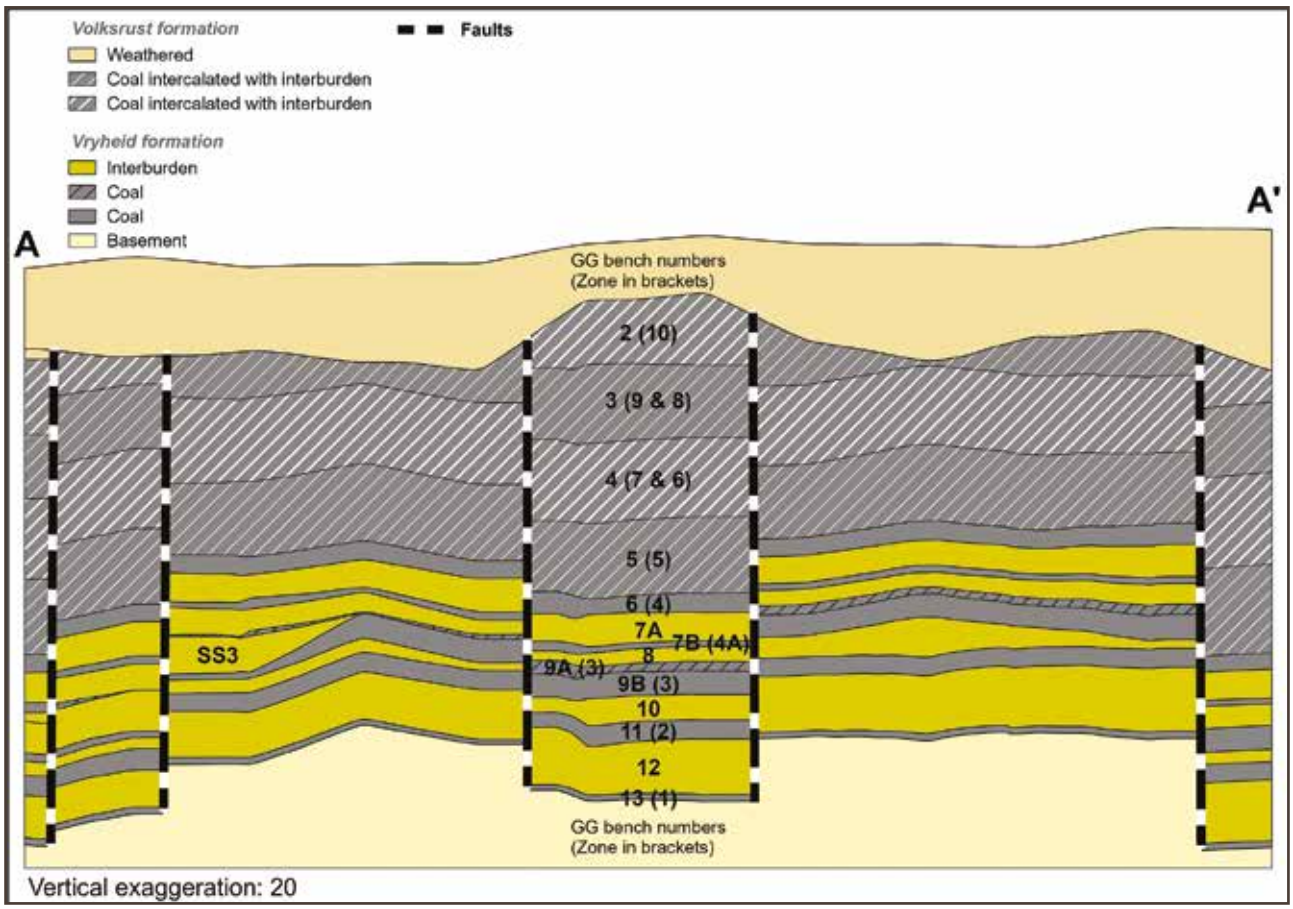
The laboratory follows one of four standard suites of analysis for each sample from Grootegeluk, namely Volksrust formation coal, Volksrust formation shale, Vryheid formation coal and Vryheid formation shale. Coal samples are analysed before shale samples because of potential changes that could take place in the characteristics of the coal due to exposure to the atmosphere.

The analyses performed on the borehole core samples include proximate analysis, ash composition analysis, ash fusion temperature analysis and petrography. Analyses are performed separately on the coal and shale samples after float-and-sink analyses have been performed to obtain fractional samples for the range of densities. All data received from Bureau Veritas is in digital format and checked against the original request list to ensure the required analyses were conducted and results were recorded appropriately. The digital data is then imported into the same database in which the core log data has been captured (Sable Data Warehouse) and subsequent validation procedures are conducted. This serves to verify laboratory accuracy and it is performed during the data-importation stage.

The Coal Resource classification methodology is fundamentally based on SANS 10320 and considers borehole spacing, type of boreholes and structural complexity of the Resource. Additional efforts are used to provide for areas with perceived geological risk.

The classification method is the same for the overlying Volksrust and underlying Vryheid formation Coal Resources for practical considerations. The classification methodology is reviewed each year and reconciliation for that year is used to test the classification criteria. The review addresses specific geological risks expected in the Resource, including increased variability in certain coal qualities, thinning of certain benches by weathering in the Volksrust formation, deterioration of coal formation in certain benches and a gradual increase in the average total sulphur content in general. Only cored boreholes with applicable coal quality data are used and structurally complex areas must be complemented by additional geophysically logged open (percussion drilled) boreholes.

Figure 16: Typical west-east section through Grootegeluk geological model showing the various benches and zones



Ancillary Resource and Reserve information by operation

continued

Table 26: Grootegeluk Coal Resource reporting criteria

Thickness cut-off (thickness and extraction height considerations)	Quality cut-offs (adb)	Geological loss (%)
<0.5m	Ash content of >65%	Variable per bench, calculated each year considering geological model estimation error and physical geological loss

Table 27: Grootegeluk Coal Resource estimation criteria

	Item	Description
Database	Borehole database	Sable Data Warehouse
	Data datum	LO27 WGS 84
	Number of boreholes used for Resource estimation	801
	Validation	Conducted using queries in Sable and Excel
	Data compositing and weighting	Sable Data Warehouse
Model	Previous model date	2013
	Last model update	2016 (conclusion of 2019 update in progress)
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm
	Grid mesh size	20m x 20m
	Scan distance	2 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering Lower: zone 1 floor
	Model outputs	Roof, floor and thickness grids generated for structure. Coal-washability quality grids
	Changes to modelling process	None

Table 28: Grootegeluk Coal Resource classification criteria

Resource category	Type of boreholes	Borehole spacing (Volksrust Formation and Vryheid Formation)	Structurally complex areas	BH/ha
Measured	Cored boreholes with applicable coal qualities	≤500m	Matrix (additional geophysically logged boreholes needed)	0.04
Indicated	Cored boreholes with applicable coal qualities	>500m and ≤1 000m	Matrix (additional geophysically logged boreholes needed)	0.01
Inferred	Cored boreholes with applicable coal qualities	>1 000m and ≤3 000m	Matrix (additional geophysically logged boreholes needed)	0.001

Table 29: Grootegeluk Resource and Reserve statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)	Reason for changes
Measured	2 786	2 844	(58)	(2)	Mining depletion
Indicated	1 017	1 017	—	—	
Inferred	653	653	—	—	
Total Coal Resources	4 455	4 514	(58)	(1)	
Proved	2 520	2 576	(56)	(2)	Mining depletion
Probable	645	645	—	—	
Total Coal Reserves	3 165	3 221	(56)	(2)	

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: opencast (OC).*
- *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
- *Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt. Coal Resources are quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources are reported on a mineable in-situ (MTIS) basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources are quoted inclusive of Coal Reserves.*

Table 30: Grootegeluk RPEEE considerations

Item	Criteria	Considered	Comment
Geological data	Data has been validated and signed off by competent person	Yes	
Geological model	Geological model was considered and signed off	Yes	Seam depth, seam thickness >0.5m, ash content <65%. Coal qualities reported on an air-dry basis
Structural model	Structural model was considered and signed off	Yes	2017 review
Mining	Mining assumptions considered and defined	Yes	Opencast
Assurance	Minimum tier 1 assurance (Exxaro governance)	Yes	Resource and LoM done in 2018
Economic evaluation	A concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	Consolidated exploitation plan
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Yes	Current required approvals in place
Tenure	Formal tenure must be demonstrated with reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national governmental legislation	Yes	Mining right (22 years) with reasonable expectation that right will be renewed
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Yes	Current mine infrastructure
Market	A potential market for the product with a reasonable assumption that this market is sustainable	Yes	Current coal-supply agreements for local and export markets

Grootegeluk Reserve estimation

No amendments were made to the LoM plan for Grootegeluk in 2019 and the change is only the result of annual mining depletion. All modifying factors were considered, and no downgrade was made to any Coal Reserves in the various categories. The amount of Inferred Resources in the LoM plan is 510Mt, representing 14% of the LoM plan. The impact of Inferred Resources on the LoM plan was tested and is well understood. The Inferred Resources are located at the latter end of the LoM plan and are addressed through continuous exploration.

XPAC mine-scheduling software is used to derive the remaining saleable Reserves from RoM Reserves in the approved pit layout. After converting the geological model's grids to the appropriate format, the floor, roof and thickness data as well as quality data for each bench is imported into the XPAC model. In this model, validations are performed to evaluate the data for possible discrepancies, such as incremental yields anomalies for each bench, thus ensuring they rise with increases in the relative float densities. The Resource category areas are also loaded into the XPAC model for Reserve categorisation purposes.

The XPAC model integrates new geometallurgical principles into the LoM planning process and scheduling model to better predict as-mined plant performance. This is an all-inclusive model that can simulate all the plants in the Grootegeluk complex from one integrated flowsheet. The key improvement is that the model provides:

- Combined washability data for all material fed to a specific plant
- The data is combined for each relative density
- The impact on plant yield performance, due to the RoM feed consisting of coal from various benches, is modelled

A number of audits have been conducted, in conjunction with the mine, to ensure the process applied is well-understood, documented and that predicted product volumes are realistic and transparent.

The washability tables for each blast block are imported into the geometallurgical model (XPAC). The geometallurgical schedule imitates reality at Grootegeluk as portions of a single blast block can be allocated to several beneficiation plants in a particular scheduling period. Once the production schedule has run, a blend of blast blocks from different benches is allocated to each plant for each scheduling period. A new composite wash table is then derived for each plant for each scheduling period, which represents the blend of material fed from the mine to that plant. This composite wash table is then used to derive the specific products required to be produced by that

Ancillary Resource and Reserve information by operation

continued

plant for that period. A set of calibrated plant factors is applied per plant to adjust theoretical product yields to practical expected levels. It is thus not assumed that a block in its entirety is allocated to one plant only, as this does not represent reality at Grootegeluk. The scheduled mining blocks are of the same size as current actual blast blocks in the mine. The fact that material from different benches is combined and beneficiated simultaneously creates difficulty in reporting saleable product tonnages per bench. The preferred reporting practice at Grootegeluk is therefore RoM tonnes per bench and saleable product tonnes per beneficiation plant.

Indicated Resources are generally converted to Probable Reserves and Measured Resources to Proved Reserves after consideration of all applicable modifying factors. If one or more of the modifying factors have not been fulfilled, Measured Resource is either not converted or the Measured Resource is converted but downgraded to Probable and the associated risk is clearly stated. Inferred Resources are not converted to Coal Reserves.

Table 31: Grootegeluk production figures

Category	Actual 2018	FC 2019	Actual 2019	FC 2020	FC 2021
RoM (Mt)	57.2	57.0	56.2	59.8	65.3

Table 32: Grootegeluk modifying factors considered in converting Coal Resources to Coal Reserves

Modifying factors	Value
Geological loss (varies per bench)	0% – 0.75% for Proved Reserves 0% – 1.5% for Probable Reserves
Thickness cut-off	<0.5m
Quality cut-offs	>65% ash content (raw in-situ coal)
Mining loss	0% due to the fact that all mining boundaries are reached, no pillars are left
Boundary pillar	N/A
Dilution	Applied to in-situ mineable Reserves due to the inter-layered composition of the deposit
Contamination (varies per bench)	0.0 – 0.75 metres applied to interburden seams
Mining recovery efficiency (varies per bench)	0.0 – 0.75 metres depending on bench height
Planned average slope angles	<61.7 degrees
Practical plant yield	Considered in the reserving process as per wash table information per combination of blocks per planning increment and the empirically determined practical yield adjustment factor
Strip ratio cut-off	Energy strip ratio >7GJ/ex-pit tonne
Environmentally sensitive areas	Areas underlying wetlands and other eco-sensitive areas are excluded from the Reserves with a 100m or 100-year floodline cut-off applied
Legal	The layout is within the mining right boundary and not closer than 15m
Social	There are no known socially sensitive areas in the pit layout (for example, graveyards and dwellings)
Geohydrological	Areas identified are flagged and excluded or reclassified in the reserving process

Grootegeluk known risks

We do not know of any pertinent risks or other material conditions that may impact on the company's ability to mine or explore, including technical, environmental, social, economic, political and other key risks.

There are a number of low risks addressed by continuous actions at the operation:

Geological structure accuracy: The structure interpretation (fault positions) is based on current points of observation. Additional percussion boreholes are required in structurally complex areas to finalise the position and characteristics of faults.

Inferred Resources: Some 15% of the total Coal Resource (~14% in LoM plan) is in the Inferred category due to the revised mining pit introduced in 2017. The impact of the Inferred Resources are known, occur on the tail-end of the LoM plan and are addressed by an integrated exploration plan that is reviewed every year.

Thinning of upper benches: Bench 2 and bench 3 are thinning, and are not present in certain areas of the Coal Resource due to weathering with only a small portion of bench 2 remaining in the next few years. This information has been incorporated in the mine's production schedules. Large portions of bench 2 and bench 3 are still available in the planned pit layout further away from the current production face.

Increasing total sulphur content in semi-soft coking coal: A trend of increasing sulphur content in the benches used to produce semi-soft coking coal (benches 2, 3 and 4) is observed in the geological model. Coal sulphur content is known to be highly variable, which makes it difficult to estimate accurately. The variability was considered during the revision of the 2017 pit and LoM plan.

Phosphorus content in semi-coke feed coal: The phosphorous content of bench 11 poses a risk to the production of semi-coke. Bench 11 and zone 1 are the sources of relatively low phosphorus content coal but bench 11 shows a continual increase in phosphorus content. Studies conducted show that most of the phosphorous content of bench 11 is in the uppermost portion of the bench and can be removed separately to mitigate the risk. In addition, zone 1 (bench 13) is currently omitted from the mine plan due to its high-stripping ratio but can be used as a sweetener if it is blended with bench 11.

Reserve within the Thabametsi mining right: A small amount of the Inferred Coal Resource inside the Grootegeluk LoM is located within the adjacent Thabametsi mining right. Both mining rights are held by Exxaro. The risk is not deemed to be material.

Grootegeluk excellence

The implementation of a short-term geological model that incorporates exploration, infill and production drilling as well as pit mapping will enhance short-term estimation and mine planning significantly. The implementation of the GG6 beneficiation plant is unlocking exceptional value in the semi-soft coking coal market.

An update of the geological model is near completion. A subsequent review process of the exploitation strategy of the Grootegeluk complex is currently under way. The review includes evaluating various alternative products, pit layouts, overburden strategies as well as optimal coal bench definitions. The review will be concluded during 2020.

Ancillary Resource and Reserve information by operation

continued

Thabametsi project

Thabametsi overview

The Thabametsi project is 22km west of the town of Lephalale and adjacent to Exxaro's Grootegeluk mine. The project area is divided into a northern opencastable portion, and a southern underground area. The northern portion aims to produce power-station coal for an on-site IPP as part of phase 1. A feasibility study on phase 1 was successfully concluded in 2016 and studies on extending the phase and the southern project area are ongoing. In October 2016, the South African Minister of Minerals and Energy announced that the Thabametsi power project, for which Thabametsi project has a 30-year CSA, had been selected as a preferred bidder in the first bid window of South Africa's coal-baseload IPP procurement programme. A mining right (10013MR) for a period of 30 years was granted and executed in June 2016. A section 102 of the Mineral and Petroleum Resources Development Act, submitted to include several additional minerals to coal, to correct an administrative error, was granted in July 2017 and executed in November 2017. Exxaro is currently ensuring that all compliance actions are executed.

Thabametsi history

Drilling on the Thabametsi project area began in 1979 during Iscor's regional exploration of the Waterberg. This investigation was prompted by positive results on adjacent farms where Grootegeluk mine began production in 1980.

As part of this exploration, one borehole was drilled on all farms of interest. On farms where results were promising, follow-up drilling was conducted in 1980/1981. During this time, eight boreholes were drilled on four of the five Thabametsi farms: McCabesvley, Jackalsvley, Zaagput and Vaalpensloop. Two boreholes were drilled in 1988 on the remaining farm, Van der Waltspan, to complete regional exploration of the Thabametsi project area. All regional exploration during this time, except the boreholes on Van der Waltspan, was conducted through rotary core diamond drilling using an NQ-sized (47.6mm) core barrel. The boreholes on Van der Waltspan used a T6-146-sized (123mm) core barrel.

Exploration activities began in earnest on the project area in 2008. Since the start of the latest drilling programme, 61 boreholes have been drilled on Thabametsi at a cost of around R50 million. All boreholes completed on the project site since 2008 were undertaken using a T6-146-sized core barrel to produce a 123mm diameter core.

Figure 17: Thabametsi project

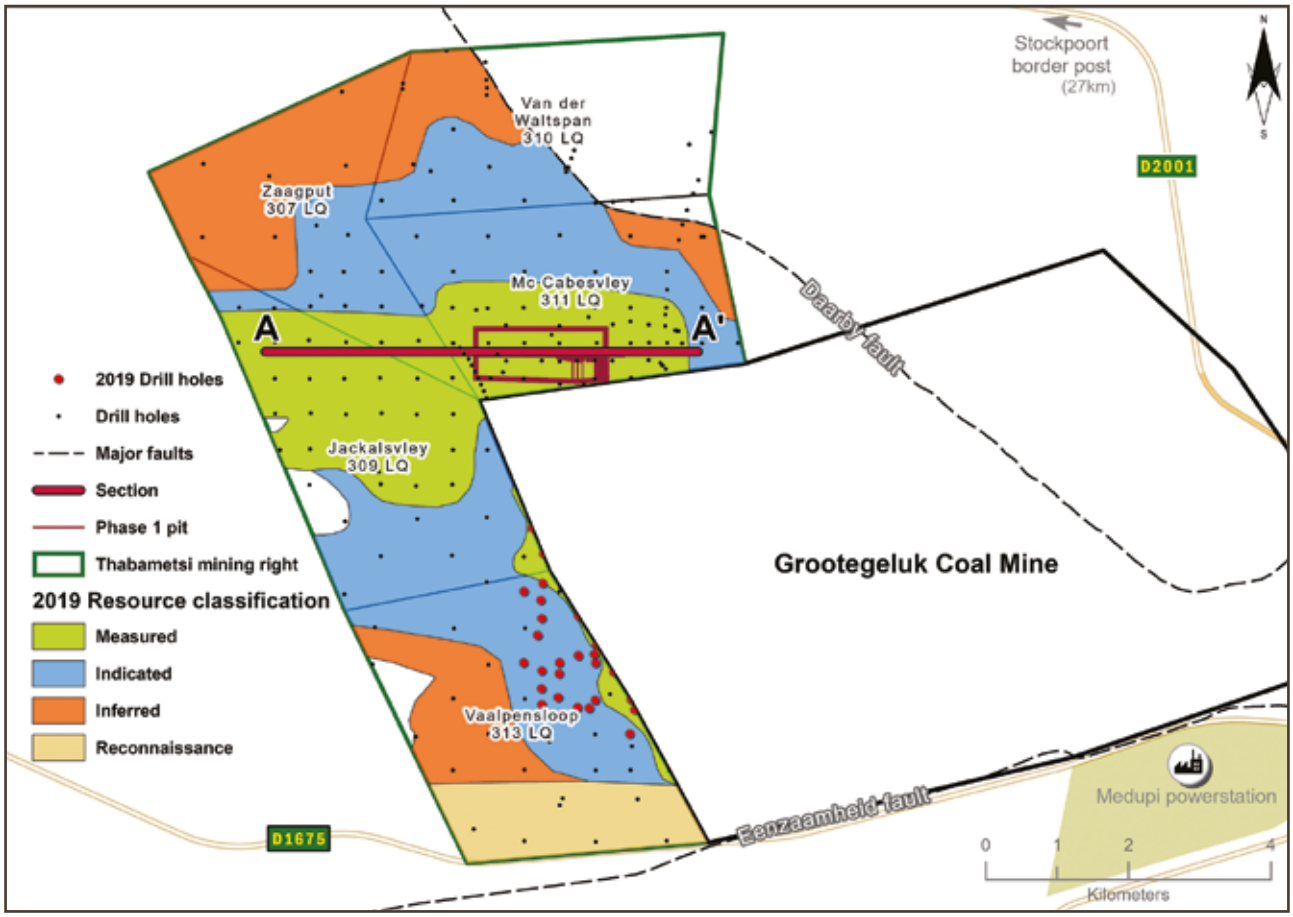


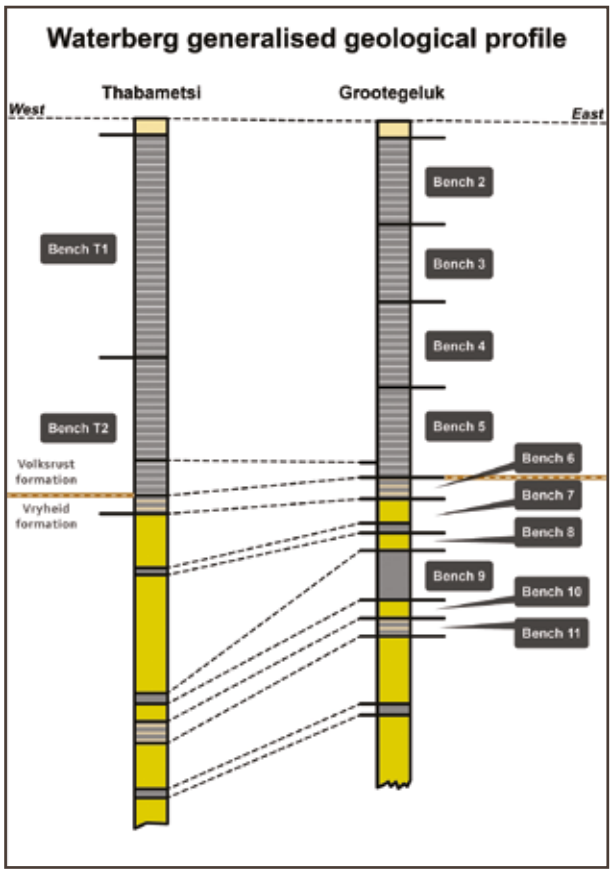
Table 33: Thabametsi project history

Date range	Company	Material notes
1979 – 1988	Iscor – Iscor Mining	Exploration drilling began (7 boreholes drilled)
1989 – 2006	Kumba Resources	51 Boreholes drilled
2007 – 2015	Exxaro Resources	Prospecting right and exploration activities specifically on the project area (180 boreholes drilled)
2016 – current	Exxaro Resources	Mining right registered in 2016 is valid for 30 years (11 boreholes drilled)

Thabametsi geology

The geology is similar to Grootegeluk's geology but increased weathering and deteriorating coal qualities required a different bench configuration. In the north, the full succession of the Volksrust and Vryheid formations is present. However, further south, the Volksrust formation thins out and eventually disappears. A pertinent channel sandstone in the northern portion of the project area affects benches 9A and 9B. A cross-section through the geological model is presented in Figure 19.

Figure 18: Generalised profile of the Grootegeluk and Thabametsi geological profile



Thabametsi Resource evaluation

Logging and sampling follow the same protocols as at Grootegeluk mine. Controls in the work procedure ensure that mistakes are omitted from the process, initially from the placement of borehole survey data in the field to the point of delivery of samples to the laboratory, and after that from receiving analyses back from the laboratory to the point where data is used for geological modelling. These procedures include controls to ensure the drill core is correctly correlated, sampled, relative densities determined, and material recoveries validated to stipulated standards.

Prior to dispatching, coal and shale samples are reweighed in air to check that they have been correctly labelled and that the initial weights recorded are correct for subsequent relative density (RD) calculation. When samples arrive at the Bureau Veritas laboratory in Pretoria, they are reweighed and checked against the recorded RDs on the sample list supplied with the samples by the geology department. The geology personnel are notified of any discrepancy, which is rectified without delay.

The senior geologist in the geodata subsection at Grootegeluk mine is responsible for maintaining a system to ensure that all exploration borehole data is verified, and all geological information is correctly entered into the borehole database (Sable Data Warehouse). The individual is also responsible for tracking borehole samples in the analytical process, accepting analytical data from Bureau Veritas, electronic transfer of analytical data to the borehole database and validation of the data.

Resource estimation and data-compositing methods are aligned with the methodology applied at Grootegeluk. In recent years, five geological models have been built for the Thabametsi project area, accounting for alternate interpretations and compositing scenarios.

The Resource classification methodology throughout the Volksrust and Vryheid formations, although fundamentally based on SANS 10320 (guidelines for multi-seam deposits), is based on a matrix approach that incorporates borehole spacing, type of boreholes and structural complexity in the Resource. The approach is recognised as more conservative than applying guidelines for thick interbedded-type deposits and was chosen to remain conservative during current studies. The classification methodology will be reviewed (as with Grootegeluk) in 2020. Some 116 boreholes were used for Resource estimation and all contain coal-washability data.

Ancillary Resource and Reserve information by operation

continued

Table 34: Thabametsi Coal Resource reporting criteria

Thickness cut-off (thickness and extraction height considerations)	Quality cut-offs (adb)	Geological loss (%)
<0.5m	Ash content of >65%	5%

Table 35: Thabametsi Coal Resource estimation criteria

	Item	Description
Database	Borehole database	Sable Data Warehouse
	Data datum	LO27 WGS 84
	Number of boreholes used for Resource estimation	116
	Validation	Conducted using queries in Sable and Excel
	Data compositing and weighting	Sable Data Warehouse
Model	Previous model date	2014
	Last model update	2015
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm
	Grid mesh size	45m x 45m
	Scan distance	1 000m
	Data boundary	300m
	Model build limits	Limit of weathering
	Model outputs	Roof, floor and thickness grids generated for structure and coal washability quality grids
	Changes to modelling process	None

Figure 19: Cross-section through 2015 Thabametsi geological model

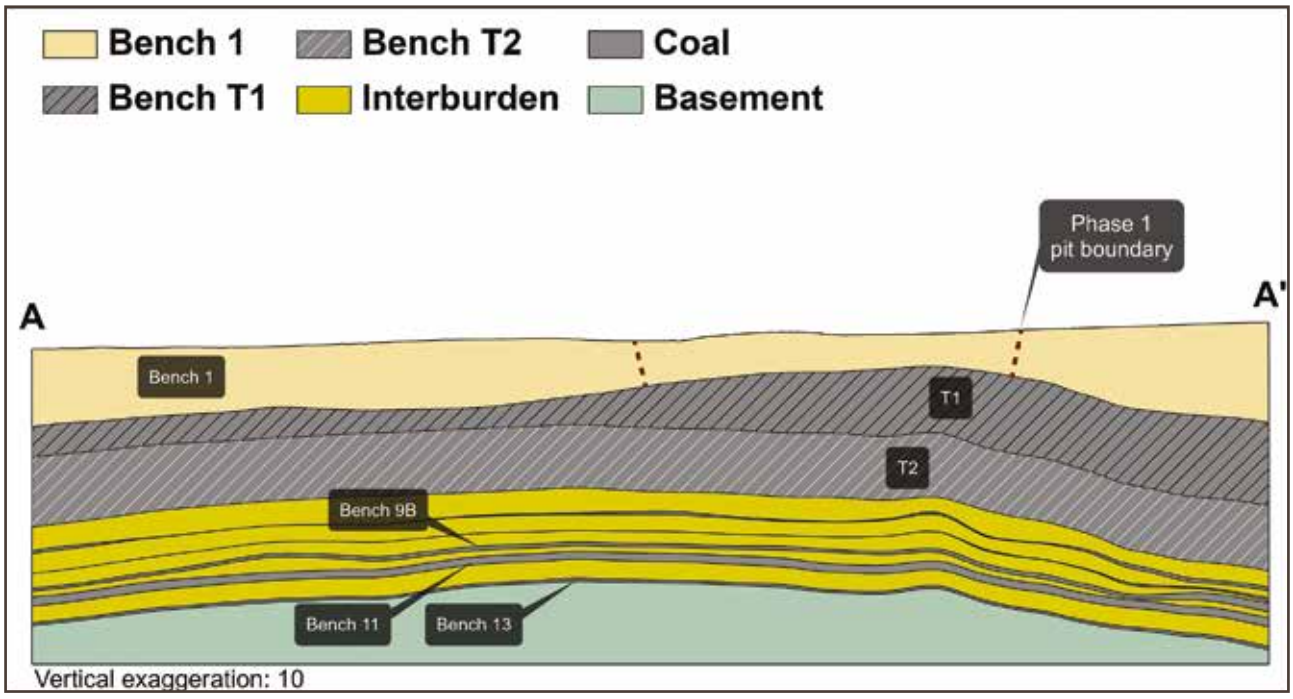


Table 36: Thabametsi Coal Resource classification criteria

Resource category	Type of boreholes	Borehole spacing (Volksrust Formation and Vryheid Formation)	Structurally complex areas
Measured	Cored boreholes with applicable coal qualities	0m – 350m	(Matrix) Additional geophysically logged boreholes needed
Indicated	Cored boreholes with applicable coal qualities	350m – 500m	(Matrix) Additional geophysically logged boreholes needed
Inferred	Cored boreholes with applicable coal qualities	500m – 1 000m	(Matrix) Additional geophysically logged boreholes needed

Table 37: Thabametsi Resource and Reserve statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)
Measured	270	270		
Indicated	749	749		
Inferred	2 916	2 916		
Total Coal Resources	3 935	3 935	—	—
Proved	109	109		
Probable	21	21		
Total Coal Reserves	130	130	—	—

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: opencast (OC).*
- *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
- *Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt. Coal Resources are quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources are reported on a MTIS basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources are quoted inclusive of Coal Reserves.*

Table 38: Thabametsi RPEEE considerations

Item	Criteria	Considered	Comment
Geological data	Data has been validated and signed off by competent person	Yes	
Geological model	Geological model was considered and signed off	Yes	Geological structure and depositional extent, seam thickness >0.5m and <65% ash
Structural model	Structure model was considered and signed off	Yes	
Mining	Mining assumptions considered and defined	Yes	Opencast and underground
Assurance	Minimum tier 1 assurance (Exxaro governance)	Yes	2015
Economic evaluation	A concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	Studies that underpin the IPP study and mining right mine works programme
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Yes	Approvals and land ownership in place
Tenure	Formal tenure must be demonstrated with reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national governmental legislation	Yes	Mining right (30 years)
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Yes	Current infrastructure
Market	A potential market for the product with a reasonable assumption that this market is sustainable	Yes	IPP and current Grootegeluk steam coal market

Ancillary Resource and Reserve information by operation

continued

Thabametsi Reserve estimation

For the phase 1 feasibility study (IPCC Pit), XPAC mine-scheduling software is used to derive remaining saleable Reserves from RoM Reserves in the approved pit layout. After converting the geological model's grids to the appropriate format, the floor, roof and thickness data as well as the quality data for each bench is imported into the XPAC model. With this model, validations are performed to evaluate the data for possible mistakes, such as incremental yields for each bench rising with increases in relative float densities.

The Resource category areas are also loaded into the XPAC model for Reserve categorisation. Indicated Resources are generally converted to Probable Reserves and Measured Resources to Proved Reserves after consideration of all applicable modifying factors. If one or more of the modifying factors have not been fulfilled, Measured Resource is either not converted or the Measured Resource is converted but downgraded to Probable and the associated risk is clearly stated. Inferred Resources are not converted to Coal Reserves. No Inferred Resources are included in the LoM plan.

The Coal Reserve is based on a bankable feasibility project level of investigation.

Thabametsi known risks

Some assumptions regarding the highwall mining method need to be confirmed at the start of the operation.

The IPP financial close has been delayed by a number of regulatory and funding challenges. Exxaro is ensuring that all compliance actions are executed while strategic options are being considered.

Table 39: Thabametsi modifying factors considered in converting Coal Resources to Coal Reserves

Modifying factors	Value
Geological loss	5%
Average thickness cut-off	<1m
Quality cut-offs (adb)	Raw CV >11Mj/kg
Mining loss	*T1 – 0.5m losses to overburden *T2 – 0.25% of coal left in pit bottom
Boundary pillar	N/A
Dilution	Applied to in-situ mineable Reserves due to inter-layered composition of deposit
Contamination	T2 – 0.3m
Mining recovery efficiency	No additional losses due to proposed mining method. Coal transfer between benches T1 and T2 will balance out over time as both go to same plant
Planned average slope angles	35 degrees
Practical plant yield	Crushing and screening process 98%
Strip ratio cut-off	Energy strip ratio >7Gj/ex-pit tonnes Strip ratio < 0.3m^3/tonne
Environmentally sensitive areas	No sensitive areas in pit layout
Legal	The layout is within the mining right boundary
Social	There are no socially sensitive areas in the pit layout (for example graveyards and dwellings)
Geohydrological	No areas identified in the mining area

** T1 and T2 are mining benches (Figure 19).*

Dorstfontein complex

Dorstfontein overview

Dorstfontein (DCM) complex forms part of ECC and is on the northern margin of the Highveld coalfield along the boundary of the Smithfield Ridge, the boundary between the Highveld and Witbank coalfields.

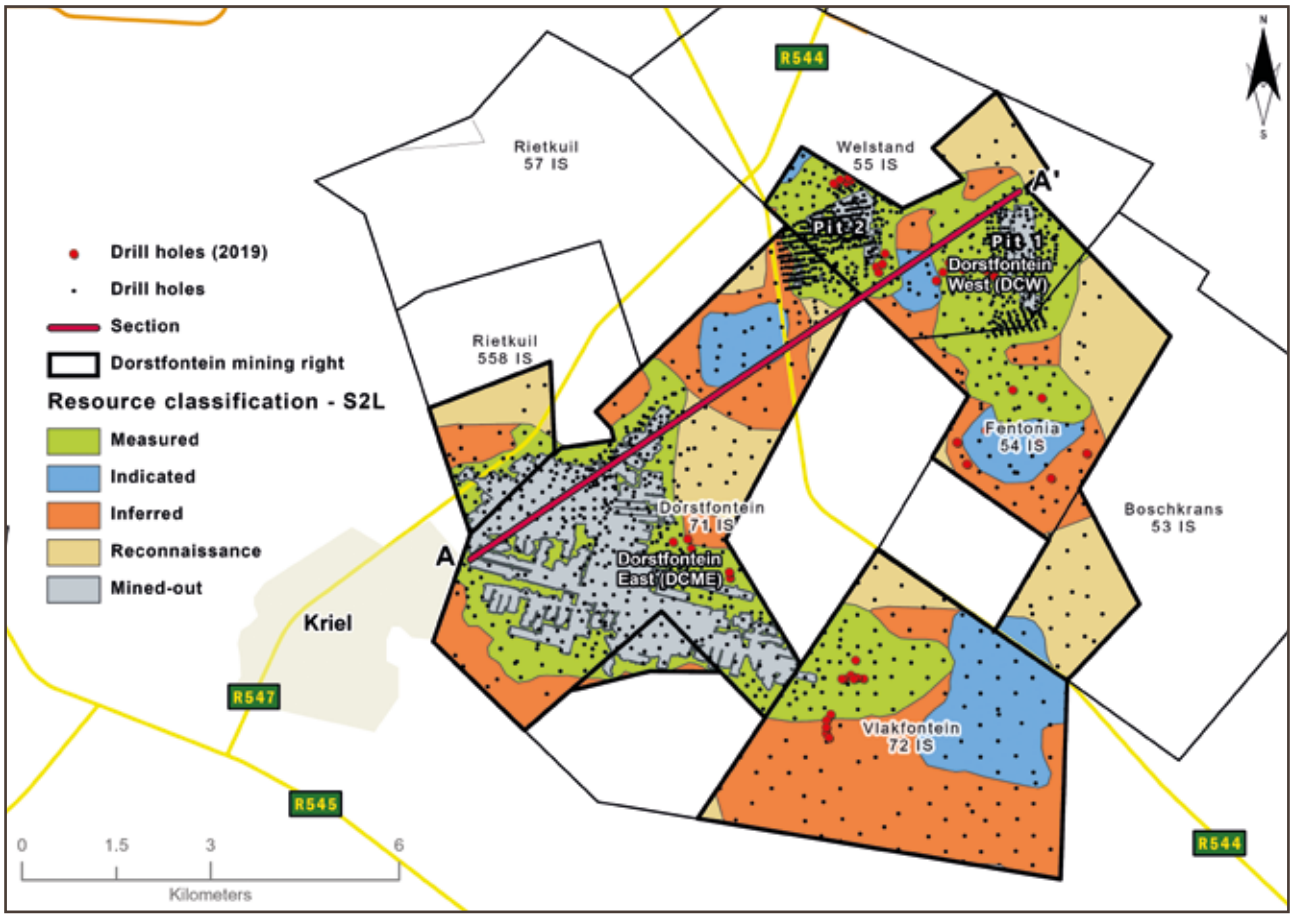
DCM complex is 36km south of the town of eMalahleni and, to the south-west, the property borders the town of Kriel. It is in the Highveld magisterial district, under the jurisdiction of the eMalahleni local council, Mpumalanga, South Africa. DCM operations can be reached via the hard-topped R544/R547 roads linking the towns of Witbank and Kriel. DCM is surrounded by mineral right tenure owned by Kusile Mining to the west, the Universal Coal NCC operation to the north, the Kriel-East operation to the south and Mbuyelo Coal to the east.

The complex covers a total rights area of 7 892ha comprising the underground Dorstfontein West Mine (DCMW) and opencast Dorstfontein East Mine (DCME). Seams being exploited are mainly seam 4 (S4) divided into seam 4 upper (S4U) and seam 4 lower (S4L) and S2 divided into seam 2 upper (S2U) and seam 2 lower (S2L). DCMW exploited the S2 through underground bord-and-pillar method during the reporting year. With the S2 Reserves coming to an end, the operation has moved upwards to exploit the S4L through an incline development from the current S2 working. DCME is the only opencast mine in the ECC stable. However, where thicker than 1.0m, the seam 5 (S5), seam 3 (S3) and seam 1 (S1) are also extracted. Mining activities use a truck-and-shovel method to expose and extract coal. The LoM plan entails the introduction of underground extraction of S4L via an adit from one of its pits' highwalls.

A major high-tension power line from the Komati power station crosses the property, in a south-westerly direction, over the northern part of the farm Fentonia 54IS and then swings westward over portions 1, 2 and 9 of the farm Dorstfontein 71IS. A secondary high-tension power line runs along the southern boundary of the farm Welstand 55 IS and continues over portions 2 and 3 of the farm Fentonia 54IS.

DCMW mining infrastructure extends over a portion of the farm Rietkuil 558 IS and portion RE 3 of the farm Dorstfontein 71IS while DCME mining infrastructure lies on portion 11 of the farm Welstand 55 IS. Surface infrastructure consists of mine buildings (offices, workshops and change houses), a box-cut to access the coal seams, conveyor belt systems, coal-washing plant, pollution-control dams, coal stockpile areas, truck-loading facilities with weighbridges, discard dumps and a rapid coal-loading facility (rapid-loading terminal) linked to the main Richards Bay Coal Terminal. DCMW mainly supports the inland market (ferrochrome and charring plants). However, screened product from DCMW is trucked to DCME, forming part of its export product. Historically, DCME has always catered only for the export market but since 2019, it has supported both the domestic Eskom and export markets. DCMW RoM is beneficiated in a heavy medium coal-washing plant for various sizes. Final plant product is screened and classified into large nuts, small nuts, jumbo peas, peas and duff. RoM from DCME is also beneficiated in a heavy medium coal-washing plant to produce a product that depends on the coal characteristics and contractual requirements.

Figure 20: Dorstfontein complex



Ancillary Resource and Reserve information by operation

continued

Dorstfontein history

DCM complex mining and prospecting rights cover some 7 892ha, which have been explored since the 1950s. To date, 2 049 boreholes have been drilled. However, the 2017 geological model was built using 1 580 boreholes with wash-quality information and excluding the remaining boreholes based on a rigorous data-validation process. As a result of the long history of ownership and various exploration companies some boreholes cannot be directly correlated with a certain company or date drilled as the boreholes logs do not always have the relevant information.

Table 40: Dorstfontein operation history

Date range	Company	Material notes
1956	Natal Navigation Collieries Proprietary Limited jointly with Estate Company Proprietary Limited	Widespread drilling of 13 boreholes on the farms Dorstfontein 71IS, Welstand 55IS and Rietfontein 43IS
1970	Anglo American Proprietary Limited	Drilling of 37 boreholes for more detailed cover
1974 – 1975	South Cape Exploration Proprietary Limited	86 boreholes drilled and 340 samples analysed
1976 – 1978	Sun Mining and Prospecting Proprietary Limited, an Anglovaal exploration company	82 boreholes drilled and 328 coal samples analysed for washing characteristics
1980 – 1982	Anglovaal Proprietary Limited	100 boreholes drilled on the farm Dorstfontein 71IS
1996 – 1998	Anglovaal Proprietary Limited	Drilling of 105 boreholes on the southern portion of the farm Dorstfontein 71 to support a feasibility study of the S2 mining operation at DCMW for first coal in 1997
1999 – 2004	Total Exploration South Africa (TESA)	TESA took over the DCMW operation
2004 – 2007	Dorstfontein Coal Mines Proprietary Limited	Total Coal South Africa (TCSA) emerged from TESA. Continuous drilling for exploration and mine planning purposes. In 2007, 140 boreholes drilled for the feasibility study of the proposed S4 mining operation at DCMW. An additional 25 boreholes drilled for specialised analysis
2008 – 2015	Dorstfontein Coal Mines Proprietary Limited	Since 2008, a total 1 022 boreholes drilled in both areas where ECC holds prospecting and mining rights. First coal was recorded at DCME in 2011
2015 – 2019	Dorstfontein Coal Mines Proprietary Limited	Exxaro acquired TCSA in 2015. The feasibility study for DCMW S4L project was approved as a replacement for the current DCMW S2L operations. A total of 201 boreholes were drilled

Dorstfontein geology

Coal measures of the Highveld and Witbank coalfields are hosted in the Ecca Group, which includes the Vryheid and Volksrust coal-bearing formations. All coal seams in the ECC area are hosted in the Vryheid formation which ranges in thickness from 80m to 300m. There are five major coal seams present in the area, named from the base upwards as S1, S2, S3, S4 and S5.

A granitic basement high, which forms part of the Smithfield Ridge and is referred to below as the Central plateau, divides the DCM complex into two separate geological domains and the western and eastern limbs can be found on either side of this plateau. S1 is only developed in the central portions of the paleo-valleys, ranging in thickness from 0.1m to 2.5m. Underground extraction of this seam is considered uneconomic due to its highly variable thickness, inferior quality, isolated occurrence and coal devolatilisation. In the DCM complex, seam splitting is generally a provenance of detrital material resulting largely from the proximity of the seam to the Smithfield Ridge and, as a result, the S2 and S4 are further subdivided into S2L, S2U and S4L and S4U, respectively.

S2L is thinnest over palaeo-highs and thickest over troughs of palaeo-valleys. Two S2L thickness domains exist in the complex. In the west (DCMW), seam thickness ranges from 0.1m to 5m and, in the east (DCME) from 0.2m to 6.0m. In the north of DCMW, the S2L exists as a single coal horizon, generally devoid of stone partings. To the south of this block, an arenaceous parting splits the seam into an upper and lower subseam. The parting separating S2U and S2L in both the west and east attains a maximum thickness of 4.5m and, in the northern portion, a minimum of 0.2m with an average of 1.5m. S2U is considered uneconomic to mine separately by underground methods but is included for the opencastable blocks. Generally, S2L is the thicker of the two subseams and has better quality coal. As such, S2L is theoretically the mining target. However, practical mining of S2L is often problematic due to parting between two subseams S2L and S2U.

On the basis of seam thickness and coal quality, S4L is the main underground exploitation target in S4, which comprises coal and minor in-seam partings, and is characteristically banded with alternating dull and bright coal. The seam contains one in-seam parting of significant thickness and lateral extent with a thickness average of 0.2m but can reach 0.5m. Generally, the average thickness of S4L is 3.0m. S4U has an average thickness of 1.7m in the west and, in the east, the thickness is generally more than 1.0m, reaching 3.0m in the centre of the palaeo-valley. Seam S4U has a higher ash content and thus lower CV compared to S4L. Thickness of the S5 is generally over 1.5m. Due to a significant parting, the seam is considered uneconomic for underground extraction but can be considered for selective extraction in opencast.

Numerous Jurassic dolerites (dykes and sills) intrude the Vryheid formation at various stratigraphic levels in the area. These intrusions negatively influence the stratigraphy and coal qualities in places. The distribution of the lower coal seams are strongly influenced by basement topography while distribution of the upper seams is controlled by present-day topography. Most affected by basement topography are S1 and S2. Seams are often thin and sometimes pinch out over and against palaeo-highs. Strata (including coal) are often faulted, although displacements are rarely more than 1m. Structural displacements, resulting from intrusions of dolerite sills through seams, often complicate mining seams.

The DCM complex geology and grade continuity are largely influenced by palaeo-topography, present-day topography, surface weathering, seam thickness variation (mainly between DCMW and DCME), in-seam parting, in-seam washouts, dolerite intrusions in the form of sills and dykes, resulting in minimal to extensive zones of devolatilisation. These geological risks are well managed through extensive drilling in areas of concern, using downhole wireline logging for better definition, underground channel sampling incorporated as points of observation in the short-term model, underground face mapping generally used to track both vertical and lateral variations in the lithology to assist with reconciliations as well as structural interpretation and surface mapping, particularly of basement outcrops. The information collated from the various approaches is incorporated in the structural model, together with additional potential risks from other disciplines and represented in a GIS-based risk and opportunity domain analysis (RODA), allowing for a more integrated approach to risk management.

Dorstfontein Resource evaluation

All exploration boreholes are logged and sampled by experienced on-site geologists aligned and complying to logging and sampling standards and standard operating procedures. Samples are selected according to seam boundaries, visual variation in the vitrinite content, assisted by density logs, and non-coal material present in the seam boundaries. Each sample submitted to the laboratories is accompanied by a unique sample number for validation and tracking as well as a submission list that serves as a sample advice sheet with instructions for analysis. Three major laboratories have been used over the past 10 years: Australian Laboratory Services (ALS), Societe Generale de Surveillance (SGS) and CoalLab (Cotecna), all with SANAS accreditation (T0611, T0815 and T0612 respectively). All three laboratories have committed to assuring the quality of results provided to the customer by ensuring quality assurance, quality control, data validation and proficiency testing procedures are observed.

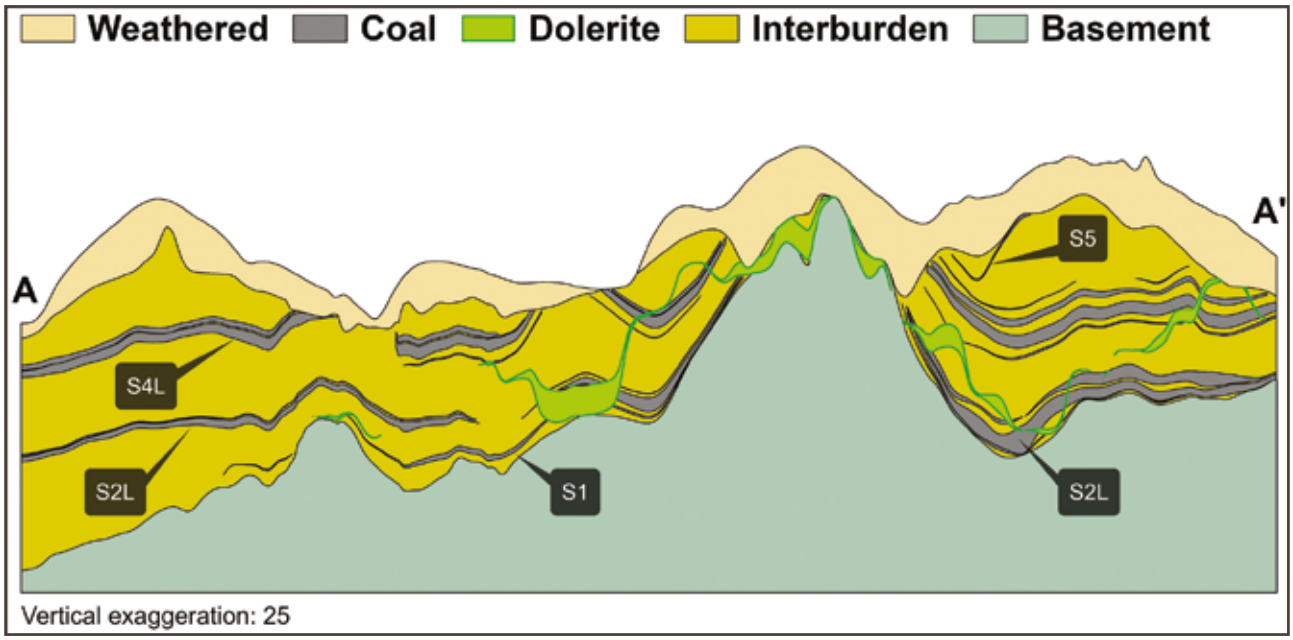
The Coal Resource classification methodology is fundamentally based on SANS 10320 and considers borehole spacing, type of boreholes and structural complexity of the Resource.

Table 41: Dorstfontein Coal Resource reporting criteria

Thickness cut-off (thickness and extraction height considerations)	Quality cut-offs (adb)	Geological loss*
Opencast ≤0.5m Underground ≤1.2m	Dry ash free volatiles (DAFV) ≤24% Raw ash ≥50%	10% – 50% (domains)

** A 10% standard geological loss is applied but may vary based on the consideration of structural complexity (dolerite sill breakthrough – 50% loss within determined spatial extent), seam gradient (>4 degrees – 50% loss) and dolerite sill proximity to seam (25% loss).*

Figure 21: Typical southwest-northeast section through Dorstfontein geological model



Ancillary Resource and Reserve information by operation

continued

Table 42: Dorstfontein Coal Resource estimation criteria

	Item	Description
Database	Borehole database	Sable Data Warehouse
	Data datum	Cape LO29
	Number of boreholes used for Resource estimation	1 580 of 2 049 boreholes in the database
	Validation	The laboratory conducts data validation on samples. In the Sable Database Warehouse, additional validations are conducted and corrected. Data is exported from Sable into csv files where additional checks are done in Excel
	Data compositing and weighting	Data compositing is conducted per seam using a weighted value from the individual samples that make up the seam along with the RD and length of each individual sample. This is done in Geovia Minex™
Model	Previous model date	2016
	Last model update	2017 (peer review in 2017)
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm
	Grid mesh size	25m x 25m
	Scan distance	2 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering and topography/collar Lower: basement/Dwyka
	Model outputs	Roof, floor and thickness grids generated for structure with raw quality and washability grids
	Changes to modelling process	None

Table 43: Dorstfontein Coal Resource classification criteria

Category	Type of boreholes	Borehole spacing	Structurally complex areas	Borehole/ha
Measured	Cored boreholes with applicable coal qualities	0m – 350m	Structural complexity and coal variability (RODA) additional infill drilling	0.49
Indicated	Cored boreholes with applicable coal qualities	350m – 500m	Structural complexity and coal variability (RODA) additional infill drilling	0.10
Inferred	Cored boreholes with applicable coal qualities	500m – 1 000m	Structural complexity and coal variability (RODA) additional infill drilling	0.06

Table 44: Dorstfontein Coal Resource and Reserve statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)	Reason for changes
Measured	149.1	156.4	(7.3)	(5)	The decrease is the result of mining of DCMW (1.5Mt) and DCME (2.5Mt) respectively, the disposal of S2L barrier pillars and remnant blocks from DCMW (4.3Mt) as well as reconciliation done on an unaccounted area mined (1.6Mt) from Pit 3 mined in 2018.
Indicated	135.5	137.5	(2)	(1)	
Inferred	52.1	52.8	(0.7)	(1)	
Total Coal Resources (UG and OC)	336.7	346.7	(10)	(3)	
Proved	46.5	54.3	(7.8)	(14)	The increase of Reserves in Pit 1 NW Extension 1.4Mt as a result of environmental approvals obtained is offset by mining (1.3Mt and 2.2Mt from DCMW and DCME respectively), the disposal of remnant S2 boundary pillars at DCME and mine layout refinements at both operations (~4.6Mt).
Probable	41.5	40.5	1.0	2	
Total Coal Reserves (UG and OC)	88.0	94.8	(6.8)	(7)	

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: opencast (OC) and underground (UG).*
- *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
- *Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt. Coal Resources are quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources are reported on a MTIS basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources are quoted inclusive of Coal Reserves.*

Table 45: Dorstfontein RPEEE considerations

Item	Criteria	Considered	Comment
Geological data	Data has been validated and signed off by competent person	Yes	Geological structure and depositional extent, seam thickness >1.2m (UG) and >0.5m (OC), <50% ash content and >24% DAFV with coal qualities reported on an air-dry basis
Geological model	Geological model was considered and signed off	Yes	
Structural model	Structural model was considered and signed off	Yes	
Mining	Mining assumptions considered and defined	Yes	OC and UG areas defined and aligned with exploitation strategy
Assurance	Minimum tier 1 assurance (Exxaro governance)	Yes	Compliance updated in 2018
Economic evaluation	Concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	Only approved economic assumptions and parameters are applied
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Yes	Environmental and social concept assessment is done, applications and approvals are considered
Tenure	Formal tenure must be demonstrated. Reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national governmental legislation	Yes	Mining and prospecting rights licences are valid. Extensions or annexations will be lodged when necessary with reasonable expectations that the applications will be granted
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Yes	Current infrastructure is considered
Market	Market(s) identified – form part of an existing operation market strategy or potential market for which a conceptual market study exists	Yes	Operational strategies are aligned with existing markets

Dorstfontein Reserve estimation

Scheduling of the Reserve is determined using mining scheduling applications from XPAC. This is the same software used to develop the LoM plan schedule.

The geological 3D model used for the Reserve statement is referred to as the Reserve geological 3D model. This Reserve model differs from the Resource model as the latter uses the full coal seam (with specific reporting assumptions) while the Reserve model uses a select mining height based on practical mining heights and other modifying factors. The process ensures that the model represents practical aspects of the capabilities of production sections and their equipment.

Indicated Resources are generally converted to Probable Reserves and Measured Resources to Proved Reserves after consideration of all applicable modifying factors. If one or more of the modifying factors have not been fulfilled, Measured Resource is either not converted or the Measured Resource is converted but downgraded to Probable and the associated risk is clearly stated. Inferred Resources are not converted to Coal Reserves.

A total of 0.9Mt of Inferred Resource is included in the LoM plan, which is around 0.9% of the LoM plan. The majority is located along main developments that serve as access to future Reserve blocks well beyond the first five years of LoM. The impact of including these Coal Resources is well understood and tested, and exploration activities are planned to upgrade these categories to a higher level.

Ancillary Resource and Reserve information by operation

continued

Table 46: Dorstfontein production figures

	Actual 2018	FC 2019	Actual 2019	FC 2020	FC 2021
DCME RoM (Mt)	1.85	2.44	2.20	2.29	2.58
DCMW RoM (Mt)	1.04	1.11	1.28	1.83	1.83
DCM complex RoM (Mt)	2.89	3.56	3.48	4.11	4.41

Table 47: Dorstfontein modifying factors considered in converting Coal Resources to Coal Reserves

Considerations	Underground	Opencast
Geological loss	10% – 25%	10% – 25%
Average thickness cut-off	1.4m	1.0m
Quality specification	5 200kcal/kg	5 200kcal/kg
Mining loss	0.05m	0.1m
Depth to roof	15m	0
Safety factor	1.6 – 2.0	0
Bord width	6.5m	0
Barrier pillar	At least equal to the panel pillar width	0
Boundary pillar	15m	15m
Pillar centres	14m x 14m	0
Mining height	1.4m	0
Extraction factor	65%	0
Dilution	Already included in model	Already included in model
Contamination	0.05m	0.10m
Practical plant yield	Considered in reserving process	Considered in reserving process
Environmentally sensitive areas	Areas underlying wetlands and other eco-sensitive areas are excluded from Reserves. A higher safety factor is used underneath rivers and surface structures	50m cut-off away from opencast mining activities
Legal	Mining right boundary	
Social	Considered in reserving process	
Geohydrological		

Dorstfontein known risks

DCME pits 1, 2 and 3 and Vlakfontein areas are affected by dolerite activity. Risk in these areas has been accommodated in mine planning by assigning higher geological loss values to areas reasonably expected to incur losses caused by dolerite activity. Reporting of Coal Resources on the Rietkuil Vhakoni prospecting right (1916PR) is currently under review with regard to RPEEE considerations.

Dorstfontein excellence

The implementation of the incline at DCMW to access the thicker, although somewhat lower quality, S4L was completed and mining is progressing well.

The introduction of in-house computerised mine planning capabilities involves the building of short-term mining models that will incorporate roof and floor lithologies, as well as economic assumptions for reporting purposes, enabling quick response time on adapting to the actual mining conditions.

Forzando complex

Forzando overview

Forzando (FZO) complex, consisting of the Forzando North (FZON) and Forzando South (FZOS) operations and contiguous prospecting rights, is in the north-eastern corner of the Highveld coalfield, separated from the Witbank coalfield by the pre-Karoo Smithfield Ridge.

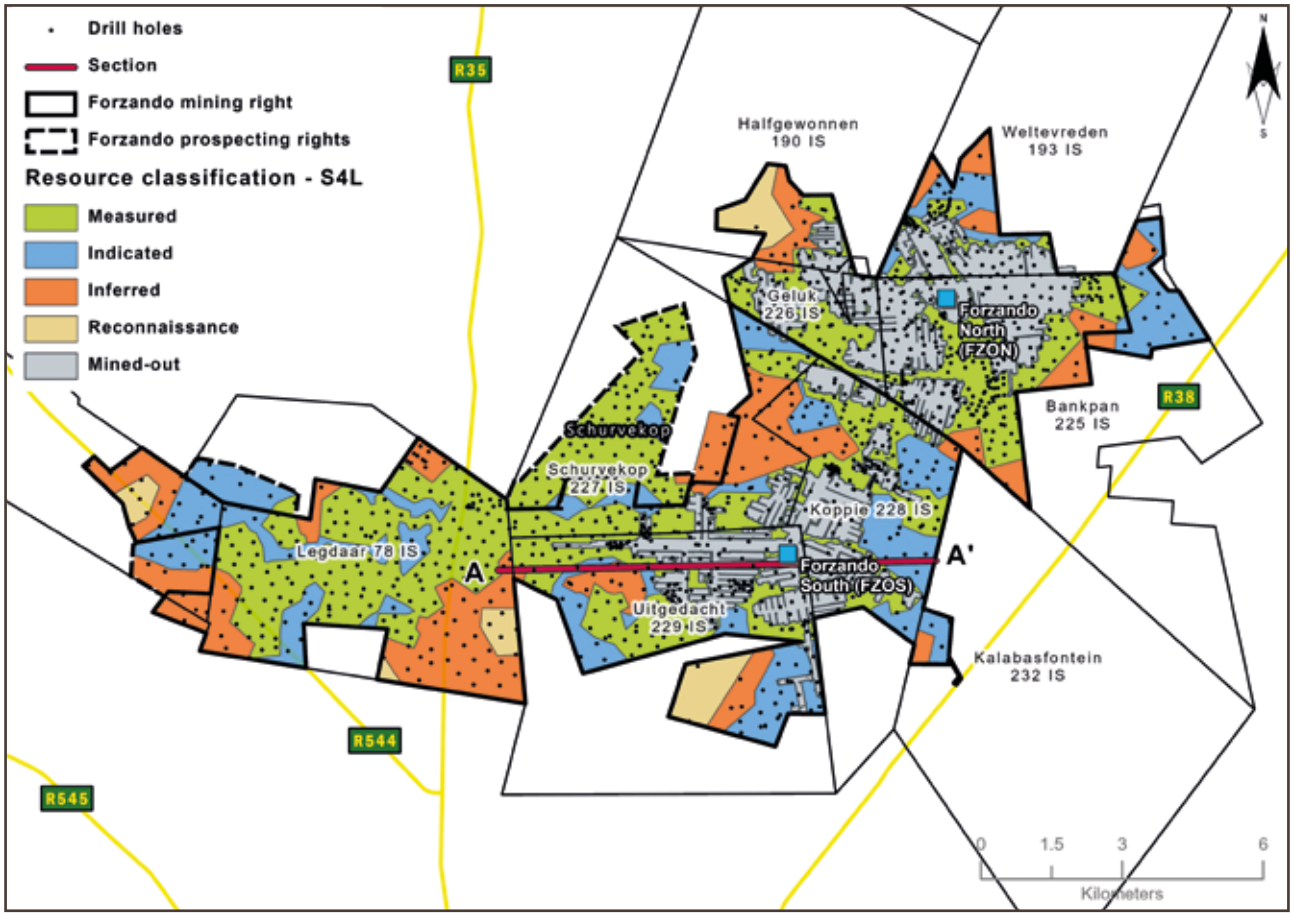
FZO complex is in Mpumalanga province, some 10km north of the town of Bethal. The complex is also some 55km and 77km from two major urban cities, eMalahleni and Middelburg, respectively. Major forms of transport include road and railway networks that operate throughout the year. Major roads servicing the area are R35 and R542. The complex is adjacent to several other mineral tenures, including the Anglo-American Coal project of Elders to the north and prospects of Canyon and Continental Coal to the south. Two provincial roads run through the property: Bethal-Middelburg tarred road lies just west of the area and Bethal-Hendrina tarred road passes along the extreme eastern edge. Three secondary, all-weather dirt roads traverse the area.

The complex covers 12 113ha and comprises two underground operations, namely Forzando North Colliery (FZON) and Forzando South Colliery (FZOS). FZOS is characterised by mechanised bord-and-pillar mining using a suite of continuous mining (CM) equipment. The operation is currently exploiting the seam 4 lower (S4L) with five CM sections and is supported by a fleet of primary and secondary mining equipment. FZOS is in its fourteenth year of operation. FZON also uses mechanised bord-and-pillar mining using a suite of CM equipment to exploit primarily the S4L, although seam 2 lower (S2L) was also previously exploited. After operating for 20 years, FZON was placed under care and maintenance in February 2014. It was recommissioned in October 2018 with one CM section targeting the S4L, investigations are currently under way to determine the viability for the future of the operation.

Surface infrastructure still in use includes: mine buildings (offices, workshops and change houses), box-cuts to access the coal seam, conveyor belt systems, two coal-washing plants and a rapid coal-loading facility (rapid loading terminal) linked to the main Richards Bay Coal Terminal via a privately owned railway loop.

RoM from FZOS is conveyed by surface to the beneficiation plant at FZON. Both operations support the export market. Discard from FZON is rewashed to add to the coal product mix.

Figure 22: Forzando complex



Ancillary Resource and Reserve information by operation

continued

Forzando history

The complex has been exploited since the late 1960s with several companies undertaking drilling campaigns.

FZO complex mining and prospecting rights cover 12 113ha. To date, 2 573 boreholes have been drilled with only 1 937 falling in the respective FZO rights. The 2017 geological model was built using 1 386 boreholes with wash-quality information. In general, FZO complex has a borehole distribution of 0.11bh/ha as per classification criteria in the table below. Exploration has been conducted through diamond core and open wirelined (percussion) drilling as well as surface geophysical magnetic surveys.

As a result of the long history of ownership and various exploration companies some boreholes cannot be directly correlated with a certain company or date drilled as the boreholes logs do not always have the relevant information.

Table 48: Forzando operation history

Date range	Company	Material notes
1966 – 1969	Anglo American Corporation	The first company to conduct an exploration programme, approximately 34 boreholes drilled
1995 – 1998	Anglovaal Minerals	FZO complex was acquired by Anglovaal Minerals in 1980s. Exploitation of S4L started in 1995 at FZON. Approximately 322 boreholes drilled
1999 – 2004	Total Exploration South Africa (TESA)	TESA took over the operations and exploitation of S4L continued at FZON. Approximately 1 082 boreholes drilled
2005 – 2015	Total Coal South Africa (TCSA)	Further exploration work was conducted by TCSA. Exploitation of S4L started in 2006 at FZOS. FZON placed was placed under care and maintenance in February 2014. Approximately 320 boreholes drilled
2015 – 2019	Exxaro Coal Central (ECC)	TCSA became ECC after it was taken over by Exxaro in August 2015. FZON reopened in October 2018 after being on care and maintenance for five years. 147 boreholes drilled

Forzando geology

Highveld coalfield hosts up to five coal seams in the middle Ecca Group sediments of the Karoo Supergroup. The stratigraphic sequence in the mine area includes five coal seams that can be correlated with seams found in the Witbank coalfield, named from the base upwards as seam 1 (S1), seam 2 (S2), seam 3 (S3), seam 4 (S4) and S5. Seam splitting is common feature in the area. This is fundamentally attributed to the proximity to the Smithfield Ridge and thus the provenance of detrital material. S2 may be split into seam 2 upper (S2U) and seam 2 lower (S2L) while S4 is split into three subseams, seam 4 lower (S4L), seam 4 upper (S4U) and S4A. Furthermore, S4A may be split into S4A1 and S4A2. S5 is generally split into the S5 and seam 5 lower (S5L).

The thickest and most ubiquitous being the S2, S4 and S5 seams. S1 is restricted to palaeo-lows while S3 only occurs on the western side of the complex. The principal economic seams currently exploited are S2L and S4L, with the remaining seams being either too thin, laterally discontinuous, poor quality or impractical/uneconomical to mine.

FZO complex is characterised by two adjoining palaeo-valleys, one in FZON and the other in FZOS. The valley in FZON has higher-quality coal while FZOS is characterised by lower-quality coal. The different coal qualities are indicative of different depositional environments and thus the different geological domains. Remnants of the Smithfield Ridge exist in the north-western edge of FZON and northern extremity of Schurvekop.

S2 occurs over most of the Forzando area, except for areas of extreme palaeo-highs along the Smithfield Ridge, along the central portion and in an isolated palaeo-hill in the north-east of the complex. The seam varies in thickness from under 1.0m to over 6.0m, with siltstone and sandstone parting typically found in areas where the seam thickness exceeds 3.5m.

The seam has been extensively devolatilised, leaving disconnected pockets of unaffected coal. Within these pockets, coal quality is extremely variable with high ash content resulting from the prevalence of thin shaly partings. The lack of continuity of unburnt coal renders it of no economic value.

Throughout the area the S4 consists, from top down, of S4A (a gritstone parting), S4U (siltstone and coarse-grained sandstone parting) and the S4L. In the east, the siltstone and coarse-grained sandstone below have been eroded, leaving only the overlying grit. Both S4A and S4U are rarely thick enough and too poor in quality to be considered economic. S4L is the only seam that is thick enough, of sufficient quality and developed throughout the area to warrant economic extraction in prevailing economics. In the FZO complex area, the thickness of the seam ranges from 0.5m to 4.0m with an average of 2.1m.

The total FZO area has been intruded by Karoo dolerites even though the impact on S4 is comparatively small and confined to those areas where they come close to or intersect the seams. Transgressive sills with a thickness of 5m to 30m have been noted, resulting in extensive burning of coal in areas, particularly where the sill either closely underlies or overlies the seam. Seams are also burnt and devolatilised near the sill transgression zones with burnt zones ranging from a few metres to 20m.

Dolerite dykes and stringers with a thickness ranging from 0.5m to 5.0m are commonly encountered in the FZO complex. Dolerite structures have a tendency to pinch and swell, even over very short distances. Dolerite stringers are thought to be offshoots from the dykes which in turn feed from the dolerite sills below. Dykes in the area are noted as having a general preferred orientation of north-west to south-east and north-east to south-west. Burnt coal zones associated with dykes/stringers vary considerably from zero to ∔10m with the width of the burnt zone not necessarily relating to the thickness of the dyke/stringer. These geological risks are well

managed through extensive surface vertical and underground horizontal drilling in areas of concern, use of downhole wireline logging for better correlation, underground channel sampling incorporated in the short-term planning model, underground face mapping to track both vertical and lateral variations in the lithology, which assists with reconciliations and structural interpretation, and surface mapping, particularly of basement outcrops.

The information collated from the various approaches is incorporated in the structural model, together with additional potential risks from other disciplines and represented in a GIS based risk and opportunity domain analysis (RODA), allowing for a more integrated approach to risk management.

Forzando Resource evaluation

All exploration boreholes are logged and sampled by on-site experienced geologists, aligned and complying to Exxaro standards and standard operating procedures. Samples are selected according to seam boundaries, visual variation in the vitrinite content (assisted by density logs) and non-coal material present in the seam boundaries. Each sample to be submitted to the laboratory is accompanied by a unique sample number for tracking and a submission list that also serves as a sample advice sheet with instructions for analysis.

Three major laboratories have been used over the past 10 years: Australian Laboratory Services (ALS), Societe Generale de Surveillance (SGS) and Bureau Veritas (BV), all with SANAS accreditation (T0611, T0815 and T0313, respectively). ISO and South African National Standards (SANS) have a standard set of tests and methods used for coal analysis by South African laboratories. The noted laboratories have committed to assuring the quality of results provided to the customer by ensuring quality assurance, quality control, data validation and proficiency testing procedures are observed.

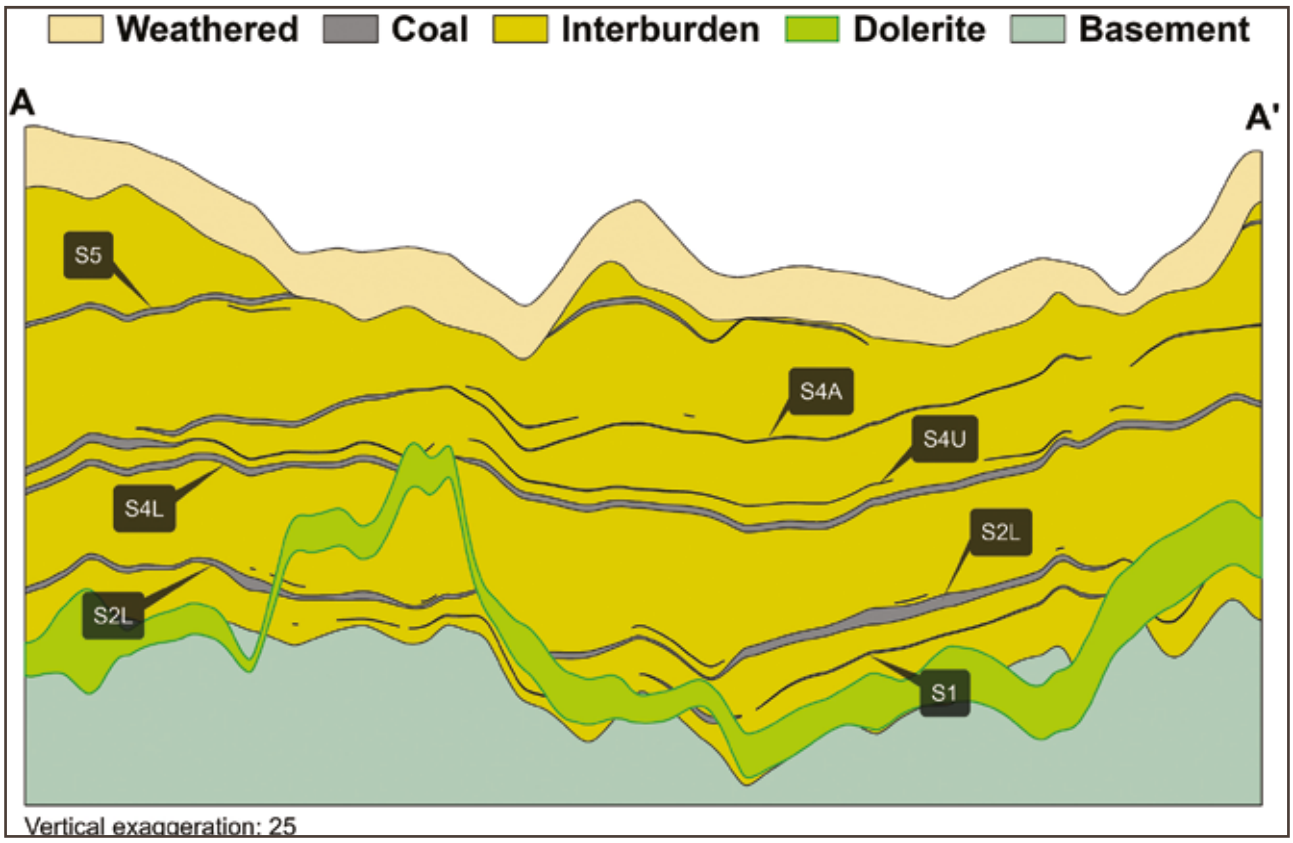
The Coal Resource classification methodology is fundamentally based on SANS 10320 and considers borehole spacing, type of boreholes and structural complexity of the Resource.

Table 49: Forzando Coal Resource reporting criteria

Thickness cut-off (reporting and extraction height considerations)	Quality cut-offs (adb)	Geological loss[1]
Opencast ≤0.5m Underground ≤1.2m	DAFV ≤24% Raw ash ≥50%	10 – 50%

[1] *A 10% standard geological loss is applied but may vary based on the consideration of structural complexity (dolerite sill breakthrough – 50% loss within determined spatial extent), seam gradient (>4 degrees – 50% loss) and dolerite sill proximity to seam (25% loss). A 15% geological loss is applied (weighted average of the various risk domains).*

Figure 23: Typical west-east section through Forzando geological model



Ancillary Resource and Reserve information by operation

continued

Table 50: Forzando Coal Resource estimation criteria

	Item	Description
Database	Borehole database	Sable Data Warehouse
	Data datum	Cape LO29
	Number of boreholes used for Resource estimation	1 937 of 2 575 boreholes in the database
	Validation	The laboratory conducts data validation on samples. In the Sable Database Warehouse, additional validations are conducted and corrected. Data is exported from Sable into csv files where additional checks are conducted in Excel
	Data compositing and weighting	Data compositing is conducted per seam using a weighted value from individual samples that make up the seam, along with the relative density and length of each individual sample. This is conducted in Geovia Minex™
Model	Previous model date	2016
	Last model update	January 2017
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm: general purpose gridding
	Grid mesh size	25m x 25m
	Scan distance	2 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering and topography/collar Lower: basement/Dwyka
	Model outputs	Roof, floor and thickness grids generated for structure with raw quality and washability grids
	Changes to modelling process	None

Table 51: Forzando Coal Resource classification criteria

Category	Type of boreholes	Borehole spacing	Structurally complex areas	Borehole/ ha
Measured	Cored boreholes with applicable coal qualities	0m – 350m	Structural complexity and coal variability (RODA)	0.15
Indicated	Cored boreholes with applicable coal qualities	350m – 500m	Structural complexity and coal variability (RODA)	0.07
Inferred	Cored boreholes with applicable coal qualities	500m – 1 000m	Structural complexity and coal variability (RODA)	0.02

Table 52: Forzando RPEEE considerations

Item	Criteria	Considered	FZO applicable comments
Geological data	Data validated and signed off by competent person	Yes	Geological structure and depositional extent, seam thickness >1.2m (UG) and >0.5m (OC), <50% ash content, >24% DAFV with coal qualities reported on an air-dry basis
Geological model	2017 geological model was considered and signed off	Yes	
Structural model	Structural model was considered and signed off	Yes	2018
Mining	Mining assumptions considered and defined	Yes	Opencast and underground aligned with exploitation strategy
Assurance	Policy-driven governance, internal and external audits	Yes	External audit in 2018
Economic evaluation	Concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	Only approved economic assumptions and parameters are applied within current prefeasibility and feasibility studies
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Done	Environmental and social concept assessments were considered
Tenure	Only areas within acceptable prospecting and mining rights. In areas adjacent to existing rights where legal section application is pending with reasonable expectation of approval	Yes	Mining and prospecting rights are valid
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Yes	Current infrastructure
Market	Market(s) identified form part of an existing operation market strategy or potential market with a conceptual market study	Yes	Operational strategies are aligned with existing markets

Table 53: Forzando Coal Resource and Reserve statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)	Reason for changes
Measured	85.5	81.5	4.0	5	Mining depletion (~2.8Mt) was offset by the addition of Resource blocks in FZON and the FZON northeast area ~7.8Mt
Indicated	36.3	35.9	0.4	1	
Inferred	26.4	25.8	0.6	2	
Total Coal Resources	148.2	143.2	5.0	3	
Proved	23.9	38.6	(14.7)	(38)	A slight increase of 1.4Mt as a result of additional Resource blocks at FZON was offset due to mining depletion (~2.9Mt), macro-economic assumptions (~11.4Mt) as well as areas excluded at FZON due to unfavourable floor gradients, consideration of geological complexities (dykes) and the disposal of mining blocks due to excessive methane encountered (~7.1Mt)
Probable	10.7	15.9	(5.2)	(33)	
Total Coal Reserves	34.6	54.5	(19.9)	(37)	

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: underground (UG).*
- *Figures are reported at 100% irrespective of percentage attributable to Exxaro.*
- *Tonnages are quoted in metric tonnes and million tonnes is abbreviated as Mt. Coal Resources are quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources are reported on a MTIS basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources are quoted inclusive of Coal Reserves.*

Ancillary Resource and Reserve information by operation

continued

Forzando Reserve estimation

Scheduling of the Reserve is determined using mining scheduling applications from XPAC. This is the same software used to develop the LoM plan schedule.

The geological 3D model used for the Reserve statement is referred to as the Reserve geological 3D model. This Reserve model differs from the Resource model in that the latter uses the full coal seam (including specific reporting criteria) while the Reserve model uses a select mining height based on practical mining height considerations. The process ensures the model represents the practical aspects of the capabilities of current production sections and their available equipment.

Indicated Resources are generally converted to Probable Reserves and Measured Resources to Proved Reserves after consideration of all applicable modifying factors. If one or more of the modifying factors have not been fulfilled, Measured Resource is either not converted or the Measured Resource is converted but downgraded to Probable and the associated risk is clearly stated. Inferred Resources are not converted to Coal Reserves.

A total of 0.1Mt of Inferred Resource is included in the LoM plan, representing 0.2% of LoM plan. The majority is located along the boundaries of the LoM layout well beyond the first five years of LoM. The impact of including these Coal Resources is well understood and tested, and exploration activities are planned to upgrade these categories to a higher level.

Table 54: Forzando production figures

	Actual 2018	FC 2019	Actual 2019	FC 2020	FC 2021
FZOS RoM (Mt)	2.02	2.13	2.14	1.83	1.82
FZON RoM (Mt)	0.05	0.81	0.6		
FZO complex RoM (Mt)	**2.07**	**2.93**	**2.73**	**1.83**	**1.82**

Table 55: Forzando modifying factors considered in converting Coal Resources to Coal Reserves

	Underground	Opencast
Geological loss	10% – 25%	10% – 25%
Average thickness cut-off	1.65m	1.0m
Quality specification	5 200kcal/kg	5 200kcal/kg
Mining loss	0.1m	0.1m
Depth to roof	30m, unless rock strength allows otherwise	0
Safety factor	1.6 to 2.0	0
Bord width	7.2m	0
Barrier pillar	At least equal to pillar width	0
Boundary pillar	15m	15m
Pillar centres	14m x 14m	0
Mining height	2.1m	0
Extraction factor	65%	0
Dilution	Already included in model	
Contamination	0.1m	0.1m
Practical plant yield		
Environmentally sensitive areas	A higher safety factor is used underneath rivers and surface structures together with weathering depth consideration	Coal blocks underlying wetlands and other eco-sensitive areas are excluded from Reserves and 50m cut-off away from opencast mining activities
Legal	Mining right boundary	
Social	Socially sensitive areas in the mining right (such as graveyards) are excluded from Reserves in the reserving process	
Geohydrological	Areas identified are flagged and excluded or reclassified in the reserving process	

Forzando known risks

There is a high occurrence of dolerite dykes and faulting at the various Forzando operations. Applicable surface geophysical surveys, wire-logged vertical openholes and horizontal drilling are used to provide adequate cover ahead of mining panels. The reporting of Coal Resources on the Kalabasfontein prospecting rights (1170PR and 1035PR) is currently under review with regard to RPEEE considerations.

Current economic assumptions at Forzando North have resulted in a change in the marketing strategy that could influence coal production in 2020. However, long-term price forecasts indicate that the mine can revert to its original markets post-2020.

Forzando excellence

The introduction of in-house computerised mine-planning capabilities involves the building of short-term mining models that will incorporate roof and floor lithologies, as well as economic assumptions for reporting purposes, enabling quick response time on adapting to the actual mining conditions.

Matla mine

Matla overview

Matla mine is in the Highveld coalfield, immediately south of the Witbank coalfield. Matla is in Mpumalanga province, South Africa, some 15km west of Kriel and 63km south of eMalahleni. Two power stations, Kriel and Matla, are some 10km from the mine and it is contracted to supply bituminous coal to Eskom's Matla power station. Matla is on the P53-1 and R547 secondary roads branching off the R580 and R545. The well-known Kriel coal mine neighbours Matla mine to the east and the operations of Khutala (South32) and Zondagsfontein (Anglo-American) to the north.

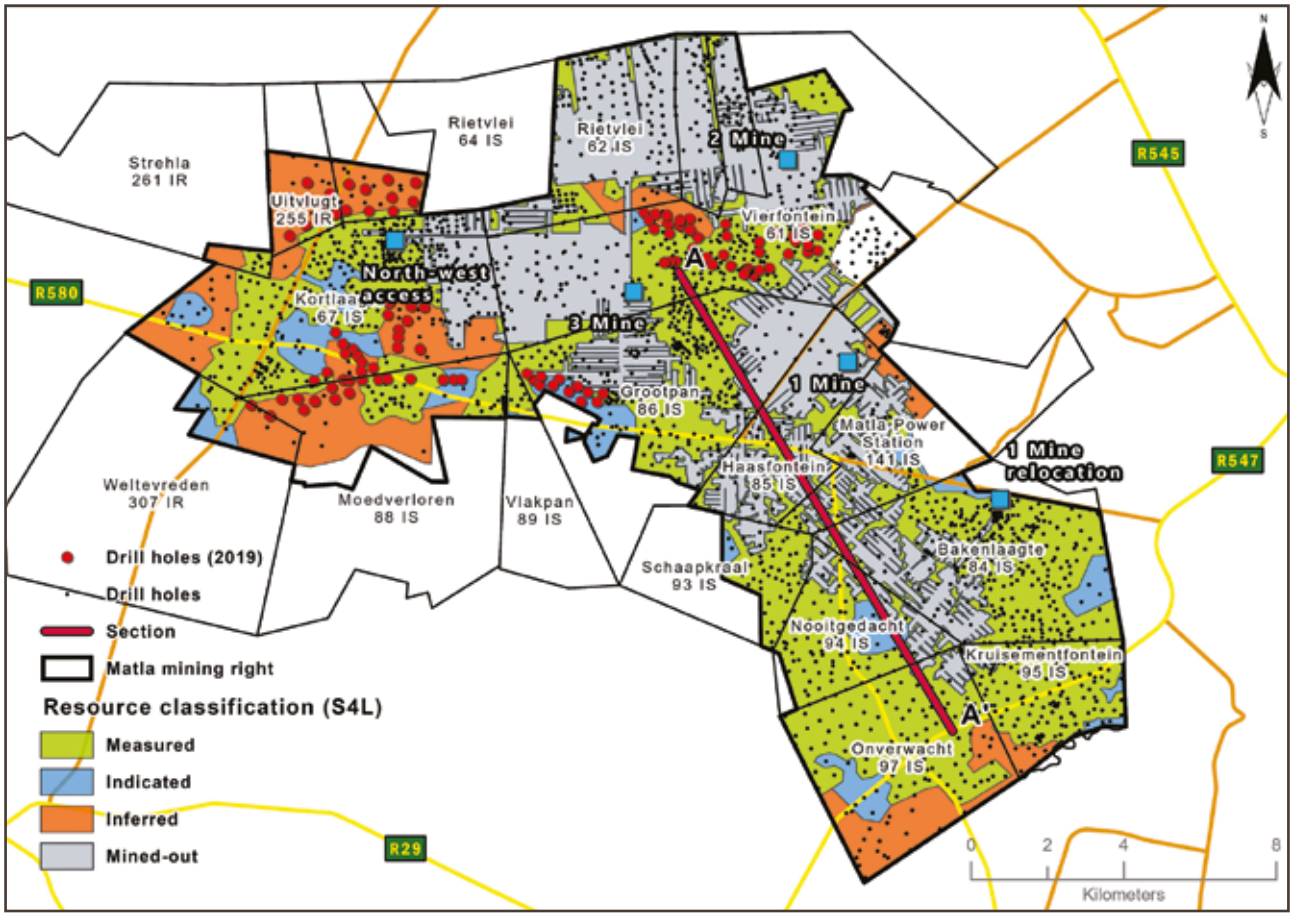
Matla comprises three underground production facilities: mine 1, mine 2 and mine 3. All three are long-life assets, each with a specific operating capacity comprising conventional coal circuits to produce bituminous coal. Work at mine 1 was stopped in 2015 due to pillar instability but an Eskom-approved project to relocate mine 1 access is currently in the implementation phase. Mine 2 and mine 3 use both bord-and-pillar and shortwall methods to mine seam 2 (S2) and seam 4 (S4) coal seams. In 2019, Matla continued with pillar extraction (stooping) as a mining method to maximise Resource extraction. At mine 2, there are four continuous miner (CM) sections (two currently stooping) and a shortwall section mining S2. At mine 3, there are two CM sections (one currently stooping) and a shortwall section mining S4 and three CM sections mining S2.

Existing infrastructure of the three shaft complexes includes three ventilation shafts, a network of conveyor belts, coal silos and stockpiles, a crushing-and-screening plant, four pollution-control dams, hospital, accommodation facilities, offices and workshops, and a water-treatment plant. Potable water is received from Eskom and no potable water plant exists on the mine property. Electricity is sourced from Eskom (Matla power station) and transporting coal from the mine to Matla power station is via a network of conveyor belts.

Matla mine produces thermal coal exclusively to Eskom. Historically, Matla produced approximately 12.5Mt of coal per annum. Due to the closure of mine 1, Matla currently produces about 6Mt of coal annually. None of the coal mined at Matla is beneficiated, but is crushed and screened (sized) before being conveyed to the power station.

The Eskom contract renewal is in 2023 but Exxaro has reasonable expectations that the contract will be renewed. The Matla Resource base is sufficient to sustain mining beyond the 2023 contract-review date where Resource thickness and quality permit mining according to existing operational standards.

Figure 24: Matla mine



Ancillary Resource and Reserve information by operation

continued

Matla history

Matla has been exploiting since the mid-1970s and a significant amount of exploration and extraction activities has been conducted over the large tenure area of some 22 000ha. The 2019 geological model update includes 2 409 boreholes with coal qualities.

Table 56: Matla operation history

Date range	Company	Material notes
1976 – 1990	Trans Natal Mines	Construction began in 1976,with full production in 1983 and 465 boreholes drilled in this period
1990 – 2019	Eyesizwe – Exxaro	Eyesizwe (now Exxaro) took over ownership from Trans Natal Mines with >2 060 boreholes drilled in this period

Matla geology

The coal deposit at Matla forms part of the Highveld coalfield. The coal seams are found in the Vryheid formation of the Karoo Supergroup. The stratigraphy sequence in the Matla area includes five coal seams that can be easily correlated with seams found in the Witbank coalfield. Coal seams in the area are generally flat and continuous, with subsequent igneous activity resulting in displacements and devolatilisation of coal seams at places.

The principal economic seams currently exploited are S2 and S4, with mining of seam 5 (S5) terminated in 1998 due to high levels of contamination and subsequent increase in abrasive index. The Matla mining area is characterised by two distinct dolerite types, the B8 (porphyritic) and B4 (olive-rich) types which have varying effects on seam displacements and coal burning and devolatilisation. A dolerite sill with an average thickness of 10m is generally found above S5 in mine 2 and 3, however, the sill intersects the coal seams and underlies S2 in mine 1 and S4 on the south-western part of the Reserves. This sill has burned and devolatilised S2 on the southern part of the mining area in mine 1. Floor rolls have been encountered in S2 workings and created some challenges in some mining sections. The floor rolls strike NE-SW vary in width between 50m and 200m and have amplitudes up to 1.5m. The floor rolls are more prominent if the seam floor is close to the basement contact. Sandstone lenses encountered are generally less than 0.5m in width but can reach up to 1.5m in thickness.

S5 was historically mined for a limited period but is currently not extracted. The seam is most prominent in the mine 2 and mine 3 areas and, to a limited extent, in the Western Limb of the southern part of the mining rights area. The roof comprises ~0.5m of thick sandy micaceous shale at mine 2 that thickens up to ~1.6m in mine 3. Above this is a competent sandstone, usually saturated with water, resulting in a weathered parting between the two sequences. This presents challenges in supporting the shale during coal extraction and must, in most cases, be removed. The seam consists of mixed coal and torbanitic material with an average thickness of 1.5m.

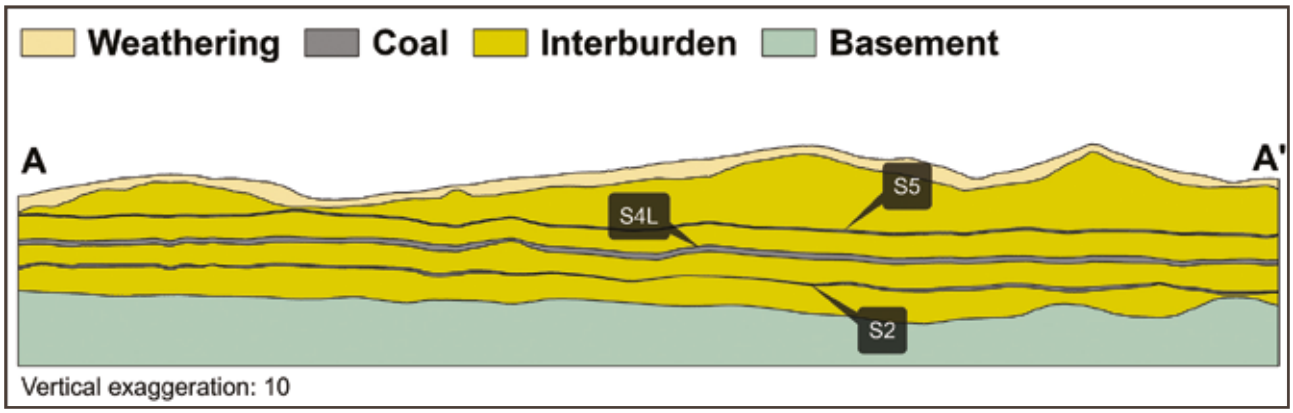
S2 at Matla is well developed in the north-western part of the mining area, in the mines 2 and 3 Resource areas. It thins out to the south, where thickness averages at 1.2m to 2.5m. Coal qualities are also generally poor in this area, thus S2 is not generally mined in the southern portion of the mine area. S4 is generally well distributed throughout mine 1, 2 and, to a limited extent, mine 3. Seam thickness varies between 1.0m to 5.5m and consists of homogenous, dull lustrous coal interspersed with bright coal bands.

S4 splits in two thin and poor-quality horizons impacting the economic viability in mine 3. The best S4 qualities are on the southern part of the lease area (mine 1 area). However, S4 is heavily intruded by dykes in this area, creating significant challenges for coal extraction.

Matla Resource evaluation

Geological and structural models were updated in 2019, incorporating new information from drilling and results of reviewing previously excluded historic borehole information. The new information was used to review Coal Resource classification categories and enhanced specifically the outlines of the Indicated and Measured Resource categories.

Figure 25: Typical north-south section through Matla geological model



All data collection (geological logging, description, interpretation, sampling, validation and capturing of borehole cores information) is undertaken by on-site qualified, trained and competent geologists and aligned with Exxaro standards. A well-trained grade-control and geological mapping team undertakes mapping and reconciliation. Mapping captures intrusions, devolatilised coal, channel sandstones/in-seam partings, slumping structures, faults, joints, guttering, slabbing and floor rolls as well as measurements of mined heights, contamination and dilution. Dips and dip directions of all geological features and structures are measured and recorded. Surface mapping was only conducted where outcrops were observed.

Core loss for coal-seam intersections is recorded and a recovery of <95% through coal (by volume) is deemed unsatisfactory. Anomalies are investigated and redrilled if required. Wire-line logging is conducted on all vertical holes to enhance the definition of contacts and improve seam correlation.

All geological logging and sampling are undertaken by a team of on-site qualified, trained and competent geologists. Logging is conducted by recording of lithology down to centimetre according to the classification of the various coal "lithofacies"/ coal type zones or ply (shale-coaly, coal-shaly, coal dull, coal mixed/mainly dull, coal mixed, coal mixed/mainly bright and coal bright), based on discernible lithofacies change and identified marker horizons, particularly through coal zones. All holes are captured in the acQuire Technology Solutions geological database.

All core sampling is done at the drill sites. Samples are selected according to their respective coal-seam boundaries after thorough correlation. A general rule of >0.5m seam sample thickness cut-off is applied but is evaluated in the field where necessary. In addition, the proposed mining method, mining equipment and sample mass (chemical and physical analysis required) are also considered. In-seam partings are sampled together with coal zone samples, especially the PL parting (after considering thickness) within the seam.

All geological coal core samples are sent biweekly to Siza Coal laboratory (SANAS accreditation no T0447) in Kinross. ISO and South African National Standard (SANS) have a standard set of tests and methods used for coal analyses by South African laboratories.

Resource classification was guided by SANS 10320 minimum guidelines (~350m spacing between boreholes with quality and structural information). Additional closer-spaced drilling was conducted in areas of structural complexity to ensure timely geotechnical accessibility and mineability (fall-of-ground considerations) of Coal Resources/Reserves.

Table 57: Matla Coal Resource reporting criteria

Thickness cut-off (thickness and extraction height considerations)	Quality cut-offs (adb)	Geological loss
<1.8m	DAFV +26% CV <15MJ/kg	10% (may vary considering RODA)

Table 58: Matla Coal Resource estimation criteria

	Item	Description
Database	Borehole database	acQuire
	Data datum	Cape LO29
	Number of boreholes used for Resource estimation	2 409 of 2 474 in the database
	Validation	Conducted using queries in acQuire and Excel
	Data compositing and weighting	Conducted in Geovia Minex™
Model	Previous model date	2018
	Last model update	2019
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm
	Grid mesh size	25m x 25m
	Scan distance	2 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering and topography/collar Lower: basement/Dwyka
	Model outputs	Roof, floor and thickness grids generated for structure Raw quality grids
	Changes to modelling process	None

Ancillary Resource and Reserve information by operation

continued

Table 59: Matla Coal Resource classification criteria

Category	Type of boreholes	Borehole spacing	Structurally complex areas	BH/ha
Measured	Cored boreholes with applicable coal qualities	0m – 350m	Closer-spaced boreholes and geotechnically logged holes are required to evaluate mineability	~0.12 (average 2 and 4 seam)
Indicated	Cored boreholes with applicable coal qualities	350m – 500m		~0.06 (average 2 and 4 seam)
Inferred	Cored boreholes with applicable coal qualities	500m – 1 000m		~0.04 (average 2 and 4 seam)

Table 60: Matla Coal Resource and Coal Reserve statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)	Reason for changes
Measured	705	713	(8)	(1)	Mining depletion (8.5Mt)
Indicated	105	97	8	8	Revised Resource classification and the update of the geological model resulted in the movement between the categories
Inferred	232	240	(8)	(3)	
Total Resources	1 043	1 050	(7)	(1)	
Proved	145	172	(27)	(15)	The decrease is primarily the result of mining as well as the disposal of mining panels related to unfavourable stooping conditions
Probable	16	16	(0.7)	(4)	Stooping areas where the surface rights are not secured are reported as Probable Reserves
Total Reserves	161	188	(27)	(14)	

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: underground (UG).*
- *Figures reported at 100% irrespective of percentage attributable to Exxaro.*
- *Tonnages quoted in metric tonnes and million tonnes is abbreviated as Mt. Coal Resources quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2018 and 31 December 2019.*
- *Coal Resources reported on a MTIS basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources quoted inclusive of Coal Reserves.*

Matla Reserve estimation

Scheduling of the Coal Reserve is determined using mining scheduling applications from XPAC and ProgCad. The geological 3D model used for the Coal Reserve estimation is referred to as the Reserve 3D model. The Coal Resource model uses the full coal seam while the Reserve model only defines a select mining height. The process ensures the model represents reality regarding the technical capability of current production equipment.

At Matla, Indicated Resources are generally converted to Probable Reserves and Measured Resources to the Proved Reserve category, except if any modifying factors have not been (partly) fulfilled, where the Resource is either not converted or downgraded to the Probable Reserve category, clearly stating the outstanding requirement and risk. The LoM was updated in the reporting year to incorporate new information used in the geological model update. All applicable modifying factors have been considered, specifically focusing on geotechnical as Matla faces several geological structural challenges.

A number of changes were made to the LoM plan between 2016 and 2018 to accommodate the 2015 mine 1 closure, due to pillar instability. All mining sections of mine 1 had to be placed in mine 2 and 3 to ensure that planned tonnages and qualities complied to contractual agreements. These forced changes, accelerated the need for high-resolution geological information in Reserve areas only planned for later, in the prior LoM plan. Infill vertical drilling, supplemented by horizontal drilling and geophysical surveys, has therefore increased dramatically in the last three years and the Matla team has done exceptionally well in the absence of mine 1 to keep coal production stable. However, the number of Reserve areas and associated mining flexibility will increase in the future, due to the fact that the mine 1 relocation project was approved in this reporting year. Some 27Mt of Inferred Resource in the LoM plan translate to 32% of total LoM plan. However, only 16.9% of Inferred Resources are within the five-year production plan due to focused efforts to minimise the mine 1 closure impact on Matla. Continuous exploration drilling is in place to improve the confidence level of these Resources.

Matla known risks

Dolerite sills and dykes pose a risk for operations at Matla. Dykes have been identified through both geophysical surveys and mining observations and are known to affect S4 at mines 1 and 2 as well as S2 at mine 3. Dykes impact on production rate and roof stability, where sill activity causes burnt coal, devolatilisation and instability and mine-panel accessibility challenges. The challenges are addressed through a suite of exploration activities and are generally proactively accommodated in mine planning. Continuous surface exploration drilling aims to improve sill characterisation in mine 2, while underground horizontal drilling is used to pinpoint dykes in operating sections at mines 2 and 3. Unforeseen geological structural complexity (faulting and intrusives) poses risk for specifically the low seam Reserves at mines 2 and 3. Geological faults with a significant offset have been encountered and they have production tempo impacts mining sections.

Sizeable pillars of generally good qualities with the potential to be mined by the stooping method, are left behind due to current mining equipment limitations.

Obtaining environmental approvals for stooping, as an alternative mining method, may have an impact on the mining schedule, and require a revision of the LoM plan. The ability to extract all planned stooping Reserves is dependent on Eskom purchasing the required surface rights.

The implementation of the various expansion projects on schedule is important to ensure the availability of adequate S2 and S4 Coal Reserves.

Matla excellence

The implementation, currently in progress, of both mine 1 relocation and the two (mines 2 and 3) expansion projects (called the north-western access projects) will unlock considerable value for the operation and provide vital mining flexibility for mine planning and operational teams.

Table 61: Matla RPEEE considerations

Item	Criteria	Considered	Comment
Geological data	Data validated and signed off by competent person	Yes	Tested in 2019
Geological model	Geological model considered and signed off	Yes	Seam depth, seam thickness >1.8m, dry ash-free volatiles >26% air-dried CV >15MJ/kg and ash <50% with coal qualities reported on an air-dry basis
Structural model	Structural model considered and signed off	Yes	Updated in 2019
Mining	Mining assumptions considered and defined	Yes	Underground
Assurance	Minimum tier 1 assurance (Exxaro governance)	Yes	2019 (model and chain of custody)
Economic evaluation	Concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	LoM exploitation study
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Yes	All required approvals in place. Additional requirements can be demonstrated in the context of local, regional and national legislation. Land acquisitions for future stooping can be achieved based on current acquisition strategy
Tenure	Formal tenure must be demonstrated with reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national governmental legislation	Yes	Approval for Mining right is pending. Exxaro has a reasonable expectation that the right will be granted
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Yes	Current infrastructure
Market	A potential market for the product with a reasonable assumption that it is sustainable	Yes	Current coal-supply agreement

Ancillary Resource and Reserve information by operation

continued

Table 62: Matla production figures

	Actual 2018	FC 2019	Actual 2019	FC 2020	FC 2021
RoM (Mt)	6.7	6.31	5.99	7.54	6.25

Table 63: Matla modifying factors considered in converting Coal Resources to Coal Reserves

Modifying factors	Value
Geological loss	10% (already included in model)
Average thickness cut-off	>1.8m and <4.8m
Quality cut-offs (adb)	DAFV >26% and CV >15MJ/kg
Mining loss	Already included in model, based on specific geological conditions and mining restrictions
Depth to roof	40m unless rock strength allows otherwise
Safety factor	Tertiary panels 1.6 and main development 2.0
Bord width	7.2m
Barrier pillar	At least equal to pillar width
Boundary pillar	15m
Pillar centres	19m x 19m or depending on depth and safety factor
Mining height	>1.8m and <4.8m
Extraction factor	Already included in model
Dilution	Already included in model
Contamination	Use select seam
Practical plant yield	N/A
Environmentally sensitive areas	Areas underlying wetlands and other eco-sensitive areas are excluded from Reserves. A higher safety factor is used underneath rivers and surface structures
Legal	Mining right boundary
Social	None
Geohydrological	None

Leeuwpan mine

Leeuwpan overview

Leeuwpan mine is in the Delmas coalfield, on the western border of the Witbank coalfield. Leeuwpan, in the Victor Khanye local municipality in Mpumalanga province, is 10km south-east of the town of Delmas, 80km east of Johannesburg and 70km south-east of Pretoria. It lies alongside the R50 hard-topped secondary road and is serviced by a rail track that includes a rapid load-out station.

Leeuwpan is an opencast operation with various Reserves, in various pits, mined simultaneously. Current mining operations are on the OJ (depleted in 2018), OL and OWM Reserves with the introduction of OI Reserves. The OI box-cut was completed in September 2018 and first coal was produced in Q1 2019. The mine uses trucks and shovels for mining-related operations. We estimate that the mine will be in production until 2031, with the mining right lapsing in 2039. Leeuwpan supplies domestic and export markets. The mine is equipped with a rapid rail load-out station, which is the preferred means of coal offtake, although road transport is accommodated.

Leeuwpan has two dense medium separator (DMS) plants that beneficiate export thermal coal and a crush-and-stack (CS) plant that handles selectively mined thermal coal, mainly for the local market. The second DMS plant, commissioned in 2016, is operated by Fraser Alexander (FA DMS). The original DMS plant produced a 5 700kcal/kg product whose market ended in Q4 2018, necessitating the change to a 5 300kcal/kg product. The FA DMS, on the other hand, was geared to produce a 5 200kcal/kg product. The CS produced a 4 200kcal/kg product. All three plants produce mainly thermal coal.

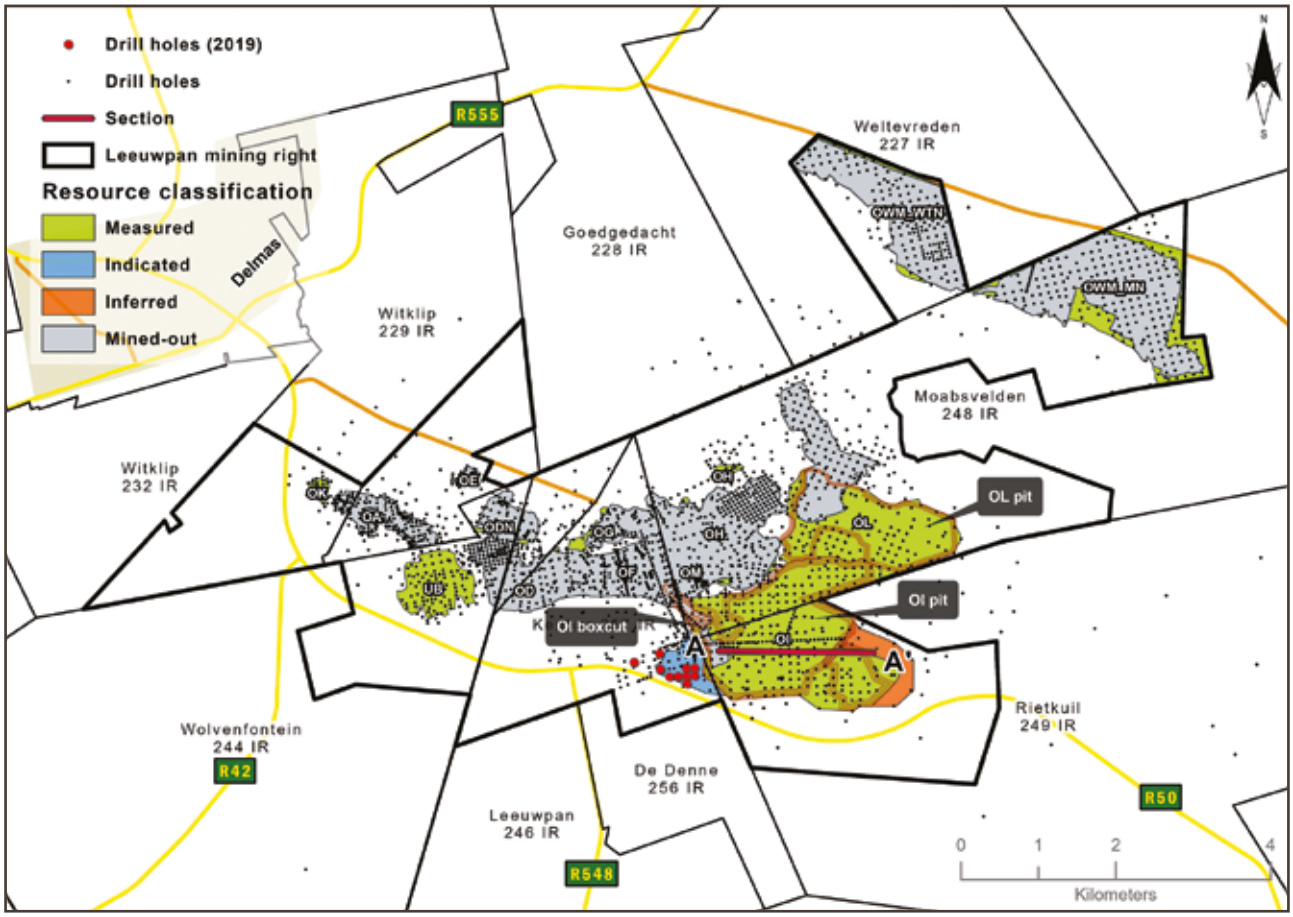
Leeuwpan history

Leeuwpan has 4 152 boreholes in the mining right area covering 4 269ha but only 2 215 falls in the Resource blocks. These boreholes were drilled in various drilling campaigns and 871 holes were used for the creation of the geological model. All Measured Resources at Leeuwpan are currently at 100m x 100m drill spacing.

Table 64: Leeuwpan operation history

Date range	Company	Material notes
Up to 1988	Southern Sphere	262 borehole records exist for this period. Leeuwpan was sold to Kumba in 1988
1988 – 2006	Kumba Resources	Exploration began in 1990. Box-cut was commissioned in 1992. Rights were ceded to Exxaro Resources in 2006
2006 – 2019	Exxaro Resources	Ongoing exploration campaigns focused mainly on operational de-risking drilling programmes

Figure 26: Leeuwpan coal mine



Ancillary Resource and Reserve information by operation

continued

Leeuwpan geology

Two coal seams have been identified at Leeuwpan: top coal seam (TC) and bottom coal seam (BC). BC correlates with the seam 2 (S2) of the Witbank and Highveld coalfields and TC correlates to the seam 4 (S4) and seam 5 (S5). BC qualities are generally higher than TC qualities.

The coal seams at Leeuwpan are primarily interbedded with sandstone, shale and carbonaceous shale. The coal was deposited on glacial sediments of Dwyka tillite which, in turn, were deposited on dolomite of the Transvaal Supergroup. A significant amount of magma intruded as concordant sills of dolerite in the Karoo strata in the Delmas area. Associated with the dolerite intrusion are numerous thin dolerite dyke structures that transgress the stratigraphy. Factors controlling geological and quality continuity are mainly surface weathering, significant variation in seam thickness due to an undulating tillite floor, faulting associated dolerite activity and dolomitic basement, and devolatilisation and weathering due to dolerite intrusions (sills and dykes).

The average total seam thickness at Leeuwpan is 10.9m, with an average raw calorific value of 20.1MJ/kg, raw volatile matter of 18.7% and raw ash content of 31.4% (adb). These qualities require beneficiation for export-quality products.

Leeuwpan Resource evaluation

Samples are named and numbered as per the standard task procedure at Leeuwpan (STP-LP-PO.003) which states that samples should be numbered on the BH core using a wax marker in a different colour to that of the lithology code. The number of samples is recorded on the log sheet as per STP-LP-PO.002. Numbering of the sample tag is written in the order of Reserve BHID/sample number, example, MN971/2.

Samples are split on the lithological contact, if needed, using a chisel and hammer to ensure a clean break. Each sample is put in an individual bag with all contents represented in that interval, ensuring no contamination occurs between materials to be sampled. Should there be any unwanted material in the bag, a comment is made on the sample sheet. Once the sample is in the bag, a tag is attached. Two sample tags are written on plastic sample tags using a permanent marker. One sample tag is placed inside the bag and the second on the outside of the bag when sealed with a cable tie.

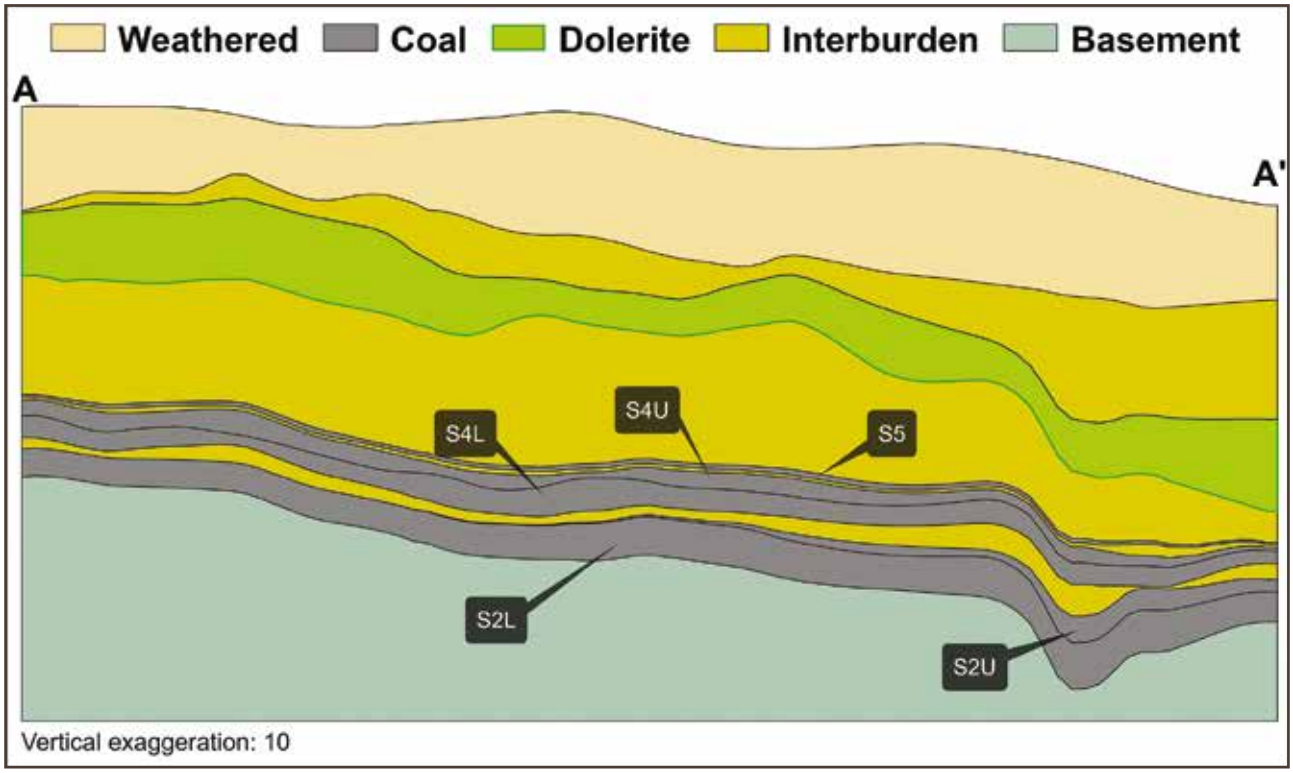
In 2014, Bureau Veritas was awarded the coal quality analyses contract for sample preparation and analyses. Raw RD is determined before the sample is crushed to -12.5mm and the 0.5mm fraction is screened out. Raw analysis is done on the +0.5mm -12.5mm material and float-sink analyses performed at float RD: 1.4, 1.5, 1.6, 1.7 and 1.8. Proximate analysis, CV and sulphur are performed on each fraction. All sample preparation is done in accordance with ISO 3909 parts 1 to 5.

Bureau Veritas is SANAS-accredited for analytical work and participates in monthly local and international round-robins.

Table 65: Leeuwpan Coal Resource reporting criteria

Thickness cut-off (thickness and extraction height considerations)	Quality cut-offs (adb)	Geological loss
<2m (2014 model) <1m (2015 model and onwards)	Ash >50%	5%

Figure 27: Typical cross-section through Leeuwpan geological model (Moabsvelden)



Geovia Minex™ is used to model the coal seams and estimate in-situ Coal Resources at Leeuwpan. Coal Resource block sizes vary, and boundaries are determined by farm boundaries, coal qualities, coal thicknesses, infrastructure and geological structures. The model generates grid surfaces for the upper and lower boundaries of the coal seams from borehole intersection points. The grid surfaces of the top of a seam and bottom of the seam are then subtracted from each other to estimate the thickness of the seam. The washability qualities associated with each sample are also converted from point to grid data using the same growth algorithm technique. The method gives smooth surfaces which replicate the regional trends of geology, while reflecting local anomalies.

The Coal Resource classification methodology is fundamentally based on SANS 10320 and considers borehole spacing, type of boreholes and structural complexity of the Resource.

Table 66: Leeuwpan Coal Resource estimation criteria

	Item	Description
Database	Borehole database	acQuire
	Data datum	Cape LO29
	Number of boreholes used for Resource estimation	871 boreholes
	Validation	Conducted using queries in acQuire and Excel
	Data compositing and weighting	Geovia Minex™
Model	Previous model date	2016
	Last model update	2018
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm
	Grid mesh size	20m x 20m
	Scan distance	2 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering and topography/collar Lower: basement/Dwyka
	Model outputs	Roof, floor and thickness grids generated for structure Raw quality grids Wash quality grids
	Changes to modelling process	None

Table 67: Leeuwpan Coal Resource classification criteria

Category	Type of boreholes	Borehole spacing	Structurally complex areas	BH/ha
Measured	Cored boreholes with applicable coal qualities	0m – 100m	Resource blocks limited by faults, dolerite sill breakthrough and devolatilisation Geotechnical risks associated with faulting, dykes, sill and weathering – infill drilling	1.1
Indicated	Cored boreholes with applicable coal qualities	100m – 200m	Resource block limited by devolatilisation and coal depth – infill drilling	0.6
Inferred	Cored boreholes with applicable coal qualities	200m – 1 000m	Resource block limited by devolatilisation – infill drilling	0.2

Ancillary Resource and Reserve information by operation

continued

Table 68: Leeuwpan Coal Resource and Reserve statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)	Reason for changes
Measured	92.8	101.1	(8.3)	(8)	Mining depletion (8.3Mt)
Indicated	2.6	2.6	—	—	
Inferred	3.6	3.6	—	—	
Total Coal Resources	99	107.3	(8.3)	(8)	
Proved	45.9	53.7	(7.8)	(14)	The decrease is primarily due to mining depletion (6.1Mt) and the disposal of areas due to dolerite activity (1.4Mt). Change in material allocation as a result of beneficiation quality changes (0.1Mt)
Probable	6.1	6.2	(0.1)	(1)	
Total Coal Reserves	52.1	59.8	(7.8)	(13)	

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: opencast (OC).*
- *Figures reported at 100% irrespective of percentage attributable to Exxaro.*
- *Tonnages quoted in metric tonnes and million tonnes abbreviated as Mt. Coal Resources quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources reported on a MTIS basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources quoted inclusive of Coal Reserves.*

Table 69: Leeuwpan RPEEE considerations

Item	Criteria	Considered	Comment
Geological data	Data validated and signed off by competent person	Yes	
Geological model	Geological model considered and signed off	Yes	Seam depth, seam thickness >2m (2014 model) and seam thickness >1m (from 2015 model). <50% ash content, coal qualities are reported on an air-dry basis
Structural model	Structural model considered and signed off	Yes	
Mining	Mining assumptions considered and defined	Yes	OC
Assurance	Minimum tier 1 assurance (Exxaro governance)	Yes	2018
Economic evaluation	Concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	LoM exploitation study
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Yes	Current required approvals in place, except for OI West where an integrated water use licence has been granted for infrastructure. Approval for mining is pending
Tenure	Formal tenure must be demonstrated with reasonable demonstration that a mining right approval can be obtained within the context of local, regional and national governmental legislation	Yes	Mining right valid to 2039
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Yes	Current infrastructure
Market	A potential market for the product with a reasonable assumption that it is sustainable	Yes	Current market

Leeuwpan Reserve estimation

Scheduling of the Reserve is determined using mine scheduling applications from XPAC, which is the same software used to develop the LoM plan schedule.

There is no difference between Resource grids and Reserve grids. Grid validation for Leeuwpan is conducted by checking for negative thicknesses, ensuring contact integrity and checking energy ratios to ensure progressive increase down the wash tables.

At Leeuwpan generally, the Measured Resources are converted to Proved Reserves, except for UB, where it is classified as a Probable Reserve because of additional modifying factors such as low volatiles and the limited market for this particular quality of coal. Indicated Resources are converted to Probable Reserves as is the case for OI West.

Table 70: Leeuwpan production figures

	Actual 2018	FC 2019	Actual 2019	FC 2020	FC 2021
RoM (Mt)	6.65	6.83	6.5	7.09	7.09

Table 71: Leeuwpan modifying factors considered in converting Coal Resources to Coal Reserves

Modifying factors	Value
Geological loss	5%
Average thickness cut-off	1.0m
Quality cut-offs	N/A
Mining loss	25% for S5 and 5% for all other seams
Boundary pillar	100m
Dilution	0
Contamination	5% on DMS plants and 1% on CS plant
Mining recovery efficiency	5% (CS) and 5% (DMS bypass)
Planned average slope angles	45 degrees. For highwall stability, soft material is mined at least one strip ahead of hard material and coal-mining activities
Practical plant yield	90% DMS and 90% FA DMS with slimes loss on DMS of 9% and 15% on FA DMS
Strip ratio cut-off	N/A
Environmentally sensitive areas	OJ (environmentally sensitive areas such as wetlands)
Legal	OWM and OJ
Social	Socially sensitive areas in the mining right (such as graveyards) are excluded from Reserves in the reserving process
Geohydrological	Pit floor was taken into consideration to minimise water handling in the pit face

Leeuwpan known risks

The OI West portion of the Coal Reserve is classified as Probable as Leeuwpan is still awaiting approval of the integrated water use licence (IWUL).

Geological challenges (eg seam floor undulation and presence of sill and dykes) are addressed through proactive infill drilling, grade control and mine planning.

Groundwater management and pit de-watering requires constant monitoring to ensure that it does not influence production.

A delay in an Eskom powerline relocation poses a risk to mine scheduling of the OL pit and the execution of the LOM plan. The LOM plan has been revised to accommodate this relocation delay and maintain production stability.

Achieving the higher than previously experienced overburden volumes, as scheduled, is critical to obtain the mine's planned production.

Leeuwpan excellence

DMS bypass project to improve plant throughput on RoM with in-spec raw qualities. Leeuwpan is running a number of operational excellence initiatives to improve productivity, including:

- Overburden optimisation
- Improve DMS throughput
- Frazer Alexander plant RoM circuit improvement (upgrade)
- Cost reduction
- Mining fleet improvement
- Improve equipment availability and reliability

The Leeuwpan integrated operations centre is intended to increase operational throughput by optimising the value chain. Having an across-the-board view of operations, it will be possible to make timely decisions for better control of interruptions across the value chain.

Ancillary Resource and Reserve information by operation

continued

Tumelo mine

Tumelo overview

Exxaro only provides an overview in projects and operations directly under Exxaro's management control. Tumelo shareholding is 51% Mmakau Mining and 49% ECC. We, however, decided to include an overview of Tumelo since it formed part of the original Total Coal South Africa Complex. Tumelo mine forms part of Exxaro Coal Central (ECC) and is in Mpumalanga, 15km north-west of the town of Hendrina and 5km south-east of Hendrina power station. The Hendrina-Middelburg tarred road passes 6km east of the property. An all-weather dirt road linking the town of Hendrina and the power station runs 500m to the west of the property, while the Wonderfontein-Broodsnyersplaas railway line lies 2km west with the closest siding being Pullenshope, 3.5km away.

Tumelo's mining right (10115MR) covers 462.9ha on the farm Boschmanskop 154 IS. Following the purchase of Total Coal South Africa (TCSA) assets by Exxaro in August 2015, the current Tumelo shareholding is 51% Mmakau Mining and 49% ECC. The project is included in the ancillary section as Tumelo forms an integral part of the ECC complex.

Surface infrastructure still in use includes: mine buildings (offices, workshops and change houses), box-cuts to access the coal seam, conveyor belt systems and a RoM stockpile facility. After operating for six years, Tumelo ceased production in January 2014 after its mining contract expired, and it was placed on care and maintenance.

Since then, a series of technical and economic evaluations were conducted by TCSA and Mmakau Mining, reviewing the potential of the remaining mineable Reserves, mining method and production rate. Mmakau Mining recommissioned the operation in 2019 with first coal mined in April, this S2 ROM is trucked to FZON where the coal is then crushed and screened for a 5 300kcal/kg export market.

Tumelo exploits seam 2 (S2) on the edge of the Springs-Witbank coalfield and RoM was trucked using existing roadways to Forzando North (FZON) where it was beneficiated for a 5 800kcal/kg export product.

Tumelo history

Exploration activities started in the early 1990s with a mining right submitted in 2006 and first coal production in 2009. To date, there are 132 boreholes (103 with coal wash data) in Tumelo's mining right area. The 2017 geological model update incorporated all existing boreholes with wash quality information. In general, Tumelo has a borehole distribution of 0.22bh/ha.

Figure 28: Tumelo locality map

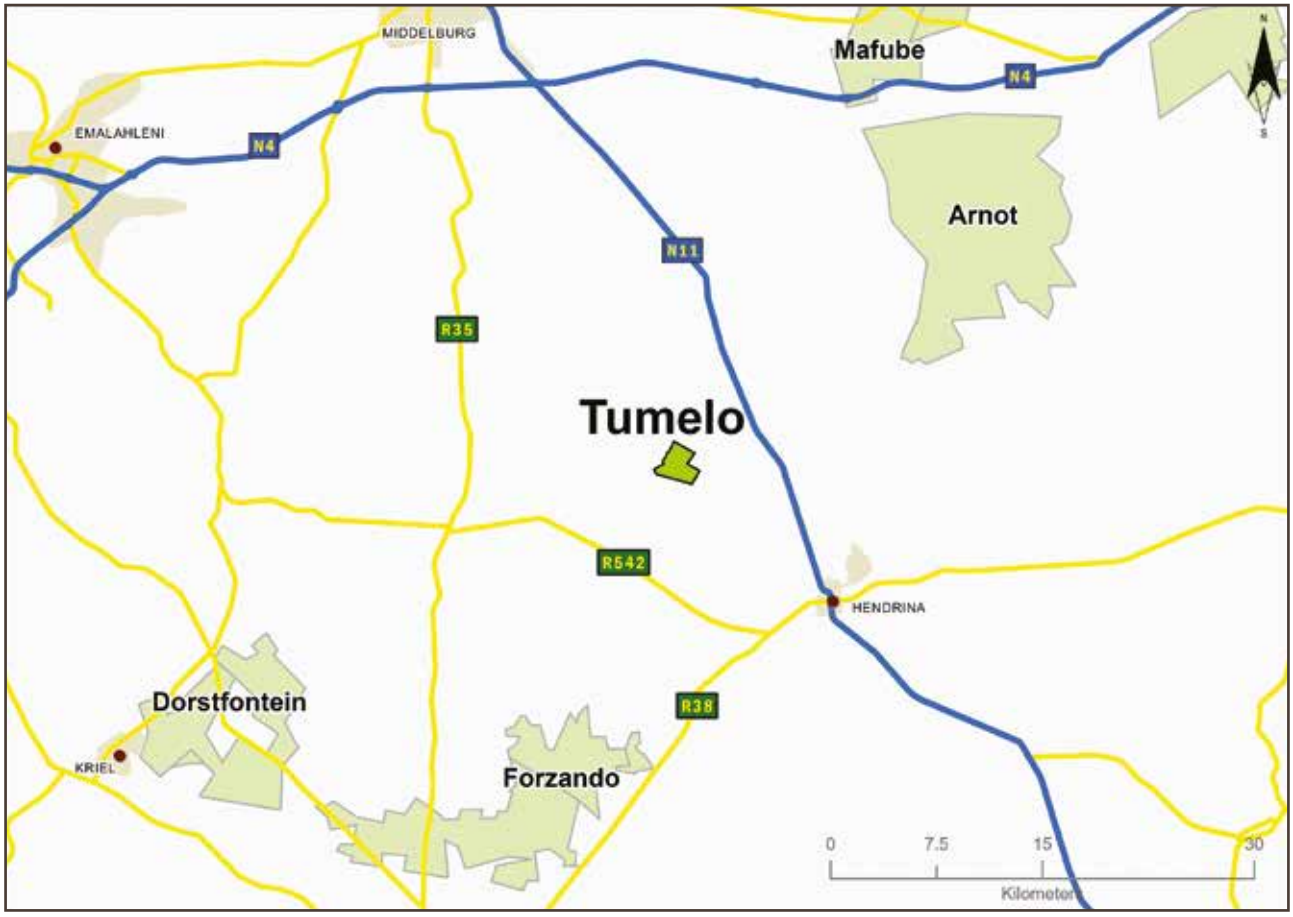


Table 72: Tumelo project history

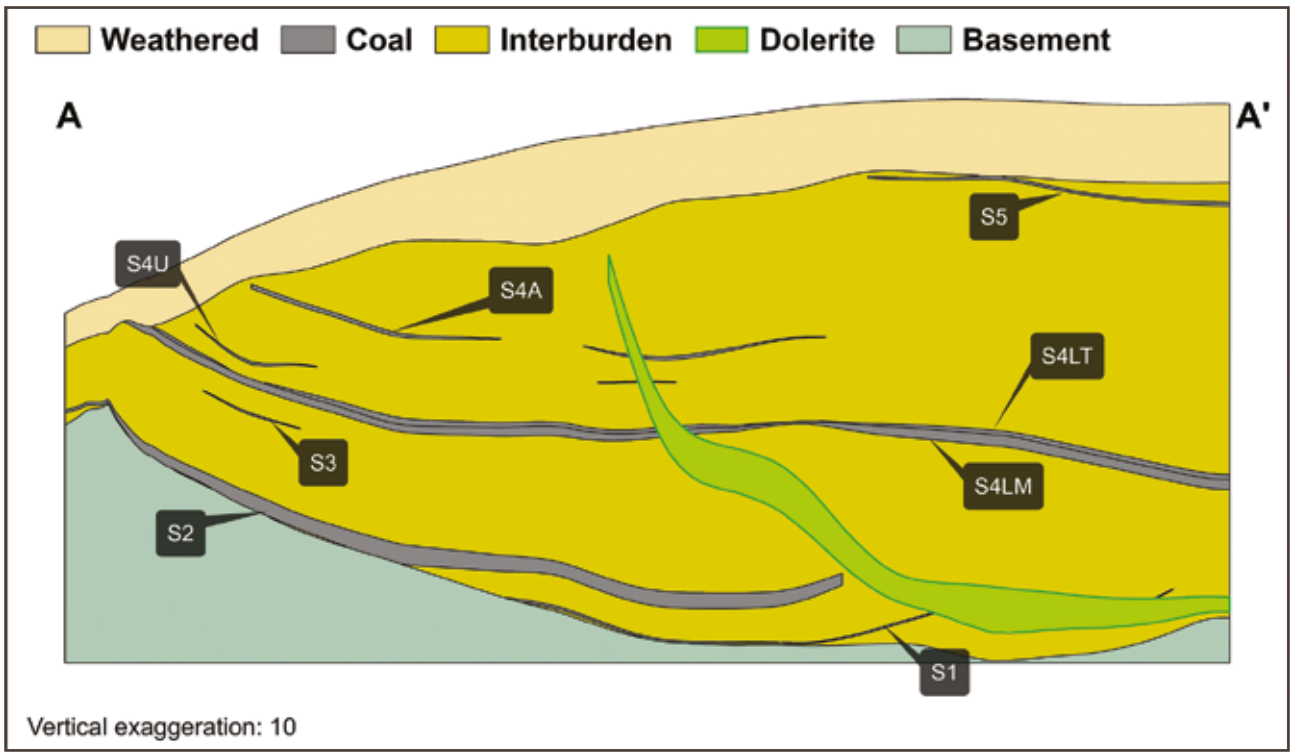
Date range	Company	Material notes
1990	Senekal Mine	The first company to conduct exploration programme, drilling 26 boreholes
1991	Hanover Mining	Further exploration work, 34 boreholes drilled
2002	Total Exploration South Africa (TESA)	TESA acquired the project with 18 boreholes drilled during its tenure. A feasibility study in 2002 confirmed the presence of economic Coal Reserves. The Boschmanskop project would later become known as Tumelo
2004 – 2013	Total Coal South Africa (TCSA)	Further exploration work undertaken by TCSA. Mining right applied for in 2006 in the name of Tumelo Coal Mine. First coal recorded in 2009, exploiting S2 via bord-and-pillar method. Mining outsourced to SBS Mining Proprietary Limited, a mining contractor. Initially RoM coal was custom washed for an export product at the Shanduka (Glencore)-owned Koornfontein Colliery washing plant but would later be trucked to TCSA's FZON and washed for a 5 800kcal/kg export product
2014 – 2015	TCSA	Production ceased in January 2014 when the mining contract expired. Failure to agree on a possible extension with the contractor led to the operation being placed under care and maintenance in February 2014.
2015 – 2018	Exxaro Coal Central (ECC)	TCSA became ECC after being taken over by Exxaro in August 2015. Tumelo remained under care and maintenance.
2019	ECC	Mmakau Mining recommissioned the operation in 2019 with first coal mined in April.

Tumelo geology

Tumelo is to the north of the Smithfield Ridge on the north-eastern edge of the Springs-Witbank coalfield. The area is part of the Karoo basin with stratigraphy similar to that of other ECC operations, Dorstfontein and Forzando with subtle location-induced differences.

Six coal seams are developed in the area, named from the base up as S1, S2, S4L, S4U, S4A and S5. S1 is very thin, being only developed in the deepest part of the palaeo-valley. The thickest average seam is the S2 (0.5m to 5.3m), developed mainly in a palaeo-valley where it is either thin or absent over the adjacent palaeo-ridges. S2 has been exploited since Tumelo production started in 2009. S4L is the most continuous and second-thickest seam while S4U is thin and has mostly been eroded. S4A is thin and patchily developed and S5 is only present in a topographically high area in the south east. The only economically exploitable seam is S2.

Figure 29: Tumelo cross-section



Ancillary Resource and Reserve information by operation

continued

Late Jurassic dolerite sills and dykes occur in the Tumelo area. The intrusions resulted in displacement of the various seams and devolatilisation of extensive areas of coal. The geological complexity and associated challenges are proactively managed by extensive infill drilling, downhole wireline logging for better contact definition and seam correlation as well as surface mapping, particularly of basement outcrops. This information is captured in a structural model, together with potential risks captured in a GIS-based risk and opportunity domain analysis (RODA), allowing for a more integrated approach to risk management.

Tumelo Resource evaluation

All exploration boreholes are logged and sampled by qualified geologists, aligned with Exxaro logging and sampling standards and standard operating procedures. Samples are selected according to seam boundaries, visual variation in the vitrinite content, assisted by density logs, and non-coal material present in the seam boundaries. The geologist takes cognisance of the borehole purpose and drilling conforms to ECC standards.

ECC's sampling governance and chain of custody requires that each sample to be submitted to the laboratories is accompanied by a sample submission list that also serves as a sample advice sheet with instructions for analysis. The laboratory is notified of samples that are ready for collection. On collection, the laboratory representative cross-checks all samples against the submission list to confirm the names and number of samples they are receiving. All submission lists are managed in duplicates with signed copies scanned and saved electronically in the geology server.

All geological core sample are sent to the laboratory for coal quality analysis. Two major laboratories have been used at Tumelo: Australian Laboratory Services (ALS) and Societe Generale de Surveillance (SGS) with SANAS accreditation (T0611 and T0815 respectively). ISO and South African National Standards (SANS) have a standard set of tests and methods used for coal analysis by South African laboratories. These laboratories have committed to assuring the quality of results provided to the customer by ensuring quality assurance, quality control, data validation and proficiency testing procedures are observed.

Table 73: Tumelo Coal Resource reporting criteria

Thickness cut-off (reporting and extraction considerations)	Quality cut-offs (adb)	Geological loss*
Underground ≤1.2M	DAFV ≤24% Raw ash ≥50%	10% – 50%

** A 10% standard geological loss is applied but may vary based on consideration of structural complexity (dolerite sill breakthrough – 50% loss within determined spatial extent), seam gradient (>4 degrees – 50% loss) and dolerite sill proximity to seam (25% loss). A 15% geological loss is applied (weighted average of the various risk domains).*

Table 74: Tumelo Coal Resource estimation criteria

	Item	Description
Database	Borehole database	Sable Data Warehouse
	Data datum	Cape LO29
	Number of boreholes used for Resource estimation	103 of 132 boreholes in the database with washability data
	Validation	The laboratory conducts data validation on samples. In the Sable Database Warehouse, additional validations are conducted and corrected. Data is exported from Sable into csv files where additional checks are conducted in Excel
	Data compositing and weighting	Data compositing is conducted per seam using a weighted value from individual samples that make up the seam, along with the RD and length of each sample. This is done in Geovia Minex™
Model	Previous model date	January 2010 in Stratmodel
	Last model update	January 2017
	Geological modelling software	Geovia Minex™
	Estimation technique	Growth algorithm – general purpose gridding
	Grid mesh size	25m x 25m
	Scan distance	2 000m
	Data boundary	200m
	Model build limits	Upper: limit of weathering and topography/collar Lower: basement/Dwyka
	Model outputs	Roof, floor and thickness grids generated for structure. Raw quality and washability grids
	Changes to modelling process	Change in modelling package from Stratmodel to Geovia Minex™

Table 75: Tumelo Coal Resource classification criteria

Category	Type of boreholes	Borehole spacing	Structurally complex areas	BH/ha
Measured	Cored boreholes with applicable coal qualities	0m – 350m	Structural complexity and coal variability – additional infill drilling	0.30
Indicated	Cored boreholes with applicable coal qualities	350m – 500m	Structural complexity and coal variability – additional infill drilling	0.20
Inferred	Cored boreholes with applicable coal qualities	500m – 1 000m	Structural complexity and coal variability – additional infill drilling	0.11

Table 76: Tumelo Coal Resource statement

Category	2019 (Mt)	2018 (Mt)	Difference in tonnes (Mt)	Difference (%)	Reason for change
Measured	8.4	8.7	0.3	(3)	Mining
Indicated	0.2	0.2	—	—	
Inferred	1.8	1.8	—	—	
Total Coal Resources	10.4	10.7	0.3	(3)	

Rounding of figures may cause computational discrepancies.
- *All changes more than 10% are explained.*
- *Mining method: underground (UG).*
- *Figures reported at 100% irrespective of percentage attributable to Exxaro.*
- *Tonnages quoted in metric tonnes and million tonnes abbreviated as Mt. Coal Resources quoted as mineable tonnes in-situ (MTIS) and refer to remaining Resources after 31 December 2019 and 31 December 2018.*
- *Coal Resources reported on a MTIS basis.*
- *Cut-offs applied as per Resource reporting criteria table.*
- *Coal Resources quoted inclusive of Coal Reserves.*

Ancillary Resource and Reserve information by operation

continued

Table 77: Tumelo RPEEE considerations

Item	Criteria	Considered	Comment
Geological data	Data validated and signed off by competent person	Yes	Geological structure and depositional extent, seam thickness >1.2m (UG), <50% ash content, >24% DAFV. Coal qualities reported on an air-dry basis
Geological model	2017 geological model considered and signed off	Yes	
Structural model	Structural model considered and signed off	Yes	
Mining	Mining assumptions considered and defined	Yes	UG areas defined and aligned with exploitation strategy
Assurance	Policy-driven governance, internal and external audits	Yes	In place, internal review 2012
Economic evaluation	Concept-level exploitation with economic and mining assumptions, including geotechnical and geohydrological assumptions	Yes	Only approved economic assumptions and parameters applied
Environmental	Reasonable demonstration that environmental approvals can be obtained within the context of local, regional and national governmental legislation	Done	Areas where there is reasonable expectation that mining will not be permitted are considered, such as wildlife sanctuary, river and streams, historic sites and monuments. Environmental and social concept assessments have been completed
Tenure	Only areas in acceptable prospecting and mining rights. In areas adjacent to existing rights where legal section application is pending with reasonable expectation of approval	Yes	MR/PR licences are valid. Extensions or annexations will be lodged as necessary
Infrastructure	Assumptions used should be reasonable and within known/assumed tolerances or have examples of precedence	Done	Current infrastructure
Market	Market(s) identified form part of an existing operation market strategy or potential market for which there is a conceptual market study	Done	Operational strategies aligned with existing markets

Tumelo known risks

The Tumelo mining right expired on 10 December 2015 and a renewal application was lodged with the Department of Minerals and Energy on 29 July 2015, approved in early 2019 and executed in August 2019.

Boreholes received from third parties and drilled between 1990 and 1991 lack wash information for specific fractions. A limited amount of drilling is required to address this data gap. The Coal Resouces estimates are received from Mmakau Mining.

Tumelo excellence

Continuous reviews of geological information and economic viability by Mmakau Mining lead to the mining of 0.3Mt during the reporting year.

Exploration

Exploration in existing operations of our coal business consisted primarily of drilling (diamond core and reverse circulation) with surface geophysical surveys, when required, and downhole geophysical logging.

In 2019, a number of initiatives were implemented to utilise technology to enhance our exploration activities. In 2018, we indicated that the centralised managed acQuire database system was successfully implemented. Initially some challenges regarding the information management support systems were experienced but this was overcome and the bulk of borehole data captured during the reporting year was successfully deposited directly into the cloud-based database. This initiative not only increase the ease and speed of core logging-and-sampling but also improve data integrity and security vital to our Resource estimation assurance process. In addition the implementation of the EQuIS groundwater data system ensure real-time groundwater data capture for fast and effective decision making regarding water management as well as empowering us in taking proactive steps to ensure compliance to our water use licence requirements.

All exploration holes, aligned with our Exploration Procedure must be downhole geophysically logged using density and gamma probes for validating borehole depths and geological contacts. In 2019, we also started surveying selective holes using optical televiewer (OTV), acoustic televiewer (ATV) and Sonic to obtain geotechnical information of the rock mass. Geotechnical data collection from exploration boreholes are historically limited due to a number of factors, including the requirement that the complete coal zones be sampled for coal quality tests. This requires that dedicated boreholes be drilled only for geotechnical sampling and testing resulting in a significant increase in exploration cost. Geophysical down-hole logging using the abovementioned techniques allowed us to conduct repeatable measuring of the physical properties of the undisturbed rock mass down the borehole wall. Empirical methods were then applied to the data to obtain the required geotechnical parameters. Advantages of applying these techniques include non-destructive, quick, precise, repeatable, and continuous surveying along the depth of the borehole (including weak zones). The successful implementation of these technologies will ensure that in future all boreholes targeting the Coal Resource as well as geological structures can be surveyed and used as points of observation for geotechnical interpretations.

Exploration in 2019 was primarily conducted to improve geological confidence to enhance geological modelling and estimation. These boreholes are depicted in the relevant locality maps in the ancillary section. A limited amount of geotechnical and hydrogeological drilling was conducted to improve mine-planning parameters and is included in exploration results (Table 78).

No exploration was conducted on areas not included in the Coal Resource statement. The exploration cost reflected at Thabametsi and the Waterberg North and South project areas are related to the reworking of exploration data to identify information gaps to plan future exploration activities as well as for the compilation of reports associated with legal reporting and mineral right closure.

The Coal Resource in the various operations were reviewed in 2019 to identify and outline geological challenges. Based on this review, an integrated exploration plan was compiled that includes activities required to address Coal Resource and metallurgical characterisation, overburden characterisation, geological structure as well as rock engineering and hydrogeological data requirements. The plan is dynamic and additional activities are included when previously unforeseen complexities are encountered.

Grootegeluk mine drilled a number of large-diameter cored exploration boreholes to increase geological confidence to mitigate geological risk and enable detailed mine planning. Positions were carefully selected to address Coal Resource information gaps and to increase our confidence on rock engineering and hydrogeological information. An additional focus this year was to drill with openholes a series of parallel profiles in front of the advancing pit. The profiles extends up to the mining right boundary in the west and the boreholes intersected both the full Vryheid and Volksrust formation successions (~120m). The results delivered valuable information regarding overburden characteristics and increased the accuracy of our bench/seam definitions as weathering and structural complexity increase towards the west. In addition a number of strategically located boreholes, downhole geophysical surveyed were drilled to better define geological faulting that poses challenges for future mining. The results combined with detail pit mapping were used to better define a graben-like structure located near the centre of the pit disrupting coal bench allocation to the various processing plants. The slight increase of boreholes drilled at Grootegeluk are contributed to the drilling of a number of holes both for Coal Resource definition and geotechnical purposes in the Turfvlakte project area. Turfvlakte is a smaller project area to the south-east of the Grootegeluk pit and is investigated for additional coal potential.

At Matla mine, exploration activities in recent years have aimed to address the information gap created by several changes to LoM plan layouts to accommodate delayed Eskom approvals of the Matla expansion projects. The continued diligent work by the Matla exploration team has in a major part overcome this information gap. Vital progress has been made and drilling in 2020 will proceed to mitigate geological risk in the short and medium term, derisking accessibility and mineability (roof stability) within the LoM plan.

The risk of geological faulting as well as the impact of sill and dykes are very pertinent challenges in all three of the Matla mine expansion projects. Exploration that includes vertical and incline core and openhole drilling, horizontal drilling, surface geophysics and, for the first time, surface to seam directional drilling are scheduled within the 2020 exploration plan to address these challenges. The directional drilling will be executed at the mine 2 expansion project where two fixed borehole positions will be used to drill a number of trails as to identify the occurrence of faults, sills and dykes.

Exploration continued

Infill drilling of the two box-cut areas at Belfast mine produced excellent results. The weathered coal horizon was accurately outlined and minimal coal RoM was lost during the opening of the box-cut areas. The results defining the fresh coal contacts again underpinned the importance of adequate infill drilling during box-cut positioning and design. Additional drilling was conducted to define the depth of weathering along the mine plan edges as well as to confirm a number of seam variability anomalies. Drilling in 2020 will, in addition to increasing the level of Coal Resource confidence, also focus on the characterisation of the overburden regarding soft and hard materials. A number of small previously unforeseen and extremely hard quartzitic channels have been encountered during the year impacting on overburden contractual mining efficiency. Drilling at Belfast will, however, primarily focus on the northern expansion of the Belfast operation. The Coal Resource in the northern area outside the LoM plan will be investigated through vertical and incline core, and percussion drilling to increase the level of Resource confidence to support mine planning studies. Access and environmental approvals were obtained and drilling will start in the first quarter of 2020.

Drilling at Leeuwpan mine was executed to improve the confidence of coal seam structure and coal qualities in the OI West Resource expansion area and results will be incorporated in the next update of the geological model. Drilling in 2020 will target potential geological challenges relating to dyke and sill occurrence, geological faulting and depth of weathering in the short and medium-term mine layouts.

Exploration activities at ECC focused as in 2018 on derisking the first five-years in the LoM plan. A significant number of boreholes were drilled to investigate dyke and sill occurrence as well as geological faulting. Drilling to derisk the expansion of 4 seam mining at Dorstfontein West as well as the area to the west of Pit 2 in Dorstfontein East where ECC will expand into an underground operation was concluded.

Table 78: Summary of exploration expenditure for coal

	2018 actual		2019 actual				2020 planning*	
Project or mining operation	**Number of boreholes**	**Total cost (Rm)**	**Number of boreholes**	**Drilling cost (Rm)**	**Analysis and other costs (Rm)**	**Total costs (Rm)**	**Number of boreholes**	**Total cost (Rm)**
Grootegeluk	98	16.6	155	8.6	12.2	20.8	45	21.0
Arnot								
Matla***	124	11.1	109	9.7	1.3	10.9	80	28.7
Belfast	74	1.4	59	1.8	1.2	3.0	66	9.0
Leeuwpan	33	2.1	6	1.3	0.2	1.5	5	1.0
Thabametsi project (mining right)****		0.4				1.2		7.0
Dorstfontein	68	3.5	41	1.7	2.1	3.8	54	8.3
Forzando*****	30	2.4	2	0.1		0.1	28	5.6
Tumelo								
Others (projects not reported on)						7.0		
Total	427	37.5	372	23.1	17.1	41.9	278	80.6

* *Non-committed.*
** *Includes all associated exploration cost, such as drilling, geophysics surveys and geotechnical, hydrogeological and metallurgical test work, excluding personnel, and excludes horizontal drilling.*
*** *2020 cost includes directional surface to seam drilling (SIS).*
**** *Includes surface geophysical surveys over the southern area of the project.*
***** *Limited drilling in 2019 is the result of surface access restrictions.*

Endorsements

The Exxaro lead competent persons are appointed by the executive management team.

The Exxaro lead Mineral Resource competent person is Henk Lingenfelder, a member of the Geological Society of South Africa and registered (400038/11) with the South African Council for Natural Scientific Professions. He has a BSc (Hons) in geology and 24 years of experience as a geologist in coal, iron ore and industrial minerals.

The person in Exxaro designated to take corporate responsibility for Coal Resources, Henk Lingenfelder, the undersigned, has reviewed and endorsed the reported estimates.

JH Lingenfelder
BSc geology (Hons)
Pr Sci Nat (400038/11)
Group manager: geoscience

263 West Avenue, Die Hoewes
Centurion 0163

South African Council for Natural Scientific Professions
Private Bag X540
Silverton 0127
Gauteng
South Africa

The Exxaro lead Mineral Reserve competent person is Chris Ballot, a mining engineer registered (20060040) with the Engineering Council of South Africa. He has 23 years of experience in iron ore, mineral sands and coal in various technical and management roles. His qualifications include BEng (mining), GDE and MBA.

The person in Exxaro designated to take corporate responsibility for Mineral Reserves, Chris Ballot, the undersigned, has reviewed and endorsed the reported estimates.

CC Ballot
BEng (mining)
ECSA 20060040
Group manager: mining processes

263 West Avenue, Die Hoewes
Centurion 0163

Engineering Council of South Africa
Private Bag X691
Bruma 2026
Gauteng
South Africa

Both parties are in the full-time employment of Exxaro, Henk Lingenfelder as the group manager: geosciences and Chris Ballot as the group manager: mining processes. Both parties have consented to the inclusion of Resources and Reserves estimates in the integrated report 2019. Exxaro has written confirmation from the competent persons that the reporting is compliant with the SAMREC Code, the relevant portions of Table 1 and the JSE section 12 requirements, and they consent to the publication of the report.

Abbreviations

AMT	audio magnetic telluric
adb	air-dried basis
CM	continuous miner
CMRR	Consolidated Mineral Resource and Reserve report
CP	competent person
CPR	competent persons report
CSA	coal-supply agreement
CV	calorific value
DAF	dry ash free volatiles
DCM	Dorstfontein complex
DCME	Dorstfontein East complex
DCMW	Dorstfontein West complex
FZO	Forzando
GBIS	global borehole information system
GTIS	gross tonnes in-situ
ha	hectare
IM	inherent moisture
JORC Code	Australasian Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves
JSE	JSE Securities Exchange Limited
kcal/kg	kilocalories per kilogram
LoM	life of mine
MJ/kg	megajoules per kilogram
Mt/Mtpa	million tonnes/per annum
NAR	nett as received
RODA	risk and opportunity domain analysis
RoM	run of mine
SAMREC	South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves
SANS	South African National Standard

Appendix A

Table 79: Shareholding and tenure of reported Mineral Resources and Mineral Reserves

Complex		Name of right	Type	Status	% attributable to Exxaro	Expiry date	Remainder attributable to
Arnot	Arnot (UG and OC)	Arnot (325MR)	mining right	executed	100	11 December 2038	
Matla	Matla (UG)	Matla (327MR)	mining right	executed	100	22 November 2019	
			renewal	new application	100		
Leeuwpan	Leeuwpan (OC)	Leeuwpan (157MR)	mining right	registered	100	31 May 2039	
		Leeuwpan Ext (171MR)	mining right	registered	100	31 May 2039	
Mafube	Mafube (OC)	Mafube (172MR)	mining right	registered	50	30 July 2030	Anglo American Coal Proprietary Limited
		Nooitgedacht (10026MR)	mining right	registered	50	13 November 2043	Anglo American Coal Proprietary Limited
Strathrae	Strathrae (OC)	Strathrae (328MR)	mining right	granted	100	22 November 2019	
			renewal	new application	100		
Belfast	Belfast (OC)	Belfast (431MR)	mining right	registered	100	20 February 2043	
Grootegeluk	Grootegeluk (OC)	Grootegeluk (46MR)	mining right	registered	100	1 April 2039	
Thabametsi	Thabametsi (UG and OC)	Thabametsi (10013MR)	mining right	registered	100	20 May 2046	
Waterberg prospecting	Waterberg North (OC)	Pentonville (10719PR)	prospecting right	executed	100	22 January 2020	
		Dartmoore (10720PR)	prospecting right	executed	100	29 September 2019	
		Carolina (10718PR)	prospecting right	granted	100	19 July 2021	
	Waterberg South (OC)	Swelpan (10721PR)	prospecting right	granted	100	19 July 2021	
Australian region	Moranbah South (OC and UG)	MDL277 and 377	mineral development licences	granted	50	31 July 2021 and 30 September 2023	Anglo American Coal Proprietary Limited
		EPC 548	exploration permit	executed	50	20 February 2022	Anglo American Coal Proprietary Limited
Dorstfontein	Dorstfontein (OC and UG)	Dorstfontein West + Vlakfontein (119MR)	mining right	registered	74	18 December 2036	Mmakau Mining Proprietary Limited
		Dorstfontein West (123MR)	mining right	registered	74	18 December 2036	Mmakau Mining Proprietary Limited
		Dorstfontein East (51MR)	mining right	registered	74	30 October 2036	Mmakau Mining Proprietary Limited

Appendix A continued

Complex		Name of right	Type	Status	% attributable to Exxaro	Expiry date	Remainder attributable to
Forzando	Forzando (OC and UG) ECC has an additional indirect 12.75% shareholding through Mmakau Coal hence a total interest of 86.74%	Forzando South (380MR)	mining right	executed	86.74	9 November 2027	Mmakau Mining Proprietary Limited
		Forzando North (381MR)	mining right	registered	86.74	20 November 2027	Mmakau Mining Proprietary Limited
		Legdaar (1846PR)	prospecting right	renewal submitted	74	4 May 2015	Mmakau Mining Proprietary Limited
		Legdaar (13825PR)	renewal	new application	74		Mmakau Mining Proprietary Limited
Schurvekop	Schurvekop Applicant Mmakau Coal	Schurvekop (1063PR) Mmakau Coal	prospecting right	registered	49	27 November 2016	Mmakau Mining Proprietary Limited
		Schurvekop (10160MR)	mining right	new application	49		Mmakau Mining Proprietary Limited
Tumelo	Tumelo (UG)	Boschmanskop (10115MR)	mining right	executed	49	29 January 2025	Mmakau Mining Proprietary Limited

PR: Prospecting right.
MR: Mining right.
Prospecting right of Rietkuil (1916PR) that forms part of the Dorstfontein Complex as well as the Kalabasfontein (1035PR/1170PR), Schurvekop Port 24 and the Vlaklaagte (1140PR & 10991PR) prospecting rights that forms part of the Forzando Complex are not displayed since they are currently under review.

Table 80: Shareholding and tenure of reported Base Metal Resources and Reserves

Commodity	Name of right	Type	Status	% attributable to Exxaro	Expiry date	Remainder attributable to
Base metals	Deeps and Swartberg (zinc, lead, copper and silver)	converted right	executed	26	30 September 2038	Vedanta Resources plc
	Gamsberg North and Gamsberg East prospecting (zinc)	converted right	executed	26	18 August 2038	Vedanta Resources plc

Table 81: Coal production figures (kilotonnes)

Operation	Product	2018	2019	FC 2020*	FC 2021*
Grootegeluk	Thermal coal	27 375	25 684	26 373	26 758
Grootegeluk	Metallurgical coal	2 323	2 074	3 148	4 849
Matla	Thermal coal	6 609	5 991	6 217	5 215
ECC	Thermal coal	3 797	4 235	3 923	4 396
Leeuwpan	Thermal coal	4 220	4 396	4 958	5 215
Mafube (buy-ins from joint venture)	Thermal coal	991	1 869	1 892	1 889
Belfast	Thermal coal		1 029	2 951	3 123

** Forecast.*

Table 82: 2019 competent persons' register

	Mineral Resources				Mineral Reserves			
Operation/ project	**Name**	**Relevant experience (years)**	**Job title**	**Registration***	**Name**	**Relevant experience (years)**	**Job title**	**Registration**
Lead competent person: Exxaro	JH Lingenfelder	24	Group manager: geosciences	SACNASP (400038/11)	C Ballot	23	Group manager: mining	ECSA (20060040)
Arnot	MV Sambo	12	Senior geologist: ECC	SACNASP (400369/12)	N/A			
Belfast	G Gcayi	12	Resident geologist: Belfast	SACNASP (400299/11)	PDM Lourens	14	Principal mining engineer	SAIMM (702550)
Grootegeluk	CW van Heerden	17	Resident geologist: Grootegeluk	SACNASP (400069/04)	R van Staden	16	Manager: mining operations	ECSA (20050123)
Leeuwpan	P Themba	17	Resident geologist: Leeuwpan	SACNASP (400031/09)	M Sethethi	12	Mine manager: Leeuwpan	ECSA (20095030)
Matla	TF Moabi	14	Resident geologist: Matla	SACNASP (400067/08)	B Young	23	Mineral Resource manager: Matla	PLATO, PMS (0182)
Thabametsi	CW van Heerden	17	Resident geologist: Grootegeluk	SACNASP (400069/04)	C Ballot	23	Group manager: mining	ECSA (20060040)
Dorstfontein and Forzando	G Bittah	12	Manager geologist: ECC	SACNASP (400217/12)	G Ndebele	36	Mineral Resource manager: ECC	SACNASP (400107/10)
Tumelo and Schurvekop 1063	G Bittah	12	Manager geologist: ECC	SACNASP (400217/12)				
Mafube (Nooitgedacht and Wildfontein)	D Xaba	20	Geology manager: Anglo American Coal	SACNASP (400019/05)	D Xaba	20	Geology manager: Anglo American Coal	SACNASP (400019/05)
Mafube (Springboklaagte)	D Xaba	20	Geology manager: Anglo American Coal	SACNASP (400019/05)	D Xaba	20	Geology manager: Anglo American Coal	SACNASP (400019/05)
Moranbah South, Australia	AJ Laws	24	Specialist resource geologist: Anglo American Coal	AusIMM (209913)	N/A			
Black Mountain (Deeps mine, Swartberg and Big Syncline)	M Campodonic	19	Director and corporate consultant: resource geology, SRK Consulting (UK)	AusIMM (CP Geology), FGS	J Miles	30	Associate principal consultant: mining engineering, SRK Consulting (UK)	MIMMM (CEng)
Gamsberg	M Campodonic	19	Director and corporate consultant: resource geology, SRK Consulting (UK)	AusIMM (CP Geology), FGS	J Miles	30	Associate principal consultant: mining engineering, SRK Consulting (UK)	MIMMM (CEng)

Addresses
- *Exxaro Resources: 263 West Avenue, Die Hoewes, Centurion 0163, Gauteng, South Africa.*
- *South African Council for Natural Scientific Professions: Private Bag X540, Silverton 0127, Gauteng, South Africa.*
- *Engineering Council of South Africa: Private Bag X691, Bruma 2026, Gauteng, South Africa.*
- *Australasian Institute of Mining and Metallurgy: 204 Lygon Street, Carlton VIC 3053, Australia.*

All competent persons are Exxaro employees except where otherwise stated and competent person qualifications are included in the individual competent persons' reports.

exxaro

POWERING POSSIBILITY

www.exxaro.com