Coaltech

QUARTERLY NEWSLETTER

Q1 2026

Contents

Chief Executive Officer's Statement

Dear Coaltech Community,

Coal powers economies. It underpins energy security, industrial development and the livelihoods of millions across South Africa and the continent. Every year, global events confirm what we already know: coal remains central to how nations sustain themselves, particularly in times of uncertainty. The question has never been whether coal matters. It does. The question is whether we are investing in the research and innovation that ensures the coal sector continues to advance in efficiency, safety and sustainability. At Coaltech, that is exactly what we do. And as we open FY2026/27, I can say with confidence that the answer is yes.

Two years ago, we were an organisation of 15 associates in a period of rebuilding. Today, we are 34 members strong, managing 20 active research projects in a portfolio that is funded by our members and partners. In February, Coaltech stood alongside the Mining Indaba organisers as a strategic partner at the largest mining investment conference in the world. That moment was significant for all of us following a few years where conversations around the future of coal were sidelined. It reflected how far we have come and how seriously the industry takes work around the future of coal. Earlier this year, we also launched the Coaltech Youth Innovation Council, because the future of coal research must be shaped by the next generation of scientists and engineers from the very start.

EIGHT NEW PROJECTS FOR FY2026/27

This financial year opens with eight new research projects: Discard Dewatering (NWU), Turning Ash into Assets (Mintek), Resource Valorization and Critical Minerals (UJ), Wearable Technologies for Mine Safety (RIIS), Sustainable Liner Technology (ARC Innovations), Rare Earth Element Recovery (Wits), Coal Mining Digital Evaluation Platform (Digital Twin), and the 100 kW Coal-Fired Air-Brayton Cycle (Wits), whose kick-off has been deferred for further review and may commence later this year. The breadth of this portfolio is remarkable: from underground safety wearables to rare earth element recovery to digital twins for mine modernisation. This is coal R&D leading from the front. Full project descriptions are available at:

https://coaltech.co.za/events/featured-insights-press-releases/.

HELE CFB PROGRAMME: WHAT PARTNERSHIPS MAKE POSSIBLE

Over the last year, together with our partners in the CSIR, Eskom, SANEDI we formally launched Phase 1 of the HELE CFB Clean Coal Technology Localisation Programme. This is what meaningful partnership looks like. The CSIR brings world-class engineering capability. Eskom brings the operational mandate to modernise. SANEDI bridges national energy policy and planning. And Coaltech brings the collaborative research model and industry network that makes multi-institutional programmes of this scale possible. Together, we are laying the groundwork for a pilot-scale advanced coal technology facility in South Africa, aligned with the Integrated Resource Plan 2025.

THE MAIN EVENT: COALTECH COLLOQUIUM 2026 | 28 MAY | ANEW HOTEL, BENONI

The Colloquium is our flagship event, held once every two years. Ten speakers across four research themes covering safety, water, carbon, critical minerals and advanced coal technologies. One full day of research findings that directly inform operational and investment decisions. Attendance is free for Coaltech members.

Register at www.coaltech.co.za.

Exhibitors: this is a once-in-two-years opportunity to showcase your brand to senior managers, executives, researchers and policymakers. Booths are R12,000 (members) / R20,000 (non-members) ex VAT. Contact Carmen Bergman-Ally at cbergman@coaltech.co.za. Spaces are limited.

Our sincere thanks to headline sponsors FlowCentric and Agreenco, and to confirmed exhibitors: MCS, Blugrey, CSIR, Phatsema Mining, CDC Dust Control, DMT Kai Batla, Nafasi Water, AECI, Mandela Mining Precinct, Life Agriscience, Eco Elementum and JCI Mining.

To our researchers: your work is reaching boardrooms and policy tables across the country. To our members: every rand you contribute is delivering real, measurable impact. And to those who have not yet joined us: this is your invitation. The coal sector deserves the best R&D platform on the continent. We are building it. Be in the room on 28 May.

Avhurengwi Nengovhela
Chief Executive Officer

COALTECH Colloquium 2026

The Premier Research, Development and Innovation Platform for the Coal Industry

400 - 600 DELEGATES

50+ COMPANIES

10 RD&I PRESENTATIONS

FREE TO ATTEND

DATE:
28 May 2026

TIME:
8:00 - 15:30
(one day event)

VENUE:
ANEW Hotel, Benoni.
Hotel & Convention Centre OR Tambo
1 Country Street, Lakefield, Benoni, 1501,
Johannesburg, South Africa

REGISTER AS A DELEGATE

EXHIBITOR & SPONSOR OPPORTUNITIES

VIEW OUR AGENDA HERE

JOIN US

for a day of knowledge, innovation and collaboration.

The Coaltech Colloquium 2026 brings together the full Coaltech community and wider coal value chain – including mining groups and mines, researchers and research organisations, universities and students, government and regulators, technology innovators, service providers and investors who are committed to making the South African coal industry competitive, sustainable and safe.

HEADLINE SPONSORS

AGREENCO

FlowCentric MINING TECHNOLOGY

EXHIBITORS

mcs.

Life AgriScience

BCOE

CSIR

AECI MINING

DMT Kai Batla (Pty) Ltd

PHATSEMA

Jones & Wagener Engineering & Environmental Consultants

CDC DUST CONTROL

BLUGREY Occupational Hygiene (Pty) Ltd

MANDELA MINING PRECINCT MINDS FOR MINES

JCI MINING

nafasi water

razorlabs

genet MINERAL PROCESSING

Reasons to attend the 2026 Coaltech Colloquium

MIKE TEKE

Seriti Resources - CEO

Mike Teke is the Group CEO of Seriti Resources Holdings which he co-founded in 2018 and serves as Chairman of FutureCoal Limited.

Headline Sponsor

AGREENCO

Agreenco Environmental Projects is an integrated environmental solutions provider specialising in ESG compliance, water-use innovation, ecological infrastructure, and land repurposing through rehabilitation.

Their team of experienced scientists, engineers, and environmental practitioners develops practical and implementable solutions to address complex environmental challenges across the mining sector.

With a strong focus on monitoring, adaptive management, and long-term sustainability, Agreenco works closely with clients and stakeholders to deliver meaningful environmental improvements to ecosystems and communities affected by mining. Their extensive track record across multiple commodities and climatic regions, combined with ongoing involvement in research, industry associations, and social upliftment initiatives, positions them as a trusted leader in environmental solutions.

We thank Agreenco Environmental Projects for their valued support in helping make the Coaltech Colloquium 2026 an impactful platform for collaboration, research, and innovation in the coal mining industry.

Headline Sponsor

FlowCentric MINING TECHNOLOGY

FlowCentric Mining Technology supports the coal industry with practical solutions built for real operational challenges. At the centre of its offering is FlowCentric Heatshield™, a long-term solution developed to help prevent, control, and extinguish self-heating and spontaneous combustion in coal.

The product is designed for both proactive and reactive treatment, helping operations manage one of the sector's most persistent safety and resource risks.

Alongside FlowCentric Heatshield™, the company also provides mechanical wastewater evaporation solutions for mine dewatering, as well as a full range of industrial dust control and stabilisation services for roads, tailings, and material processing areas.

As the Coaltech community comes together to share research, insight, and progress across the sector, the support of organisations such as FlowCentric Mining Technology helps strengthen the shared drive towards a safer, more efficient, and more sustainable coal industry.

Thank you to FlowCentric Mining Technology for supporting the Coaltech Colloquium 2026 as one of the two Headline Sponsors.

Keeping People Safe and Operations Stable

MINING

RIAAN BERGH

Mechanical Engineer | CSIR

Presenting: Coal Dust Explosibility, Kloppersbos Testing Capability

Riaan Bergh brings 25 years of structural mechanics and performance testing experience to the coal sector. He leads the CSIR's Mining Testing and Training impact area, which includes the Cottesloe Mining Laboratories and the Kloppersbos mine fire and explosion testing and training facility. His presentation covers South Africa's coal dust explosibility testing capability and what it means for operational safety standards underground. The work is directly relevant to every underground coal operation in the country: if dust explosibility thresholds are not properly understood and tested, the safety protocols built on top of them are unreliable.

"Improved stress measurement is the key to preventing fall-of-ground incidents and saving lives"

Coaltech

MINING

JOHAN HANEKOM

Chief Rock Engineer | CSIR

Presenting: Stress Measurement for Fall-of-Ground Prevention

Johan Hanekom is a rock engineer with 36 years of experience spanning AngloGold Ashanti, SRK Consulting, and the University of Pretoria's Mining Engineering Department. He held the Harmony Chair in Rock Engineering and Numerical Modeling at the University of Pretoria from 2015 to 2018 and has operated as an independent specialist consultant before joining the CSIR as Chief Rock Engineer in 2023. His presentation addresses how improved stress measurement techniques can prevent fall-of-ground incidents, the leading cause of fatalities in South African underground mining. The research targets practical, deployable measurement approaches that mines can integrate into existing ground control programmes.

Managing Water, Land & Carbon as Systems

SURFACE ENVIROMENT

DR RYAN MERCKEL

Bioprocess Specialist | Mintek, Biometallurgy Division

Presenting: Biological Treatment of Brines

Dr Ryan Merckel is a chemical engineer and bioprocess specialist with experience spanning academia, applied research, and industry. He has been affiliated with the University of Pretoria and Mälardalen University and has worked in the forestry, energy, and chemicals sectors before joining Mintek's Biometallurgy Division. His work focuses on biological process development for industrial and environmental applications, particularly mine water treatment, biological sulphate reduction, sulphide management, and the biological treatment of brines. At the Colloquium, he presents research on how biological processes can offer more sustainable alternatives for treating the concentrated brines that conventional mine water treatment systems produce.

"Biological processes offer a sustainable alternative for treating concentrated industrial brines"

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SURFACE ENVIROMENT

LESEGO MADISENG

PhD Candidate in Agronomy | University of Pretoria

Presenting: Irrigation Using Treated Mine Water

Lesego Madiseng is an environmental and agricultural scientist with more than five years of experience in mine water irrigation research. She holds a BSc (Hons) in Environmental Soil Science and an MSc Agric in Agronomy, and is currently completing her PhD in Agronomy at the University of Pretoria. She has worked as an environmental consultant in the mining industry, specialising in rehabilitation and mine closure planning. Her presentation covers the work undertaken by the University of Pretoria's Mine Water Irrigation Research group to facilitate the acceptance and adoption of irrigation as a mine water management strategy through evidence-based decision-making. The goal is to turn treated mine water from a disposal problem into a productive agricultural resource.

Managing Water, Land & Carbon as Systems

SURFACE ENVIROMENT

PROF WAYNE TRUTER

Full Research Professor | University of the Free State, Green Futures Hub

Presenting: Carbon Farming on Rehabilitated Coal-Mined Land

Prof Wayne Truter holds a PhD in Integrated Agricultural and Environmental Sciences from the University of Pretoria. He is currently employed by the University of the Free State as Full Research Professor in the Faculty of Natural and Agricultural Sciences, Centre of Mineral Biogeochemistry, and serves as the Executive Manager of the Green Futures Hub. He is also a Research Programme Specialist Advisor at Enterprises University of Pretoria. His specialisation focuses on establishing the most sustainable, economical, and practically feasible regenerative land use management systems in disturbed and rehabilitated environments. He is a founding member and past president of LaRSSA (Land Rehabilitation Society of Southern Africa). His presentation explores how carbon farming can turn post-mining landscapes into carbon sinks rather than liabilities.

"Carbon farming can transform post-mining landscapes into valuable carbon sinks rather than liabilities"

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SURFACE ENVIROMENT

KAREN SSEKIMPI

Scientific Officer | Centre for Bioprocess Engineering Research (CeBER), University of Cape Town

Presenting: Carbon Capture & Energy Recovery Using Algae

Karen Ssekimpi holds both a Bachelor's and a Master's degree in Chemical Engineering from UCT. She has several years of experience in microalgal biotechnology, with a particular interest in developing sustainable and scalable solutions to environmental challenges. Her current work at CeBER focuses on advancing microalgal-based systems for wastewater treatment and resource recovery, integrating biological processes to improve water quality while generating value-added products. Her research includes the use of microalgal polycultures to remediate mine-impacted wastewater, coupled with carbon capture. At the Colloquium, she presents work highlighting the potential of these systems for addressing both water treatment and climate-related challenges for the coal sector.

Extracting New Value from Coal & Residues

PROCESSING

DR JUAREZ AMARAL FILHO

Researcher | Centre for Bioprocess Engineering Research (CeBER), University of Cape Town

Presenting: Characterisation of Coal Downstream Materials for Resource Recovery

Dr Juarez Amaral Filho is a researcher at UCT's CeBER whose work explores opportunities for the valorisation and repurposing of secondary resources in line with circular economy principles. His Coaltech-supported research project investigates how conventional mineral processing technologies can be applied in innovative ways to improve environmental management in the mining sector. With a particular focus on critical minerals and pyrite, the study demonstrates how detailed characterisation can support resource recovery, reduce waste-related liabilities, and create value across the coal value chain. The work is directly relevant to South Africa's strategic interest in critical mineral supply chains and the growing pressure to find productive uses for coal waste streams.

"Detailed characterisation allows us to recover critical minerals and create value from waste streams"

Coaltech

PROCESSING

REATILE PITSO

Senior Researcher, Pavement Design and Construction Engineering | CSIR, Smart Mobility Cluster

Presenting: Coal-Based Circular Innovation for Asphalt Applications

Reatile Pitso holds a Master's Degree in Civil Engineering (Cum Laude) specialising in Transportation Engineering and is currently in the final stages of his PhD at the University of KwaZulu-Natal. He has more than 18 years of diverse experience in water supply, construction materials, pavement design, geometric design, and construction, spanning Lafarge's research operations in France and now the CSIR. His Coaltech-supported research, conducted in collaboration with the CSIR, tests whether coal waste, including coal fines, can serve as a viable substitute for natural aggregates in asphalt wearing courses. Laboratory results (Marshall Stability, Indirect Tensile Strength, Hamburg Wheel Tracking, and Four-Point Bending Beam tests) show coal waste asphalt matching or outperforming conventional mixes, with measurable cost savings where transport distances remain limited.

The Next Frontier of Coal Innovation

FUTURE TECHNOLOGIES

DR MIKE MASUKUME

Principal Researcher and Project Leader | CSIR, Hydrogen South Africa and Carbon Capture and Utilisation Research Group (HySA/CCU)

Presenting: High-Efficiency, Low-Emissions (HELE) Technologies

Dr Mike Masukume holds a PhD in Chemical Engineering and an MSc in Project Management. He is the Project Leader for the strategic Circulating Fluidised Bed (CFB) Project at the CSIR, focused on developing a Basic Engineering Package for a 500 kW CFB plant in South Africa. The overall aim is to establish a CFB facility as an alternative to conventional coal combustion technology in order to demonstrate its fuel flexibility and emission control capabilities. He is also co-developer representing CSIR in the Mast3RBoost consortium, an international collaboration of 13 partners developing hydrogen storage technology. His presentation makes the case for HELE technology as a practical transition pathway for South Africa's coal fleet.

"Understanding and reporting Scope 1 and 2 emissions is now a regulatory necessity for coal operations"

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FUTURE TECHNOLOGIES

JUAN DU PLESSIS

Climate Change Advisor | Promethium Carbon

Presenting: Emissions Scope 1 & 2

Juan du Plessis is a mechanical engineer with a Bachelor's degree in Mechanical Engineering and a Master's in Additive Manufacturing from North-West University. He currently serves as a Climate Change Advisor at Promethium Carbon, where he assists organisations with developing climate change mitigation strategies, conducting GHG inventories, and ensuring compliance with carbon regulations. He specialises in carbon footprint calculation using ISO 14064 standards and the GHG Protocol, lifecycle assessments, and energy efficiency. He has worked across mining, finance, floriculture, and manufacturing sectors. His presentation addresses how coal operations should understand, measure, and report their Scope 1 and 2 emissions in the current South African regulatory environment, as carbon tax and reporting requirements continue to tighten.

Welcoming our New Associate Members

ASH RESOURCES
www.ashresources.co.za

PHATSEMA MINING
www.phatsemamining.co.za

CDC DUST CONTROL
www.cdcdustcontrol.co.za

MPBIASA
www.mpbiasa.co.za

JCI MINING
www.jcimining.co.za

NKANGALA BUSINESS CHAMBER
www.nkangalabc.org.za

Current Projects

MINING

Active Projects

- Blast Induced Vibration
- Stress Measurements –FOG Prevention

COAL PROCESSING

Active Projects

- Circular Transformation of Carbon Ore Residue into Building Components
- Characterization of Coal Downstream Materials for Resource Recovery and Conservation
- Concrete and segmental block pavements
- Coal Stockyard Management

SURFACE ENVIRONMENT

Active Projects

- Irrigation of Natrophile Grass
- Biological Treatment of Brine
- Carbon Capture with Algae
- Irrigation as Mine Water Management
- Brines as Battery Metal Sources
- Carbon Farming Model

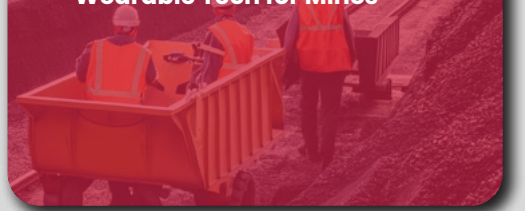
FUTURE TECHNOLOGIES

Active Projects

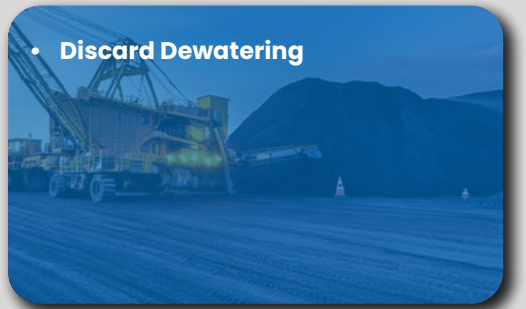
- Agrivoltaics in Rehabilitated Mine Soils
- Ion Exchange for REE Recovery
- Scope 1 & 2 Emissions Management
- CFB Clean Coal Technology – Phase I

New Projects starting 1 April 2026

- Coal Mining Digital Twin
- Wearable Tech for Mines



- Discard Dewatering



- Sustainable Liner Tech

- Turning Ash into Assets – Recovery of valuable materials from coal combustion ash.
- Resource Valorisation and Critical Minerals – Recovery of critical minerals from coal waste streams.

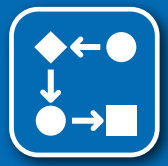
Completed Projects

MINING

Kloppersbos explosibility laboratory upgrade

The accurate characterisation of coal dust explosibility is important when assessing and mitigating against the risk of methane ignitions resulting in coal dust explosions. In South Africa the 40-litre explosion vessel has been the standard equipment for characterising coal dust explosibility in terms of the explosibility index, Kex. However, there has not been a means of doing calibration testing of the 40-litre apparatus for several years.

COAL PROCESSING



Repurposing of Coal Waste – Incorporation of Coal Waste in Asphalt Mixes

The Council for Scientific and Industrial Research (CSIR), in collaboration with Coaltech, initiated this project to explore the repurposing of coal waste in asphalt production as part of a broader move towards a circular economy. The study aimed to assess whether coal waste — including coal fines — can serve as a viable substitute for natural aggregates in asphalt wearing courses, thereby reducing environmental impacts while improving material efficiency and performance in South African road construction.

SURFACE ENVIRONMENT

Novel materials and directed crystal engineering for continuous Eutectic Freeze Crystallization (EFC) applications

Eutectic freeze crystallization (EFC) is a technology with potential to treat hypersaline brines from various industrial operations. However, ice scaling on heat exchange surfaces of crystallizers and poor gravitational separation of ice and salt have hindered the industrial implementation of this technology. Current methods of mitigating ice scaling in EFC use mechanical scrapers, which are prone to mechanical breakdowns, thereby reducing the overall productivity of the process.

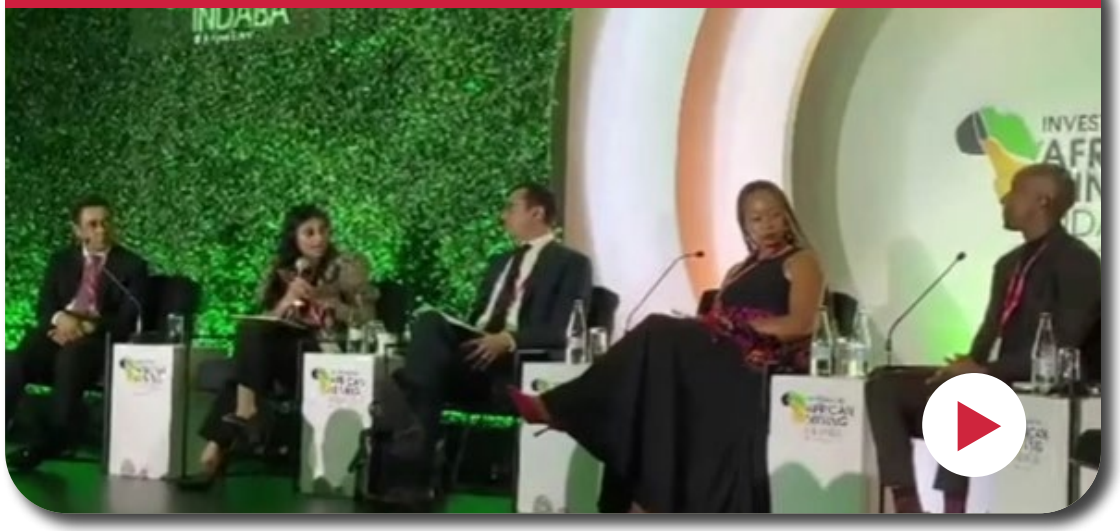
FUTURE TECHNOLOGIES

Enhancing Scope 1 And 2 Emissions Management In The South African Coal Mining Industry

South Africa's coal mining sector is operating within an increasingly complex regulatory, financial, and stakeholder environment shaped by climate policy developments, evolving disclosure expectations, and the global transition toward lower-carbon energy systems. While coal remains a critical component of South Africa's energy security and economic activity, mining companies face growing expectations to transparently manage and report their greenhouse gas (GHG) emissions and demonstrate credible pathways for reducing operational emissions (Scope 1 and Scope 2) over time.

Events and Engagements

African Mining Indaba



February 2026

Cape Town, South Africa

"Coincidence we think not"

Coaltech

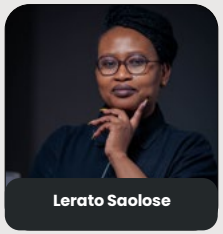
Celebrating International Women's Day

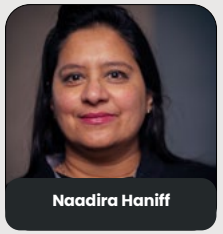
The women of Coaltech lead, build, restore and anchor one of South Africa's most important sectors. Every single one of them started somewhere.

To the young woman who was told this industry isn't for her....
At Coaltech, women lead projects, chair committees, hold board seats, and drive the research shaping the future of energy. The door is open. Walk through it.

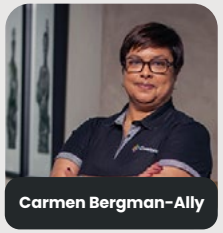
41%
of all Coaltech projects are led by women

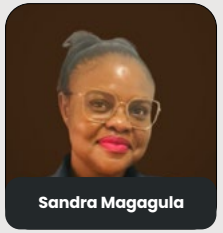
67%
of the new Youth Innovation Council are women


Lerato Saolose


Naadira Haniff


Vicky van Schalk Wyk


Carmen Bergman-Ally


Sandra Magagula


Kelley Reynolds-Clausen

Critical Minerals and the Future of Coal

"Coaltech was invited by the South African Colliery Managers' Association (SACMA) to present on "Critical Minerals and the Future of Coal" at both its Southern Regional Meeting on 26 March 2026 and its Northern Regional Meeting on 16 April 2026 in Secunda".

The presentation laid out what the science is telling us. South Africa generates approximately 34 million tonnes of fly ash every year, and independent research teams working across three coalfields have confirmed the presence of rare earth elements in that waste. Lab-scale extraction has demonstrated recovery rates of 40 to 80 percent. When you apply conservative assumptions to those figures, the recoverable value runs into tens of billions of rands. We have been treating a strategic mineral asset as a disposal problem.

The global context makes this urgent. China controls over 85 percent of rare earth processing capacity worldwide and has already imposed export controls on critical minerals. The United States, European Union, and Australia are all investing in alternative supply chains. South Africa is sitting on the feedstock. What we decide to do next matters.

Coaltech currently has five active research projects targeting critical mineral recovery from coal waste streams, spanning characterisation, extraction, and separation. Our research partners include the Universities of the Witwatersrand, Johannesburg, and Cape Town, UNISA, and Mintek.

We thank the SACMA Southern Region Chairperson, Mr Tlotlo Phele, and the Northern Region Chairperson, Ms Portia Malele, for the opportunity and for audiences that engaged seriously with the work. These are exactly the conversations the industry needs to be having. If this interests you, reach out to us at cbergman@coaltech.co.za.

In case you missed it - Coaltech Masterclass

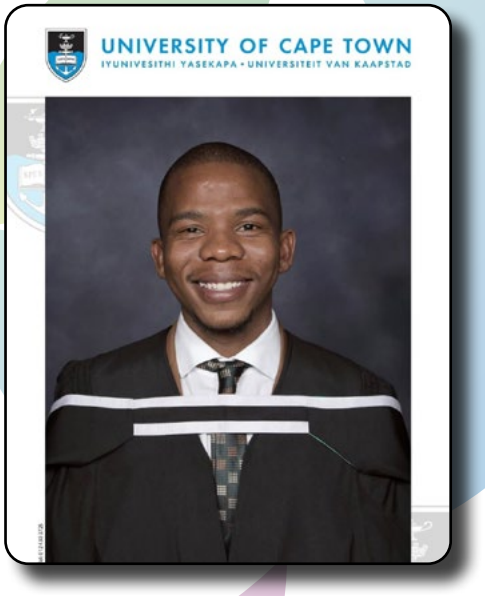
FIND US ON: YouTube LinkedIn

Celebrating our Graduate

Madimetsa Matau

Madimetsa Matau holds a Master of Science in Chemical Engineering from the University of Cape Town, where his research focused on freeze crystallization and sustainable water treatment solutions. He was the lead author of a publication in Separation & Purification Technology on reducing ice scaling in continuous freeze crystallization using a novel polymer composite material.

He worked as a Vacation Student (Utilities Department) at The South African Breweries (Newlands) from December 2024 to January 2026 and is currently acting as the Utilities Team Leader at SAB Newlands. His experience includes recommissioning water recovery systems, supporting HAZOP and MSG-3 studies, and optimizing utilities through P&ID reviews. He has knowledge of refrigeration, CO_2 liquefaction, thermodynamics, and Six Sigma-driven process improvement.



The Launch of the Youth Innovation Council (YIC)

COALTECH
YOUTH INNOVATION
COUNCIL

We are incredibly proud to officially announce the Inaugural Coaltech Youth Innovation Council (YIC)!

As the official "Youth Arm" of Coaltech, the YIC was established to mobilize Africa's brightest young researchers, engineers, and professionals. Their mandate? To shape the future of clean coal energy, critical minerals extraction, and environmental innovation through actionable, applied research.

Please welcome the 2026 Leadership Team driving this vision forward:

Eliakim Chauke (Chairperson)
Mining Engineering student and entrepreneur advancing innovative approaches to mine rehabilitation via productive hydroponic systems.

Palesa Diale
Ph.D (Snr Advisor and Mentor) Senior researcher (PhD, Chemical Engineering) specialising in innovative wastewater treatment solutions, providing high-level guidance and mentorship to the YIC.

Leanne Mukwevho (Vice Chairperson) – Environmental Sciences MSc candidate focusing on environmental sustainability in mining and energy, with expertise in mine closure, ecological engineering, and phytoremediation.

Mushava Bridget (Secretary General) – Chemical Engineering MSc candidate pioneering sustainable mine water treatment using continuous Eutectic Freeze Crystallization (EFC).

Dimakatso Makgati (Finance & Membership) – Mining Engineering professional and 2024 M&G 200 Young South African shaping the future of mining through big data and sustainable advanced materials.

Itumeleng Venessa Matlala (Marketing) – Coal Geologist and Geochemist specialising in coal depositional environments, organic petrology, and beneficiation.

Lehlohonolo Jack (Partnerships) – Climate and community development practitioner driving youth-led clean air and Just Transition initiatives.

Tshishonga Ngelekanyo (Outreach) – Environmental Scientist and innovation strategist specialising in Air Quality Research, Environmental Monitoring, and Stakeholder-Driven initiatives.

Lwandile Sabelo Simelane (Innovation) – Industrial Engineer leveraging data-driven decision-making for process optimisation and operational efficiency in water and manufacturing.

CSIR, Eskom, SANEDI, Coaltech launch HELE CFB Localisation Programme

The Council for Scientific and Industrial Research (CSIR), State-owned power utility Eskom, the South African National Energy Development Institute (SANEDI) and the Coaltech Research Association have formally initiated Phase 1 of the High Efficiency Low Emission (HELE) Circulating Fluidised Bed (CFB) Clean Coal Technology Localisation Programme.

This collaborative initiative supports the direction set out in South Africa's Integrated Resource Plan (IRP) 2025, which outlines the country's approach to securing energy supply, improving the performance of the national electricity system and modernising the generating fleet.

The IRP 2025 highlights that coal remains an important component of the national energy mix in the short to medium term.

It also emphasises the need to improve the efficiency and reliability of existing coal-fired power stations, while assessing cleaner and more flexible technologies that can operate within a diversified electricity system.

The plan also notes that continued coal use must be accompanied by improved plant performance, a greater degree of system flexibility and an evaluation of technologies that can support the country's transition to a more resilient and balanced electricity future.

In a joint media release, the entities explain that the HELE CFB programme is designed to respond to these priorities.

Phase 1 focuses on feasibility assessment, engineering design and readiness work required to develop a modern pilot-scale HELE CFB test facility in South Africa.

It aims to generate rigorous scientific, engineering and regulatory insights that will support evidence-based national decision-making on the future role of HELE coal technologies.

Beyond Phase 1, the entities note, the programme is intended to form the foundation of a longer-term national capability for advanced coal technology development and localisation.

Subject to future approvals and funding availability, they explain that the programme has the potential to progress towards pilot-scale demonstration.

In the longer term, they note that this platform could support skills development, supplier localisation and informed investment decisions, positioning South Africa to deploy cleaner, more flexible coal-based technologies where they are most appropriate within a diversified energy system.

The Project Leadership Committee, representing all four partner organisations, stated that the programme aligns closely with the vision set out in the IRP 2025, which calls for credible local analysis of technologies that can improve the efficiency of coal-based generation, reduce emissions and support system stability during the transition period.

The partners note that responsible technology evaluation is essential for ensuring energy security while enabling a gradual shift towards a cleaner and more diverse energy portfolio.

They express that the HELE CFB programme reflects a shared commitment to understanding how modern coal technologies can contribute to the energy system of the future.

They add that the programme will help South Africa to assess the technical and economic implications of high efficiency coal technologies and to determine how these technologies can support a more resilient, flexible and lower-emission energy system.

Phase 1 activities, including process engineering, plant design, site selection and preparation for environmental, as well as regulatory engagements, the development of engineering diagrams for future costing and procurement, and collaboration with international technology experts, are under way.

The work also includes analysis of plant performance assumptions and system requirements consistent with the modelling framework presented in the IRP 2025.

The HELE CFB programme marks an important step in South Africa's pursuit of a stable, reliable and lower-emitting energy system.

By investing in the evaluation of advanced coal technologies, the country is positioning itself to make informed choices about the future of its energy mix.

The programme strengthens its ability to navigate a complex transition while supporting economic activity, industrial capability and energy resilience.

As Phase 1 progresses, the insights generated through this work will play a meaningful role in shaping national energy planning and ensuring that South Africa remains prepared for the evolving demands of its electricity system," the entities say.

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