FUTURE MINERALS FORUM

2025 REFLECTIONS REPORT

14-16 January 2025

King Abdulaziz International Conference Center,
Riyadh, Saudi Arabia

ORGANIZED BY

وزارة الصناعة والثروة المعدنية
Ministry of Industry and Mineral Resources

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وزارة الخارجية
MINISTRY OF FOREIGN AFFAIRS

وزارة الاستثمار
Ministry of Investment

PIF
صندوق الاستثمارات العامة

A MILLION THANKS FOR MAKING FMF 2025 AN EXCEPTIONAL SUCCESS

The Future Minerals Forum (FMF) began as an ambitious vision, a bold initiative in 2022 to place the Super Region and other mineral supply nations at the center of the global mineral conversation. What started as an idea has become a leading international platform, bringing together governments, industry leaders, and investors to shape the future of minerals.

Our theme for 2025 was "Year of Impact," making for an event that was nothing short of extraordinary, incorporating new additions consisting;

- **Inaugural Centers of Excellence and Technology meeting**, a gathering of experts at the leading edge of minerals research and innovation.
- **Inaugural Knowledge Exchange** program creating a space for in-depth sharing of the latest advancements in minerals intelligence, geology, technology, sustainability, and talent development.
- **Inaugural Leadership Roundtables**, eight closed-door gatherings of Ministers, CEOs, and global experts who came together to discuss tough issues facing the minerals sector and recommending solutions, including investment, infrastructure, value addition and policy.
- **First-ever Regional Leadership Roundtables** on Africa, Central Asia, and Latin America, uniting supplier nations to work together on common challenges and create a global minerals movement.
- **FMF Conference Plenary** brought together the largest number of CEOs from the minerals and related sectors to address today's market challenges and drive actionable impact. Speakers included CEOs from 11 of the world's top 20 mining companies and 10 member companies of the International Council on Mining and Metals (ICMM).

FMF 2025 marked a year of many firsts, with over 18,000 attendees from 165 countries, more than 400 speakers across 200+ sessions, and announcing investment agreements totaling USD 28.5 billion among other milestones demonstrating the forum's global appeal and role as the leading mineral platform.

This year's conference kicked off with our largest Ministerial Roundtable to date, bringing together 89 governments and representatives from 50 international organizations and global companies.

To our founding partners, the very backbone of FMF: ESNAD (Saudi Mining Services Company), Saudi Aramco, Ma'aden (Saudi Arabian Mining Company), Hadeed (Saudi Iron and Steel Company), Invest Saudi, and Riyad Bank—your immeasurable and enduring support at various levels has given us the impetus and confidence to push through the barriers of impossibility.

I am equally grateful to our sponsors, partners and governments that graced the conference, your trust and collaboration continue to push the horizon of FMF's growing impact.

To the industry leaders, speakers, and exhibitors—you brought ideas to life, shared groundbreaking insights, and showcased the innovations that will define the future of mining and minerals.

Through FMF, we are creating an ambitious cause, and we are proud to have you all as members of this big family.

Your continued support and contribution are the foundations on which FMF has built a global appeal with sustained visible impacts.

Though we have concluded the three-day event, however, our journey is just beginning. The momentum from this year's forum propels us forward. As we journey through the "Year of Impact," we are more determined than ever to translate insights into action, ensuring that the partnerships and initiatives born at the fourth FMF deliver meaningful outcomes across the entire mineral value chain.

But we will not stop here. The responsibility we carry demands that we do more, aim higher, and build on this foundation. We promise that FMF 2026 will continue this journey, redefine it, and project it for future success with the theme, "A Global Cause." Our commitment remains steadfast in promoting a responsible, resilient, and future-ready mineral supply chain, ensuring that this sector serves today's needs and tomorrow's ever-growing demands.

Lastly, we look forward to our family reunion at the 5th FMF, on **January 13 -15, 2026.**

Ali Al-Mutairi
Executive Director,
Future Minerals Forum

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KEY OUTCOMES OF THE FMF

On the first day of the FMF, the International Ministerial Roundtable was held with the participation of 89 countries, including 16 G20 member states, along with 50 international organizations, both governmental and non-governmental, business associations, and global mining and minerals industry leaders.

The International Exhibition held on the sidelines of the FMF witnessed the participation of over 170 exhibitors from around the world, along with national pavilions from 8 countries, including Australia, Austria, Sweden, the United Kingdom, Egypt, India, and Pakistan.

The Young Mining Professionals (YMP) initiative was launched. The initiative aims to provide opportunities for youth across various academic and professional disciplines, encouraging their active participation in shaping the future of the mining and minerals industry.

The "Mining Innovation Studio" initiative was launched in collaboration with the Saudi Geological Survey, the National Industrial Development and Logistics Program (NIDLP), the Saudi Arabian Mining Company (Ma'aden), "Newlab" US company, and Saudi Mining Services Company (ESNAD) to attract global talents and develop cutting-edge technological solutions.

The FMF sparked a record turnout of over 18,000 participants from 165 countries, with international attendees constituting 70%, reaffirming the FMF's position as a leading global platform for the mining and minerals sector.

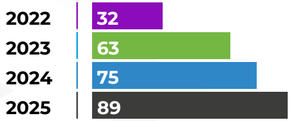
A total of 126 agreements and memoranda of understanding worth USD 28.5 billion were signed between Saudi government entities and international and local companies in various fields, including exploration, mining, finance, research, development, innovation, sustainability, value chains, and mineral industries.

The FMF featured 405 speakers across 96 sessions, including ministers from inside the kingdom and abroad, and CEOs of the world's largest mining companies.

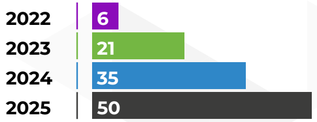
Four major strategic announcements have been made at FMF, involving Saudi Aramco, Ma'aden, Hadeed and Baowu Steel. The announcements mark a significant step in reinforcing Saudi Arabia's position as a leading global mineral processing hub, in line with its Vision 2030 goals of diversifying its economy and positioning it as an industrial powerhouse.

CONFERENCE EDITION EVOLUTION IN NUMBERS

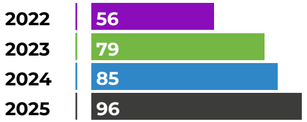
Ministerial Roundtable
(Countries)



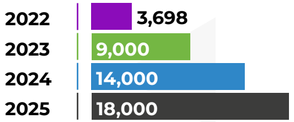
Organization
(Government and Non-Governmental)



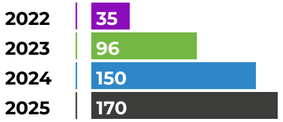
Program Sessions
(Discussion Panels, Bilateral Meetings, Keynote Speeches, Fireside Chats)



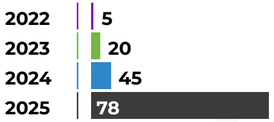
Attendance



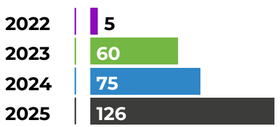
Sponsors and Exhibitors



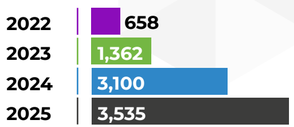
Attendance from Top Executives
(CEOs, investment companies and value chain representatives)



Memorandum of Understanding and Agreements

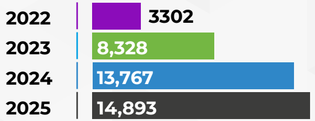


Business Meetings

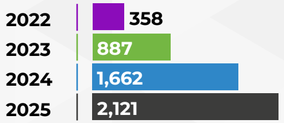


MEETINGS EVOLUTION IN NUMBERS

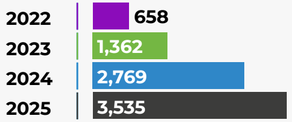
Contacts



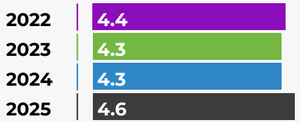
Users with Confirmed Meetings



Total Confirmed Meetings

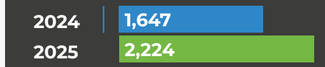


Average Meeting Rating

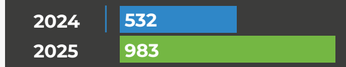


GLOBAL CONNECT LOUNGE MEETINGS

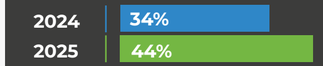
Meetings Booked in Connect Lounge



Lounge Meetings Attended



Attendance Percentage



HIGH-LEVEL INTERNATIONAL MINISTERIAL ATTENDANCE

Sarah Jones
Minister of Industry, the UK

Dr. Gilberto Pichetto Fratin
Minister of the Environment and Energy Security, Italy

Alexandre Silveira
Minister of Mines and Energy, Brazil

G. Kishan Reddy
Minister of Coal and Mines, India

Luigi Di Maio
EU Special Representative for the Gulf region, European Union

Wille Rydman
Minister of Economic Affairs and Employment, Finland

Klemen Boštjančič
Deputy Prime Minister and Minister for Finance, Slovenia

Masadik Malik
Minister of Petroleum, Pakistan

ENG. Karim Badawi
Minister of Petroleum and Mineral Resources, Egypt

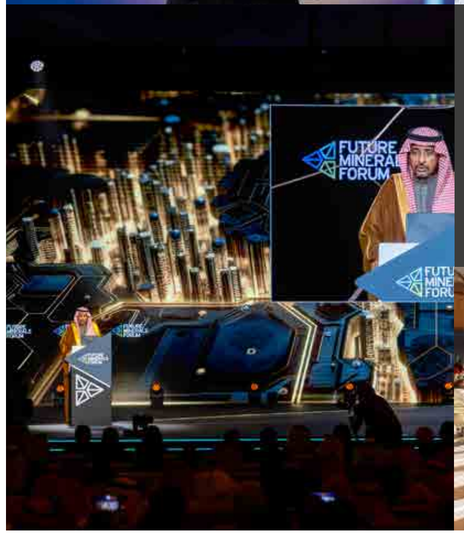
Dr. Leila Benali
Minister of Energy Transition & Sustainable Development, Morocco

Nik Nazmi Bin Nik Ahmad
Minister of Natural Resources and Environmental Sustainability, Malaysia

Kanat Sharlapaev
Minister of Industry, Kazakhstan

Dele Alake
Minister of Solid Minerals Development, Nigeria

Bouna Sylla
Minister of Mines & Geology, Republic of Guinea



KEY TESTIMONIALS AND IMPRESSIONS ABOUT THE FMF

Benjamin Gallezot
Minister-Delegate, Supply of Strategic Minerals and Metals, France

"I would like to thank the Government of Saudi Arabia and the Ministry of Industry and Mineral Resources for organizing the Future Minerals Forum. I am proud to participate in it and pleased to cooperate with the KSA for its leading role in the mining sector".

Dr. Leila Benali
Minister of Energy Transition & Sustainable Development, Morocco

'I would like to express my sincere gratitude to the kingdom for the generous support and care provided to us. This Forum has been an exceptional opportunity for collaboration, exchange of ideas, and innovation".

Alexandre Silveira
Minister of Mines and Energy,
Brazil

"I commend the KSA's leading role in driving global efforts towards governing critical mineral supply chains, ensuring a just and inclusive energy transition, and fostering sustainable economic development worldwide".

Lord Gerry Grimstone
Former Minister for Investment,
Department of International Trade
and Department Business Energy and
Industrial Strategy, UK

"I anticipate greater cooperation among countries with shared visions, with the kingdom playing a pivotal role in exploring new mineral resources and enhancing global efforts in this vital sector".

Paul Chanda Kabuswe
Minister of Mines and Mineral
Development,
Zambia

"For the third time, I am delighted to attend the Future Minerals Forum, which has shown remarkable progress year after year".

Gilles Nembe
Minister of Mines,
Gabon

"The Future Minerals Forum has become a pivotal global platform where decision-makers gather to exchange ideas, expertise, and explore ways to improve the mining sector worldwide".

Nik Nazmi Bin Nik Ahmad
Minister of Natural Resources and
Environmental Sustainability,
Malaysia

"The Future Minerals Forum is a unique platform that brings together ministers, industry leaders, and experts to discuss the future of minerals, and therefore we are keen to attend the Forum and network and collaborate amidst geopolitical tension".

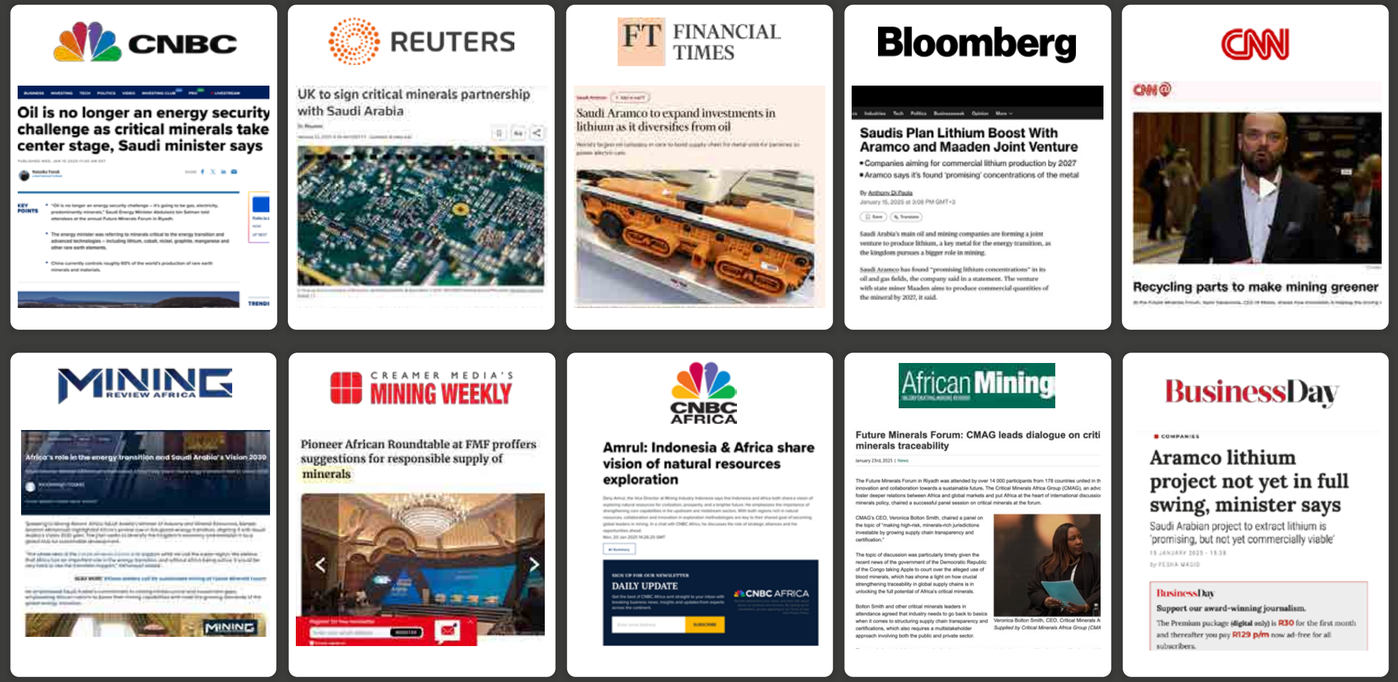
Kanat Sharlapaev
Minister of Industry and Construction,
Kazakhstan

"I would like to express my sincere gratitude to our Saudi partners for organizing this exceptional event, which provides a significant opportunity to meet with global mining industry leaders and foster international collaboration".

EXTENSIVE INTERNATIONAL MEDIA COVERAGE OF THE FMF

The FMF received extensive and positive international media coverage, with various international media outlets dedicating significant space to that event.

Among the global outlets, the international media coverage and targeted investments in the Kingdom's mineral industries, valued at SAR 100 billion, were significant highlights. Notably, the Ministry signed several memoranda of understanding and cooperation agreements with various countries, and an agreement between Aramco and Ma'aden for mineral exploration in the Arabian Shelf.



MEDIA OUTLETS AT FMF25 INCLUDED ARE:

FUTURE MINERALS FORUM
MINISTERIAL ROUNDTABLE

Wednesday 13 January 2025

Prefacing FMF was the 2025 Ministerial Roundtable, a high-level government-led meeting that gathered 89 government representatives, of whom 50 were ministers. Sixteen of the G20 countries were also represented, and 50 multilateral organizations in total. This year's Roundtable once again focused on strengthening international cooperation to build resilient, responsible mineral value chains across Africa, Central Asia, West Asia, and other supplier countries.

89 GOVERNMENTS ATTENDED THE MINISTERIAL ROUNDTABLE

Algeria
Australia
Austria
Azerbaijan
Bahrain
Bangladesh
Brazil
Bulgaria
Burundi
Canada
Comoros
Congo
Cote d'Ivoire
Denmark
Djibouti
Egypt
Eswatini
European Union
Finland
France
Gabon
Gambia
Germany
Guinea
Guinea-Bissau
Herzegovina
Hungary
India
Indonesia
Iraq
Italy
Japan
Jordan
Kazakhstan
Kenya
Korea
Kuwait
Kyrgyzstan
Liberia
Libya
Malaysia
Mauritania
Morocco
Mozambique
Netherlands
Niger
Nigeria
Norway
Oman
Pakistan
Palestine
Paraguay
Peru
Philippines
Portugal
Qatar
Russia
Senegal
Sierra Leone
Singapore
Slovak
Somalia
South Africa
South Sudan
Sudan
Sweden
Switzerland
Tanzania
Thailand
Togolese
Tunisia
Türkiye
Turkmenistan
Uganda
UK
United Arab Emirates
USA
Uzbekistan
Yemen
Zambia

50 INTERNATIONAL ORGANIZATIONS AND CEOS ALSO ATTENDED THE MINISTERIAL MEETING

INTERNATIONAL AND REGIONAL ORGANIZATIONS

NON-GOVERNMENTAL ORGANIZATIONS

NON-GOVERNMENTAL ORGANIZATIONS

"Boldness is part of our DNA in the Future Minerals Forum, and together, we will shape a sustainable and prosperous future for the mining sector,"

– H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources, Saudi Arabia

OPENING OF MINISTERIAL ROUNDTABLE

H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources for Saudi Arabia, opened the fourth Ministerial Roundtable at the Future Minerals Forum in Riyadh. He highlighted the forum's role in transforming dialogue into actionable outcomes over the past three years. The Minister emphasized the importance of the ministerial roundtable, the world's largest gathering of ministers responsible for mineral resources, as a platform for inclusive, multi-stakeholder leadership.

The Minister outlined three key initiatives developed by over 100 experts from more than 40 governments, international organizations, and companies:

1. **Development of an International Critical Minerals Framework:** To build resilient and responsible minerals value chains.
2. **Creation of a Network of Centers of Excellence:** To build capacity across supplier countries worldwide.
3. **Definition of Responsible Supply Priorities:** To enhance transparency through traceability and certification.

He noted the presence of ministers from over 89 countries and other notable attendees as fundamental to bringing these initiatives to life. The Minister called for collective action to transform these initiatives into impactful outcomes, making 2025 a landmark year in the history of the forum.

The Minister concluded with a call to action, encouraging all participants to actively engage, share insights, and forge partnerships to drive meaningful progress and achieve a shared vision for the future of minerals.

CLOSING OF MINISTERIAL ROUNDTABLE (MINISTER'S SPEECH)

Moderator: Dr. Kandeh Yumkella
Speaker: H.E. Bandar Alkhorayef

The interventions of Dr. Kandeh Yumkella, Energy Transitions Commission and former United Nations Under-Secretary General, the moderator focused on developing business cases for funding projects in the Africa Copper Belt and South America's Lithium Triangle. These regions serve as exemplary models for partnership approaches that can be applied in other areas.

His talks also covered the implementation of traceability and certification pilot projects, communication of responsible supply priorities, and the creation of a network of centers of excellence.

Then the Chairman, H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources, Saudi Arabia of the 2025 Future Minerals Forum – Ministerial Roundtable was invited to deliver a speech on the closing ceremony.

Mr. Chairman, the Minister, expressed his gratitude to the government of Saudi Arabia for organizing the event and appreciated the efforts of all participants. He highlighted two key consensuses from the session:

- Responsibility and Cooperation: The H.E. Bandar Alkhorayef, stressed the need for responsible actions and cooperation among countries to address the challenges and opportunities in the mining sector. He emphasized the importance of balancing mineral extraction with economic and social impacts.
- Investment and Technology: H.E. Bandar Alkhorayef, acknowledged the significant investment required, estimated at six trillion dollars, to address the challenges in mining and future minerals. He highlighted the role of technology in providing creative solutions and the importance of human capital development.

The Minister also outlined several initiatives:

- Implementing traceability and certification pilot projects in open supply chains.
- Communicating responsible supply priorities to international standards organizations.
- Contributing experts to create a network of centers of excellence across supply countries.
- Establishing a ministerial-level steering group to oversee these initiatives.

The Minister thanked the Custodian of the Two Holy Mosques, King Salman, and His Royal Highness Prince Mohammed bin Salman, Crown Prince and Prime Minister of Saudi Arabia, for their strong support. He also invited participants to nominate coordinators for the initiatives and to join the upcoming conference and exhibition at the King Abdulaziz International Conference Center.

Session Summary
The Ministerial Roundtable of the 2025 Future Minerals Forum concluded with a call for continued collaboration and the establishment of a ministerial-level steering group to drive these initiatives forward. The Minister expressed optimism about the progress made since the previous meeting in 2024 and the potential for future achievements through collective efforts.

"We are all committed to finding the right balance between securing the minerals essential for our growth and energy transition and ensuring that our investments have a positive economic and social impact on the communities involved. Together, through responsible actions and innovative solutions, we can overcome the challenges and seize the opportunities in the mining sector"

– H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources, Saudi Arabia

FUTURE MINERALS FORUM

INTERNATIONAL GEOLOGICAL SURVEYS MEETING

Wednesday 13 January 2025

To lead the conversation on the expansion of geological surveying, FMF 25 saw the second edition of its International Geological Survey Meeting. This is the largest global gathering of geological experts, with 30 senior leaders from Africa, Asia, the USA, Great Britain, France, and Finland in attendance. The meeting addressed critical challenges in geological surveying, improving access to geological data, and the creation of a global Center of Excellence to enhance exploration and targeting efforts.

WHAT IS THE KNOWLEDGE EXCHANGE?

Reflecting the crucial theme of collaboration, the Knowledge Exchange was held on the opening day of FMF25.

Knowledge Exchange provided a dedicated space for in-depth discussions on advancements in geology, sustainability, mineral intelligence, and talent development, fostering the exchange of ideas to strengthen the industry's future.

NEW FOR FMF25

KNOWLEDGE EXCHANGE: STREAM 1

14 January 2025

Future Tech Hub (The Link)

Theme:
Global Leadership Through Action

PRESENTATION 1 AND Q&A:
GLOBAL MATERIALS PERSPECTIVES 2024

SESSION 1:
MINERALS OUTLOOK

Karel Eloot
Partner, McKinsey

In this session Mr. Karl Elot, Senior Partner at McKinsey & Company, shared his expert insights on the evolving landscape of the global materials industry. Based in China, a pivotal region for mining and metals, Mr. Elot provided a comprehensive overview of the industry's growth, challenges, and future prospects.

A Dynamic Industry on the Rise
Over the past two decades, the materials industry has experienced a robust 6% annual increase in revenues. This growth is particularly pronounced in the metals and mining sectors, which have outpaced other materials such as building materials, pulp and paper, and plastics.

Today, the materials industry contributes a significant 7% to the global GDP, underscoring its critical role in the world economy.

Several factors are propelling the industry's expansion. Global population growth and the burgeoning middle class are driving increased demand for materials. Additionally, the transition to net-zero emissions is reshaping both demand and supply dynamics. New energy applications require higher material inputs, while geopolitical complexities and the need for scale further complicate the supply chain.

Both positive and negative surprises mark supply and demand dynamics.

While the supply of materials like nickel and lithium has exceeded expectations, copper supply has lagged due to processing costs and availability issues. The Chinese ecosystem, known for its agility, has been instrumental in quickly bringing new assets online, highlighting the importance of collaboration and innovation.

Looking Ahead: Challenges and Opportunities
The future of the materials industry hinges on exploration, efficiency, and standardization. Policies that provide stability and simplicity are crucial to support investment and drive growth. Collaboration on infrastructure and operational efficiency will be key to overcoming challenges and ensuring successful project ramp-ups.

Sustainability at the Forefront
Sustainability is a central focus for the industry, which aims to provide materials that are not only available and affordable but also green. Emissions reduction efforts are concentrated on the steel, aluminum, and thermal coal value chains, which account for nearly 90% of industry emissions. New materials like nickel, despite their high carbon footprint, are essential for the energy transition, necessitating technological advancements for cleaner production.

The materials industry stands at a crossroads, with significant opportunities and challenges ahead. Collaboration, innovation, and supportive policies will be critical to achieving sustainable growth and meeting future demand. As Mr. Elot emphasized, the industry's dynamic nature requires agility and foresight to navigate the complexities of the global market.

Session summary
Mr. Karel Eloot highlighted the materials industry's robust growth, driven by global population increases and the net-zero transition. He emphasized the importance of agility and collaboration, particularly within the Chinese ecosystem, to meet supply demands. Sustainability remains a key focus, with significant efforts needed to reduce emissions in the steel, aluminium, and thermal coal sectors. Future success hinges on exploration, efficiency, and supportive policies.

The industry must navigate complex geopolitical landscapes to achieve sustainable growth.

> **"Collaboration, innovation, and supportive policies will be critical to achieving sustainable growth and meeting future demand"**
>
> – H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources, Saudi Arabia

PANEL SESSION 1: UNLOCKING MINERAL SUPPLY FOR GLOBAL DEVELOPMENT AND THE ENERGY TRANSITION: FMF REPORT INSIGHTS

SESSION 1: MINERALS OUTLOOK

SUMMARY:

The panel discussed the global materials industry's rapid growth and future challenges, emphasizing the need for sustainable supply chains and innovative financing. Key drivers include population growth, the net-zero transition, and geopolitical complexities. The Super Region (Africa, Western and Central Asia) has the potential to become a major player by leveraging its resources and collaborating effectively. The importance of building competitive processing hubs and focusing on key segments was highlighted. Collaboration, innovation, and strategic focus are essential for success.

KAREL ELOOT

Partner, McKinsey

"We need to build the end-to-end value chain because also for instance in Africa, the opportunity lies in clear availability of power and balanced infrastructure development."

JOHNNY LAZAR

Principal Consultant, CRU

"The cost is way too high for one stakeholder to bear, and there is a need for people to share in the risk as well."

PATRICK BARNES

Global Head of Metals and Mining Consulting, Wood Mackenzie

"Developing a value chain requires a significant commitment and focus on specific segments with a sustainable cost advantage."

RICHARD ROTHENBERG

President, Global AI

"The FMF has an opportunity to increase collaboration and transparency and align with ESG values and sustainable mining."

IONUT LAZAR

Principal Consultant, CRU Group

"We must go Full Tilt on solar, wind, EVs, nuclear—everything. The narrative is shifting from energy transition to energy expansion."

PANEL SESSION 1: UNLOCKING MINERAL SUPPLY FOR GLOBAL DEVELOPMENT AND THE ENERGY TRANSITION: FMF REPORT INSIGHT

SESSION 1: MINERALS OUTLOOK

William Adams
Head of Base Metals

Karel Eloot
Partner, McKinsey Research, Fast markets

Ionut (Johhny) Lazar
Principal Consultant, CRU

Patrick Barnes
Global Head of Metals and Mining

Richard Rothenberg
President, Global AI

In this panel discussion, experts delved into the dynamic landscape of the global materials industry, emphasizing the need for sustainable energy solutions. The global materials industry stands at a pivotal crossroads. The recent panel discussion at the FMF conference shed light on this industry's dynamic landscape, highlighting key topics, challenges, and opportunities. Here's an in-depth look at the insights shared by industry leaders and experts.

The Global Materials Industry: A Snapshot
The materials industry has experienced robust 6% annual revenue growth over the past two decades, with metals and mining sectors outpacing other materials. This growth is fueled by several factors, including the rising global population, the expanding middle class, and the urgent push towards net-zero emissions.

As Karel Eloot, Senior Partner at McKinsey & Company, noted, "We are in a dynamic space where both traditional and new energy applications are driving the demand for materials."

Micro Drivers of Growth
Three primary drivers are shaping the future of the materials industry:

1. **Population and Middle-Class Growth:** The global population is expected to grow by 10% by 2040, with a significant 30-40% increase in the middle class, leading to higher consumption.
2. **Net-Zero Transition:** The shift towards renewable energy sources is increasing the demand for materials like battery components and traditional metals.
3. **Geopolitical Complexities:** The need for scale in energy transition efforts is complicated by geopolitical factors, making supply chains more intricate.

Supply and Demand Challenges
The materials market is characterized by its agility and rapid changes. Unexpected supply shifts in nickel and lithium have highlighted the need for efficient and sustainable supply chains. As Elot emphasized, "We need to build the end-to-end value chain, from mining to the end customer, to ensure a balanced and sustainable supply."

Sustainability and Innovation
Reducing emissions in the materials industry is crucial. Technological advancements offer significant potential for CO2 abatement, but these solutions come at a cost. The willingness of industry players to invest in sustainable practices is essential. "We need business cases to support green initiatives," Elot remarked, underscoring the importance of aligning economic incentives with environmental goals.

The Super Region's Role
The super region, encompassing Africa and Western and Central Asia, is poised to become a major player in the global materials supply chain. This region's competitive advantages include abundant natural resources, cost-effective processing capabilities, and a strategic geographic position. However, collaboration and infrastructure development are key to unlocking its full potential.

Opportunities for the Super Region

- **Building Competitive Processing Hubs:** Leveraging the Gulf's cost competitiveness and capital availability to create processing hubs for materials from the super region.
- **Collaborative Ecosystems:** Learning from China's success in creating collaborative ecosystems to de-risk operations and accelerate development.
- **Focus on Key Segments:** Prioritizing specific value chain segments where the super region can compete effectively.
- **Innovative Financing:** Developing new financing mechanisms to attract private sector investment and support large-scale projects.

PRESENTATION 2 & Q&A: BATTERY RAW MATERIALS LONG-TERM OUTLOOK REMAINS STRONG DESPITE SHORT-TERM CHALLENGES AND PRESSURES

SESSION 1: MINERALS OUTLOOK

William Adams
Head of Base Metals Research,
Fastmarkets

In this presentation, William Adams, Head of Base Metals Research at Fastmarkets explained the dynamic world of commodities.

Current Market Landscape
The battery raw materials market is currently experiencing a supply surplus. However, looming on the horizon are significant deficits that underscore the urgent need for investment and expansion.

Price volatility and a persistently low-price environment pose threats to the timely arrival of new supplies. In this landscape, China emerges as a formidable player, leading in both investment and production, while other regions grapple with higher costs and investment delays.

Energy Consumption and the Renewable Surge
The energy sector is at a pivotal juncture. In 2023, a staggering 84% of primary energy consumption was derived from fossil fuels, leaving a mere 16% to renewables. This stark contrast highlights the immense potential for growth in renewable energy, particularly solar and wind. As the world pivots towards these sustainable sources, the role of energy storage, especially lithium-ion batteries, becomes increasingly critical.

Soaring Lithium Demand
Lithium demand is set to skyrocket, projected to leap from 760,000 tons LCE in 2023 to an impressive 3.6 million by 2034. This surge is driven by the burgeoning electric vehicle (EV) market, energy storage systems, and innovative solutions like battery swaps. The growth trajectory is clear: the future is electric, and lithium is at its core.

Adams then explained that achieving a balanced supply chain is paramount to navigating the challenges of price volatility and supply disruptions. While China continues to dominate the market with swift responses to supply needs, other regions face significant hurdles due to higher operational costs and delayed investments. The disparity underscores the need for a more distributed and resilient supply chain.

The current low-price environment has led to widespread production cuts and investment delays, particularly outside of China. Despite these challenges, China remains resilient, continuing to invest heavily in Africa, Indonesia, Bolivia, and domestically, thereby consolidating its market dominance.

Commodity-Specific Insights

- **Lithium:** Expansion is ongoing in Chile, but production cuts are evident in Australia and China.
- **Cobalt:** Growth is concentrated in the Democratic Republic of the Congo and Indonesia, while Australia and North America face reductions.
- **Nickel:** Significant production cuts are seen in Australia, contrasted by robust expansion in Indonesia.

Adam concluded his presentation highlighted that Building localized supply chains outside of China is fraught with challenges, primarily due to higher costs. Substantial subsidies, loans, and grants are essential to overcome these barriers. The US has made strides with the Inflation Reduction Act (IRA), fostering supply chain development, but Europe lags, lacking similar financial support.

Session Summary
Fastmarkets, a price reporting agency, assesses prices for various commodities and provides market intelligence. The battery raw materials market faces future deficits, necessitating investment and expansion. Renewable energy growth, particularly in solar and wind, drives lithium demand, which is projected to rise significantly. China dominates the market, while other regions struggle with higher costs and investment delays. Strong partnerships and strategic investments are essential for building resilient supply chains and securing a green future.

PRESENTATION 3 AND Q&A: THE IMPORTANCE OF THE CIRCULAR ECONOMY TO CAPITAL ALLOCATION PRESSURES

Jay Hambro
Chief Executive Officer,
Verdigris Strategic

In this presentation, Jay Hambro clarified a path to a Sustainable Future. Industry experts gathered to explore the concept of circularity in the metals and mining sector, with a particular focus on recycling.

The session was led by a representative from Verdigris Strategic, who shared valuable insights and experiences from his career.

SESSION 2: ROLE OF CENTERS OF EXCELLENCE AND TECHNOLOGY IN MINERAL SUPPLY GROWTH

The Importance of Circularity
The speaker emphasized the need to transition from the traditional "take, make, dispose" model to a more sustainable approach involving re-evaluation, recycling, repurposing, and reusing materials. This shift is crucial for conserving finite resources and leveraging the infinite potential of recycled materials like aluminum and steel.

Economic Implications and New Revenue Stream:
Circularity presents significant economic benefits, including price-driven gains and operational efficiency from recycling. The concept of urban mining, which involves recovering valuable materials from urban waste, was highlighted as an exciting opportunity to unlock new revenue streams.

Challenges and Opportunities:
Despite the potential, there are notable challenges in achieving circularity. The gap between announced investments and the actual need for increased production underscores the importance of capital allocation. Technological advancements in recycling, such as optical and air sorting, X-ray sorting, and gravitational sorting, have improved efficiency, but further investment is needed.

Government Support and Policy Recommendations
Government support is essential to level the playing field and encourage investment in recycling and circularity. The speaker cited examples from Europe and Saudi Arabia, emphasizing the need for education, tariffs, and financial support to prioritize recycling.

Case Study: Europe's Decline in Primary Production
The discussion included a case study on Europe, highlighting the significant decline in primary aluminum production from 20% of global production in 1992 to about 5% today. Despite a 190% increase in aluminum demand, recycling has not kept pace, leading to increased reliance on imports. The environmental benefits of recycling, such as a 93% reduction in emissions compared to primary production, were emphasized.

The speaker urged governments to prioritize recycling and circularity through education, tariffs, and financial support. Investment in recycling technologies and infrastructure is crucial to capture value from recycled materials. Local supply chains must be strengthened to mitigate the impact of global macroeconomic and political factors.

Session Summary
The session emphasized the importance of circularity in the metals and mining sector, focusing on recycling and sustainable practices. Verdigris Strategic highlighted the need to transition from a "take, make, dispose" model to a more sustainable approach. Despite challenges, advancements in recycling technologies and government support are crucial. The case study on Europe underscored the decline in primary aluminium production and the need for better recycling practices. The session concluded with a call to action for increased investment in circularity to ensure a sustainable future.

> **"We need to drive innovation and move forward with product design and manufacturing to reuse materials in the operating environment."**
>
> – Jay Hambro, Chief Executive Officer, Verdigris Strategic

PANEL SESSION 2: DEFINING MINERAL PRODUCTION CHALLENGES AND HOW TO ADDRESS THEM THROUGH INNOVATION AND TECHNOLOGY

SESSION 2: ROLE OF CENTERS OF EXCELLENCE AND TECHNOLOGY IN MINERAL SUPPLY GROWTH

SUMMARY:

The panel discussion on mineral production highlighted the shift towards sustainable practices, emphasizing recycling and reusing materials. Economic drivers and investment in recycling technologies were deemed essential for circularity. Challenges such as permitting and lower mineral grades were discussed, with innovation seen as a key solution. Saudi Arabia's potential to lead in modern mining practices was noted, along with the importance of leveraging hydrocarbon technologies for mining. Collaboration between industry and government was emphasized to drive innovation and sustainable growth.

ANDEW FIGUERIRIDO

Head of International Sales, Essar Capital

"The fundamental problem is that innovation is not playing a role in the way ore is produced. We need to change our production practices and waste management practices."

DOUGLAS MORRISON

Chief Executive Officer, CEMI (Canada)

"We need environments where we can embrace innovation and make it a leading characteristic in driving investment and desire to be here"

PANEL SESSION 2: DEFINING MINERAL PRODUCTION CHALLENGES AND HOW TO ADDRESS THEM THROUGH INNOVATION AND TECHNOLOGY

Moderator

Shivani Torres
Go-To-Market Leader, Newlab

Andew Figuerirido
Head of International Sales, Essar Capital

Dr. Douglas Morrison
Chief Executive Officer, CEMI (Canada)

This panel discussion provided a comprehensive overview of the current state and prospects of mineral production, emphasizing the critical role of innovation, investment, and collaboration in driving sustainable growth.

Innovation and technology were recurrent themes throughout the discussion. The mining industry must adopt new technologies to enhance efficiency and reduce environmental impact.

SESSION 2: ROLE OF CENTERS OF EXCELLENCE AND TECHNOLOGY IN MINERAL SUPPLY GROWTH

The importance of patient capital and supportive regulations was also emphasized, as these elements are critical for fostering innovation.

Saudi Arabia was spotlighted as a potential leader in modern mining practices. By investing in innovation and creating a supportive environment for startups, the Kingdom could drive significant advancements in the sector. Collaboration between industry and government was deemed essential for fostering innovation and achieving sustainable growth.

The panel explored the potential for leveraging technologies and mindsets from the hydrocarbon industry to benefit mining. Modeling and simulation were identified as crucial tools for understanding subsurface mineral deposits. The application of hydrocarbon exploration techniques to mining presents both challenges and opportunities.

The panel identified several key opportunities for the future of mineral production:

- **Investment in Recycling Technologies:** Encouraging investment in recycling groups and technologies to capture value from waste materials.
- **Government Support and Regulation:** The need for government support to level the playing field and provide financial incentives for recycling and circular practices.

PRESENTATION 4 AND Q&A:
LESSONS LEARNED FROM SPACE MINING: THE KEY TO EFFECTIVENESS

Dr. Douglas Morrison
Chief Executive Officer,
Centre for Excellence in Mining Innovation (CEMI)

Dr. Douglas Morrison addressed the critical need for innovation in the mining industry. He emphasized that the current focus on large, inefficient equipment is unsustainable and highlighted the potential of smaller, more efficient machines. These innovations are essential for improving productivity, reducing energy consumption, and minimizing environmental impact.

Also discussed the unrealistic depictions of lunar activities and the practical challenges of operating on the moon. He argued that if we can't make things work on the moon, Mars is even less feasible. His organization is dedicated to developing and promoting innovative solutions to ensure a sustainable future for the mining industry.

SESSION 2:
ROLE OF CENTERS OF EXCELLENCE AND TECHNOLOGY IN MINERAL SUPPLY GROWTH

One notable achievement mentioned was a competition where a small Canadian university used an Archimedes screw to move lunar dust, demonstrating the effectiveness of simple, low-energy technologies.

The overarching message was clear: to support the transition to an electric economy, the mining industry must produce more copper at a lower cost. Higher metal prices will hinder this transition, as electric technologies need to be cost-competitive with fossil fuels. Innovation is the key to achieving this goal and ensuring a sustainable future.

Session Summary
There is a need for innovation in the mining industry, focusing on smaller, more efficient machines to improve productivity and reduce environmental impact. He discussed the challenges of lunar operations and the importance of practical solutions. A notable achievement was a competition where a Canadian university used an Archimedes screw to move lunar dust. The key message was that the mining industry must produce more copper at lower costs to support the transition to an electric economy. Innovation is crucial for achieving this goal and ensuring a sustainable future.

"Dr. Douglas Morrison addressed the critical need for innovation in the mining industry. He emphasized that the current focus on large, inefficient equipment is unsustainable and highlighted the potential of smaller, more efficient machines. These innovations are essential for improving productivity, reducing energy consumption, and minimizing environmental impact."

– Dr Douglas Morrison, Chief Executive Officer, Centre for Excellence in Mining Innovation (CEMI)

PRESENTATION 5 AND Q&A: TECHNOLOGICAL TRANSITION FROM HYDROCARBON TO MINING: WHAT TO LEVERAGE?

SESSION 2: ROLE OF CENTERS OF EXCELLENCE AND TECHNOLOGY IN MINERAL SUPPLY GROWTH

Dr Thamer Aldaajani
General Manager,
Mining Technologies Institute,
King Abdulaziz City for Science and Technology

Dr. Thamer clarified the evolving landscape of the mining sector, emphasizing the critical role of mindset, technology, and interdisciplinary approaches in driving innovation. The discussion highlighted the pressing need for change, inherent challenges, and promising opportunities.

The mining industry often struggles with a mindset resistant to technological advancement. Despite available cutting-edge solutions, large companies remain hesitant to change. Currently, 50 companies are supported with $160 million to develop new methods, but convincing major players to adopt these innovations remains a challenge.

Dr. Thamer pointed out that mining companies have incentives to maintain the status quo. As supply-demand gaps widen, commodity prices rise, leading to increased profits and bonuses for executives.

This creates a paradox where the incentive to innovate is overshadowed by the benefits of doing nothing.

The focus was on making new ideas and techniques commercially available. By removing excuses for not adopting new technologies, the industry can pave the way for meaningful change. Ensuring that innovative solutions are accessible and practical is key to widespread adoption.

The demand for copper is set to soar with the global push towards electrification. However, production is declining, with global capacity expected to reduce by almost 50% by 2025. This underscores the urgent need for investment in exploration and innovation.

Environmental, Social, and Governance (ESG) considerations are increasingly shaping the mining industry's future. Local communities are more concerned with tangible issues like access to land, water, and clean air. Addressing these concerns is essential for gaining community support.

The importance of focusing on simple, modular, and effective machines that can be easily maintained and replaced was highlighted. Transitioning from pneumatic to electric and autonomous systems can significantly improve efficiency and reduce operational risks.

Innovations developed for space mining are being adapted for use on Earth. The harsh environment of the Moon provides valuable lessons for future mining technologies, emphasizing the need for autonomous, energy-efficient, and modular machines.

Several companies are transitioning from hydrocarbon to mining, particularly for lithium extraction. Technologies developed for hydrocarbons, such as seismic and geophysical methods, are being successfully adapted for mining.

Seismic exploration and geochemistry, well-established in the hydrocarbon industry, are being applied to mining. Adapting these technologies to different geological conditions presents unique challenges.

Remote operation centers, akin to those in the hydrocarbon industry, are being implemented in mining. Advanced modeling and simulation techniques are crucial for controlling drilling operations and understanding subsurface conditions.

Modeling in mining requires an interdisciplinary approach, integrating data from various sources. Predictive and inversion models are used to interpret subsurface characteristics and identify mineral deposits.

Airborne geophysical surveys have been instrumental in identifying anomalies for hydrothermal and mining purposes. Successful drilling and identification of gold deposits highlight the importance of adopting hydrocarbon industry mindsets in mining.

Basin analysis techniques from hydrocarbons are being applied to understand the thermo-mechanical evolution of mineral belts. Combining conservation laws and modeling techniques helps in predicting mineral deposits.

The Arabian-Nubian Shield is being studied as a single unit to understand its geological evolution. Modeling this region can provide valuable insights for mineral exploration.

The relationship between volcanic activity and mineralization in the Mecca-Medina Transform Zone is being explored. Geophysical data and structural models are used to understand the area's potential for mineral deposits and geohazards.

Developing a 3D model of Western Arabia is crucial for understanding its thermo-mechanical history. This model incorporates thermal profiles, viscosities, and boundary conditions to predict strain localization and potential mineral deposits

Session Summery
Dr. Thamer emphasized the need for innovation in the mining industry, highlighting the challenges posed by a resistant mindset and the status quo. The discussion covered the importance of making new technologies commercially viable and the urgent need for investment in exploration, especially for copper. ESG considerations and community impact were also crucial topics. Technological advancements, including those from space mining, are being adapted for Earth. Finally, interdisciplinary approaches and advanced modelling are essential for future mining success.

> **"The biggest single advantage that exists in the Kingdom is that you're not constrained by the paradigms of the past."**
>
> – Dr Thamer Aldaajani, General Manager, Mining Technologies Institute, King Abdulaziz City for Science and Technology

PRESENTATION 6 AND Q&A:
MINERAL PRODUCTION ENVIRONMENT AND CIRCULAR ECONOMY: NEW HORIZONS

SESSION 2:
SUSTAINABILITY

Mr. Yassine Taha
Assistant Professor at Mohammed VI Polytechnic University (UM6P), Morocco

In a compelling presentation, Yasin Taha, a professor at the University of Muhammad VI Polytechnic in Morocco, delved into the mining industry's pressing challenges and innovative solutions. The talk centred around the integration of circular economy principles to transform waste into valuable resources, paving the way for a more sustainable future.

The mining industry faces significant hurdles, particularly in managing the vast amounts of waste generated. Taha highlighted the various types of waste, including waste rock, tailings, and slags, and the environmental impact they pose. With the green energy transition demanding more minerals and metals, the volume of waste is set to increase dramatically. By 2050, the industry could generate hundreds of billions of tons of waste annually.

Taha introduced the concept of circular economy within the mining context, emphasizing its potential to revolutionize waste management. The circular economy aims to minimize material extraction and waste generation by reimagining waste as a resource. "A waste is a failure of imagination," Taha remarked, underscoring the need for innovative thinking to repurpose waste materials.

The presentation featured several case studies demonstrating successful waste valorization. In Morocco, researchers have developed methods to transform phosphate mining waste into valuable materials for construction, such as aggregates and cement additives. Similar initiatives in Sweden and Finland showcase how companies are collaborating to utilize each other's waste streams, producing a range of products from fertilizers to building materials.

Despite the promising potential of circular economy practices, Taha acknowledged the technological and economic challenges that must be addressed. Advancements in technology, economic incentives, and regulatory support are crucial to drive these initiatives forward. He pointed out the knowledge gaps in waste characterization and the need for comprehensive data to inform sustainable practices.

The presentation highlighted the immense opportunities for collaboration and innovation in the mining industry. By working together, companies can optimize resource use and reduce waste, creating a more sustainable and resilient industry. Strategic planning and business innovation are essential to integrate circular economy principles into the mining sector effectively.

In closing, Taha emphasized the transformative potential of circular economy practices: "Circular economy is not about one manufacturer changing one product; it's about interconnecting companies and rethinking the operating system itself." The presentation underscored the importance of creativity and innovation in reimagining the future of mining, offering a hopeful vision for a sustainable and prosperous industry.

This presentation serves as a powerful reminder that with the right mindset and collaborative efforts, the mining industry can overcome its challenges and embrace a circular economy, turning waste into wealth and ensuring a greener future for all.

Session Summary
Yasin Taha's presentation explored the challenges of managing mining waste and the potential of circular economy principles to transform waste into valuable resources. He highlighted successful case studies from Morocco and other countries, showcasing innovative waste valorization methods.

Taha emphasized the need for technological advancements, economic incentives, and regulatory support to drive these initiatives. He also underscored the importance of collaboration and strategic planning to achieve sustainability in the mining industry.

> **"A waste is a failure of imagination. With creativity and innovation, we can rethink and redesign our future."**
>
> – Yassine Taha, Assistant Professor at Mohammed VI Polytechnic University (UM6P), Morocco

PRESENTATION 7 AND Q&A:
CRITICAL RAW MATERIALS FOR A GREEN TRANSITION AND SUSTAINABLE DEVELOPMENT

SESSION 2:
SUSTAINABILITY

Prof. Svetoslav Georgiev
Associate Professor, Geological Institute, Bulgarian Academy of Sciences

In a groundbreaking presentation, Prof Georgiev, a distinguished professor in geosciences at the Bulgarian Academy of Sciences, unveiled a new national scientific initiative by the Bulgarian government. This ambitious program aims to address the pressing need for critical raw materials essential for modern technology and the green energy transition. Georgiev's talk highlighted the significance of these materials, the challenges in their extraction, and the innovative approaches Bulgaria is adopting to ensure a sustainable future.

The Vital Role of Critical Raw Materials
Georgiev began by emphasizing the fundamental role materials have played throughout human civilization. From the Stone Age to the present, materials have defined our progress. Today, critical raw materials are indispensable for producing renewable energy technologies, electric vehicles, and various high-tech applications. However, the demand for these materials is skyrocketing, driven by the global shift towards green energy.

Navigating the Complexities of Resource Management
The extraction and management of critical raw materials are fraught with challenges. Georgiev explained the intricate process of locating and characterizing ore deposits, which requires extensive geological research and mapping. He noted that the grades of these deposits are often low, necessitating the extraction of vast amounts of rock to obtain usable quantities of minerals. This process is not only time-consuming but also energy intensive.

Overcoming Technological and Economic Barriers
Georgiev highlighted the significant technological and economic barriers that must be overcome to achieve the program's goals. The long lead times and substantial investments required for mining projects pose considerable risks. Additionally, the decline in geoscience expertise underscores the need for concerted efforts to revitalize the field. Georgiev stressed the importance of enhancing geological knowledge and fostering collaboration between research organizations, government, and industry.

A Vision for the Future
The presentation concluded with a call to action, emphasizing the immense opportunities for sustainable practices in the mining industry. By leveraging Bulgaria's geological potential and fostering innovation, the country can play a pivotal role in the global supply of critical raw materials. Georgiev's vision is clear: with strategic planning and collaborative efforts, Bulgaria can turn challenges into opportunities and lead the way towards a sustainable future.

Session Summary
Prof Georgiev's presentation introduced Bulgaria's new national initiative focused on critical raw materials. He highlighted the importance of these materials for modern technology and the green energy transition, the challenges in their extraction, and Bulgaria's comprehensive approach to sustainable mining. The initiative involves extensive geological research and collaboration between research organizations, government, and industry. Georgiev emphasized the need for innovative thinking and strategic planning to ensure a sustainable future for resource management.

"Critical raw materials are critical because of negligence, not because of their abundance on Earth. With concerted efforts and innovative thinking, we can ensure a sustainable future for resource management."

– Yassine Taha, Assistant Professor at Mohammed VI Polytechnic University (UM6P), Morocco

PRESENTATION 8 AND Q&A:
NEW APPROACHES FOR MINING WASTE MANAGEMENT

SESSION 2:
SUSTAINABILITY

Dr Mabkhoot Alsaiari
Associate Professor, Head of Investment and Endowment, Najran University

The discussion underscored the critical importance of waste management in the mining sector, introduced cutting-edge technologies, and explored the future of sustainable practices.

The Imperative of Mining Waste Management
The presentation began by highlighting the vital role of effective mining waste management in safeguarding the environment, ensuring health and safety, and complying with regulatory standards. Traditional methods, such as landfill disposal and open dumping, were scrutinized for their environmental and health risks. It was emphasized that efficient waste management is not only a regulatory necessity but also a potential investment opportunity, as some waste materials can become more valuable than the mined resources themselves.

Pioneering Technologies
Several innovative technologies poised to revolutionize waste management in mining were showcased. Sustainable mining practices, circular economy principles, zero waste mining, geochemical engineering, and bioremediation were among the key approaches discussed. Inspiring case studies were shared, including Newmont mining's successful tailing reprocessing to recover precious metals and Amazon's use of native plants to restore ecosystems affected by gold mining.

Overcoming Challenges
The presentation addressed the challenges faced by the mining industry, including high upfront costs, lack of regulatory frameworks, and scaling limitations. Proposed solutions included increased investment in research and development, fostering cross-sector collaboration, and providing incentives for adopting green technologies.

These solutions aim to make advanced waste management technologies more accessible and scalable.

The Future of Mining Waste Management
Looking ahead, an optimistic picture of the future was painted, where automation, artificial intelligence, and alternative energy sources play a pivotal role in waste management. The adoption of global standards for sustainable waste management was highlighted as essential for creating a more efficient and environmentally friendly industry.

Saudi Arabia's Mining Sector
The presentation also delved into the significant contributions of Saudi Arabia's mining sector to the national economy. With 250,000 workers and substantial export revenues, the sector is poised to become a cornerstone of the country's industrial landscape. The government's strategic initiatives to accelerate growth and diversify the GDP were discussed, emphasizing the sector's potential to become a key pillar of the country's economy.

Global Insights and Lessons
Valuable lessons from various countries, including Portugal, Japan, Germany, and India, were shared. These examples illustrated the transformative impact of digital technologies, robotic innovations, and nanotechnology on various industries. The importance of modern technologies and clean energies in achieving sustainable development was a recurring theme.

Opportunities for the Future
Several opportunities for advancing mining waste management were identified:

- **Investment in R&D:** Crucial for developing cost-effective and scalable technologies.
- **Cross-Sector Collaboration:** Enhancing partnerships between government bodies and investors.
- **Green Technology Incentives:** Encouraging the adoption of environmentally friendly practices.
- **Global Standards:** Establishing universal frameworks for sustainable waste management.

A Vision for Sustainable Mining
In conclusion, the presentation offered a visionary outlook on the future of mining waste management. By embracing innovative technologies and sustainable practices, the mining industry can significantly reduce its environmental footprint and contribute to a greener future.

Session Summary
This presentation discussed innovative mining waste management strategies. Key topics included the importance of waste management, emerging technologies, and future sustainable practices.

Challenges such as high costs and regulatory issues were addressed, with solutions like increased R&D investment and cross-sector collaboration. The presentation also highlighted Saudi Arabia's mining sector and lessons from international experience

> **"The waste here is a raw material there. By using advanced techniques, we can recover minerals and create construction materials."**
>
> – Dr Mabkhoot Alsaiari, Associate Professor, Head of Investment and Endowment, Najran University

PRESENTATION 9 AND Q&A: THE NEXT-GENERATION ZERO EMISSION HYDROGEN AUTONOMOUS FREIGHT TRUCK FOR A SUSTAINABLE MINING INDUSTRY

SESSION 2:
SUSTAINABILITY

Dr. Feilong Liu
Chief Executive Officer,
Hyperview

In a groundbreaking presentation at the Future Minerals Forum, the spotlight was on a revolutionary hydrogen-powered truck that promises to transform the mining industry. This state-of-the-art vehicle, showcased right outside the venue, is not just a marvel of engineering but a beacon of sustainability and efficiency.

A Leap Towards Zero Emissions
The hydrogen-powered truck stands out for its zero-emission operation. Unlike traditional diesel trucks, this innovative vehicle produces only water as a byproduct, making it an environmentally friendly alternative. This is a crucial development for the mining industry, which is under increasing pressure to reduce its carbon footprint.

Advanced Autonomous Technology
Safety and efficiency are at the forefront of this truck's design. Equipped with cutting-edge autonomous driving technology, the truck can maintain safe distances and significantly reduce the risk of accidents. This feature is particularly advantageous in remote mining areas where human labor is limited. The autonomous capabilities ensure that the truck can operate seamlessly, even in challenging environments.

Operational Efficiency and Quick Refuelling
One of the most impressive features of the hydrogen-powered truck is its quick refueling time. Unlike battery electric vehicles that require several hours to charge, this truck can be refuelled with hydrogen in just 10 minutes. This rapid refuelling capability makes it ideal for the demanding 24/7 operations typical in the mining industry. The truck's long driving range further enhances its suitability for extensive mining operations.

Economic and Environmental Benefits
The presentation highlighted the economic advantages of adopting hydrogen technology. The potential for significant fuel cost savings and the ability to earn carbon credits make hydrogen-powered trucks a financially attractive option for mining companies. The speaker also addressed the various sources of carbon emissions in mining, including diesel-powered machinery, processing and smelting operations, and transportation. By transitioning to hydrogen-powered trucks, mining companies can substantially reduce their carbon emissions.

Versatile Hydrogen Production
Hydrogen can be produced through various methods, including natural gas (blue hydrogen) and solar power (green hydrogen). The potential for on-site hydrogen production was discussed, which could further reduce costs and environmental impact. This flexibility in hydrogen production methods ensures that mining companies can adopt the most suitable and sustainable approach for their operations.

Session Summary
The hydrogen-powered truck represents a significant step towards a more sustainable and efficient future for the mining industry. By leveraging hydrogen and autonomous technology, mining operations can achieve notable reductions in carbon emissions, enhance safety, and improve operational efficiency. This innovative vehicle is a technological advancement and a testament to the industry's commitment to sustainability.

> **"Our hydrogen-powered truck is a game-changer for the mining industry, offering zero emissions and enhanced safety through autonomous technology."**
>
> – Dr. Feilong Liu,
> Chief Executive Officer, Hyperview

PRESENTATION 10 AND Q&A:
HOW TO MAKE MINING NATURE POSTITIVE

SESSION 2:
SUSTAINABILITY

Keegan Eisenstadt
Global Practice Lead for Nature, South Pole

In a thought-provoking presentation, a representative from South Pole, a leading carbon climate mitigation company, delved into the transformative potential of nature-positive mining. The session, held at the close of a long day, captivated the audience with its forward-thinking approach to integrating environmental stewardship into mining operations.

The speaker, Mr Keegan Eisenstadt, began by addressing the inherent reputational risks associated with the mining industry, emphasizing the urgent need for sustainable practices. Nature-based solutions (NBS) emerged as a cornerstone of this strategy, leveraging ecological processes to mitigate emissions and restore degraded ecosystems.

By harnessing the power of nature, mining companies can create a restorative climate and economic system.

One compelling example highlighted was the use of tailings as marketable products, alongside the generation of carbon benefits and biodiversity credits. These innovative approaches not only reduce environmental impact but also open new revenue streams for the industry.

A key theme of the presentation was the importance of risk management and fostering strong relationships with stakeholders. Mining companies face significant climate exposures, necessitating robust engagement with buyers and local communities.

The speaker underscored the need for long-term financial success through participation in the circular economy and the creation of new revenue streams from carbon and biodiversity credits.

South Pole's extensive experience in developing carbon credit projects was a focal point of the discussion. Over the past 18 years, the company has abated approximately 200 million tons of CO2 through various initiatives. Notable projects included Rio Tinto's 500,000-hectare restoration project and Anglo American's biodiversity efforts in Brazil, showcasing the tangible benefits of integrating NBS into mining operations.

The presentation also tackled the physical challenges posed by climate change, such as water and energy constraints, increased precipitation, and extreme weather events. Mining companies must proactively adapt to these risks to ensure operational resilience. The speaker highlighted the critical role of adaptive strategies in maintaining business continuity in a climate-altered future.

Unlocking the Potential of Biodiversity Markets, biodiversity credits are rapidly emerging as a valuable asset, with compliance markets driving higher prices. The speaker provided examples of constructed wetlands for tailings management and biochar projects that enhance soil fertility and water retention. These initiatives contribute to environmental restoration and offer significant financial returns.

The evolving landscape of financing for carbon and biodiversity projects was another key topic. Venture capital and large investment houses are increasingly entering the market, bringing new opportunities for project funding. The speaker emphasized the importance of bundling projects to attract large-scale investments and the role of national compliance markets in stabilizing prices.

Opportunities for the Mining Industry

- Revenue Generation: Mining companies can tap into new revenue streams through the sale of carbon and biodiversity credits.
- Enhanced Stakeholder Relationships: Strengthening ties with local communities and stakeholders can lead to improved social license to operate.
- Climate Resilience: Adopting nature-based solutions can bolster the resilience of mining operations to climate risks.
- Market Leadership: Companies that invest in sustainable practices can position themselves as leaders in the transition to a low-carbon economy.

A Vision for the Future

Mining companies has a unique opportunity to drive positive environmental change while ensuring long-term financial success. By integrating nature-based solutions and leveraging carbon and biodiversity credits, we can create a sustainable future for the industry and the planet," the speaker concluded.

Session Summary

This presentation underscored the critical role of the mining industry in addressing climate change and highlighted innovative approaches that can lead to a more sustainable and resilient future. As the session drew to a close, it was clear that the path towards nature-positive mining holds immense promise for both the environment and the industry.

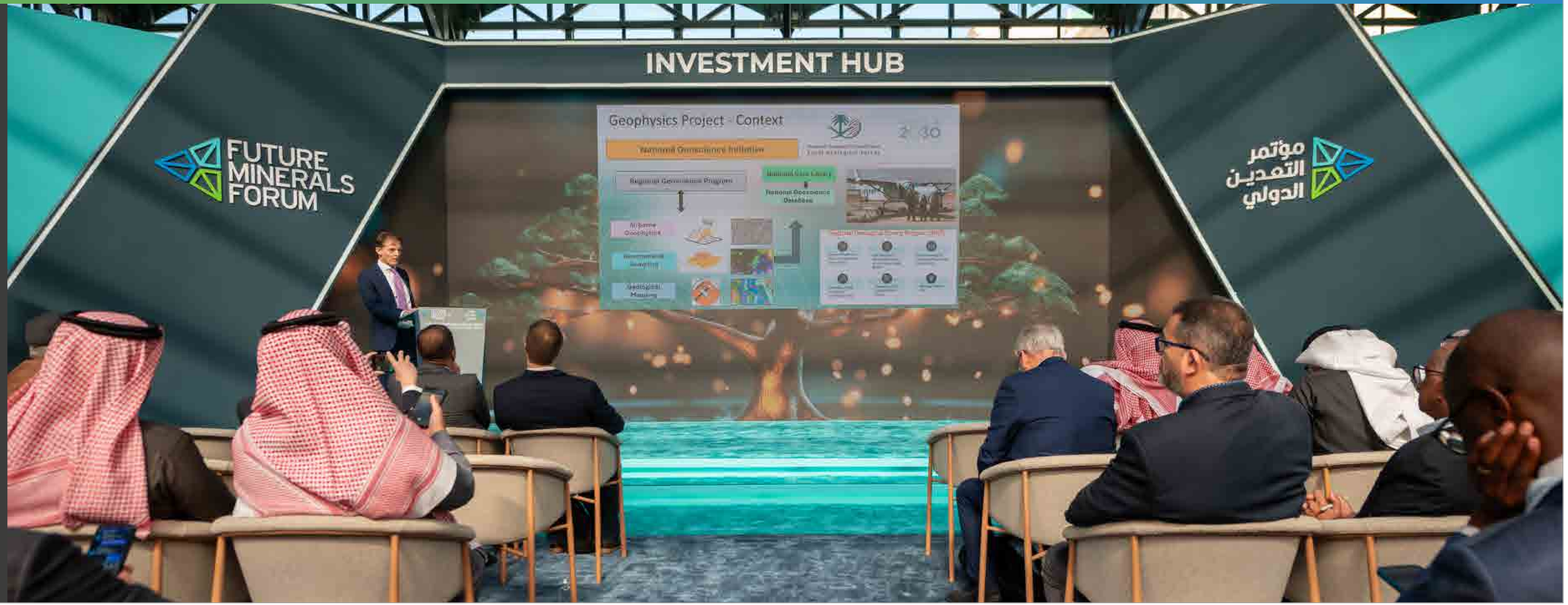
> **"This presentation underscored the critical role of the mining industry in addressing climate change and highlighted innovative approaches that can lead to a more sustainable and resilient future. ."**
>
> – Keegan Eisenstadt, Global Practice Lead for Nature, South Pole

KNOWLEDGE EXCHANGE: STREAM 2

14 January 2025

Investment Hub (Dome)

Theme:
Global Leadership Through Action



PRESENTATION 1 AND Q&A:
MINING INNOVATION STUDIO

SESSION 1:
GEOLOGY AND EXPLORATION

Muneef Al Muneef
Managing Director,
NewLab KSA

The 30-minue presentation introduced NewLab and shed light on the Minning Innovation Studio. Mr. Muneef noted that Newlab was a global venture platform that supported critical technology start-ups in various high-impact sectors, including mining, mobility, logistics, and energy.

The platform aimed to lower barriers for start-ups by providing essential infrastructure, access to capital, and customer networks.

Newlab offered technical infrastructure, piloting sites, labs, and commercialization support, while also investing high-risk capital into those start-ups.

The presentation highlighted Newlab's successful model, which aligns public and private resources to support start-ups through stages such as applied research, tech transfer, lab-to-pilot, pilot-to-demonstration, and commercialization. The model has demonstrated success, with a significant percentage of pilots advancing towards commercialization and substantial capital raised.

Newlab had expanded its presence from Brooklyn to Detroit, Uruguay, and Riyadh, focusing on economic impact and job creation. Partnerships with industry and government entities were crucial, providing regulatory frameworks and innovation zones for pilots. Newlab Riyadh aimed to attract global talent and high-velocity start-ups, creating substantial value in the region. The presentation also emphasized the importance of innovation in the mining sector, especially in the context of the energy transition and the increasing demand for critical minerals.

PRESENTATION 2 AND Q&A: SGS REGIONAL GEOSCIENCE AIRBORNE GEOPHYSICS PROJECT: OVERVIEW AND PRELIMINARY RESULTS

SESSION 1: GEOLOGY AND EXPLORATION

Dr. Feargal Murphy
Principal Geologist, International Geosciences Services

Dr. Murphy from IGS delivered a presentation on the Saudi Geological Survey Regional Geoscience Project, with a focus on the airborne geophysics component. This significant project, spearheaded by the Saudi Geological Survey (SGS) and supported by IGS and other partners, is designed to stimulate exploration within Saudi Arabia by providing new pre-competitive geoscience data. The airborne geophysics survey commenced in Q4 2021 and is currently in its first phase, covering an extensive 2.25 million line kilometers, with over 2 million line kilometers already acquired.

Up to nine aircraft have been deployed, logging nearly 12,000 flying hours and production flights.

The survey, which is the largest of its kind in the world, utilizes cutting-edge technology to produce more accurate and higher resolution data than previous surveys conducted between the 1960s and 1980s. This enhanced data aids in geological mapping and boosts exploration activities. Despite facing challenges such as adverse weather conditions, including wind, dust, and rugged terrain, the project has safely and effectively acquired high-quality data.

The benefits to Saudi Arabia are substantial. This project supports the National Geoscience Initiative under Saudi Vision 2030, providing essential baseline geophysical data for geological mapping and exploration. It also promotes geoscience research and skills development within the Kingdom, positioning Saudi Arabia at the forefront of geophysical surveying on a scale comparable to efforts in countries like Canada and Australia.
In summary, this project is a significant achievement for Saudi Arabia, enhancing geological understanding and exploration potential, and supporting the country's broader vision for economic development and technological advancement

PRESENTATION 3 AND Q&A: DERISKING MINERAL EXPLORATION & REDUCING PROJECT TIMELINES WITH INNOVATIVE TECHNOLOGIES

SESSION 1: GEOLOGY AND EXPLORATION

Sophie Zurquiyah
Chief Executive Officer,
Viridien Group

The mining and oil and gas industries have vastly different financial scales, with the mining sector often operating on more constrained budgets. For instance, the $50 billion investment in seismic data over past decades has provided detailed subsurface imagery critical for planning and development cycles.

A notable example from Oman showcases how hard rock exploration progressed significantly in three years through advanced technologies. Even low-end seismic datasets, when paired with best-in-class algorithms and processing techniques, have demonstrated their ability to yield meaningful insights, showcasing the potential for innovative approaches in resource evaluation and extraction.

Geoscience and geophysics play a crucial role in the mining sector, particularly in planning, development, and operational monitoring. By creating consistent workflows, these disciplines ensure a deeper understanding of rock physics, contributing to more efficient mining operations. Companies like BHP are redefining their strategies and learning to think and act differently to address sector-specific challenges such as drilling hazards and health, safety, and environmental risks. Drilling efficiency, site placement, and advanced geoscience techniques are becoming essential in ensuring sustainable and effective mining practices. This evolution underscores the growing importance of geoscience in shaping the future of mining and mineral exploration.

Session Summary

The mining and oil and gas industries differ significantly in budgets, with mining operating on tighter financial margins. Investments in seismic data, such as the $50 billion spent over past decades, have provided valuable subsurface imagery, aiding planning and development cycles. In Oman, technological advancements have significantly improved hard rock exploration within just three years.

Even low-end seismic datasets, when combined with advanced algorithms and processing, demonstrate their potential to effectively enhance resource evaluation and extraction.

Geoscience and geophysics are integral to mining operations, from planning and development to operational monitoring. By integrating these disciplines, companies achieve a better understanding of rock physics and improve efficiency. Leading firms like BHP are adopting innovative strategies to address challenges like drilling hazards, safety, and environmental concerns. Advanced drilling and site placement techniques highlight the essential role of geoscience in driving sustainable and effective mining practices.

PRESENTATION 4 AND Q&A: IN-SITU GEOCHRONOLOGY FOR MINERAL EXPLORATION: APPLICATIONS AND LIMITATIONS

SESSION 1: GEOLOGY AND EXPLORATION

Dr. Ahmad Redaa
Assistant Professor, Department of Mineral Resources and Rocks, King Abdulaziz University

In this presentation, Dr. Ahmad Redaa emphasized the importance of isotopic systems in dating mineral deposits and understanding the geological events that shape them.

However, a major challenge in the region is the lack of a specialised geological chronological laboratory that can offer advanced dating methods.

Dr Redaa expressed that, despite the potential of these methods, the absence of such a lab is a significant limitation.

To address this issue, Dr. Ahmad Redaa mentioned that King Abdulaziz University is open to collaborating with organizations interested in establishing a geological lab with this advanced technology in Saudi Arabia. This collaboration would help foster research and development in the geological dating field.

Another key point of discussion was the current limitations of the beta system for dating. The method is restricted to certain types of minerals due to the lack of reference materials and standards necessary for calibrating results and ensuring quality control. Dr Redaa noted that efforts are being made to develop these standards, and once established, they would allow the technique to be applied to a broader range of mineral types.

In addition, Dr. Redaa highlighted technological advancements, particularly the development of newer instruments equipped with multicollectors. These upgraded machines offer much better precision compared to the older versions, which was an important point in the context of improving the accuracy of geological dating methods.

During the Q&A session, Dr. Redaa also clarified that in order to conduct isotope parent analysis, it is essential to first determine the sample's age by analysing its isotopic composition. This is a critical step in obtaining accurate age measurements for geological samples.

PRESENTATION 5 AND Q&A: GEOCHEMICAL SURVEY OF THE ARABIAN SHIELD: METHODS, RESULTS, AND OUTLOOK TO MINING AND MINERAL EXPLORATION

SESSION 1: GEOLOGY AND EXPLORATION

Dr. Jordan Gyozo
Associate Professor, Institute of Geography and Earth Sciences, Eotvos University Seequent

The Presentation titled "Geochemical Survey of the Arabian Shield: Methods, Results, and Outlook to Mining and Mineral Exploration" was presented by Dr. Jordan Gyozo, Associate Professor at the Institute of Geography and Earth Sciences, Eotvos University Seequent. Dr Gyozo outlined the ambitious project's scope, methodologies, and findings, offering insights into its importance for mineral exploration in Saudi Arabia.

The project, initiated by the Saudi Geological Survey in collaboration with the China Geological Survey and the Geological Survey of Finland, is part of the Regional Geological Survey Programme. This six-year initiative (2021-2027) aims to generate high-resolution geochemical maps and atlases. Dr Gyozo noted that This is one of the world's largest geochemical surveys, spanning over 86,000 sampling sites across the Arabian Shield.

The study focuses on collecting and analyzing stream sediment and heavy mineral concentrate samples using rigorous quality control measures.

Dr. Gyozo detailed the sampling design, subdividing the region into 50 quadrangles, each covering 25x25 km and further divided into 2.5x2.5 km cells. From each cell, stream sediment samples are collected and analyzed to represent eroded material from nearby rocks. He emphasized the importance of high sampling density, stating that their project boasts an unprecedented density of 2.5 km per sample, significantly enhancing the resolution compared to international standards.

Key highlights included advanced laboratory analyses conducted in China, where 76 chemical elements are examined using cutting-edge techniques such as ICP-MS and XRF. Dr. Gyozo remarked that this level of analysis, covering nearly the entire periodic table, is unique and unmatched. He also underscored the importance of statistical methodologies, quality assurance, and anomaly detection to identify potential mineral-rich areas for further exploration.

The session concluded with discussions on the practical applications of geochemical data, including the creation of geochemical anomaly maps and mineralogical analyses.

Participants engaged in a lively Q&A session, addressing topics such as sampling depth, the influence of environmental factors, and the integration of results into the National Geological Database.

Session Summary

Dr Gyozo expressed his gratitude to all collaborators, emphasising the importance of international cooperation: Their success lies in the seamless collaboration between Saudi Arabia, China, and Finland, which the Saudi government has duly recognised with an outstanding project grant. The session ended with an invitation to access the survey's preliminary data and resources through the Saudi Geological Survey's portal.

PRESENTATION 6 AND Q&A: INCREASING MINERAL PROSPECTING CONFIDENCE LEVELS AND DRILL TARGETING PRECISION USING ARTIFICIAL INTELLIGENCE

SESSION 1: GEOLOGY AND EXPLORATION

Farzi Yusufali
Co-Founder, Stratum AI

The presentation highlighted various significant points. It began by discussing advanced geomagnetic and geochemical analysis techniques applied to identify regions of interest, particularly those with alkaline rocks associated with rare earth elements (REEs). Farzi Yusufali highlighted the successful application of this data to other areas and emphasised the importance of producing a detailed atlas of alkaline rocks at a 1:5000 scale to further inform targeted exploration efforts. They stress the significance of leveraging data from the National Geological Database (NGD) to identify valuable resources critical to modern technology, such as those found in laser pointers and other devices.

Farzi Yusufali also discussed Saudi Arabia's untapped mining potential and strategic location, coupled with high-resolution datasets that can transform exploration by making it faster, cheaper, and less risky. Saudi Arabia is presented as an attractive destination for mining and investment opportunities. Furthermore, the importance of Utlizing advanced techniques, such as machine learning, to extract maximum value from both existing and new datasets was underscored. The new datasets, expected to be released soon, are anticipated to provide additional insights and opportunities for exploration.

The Yusufali expressed gratitude towards the Saudi Geological Survey (SGS) for its support and emphasised the importance of including young professionals in industry discussions to ensure the next generation's engagement. They also highlighted the role of creativity in driving the industry forward, citing examples of initiatives that encourage employee innovation.

In the Q&A session, audience members raised questions regarding specific geological features, differences in map scales, and data availability. Yusufali clarified that certain features are not captured in older geological maps due to scale limitations and indicated that new map productions with additional features are forthcoming. However, they noted that raw data is unlikely to be made publicly available, as such decisions rest with the SGS.

Overall, the session emphasized collaboration, innovation, and the strategic importance of leveraging available resources to advance exploration and mining efforts.

Session Summary

The presentation highlighted advanced geomagnetic and geochemical techniques used to identify regions rich in rare earth elements (REEs), emphasizing the need for detailed geological mapping and leveraging the National Geological Database. Saudi Arabia's vast mining potential, supported by high-resolution data and advanced technologies like machine learning, was presented as a significant investment opportunity. Farzi Yusufali praised the Saudi Geological Survey's (SGS) role and stressed the inclusion of young professionals and fostering creativity in the industry.

In the Q&A, questions focused on geological mapping details and data availability, clarifying that raw data remains under SGS control. Collaboration and innovation were emphasised throughout.

PRESENTATION 7 AND Q&A: THE VALUE OF HIGH-RESOLUTION AIRBORNE MAGNETIC DATA FOR MINERAL DEVELOPMENT IN THE KINGDOM OF SAUDI ARABIA

SESSION 1: GEOLOGY AND EXPLORATION

Thashen Naidoo
Project Geophysicist,
Xcalibur Smart Mapping

The Future Minerals Forum focused on the importance of talent in the mining and heavy industries, particularly how to inspire career pathways for young Saudis. A key discussion point was the need to bring together talent from different sectors, fostering collaboration and creating growth opportunities. Khed Ahmedi, the head of Saudi R Brick Company, shared insights from his 70 years of experience in the business, emphasizing the need to engage more Saudi youth in the heavy industries sector. He highlighted the challenges of developing the workforce, especially in rural areas, and the benefits of offering alternatives to university education, such as training in fields like carpentry, steel fitting, and other engineering support roles. Ahmedi stressed the importance of providing career pathways that create a strong middle class, which is foundational to the success of industrial growth. His company has initiated training programs specifically targeting Saudi youth to equip them with the skills necessary for various heavy industry roles, from mining to kiln production. He emphasized that such programs not only contribute to the economy but also ensure that young people have the opportunity to grow and thrive in different career paths, challenging the myth that all careers must be in fields like engineering or medicine.

The university focuses on developing the talent demanded by the industry, particularly in fields beyond traditional science and engineering, such as data science, artificial intelligence, and machine learning, which can also be applied to the minerals industry. At KFUPM, a transition occurs as the institution shifts from its strong petroleum engineering background to incorporating a greater emphasis on minerals, recognizing it as a key pillar of Saudi Arabia's Vision 2030. This shift involves integrating industry-relevant courses, field trips, and direct interaction with the industry to better prepare students for the job market.

Moreover, the Kingdom's long-standing expertise in oil and gas, which has established a solid foundation for talent development, is being leveraged to bridge the gap between the petroleum sector and the emerging minerals industry. By exposing students to the industry through practical experiences, the aim is to ensure they are equipped to contribute to the Kingdom's evolving industrial landscape.

Al Aan Group focuses on the mining industry's upstream, midstream, and downstream sectors, particularly in the transition of metals from the land to the market. A key priority is investing in skilled technicians and engineers for their operations, with a target to employ Saudi citizens. This effort is supported through a collaboration with the Saudi Technic Institution for Minerals, where over 50 students are currently enrolled to receive specialized training in areas like drilling, chemical safety, and exploration. The company faces challenges as an investor in the mining sector, especially in remote areas of Saudi Arabia, where access to necessary minerals often requires both geological and geophysical data. However, with the support of the Ministry of Education, the Ministry of Industry, and the Technical and Vocational Training Corporation (TVTC), along with university partnerships, they are well-positioned for growth. Their efforts have resulted in a Saudization rate of over 50% in their workforce.

Meanwhile, Arabian Geophysical and Surveying Company, a 60-year-old institute, provides fully integrated geoscience services across the Middle East. The company employs around 2,400 people and operates in Saudi Arabia and several neighbouring countries. One of the significant challenges they face is a shortage of skilled workers in the industry, particularly in the geosciences and fieldwork sectors. As the demand for manpower in the industry is expected to grow by four times in the coming years, the company is preparing for a substantial increase in demand for geoscientists, geophysicists, and other support roles. They acknowledge that the growing need for professionals will require a broad range of workers, from geoscientists to truck drivers and mechanics, in the often remote and harsh environments where they operate.

WOMEN IN MINING SAUDI ARABIA AND WIM UK: INETWORKING AND ANNOUNCEMENT OF YOUNG MINING PROFESSIONALS SAUDI ARABIA

SESSION 1: GEOLOGY AND EXPLORATION

Rana Zumai
President,
Women in Mining Saudi Arabia

The session featured an inspiring speaker from the women in the mining community across the world, highlighting the importance of diversity, inclusion, and innovation in the mining industry.

The session also included a presentation from a student, Lamar Sel, from King Abdulaziz University, representing the first cohort of Saudi female students majoring in Earth Sciences. She expressed gratitude for the opportunity to contribute to the Kingdom's prosperity through the Earth Sciences and Mining sectors. Lamar highlighted the pivotal role these sectors play in the country's economic growth and spoke about the ambition of her cohort to become active contributors to this vital field, aligning their work with the goals of Saudi Arabia's Vision.

The discussion underscored the exciting opportunities for sustainable development in the mining industry, with a focus on the future and the role of emerging talents.

The discussion revolves around the empowerment of women in the mining and STEM fields, with speakers acknowledging the importance of collaboration and dedication to achieving shared goals.

The participants emphasise the need for ongoing support from governmental and educational entities to help students and professionals succeed in these industries. One speaker, representing the Ministry of Industry and Mineral Resources, expresses gratitude for the opportunity to share aspirations and highlights the contributions of women in these sectors.

Florence from Australia shares her personal journey in the mining industry, reflecting on her growth from an operator to a global role, while celebrating the achievements of women in mining across Australia. She also expresses appreciation for the global sisterhood and the shared inspiration of women involved in this field.

The conversation continues with the involvement of colleagues from South Africa, particularly Raka, who emphasises the significance of curiosity and STEM education for young girls. Raka encourages attendees to continue learning from each other, inspiring future generations of women to engage in impactful work and shape the future of the industry.

LEADERSHIP ROUNDTABLE

For the first time at the FMF, the 2025 event welcomed delegates to its Regional Leadership Roundtables. Focused on Africa, Central Asia, and Latin America, these sessions brought together supplier nations to create a unified global minerals movement, amplifying the voices of those regions which are rich in resources but underrepresented on the global stage.

CENTERS OF EXCELLENCE & TECHNOLOGY MEETING

New to the Future Minerals Forum 2025, the Centers of Excellence & Technology meeting brought together industry leaders and other experts from the mining, academic and technological sectors.

This inaugural meeting was aimed at building capacity in mineral supply and driving research, technology transfer, and the adoption of responsible mining practices.

15-16 JANUARY 2025

Due to overwhelming demand, the FMF25 International Exhibition was extended to a third day and showcased over 170 exhibitors and eight country pavilions from Australia, Austria, Brazil, Sweden, Canada, the UK, India, and Pakistan. Each country showcased opportunities, technologies, and future mining innovations to a diverse global audience, while corporate exhibitors provided a window into their pioneering activities in shaping the future of minerals.

ABOUT THE EXHIBITION

The 2025 exhibition provided a high-profile global platform for showcasing the latest innovations – from cutting-edge mining equipment to groundbreaking technologies and optimized services – in front of a huge and focused audience of thousands, comprising decision-makers from across the minerals value chain. Opportunities abounded for exhibitors to connect with industry leaders, potential partners, and suppliers, fostering valuable relationships that led to future collaboration and opened doors to new business opportunities.

The FMF exhibition merged thought leadership with practical solutions across the entire minerals value chain and was an unmissable opportunity for anyone with a professional interest in shaping the future of minerals.

LEADING MINING COMPANIES AND INVESTORS

- Analytical
- Sustainability
- Data Systems
- Electrification
- Engineering
- Construction & Infrastructure
- Consulting
- Equipment & Tools
- Health & Safety
- Water Usage
- Logistics & Transport
- Automation & Digital Transformation
- Fuel Cells & Batteries
- Mining & Exploration
- Refining & Processing
- Manufacturing
- Circular Economy
- Artificial Intelligence and Machine Learning

OUTDOOR EXHIBITION

At FMF 25, the stunning grounds outside the King Abdulaziz International Conference Center provided the backdrop to some of the most innovative and powerful mining equipment in the world.

Many of the world's leading mining equipment manufacturers brought their cutting edge technology to Riyadh to showcase in front of a global audience of potential customers numbering over 20,000.

HUB OF EXCELLENCE

Technology is key to establishing modern, best-in-class mining industries.

Technology is key to establishing modern, best-in-class mining industries. FMF 25's Hub of Excellence was therefore dedicated to displaying cutting edge current mining and minerals technologies, while also providing a glimpse into the future. Around 20 leading mining technology businesses were able to display technologies that truly represent excellence, using AI, drones and robotics to mine more safely, more efficiently and more productively.

HUB OF EXCELLENCE PARTICIPANTS INCLUDE:

- ARGAS
- ATINUM
- DAOYUN
- DIAS
- ELEMISSION
- ENVIRONMENTAL SUPPORT CONSULTING OFFICE
- EVIDENT
- FLEET
- GEO TEK
- HEXAGON
- HUAWEI
- Ivanhoe ELECTRIC
- Lithium Infinity
- Najabah
- VISION 2030
- SEEQUENT
- TAQA
- TerraDrone Arabia

MINERAL EXPLORATION HUB

With an array of world-class exhibitors dedicated to showing that exploration is the lifeblood of the minerals sector, the Mineral Exploration Hub once again reflected the critical importance of exploration for the future.

The companies on display were united by their dedication to advancing critical minerals projects and keen to find partners in order to do so.

MINERAL EXPLORATION HUB PARTICIPANTS INCLUDE:

- ANDIAMO EXPLORATION
- CENTRAL COPPER
- ELLIPSIS MINING
- Greyridge
- RAREX

Future Minerals Forum 2025 saw the return of FMF TV, the event's dedicated video channel.

Shot in the TV studio within the KAICC, interviews featured some of the leading voices from the event. Anchored by former CNN and Bloomberg TV presenter Ryan Chilcote, the channel aired exclusive interviews with BHP's Catherine Raw, Alcoa's William Oplinger and a joint interview with Ma'aden's Bob Wilt and Ivanhoe Electric's Taylor Melvin, amongst many others.

Get a sense of the scope and scale of FMF25 by watching all the interviews from FMF TV on YouTube at **https://www.youtube.com/@FutureMineral**

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MINERAL EXPLORATION HUB

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AUSTRALIA

Main Host

AUSTRALIA

Country Participants

AMC Australian Mine Societies, BYRNECUT, IBAERA, Juno minerals, WA Resources Ltd, VERIDAPT

AUSTRIA

Main Host

ADVANTAGE AUSTRIA

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Pakistan – The Mineral Marvel

Pakistan

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Main Host

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PLENARY SESSIONS DAY 1

15 January 2025

Impact Zone

OPENING REMARKS - MINISTER SPEECH

H.E. Bandar Alkhorayef
Minister of Industry and Mineral Resources,
Saudi Arabia

H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources of Saudi Arabia, began his speech by welcoming all highnesses, excellencies, attendees, and guests to the fourth edition of the Future Minerals Forum (FMF) on behalf of Custodian of the Two Holy Mosques King Salman bin Abdulaziz Al Saud and His Royal Highness Prince Mohammed bin Salman bin Abdulaziz, Crown Prince and Prime Minister. The Minister emphasized the Kingdom's commitment to making the FMF the most prominent international platform for minerals, contributing to the sector's sustainable growth.

He highlighted the significant growth of the FMF, noting the increase in attendees from 3,500 in 2022 to over 20,000 this year, 2025. He also mentioned the participation of 250 speakers, including CEOs from top mining companies and leaders from various sectors. The forum has become a global stage for essential conversations on the future of minerals, with representatives from over 40 international and bilateral organizations.

Key achievements and initiatives highlighted in his speech included progress on the international critical minerals framework, the establishment of nine centers of excellence across Africa and Asia, and advancements in responsible supply priorities. The Minister proudly shared Saudi Arabia's leadership in the mining sector, driven by Vision 2030, with a mineral potential estimated at $2.5 trillion.

He announced the launch of the Mining Innovation Studio and the exploration incentive program, which has already funded six companies. He also introduced new initiatives for FMF 2025, including the Knowledge Exchange, the Regional Leadership Round Table, and the Great Debate, aimed at fostering collaboration and addressing critical issues in the mining sector.

"Boldness is part of our DNA in the Future Minerals Forum, and together, we will shape a sustainable and prosperous future for the mining sector,"

– H.E. Bandar Alkhorayef,
Minister of Industry and Mineral Resources, Saudi Arabia

WELCOMING REMARKS BY TUMI MAKGABO

Tumi Makgabo
Broadcaster and Entrepreneur, Africa Worldwide Media

Tumi Makgabo, Broadcaster and Founder of Africa Worldwide Media kicked off the plenary session of the 2025 Future Mineral Forum and highlighted that as we step into the next quarter of a century in the New Millennium, humanity faces challenges that lie at the very core of our evolution. These challenges demand urgent breakthroughs that prioritize people and sustainable development.

"This is the mission of the Future Minerals Forum, a gathering that has become a beacon of hope and innovation in the minerals industry," Makgabo declared.

Building on the momentum of last year's "Year of Action," the Forum is set to transform 2025 into the "Year of Impact for Minerals." This year's edition aims to unite visionaries, innovators, and leaders from around the globe to create a future where minerals play a central role in global development. The urgency of this mission cannot be overstated, as the decisions and actions taken today will shape the world for generations to come.

In her opening remarks, extended an open invitation to all participants to join this noble cause.

She emphasized the importance of collaboration and collective effort in putting minerals at the heart of global development. "Together, let's commit to creating impact today that will be celebrated for the ages," she urged.

Acknowledging Key Supporters
The success of the Future Minerals Forum is built on the support of its sponsors and strategic partners. Makgabo took a moment to acknowledge these crucial contributors, with special mention of the founding partners: Aramco, Saudi Mining Services, Hadid, Invest Saudi, Ma'aden, and Riyad Bank. Their unwavering support has been instrumental in moving from ideas and plans to delivering tangible impact.

Redefining Possibilities
Reflecting on the journey so far, Makgabo highlighted the unique opportunity and privilege the Forum presents. "We literally have the opportunity to map the future of global resource management," she said. This sentiment underscores the Forum's commitment to redefining what is possible for our collective future.

A Call to Action
As the Forum marks its fourth and ever-growing edition, the call to action is clear: it is time to ensure that the plans and ideas of the past years are transformed into impactful realities. Makgabo's remarks set the stage for a year of significant achievements and progress in the minerals sector.

To kick off this year's journey, Makgabo invited participants to join her in welcoming the host of the event, H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources. This gesture symbolizes the collaborative spirit and shared vision that the Future Minerals Forum embodies.

PLENARY SESSION 1: TO BUILD OR TO BUY: ARE CAPITAL ALLOCATION AND FINANCIAL DISCIPLINE ADEQUATE TO MEET DEMAND FOR MINERALS?

THEME: DELIVERING INVESTMENT PARTNERSHIPS

SUMMARY:

The session concluded with a call to action, emphasizing the need for collective efforts from governments, companies, and multilateral institutions to achieve the green transition.

The panellists recognized the critical role of resource-rich countries in the global supply chain and the necessity of sustainable practices.

H.E. MOHAMMED AL-JADAAN

Minister of Finance, Saudi Arabia

"A competitive regulatory environment is crucial for the mining sector's growth, and significant investments are needed to drive the sector forward. Our approach in Saudi Arabia focuses on sector alignment, data investment, and robust regulatory frameworks."

TOM PALMER

President and Chief Executive Officer, Newmont

"Partnerships are key in developing large projects, especially with the growing demand for copper. At Newmont, we emphasize capital allocation, financial discipline, and operational excellence to build a portfolio of Tier 1 gold assets."

KENT MASTERS

Chairman & Chief Executive Officer, Albemarle

"Financial discipline and innovation are paramount in addressing the challenges faced in the lithium market. Cooperation between companies and governments is essential to build resilient supply chains amidst price fluctuations and geopolitical issues."

JEREMY WEIR

Chairman, Trafigura

"Long-term contracts are essential to reduce volatility in global supply chains. Increased cooperation between companies and governments is necessary to meet future mineral demands and address geopolitical implications."

BENJAMIN GALLEZOT

Interministerial Delegate for the Provision of Strategic Minerals and Metals, Office of the President of France

"France is committed to supporting the mining sector through investment funds and international cooperation. Sustainable practices and government support are vital in attracting private investments and developing new projects."

DAVID EADES

Journalist, Former BBC News

"As we navigate the complexities of the green transition, the growing demand for minerals presents both challenges and opportunities. Our discussion today aims to explore whether our current capital allocation and financial discipline are sufficient to meet this demand, ensuring that resource-rich countries can fully benefit from their mineral wealth."

PLENARY SESSION 1: TO BUILD OR TO BUY: ARE CAPITAL ALLOCATION AND FINANCIAL DISCIPLINE ADEQUATE TO MEET DEMAND FOR MINERALS?

THEME: DELIVERING INVESTMENT PARTNERSHIPS

Moderator

David Eades
Journalist, Former BBC News

H.E. Mohammed Al-Jadaan
Minister of Finance, Saudi Arabia

Benjamin Gallezot
Interministerial Delegate for the Provision of Strategic Minerals and Metals, Office of the President of France

Tom Palmer
President and Chief Executive Officer, Newmont

Jeremy Weir
Chairman, Trafigura

Kent Masters
Chairman & Chief Executive Officer, Albemarle

In a highly anticipated panel discussion, industry leaders and government officials gathered to explore the critical question: “To Build or To Buy: Are Capital Allocation and Financial Discipline Adequate to Meet Demand for Minerals?”

The session, moderated by an engaging host, set the stage for a deep dive into the future of the mining sector, focusing on the balance between building new projects and acquiring existing ones.

The session’s focus was clear: addressing the growing demand for minerals essential to the green transition and ensuring that resource-rich countries benefit from their extraction.

H.E. Mohammad Al-Jadaan, Minister of Finance, Saudi Arabia opened the discussion by highlighting Saudi Arabia’s strategic approach to mining.

He emphasized the importance of sector alignment, data investment, and robust regulatory frameworks. “A competitive regulatory environment is crucial,” he noted, “and significant investments are needed to drive the sector forward,” Al-Jadaan added.

Tom Palmer, President and CEO of Newmont, shared insights into Newmont’s strategy of building a portfolio of Tier 1 gold assets. He stressed the importance of capital allocation, financial discipline, and operational excellence. “Partnerships are key in developing large projects,” Palmer stated, “especially with the growing demand for copper.”

The conversation then shifted to Kent Masters, Chair and CEO of Albemarle, who discussed the challenges in the lithium market, including price fluctuations and geopolitical issues.

Masters emphasized the need for cooperation between companies and governments to build resilient supply chains. “Financial discipline and innovation are paramount,” he asserted.

Jeremy Weir, Chairman of Trafigura, addressed the complexity and volatility of global supply chains. He highlighted the need for increased cooperation between companies and governments to meet future mineral demands. “Long-term contracts are essential to reduce volatility,” Weir explained, “and geopolitical implications cannot be ignored.”

Bonj Galu, International Delegate for Strategic Minerals and Metals from the Office of the President of France, rounded out the discussion by highlighting France’s efforts to support the mining sector through investment funds and international cooperation. He emphasized sustainable practices and government support in attracting private investments. “Long-term contracts and partnerships are vital for developing new projects and increasing recycling capacity,” Galu remarked.

The panelists collectively addressed the risks and long-term nature of mining investments. They discussed the need for predictability and confidence in the regulatory environment to attract investments. The importance of partnerships between governments and the private sector was a recurring theme, as was the need for financial discipline, innovation, and long-term planning to meet the growing demand for minerals.

PLENARY SESSION 2: WHAT PRACTICAL STEPS CAN THE WORLD TAKE TO MANAGE COMPETITION OVER CRITICAL MINERALS?

THEME: DELIVERING INVESTMENT PARTNERSHIPS

SUMMARY:

The speakers shared their visions and strategies for harnessing the potential of critical minerals while addressing the challenges of sustainability and global competition.

As the world transitions to a more sustainable and technologically advanced future, the insights from this forum will undoubtedly play a crucial role in shaping the path forward.

H.E. BANDAR ALKHORAYEF

Minister of Industry and Mineral Resources, Saudi Arabia

"We are opening up our mining sector at a crucial time, driven by the global need for energy transition and technological advancements."

H.E. LEILA BENALI

Minister of Energy Transition and Sustainable Development, Morocco

"Morocco is uniquely positioned as a global connector, leveraging our strategic location to drive sustainable development."

THE HON. HELENIA R. MATZA

Deputy Special Presidential Coordinator for the Partnership on Global Infrastructure Investment, U.S. Department of State

"We aim to offer a better value proposition by investing in downstream projects and associated infrastructure to support economic growth in host countries."

H.E. ALEXANDRE SILVEIRA

Minister of Mines & Energy, Brazil

"Common problems can only be resolved with common solutions, as we navigate the complexities of the global energy transition, it is imperative that we foster international cooperation and strengthen global governance. Brazil is committed to promoting balanced, fair, and inclusive energy transitions that not only drive economic growth but also ensure social development and sustainability."

LORD GERRY GRIMSTONE

Chairman, Gemcorp Capital Management

"We must face the reality of competition while seeking innovative solutions and international cooperation," Grimstone stated. "The world is changing almost beyond recognition, and we must adapt to these new dynamics. The concentration of critical mineral production in a few countries poses significant challenges, but it also presents opportunities for collaboration. By working together, we can find new sources of minerals, particularly in regions like Africa, which hold vast untapped potential."

ELENI GIOKOS

Anchor and Correspondent, CNN

"Today's discussions have truly underscored the vital importance of collaboration and innovation in the mining sector. As we face the multifaceted challenges and seize the emerging opportunities of the future, our collective efforts and shared vision will be the driving force behind sustainable progress and global prosperity."

PLENARY SESSION 2: WHAT PRACTICAL STEPS CAN THE WORLD TAKE TO MANAGE COMPETITION OVER CRITICAL MINERALS?

THEME: DELIVERING INVESTMENT PARTNERSHIPS

Moderator

Eleni Giokos
Anchor and Correspondent, CNN

H.E. Bandar Alkhorayef
Minister of Industry and Mineral Resources, Saudi Arabia

H.E. Alexandre Silveira
Minister of Mines & Energy, Brazil

H.E. Leila Benali
Minister of Energy Transition and Sustainable Development, Morocco

The Hon. Helenia R. Matza
Deputy Special Presidential Coordinator for the Partnership on Global Infrastructure Investment, U.S. Department of State

Lord Gerry Grimstone
Chairman, Gemcorp Capital Management

The panel discussions delved into the intricate world of mining, energy transition, and the global competition for critical minerals.

The session highlighted several key challenges, including the need for responsible mining practices, balancing investor and state interests, and navigating the heightened global competition for critical minerals. However, it also underscored numerous opportunities, such as leveraging technological advancements to improve mining efficiency and sustainability, strengthening global partnerships, and investing in renewable energy and sustainable development.

Saudi Arabia's Mining Renaissance:

H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources, Saudi Arabia set the stage by highlighting Saudi Arabia's ambitious plans to unlock its vast mineral wealth, estimated at a staggering $2.5 trillion. He emphasized that the timing couldn't be better, with global attention on energy transition and technological advancements. Alkhorayef, shared his excitement about the country's modern mining operations, which he described as merely "scraping the surface" of their potential.

He underscored the importance of responsible mining practices, ensuring that the benefits extend beyond economic gains to social and environmental impacts. Alkhorayef, also stressed the need for competition to drive innovation and the adoption of new technologies, which would lead to safer, more productive, and energy-efficient mines. The minister's vision for Saudi Arabia's mining sector is one of comprehensive development, integrating upstream, midstream, and downstream activities to maximize value addition.

Morocco's Strategic Position:
H.E. Leila Benali, Minister of Energy Transition and Sustainable Development, Morocco brought a fresh perspective from her country, a country strategically positioned as a global connector in the reconfiguration of value chains. She highlighted Morocco's unique advantage of being interconnected with Europe and the Atlantic basin, both logistically and culturally. Benali emphasized the importance of circularity and connectivity between markets to provide minerals at the most competitive cost.

She pointed out that Morocco is not only focused on mining but also on the broader energy transition, which requires significant investments in renewable energy and grid infrastructure. Benali's vision for Morocco includes leveraging public-private partnerships and international collaborations to drive sustainable development. She also touched on the need for new business models that balance local processing with global value chain integration, ensuring that Morocco remains a key player in the global minerals market.

US Strategy on Critical Minerals:
Hon. Helenia R. Matza, Deputy Special Presidential Coordinator for the Partnership on Global Infrastructure Investment, U.S. Department of State provided insights into the US's approach to securing critical mineral supply chains. She highlighted the long-standing partnership with Greenland, which has become increasingly important in the context of national security and economic growth. The US has invested significantly in geological surveying and other activities in Greenland, recognizing its strategic importance.

She stressed the importance of a comprehensive approach that aligns foreign policy and national security interests with economic growth. This holistic approach aims to create resilient and diverse supply chains while supporting the economic development of partner countries.

Brazil's Perspective on Global Governance:
H.E. Alexandre Silveira, Minister of Mines & Energy, Brazil highlighted the importance of global governance in securing supply chains for critical minerals.

He emphasized the need for balanced, fair, and inclusive energy transitions that promote social development and sustainability.

Silveira called for strengthening international organizations and fostering dialogue to address common problems with common solutions. He highlighted Brazil's commitment to energy pluralism and the country's vast resources and public policies that support rapid advancements in energy transition.

Global Competition and Collaboration:
Lord Gerry Grimstone, Chairman, Gemcorp Capital Management provided a broader perspective on the global competition for critical minerals. He highlighted the concentration of mineral production in a few countries, which controls a significant share of the world's supply. Grimstone acknowledged the challenges posed by this concentration and the need for like-minded nations to collaborate in finding new mineral sources.

He pointed to Saudi Arabia and Africa as regions with vast untapped potential, emphasizing the importance of responsible and sustainable mining practices.

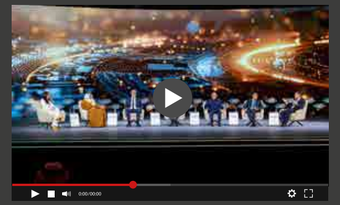
Grimstone also reflected on the changing geopolitical landscape, noting the shift from multilateralism to a more competitive environment.

PLENARY SESSION 3: WHAT ROLE CAN CAPITAL DEPLOYMENT AND INFRASTRUCTURE PLAY IN REVERSING THE GLOBAL RESOURCE DEPLETION TREND?

THEME:
DELIVERING INVESTMENT PARTNERSHIPS

SUMMARY:

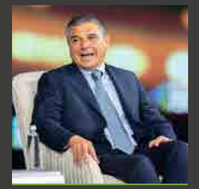
The Role of Capital Deployment and Infrastructure" painted a picture of a world striving to meet the growing demand for critical minerals through innovation, collaboration, and strategic investment. The discussions underscored the importance of systemic solutions, technological advancements, and global cooperation in securing a sustainable future for the mining industry. As the world continues to evolve, the insights and strategies shared at this roundtable will be crucial in shaping a resilient and sustainable path forward.



DUNCAN WANBLAD

Chief Executive, Anglo American

"Strategizing in the face of geopolitics and global demand is challenging. It's urgent to develop a system to provide scarce minerals and metals for the energy transition. This requires a global scale effort, involving exploration, operations management, and technology development. Good fiscal policy and political stability are crucial enablers."



LORENZO SIMONELLI

Chairman, President and Chief Executive Officer, Baker Hughes

"We see a lot of similarities between what we have done in oil and gas and the mining industry. Technology can make the industry more efficient and sustainable."

STEELE LI

Chairman and Chief Investment Officer, CMOC

"Despite the challenges, I am optimistic. We need a pragmatic discussion on satisfying the needs of the growing population and the demand for development. The investment required is significant, but these are long-term investments. We will see progress over the next four years, but continuous progress is essential for expanding towards a lower carbon economy."

H.E ENG. KARIM BADAWI

Minister of Petroleum and Mineral Resources, Arab Republic of Egypt

"Egypt's mining sector constitutes around 1% of our GDP, and we aim to increase it to 6%. To achieve this, we need to attract sustained long-term investments by making Egypt more investable in the mining sector. This involves collaboration with various ministries and revising our regulatory framework to attract global companies. We are proud to announce that we have been working hard over the last six months to get this through the parliamentary approval process."

H.E. SALEH AL-JASSER

Minister of Transport and Logistic Services, Saudi Arabia

"In Saudi Arabia, we already have a strong infrastructure to support the mining industry, including the most connected road network globally, state-of-the-art ports, and a 5,500 km rail network. Our national transport and logistics strategy is built in coordination with the Ministry of Industry and Mineral Resources to support the ambitious plans for the mining industry. We are also improving environmental friendliness and resilience in our operations."

HADLEY GAMBLE

Journalist, Al Arabiya

"In a world where the demand for essential minerals is surging, the role of capital deployment and infrastructure in addressing global resources depletion is critical."

PLENARY SESSION 3: WHAT ROLE CAN CAPITAL DEPLOYMENT AND INFRASTRUCTURE PLAY IN REVERSING THE GLOBAL RESOURCE DEPLETION TREND?

THEME: DELIVERING INVESTMENT PARTNERSHIPS

Moderator

Hadley Gamble
Journalist,
Al Arabiya

H.E. Saleh Al-Jasser
Minister of Transport and Logistic Services

H.E Eng. Karim Badawi
Petroleum and Mineral Resources, Arab Republic of Egypt

Duncan Wanblad
Chief Executive, Anglo American

Steele Li
Vice Chairman and Chief Investment Officer, CMOC

Graham Kerr
Chief Executive Officer and Managing Director, South32

Lorenzo Simonelli
Chairman, President and Chief Executive Officer, Baker Hughes

In a world where the demand for essential minerals is surging, a diverse panel of ministers and CEOs from the mining and petroleum sectors convened during the 2025 Future Minerals Forum to discuss the critical role of capital deployment and infrastructure in addressing global resources depletion.

The panel discussions, rich with insights and forward-thinking strategies, revolved around several key themes.

Supply chain and Investment Challenges
The primary issue identified was not the scarcity of minerals, but the increasing difficulty and time required to extract them. This disconnection between short-term market demands and long-term supply capabilities highlighted the need for systemic, global solutions. The volatility of short-term prices versus long-term fundamentals creates stress for investors, emphasizing the importance of balancing short-term and long-term investments to ensure a sustainable supply of minerals.

Technological Advancements
Technological advancements, particularly those borrowed from the oil and gas industry, were seen as key to improving efficiency and optimizing production. Lorenzo Seminelli, CEO of Baker Hughes, emphasized the importance of technology in making the mining industry more efficient and sustainable. Seminelli, added that the application of AI and data analytics can optimize production and recovery rates of minerals, marking a significant leap forward for the industry.

Geopolitical and Economic Factors
Geopolitical factors, including policies from the US administration, were acknowledged as significant influences on the future of the mining sector. These factors prompt companies to diversify their portfolios to mitigate risks. Additionally, the end of the commodity supercycle in China and its implications for global mineral demand were also addressed, adding another layer of complexity to the industry's future.

Regional Focus
Egypt aims to expand its mining sector, increasing its contribution to GDP from 1% to 6%. This ambitious goal requires substantial investment, regulatory reforms, and technological advancements. Collaboration between various ministries and international partners is crucial to making Egypt an attractive destination for long-term mining investments. Efforts are being made to simplify licensing processes, improve approval systems, and better market Egypt's rich mineral resources.

Saudi Arabia's robust infrastructure, including roads, ports, and rail lines, was highlighted as a model for supporting the mining industry. The importance of logistics and environmental considerations was emphasized, showcasing how strong infrastructure can facilitate industry growth and sustainability.

PANEL 1: HOW DO WE GET NATION STATES TO WORK TOGETHER TO DELIVER MINERALS ON THE SCALE REQUIRED?

THEME: LOCAL VALUE CREATION AND DEVELOPMENT

SUMMARY:

The Panel discussion underscored the necessity of global collaboration to secure supply chains and deliver critical minerals. Each country presented its unique strengths and strategies, emphasizing the importance of working together to overcome geopolitical challenges and ensure a sustainable future.

The critical role of innovation, technology transfer, and standardization in achieving these goals was highlighted, pointing towards a collaborative path forward for the critical minerals sector.

H.E. SARAH JONES

Minister for Industry, United Kingdom

"Processing and recycling are crucial for the UK's circular economy. We're committed to working together to tackle climate change."

H.E. NIK NAZMI NIK AHMAD

Minister of Natural Resources, Environment and Climate Change, Malaysia

"Malaysia is balancing trade with the US and China, aiming to process rare earths domestically for a sustainable future."

H.E. MUSADIK MALIK

Minister of Energy & Petroleum, Pakistan Transport

"Green financing is mission-critical for sustainable mining in developing regions. Let's ensure everyone can join the journey to net zero."

H.E. WILLE RYDMAN

Minister of Economic Affairs, Finland

"From mining to battery tech, Finland leads with sustainability and innovation."

H.E. KANAT SHARLAPAEV

Minister of Industry & Construction, Kazakhstan

"Kazakhstan's rich resources and strategic location make it a prime hub for critical minerals. We are committed to being reliable and sustainable"

ELENI GIOKOS

Anchor and Correspondent, CNN

"In a decoupled world, collaboration is our key to securing critical minerals and driving sustainable growth."

PANEL 1: HOW DO WE GET NATION STATES TO WORK TOGETHER TO DELIVER MINERALS ON THE SCALE REQUIRED?

THEME: LOCAL VALUE CREATION AND DEVELOPMENT

Moderator

Eleni Giokos
Anchor and Correspondent, CNN

H.E. Sarah Jones
Minister for Industry, United Kingdom

H.E. Nik Nazmi Nik Ahmad
Minister of Natural Resources, Environment and Climate Change, Malaysia

H.E. Musadik Malik
Minister of Energy & Petroleum, Pakistan Transport

H.E. Wille Rydman
Minister of Economic Affairs, Finland

H.E. Kanat Sharlapaev
Minister of Industry & Construction, Kazakhstan

In a world increasingly reliant on critical minerals, a significant roundtable discussion took place, bringing together distinguished ministers from the United Kingdom, Malaysia, Pakistan, Finland, and Kazakhstan. The focus was on the collaboration between nation states to secure supply chains and deliver essential minerals. The key theme was the importance of working together to address the challenges and opportunities in the critical minerals sector.

The discussion began with the United Kingdom's strategy. The UK is prioritizing industries to grow domestically, identifying their critical mineral needs. They are utilizing financial mechanisms such as the National Wealth Fund and UK Export Finance to attract private sector investment. Additionally, the UK is leveraging its strengths in universities and finance to work with global allies, including partnerships with Saudi Arabia on centers of excellence.

Kazakhstan's position was highlighted next. Kazakhstan boasts a vast array of minerals and a favorable jurisdiction for investment. The country has strong transportation links, including extensive railroads and access to key markets via the Middle Corridor. Significant investment in local talent, with many graduates in geology and mining, has also been a focus. Kazakhstan has been successful in attracting private investment for geological exploration, positioning itself as a top producer of copper and uranium.

Finland's approach was then discussed. Finland's clear position as a member of the EU and NATO provides geopolitical stability. The country emphasizes energy efficiency, circular economy, and sustainable mining practices. Finland has mastered the entire value chain from mining to battery technologies, supported by a strong network of universities and research organizations.

Pakistan's perspective brought attention to the electrification revolution. The transition to energy storage and electrification is driving the importance of critical minerals. However, geopolitical challenges such as the failure of globalization and the rise of trade wars, with green barriers potentially hindering developing countries, were noted. Pakistan emphasized the need for accessible green financing to support sustainable mining practices in developing regions.

Malaysia's position focused on balancing trade relationships. Malaysia has significant trade relationships with both the United States and China, aiming to maintain neutrality and cooperation. The country is making efforts to move from exporting raw materials to processing rare earths domestically, learning from experiences in the oil and gas sectors. Collaborative projects with China for technology and Australia for processing were highlighted, underscoring the importance of international cooperation.

The discussion also touched on global collaboration and challenges. There was an emphasis on bringing processing capabilities to domestic markets and enhancing recycling efforts. The geopolitical realities and the need for a balanced approach to collaboration were acknowledged. Innovation and technology transfer were deemed crucial in reducing costs and improving efficiency in the mining sector. The need for global standards and traceability in critical minerals to ensure responsible and sustainable practices was also highlighted.

PANEL 2: DE-RISKING INVESTMENT: WAYS TO DEVELOP RESILIENT MINERAL SUPPLY CHAINS IN A FRAGMENTED WORLD

THEME: LOCAL VALUE CREATION AND DEVELOPMENT

SUMMARY:

The session concluded with a call for continued investment in mining, highlighting its importance for the energy transition and technological advancements. The speakers expressed optimism about the future of mining and the potential for growth and innovation in the sector.

H.E. KHALID AL-FALIH

Minister of Investment, Saudi Arabia

"Human talent, innovation, and technology are the lifeblood of our industry," he declared, highlighting the importance of partnerships across various sectors."

H.E. SAAD ALKHALB

Chief Executive Officer, Saudi EXIM Bank

"Export credit agencies are pivotal in maintaining the stability of our supply chains. This example underscores the importance of financial support in stabilizing supply chains."

DOMINIC BARTON

Chairman, Rio Tinto

"In these turbulent times, partnerships are our strongest asset. This imbalance presents significant investment opportunities."

CATHERINE RAW

Chief Development Officer, BHP

"We must adapt to the changing landscape of competition. Despite its critical role, the mining industry is both relevant and irrelevant in today's market."

DOMINIC RAAB

Head of Global Affairs, Appian Capital Advisory

"Investing in mid-cap projects with robust teams is essential for adding value. The geopolitical landscape requires us to be agile and strategic in our investments."

HANS-PAUL BÜRKNER

former President and Chief Executive Officer, Boston Consulting Group

"We must think regionally to build resilient supply chains. Effective partnerships between countries and companies are essential to cover different parts of the value chain and engage with society to ensure acceptance and sustainability,."

ROHITESH DHAWAN

Rohitesh Dhawan, President and Chief Executive Officer, International Council on Mining and Metals (ICMM)

"Today's discussion has shown that collaboration and innovation are key to overcoming the challenges in the mineral supply chain. The power of working together to shape a sustainable future cannot be overstated."

PANEL 2: DE-RISKING INVESTMENT: WAYS TO DEVELOP RESILIENT MINERAL SUPPLY CHAINS IN A FRAGMENTED WORLD

THEME: LOCAL VALUE CREATION AND DEVELOPMENT

Moderator

Rohitesh Dhawan
President and Chief Executive Officer, International Council on Mining and Metals (ICMM)

H.E. Khalid Al-Falih
Minister of Investment, Saudi Arabia

H.E. Saad AlKhalb
Chief Executive Officer, Saudi EXIM Bank

Dominic Barton
Chairman, Rio Tinto

Catherine Raw
Chief Development Officer, BHP

Dominic Raab
Head of Global Affairs, Appian Capital Advisory

Hans-Paul Bürkner
former President and Chief Executive Officer, Boston Consulting Group

The panel discussion brought together global leaders and industry experts to explore strategies for increasing investment in the mineral supply chain. The conversation covered the current operating environment, challenges, opportunities, and the importance of partnerships in driving the sector forward.

Talks underscored the importance of collaboration, innovation, and strategic partnerships in addressing the challenges and opportunities in the mineral supply chain.

By leveraging technology, regional ecosystems, and agile investment strategies, the industry can navigate the complexities of the global market and meet the growing demand for critical materials.

The panel discussion began with a sense of urgency and optimism. H.E. Khalid Al-Falih, Minister of Investment, Saudi Arabia set the tone by emphasizing the need for collaboration. According to Al-Falih, he highlighted that the mining industry is no stranger to challenges.

From the depletion of easily accessible resources to ecological restrictions and geopolitical tensions, the hurdles are significant. Yet, "these challenges also present opportunities for innovation and sustainable practices," he pointed out.

H.E. Saad AlKhalb, Chief Executive Officer, Saudi EXIM Bank, shed light on the crucial role of export credit agencies (ECAs). "ECAs are the unsung heroes of the supply chain," he said. He shared a compelling story of how an ECA provided a $150 million revolving credit facility during a fertilizer shortage, ensuring the supply to 25 African countries. This example underscored the importance of financial support in stabilizing supply chains.

Dominic Barton, Chairman, Rio Tinto, a self-proclaimed "frightened optimist," brought a unique perspective to the discussion. He acknowledged the complexities of the current environment but remained hopeful. "Partnerships with governments, suppliers, competitors, and local communities are our best bet to manage risks and seize opportunities," he asserted. Despite the challenges, Dominic saw a silver lining in the supply-demand imbalance for critical materials needed for the energy transition.

During the panel discission, Hans-Paul Bürkner, former President and Chief Executive Officer, Boston Consulting Group introduced the idea of regionalizing supply chains to mitigate risks. "Imagine a Middle East-Africa hub for mineral extraction and processing," he suggested. This vision of creating regional ecosystems resonated with the audience, highlighting the need for effective partnerships between countries and companies to ensure sustainability.

Dominic Raab, Head of Global Affairs, Appian Capital Advisory spoke passionately about the need for substantial investment in critical minerals and rare earths. "We need trillions of dollars in investment, and mid-cap investments with strong in-house teams are key to adding value to assets," he emphasized. He also touched on the geopolitical considerations, stressing the importance of agility in partnerships and investments, particularly in regions like Indonesia, Brazil, and Saudi Arabia.

Catherine Raw, Chief Development Officer, BHP brought the discussion full circle by addressing the evolving definition of competitors in the mining industry. "We must remain alert and open-minded," she advised. She pointed out that the industry is both relevant and irrelevant in today's market, with the publicly listed mining sector valued at $1.2 trillion compared to the top five S&P 500 companies at $15 trillion.

Finally, the session highlighted the critical role of the mining industry in the global economy and the need to raise its profile in civic society.

It emphasized the increasing complexity of the industry due to the growing number of stakeholders, including communities, shareholders, NGOs, and governments. The speakers showcased examples of successful collaborations, such as BHP's joint venture in Argentina and Rio Tinto's collaboration in Canada, demonstrating how partnerships can de-risk projects and ensure long-term investments.

MAJOR ANNOUNCEMENT

THEME:
LOCAL VALUE CREATION AND DEVELOPMENT

SUMMARY:

The announcements underscored Saudi Arabia's commitment to transforming its mining sector and leveraging its mineral resources to achieve Vision 2030 goals. The breaking news made by key industry leaders highlighted significant investments and strategic partnerships aimed at positioning Saudi Arabia as a global leader in mineral processing and transition metals.

H.E. KHALID AL-MUDAIFER

Vice-Minister for Mining Affairs, Ministry of Industry and Mineral Resources

"Saudi Arabia has transformed from a nation of potential to a global mineral processing hub under Vision 2030."

BOB WILT

Chief Executive Officer, Ma'aden

"Our exploration program has revealed significant gold discoveries, and we are committed to attracting more investment into the Arabian Shield."

ABDULAZIZ ALAMIR

Chief Executive Officer, Saudi Iron & Steel Com (HADEED)

"Hadeed is focusing on horizontal and vertical growth, with investments up to $25 billion Saudi Riyals in value-added steel products."

NASIR K. AL-NAIMI

President of Upstream, Aramco

"Our joint venture with Ma'aden will unlock Saudi Arabia's high-value mineral resources and position us as a major transition metal producer globally."

XIAO YANG

Chief Procurement and Marketing Officer, Bao Steel

"We are partnering with Aramco to build a state-of-the-art steel manufacturing facility, aiming to produce 1.5 million tons of steel per year with the lowest carbon footprint in the world"

DAVID EADES

Journalist, Former BBC News

"This MoU marks a pivotal moment, combining the strengths of Ma'aden and Aramco to unlock Saudi Arabia's mineral wealth. It's not just a partnership; it's a leap towards a sustainable, mineral-rich future that will make headlines worldwide."

MAJOR ANNOUNCEMENT

THEME:
LOCAL VALUE CREATION AND DEVELOPMENT

Moderator

David Eades
Journalist, Former BBC News

H.E. Khalid Al-Mudaifer
Vice-Minister for Mining Affairs, Ministry of Industry and Mineral Resources

Nasir K. Al-Naimi
President of Upstream, Aramco

Bob Wilt
Chief Executive Officer, Ma'aden

Abdulaziz AlAmir
Chief Executive Officer, Saudi Iron & Steel Com (HADEED)

Xiao Yang
Chief Procurement and Marketing Officer, Bao Steel

Ma'aden and Aramco signed a Memorandum of Understanding (MoU) to establish a joint venture aimed at exploring and extracting transition minerals across Saudi Arabia. This collaboration combines Ma'aden's mining expertise with Aramco's geological data and infrastructure, aiming to unlock high-value mineral resources and support Saudi Arabia's goal of becoming a major transition metal producer on the global stage.

This significant announcement which is the signature of Memorandum of Understanding (MoU) between highlighted the country's ambitious journey towards becoming a global mineral processing hub under the Vision 2030 framework. The discussion revolved around the transformation of Saudi Arabia's mining sector, showcasing the progress made and future.

KEYNOTE ADDRESS: IS THE ENERGY TRANSITION SLOWING DOWN IN MAJOR MARKETS? WHAT IS THE IMPACT ON MINERAL DEMAND GROWTH?

THEME: LOCAL VALUE CREATION AND DEVELOPMENT

H.R.H. Prince Abdulaziz bin Salman Al Saud
Minister of Energy, Saudi Arabia

H.R.H. Prince Abdulaziz bin Salman Al Saud, Minister of Energy, Saudi Arabia delivered a keynote address, highlighting the challenges and opportunities in the sector.

Prince Abdulaziz emphasized the importance of a cooperative approach among government agencies, corporate entities, and state-owned enterprises to address energy security challenges. He noted the significant demand for minerals required for renewable energy technologies, such as solar, wind, batteries, and nuclear power.

"Energy security, affordability, and sustainability depend on urgent, collective, and inclusive efforts to address critical mineral challenges," he stated.

The environmental impact of mining, including emissions and water contamination, was a major topic of his address. Prince Abdulaziz pointed out the geographical concentration of mineral resources and the challenges associated with extraction and processing. He also highlighted the global race to secure critical minerals, which could lead to increased costs and monopolistic practices.

Prince Abdulaziz during his speech declared that Saudi Arabia is taking significant steps to localize the production of renewable energy components and reduce reliance on imported minerals. The establishment of "Manara" aims to source necessary resources and ensure a sustainable supply chain. Prince Abdulaziz reiterated the country's commitment to producing and utilizing its own resources to meet energy demands.

"The forum underscored the need for collaboration between governments, corporations, and international partners to develop sustainable mining practices," Prince Abdulaziz said. "Investing in research and development to find innovative solutions for reducing the environmental impact of mining was also highlighted as a key opportunity," His Royal Highness added.

During the speech, Prince Abdulaziz highlighted that Saudia Arabia Energy Strategy aims at promoting the localization of renewable energy and that this component of the production process is seen as a crucial step to enhance energy security. Developing a comprehensive list of required minerals and identifying potential sources within Saudi Arabia and abroad is part of this strategy.

Prince Abdulaziz concluded his speech calling the mining industry to implementing responsible mining practices to minimize emissions and environmental damage.

He highlighted that the forum provided a platform for meaningful discussions on the future of energy security and also explored alternative energy sources and technologies to reduce dependence on fossil fuels.

"We invite you to be part of our own responsible way of attending to a real issue, not walking blindly into a crisis that we knew ahead of time we could have mitigated," Prince Abdulaziz declared.

"Energy security, affordability, and sustainability depend on urgent, collective, and inclusive efforts to address critical mineral challenges"

– H.R.H. Prince Abdulaziz bin Salman Al Saud, Minister of Energy, Saudi Arabia

KEYNOTE: ROBERT FRIEDLAND

THEME:
LOCAL VALUE CREATION AND DEVELOPMENT

Robert Friedland
Founder, Ivanhoe Mines, Ivanhoe Electric and I-Pulse

The 2025 Future Minerals Forum hosted an inspiring session led by Robert Friedland the founder of Ivanhoe Mines, Ivanhoe Electric and I-Pulse. Known for his innovative thinking in the mining industry, Friedland's presentation was a compelling call to action for global cooperation and technological advancement.

Friedland began by reminding the audience of our shared existence on a small planet, emphasizing the need for unity in addressing global challenges. He highlighted significant events such as the Russian invasion of Ukraine and ongoing tensions in the Middle East, underscoring the interconnectedness of our world.

Central to Friedland's message was the critical role of Saudi Arabia in maintaining global energy stability. He discussed the increasing demand for energy driven by advancements in artificial intelligence and military technology, stressing the importance of critical raw materials for both military and energy transitions.

"There's no need to fight over energy," Friedland asserted, advocating for a collaborative approach to resource management.

Technological Innovations
Friedland introduced several groundbreaking technologies developed by Ivanhoe Electric. The typhoon technology, a powerful geophysical surveying platform, promises to revolutionize the discovery of critical metals. Additionally, pulse power technology offers a more efficient method of mining, potentially reducing energy consumption by up to 80%. Friedland also highlighted the potential of geothermal energy as a sustainable and abundant energy source, capable of providing green energy on a massive scale.

Africa's Role
Africa's vast mineral resources were a focus area of Friedland's presentation. He emphasized the continent's crucial role in the global energy transition and the need for sustainable mining practices. "It's Africa where the metals are most readily obtainable," Friedland noted, calling for increased investment and collaboration in African mining projects.

Friedland outlined several opportunities for collaboration with Saudi Arabia, including leveraging advanced technologies for mineral exploration and investing in high-grade iron ore deposits in Guinea. He also highlighted the potential of geothermal energy as a green and sustainable energy source, urging the Kingdom to play a leading role in this transformative effort.

Session summary
In his closing remarks, Friedland called for global cooperation and innovation to address the energy and resource challenges facing humanity. He expressed optimism about the future, emphasizing the role of young people in driving positive change. "We all live on this little planet together," he said, "and it's up to us to ensure a sustainable and prosperous future for all."

"Innovation is not just about creating new technologies; it's about rethinking our approach to the world's challenges. By leveraging advanced technologies and fostering global cooperation, we can build a sustainable future for all"

– Robert Friedland, Founder, Ivanhoe Mines, Ivanhoe Electric and I-Pulse

PLENARY SESSION 4: ARE WE WITNESSING THE DAWN OF A GOLDEN AGE FOR MINERALS IN LATIN AMERICA?

THEME: LOCAL VALUE CREATION AND DEVELOPMENT

SUMMARY:

The insights shared during this session underscore the importance of collaboration, innovation, and strategic planning in unlocking the full potential of Latin America's mineral resources. As the world moves towards a more sustainable future, the region's role in the global mining industry is set to become increasingly significant.

H.E. JORGE MONTERO

Cornejo, Minister of Energy & Mines, Peru

"Latin America needs more cooperation because all those sites of mining or natural resources should be contributing to development in our countries,"

MÁXIMO PACHECO

Chairman, Codelco

"Latin America is a place of wonderful opportunity for metals and mining investments and has been for some decades."

TRISTAN PASCALL

Chief Executive Officer, First Quantum Minerals

"You need a good commodity price backdrop, your social license, and a host nation that wants to see your project move forward."

ADAM LUNDIN

Chairman, Lundin Mining Corporation

"Forming strong partnerships and joint ventures, like our recent collaboration with BHP, is crucial for navigating the complexities and maximizing the opportunities in the mining sector."

PIERRE CHENARD

Chief Executive Officer, Manara Minerals

"Investors need to see projects de-risked and understand the real issues to make informed decisions."

ROGERIO NOGUEIRA

Interim Executive Vice President, Iron Ore Solutions, Vale

"Latin America will play a very important role in maintaining the supply of critical commodities to the world."

PLENARY SESSION 4: ARE WE WITNESSING THE DAWN OF A GOLDEN AGE FOR MINERALS IN LATIN AMERICA?

THEME: LOCAL VALUE CREATION AND DEVELOPMENT

Moderator

Dr. Kwasi Ampofo
Principal Head of Metals and Mining, BloombergNE

H.E. Jorge Montero Cornejo
Minister of Energy & Mines, Peru

Máximo Pacheco
Chairman, Codelco

Tristan Pascall
Chief Executive Officer, First Quantum Minerals

Adam Lundin
Chairman, Lundin Mining Corporation

Pierre Chenard
Chief Executive Officer, Manara Minerals

Rogerio Nogueira
Interim Executive Vice President, Iron Ore Solutions, Vale

As the world pivots towards sustainable energy and technological advancements, Latin America stands on the brink of a transformative era in the mining sector. This panel discussion, "The Dawn of a Golden Age for Minerals in Latin America," brought together industry leaders to explore the region's potential, challenges, and opportunities. The insights shared by the distinguished panelists painted a vivid picture of a region poised for growth, provided it navigates the complexities of the modern mining landscape.

The session kicked off with a thought-provoking question: Are we witnessing a golden age for minerals in Latin America? H.E. Jorge Montero Cornejo the Minister of Energy & Mines for Peru emphasized the need for cooperation among Latin American countries, improvements in legal frameworks, and cost reduction through renewable energy, particularly solar power. "Latin America needs more cooperation because all those sites of mining or natural resources should be contributing to development in our countries," he stated.

Máximo Pacheco, Chairman of Codelco echoed this sentiment, highlighting the region's vast opportunities for mining investments. "Latin America is a place of wonderful opportunity for metals and mining investments and has been for some decades," he remarked. The optimism was palpable, with panelists agreeing that the region's rich mineral resources could drive significant economic growth.

Despite the promising outlook, the panelists did not shy away from discussing the challenges that lie ahead. Rogerio Nogueira, Interim Executive Vice President of Iron Ore Solutions at Vale pointed out Latin America's significant role in global mineral production and the need to leverage this expertise for decarbonization efforts. He noted that the region accounts for substantial percentages of global production in iron ore, copper, lithium, and niobium.

Pacheco discussed the importance of innovation and new technologies in mining to address declining ore grades and environmental concerns. He mentioned Codelco's efforts in robotics, artificial intelligence, and business analytics. "Innovation and new technologies are essential to address environmental concerns and declining ore grades," he said.

Tristan Pascall, Chief Executive Officer at First Quantum Minerals, highlighted the need for flexibility in project design and the importance of having skilled people in the industry. He stressed that managing risk and reducing costs are crucial in a high-cost capital environment. "You need a good commodity price backdrop, your social license, and a host nation that wants to see your project move forward," he explained.

Strategic Partnerships and Investments
The discussion also delved into the importance of strategic partnerships and investments. Adam Lundin, Chairman at Lundin Mining Corporation, shared insights on forming joint ventures, specifically mentioning a recent JV with BHP. He emphasized the importance of strong relationships and collaboration. "The potential in Argentina is very exciting and wouldn't mind living in San Juan," he quipped.

Pierre Chenard, Chief Executive Officer of Manara Minerals discussed the challenges of attracting investment, including the need for clear communication and risk management. He noted that large upfront capital requirements and complex projects make investors cautious. "Investors need to see projects de-risked and understand the real issues to make informed decisions," he pointed out.

Regulatory Frameworks and Community Engagement

Permitting and licensing were identified as critical factors in developing successful mining projects. Cornejo and Nogueira emphasized the importance of a clear regulatory framework and comprehensive planning to overcome these challenges. They highlighted the need for stability, transparency, and efficiency in the legal and regulatory environment.

Cornejo also stressed the importance of community engagement and sustainability. "We must embark on projects that the whole region can benefit from, and the private companies should remain committed to these projects," he said. The panelists agreed that ensuring community engagement and social license to operate are essential for long-term success.

As the session drew to a close, the panelists shared their thoughts on the future of mining in Latin America. The consensus was clear: the region holds immense potential for a golden age in mining, provided it navigates the challenges with cooperation, innovation, and strategic investments.

PLENARY SESSION 5:
WHY DO GREEN METALS STRUGGLE TO TAKE OFF?

THEME:
NEW VOICES FROM THE DOWNSTREAM

SUMMARY:

The panel discussion highlighted the complexities and challenges of transitioning to green metals. Despite these hurdles, industry leaders identified several opportunities for progress. Key areas of focus include technological innovation in low-carbon metal production, collaboration between governments and industries, and market development. Expanding the market for low-carbon metals and implementing energy efficiency and waste management initiatives can drive the transition forward, paving the way for a more sustainable future.

WILLIAM OPLINGER

President & Chief Executive Officer, Alcoa

"We need to ensure a competitive aluminium industry in the U.S. that provides our downstream customers with metal at a competitive price."

JOE KAESER

Chairman, Supervisory Board, Siemens Energy and Daimler Trucks

"We must look at green and sustainability efforts as economically feasible. If we only depend on governmental subsidies, we cannot build a long-term energy agenda."

H.E. KHALID AL-SALEM

Chairman, Royal Commission of Jubail and Yanbu

"In Saudi Arabia, we are looking to collaborate with everyone to resolve challenges and enable green metal manufacturing through initiatives like green hydrogen and carbon capture."

NAUSHAD ANSARI

Chief Executive Officer, Green Steel Arabia

"The technology exists to achieve low-carbon steel production, but we need to make hydrogen available at prices that can make a meaningful change in the industry."

DR. OTHMAN AL-MALKI

Vice President, Growth, Hadeed

""Achieving green targets is not going to be easy and will come at a cost. We must include all stakeholders, from producers to end-users and policymakers, to optimize processes and reduce expenses."

HADLEY GAMBLE

Journalist, Al Arabiya

"The transition to green metals is fraught with complexities, but through collaboration and innovation, we can pave the way for a more sustainable and environmentally friendly future."

PLENARY SESSION 5:
WHY DO GREEN METALS STRUGGLE TO TAKE OFF?

THEME:
NEW VOICES FROM THE DOWNSTREAM

Moderator

Hadley Gamble
Journalist,
Al Arabiya

Joe Kaeser
Chairman,
Supervisory
Board, Siemens
Energy and
Daimler Trucks

**William
Oplinger**
President &
Chief Executive
Officer, Alcoa

Naushad Ansari
Chief Executive
Officer, Green
Steel Arabia

**H.E. Khalid
Al-Salem**
Chairman, Royal
Commission
of Jubail
and Yanbu

**Dr. Othman
Al-Malki**
Vice President,
Growth, Hadeed

In a world increasingly focused on sustainability and reducing carbon footprints, the transition to green metals is a critical topic. However, despite the urgency and the technological advancements, green metals continue to face significant challenges. This panel discussion at the 2025 Future Minerals Forum shed light on these issues, bringing together industry leaders and experts to explore why green metals struggle to take off and what can be done to overcome these hurdles.

The discussion kicked off with a focus on the geopolitical landscape, particularly the impact of U.S. policies under President Donald Trump. William Oplinger, the President and Chief Executive Officer of Alcoa highlighted the complexities of tariff regimes and their disruptive effects on trade flows. He pointed out that the U.S. aluminum industry is structurally short on aluminum, and changes in tariff policies could significantly alter trade dynamics, potentially driving up metal prices and causing substantial shifts in supply chains.

As for Joe Kaeser, the Chairman, Supervisory Board of Siemens Energy and Daimler Trucks emphasized the importance of balancing affordability, sustainability, and security of supply in energy policies. He warned against relying solely on government subsidies, advocating instead for economically feasible green technologies that can sustain long-term energy agendas.

One of the central themes of the panel was the lack of clear, agreed-upon definitions for green metals. Naushad Ansari, the Chief Executive Officer of Green Steel Arabia explained that different regions and organizations have varying standards for what constitutes green steel. This lack of consensus creates confusion and hinders the development and adoption of green technologies.

Technological advancements are crucial for the transition to green metals, but they come with their own set of challenges. Ansari noted that while the technology for low-carbon steel production exists, the availability and cost of hydrogen—a key component in green steel manufacturing—remain significant barriers. The production of green hydrogen requires large amounts of green electricity, adding another layer of complexity and cost.

The economic feasibility of green metals was a recurring topic. H.E. Khalid Al-Salem, the Chairman of Royal Commission of Jubail and Yanbu discussed Saudi Arabia's collaborative approach to addressing these challenges. He highlighted initiatives in green hydrogen, carbon capture, and waste recycling as part of the Kingdom's efforts to support sustainable metal production.

Al-Salem also pointed out the importance of including all stakeholders in the transition to green metals, from producers to end-users and policymakers. He stressed that achieving green targets will come at a cost, and the industry must work together to optimize processes and reduce expenses.

The panelists also explored the global market dynamics, particularly the role of China. With China being the largest emitter of CO2 and a major player in the metals market, its policies and economic activities have a significant impact on the global transition to green metals. William Oplinger, the President and Chief Executive Officer of Alcoa noted that China's commitment to capping aluminium production at 45 million metric tons and its high carbon emissions present both challenges and opportunities for the industry.

Joe Kaeser, the Chairman and Supervisory Board of Siemens Energy and Daimler Trucks emphasized the need for a global approach to carbon pricing and the importance of gradual, realistic steps towards reducing emissions. He warned against pushing China too hard, advocating instead for a collaborative and practical approach that considers the entire ecosystem of the energy and metal supply chain.

Despite the challenges, the panelists identified several opportunities for advancing green metals. Technological innovation, particularly in low-carbon and ultra-low-carbon aluminum and steel production, is a key area of focus. Collaboration between governments, industries, and technology developers is essential to create supportive policies and standards.

Market development is another critical area. Expanding the market for low-carbon metals and creating incentives for producers to invest in green technologies can drive the transition forward. Additionally, implementing energy efficiency programs and waste management initiatives can help reduce the environmental impact of metal production.

GREAT DEBATE 1:
MINERALS-LED DEVELOPMENT: REALITY OR MYTH?

SUMMARY:

The debate underscored that while minerals development presents significant opportunities for economic and social progress, it also poses substantial challenges. The key to unlocking the full potential of minerals development lies in responsible practices, inclusive stakeholder engagement, and robust governance frameworks.

MARK CUTIFANI

Chairman, Vale Base Metals

"Minerals support everything, including the sustainability of the globe and our way of life."

MOATH AL RAWI

Chief Executive Officer & Member of the Board of Directors, ARGAS

"If you want to play, you need to understand that there are compromises, and it will come at a cost."

FLORENCE DRUMMOND

Executive Director, Development Partner Institute

"If we have done it for so long, why haven't we gotten it right yet?"

THEME:
NEW VOICES FROM THE DOWNSTREAM

JOHN MORRISON

Chief Executive Officer, Institute for Human Rights & Business (IHRB)

"Development is a human right; it's the right of every person to advance their economies and livelihoods."

MARK BRISTOW

President & Chief Executive Officer, Barrick Gold Corporation

"We need to embrace mining and have a much more transparent conversation about its benefits."

MARCELO PAIVA

Co-Chairperson & Director, Sigma Lithium

"Development is not a myth; it can be clearly demonstrated by the prosperity brought to regions by the mining sector."

DAVID EADES

Journalist, Former BBC News

"As we navigate the complexities of minerals development, it's crucial to foster a dialogue that bridges economic ambitions with sustainable practices."

GREAT DEBATE 1:
MINERALS-LED DEVELOPMENT: REALITY OR MYTH?

THEME:
NEW VOICES FROM THE DOWNSTREAM

Moderator

David Eades
Journalist, Former BBC News

Mark Cutifani
Chairman, Vale Base Metals

John Morrison
Chief Executive Officer, Institute for Human Rights & Business (IHRB)

Florence Drummond
Executive Director, Development Partner Institute

Mark Bristow
President & Chief Executive Officer, Barrick Gold Corporation

Marcelo Paiva
Co-Chairperson & Director, Sigma Lithium

Moath Al Rawi
Chief Executive Officer & Member of the Board of Directors, ARGAS

In a compelling panel discussion titled "The Great Debate," six distinguished speakers gathered to explore the critical question of whether minerals development is a myth or a reality. The debate, delved into the multifaceted impact of minerals development on resource-rich countries, local communities, women, indigenous communities, and the green transition.

Economic and Social Impact of Minerals Development.

The panelists collectively agreed on the significant role of minerals in supporting industrialization and economic growth. Mark Cutifani, the Chairman of Vale Base Metals emphasized the critical importance of minerals, stating, "Minerals support everything, including the sustainability of the globe and our way of life."

He argued that minerals have been essential not only in the past but will continue to be crucial in the future, particularly in the context of the green transition.

Moath Al Rawi, the Chief Executive Officer and Member of the Board of Directors at ARGAS highlighted the challenges and compromises inherent in minerals development. He noted, "If you want to play, you need to understand that there are compromises, and it will come at a cost." Al Rawi stressed the need for sustainable long-term investments and better regulation to avoid market volatility and ensure that development benefits all stakeholders.

Florence Drummond, the Executive Director of Development Partner Institute provided a contrasting perspective, arguing that minerals development remains a myth for many stakeholders due to ongoing challenges. She pointed out the persistent issues of sustainable agreement-making, investment risks, and talent shortages in the mining industry. Drummond questioned, "If we have done it for so long, why haven't we gotten it right yet?"

Challenges and Opportunities in Minerals Development
Environmental concerns and the need for sustainable mining practices were central to the debate. The panelists discussed the importance of governance, transparency, and traceability in the mining sector.

John Morrison, Chief Executive Officer, Institute for Human Rights & Business emphasized the need for a rules-based approach to ensure that mining benefits all stakeholders. He stated, "Development is a human right; it's the right of every person to advance their economies and livelihoods."

Morrison also highlighted the risks associated with rapid spikes in demand for transition minerals and the lack of transformation in global value chains. He called for better alignment and incentives to promote sustainable mining practices, stressing the importance of including the most vulnerable people, such as indigenous communities and artisanal miners, in the development process.

Mark Bristow, President and Chief Executive Officer at Barrick Gold Corporation argued that mining is essential for global development and industrialization. He stressed the need for a more transparent and inclusive approach to mining, saying, "We need to embrace mining and have a much more transparent conversation about its benefits."

Bristow also pointed out the exclusion of the developing world by the developed world, emphasizing the need for a more equitable distribution of benefits from minerals development.

The Role of Stakeholders
The responsibility of mining companies, governments, and investors in promoting sustainable development was a recurring theme. **Marcelo Paiva, Co-Chairperson & Director at Sigma Lithium** provided examples of successful minerals development in Brazil, emphasizing the importance of low-cost operations and renewable energy. He highlighted the need for traceability and transparency in the mining sector, noting, "Development is not a myth; it can be clearly demonstrated by the prosperity brought to regions by the mining sector."

The panelists discussed the need for better communication and collaboration among all stakeholders. Drummond raised the issue of power dynamics and the importance of creating awareness and education around these dynamics as part of the investment strategy. She questioned, "Whose responsibility is it to create that awareness and is it part of the investment strategy?"

PLENARY SESSION 6:
IS AFRICA MISSING AN OPPORTUNITY TO DEVELOP?

THEME:
A FAST-CHANGING CRITICAL MINERALS LANDSCAPE

SUMMARY:

The discussion emphasized the potential for Africa to leverage its resources for sustainable development and industrialization. It also highlighted the immense opportunities and challenges in Africa's critical minerals sector.

H.E. PAUL KABUSWE

Minister of Mines and Minerals Development, Zambia

"We must emphasize win-win partnerships that are mutually respectful and focus on value addition to benefit our people."

KIMBERLY HARRINGTON

Deputy Assistant Secretary of State for Energy Diplomacy, US Department of State

"We are hugely optimistic about the opportunities to create a critical minerals ecosystem that gives back to the community and meets global energy security goals."

FRANK GIUSTRA

President and Chief Executive Officer, Fiore Group of Companies

"The opportunity here is to develop Africa in a conflict-free manner and lift the African people up through responsible investment."

AGESAN RAJAGOPAUL

Partner, McKinsey

"We need to focus on competitiveness and infrastructure to unlock Africa's potential and ensure successful long-term partnerships."

ELENI GIOKOS

Anchor and Correspondent, CNN

"Today's discussion has highlighted the immense opportunities and challenges in Africa's critical minerals sector. With the right partnerships, investments, and strategies, Africa can leverage its resources for sustainable development and industrialization."

PLENARY SESSION 6:
IS AFRICA MISSING AN OPPORTUNITY TO DEVELOP?

THEME:
A FAST-CHANGING CRITICAL MINERALS LANDSCAPE

Moderator

Eleni Giokos
Anchor and Correspondent, CNN

H.E. Paul Kabuswe
Minister of Mines and Minerals Development, Zambia

Kimberly Harrington
Deputy Assistant Secretary of State for Energy Diplomacy, US Department of State

Frank Giustra
President and Chief Executive Officer, Fiore Group of Companies

Agesan Rajagopaul
Partner, McKinsey

During this panel discussion, industry leaders and government officials gathered to explore the immense opportunities and challenges in Africa's critical minerals sector. The conversation highlighted the potential for Africa to leverage its vast mineral resources for development, the importance of fair and mutually beneficial partnerships, and the need for industrialization and value addition within the continent.

Africa's Development Opportunities
Africa is endowed with an abundance of mineral resources, presenting a unique opportunity for development. H.E. Paul Kabuswe, Minister of Mines and Minerals Development in Zambia emphasized the need for win-win partnerships and value addition. "We must emphasize win-win partnerships that are mutually respectful and focus on value addition to benefit our people," he stated.

Global Competition and Investment
The competitive landscape for Africa's resources is intense, with China, Russia, and other countries vying for a foothold. Kimberly Harrington, Deputy Assistant Secretary of State for Energy Diplomacy at the US Department of State expressed optimism about the opportunities for creating a critical minerals ecosystem in Africa. "We are hugely optimistic about the opportunities to create a critical minerals ecosystem that gives back to the community and meets global energy security goals," she said.

Challenges and Risks
Political instability and conflicts in regions like the Sahel and Sudan pose significant challenges to investment. Frank Giustra, President and Chief Executive Officer at Fiore Group of Companies discussed the risks of political instability and the need for responsible external actors. "The opportunity here is to develop Africa in a conflict-free manner and lift the African people up through responsible investment," he noted.

Strategic Partnerships and Deals
Successful long-term deals, such as Botswana's diamond industry and South Africa's platinum sector, serve as models for future partnerships. Agesan Rajagopaul, Partner at McKinsey highlighted the importance of competitiveness and infrastructure in unlocking Africa's potential. "We need to focus on competitiveness and infrastructure to unlock Africa's potential and ensure successful long-term partnerships," he explained.

Policy Continuity and Investment Security
Maintaining stable and predictable policies is crucial for attracting and retaining investment. Zambia's commitment to providing a stable investment environment was emphasized by Minister Kabuswe. "We have looked at best practices and benchmarked to ensure that when someone invests in mining, they feel safe and confident that the goalposts won't be shifted," he assured.

Opportunities Identified
The panel identified several key opportunities for Africa's critical minerals sector:

- Industrialization: Leveraging mineral wealth to create jobs and develop local industries.
- Regional Cooperation: Developing regional clusters and infrastructure to support heavy processing and export.
- Sustainable Investment: Attracting investments that adhere to ESG standards and benefit local communities.
- Energy Development: Investing in diverse energy sources to support industrial growth and reduce energy poverty.
- Professionalizing the Sector: Initiatives like Ghana's gold refinery to consolidate artisanal and small-scale mining.

PLENARY SESSIONS DAY 2

16 January 2025

Impact Zone

INAUGURATION OF FMF YOUNG PROFESSIONALS ASSOCIATION

H.E. Bandar Alkhorayef
Minister of Industry and Mineral Resources, Saudi Arabia

On the second day of the report, H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources, Saudi Arabia delivered opening remarks that underscored the nation's dedication to its people and the mining sector. The minister's speech highlighted three key areas of focus: human capital, Vision 2030, and the development of a robust mining ecosystem.

Human Capital: The True Asset

The minister began by emphasizing that the most important asset of Saudi Arabia is its people. Despite the country's abundance of natural resources such as oil, gas, and minerals, it is the citizens who are considered the true wealth of the nation. The minister expressed pride in the country's focus on its most precious assets and their future.

Saudi Arabia Vision 2030: Economic and Sectoral Development

In alignment with Saudi Arabia Vision 2030, the minister stressed the importance of ensuring that all economic and sectoral developments have a positive impact on the people. This vision is designed to create opportunities for investment, entrepreneurship, and quality job opportunities. The mining sector is seen as a critical area for development, with a focus on how it can benefit the youth of Saudi Arabia.

Building a Robust Mining Ecosystem

The minister discussed the efforts to build the best and most robust mining ecosystem in Saudi Arabia. By looking at successful models from around the world, it became clear that involving young professionals is key to completing and enhancing this ecosystem. The launch of the Young Mining Professionals of Saudi Arabia initiative was highlighted as a significant step in this direction.

Encouragement to the Youth

H.E. Bandar Alkhorayef, the Minister of Industry and Mineral Resources of Saudi Arabia concluded by encouraging young mining professionals to actively participate and bring forward their ideas. Emphasizing that every idea is valuable, the minister urged the youth to take advantage of the opportunities offered by the ministry and the larger sector.

The minister expressed trust in the youth to drive the future of the mining sector in Saudi Arabia and beyond.

Session summary

The opening remarks of H.E. Bandar Alkhorayef, the Minister of Industry and Mineral Resources of Saudi Arabia reflect a strong commitment to human capital and the development of a sustainable and innovative mining sector, positioning Saudi Arabia as a leader in the global mining industry.

INAUGURATION OF FMF YOUNG PROFESSIONALS ASSOCIATION

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

H.E. Bandar Alkhorayef
Minister of Industry and Mineral Resources, Saudi Arabia

The event celebrated a significant milestone in the mining sector with the exchange of agreements. Key dignitaries, including the Vice Minister of Mining Affairs of the Industry and Mineral Resources Ministry in Saudi Arabia, the Deputy Minister of the Industry and Mineral Resources Ministry in Saudi Arabia and the Assistant Minister were welcomed on stage alongside Bob Wils, the CEO of Ma'aden.

The event highlighted the contributions of various individuals who were involved in the agreement exchange.

The focus then shifted to the students participating in the Young Mining Professionals program, emphasizing their importance and celebrating their achievements with a warm round of applause.

"Today, we not only celebrate the exchange of agreements but also the bright future of our young mining professionals, who are the true pioneers of tomorrow's mining industry"

– H.E. Bandar Alkhorayef, Minister of Industry and Mineral Resources

PLENARY SESSION 7: DEVELOPING THE NEXT GENERATION OF WORKERS FOR THE GLOBAL FUTURE MINERALS INDUSTRY

THEME: MINERALS' CONTRIBUTION TO SOCIETY

Moderator

Hadley Gamble
Journalist,
Al Arabiya

Dr Muhammad Al-Sagaff
President, King Fahd University of Petroleum and Minerals (KFUPM)

The 2025 Future Minerals Forum hosted a compelling session featuring Dr Muhammad Al-Sagaff, President, King Fahd University of Petroleum and Minerals (KFUPM).

The discussion, delved into the ambitious strategies and transformative goals of KFUPM, as it plays a pivotal role in Saudi Arabia's Vision 2030.

Dr. Al-Sagaff began by outlining the mandate of KFUPM, emphasizing the need to diversify Saudi Arabia's economy.

"The goal is to expand Saudi Arabia's economy by creating and nurturing new sectors beyond oil and gas," he stated. This diversification is crucial for sustainable growth and reducing the kingdom's reliance on its traditional economic pillars.

The Crucial Role of Investment and Talent
Investment and talent were highlighted as the twin pillars of economic development. Dr. Al-Sagaff stressed that while investment is vital, talent is the true multiplier. "Talent amplifies investment, making it essential for achieving Vision 2030 goals," he explained. Without the right talent, investment alone cannot drive the desired development.

Three Types of Talent
Dr. Al-Sagaff categorized talent into three distinct types:

1. Economy-burdening talent: Graduates who lack the necessary skills for today's or tomorrow's economy, becoming a burden.
2. Economy-maintaining talent: Professionals who maintain the progress of the current economy, such as engineers, doctors, and lawyers.
3. Economy-creating talent: Innovators who will create future jobs and sectors. The University focuses on nurturing this type of talent.

Role as a Tech-Leading Institution
KFUPM aims to be a tech-leading institution, preparing students to foresee and solve future challenges. Dr. Al-Sagaff emphasized the importance of future-facing programs that develop solutions before industry demands them. "We need to be type three, tech-leading or even tech-leaping," he asserted.

Empowering Women in the Workforce
One of the most notable achievements discussed was the significant progress in women's employment. Women's participation in the workforce has risen from 17% to over 35%, with 50% of engineering students now being women. "You cannot win a game with half a team. You cannot run an economy with half the population," Dr. Al-Sagaff remarked, highlighting the importance of tapping into the talent of the entire population.

Addressing Challenges and Seizing Opportunities
The session also addressed the challenges and opportunities in achieving Vision 2030 goals. Dr. Al-Sagaff acknowledged the criticism about whether there are enough skilled people to meet these goals but emphasized the young, smart, and competent population of Saudi Arabia. "We do have the numbers, we do have the quality, we do have the caliber," he affirmed.

Summary:
This session provided a comprehensive look at the strategies and initiatives driving Saudi Arabia's economic transformation. Dr. Al-Sagaff 's insights underscored the importance of investment, talent, and inclusivity in achieving the kingdom's ambitious Vision 2030 goals.

"Our mission at King Fahd University of Petroleum and Minerals is to drive Saudi Arabia's economic expansion by fostering new sectors and nurturing talent. Investment alone isn't enough; it's the talent that multiplies investment, creating a sustainable and innovative future for our kingdom"

Dr Muhammad Al-Sagaff,
President, King Fahd University of Petroleum and Minerals (KFUPM)

PLENARY SESSION 8: HOW CAN TRACEABILITY, CERTIFICATION AND ENFORCEMENT HELP ADDRESS THE RESPONSIBLE SUPPLY CHALLENGE?

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

SUMMARY:

The session concluded with a call for greater engagement with governments and communities to build successful long-term cycles. The panel emphasized that responsible sourcing is not just about compliance but about creating resilient and reliable supply chains.

As the world moves towards a greener future, the insights from this panel highlight the importance of collaboration, innovation, and unwavering commitment to responsible sourcing. The journey is complex, but with the right approach, it is possible to create a sustainable and equitable supply chain for critical minerals.

CARMINE DI NOIA

Director for Financial and Enterprise Affairs, OECD

"Due diligence must have an approach that believes in the importance of behaviors for long-term profitability and resilience."

MATTHEW CHAMBERLAIN

Chief Executive Officer, London Metal Exchange

"The London Metal Exchange should reflect industry consensus and embed responsibility standards into our brand listing requirements."

ELAINE DORWARD-KING

Non-Executive Director Sibanye Stillwater

"It takes not just compliance but the political and economic will to ensure a secure and transparent supply chain."

BRIAN MENELL

Chairman and Chief Executive Officer Techmet

"We need systems of traceability and governance standards, but we must avoid bureaucratic box-ticking that hinders progress."

DAVID EADES

Journalist, Former BBC News

"The demand for responsibly sourced minerals is higher than ever, and the challenge of governance and enforcement is at the forefront of our discussions today."

PLENARY SESSION 8: HOW CAN TRACEABILITY, CERTIFICATION AND ENFORCEMENT HELP ADDRESS THE RESPONSIBLE SUPPLY CHALLENGE?

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

Moderator

David Eades
Journalist, Former BBC News

Matthew Chamberlain
Chief Executive Officer, London Metal Exchange

Brian Menell
Chairman and Chief Executive Officer Techmet

Elaine Dorward-King
Non-Executive Director Sibanye Stillwater

Carmine di Noia
Director for Financial and Enterprise Affairs, OECD

In the quest for a sustainable future, the responsible sourcing of critical minerals has emerged as a pivotal challenge during different panels discussion held at the 2025 FMF, where industry leaders and experts convened to delve into the complexities and opportunities of ensuring that these essential resources are obtained responsibly.

The session opened with a compelling introduction to the theme: the importance of governance, certification, traceability, and enforcement in the responsible sourcing of critical minerals. These elements are crucial as the world increasingly relies on these minerals to power the green transition.

Carmine di Noia, Director for Financial and Enterprise Affairs at the OECD, provided a comprehensive overview of the OECD guidelines. She emphasized the necessity of framing certification and traceability within a broader due diligence approach. Deoa highlighted the importance of a global strategy that adapts to local realities, stressing that responsible business conduct is vital for long-term profitability and resilience.

While, Matthew Chamberlain, Chief Executive Officer, London Metal Exchange of the London Metal Exchange (LME), discussed the LME's proactive steps in embedding responsibility standards into their brand listing requirements. He underscored the significance of reflecting industry consensus and acknowledged the substantial contributions of the OECD in this domain.

Chamberlain also shared that the LME had to suspend some brands that did not meet the new standards, but many were reinstated after making the necessary improvements.

As for Elaine Dorward-King, a non-Executive Director at Sibanye Stillwater emphasized the critical role of regulation, standards, and enforcement in ensuring transparency and good governance in the mining sector. She highlighted the importance of understanding the chain of custody and the political and economic will to enforce standards.

Brian Menell, Chairman and Chief Executive Officer Techmet discussed the need for traceability and governance standards within the context of the energy transition and the geopolitical landscape. He highlighted the challenges of balancing the need for increased supply, responsible engagement, and competitiveness.

The panel also explored the role of technology in improving traceability and compliance. Elaine Dorward-King mentioned the use of blockchain and ledger technology, which can trace gold through the refinery, ensuring a verifiable chain of custody.

The discussion also took a poignant turn as the panel addressed the human tragedy in South African gold mines, where illegal miners have lost their lives. Elaine Dorward-King stressed the need for better enforcement and opportunities to formalize artisanal and small-scale mining.

PLENARY SESSION 9:
DELIVERING INFRASTRUCTURE TO SUPPORT MINERAL DEVELOPMENT

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

Moderator

Eleni Giokos
Anchor and Correspondent, CNN

Eng. Mattar Alharthi
Executive Vice President Metals and Mining, National Industrial Development Centre

Mohammed Al-Jada
Vice President Strategy and Customer Experience, ESNAD

The panel discussion shed light on the importance of infrastructure in supporting mineral sector development. Eleni Giokos, CNN Anchor and Correspondence introduced the panelists and set the stage for a discussion on how to build out infrastructure effectively across the globe.

Eng. Mattar Alharthi, the Executive Vice President Metals and Mining at the National Industrial Development Centre began by explaining the role of the Industrial Center in Saudi Arabia.

He highlighted their responsibility in attracting investment, expanding the industrial landscape, and ensuring a competitive and sustainable industrial sector. He noted, "We build business cases, create investment opportunities, and ensure they align with our strategy for a win-win situation."

Mohammed Al-Jada, the Vice President Strategy and Customer Experience at ESNAD then provided insights into EAD's focus on the upstream side of mining. He discussed the comprehensive support provided to investors, from obtaining exploration licenses to ensuring compliance with environmental, health, and safety standards.

The conversation then shifted to the infrastructure challenges faced by the mining industry, particularly the need for water and electricity.

Alharthi shared insights on the proactive measures taken by the Industrial Center to develop business cases for standard tender, making them financially viable for investors. He explained, "We develop business cases for standard tenders and complexes in need of water or electricity, making them financially viable for investors."

The moderator then inquired about the current interest from investors to which Alharthi responded with impressive figures.

He revealed that they had completed 12 business cases worth over 14 billion dollars and had 43 investors scheduled to meet with them during the forum.

While Al-Jada provided insights about the timeline needed for translating these opportunities into real projects, emphasizing the role of technology in streamlining processes and ensuring compliance. He explained, "from applying for a license to starting mining operations, it can take between five to ten years."

The discussion also touched on the critical issue of water supply for mining operations. Al-Jada highlighted the innovative approaches being explored, such as privatization options, using treated water, and closed-cycle processes to minimize environmental impact. "Ensuring the availability of water is crucial for mining operations," he stressed.

Summary:
The session concluded leaving the audience with a deeper understanding of the infrastructure and investment landscape in Saudi Arabia's mining sector. It also shed light on the competitive edge Saudi Arabia is having especially in export on a global scale, particularly against dominant players like China

> **"We work with investors in the mining sector, from exploration licenses to mine licenses and beyond."**
>
> Mohammed Al-Jada
> Vice President Strategy and Customer Experience, ESNAD

PLENARY SESSION 10: FROM RULE TAKERS TO RULE SHAPERS: ESG MOVING BEYOND BOX-TICKING TO REFLECTING SUPPLIER COUNTRIES

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

SUMMARY:

The session focused on the significant role of minerals in society, transitioning from rule takers to rule shapers, and the importance of ESG (Environmental, Social, and Governance) practices moving beyond mere box-ticking.

DINO OTRANTO

Chief Executive Officer, Fortescue Metals

"Our ambition aligned with the 2030 future vision is to rid ourselves of hydrocarbons, demonstrating that ESG initiatives can be economically viable and value-accretive."

RANDY SMALLWOOD

President and Chief Executive Officer, Wheaton Precious Metals

"ESG applies to everyone. Even though we don't operate mines, we believe in co-funding community programs to ensure benefits are delivered back to those impacted stakeholders."

SHAUN USMAR

Chief Executive Officer, Vale Base Metals

"We look at ESG through a strict social license and value creation lens. Partnering with communities and governments is essential for maintaining our social license and enhancing competitiveness."

FRANK HA

President & Executive Director, Tianqi Lithium

"Reaching net-zero targets involves reducing energy consumption and emissions. It's a requirement and an order that we must follow to achieve sustainability."

RAHIM BAPOO

Managing Director, BMO Capital Markets

"The better companies are at tailoring coordination to the communities in which they operate, the more access to capital they'll have and the better their license will be to continue accessing mineral wealth."

PLENARY SESSION 10: FROM RULE TAKERS TO RULE SHAPERS: ESG MOVING BEYOND BOX-TICKING TO REFLECTING SUPPLIER COUNTRIES

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

Moderator

Rahim Bapoo
Managing Director, BMO Capital Markets

Dino Otranto
Chief Executive Officer, Fortescue Metals

Randy Smallwood
President and Chief Executive Officer, Wheaton Precious Metals

Frank Ha
President & Executive Director, Tianqi Lithium

Shaun Usmar
Chief Executive Officer, Vale Base Metals

The discussion highlighted the following key points:

Coordination and Stakeholder Engagement:
Mining companies must coordinate with various stakeholders, including communities, indigenous people, regulators, workers, and shareholders, to access mineral wealth effectively. The panel discussion also highlighted that tailoring coordination to specific community circumstances enhances access to capital and operational licenses.

Economic Viability of ESG:
ESG is often viewed as a cost, but it can be economically beneficial. Fortescue's ambition to eliminate hydrocarbons by 2030 demonstrates that ESG initiatives can be value accretive.

Investment in Community Programs:
Companies like Wheaton Precious Metals, which do not operate mines but invest in them, emphasize the importance of co-funding community programs to deliver benefits to impacted stakeholders.

Technological Advancements and Partnerships:
Implementing new technologies and forming partnerships with communities and governments are essential for maintaining social licenses and enhancing competitiveness. It was also clearly mentioned that significant capital is available for investing in technology infrastructure, with organizations committing substantial funds to R&D.

Environmental Impact and Sustainability:
The production of essential minerals like lithium and iron ore involves significant environmental costs. Companies are striving to reduce energy consumption and emissions to meet net-zero targets. The transition to electric and green technologies in mining operations is becoming economically viable and essential for sustainability.

Governance and Compliance:
Governance is a critical aspect of ESG, with a focus on legal systems, property rights, and compliance. Ensuring robust governance structures is essential for attracting investment and maintaining social licenses.

PLENARY SESSION 11: THE RACE FOR EXCELLENCE IS ON: CREATING SILICON VALLEYS OF THE FUTURE IN SUPPLIER COUNTRIES

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

SUMMARY:

The panel discussion highlighted the transformative potential of innovation and collaboration in the mining industry. By embracing new technologies, fostering interdisciplinary collaboration, and changing the industry's image, mining can attract the talent and investment needed to drive sustainable growth. The creation of "Silicon Valleys" in supplier countries represents a promising opportunity to achieve these goals, ensuring that the mining sector remains at the forefront of technological and sustainable advancements.

ANDREW SOUTHAM

Chief Executive Officer, KAZ Minerals

"You need to bring together education, finance, entrepreneurial culture, and government support to develop technologies locally."

TAYLOR MELVIN

President & Chief Executive Officer, Ivanhoe Electric

"We're not trying to create Silicon Valley. We're trying to replicate Silicon Valley in a way that works for our industry."

JOE LOMBARD

Vice Chairman, Hatch

"Each situation creates a unique solution, and we need to recognize that."

DR. DAVID CHIARAMONTI

President, RE-CORD

"Transfer of information is an effort that has to be carried out by interdisciplinary teams with contributions from different countries."

ANDRES BLANCO

Chief Executive Officer, Xcalibur Smart Mapping

"We all need to get this industry as a fascinating industry to attract talent, especially when competing with companies like Facebook."

PLENARY SESSION 11: THE RACE FOR EXCELLENCE IS ON: CREATING SILICON VALLEYS OF THE FUTURE IN SUPPLIER COUNTRIES

THEME:
MINERALS' CONTRIBUTION TO SOCIETY

Moderator

Tumi Makgabo
Broadcaster and Founder, Africa Worldwide Media

Andres Blanco
Chief Executive Officer, Xcalibur Smart Mapping

Andrew Southam
Chief Executive Officer, KAZ Minerals

Joe Lombard
Vice Chairman, Hatch

Dr. David Chiaramonti
President, RE-CORD

Taylor Melvin
President & Chief Executive Officer, Ivanhoe Electric

The panel emphasized the critical role of innovation and research and development (R&D) in transforming the mining sector.

The concept of establishing "Silicon Valleys" in supplier countries emerged as a key strategy to drive technological advancements and attract top talent.

Key Challenges and Opportunities:
Attracting Young Talent: The mining industry, often seen as conservative and risk-averse, faces the challenge of drawing in young professionals. By fostering a culture of innovation, the sector can become more appealing to the next generation.

Accelerating Discoveries: Developing new technologies is crucial for accelerating discoveries, especially in unexplored regions like Africa. This can lead to significant advancements in the industry.

Replicating Silicon Valley's Success:
The idea is to replicate the success of Silicon Valley in various cultural and economic contexts, creating innovation hubs that can thrive globally.

Opportunities for Growth:
Leveraging New Technologies: Utilizing advanced technologies for data acquisition and interpretation can significantly enhance the efficiency and accuracy of mining operations.

Public-Private Collaboration: Combining efforts from both public and private sectors to create innovation hubs can lead to groundbreaking developments.

Learning from Other Industries: Adapting best practices from other industries can provide valuable insights and drive progress in the mining sector.

Panelists Insights:
Dr. David Chiaramonti, President of RE-CORD discussed the global nature of innovation and the significance of interdisciplinary collaboration. He pointed to the establishment of hydrogen valleys in Europe as an example of systematic innovation and stressed the need for long-term thinking and stable conditions to support innovation.

While Joe Lombard, Vice Chairman of Hatch shared insights on creating ecosystems and incubators for continuous improvement. He highlighted the Aluminum Valley in Quebec as a successful example of local and global impact and emphasized the need to communicate that mining is "cool" and innovative.

As for Taylor Melvin, President & Chief Executive Officer of Ivanhoe Electric stressed the figurative rather than literal replication of Silicon Valley. He underscored the importance of attracting young talent and embracing technology to drive innovation, as well as the value of collaboration and learning from other industries.

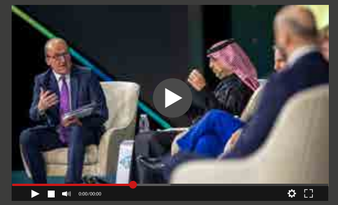
Finally, Andrew Southam, Chief Executive Officer of KAZ Minerals highlighted the need for host countries to capture value from mining activities. He discussed the importance of education, finance, entrepreneurial culture, and government support in creating innovation hubs and emphasized the need to change the image of mining to attract new ideas and talent.

PLENARY SESSION 12: IS THE MINERALS INDUSTRY INVESTING ENOUGH IN INNOVATION AND FOCUSING ON THE RIGHT PRIORITIES?

THEME:
UNLEASHING INNOVATION

SUMMARY:

This panel discussion underscored the critical need for the minerals industry to innovate, collaborate, and adapt to meet future challenges and opportunities. By leveraging technology, fostering partnerships, and aligning with strategic policies, the industry can drive sustainable growth and efficiency.



SALEH M. SALEH

Vice President, Aramco Transition Minerals (ATM)

"Investing in talent, data, and advanced capabilities like supercomputing and AI has allowed us to identify potential mining resources efficiently."

CHRISTOPHE BECK

Chairman and Chief Executive Officer, Ecolab

"The key question for the industry is really, are we moving fast enough to answer the needs that are huge opportunities?"

BASHAR ALMALIK

Chief Executive Officer, Saudi Arabia Railways

"Innovation in railway technology has made transportation more efficient and cost-effective, positioning Saudi Arabia as a leader in mining logistics"

JON STANTON

Chief Executive Officer, The Weir Group

"The mining industry needs to scale up and clean up to deliver the resources required for the energy transition."

DR. ROBERT (RJ) JOHNSTON

Senior Research Director, University Center on Global Energy Policy

"We need an innovative approach for policy to align the industry with global goals around climate change and AI."

SAMI TAKALUOMA

President and Chief Executive Officer, Metso Ecolab

"Recycling is clearly one area that is maybe not yet fully exhausted from the innovation point of view."

DAVID EADES

Journalist, Former BBC News

"In a sector that deals in decades rather than days, weeks, months, and years, ending on a note of urgency is crucial for the innovation cycle."

PLENARY SESSION 12: IS THE MINERALS INDUSTRY INVESTING ENOUGH IN INNOVATION AND FOCUSING ON THE RIGHT PRIORITIES?

THEME:
UNLEASHING INNOVATION

Moderator

David Eades
Journalist, Former BBC News

Jon Stanton
Chief Executive Officer, The Weir Group

Sami Takaluoma
President and Chief Executive Officer, Metso Ecolab

Saleh M. Saleh
Vice President, Aramco Transition Minerals (ATM)

Christophe Beck
Chairman and Chief Executive Officer, Ecolab

Dr. Robert (RJ) Johnston
Senior Research Director, University Center on Global Energy Policy

Bashar AlMalik
Chief Executive Officer, Saudi Arabia Railways

In this panel discussion, industry leaders gathered to explore the critical question: Is the minerals industry investing enough in innovation and focusing on the right priorities? The conversation delved into various aspects of innovation, sustainability, and policy, offering valuable insights into the future of the sector.

Saleh M. Saleh, Vice President of Aramco Transition Minerals shared how Aramco has successfully transferred its expertise from the oil sector to the mineral sector. By investing in talent, data, and advanced technologies such as supercomputing and AI, Aramco has been able to identify potential mining resources efficiently.

"Investing in talent, data, and advanced capabilities like supercomputing and AI has allowed us to identify potential mining resources efficiently," said Sale.

While Christophe Beck, Chairman and Chief Executive Officer of Ecolab emphasized the need for the minerals industry to benchmark its innovation efforts against global standards. He highlighted the significant impact of AI on resource consumption and the importance of addressing water needs in the context of energy transitions. "The key question for the industry is really, are we moving fast enough to answer the needs that are huge opportunities?" Beck remarked.

Bashar AlMalik, Chief Executive Officer at Saudi Arabia Railways, discussed the importance of integrating sectors and investing in railway technology to support the mining industry. Innovations in loading systems, wagon capacity, and real-time monitoring have made railway transportation more efficient and cost-effective. "Innovation in railway technology has made transportation more efficient and cost-effective, positioning Saudi Arabia as a leader in mining logistics," noted al Atni.

As for Jon Stanton, Chief Executive Officer of the Weir Group addressed the dual challenge of scaling up and cleaning up the mining industry to meet the demands of the energy transition. He stressed the importance of collaboration between industry, government, and capital providers to invest in and adopt new technologies. "The mining industry needs to scale up and clean up to deliver the resources required for the energy transition," Stanton explained.

Sami Takaluoma, President and Chief Executive Officer of Metso Ecolab highlighted the need to maximize the efficiency of existing assets through innovation and modernization. He emphasized the importance of maintaining and upgrading equipment to extend its life and improve efficiency. "Recycling is clearly one area that is maybe not yet fully exhausted from the innovation point of view," Takalorma stated.

Dr. Robert (RJ) Johnston, Senior Research Director at the University Center on Global Energy Policy, emphasized the importance of innovative policy approaches to align the minerals industry with global goals around climate change and AI. He highlighted the need for effective community partnerships, innovative financing solutions, and a focus on recycling and circularity to drive sustainability. Johnston also stressed the significance of global trade cooperation and regional partnerships to support the industry's growth.

Stanton also pointed out that sustainability does not necessarily come at a higher cost. Innovations that reduce energy and water consumption can also lower operational costs, creating a win-win situation for both the environment and the business. "There is a real win-win opportunity because if you can reduce energy and water consumption, you're also saving costs," he said.

Beck discussed the critical role of water management in the industry, emphasizing the importance of government-industry collaboration to create sustainable water usage plans. He mentioned the World Water Resilience Coalition as an example of successful collaboration. "Collaboration with government and industry is essential to manage natural resources efficiently and sustainably," Beck added.

The panelists agreed that policy and regulation play a crucial role in driving innovation and sustainability. They discussed the need for balanced policies that enable rapid permitting and licensing while ensuring environmental protection. Examples from Chile and India were cited to illustrate how policy can stimulate technological advancements.

The importance of secondary recovery and recycling was also highlighted as a key area for innovation. The panelists discussed how maximizing the efficiency of existing assets and incorporating recycling into the value chain can contribute to the sustainability of the minerals industry.

The discussion concluded with a sense of urgency in the innovation cycle to meet the increasing demand for metals. The industry must accelerate its efforts to develop and implement new technologies. "In a sector that deals in decades rather than days, weeks, months, and years, ending on a note of urgency is crucial for the innovation cycle," the moderator concluded.

GREAT DEBATE 2: IS TOO MUCH ATTENTION PAID TO WHAT CUSTOMERS AND SHAREHOLDERS THINK, GIVEN THE GLOBAL MINERALS SUPPLY CHALLENGE?

THEME:
UNLEASHING INNOVATION

SUMMARY:

This debate provided valuable insights into the complexities of the mineral sector and the multifaceted approach needed to navigate its future. The panelists' diverse perspectives underscored the importance of addressing both short-term and long-term challenges to ensure a sustainable and profitable industry.

FRANK GIUSTRA

President and Chief Executive Officer, Fiore Group of Companies

"Higher prices will ultimately drive investment and profitability in the mineral sector."

JEFF CURRIE

Chief Strategy Officer of Energy Pathways, Carlyle

"The market is failing due to the myopic nature of capital markets dominated by passive players."

DAVID AWRAM

Co-Founder and Director, Sandstorm Gold Royalties

"Transparency and smooth permitting processes are key to attracting investment in early-stage project."

MARK KRISTOFF

Chief Executive Officer, Traxys

"The availability of supply will drive market reactions and investment in the sector."

DR. GRACELIN BASKARAN

Director, Critical Minerals Security, Center Strategic and International Studies

"Strengthening demand signals and ensuring long-term support for the EV industry are crucial for the mineral sector."

HON. FRANK FANNON

Managing Director, Fannon Global Advisors

"We need to understand the real costs and have proper competition to address the supply issues in the mineral sector."

MOUNIA BOUCETTA

Senior Fellow, Policy Center for the New South, Morocco

"Cooperation and technological advancements are essential to address the challenges in the mineral sector."

JEFFREY LORCH

Partner, McKinsey

"In conclusion, there are many parts to the solution, and no single approach will achieve it all. Collaboration, policy changes, and technological advancements are all crucial."

GREAT DEBATE 2: IS TOO MUCH ATTENTION PAID TO WHAT CUSTOMERS AND SHAREHOLDERS THINK, GIVEN THE GLOBAL MINERALS SUPPLY CHALLENGE?

THEME:
UNLEASHING INNOVATION

Moderator

Jeffrey Lorch
Partner, McKinsey

Frank Giustra
President and Chief Executive Officer, Fiore Group of Companies

Jeff Currie
Chief Strategy Officer of Energy Pathways, Carlyle

David Awram
Co-Founder and Director, Sandstorm Gold Royalties

Hon. Frank Fannon
Managing Director, Fannon Global Advisors

Mark Kristoff
Chief Executive Officer, Traxys

Mounia Boucetta
Senior Fellow, Policy Center for the New South, Morocco

Dr. Gracelin Baskaran
Director, Critical Minerals Security, Center Strategic and International Studies

The debate moderated by Jeffrey Laorch, Partner at McKinsey, gathered industry leaders to discuss the future of the mineral sector. The conversation revolved around the misalignment of expectations among different stakeholders and the challenges faced by the industry in securing long-term investments.

Capital Markets and Long-Term Growth
The panelists highlighted the fragmented nature of capital markets and their short-term focus, which hinders long-term investments in the mining sector.

David Awram, Co-Founder and Director of Sandstorm Gold Royalties emphasized the difficulties in securing financing for early-stage projects due to the short-term nature of capital markets.

Challenges in Financing and Investment
The discussion underscored the impact of regulatory and permitting delays on project timelines and costs. Jeff Currie, Chief Strategy Officer of Energy Pathways at Carlyle pointed out that the market is failing to provide the necessary capital due to the dominance of passive players who cannot hold long-term positions.

Role of Governments and Policy
Government support and policy were deemed crucial in facilitating investment and reducing political risk. Frank Fannon, Managing Director, of Fannon Global Advisors suggested that public-private partnerships and government co-investment could help address these challenges.

Global Cooperation vs. Competition
The debate also touched on whether global cooperation or competition is more effective in ensuring a stable mineral supply. While some panelists favoured regional cooperation based on shared values, others highlighted the need for transactional relationships to drive investment.

Technological Advancements and Market Dynamics
Technological advancements and the need for a clear demand signal to drive investment were discussed. Dr. Gracelin Baskaran, Director of Critical Minerals Security, Center Strategic and International Studies stressed the importance of strengthening demand signals for the EV industry to ensure long-term support for the mineral sector.

Regulatory and Permitting Challenges
The need for competent regulatory bodies and streamlined permitting processes to facilitate project development was highlighted. Mark Kristoff, Chief Executive Officer, Traxys emphasized that the availability of supply will drive market reactions and investment in the sector.

KEYNOTE: SHAOYANG SHEN

THEME:
UNLEASHING INNOVATION

Shaoyang Shen
Vice President, Zijin Mining Group

As the global minerals industry gathers momentum, this keynote address shed light on its future, with a particular focus on the Kingdom of Saudi Arabia. The session delved into technological disruptions, the industry's reputation, and the potential for a makeover.

Keynote Insights from Zijin Mining Group
The highlight of the session was the keynote address by Shia Yang Shen, Vice President of Zijin Mining Group. Shen provided a comprehensive overview of the challenges and opportunities facing the industry.

Zijin Mining Group: A Global Leader
Zijin Mining Group, which began as a single gold company in China 30 years ago, has evolved into a multinational powerhouse. With operations in 16 countries, Zijin is a major producer of gold, copper, zinc, and an emerging player in lithium production. Shen emphasized the company's commitment to sustainability, with over 30% of its energy coming from renewable sources.

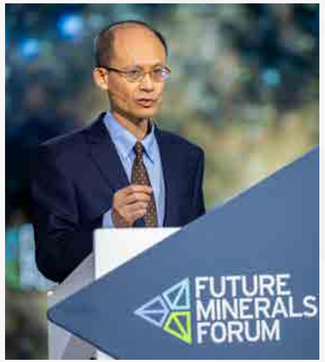
Challenges in the Minerals Industry
Shen outlined several significant challenges:

- **Global Economic Uncertainty:** The slowing growth of major economies and high inflation rates are causing concern.
- **Geopolitical Tensions:** Rising protectionism and restrictive trade policies are complicating international cooperation.
- **Declining Demand from China:** As China shifts its growth model, demand for industrial commodities is slowing.
- **Resource Replacement:** The industry faces inadequate resource replacement and rising operational costs.

Opportunities on the Horizon
Despite these challenges, Shen highlighted several opportunities:

- **Technological Advancements:** Innovations in mining technology can improve efficiency and sustainability.
- **Energy Transition:** The demand for minerals critical for renewable energy technologies, such as copper and lithium, is growing.
- **International Cooperation:** Market-based cross-border transactions and integrated global supply chains are essential for the industry's growth.
- **Saudi Arabia's Potential:** The Kingdom's strategic initiatives to diversify its economy and attract international mining investments present significant opportunities.

Saudi Arabia: A Promising Frontier
Saudi Arabia, known for its oil production, is now focusing on its mining potential. The Arabian-Nubian Shield is highly prospective for gold, copper, and other minerals. The Kingdom's favorable policies, improved business environment, and strategic location make it an attractive destination for international mining companies.



PLENARY SESSION 13:
CAN THE MINING INDUSTRY OF THE FUTURE EMERGE IN SAUDI ARABIA?

THEME:
UNLEASHING INNOVATION

SUMMARY:

The panel discussion concluded with a call to action for the mining industry to leverage these insights and opportunities to drive future growth and success in Saudi Arabia. The collaborative efforts of government, industry leaders, and educational institutions will be crucial in realizing the vision of Saudi Arabia as a global mining hub.

ABDULRAHMAN ALBELUSHI

Deputy Minister of Mineral Resources, Saudi Arabia

"Our focus today is to reduce the duration from the start of exploration all the way to the production of a mine."

SULIMAN AL OTHAIM

Chairman, Saudi Gold Refinery

"We need the expertise for international design and planning to combine with our local capabilities."

JOHN WEBSTER

Chief Executive Officer, Gold and Minerals Co

"Saudi Arabia ticks every box for developing projects, with enthusiastic support from the ministry and environmental agencies."

DR. DARRYL CLARK

Executive Vice President of Exploration, Ma'aden

"We need to double down on efforts to create a skilled workforce here in the Kingdom to support our growth."

ABDULAZIZ AL HAMWAH

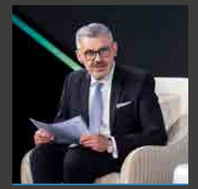
Vice Chairman and Chief Executive Officer, Modern Industrial Investment Holding Group

"The National Industrial Strategy aims to reach 56,000 factories by 2050, which will have a significant impact on the mining sector."

NAIF ALDURAYWISH

General Director, Partnerships and Products Department, MODON

"With the launch of the National Industrial Strategy back in 2022, the kingdom has positioned itself very well. Just last year, 275 new factories selected MODN as their partner to start their manufacturing journey."



IGOR HULAK

Partner, Global Head of Metals and Mining Practice, Kearney

"Saudi Arabia's geological potential and mineral endowment are unparalleled. With the right investments and strategic partnerships, we can transform the Kingdom into a global mining powerhouse."

PLENARY SESSION 13:
CAN THE MINING INDUSTRY OF THE FUTURE EMERGE IN SAUDI ARABIA?

THEME:
UNLEASHING INNOVATION

Moderator

Igor Hulak
Partner, Global Head of Metals and Mining Practice, Kearney

Dr. Darryl Clark
Executive Vice President of Exploration, Ma'aden

Abdulrahman AlBelushi
Deputy Minister of Mineral Resources, Saudi Arabia

Geoffrey McDonald Day
Chief Executive Officer, AMAK

John Webster
Chief Executive Officer, Gold and Minerals Co

Abdulaziz Al Hamwah
Vice Chairman and Chief Executive Officer, Modern Industrial Investment Holding Group

Suliman Al Othaim
Chairman, Saudi Gold Refinery

Naif Alduraywish
General Director, Partnerships and Products Department, MODON

This pivotal panel discussion delved into the potential of Saudi Arabia as a future hub for the mining industry. The session, moderated by Igor Hulak, Partner and Global Head of Metals and Mining Practices at Kearney, brought together industry leaders and experts to explore the challenges, opportunities, and strategic directions for the sector.

The session started with an address from Dr. Darryl Clark, Executive Vice President of Exploration, at Ma'adens where he set the stage by outlining the challenges faced by the mining sector, followed by a discussion on the opportunities that lie ahead.

A strong message arose from the discussion and emphasized the need for global cooperation, with a specific reference to the Kingdom of Saudi Arabia's role in the industry's future.

The panel reflected on the significant developments and growth in Saudi Arabia's mining sector over recent years. The talks also highlighted the ambition turning into impactful actions, a theme that resonated throughout the forum. The session aimed to answer a critical question: Can the mining industry of the future emerge in Saudi Arabia? The panelists, including key industry leaders, shared their insights and experiences to address this question.

Abdulrahman Al Belushi, Deputy Minister of Mining Development at the Ministry of Industry and Mineral Resources in Saudi Arabia emphasized the importance of data, land, and financing for the mining sector. He highlighted efforts to reduce the duration from exploration to production, which currently averages 17 years. Al Belushi noted, "Our focus today is to reduce the duration from the start of exploration all the way to the production of a mine."

The adoption of cutting-edge technologies was highlighted as a crucial factor in accelerating the mining process.

Dr. Darryl Clark, Executive Vice President of Exploration at Ma'aden, stressed the need to double down on efforts to create a skilled workforce in the Kingdom to support growth. He remarked, "We need to double down on efforts to create a skilled workforce here in the Kingdom to support our growth."

The significance of local and international partnerships was underscored as essential for driving the mining sector forward. John Webster, the Chief Executive Officer at Gold and Minerals Co, shared his positive experience in Saudi Arabia, stating, "Saudi Arabia ticks every box for developing projects, with enthusiastic support from the ministry and environmental agencies."

Continuous improvement of regulations and creating an investment-friendly environment were identified as critical. Abdulaziz Al Hamwah, the Vice Chairman and Chief Executive Officer of Modern Industrial Investment Holding Group highlighted the impact of the National Industrial Strategy, which aims to reach 56,000 factories by 2050. He said, "The National Industrial Strategy aims to reach 56,000 factories by 2050, which will have a significant impact on the mining sector."

Developing a skilled workforce to support the mining industry's growth was a recurring theme. Collaboration with educational institutions to introduce relevant courses and training programs was seen as vital. Suliman Al Othaim, the Chairman Executive Officer of Saudi Gold Refinery, emphasized the need for international expertise in design and planning to combine with local capabilities.

Saudi Arabia's geological potential and mineral endowment were recognized as significant opportunities. Government incentives and support for the mining sector, along with the potential for Saudi Arabia to become a world-class processing and manufacturing hub, were also highlighted. Strategic partnerships and international collaboration were seen as key to bringing in expertise and technology.

PLENARY SESSION 14: NAVIGATING TECHNOLOGY DISRUPTION: HOW ARE CHANGES IN TECHNOLOGY IMPACTING GROWTH OF CRITICAL MINERALS MARKETS?

THEME:
UNLEASHING INNOVATION

SUMMARY:

The panelists' insights underscored the transformative potential of technology in the mineral sector, highlighting both the challenges and opportunities that lie ahead. As the industry continues to evolve, embracing technological advancements will be crucial for driving growth and sustainability.

CHEN YINXU

President, Huawei Oil, Gas and Mining BU

"AI applications can significantly improve safety and efficiency in mining operations, reducing prediction times from days to minutes."

DR. FADI TRABZUNI

Managing Director, Advanced Metal Industries Cluster Company (AMIC)

"Technological disruptions today are driven by sustainability goals and decarbonization, which are crucial for the future of the mineral processing industry."

CRAIG MILLER

Chief Executive Office, Anglo American Platinum

"Technology is a positive disruption that creates opportunities, such as the use of platinum group metals in hydrogen production and food freshness extension."

HELENA HEDBLOM

President and Chief Executive Officer, Epiroc

"We are moving from a transactional business to a partnership with our customers, implementing autonomous solutions that require significant change management and upskilling."

AMIN AL JABAR

Chief Information Officer at Nesma and Partners

"Our role is to support the construction of facilities required for processing and throughout the value chain. By utilizing advanced technologies such as digital twins and modular construction, we can optimize operations and adapt to changing market demands, ensuring a sustainable and efficient future for the mining sector."

DAVID EADES

Journalist, Former BBC News

"In a sector often perceived as conservative and slow-moving, the integration of cutting-edge technology is proving to be a game-changer."

PLENARY SESSION 14: NAVIGATING TECHNOLOGY DISRUPTION: HOW ARE CHANGES IN TECHNOLOGY IMPACTING GROWTH OF CRITICAL MINERALS MARKETS?

THEME: UNLEASHING INNOVATION

Moderator

Helena Hedblom
President and Chief Executive Officer, Epiroc

Craig Miller
Chief Executive Office, Anglo American Platinum

Dr. Fadi Trabzuni
Managing Director, Advanced Metal Industries Cluster Company (AMIC)

Amin Al Jaber
Chief Information Officer, Nesma & Partners

Chen Yinxu
Vice President, Huawei Oil, Gas and Mining BU

In a sector often perceived as conservative and slow-moving, the integration of cutting-edge technology is proving to be a game-changer. This panel discussion on "Navigating technology disruption: how are changes in technology impacting growth of critical minerals markets?" brought together industry leaders to explore the transformative potential of technology in the mineral sector.

The panel delved into the significant role of automation, electrification, and digitalization in enhancing safety, productivity, and sustainability. Helena Hedblom, the President and Chief Executive Officer at Epiroc emphasized the shift from a transactional business model to a partnership approach with customers.

"Implementing autonomous solutions requires significant change management and upskilling on both ends," she noted. Hedblom highlighted the impressive growth in driverless machines, with over 3,000 units globally, driving safety and productivity in mining operations.

Dr. Fadi Trabzuni, the Managing Director of Advanced Metal Industries Cluster Company (AMIC), pointed out that technological disruptions are increasingly driven by sustainability goals and decarbonization. "This is a very important topic for the future of mineral processing," Trabzuni said, underscoring the need for integrated value chains to reduce transportation distances and improve efficiency.

Overcoming Challenges
Despite the promising advancements, the panel acknowledged several challenges. Connectivity and infrastructure issues, particularly in remote mining locations, remain significant hurdles. Craig Miller the Chief Executive Office at Anglo American Platinum shared insights on the complexities of underground mining. "While open-pit mines are relatively easier to manage, underground operations present more challenges," he explained. However, Miller also highlighted the decreasing costs and increasing robustness of technology, making it more accessible and effective.

The high cost of technological advancements and the need for robust equipment were also discussed. Chen Yinxu the Vice President at Huawei Oil, Gas and Mining BU shared how AI applications have significantly improved efficiency in various production scenarios. "AI can ensure an average prediction accuracy of over 95% and reduce prediction time from days to minutes," he said, illustrating the tangible benefits of technology.

Seizing Opportunities
The discussion also shed light on the numerous opportunities presented by technological disruption. Enhanced safety and productivity through automation and AI applications were key highlights. The potential for AI to improve efficiency in production scenarios and the growing importance of sustainability and decarbonization were emphasized as major drivers of technological innovation.

The integration of value chains to reduce transportation distances and improve efficiency was another critical opportunity. Dr. Trabzuni shared the success of AMIC's titanium value chain, which includes the world's only plant connected through a pipeline for raw material supply and recycling. "This integration has put a lot of efficiencies into our process," he said.

Recycling and prolonging the life of mining and construction equipment were also identified as significant opportunities. Hedblom mentioned the development of service products aimed at pushing the life of equipment by reusing and remanufacturing components. "This is the future," she asserted.

The Future of Technological Disruption
As the panel concluded, it was clear that technological disruption is not just a desirable addition but a necessity for staying competitive and meeting future challenges. The integration of AI, automation, and sustainable practices is set to revolutionize the mineral sector, driving it towards a more efficient and environmentally friendly future.

In the words of the moderator, "Technology is not just a desirable addition; it has become a must-have to stay competitive and meet the challenges of the future."

PLENARY SESSION 15: CHANGING THE MINING INDUSTRY'S POOR REPUTATION: SHOULD THERE BE A GLOBAL CAMPAIGN, AND WHO WILL COMMIT?

THEME:
UNLEASHING INNOVATION

SUMMARY:

The panel discussion highlighted the significant challenges and opportunities facing the mining industry. By leveraging technology, engaging young talent, and fostering collaboration among stakeholders, the industry can transform its reputation and contribute to a sustainable and prosperous future.

SILLE KRUKOW

Nudge and Behavior Design Expert, Transformative Solutions Consulting

"We need to start redesigning our world from a holistic approach and figure out how to design behavior more effectively."

DR. DORIS HIAM-GALVEZ

Author of 'Designing Sustainable Prosperity

"We must work all together for the benefit of the region. If we genuinely address the needs of the people and the environment, we can build our reputation."

CHRIS MAYBURY

Deputy Chairman, Bermuda Commercial Bank

"We need to be better at showing what the products of mining can do, as opposed to talking about mining itself."

DAVID EADES

Journalist, Former BBC News

"Toxic, dirty, and dull. That's how many people see the mining industry. It's up to the sector to drive that change"

KHALID AL-MUDAIFER

Vice Minister of Mining Affairs, Ministry of Industry and Mineral Resources

"We need all stakeholders to work together. It wouldn't be only the industry; the policy makers, the inspection, and the educational system all need to be right and good."

HADLEY GAMBLE

Journalist, Al Arabiya

"We have gone from ambition to action and impact, and this is an important message. This is part of a start to say yes - we can, things can change."

PLENARY SESSION 15: CHANGING THE MINING INDUSTRY'S POOR REPUTATION: SHOULD THERE BE A GLOBAL CAMPAIGN, AND WHO WILL COMMIT?

THEME: UNLEASHING INNOVATION

Moderator

Hadley Gamble
Journalist,
Al Arabiya

Khalid Al-Mudaifer
Vice Minister of Mining Affairs, Ministry of Industry and Mineral Resources

David Eades
Journalist,
Former BBC News

Chris Maybury
Deputy Chairman,
Bermuda Commercial Bank

Dr. Doris Hiam-Galvez
Author of 'Designing Sustainable Prosperity'

Sille Krukow
Nudge and Behavior Design Expert, Transformative Solutions Consulting

In a world increasingly focused on sustainability and environmental responsibility, the mining industry finds itself at a crossroads. Often perceived as "toxic" and "dirty," the sector is now striving to reshape its image and highlight its indispensable role in modern life. This was the central theme of this panel discussion, where industry leaders, policymakers, and experts gathered to explore the challenges and opportunities facing the mining sector.

Reputation and Perception: A Long Road Ahead
The panel kicked off with a candid acknowledgment of the industry's poor reputation. Moderator Hadley set the stage by addressing the audience: "We're going to be having a longer conversation about not just the mineral industry but what could potentially be called its toxic reputation and how folks on every step of the value chain can change that narrative."

David Eades, who is a former Journalist at BBC News started his intervention that many people in see the mining industry as "Toxic, dirty, and dull. It's up to the sector to drive that change." He emphasized the need for the industry to take control of its narrative and actively promote the positive aspects of mining.

Khalid Al Mudaifer, the Vice Minister of Mining Affairs at the Ministry of Industry and Mineral Resources in Saudi Arabia echoed this sentiment, acknowledging the industry's challenges but also highlighting its critical role in modern life. "We need all stakeholders to work together. It wouldn't be only the industry; the policy makers, the inspection, and the educational system all need to be right and good." Al Mudaifer highlighted.

The Role of Technology and AI
One of the most promising avenues for transforming the mining industry lies in the adoption of advanced technologies. AI, in particular, has the potential to revolutionize mining processes, making them more efficient and environmentally friendly. However, Chris Maybury, the Deputy Chairman of Bermuda Commercial Bank pointed out, AI also presents challenges. "AI creates more of a problem; it needs 10 times more power. We better get better at the solutions so that we can have AI." Maybury said.

Dr. Doris Hiam-Galvez, Author of 'Designing Sustainable Prosperity'stressed the importance of clarity and purpose when implementing AI. "We have to first understand what problem we are trying to solve, what questions we are trying to address, what hypothesis we're trying to test, and have clarity on what we will do if we use AI."

Despite these challenges, H.E. Al Mudaifer remained optimistic about the potential of technology to drive positive change. "Technology will make mining safer, better, and less environmentally impactful. It will also attract young talent to the industry."

Collaboration and Stakeholder Engagement
The panelists agreed that collaboration among industry players, policymakers, and educational institutions is crucial for driving sustainable change. Dr. Hiam-Galvez emphasized the need for a holistic approach: "We have to work all together for the benefit of the region. If we genuinely address the needs of the people and the environment, we can build a better reputation for the mining industry."

Sille Krukow, Nudge and Behavior Design Expert at Transformative Solutions Consulting, highlighted the importance of designing environments that promote sustainable behaviors. "We need to start redesigning our world from a holistic approach and figure out how to design behavior more effectively."

Engaging the Younger Generation
One of the key challenges facing the mining industry is attracting young talent. Maybury shared insights from Beacon Events' "NextG initiative", which aims to educate and engage young people about the mining industry. "If we failed with this generation, how can we win the next generation? We have three levels of NextG, from primary school children to college students, to educate them and excite them about the industry."

H.E. Al Mudaifer also highlighted Saudi Arabia's efforts to engage young people in mining. "We opened a new mining engineering school, and the application rate is almost three times the capacity. We need the expertise and skills that we do not have in the mining sector."

Behavioral Change and Communication
Changing public perception and behavior towards the mining industry requires effective communication and storytelling. Eades emphasized the need to find and promote positive stories within the industry. "Find the good stories, sell the good stories. There are plenty of them," Eades declared.

Dr. Hiam-Galvez added that communication alone is not enough. "We need to start talking to the instincts by designing everything we touch and feel on a daily basis differently. Communication and awareness are not going to drive behavior change; we need to design our environments to promote sustainable behaviors.

PLENARY SESSIONS: CLOSING REMARKS

Tumi Makgabo
Broadcaster and Entrepreneur, Africa Worldwide Media

As the curtains drew to a close on the 2025 Future Minerals Forum 2025, the atmosphere was charged with a sense of accomplishment and anticipation. Over three days industry leaders, policymakers, and innovators had gathered to discuss, deliberate, and forge connections that would shape the future of the mining sector.

Tumi Makgabo, the Broadcaster and Founder of Africa Worldwide Media who was the charismatic master of ceremony of the ministerial roundtable and all plenary sessions, took to the stage with her signature blend of humor and sincerity. “It is always an utmost and maybe even extreme pleasure for me to be here,” she began.

Makgabo’s gratitude for being part of the event was palpable, and she hoped that the forum had been as stimulating for the participants as it had been for her. “I hope certainly the past two days have been stimulating for you, have given you many ideas, and a good sense of how you can participate in the future that we would like to build not just for this industry but indeed for Humanity as a whole.”

The forum had been a whirlwind of activity, with discussions ranging from policy frameworks to the latest technological advancements. Makgabo highlighted the importance of making connections and delivering impact, a theme that had been central to this year’s event.

“You’ll remember on day one I highlighted the fact that this year it was about looking at delivering impact,” she reminded the audience. The goal was not just to discuss whether the industry had met its commitments, but to explore how it could continue to do so in the future.

As Makgabo spoke, David Eades, former Journalist, at BBC News joined her on stage. Their conversation turned to the challenges of changing the global perception of mining. “Part of fixing the problem is acknowledging there is a problem in the first place,” Eades remarked. He emphasized that solving the industry’s issues would require a multifaceted approach. “It’s not one thing that’s going to solve the problem; it’s a multiplicity of things that’s going to solve the problem.”

Eades insights were echoed by Mark Bristow, the President and Chief Executive Officer of Barrick Gold Corporation who had been a vocal advocate for transparency and action within the sector. “We’ve got to acknowledge it, deal with it, and don’t hide behind it,” Bristow had said earlier in the forum. His words underscored the need for the industry to confront its challenges head-on and work towards meaningful change.

The conversation also touched on the importance of involving younger generations in the industry.

Makgabo noted that most of the people in the room were not 25-year-olds, and bringing in fresh perspectives could significantly impact how the industry evolves. “If you get younger people in the room and you get them involved, I think that can change the way you think about it,” he said.

As the forum drew to a close, Makgabo reflected on the progress made over the years. “This has been quite an extraordinary year of the Future Minerals Forum,” she said, noting the impressive growth in participation. From 3,500 registrations four years ago to 24,000 this year, the forum had become a significant event in the industry calendar.

In her final remarks, Makgabo expressed optimism for the future. “We don’t necessarily know what the next 10 years is going to look like, but I think it’s exciting to know that this industry will continue to play a crucial and critical role in our future,” he said. The forum had provided a platform for open dialogue, innovative ideas, and a shared commitment to shaping a sustainable and impactful future for the mining industry.

Session summary
The Future Minerals Forum 2025 had not only been a venue for discussion but a catalyst for change, setting the stage for a brighter and more responsible future in mining.

PLENARY SESSIONS: CLOSING CEREMONY (MINISTER'S SPEECH)

H.E. Bandar Alkhorayef
Minister of Industry and Mineral Resources, Saudi Arabia

The 2025 Future Minerals Forum concluded with a compelling closing speech by H.E. Bandar Alkhorayef, the Minister of Industry and Mineral Resources of Saudi Arabia. The minister's address encapsulated the achievements of the forum, expressed gratitude to all contributors, and outlined a vision for the future of the mining sector.

Acknowledgment of Efforts
H.E. Alkhorayef began by acknowledging the collective efforts that made the event a success. He emphasized that such events do not happen spontaneously but are the result of dedicated commitment, resource allocation, and the hard work of many individuals.

Special thanks were extended to the leadership of Saudi Arabia, including the Custodian of the Two Holy Mosques, His Royal Highness King Salman bin Abdulaziz, and His Royal Highness Prince Mohammed bin Salman, Crown Prince and Prime Minister, for their unwavering support and belief in the forum's mission.

Pride in Achievements
Reflecting on the forum's progress, the minister expressed immense pride in how the event has evolved. Initially aimed at bringing attention to the mining sector, the forum has successfully shifted its focus to the people and communities impacted by the industry. This transition underscores the forum's commitment to sustainability and the broader societal benefits of the mining sector.

Future Vision
Looking ahead, H.E. Alkhorayef stressed the importance of maintaining the momentum generated by the forum. He highlighted the need to focus on topics that bring the most value to the sector globally. The minister called for a structured approach to ensure that the forum continues to address critical issues and drive meaningful impact.

Gratitude to Key Figures
A significant portion of the speech was dedicated to expressing gratitude to key figures and organizations. The minister thanked the forum's partners, sponsors, exhibitors, speakers, and moderators for their invaluable contributions. Special recognition was given to H.E. Khalid Al Mudaifer, the Vice Minister of Mining Affairs, at Ministry of Industry and Mineral Resources of Saudi Arabia, whose vision, belief, and passion were instrumental in driving the forum's success. The broader government entities and the ministry's ecosystem were also acknowledged for their efforts in ensuring a smooth experience for international guests.

In conclusion, by H.E. Bandar Alkhorayef, the Minister of Industry and Mineral Resources of Saudi Arabia reiterated the forum's noble mission and the collective power of collaboration and commitment. He encouraged continued engagement and collaboration to keep the momentum going and to ensure the forum's ongoing success and impact. The minister closed his speech with a heartfelt thank you to all participants and expressed his anticipation for the next edition of the Future Minerals Forum.

Session summary
The closing speech by by H.E. Bandar Alkhorayef, the Minister of Industry and Mineral Resources of Saudi Arabia was a fitting end to a successful event, highlighting the achievements, expressing gratitude, and setting a clear vision for the future. The Future Minerals Forum has established itself as a significant platform for discussing and advancing the mining sector, with a strong focus on sustainability and community benefits.

DAY 1
15 January 2025

Future Tech Hub (The Link)
Stream 1

PLENARY SESSION 1: HOW WILL THE WORLD MEET THE SURGE IN POWER DEMAND REQUIRED BY THE RAPID EXPANSION OF THE AI ECONOMY?

THEME: POWERING THE AI REVOLUTION

SUMMARY:

The panel discussed the significant surge in energy demand driven by AI technologies and the need for modernizing energy infrastructure. They emphasized the importance of renewable energy sources, advanced cooling technologies, and critical minerals like lithium and germanium. The panelists highlighted the necessity of a multifaceted approach, combining traditional and innovative solutions to meet future energy needs. They also stressed the role of AI-driven software in optimizing energy efficiency. The discussion underscored the importance of continuous innovation and investment in sustainable energy solutions.

CYRUS HIRAMANEK

Senior Managing Director, M Klein and Company

"We need to improve the grid and focus on energy efficiency gains from compute units to address the surge in energy demand."

WALID SHETA

President Middle East Africa, Schneider Electric

"Efficiency in generation and cooling is crucial. We are developing new cooling technologies to reduce energy consumption."

FABIO FONTANA

Executive Director of Datacenters, Tonomus

"Combining solar, wind, and hydrogen with energy efficiency and innovation can help us achieve fully green data centres by 2030."

MAJED ALHUMAID

Vice President, Digita Transformation, ESNAD

"We need to explore all options to meet the increasing energy demand, including traditional and innovative solutions."

PLENARY SESSION 1: HOW WILL THE WORLD MEET THE SURGE IN POWER DEMAND REQUIRED BY THE RAPID EXPANSION OF THE AI ECONOMY?

THEME: POWERING THE AI REVOLUTION

Moderator

Dr. Gracelin Baskaran
Director, Critical Minerals Security, Center for Strategic and International Studies

Cyrus Hiramanek
Senior Managing Director, M Klein and Company

Walid Sheta
President Middle East Africa, Schneider Electric

Fabio Fontana
Executive Director of Datacenters, Tonomus

Majed Alhumaid
Vice President Digita Transformation, ESNAD

The panel discussed the Future of Energy: Navigating the AI-Driven Surge.

In a world where artificial intelligence (AI) is rapidly transforming industries, the demand for energy is skyrocketing. This was the central theme of a recent panel discussion at the Future Minerals Forum, where experts from various sectors gathered to explore the implications of this surge and the opportunities it presents.

The panelists delved into the specifics, with Cyrus Hino, Senior Managing Director at M CLI and Company, emphasizing the need for a robust energy infrastructure. “We need to improve the grid and focus on energy efficiency gains from compute units to address the surge in energy demand,” Hino explained. He pointed out that the current energy grid, particularly in the US and Europe, is outdated and inefficient, necessitating significant upgrades.

Walid Sheta, President of Middle East and Africa at Schneider Electric discussed efficiency’s critical role in meeting energy demands. “Efficiency in generation and cooling is crucial,” Sheta said. “We are developing new cooling technologies to reduce energy consumption.” He highlighted the importance of advanced cooling methods, such as immersion cooling, which can significantly lower the energy required for data centres.

Fabio Fontana, Executive Director of Data Centers at Autonomous, shared insights from his work on the NEOM project in Saudi Arabia. “Combining solar, wind, and hydrogen with energy efficiency and innovation can help us achieve fully green data centres by 2030,” Fontana stated. He emphasized the potential of renewable energy sources and the benefits of Saudi Arabia’s natural resources, such as abundant sunlight and wind.

The discussion also touched on the critical minerals necessary for AI and energy technologies. We need to explore all options to meet the increasing energy demand, including traditional and innovative solutions,” Alade said. The geopolitical implications of relying on minerals predominantly produced in China were also noted, underscoring the need for diversified supply chains.

One of the key challenges discussed was aligning the clean energy transition with the need for stable base load power. “We have to think about it in the short, medium, and long term,” Hino suggested. Gas has to be the solution for base load in the short term, but renewables, nuclear, and geothermal will play crucial roles in the future.”

Fontana echoed this sentiment, highlighting the potential of small modular reactors and geothermal energy. “These technologies can provide reliable, low-cost power, essential for a clean energy transition,” he said.

The key takeaways as the panel concluded: The future of energy lies in a mix of traditional and innovative solutions. We need to invest in renewable energy, modernize our grids, and continuously innovate to meet the growing demands of the AI-driven economy.

The discussion underscored the importance of a multifaceted energy generation and efficiency approach. With the right investments and innovations, the world can navigate the challenges of increased energy demand and move towards a sustainable, AI-powered future

PLENARY SESSION 2: VOICES FROM THE DOWNSTREAM: END-USER EXPECTATIONS OF MINERAL PRODUCERS

THEME: POWERING THE AI REVOLUTION

SUMMARY:

In the panel discussion "Voices from the Downstream," experts emphasized the need for enhanced downstream processing capacity to support the green transition. They highlighted the increasing demand for metals due to renewable energy and EVs and the environmental impact of current production methods. The discussion underscored the importance of public-private partnerships, regulatory changes, and technological innovations to drive progress. Key opportunities include developing new mining and processing technologies and investing in renewable energy sources. The panellists called for collaborative efforts across all value chain stages to ensure a sustainable future for green metals.

FAISAL SULTAN

Vice President and Managing Director, Lucid Motors

"Electrification is the future, and we must talk about green metals. The demand for rare metals and minerals will increase twentyfold in the next eight years."

H.E. DR. ABDULLAH ALAHMARI

Assistant Minister of Planning & Development, Ministry of Industry & Mineral Resources, Saudi Arabia

"Steel will be with us for life, but every ton we produce today from steel generates two tons of CO2. We need to switch to green processing and green steel."

PLENARY SESSION 2: VOICES FROM THE DOWNSTREAM: END-USER EXPECTATIONS OF MINERAL PRODUCERS

THEME: POWERING THE AI REVOLUTION

Moderator

Jukka Maksimainen
Senior Partner, McKinsey

Faisal Sultan
Vice President and Managing Director, Lucid Motors

H.E. Dr. Abdullah Alahmari
Assistant Minister of Planning & Development, Ministry of Industry & Mineral Resources, Saudi Arabia

The panel Highlighted voices from the Downstream, Navigating the Future of Green Metals, industry leaders and experts gathered to address the pressing need to develop downstream processing capacity in the metals value chain. The session, moderated with finesse, delved into the intricate dynamics of sustainability, geopolitical considerations, and the burgeoning demand for materials essential to the green transition.

The Critical Role of Downstream Processing
The discussion opened with a focus on the importance of enhancing downstream processing capabilities. The panelists underscored how countries like China had dominated the global processing capacity, raising concerns about supply security and geopolitical stability.

As the world pivots towards sustainable energy solutions, the need for robust and localized processing infrastructure becomes more critical.

Sustainability and Material Demand
The transition to renewable energy sources such as wind and solar power, coupled with the rise of electric vehicles (EVs), has exponentially increased the demand for metals. The panel highlighted that by 2050, electricity consumption is expected to be 2.5 times higher than today, necessitating a significant uptick in metal production. The environmental impact of current production methods, particularly in steel manufacturing, was a focal point, with panelists advocating for a shift to green steel and minerals.

Overcoming Challenges with Innovation
Addressing the high costs associated with green transitions, the panelists called for government incentives and technological innovations. His Excellency Dr. Abdullah A. Al-Aari emphasized the need for transparency in the supply chain, suggesting blockchain as a potential solution to track and verify green practices. The discussion also touched on the importance of public-private partnerships in driving these changes.

Public-Private Partnerships: A Path Forward
The synergy between government bodies and private enterprises was highlighted as a cornerstone for progress. Mr. Faisal Sultan of Lucid Motors shared insights on how collaboration with institutions like King Abdullah University of Science and Technology is paving the way for new methods of mineral extraction and processing. Such partnerships are crucial for aligning research and development efforts with industry needs, ultimately reducing costs and accelerating the adoption of green technologies.

Regulatory Changes and Opportunities
The panelists proposed several regulatory changes to support the development of green metals. These included enforcing recognized standards and certification systems, prioritizing green metals in public procurement, and offering tax breaks and incentives for companies in the supply chain. The need for a comprehensive approach that includes all renewable energy sources, such as wind and geothermal, was also emphasized.

Looking Ahead: Opportunities and Advice
As the world grapples with geopolitical tensions and the accelerating pace of EV adoption, the panellists offered valuable advice for stakeholders. Mr Faisal Sultan highlighted the vast opportunities for innovators to develop sustainable solutions, stressing that efficiency must be at the forefront of all efforts. H.E Dr. Abdullah A. Al-Aari called for a holistic approach, urging collaboration across all value chain stages to ensure a seamless transition to green metals.

INAUGURATION OF FUTURE TECH HUB:
(5-MINUTE SPEECH)

THEME:
POWERING THE AI REVOLUTION

H.E. Bandar Alkhorayef
Minister of Industry and Mineral Resources, Saudi Arabia

H.E. Bandar Alkhorayef began by expressing admiration for the audience and highlighting Saudi Arabia's commitment to making dreams reality. He recounted a visit to New York in early 2023, where the idea of creating a space for innovation and entrepreneurship in Saudi Arabia was inspired. He emphasised the unique support Saudi Arabia offers, including financial backing and opportunities to test new technologies with major companies like Aramco and SABIC. His Excellency assured the audience that the government is dedicated to helping entrepreneurs realise their dreams, making Saudi Arabia an ideal place for innovators. He concluded by encouraging dreamers to seize the opportunities available and wished everyone success.

PLENARY SESSION 3:
SAUDI ARABIA BECOMING THE INNOVATION NATION

THEME:
POWERING THE AI REVOLUTION

Moderator

Dr Jacqui Coombes
Executive Chair, Sageability

H.E. Khalid Al-Mudaifer
Vice-Minister for Mining Affairs, Ministry of Industry and Mineral Resources

Suliman Al-Mazroua
Chief Executive Officer, National Industrial

In this panel discussion, they mentioned the role of Technology in the Minerals Industry.

In a dynamic panel discussion on “Talent and Technology,” industry leaders gathered to address one of the most pressing challenges in the minerals sector: the talent gap. The conversation, moderated with insight and expertise, explored the intersection of human capital and technological innovation, offering a roadmap for the industry’s future.

The panel opened with a stark assessment of the talent shortage plaguing the minerals industry. His Excellency Vice President Khed Alm highlighted the alarming decline in mining engineering and geology students and the retirement of seasoned professionals. This talent gap poses a significant risk to the industry’s growth as the demand for minerals rises.

Technology as a Game-Changer
Technology emerged as a beacon of hope in addressing this challenge. The panellists discussed how advancements in remote mine operations, geophysical and satellite discoveries, and artificial intelligence are revolutionising the sector. These technologies enhance operational efficiency and make the industry more attractive to the tech-savvy younger generation.

Public-Private Partnerships: A Catalyst for Innovation
The discussion underscored the importance of collaboration between government entities and private companies. Initiatives like the Sub-Region Center of Excellence and the Mineral Innovation Park were highlighted as pivotal efforts to foster research, development, and technology adoption. These partnerships are essential for building the infrastructure to support the industry’s transformation.

Vision 2030: A Blueprint for Industrial Transformation
Engineer Sulman Almaza elaborated on how Vision 2030 aims to position Saudi Arabia as an industrial powerhouse and a global logistics hub. He emphasised the role of technology in achieving sustainability, efficiency, and competitiveness. The vision includes developing digital infrastructure and innovation labs and forging partnerships with global technology leaders.

Opportunities for Growth and Innovation
The panelists identified several opportunities for growth and innovation. The potential for new technologies to revolutionize mining and processing was a key theme. Saudi Arabia’s commitment to renewable energy and green technologies also presents significant investment opportunities. The development of innovative cities like NEOM was cited as an example of the country’s forward-thinking approach.

Summary:
The panel discussion on “Talent and Technology” highlighted the severe talent shortage in the minerals industry and the critical role of technology in addressing this gap. Public-private partnerships and initiatives like Vision 2030 were emphasized as key drivers for innovation and industrial transformation.

The panelists called for leveraging technology to enhance efficiency and sustainability, presenting significant opportunities for growth and investment.

“With technology, the factory that’s run by thousands can be run by hundreds using automation, IoT, and technology.”

Suliman Al-Mazroua
Chief Executive Officer,
National Industrial

PLENARY SESSION 4: WHY THE MINERALS INDUSTRY IS NOW THINKING ABOUT SCOPE 3 CARBON EMISSIONS

THEME:
TOWARDS NET ZERO

SUMMARY:

The panel discussion highlighted the importance of addressing Scope 3 emissions in the mining industry, emphasizing sustainability and circularity. Experts discussed leveraging carbon markets, developing nature-based projects, and the role of government and market forces in driving change. They identified opportunities for innovation, particularly in recycling and designing equipment for longevity. The consensus was that a multifaceted approach is crucial for the industry's future sustainability.

BHAGYESH DASH

Director of Climate Projects Structuring, South, Pole

"Scope 3 emissions are connected to activities that you don't own and operate but have a connection to your activities."

KE WANG

Global Lead, Energy Minerals and Circularity, World, Resources Institute

"The clean energy transition needs many types of minerals, and we need to investigate their carbon footprint to prevent future problems."

EMILY OLSON

Chief Sustainability and Corporate Affairs Officer, Vale Base Metals

"Circularity must be in the strategy and on the platform to tackle Scope 3 emissions."

JAY HAMBRO

Chief Executive Officer, Verdigris Strategic

"Circularity plays a key role in addressing Scope 3 emissions by making equipment last longer and reusing it."

PLENARY SESSION 4: WHY THE MINERALS INDUSTRY IS NOW THINKING ABOUT SCOPE 3 CARBON EMISSIONS

THEME: TOWARDS NET ZERO

Moderator

Dennis Gibson
Chairman, Critical Minerals

Bhagyesh Dash
Director of Climate Projects Structuring, South Pole

Ke Wang
Global Lead, Energy Minerals and Circularity, World Resources Institute

Jay Hambro
Chief Executive Officer, Verdigris Strategic

Emily Olson
Chief Sustainability and Corporate Affairs Officer, Vale Base Metals

In a compelling panel discussion, industry leaders delved into the evolving landscape of mining, focusing on sustainability, circularity, and the critical role of Scope 3 emissions.

The discussion began by highlighting the importance of Scope 3 emissions, encompassing all indirect emissions within a company's value chain. This shift towards addressing Scope 3 emissions reflects a broader commitment to environmental responsibility and sustainability within the mining sector.

The complexity of Scope 3 emissions, noting that it remains one of the trickier elements of abatement. They underscored the importance of mapping suppliers and understanding downstream emissions to create a robust strategy.

Another expert provided a detailed breakdown of the three types of emissions: Scope 1, directly related to a company's operations; Scope 2, involving electricity consumption; and Scope 3, connected to activities that are not owned or operated by the company but are linked to its activities.

Circularity: The Key to Sustainable Mining
The discussion then pivoted to the role of circularity in mining. They passionately advocated for circular strategies, highlighting the importance of redesigning processes to integrate circularity and vertical integration into business strategies. They emphasized that circularity plays a key role in addressing Scope 3 emissions by making equipment last longer and reusing it.

Echoed this sentiment, sharing initiatives in battery recycling and using furnace slag as fertilizer. They asserted that circularity must be part of the strategy and platform to tackle Scope 3 emissions effectively.

Leveraging Carbon Markets
The panel also explored how the mining industry can leverage carbon markets to finance emissions reductions. Several strategies were outlined, including purchasing carbon credits for unavoidable emissions and developing nature-based projects. These projects benefit biodiversity and local communities while providing a long-term supply of offsets.

The Role of Government and Market Forces
The conversation took a turn towards the impact of government policies on emissions management.

One panelist remarked that the market is the ultimate driver, and government has a role to play in changing attitudes. They emphasized the importance of consumer demand for responsibly sourced products.

Sustainable businesses are essential and will continue to be so. They noted that customers in Europe are not changing course despite potential policy shifts.

Despite potential policy changes, a third expert highlighted the need for continued climate ambition. They pointed out that many other actors, including state governments and corporates, can maintain the momentum.

Opportunities and Innovation
The panelists identified several opportunities for innovation in the mining sector. One panelist pointed to the potential for partnerships beyond traditional ecosystems, while another stressed the importance of designing equipment for longevity and reuse.

Another expert noted the significant greenhouse gas intensity of minerals like nickel and cobalt, urging the industry to address these emissions to prevent future problems. They emphasized that recycling is a powerful tool because it typically has a much lower GHG intensity than virgin ore mining.

The panel concluded with a consensus on the need for a multifaceted approach to sustainability in mining. From leveraging carbon markets to embracing circularity and driving innovation, the industry is poised to significantly reduce its environmental impact.

The discussion was aptly summarized with the statement that the shift in environmental responsibility and sustainability practices within the sector is crucial for the future.

PLENARY SESSION 5:
TECHNOLOGY AND THE LITHIUM REVOLUTION

THEME:
TOWARDS NET ZERO

SUMMARY:

In a panel discussion on "Technology and the Lithium Revolution," experts explored the transformative potential of lithium in the global energy transition. Key topics included innovative lithium extraction and recycling technologies, the importance of industry-academia collaboration, and the challenges of commercializing new technologies. The discussion highlighted Saudi Arabia's unique opportunities to lead in the energy transition. The session concluded with optimism about scaling up lithium extraction from local resources and the importance of adaptability in technological advancements.

ENG. SAUD EL-MANDIL

Vice President, Technology and R&D, Ma'aden

"This collaboration can be considered a model of innovation in the Kingdom of Saudi Arabia."

PROF. ZHIPING LAI

Founder, Lithium Infinity

"Now, we can achieve in two years what usually takes 20 to 30 years, thanks to the strong support from Ma'aden and KAUST."

PLENARY SESSION 5:
TECHNOLOGY AND THE LITHIUM REVOLUTION

THEME:
TOWARDS NET ZERO

Moderator

Jim Paterson
Principal,
Discovery Group

Paolo Guida
Research Scientist, King Abdullah City for Science and Technology (KAUST).

Eng. Saud El-Mandil
Vice President, Technology and R&D, Ma'aden

Prof. Zhiping Lai
Founder,
Lithium Infinity

In a riveting panel discussion titled "Technology and the Lithium Revolution," industry leaders and academic pioneers came together to explore the transformative potential of lithium in the global energy transition. The session, moderated by a principal from a Vancouver-based group, featured insights from a research scientist and founder of a lithium battery recycling startup, a VP of Technology and Innovation at a major mining company, and a professor and founder of a lithium extraction startup.

The Dawn of a New Era
The moderator enthusiastically introduced the speakers, emphasizing the significance of lithium technology in shaping the future. "Thank you very much for staying late. We've got some great panellists with knowledge on investment, academia, and technology with respect to lithium," he remarked, highlighting the speakers' diverse expertise.

Bridging Academia and Industry
The VP of Technology and Innovation delved into the company's strategic investment in a lithium extraction startup, a venture born from innovative research at a prominent university. "This collaboration can be considered a model of innovation in the Kingdom of Saudi Arabia," underscoring the successful partnership between academia and industry. He elaborated on the critical role of lithium in the energy transition, stressing the need for innovative solutions to address the supply and demand imbalance.

Breakthrough Technologies
The professor captivated the audience with the story of the startup's groundbreaking technology to extract lithium from seawater. "Now we can achieve in two years what normally takes 20 to 30 years, thanks to the strong support from industry and academia," he proudly announced. This pioneering method can potentially revolutionize lithium extraction and significantly impact the renewable energy sector.

The research scientist introduced the recycling startup's innovative approach to recycling lithium-ion batteries. By using acetic acid instead of sulfuric acid, the technology reduces the environmental footprint and enhances economic feasibility. "We figured out that we could reduce by 20 times the footprint required to recycle lithium-ion batteries," he explained, showcasing their method's environmental and economic benefits.

Overcoming Challenges and Seizing Opportunities
The panelists discussed the inherent challenges of commercializing new technologies and the crucial role of industry support. They highlighted the unique opportunities for Saudi Arabia to position itself as a global leader in the energy transition through innovative technologies and local resources.

The VP emphasized the importance of adaptability and agility in developing and commercializing new technologies. He shared insights into the company's strategic approach, which includes taking calculated risks and fostering collaborations to drive innovation. "This collaboration can be considered a model of innovation in the Kingdom of Saudi Arabia," he reiterated, reflecting on the successful partnership with the lithium extraction startup.

A Vision for the Future
The discussion concluded with a forward-looking perspective on the potential for scaling up lithium extraction from oilfield brine in Saudi Arabia. The panelists expressed optimism about the future, envisioning a sustainable and technologically advanced energy landscape.

The moderator concluded the session by expressing appreciation for the panelists' groundbreaking work.

The discussion highlighted the transformative potential of lithium technology and underscored the importance of collaboration and innovation in driving the global energy transition.

PLENARY SESSION 6:
ROLE OF TECHNOLOGY IN HELPING SUPPLIER COUNTRIES ENTER A NEW ERA OF MINERALS

THEME:
TOWARDS NET ZERO

SUMMARY:

In a panel discussion at the Future Minerals Forum, experts explored how technology is revolutionizing mineral exploration. They highlighted the role of AI, seismic imaging, and real-time data in speeding up processes and reducing risks. Key challenges include changing mindsets and adopting sustainable practices. Opportunities lie in collaboration, workforce development, and technology transfer. The session emphasized Saudi Arabia's commitment to becoming a global mining powerhouse by 2030.

DAVID ZHEN YIN

Director and Co-Founder, Stanford, Mineral-X Initiative

"The mindset of realizing that we are moving away from traditional fossil fuels and embracing the mineral world is the biggest challenge."

FLAVIA TATA NARDINI

Chief Executive Officer and Co-founder, Fleet Space

"Time is the problem that I want to solve. Speed is the problem that interests me. We want to reduce the 12 years of finding a new deposit to one year, maybe two months."

CHRIS PAGE

Vice President, New Business Development, Viridien

"Collaboration and partnership amongst service providers to simplify solutions for our customers is key to accelerating progress."

PLENARY SESSION 6:
ROLE OF TECHNOLOGY IN HELPING SUPPLIER COUNTRIES ENTER A NEW ERA OF MINERALS

THEME:
TOWARDS NET ZERO

Moderator

Lyakhov Konstantin
Partner, Metals and Mining Practice, Kearney

David Zhen Yin
Program Director and Co-Founder, Stanford, Mineral-X Initiative

Flavia Tata Nardini
Chief Executive Officer and Co-founder, Fleet Space

Chris Page
Vice President, New Business Development, Viridien

In a dynamic panel discussion at the Future Minerals Forum, industry leaders and innovators gathered to explore the transformative role of technology in helping supplier countries enter a new era of mineral exploration.

The conversation kicked off with a reflection on the traditional, labor-intensive methods of mineral exploration. Constantin Leako set the stage by highlighting the shift towards AI-driven data analytics, seismic imaging, and real-time data processing.

These advancements are not only making exploration faster and more efficient but also reducing risks for investors.

Flavia Tata Nardini shared her journey from the space industry to mining, emphasizing the critical role of time in exploration. “Time is the problem that I want to solve. Speed is the problem that interests me. We want to reduce the 12 years of finding a new deposit to one year, maybe two months,” she stated passionately.

Her company, Fleet Space Technologies, leverages space technology to provide real-time data, significantly accelerating the exploration process.

Challenges and Opportunities for Supplier Countries
Dr. David Jen Yin addressed the historical focus of supplier countries on exporting raw materials, often leaving substantial value to be captured downstream. He stressed the importance of moving along the value chain to create jobs and boost GDP. “The mindset of realizing that we are moving away from traditional fossil fuels and embracing the mineral world is the biggest challenge,” he noted. Dr. Yin highlighted the need for collaboration between supplier countries and research institutions to develop new technologies and foster innovation.

Chris Page brought a unique perspective from Vidiian Group, a leader in geophysics. He discussed the widespread adoption of traditional geophysical approaches and the potential of new algorithms to solve complex imaging challenges. “Collaboration and partnership amongst service providers to simplify solutions for our customers is key to accelerating progress,” he emphasized.

The Path Forward: Collaboration and Innovation
The panelists unanimously agreed on the importance of collaboration and partnerships. They highlighted the need for close cooperation between industry and educational institutions to boost innovation and ensure the rapid transfer of technology. The discussion also touched on the cultural and mindset shifts required to embrace new technologies and sustainable practices in the mining sector.

A Vision for the Future
As Saudi Arabia aims to become a global powerhouse in the mining industry, the panelists identified key challenges and opportunities. They emphasized the need for technology adoption, capability development, and a collaborative approach to overcome obstacles and achieve the Kingdom’s ambitious goals.

Flavia Tata Nardini expressed her admiration for Saudi Arabia’s vision and commitment. “This country has changed so incredibly in the past 10 years. The challenge is that Saudi Arabia is big, with a lot of terrain and not a lot of time. 2030 is around the corner,” she said.

Dr. David Zhen Yin echoed this sentiment, highlighting the urgency of the transition. “We couldn’t repeat the same practice. We need to boost the supply and do it fast,” he urged.

Chris Page pointed out the importance of simplifying solutions for customers through collaboration. “We need to look at how we collaborate and form partnerships within the Kingdom to simplify the solutions for our customers,” he concluded.

The Future Minerals Forum showcased technology’s potential to revolutionize mineral exploration and underscored the importance of collaboration, innovation, and a forward-thinking mindset. As the industry continues to evolve, these discussions will play a crucial role in shaping a sustainable and prosperous future for supplier countries.

DAY 2
16 January 2025

Future Tech Hub (The Link)
Stream 1

PLENARY SESSION 8: DEPLOYING NEW TECHNOLOGIES TO 'LEAPFROG' TOWARDS ADVANCED MINERAL PRODUCTION

THEME: ADVANCED MINERAL PRODUCTION

Moderator

Jim Paterson
Principal, Discovery Group

Hirofumi Katase
Executive Vice Chairman, Director General of Industrial Science and Technology, I-Pulse, President and Chief Executive Officer, G-Pulse

Prof. Adam Simon
Chief Executive Officer, VectOres Science & Professor, University of Michigan

Piia Karhu
President, Metso

Prof. Donald Sadoway
President and Founder, Sadoway Labs
Pascal Lacourie, Chief Executive Officer, EPC Middle East and Asia Pacific

Saud Al Mandil
VP of Technology and Innovation, Ma'aden

In this insightful panel discussion, experts from academia and industry explored how emerging technologies are transforming the mining sector. The session emphasised innovation, sustainability, and collaboration as key drivers for progress.

Mr. Katase discussed the potential of high-power pulse (HPP) technology. He explained its application in advanced geophysical surveys, reducing energy consumption and costs while increasing efficiency.

Highlighting the Typhoon system, he remarked that they can survey five times deeper and 100 times faster than traditional methods, paving the way for groundbreaking exploration capabilities.

Adam Simon introduced hydrogeochemical techniques using water isotopic compositions to precisely identify minerals and improve heap leaching processes. Simon stated that their methods allow them to fingerprint specific minerals with 100% accuracy, emphasising the significant value these innovations bring to resource extraction.

Piia Karhu highlighted Metso's advancements in next-generation flotation solutions, addressing challenges like fines and water usage. Karhu stated that these solutions reduce energy consumption by up to 30% and optimise water usage, making them a game-changer for sustainable mining.

Donald Sadoway emphasised vertical integration and its role in streamlining metallurgical extraction processes. Sadoway noted that the burden is on innovators to demonstrate disruptive technologies at operational scales to reduce risks and ensure adoption.

Pascal Lacourie presented EPC's digital backbone solutions, integrating software and hardware to optimise mining operations, reduce waste, and ensure environmental sustainability.

Lacourie emphasised that their digital solutions are designed to decrease ore dilution by 30% while maintaining environmental integrity.

Session Summary
The panellists stressed the importance of collaboration between academia, industry, and governments to accelerate innovation. They emphasised the role of sustainability in driving efficiency and highlighted the need for demonstrating technologies at practical scales to gain market acceptance. The session concluded with a focus on the collaborative efforts required to bridge research and industry, fostering both innovation and sustainability in the mining sector.

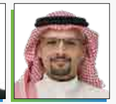
PLENARY SESSION 9:
BREAKTHROUGHS IN BATTERY MATERIALS THAT WILL REVOLUTIONIZE STORAGE

THEME:
ADVANCED MINERAL PRODUCTION

Moderator

Ken Hoffman
Senior Expert, McKinsey

Prof. Donald Sadoway
President and Founder, Sadoway Labs



Dr. Hussam Qasem
General Manager of the Future Energy Technology Institute, King Abdulaziz City for Science and Technology (KACST)

Ignacio de Calojne
Chief Investment Officer - Energy, Green Hydrogen, Metals and Mining, International Finance Corporation

The speaker begins by addressing the audience, emphasising the frequent use of the term “interruption” in modern business discussions. They question how industries can be disrupted and introduce BCM International, a mining services company with nearly a century of experience in disrupting markets. The company was founded in the 1920s in Perth, Australia, during a time when the invention of mass-produced motorcars presented new challenges, particularly the lack of driveways for parking.

Frederick List and Son, a small company, saw an opportunity and began constructing driveways, ultimately disrupting the suburban landscape of Perth.

The company’s success in driveway construction led to its rebranding as Baywater Contracting. As mining booms in Western Australia presented new opportunities, the company evolved, becoming Baywater Civil and Mining, and later BCM International.

During the 1960s, the company secured its first mining contracts after changes in government law allowed iron ore exports to East Asia. In the 1970s, the gold price spike led to further expansion, with BCM involved in remote mining projects across Western Australia.

By the 1990s, BCM extended its operations beyond Australia to West Africa, East Africa, and Central Asia, taking on significant mining contracts in Uzbekistan, Kazakhstan, and Jordan. The company played a vital role in mining oil shale for Jordan’s electricity grid. Since the 1990s, BCM has completed over 86 major projects across 13 countries, spending substantial resources within host nations, creating jobs, and fostering successful client relationships. The company works with prominent clients like AngloGold, Barrick Gold, and Newmont Mining.

In addition to its mining contracts, BCM owns and operates three gold mines and is actively developing exploration projects in Sierra Leone and Karoon. This expansion reflects BCM’s strategy to diversify its operations by not only providing contracted mining services but also owning and operating mines independently or in joint ventures.

Session Summary
The speaker highlights the term “interruption” in modern business and introduces BCM International, a mining services company with nearly a century of disrupting markets. Founded in the 1920s in Perth, Australia, the company initially disrupted the suburban landscape by constructing driveways, evolving from Frederick List and Son to Baywater Contracting. The company adapted to Western Australia’s mining booms, securing contracts in iron ore and gold, leading to the transformation into BCM International.

By the 1990s, BCM expanded globally, taking on major projects in West and East Africa, Central Asia, and Jordan. With over 86 projects across 13 countries, the company built a reputation for investing in host nations, creating jobs, and fostering strong client relationships with major companies like AngloGold and Barrick Gold. BCM also owns and operates gold mines, with active exploration projects in Sierra Leone and Karoon, further diversifying its operations.

PLENARY SESSION 10:
TECHNOLOGY DELIVERING NATURE-POSITIVE OUTCOMES

THEME:
ADVANCED MINERAL PRODUCTION

Moderator

Sarah Gordon
Chief Executive Officer, Satarla

Dr. Osama Faqeeha
Deputy Minister of Environment, Ministry of Environment, Water and Agriculture, Saudi Arabia

Dr Stacy Hope
Managing Director, Women in Mining UK and Partner, ERM

Alison Atkinson
Group Director Projects and Development, Anglo-American

Kimmo Tiilikainen
Director General, The Geological Survey of Finland (GTK)

The session began by highlighting modern mining operations' challenges, particularly the balance between progress and sustainability. While mining and extraction processes are well understood, they come at a significant cost, including financial, environmental, and societal impacts.

The primary dilemma for mining companies is innovating while ensuring operations remain economically viable and environmentally responsible.

A key point emphasised was the need for businesses to adopt new technologies and processes. Companies that hesitate to innovate risk falling behind.

For example, Anglo-Americans have set up smaller mine sites as test labs to trial new technologies. They collaborate with universities, experts, and labs to develop better practices, especially in water management and waste handling.

One notable innovation mentioned was hydraulic dry stacking, a critical development in water and waste management that allows better recycling and reuse of water, minimising the need to extract water from natural sources.

The conversation then shifted to global cooperation in mining research and development. Kimmo Tiilikainen, the Director General of the Geological Survey of Finland (GTK), discussed significant investments in new laboratories and pilot plants designed not only for local use but to be shared globally. This collaboration allows mining companies to avoid duplicating infrastructure and instead share knowledge and expertise across borders. Tiilikainen emphasised that expertise is even more important than infrastructure, underscoring the importance of international cooperation to improve technological solutions and tackle global challenges. By working together, companies can maximise the impact of innovations and avoid redundancy.

The discussion then moved to the financial challenges of adopting new technologies, particularly for junior and mid-tier mining companies. Dr Stacy Hope, Managing Director, Women in Mining UK and Partner, ERM, explained that financing is often a barrier to scaling new technologies. While larger companies like Anglo American may have the resources to absorb innovation costs, smaller companies struggle to justify investments to financiers.

Hope emphasised the need to make a strong business case for investing in climate resilience and efficiency technologies. She argued that companies can attract the necessary investment by demonstrating the financial benefits of these technologies. Furthermore, Hope highlighted the crucial role of policymakers in creating an enabling environment. Policies that promote nature-positive solutions and climate resilience can encourage investors to support these approaches, making sustainable practices more financially viable.

The panellists agreed that collaboration and knowledge-sharing are essential to moving the mining industry forward. By cooperating across companies, sectors, and nations, the industry can overcome financial barriers and drive innovation. The key to success is collective action and sharing knowledge to adopt more sustainable practices.

A final segment of the session focused on the role of governments in fostering sustainability in the mining sector, particularly in Saudi Arabia.

It was emphasized the importance of global best practices and collaboration to avoid reinventing the wheel. It was also stressed that governments must create a regulatory environment that incentivizes sustainable practices and support companies that invest in environmentally friendly technologies.

The session wrapped up with a recognition that sustainability is a journey requiring the involvement of all stakeholders, including government, operators, and innovators. The speaker concluded that open dialogue between these groups is essential to ensure that policies align with technological advancements and that economic factors are considered in the transition to more sustainable mining practices.

Session summary

The session focused on the challenges and opportunities in modern mining, particularly the need to balance progress with sustainability. Panelists discussed the importance of adopting new technologies to improve water management and waste handling, with examples like Anglo American's hydraulic dry stacking innovation. They emphasized the need for global cooperation in research and development, with countries like Finland leading investments in shared infrastructure to avoid redundancy.

Financial barriers to scaling new technologies, especially for smaller mining companies, were also discussed, with the importance of creating a strong business case for investors. Additionally, policymakers play a key role in creating an enabling environment for sustainable practices. The speakers agreed that collaboration across companies, sectors, and nations is crucial for driving innovation and achieving more sustainable mining practices. The session concluded with a call for ongoing engagement to further explore these issues.

PLENARY SESSION 11: MAKING WATER COUNT: TRANSFORMING WATER INTO A REVENUE-DRIVING METRIC FOR MINERAL PRODUCTION

THEME: ADVANCED MINERAL PRODUCTION

Moderator

Dr. Kwasi Ampofo
Principal Head of Metals and Mining, BloombergNEF

Carlos Cardounel
Vice President and General Manager NALCO Water Global Mining, NALCO Water, An Ecolab Company

Dr. Ahmed Degnah
Associate Professor, King Abdulaziz City for Science and Technology (KACST)

Rafael Guedes
Senior Fellow, CEBRI - Centro Brasileiro de Relações Internacionais

The panel discussion revolved around the critical role of water in the mining industry, addressing innovative methods for water recycling, efficient management, and sustainability.

Speakers shared their expertise on making water a source of revenue while ensuring environmentally conscious operations.

Carlos Cardounel opened the session, emphasizing, “Mining is inherently a water story. With modern technology, they can monitor and optimize water use, reducing consumption and operational costs while preserving the environment. He highlighted innovations like digital twins and AI-driven monitoring, enabling real-time water circuit mapping to improve recycling within mining plants.

Ahmed Degnah shared Saudi Arabia’s advancements in water management in mining, stating, they treat sewage water, recycle it, and use it for mining operations. This reduces reliance on fresh water and promotes sustainability. He also explained the Kingdom’s adoption of desalination plants near coastal mines, showcasing their leadership in sustainable water management practices.

Rafael Guedes discussed the balance between technology adoption and community engagement, saying, Promoting equitable water access, transparency, and job creation within communities ensures both operational success and social license to operate. She emphasized the need for inclusive strategies that integrate local communities into water management initiatives.

PLENARY SESSION 12:
ACCELERATING GREEN METALS PRODUCTION... WHAT IS REQUIRED TO MAKE IT HAPPEN?

THEME:
GREEN METALS

Moderator

Frederic Ozeir
Partner, Energy and Natural Resources, Oliver Wyman

Tadeu Carneiro
Chairman and Chief Executive Officer, Boston Metal

Nicolas Burr
Corporate General Manager, CAP

Irina Gorbounova
CVice President M&A and Head of XCarb Innovation Fund, ArcelorMittal

The metals and steel industries are working towards a goal of cutting emissions by 30% by 2030-2035. However, achieving this ambitious target faces several challenges. A key factor is the slow progress in technological advancements needed to transition to green steel production.

Currently, green steel is significantly more expensive—20-40% higher in cost—compared to traditional steel due to the high investment in new production technologies. Furthermore, while renewable energy is seen as a crucial component of decarbonization, its availability remains limited, hindering efforts for sustainable production.

Additionally, there are inconsistencies in global regulations, which impact the ability of companies to adopt green technologies across different regions effectively.

Demand for green steel and metals is expected to increase by five to six times within the next 5 to 10 years, as sustainability becomes a top priority across industries. This surge in demand will require new strategies to ensure proper certification, traceability, and standardization of green products. Although financing options such as green bonds and private equity investments are being used to fund the transition, the economics of green steel production remain less favorable compared to conventional methods. Financing alone cannot overcome the high costs involved, and more widespread policy support is needed to encourage large-scale adoption of green practices in the metals and steel sectors.

The global steel industry, which produces around two billion tons of steel annually, is a major contributor to CO2 emissions, accounting for 7-8% of global emissions. The conventional steel production process emits about two tons of CO2 for every ton of steel produced. This heavy carbon footprint makes it clear that transitioning to greener methods is essential for reducing environmental impact while meeting the growing demand for steel. The industry's shift towards green production is not just about reducing emissions but also about securing long-term sustainability and resilience in an increasingly eco-conscious global market.

Session summary
The metals and steel industries are aiming to cut emissions by 30% by 2030-2035, but several challenges remain. Key hurdles include slow progress in green steel technology, high costs (20-40% more expensive than traditional steel), and limited renewable energy availability. Additionally, inconsistencies in global regulations make it difficult for companies to adopt green technologies consistently across regions.

As demand for green steel and metals is projected to grow significantly in the next 5-10 years, new strategies for certification, traceability, and standardization are necessary. Despite financing options like green bonds, the high costs of green steel production make it less economically viable than conventional methods. The steel industry, a major contributor to global CO2 emissions, must transition to greener practices to reduce environmental impact and ensure long-term sustainability in a rapidly changing market.

PLENARY SESSION 13:
MINERALS FOR INFRASTRUCTURE DEVELOPMENT: FUTURE CEMENT INITIATIVE

THEME:
GREEN METALS

Moderator

Bassam Dally
Professor of Mechanical Engineering, King Abdullah University of Science and Technology, KAUST

Eng. Mosleh Alemrani
General Manager, Ministry of Industry & Mineral Resources, Saudi Arabia

Majed Al Osailan
Chief Executive Officer, City Cement

The session revolved around the Future Cement Initiative (FCI), highlighting Saudi Arabia's cement industry's efforts toward sustainability and collaboration among key stakeholders. The speakers explored strategies to reduce carbon emissions, promote sustainable practices, and enhance technological innovations within the industry.

Bassam Dally introduced the Future Cement Initiative as a collaborative effort involving King Abdullah University of Science and Technology (KAUST), the National Committee for Cement Companies, and the Ministry of Industry and Mineral Resources. He emphasized the mission to develop cost-effective, scalable solutions that reduce environmental impact while enhancing economic performance. He stated that their mission is to develop cost-effective, scalable solutions that reduce environmental impact while enhancing economic performance, underlining the alignment of sustainability with economic growth. He outlined the initiative's goals to connect industry leaders, academia, and government stakeholders in driving sustainable innovation.

Eng. Mosleh Alemrani discussed the ministry's efforts to decarbonize the cement industry, noting that cement production accounts for 8% of global CO2 emissions. He elaborated on strategies such as improving production processes, switching to cleaner energy sources like natural gas, and utilizing Saudi Arabia's natural resources, such as pozzolan, to reduce the carbon footprint. He noted that Educating engineering offices and updating building codes are essential steps to promote greener cement solutions, emphasizing the importance of awareness and regulatory improvements.

Majed Al Osailan provided insights into the cement industry's current status and its role in reducing emissions. He acknowledged the industry's reputation as a significant polluter but highlighted ongoing progress. He stated that Saudi Arabia's cement companies have increased the use of alternative fuels and reduced reliance on fossil fuels, stressing the importance of collaboration between government, academia, and industry to achieve carbon neutrality and foster innovation.

Session summary
The session underscored the Future Cement Initiative's mission to unify academia, industry, and government in advancing sustainable practices within the cement sector. Strategies for decarbonization include improving production efficiency, adopting cleaner energy, and leveraging natural resources such as pozzolan to lower emissions. The speakers emphasized the critical role of education, updated regulations, and stakeholder collaboration in overcoming challenges and achieving sustainability. The initiative also seeks to localize solutions that align with Saudi Arabia's conditions, contributing to the nation's Vision 2030 goals and its commitment to carbon neutrality.

The session concluded with a call to action for stakeholders to join the Future Cement Initiative and contribute to the shared vision of a sustainable future. The discussion highlighted the potential for Saudi Arabia's cement industry to lead in sustainable practices while supporting the country's Vision 2030 goals.

PLENARY SESSION 14: TECHNOLOGY AND DEVELOPMENT: HOW INNOVATION CAN HELP LOCAL VALUE CREATION AND ACCELERATE THE ENERGY TRANSITION

THEME:
GREEN METALS

Moderator

Jim Paterson
Principal, Discovery Group

Dr. Stefano Santarelli
Chief Executive Officer, RE-CORD

Dr. Iztok Seljek
Vice Chairman, Wahaj

Max Luedtke
Global Business Line Manager for Mining and Vice President, ABB Process Industries

Ionut (Johnny) Lazar
Principal Consultant, CRU

The session titled "Technology and Development: How Innovation Can Help Local Value Creation and Accelerate the Energy Transition" brought together experts to discuss the transformative role of innovation in addressing pressing industrial and environmental challenges.

Dr. Stefano Santarelli emphasized the importance of bridging the gap between academic research and industrial applications, stating, "RE-CORD's mission is to commercialize innovative technologies through pilot plants and scalable solutions, enabling practical applications for a sustainable future."

He highlighted RE-CORD's success in fostering startups and creating new ventures based on cutting-edge research, particularly in bioeconomics and circular economy initiatives.

Dr. Iztok Seljek introduced the Wahaj project, which focuses on electrification solutions in Saudi Arabia. He explained that their goal is to establish an electrical steel industry, driving local production of electric motors with 100% green electricity. He further noted the importance of vertical integration in creating sustainable business models, leveraging local resources for both economic and environmental benefits.

Max Luedtke from ABB highlighted the pivotal role of electrification, automation, and digitalization in advancing sustainable mining practices. He stated that Electrification and digitalization are the cornerstones of productivity and energy transition, sharing insights from a recent ABB study where 77% of industry leaders identified these technologies as key drivers for achieving sustainability targets. Luedtke also showcased examples of remote mining operations and ABB's investment in robotics to enhance safety and efficiency.

Ionut (Johnny) Lazar underscored the importance of tailoring innovative solutions to regional needs.

He shared examples of hydrogen blending in gas turbines and renewable energy certificates as methods to balance cost competitiveness with sustainability goals. Lazar asserted that Collaboration among stakeholders ensures that finite resources are optimally utilized while maintaining a competitive edge in export markets.

The session concluded with a discussion on uranium's role in energy transitions, led by Dr. Mark Melosi. He explained that technological advancements, such as extracting uranium from unconventional sources like phosphate deposits, could transform the industry. Melosi stated that with the right investments and technology, Saudi Arabia could emerge as a leader in uranium production, aligning with global energy goals.

Session summary
The panel emphasized the need for collaboration between academia, industry, and government to drive innovation. Key strategies include integrating advanced technologies, fostering local ventures, and addressing regional challenges through tailored solutions. As moderator Jim Paterson aptly summarized, "Innovation and collaboration are not just drivers of progress; they are essential for achieving sustainable and impactful transformations in today's industries."

DAY 2
16 January 2025

Investment Hub (Dome Theater)
Stream 2

PRESENTATION 1: THE ROLE OF MULTILATERAL ORGANIZATIONS IN TURBO-CHARGING CRITICAL MINERAL SUPPLY

THEME: FINANCING MODELS AND TRACEABILITY

Moderator

Hadley Gamble
Journalist,
Al Arabiya

Demetrios Papathanasiou
Global Director at Energy and Extractives,
The World Bank

The discussion focuses on the current state of the critical minerals supply and the potential for a future supply crunch, particularly as the world moves towards a Net Zero target by 2050.

Over the past two years, there has been a significant fluctuation in the prices of minerals, driven by disruptions during the COVID-19 pandemic, especially as Chinese processing slowed down.

However, prices have stabilised, and the supply and demand for minerals seem to be balancing out. Despite this, there is concern about a future shortage of essential minerals due to the massive demand created by the global shift towards electrification and clean energy. The urgency of this transition could cause further market rebalancing, but the pace at which the world commits to energy transition efforts will ultimately determine future outcomes.

In light of these concerns, the discussion also touches on the geopolitical implications of the energy transition, explicitly referring to the political landscape in the United States. The potential re-election of Donald Trump raises questions about the future of energy policies, particularly concerning his historical stance on energy independence and reluctance towards green energy initiatives. For many nations, the energy transition is not solely a climate issue but is intertwined with economic and geopolitical factors. Countries like India and Indonesia are prime examples of major economies that may approach the energy transition with different priorities, adding further complexity to the global strategy for achieving sustainability and meeting the world's growing energy demands.

The discussion highlights several critical issues related to the global energy transition.

It begins by addressing the supply challenges for vital minerals, particularly those needed for batteries, noting that a supply crunch occurred around two years ago. This was partly due to disruptions in global supply chains, especially in China during the COVID-19 pandemic. Although prices have stabilised, there remains concern that the growing demand for these minerals might outpace supply, especially with the global goal of achieving net-zero emissions by 2050.

Session Summary
The discussion highlights concerns about the supply of critical minerals needed for clean energy technologies, with potential future shortages as demand rises due to the global push for net-zero emissions by 2050. Although mineral prices have stabilised after pandemic disruptions, the increased demand for electrification and clean energy may still cause supply imbalances.

The geopolitical landscape, particularly in the U.S. with the possible re-election of Donald Trump, complicates the energy transition. Some nations, like India and Indonesia, have different priorities for energy policies, blending economic and geopolitical factors with climate concerns. This adds complexity to the global strategy for achieving sustainability and addressing rising energy demands.

PRESENTATION 2:
FUTURE GOLD OUTLOOK: A MAJOR'S PERSPECTIVE

THEME:
FINANCING MODELS AND TRACEABILITY

Moderator

Remi Piet
Co-Founder & Senior Partner, Embellie Advisory

Alexey Vostokov
Chief Executive Officer, Polyus

Alexey Vostokov, the Chief Executive Officer of Polyus, began by addressing the challenges faced by the gold mining industry, emphasising the rising labour costs and skill shortages that have emerged due to demographic shifts. These shifts included low birth rates and a generational gap in technical expertise.

The younger generation, in particular, perceived the mining industry as outdated and environmentally harmful, leading to a lack of fresh talent entering the field.

To combat these challenges, Alexey Vostokov advocated for a fundamental rethinking of workforce development. It is essential for companies to create dynamic, inclusive, and respectful work environments that resonate with the values of younger generations. This involves focusing on sustainability, innovation, and purpose-driven work, key factors that appeal to the modern workforce. Vostokov suggested that aligning these factors with corporate culture would help attract a new wave of skilled professionals to the industry.

Vostokov then discussed the importance of adopting a balanced, forward-looking strategy for the gold mining sector. Financial discipline is crucial, with investments needing to be both targeted and sustainable. However, he stressed that embracing innovation is not optional. Integrating advanced technologies into mining operations could not only enhance efficiency but also could help draw in a new generation of skilled workers. This strategic focus on innovation and technology would ensure that gold mining companies remain competitive in an evolving global market.

Furthermore, Vostokov underscored that companies must prioritise investments in people, technology, and sustainable practices. These elements were necessary for securing the future of the gold mining industry, ensuring that companies maintain their leadership role in the global economy.

By addressing the current challenges through strategic workforce development and technological advancements, the industry could overcome obstacles and thrive in the future.

The speech concluded with a call to action, urging industry leaders to focus on these key areas. His message highlighted the necessity of forward-thinking strategies to navigate the challenges faced by the industry and secure its role as a leader in the global economy.

Session Summary
The presentation addressed the challenges facing the gold mining industry, particularly rising labour costs, skill shortages due to demographic shifts, and the industry's negative perception among younger generations.

It emphasised the need for companies to create inclusive, sustainable work environments that align with younger values. Additionally, it highlighted the importance of financial discipline and innovation, stressing that embracing advanced technologies could improve efficiency and attract skilled workers.

By investing in people, technology, and sustainable practices, gold mining companies could have positioned themselves as leaders in a changing global economy.

PRESENTATION 3: IT TAKES TWO TO TANGO: INVESTORS AND CUSTOMER COUNTRIES STEPPING UP TO FINANCE MINERAL SUPPLY IN DEVELOPING REGIONS

THEME: FINANCING MODELS AND TRACEABILITY

Moderator

Frank Mariage
Partner, Fasken

Marcel de Groot
Co-Founder and President, Pathway Capita

Remi Piet
Co-Founder & Senior Partner, Embellie Advisory

Ludivine Wouters
Managing Director, Latitude Five

Peter Marrone
Chairman and Chief Executive Officer, Allied Gold Corporation

Frank Marage, Senior Partner at Fasken, a leading Canadian law firm, opened the panel discussion on financing mineral supply in developing regions, particularly in relation to the Kingdom of Saudi Arabia's Vision 2030.

As part of this vision, Saudi Arabia is set to invest $41 billion in Africa, focusing on expanding its economic base beyond oil, with mining and mineral sectors playing a central role in its future economy.

Marage introduced the panel, which includes industry leaders such as Marcel, Co-founder and President of Pathway Capital; Pet, Senior Partner of Ambel Advisory; Ludin Woters, Managing Director of Latitude 5; and Peter Morone, Chairman and CEO of Allied Gold.

The discussion explored the key factors and challenges surrounding these significant investments, particularly within Saudi Arabia's ambitious agenda. The panellists addressed various aspects of financing mineral supply, the geopolitical dynamics, and the challenges associated with the growing need for mineral resources in developing regions. This dialogue highlighted the importance of international cooperation and investment strategies in addressing these challenges, focusing on creating sustainable solutions for the future.

Session Summary
Frank Marage, Senior Partner at Fasken, introduced a panel discussing financing mineral supply in developing regions, focusing on Saudi Arabia's Vision 2030. As part of this vision, Saudi Arabia plans to invest $41 billion in Africa, aiming to diversify its economy by boosting the mining and mineral sectors beyond oil.

The panel, featuring industry leaders like Marcel from Pathway Capital and Peter Morone from Allied Gold, explored the challenges and factors involved in such investments. They emphasised the importance of strategic partnerships and international cooperation in addressing the growing demand for minerals and achieving sustainable economic growth in developing regions.

PRESENTATION 4:
COBALT: PRICING, TRENDS, AND MARKET PROJECTIONS

THEME:
FINANCING MODELS AND TRACEABILITY

Moderator

Dinah McLeod
Director General, Cobalt Institute

Dr. Kwasi Ampofo
Principal Head of Metals and Mining, BloombergNEF

George Q. Fang
Vice Chairman, Executive Vice President, Huayou Cobalt

This presentation centered around cobalt's future and its role in meeting global energy demands, focusing on sustainability, ethical practices, and the growing need for recycling.

It started with a reflection on the significance of cobalt in the context of the energy transition and its sustainable extraction.

It was emphasized the importance of cobalt in this transition, highlighting the role of the Cobalt Institute in upholding high industry standards and sustainability. A particular achievement mentioned was the first copper mark received in Africa, showcasing the commitment to sustainable and ethical practices within the industry.

This focus was further supported by the Cobalt 2050 study, which estimates that recycling will meet up to 18% of global cobalt demand by 2035. Although emphasizing the continued need for mining, this projection underscored the importance of recycling to ensure a balanced supply.

The role of recycling was emphasised, discussing the impact of this process in meeting future demand and its effect on pricing and market dynamics. The speakers explained the growing importance of recycling cobalt, particularly from battery usage, which was a core business unit for their company. It was outlined the advancements in technology and the strong recovery rates achieved in recycling efforts, noting that cobalt and nickel recovery through recycling has reached levels as high as 97%. However, the recycling process was still in the early stages, with the penetration of the electric vehicle (EV) market still relatively low. Despite this, it was highlighted that the percentage of cobalt recycled was expected to increase significantly in the coming years, with projections of 18% or higher by 2035.

It was discussed the role of government policies and economic factors in accelerating the growth of recycling initiatives. With the support of regulations in Europe and China encouraging materials recycling, the cobalt recycling business was gaining momentum. Policies and environmental, social, and governance (ESG) considerations also played a significant role in fostering this shift. The speaker emphasised that the growth of cobalt recycling, alongside mining practices that adhere to ethical and sustainable standards, will contribute to the market's projected expansion, with cobalt being a crucial player in reducing emissions by displacing oil and gas.

In conclusion, this discussion illustrated that cobalt's future was shaped by both technological advancements in recycling and a broader commitment to sustainability and ethical practices in mining. With strong policy support and an evolving recycling ecosystem, cobalt was poised to contribute significantly to the future energy landscape, displacing fossil fuels while ensuring a responsible supply chain.

Session Summary
This discussion centered on the critical role of cobalt in the global energy transition, emphasizing sustainability and recycling. Speakers highlighted the importance of ethical mining practices and the growth of recycling, with projections suggesting that recycling could meet up to 18% of global cobalt demand by 2035.

Technological advancements in recycling, particularly in battery recovery, were improving cobalt recovery rates. Government policies and environmental regulations were further accelerating recycling efforts.

Overall, cobalt's future relied on a combination of sustainable mining and increasing recycling to meet rising demand and support the shift towards greener energy sources.

PRESENTATION 5:
HOW SAUDI ARABIA IS INVESTING TO DIVERSIFY ITS ECONOMY AND HELP THE WORLD

THEME:
SAUDI ARABIA CREATING A NEW MINERALS INDUSTRY

Moderator

Helima Croft, Managing Director, Head of Global Commodity Strategy and MENA Research, RBC Capital Markets

Dr Klaus Kleinfeld Founder and Chief Executive Officer, K2Elevation

Dr. Hyung Hwan Joo Invited Professor, Seoul National University; Former Minister of Trade, Industry and Energy, Republic of Korea

Tarmo Haehnsen Chief Investment Officer, Manara Minerals

The "How Saudi Arabia is Investing to Diversify its Economy and Help the World" session explored the Kingdom's ongoing efforts to foster economic diversification, focusing on key strategies, achievements, and future opportunities within the minerals sector and beyond.

Dr. Klaus Kleinfeld highlighted Saudi Arabia's Vision 2030 as a cornerstone of its transformation strategy. He identified the Kingdom's visionary leadership, robust action plans, and rigorous implementation frameworks as critical success factors.

Initiatives such as the National Industrial Development and Logistics Program (NIDLP) have been pivotal in driving measurable progress. Dr Kleinfeld also underscored the role of the Future Minerals Forum in positioning Saudi Arabia as a global hub for the industry.

Tarmo Haehnsen emphasised the importance of forming strategic partnerships to advance local and international industrial value chains. Manara Minerals' investments have already yielded significant milestones, including securing $2.5 billion in projects aimed at creating integrated supply chains. He pointed to the need to develop a robust ecosystem to attract investments and enable downstream production, including lithium refining and copper processing facilities.

Dr. Hyung Hwan Joo addressed the importance of midstream and downstream industries, particularly in sectors such as batteries, electric vehicles (EVs), and semiconductors. He detailed the challenges and opportunities stemming from global shifts, including geopolitical tensions, evolving trade policies, and the rising demand for critical minerals. Dr. Joo also highlighted the potential for Saudi-Korean collaboration to create resilient supply chains and enhance technological integration.

The discussion concluded with a forward-looking perspective on the geopolitics of critical minerals, emphasising the Kingdom's unique position to act as a neutral, reliable supplier. The speakers collectively stressed the importance of enhancing investment climates, fostering trust in partnerships, and aligning stakeholders to ensure long-term success.

Session Summary

The panel highlighted Saudi Arabia's remarkable progress in economic diversification, driven by strategic investments, visionary leadership, and international collaboration. Key priorities moving forward include accelerating data collection in the geological sector, strengthening ecosystems to support industrial value chains, and leveraging partnerships to achieve long-term sustainability. The session underscored the Kingdom's potential to lead global efforts in critical minerals and advanced industries, solidifying its role in the evolving economic landscape.

FIRESIDE CHAT:
UNLOCKING INVESTMENT SOLUTIONS AND NEW OPPORTUNITIES IN THE MINERAL INDUSTRY

THEME:
SAUDI ARABIA CREATING A NEW MINERALS INDUSTRY

Moderator

Hadley Gamble,
Journalist, Al Arabiya

Kirill Dimitriev
Chief Executive Officer,
Russian Direct Investment Fund

The conversation centred around the economic impact of the ongoing conflict, with a focus on Russia, Europe, and energy markets. They touched on the significant impact of sanctions on Russia, emphasising the adverse effects on the Russian economy, including rising inflation and other economic difficulties.

Despite these challenges, the Russian economy has demonstrated some resilience, notably through consistent growth figures, particularly in sectors such as agriculture and manufacturing. Kirill Dimitriev, the Chief Executive Officer of the Russian Direct Investment Fund, highlighted the strength of Russia's trade relations with non-Western countries, particularly in Asia, and its ongoing efforts to diversify its economic ties and reduce its dependency on the West.

Moreover, the conversation shifts toward the ongoing energy crisis in Europe, exacerbated by the reduction in Russian gas exports. It was discussed how the lack of access to Russian energy supplies had put immense pressure on European industries and households. Europe's response to the crisis, including seeking alternative energy sources, led to increased costs and challenges for industries that rely heavily on cheap energy, such as manufacturing. Kirill Dimitriev also underscored the growing divide between the US and Europe over energy policies, particularly regarding US LNG (liquefied natural gas) exports and the economic implications for Europe. The conversation touches on the broader geopolitical consequences of energy dependence and the economic repercussions for European nations.

Furthermore, Kirill Dimitriev expanded on the financial strain Europe was experiencing due to the loss of Russian gas, with a cumulative cost exceeding a trillion euros. This loss is directly affecting Europe's industrial and economic resilience. The European Central Bank's high interest rates, intended to control inflation (which is at 8-9%), are also a significant factor in the current economic landscape. Dimitriev expressed concern that these rates may be too high and advocated for a reduction in the near future.

On a more optimistic note, Dimitriev pointed out Russia's relatively positive economic growth despite the sanctions, with a growth rate of 4%, and suggests that the Russian economy could maintain a slow but steady growth trajectory. He also highlighted Russia's near 2% unemployment rate, pointing to labour shortages as a significant challenge for the country's economy.

The conversation concluded with a discussion about the US's energy policy, particularly the push for US LNG exports to Europe, which has implications for Russia. Dimitriev suggested that while sanctions on Russian LNG may increase, there is potential for cooperation between Russia and the US in areas like anti-terrorism and economic initiatives. He also critiqued Europe's handling of the energy crisis, arguing that Europe's economic difficulties are partly self-inflicted due to its decision to cut ties with Russian energy. They propose that a more balanced approach, incorporating LNG from various sources, could benefit Europe. Looking ahead, he predicted that Europe would shift toward a more self-reliant economic model, focusing on internal growth, job creation, and securing diverse energy supplies. This shift would allow Europe to manage its economic future better and reduce dependence on external pressures, particularly from the US.

Session Summary
This conversation discussed the economic impacts of the ongoing Russia-Ukraine conflict, focusing on Russia's resilience despite sanctions and the significant strain on Europe due to reduced Russian gas supplies. Dimitriev highlighted Russia's relatively stable economic growth, low unemployment, and efforts to diversify trade relations. Europe, meanwhile, faces high energy costs and economic difficulties due to energy shortages and high inflation, with the European Central Bank's high interest rates exacerbating the situation. The conversation also touched on the US's energy policy and its impact on Europe, suggesting that Europe would eventually shift towards more self-reliance, focusing on internal growth and securing diverse energy supplies.

PRESENTATION 6: MAKING HIGH-RISK, MINERALS-RICH JURISDICTIONS INVESTABLE BY GROWING SUPPLY CHAIN TRANSPARENCY AND CERTIFICATION

THEME: SAUDI ARABIA CREATING A NEW MINERALS INDUSTRY

Moderator

Veronica Bolton-Smith, Chief Executive Officer, Critical Minerals Africa Group

Bady Baldé Deputy Chairman, Extractive Industries Transparency Initiative (EITI)

Jean-Raymond Boulle Chief Executive Officer, Jean Boulle Group

Lapp Thore Executive Vice President, T-V S-D

Silvio Dulinsky Deputy Secretary General – ISO – International Organisation for Standardization

Emily Iona Stewart Head of Policy and EU Relationships; Transition Minerals, Global Witness

The panel session, moderated by Veronica Bolton Smith, CEO of the Critical Minerals Africa Group, discusses the challenges and opportunities of making high-risk mineral jurisdictions more investable by increasing supply chain transparency and certification. Veronica has over 20 years of experience working across 32 African nations, focusing on trade and investment. She introduces the session and its distinguished panellists. Jean Buul, a mining expert with extensive experience in significant mineral discoveries, shares insights from the group's achievements, including large nickel deposits in Canada and offshore diamond mining in Namibia. He also highlights mineral investments in Angola, Madagascar, and Saudi Arabia, underscoring their contributions to local economies. B. Bal, deputy executive director of the EII, emphasises the importance of responsible mining. At the same time, Emily Aona Stewart from Global Witness brings attention to the intersection of human rights and climate change, particularly in the mineral sector. Tor, Executive Vice President of Tu Suit Holding, focuses on green energy and sustainability in mining. Lastly, Cinski, Deputy Secretary General of the International Organization for Standardization (ISO), emphasises the role of standards in supporting the mining sector's operations. With this diverse expertise, the panel aims to explore solutions for enhancing transparency and certification in high-risk mining areas.

International stakeholders must acknowledge the realities faced by countries operating in the mining sector. It is not the same as running mining operations in northern countries as in other parts of the world. The adaptability of standards to local practices is crucial, and the certification process, as discussed by colleagues, is vital. The entire ecosystem, including national quality infrastructure, is critical in ensuring that countries can integrate into global value chains. Without ensuring quality and standards, it becomes impossible to attract investment. Quality assurance along the value chain is fundamental for growth.

Trust is key in this process. New markets and opportunities can open by developing trust, whether for investors or operators. This trust can also expedite the licensing process, reduce bureaucracy, and provide certainty for long-term investments. Many benefits arise when trust is established, including a more stable operating environment. Ultimately, these efforts help establish a framework for responsible, effective mining operations. The goal is to ensure the rule of law and collaborative, pre-competitive efforts that contribute to stability in the industry.

In this conversation segment, the participants are discussing the critical role of standards in the mining industry, particularly in Africa. One speaker highlights the importance of engaging companies in the process of developing standards, emphasising that this participation allows companies to influence regulatory discussions instead of just complying with them. The conversation also touches on how companies should strategically manage environmental, safety, and risk systems to achieve better compliance and operational efficiency.

Another speaker discusses the challenges of navigating jurisdictions with no clear regulatory frameworks, sharing an example from their experience in Canada. Despite facing logistical challenges in Labrador, the discovery of a significant nickel deposit was eventually made, but it was complicated by the arrival of indigenous groups who claimed the land. This example underscores the importance of building relationships with local communities and overcoming challenges in unregulated environments.

Overall, the conversation reflects the complexity of operating in the mining industry, particularly in terms of navigating regulatory frameworks, engaging with local communities, and adhering to standards for operational efficiency.

Session Summary

The panel, moderated by Veronica Bolton Smith, CEO of Critical Minerals Africa Group, explores ways to make high-risk mining jurisdictions more investable by enhancing supply chain transparency and certification. Experts, including Jean Buul, B. Bal, Emily Aona Stewart, Tor, and Cinski, share their insights on responsible mining, human rights, sustainability, and the role of standards.

They discuss how improving the mining process's transparency, trust, and quality assurance can foster investment, create a stable operating environment, and ensure long-term success in high-risk mining areas.

The conversation also stresses the importance of adapting standards to local practices and integrating national quality infrastructure to ensure countries can connect to global value chains. Participants highlight the significance of building trust between investors and operators, which can expedite licensing, reduce bureaucracy, and open new markets. Real-world examples, such as challenges faced in Labrador and the impact of Indigenous communities in unregulated areas, illustrate the need for collaboration and relationship-building to navigate regulatory complexities and drive operational success.

PRESENTATION 7: CHARTING THE FUTURE OF EXPLORATION: A SAUDI ARABIA-LED VISION TO ATTRACT AND EMPOWER JUNIOR EXPLORERS

THEME: SAUDI ARABIA CREATING A NEW MINERALS INDUSTRY

PANEL 1

Moderator

Bernadette Sukkar
Founder and Chief Executive Officer, Saint Gabriel

Ahmed Al-Aqeel
General Manager of Mining Investment, Ministry of Industry and Mineral Resources, Saudi Arabia

Eng. Ameen Alghamdi
Vice President-Compliance, ESNAD

Raed Shami
Geologist, Saudi Geological Survey

PANEL 2

Moderator

Ines Scotland
Executive Chair, Metal Bank

Bill Brodie Good
Chief Executive Officer, Power Arabia

Christian Milau
Chief Executive Officer, Saudi Discovery Company

Panel 1:
The first panel delved into Saudi Arabia's comprehensive efforts to position the mining sector as a cornerstone of the economy under Vision 2030. Ahmed Al-Aqeel highlighted the nation's push for economic diversification, emphasising a mining sector valued at $1.3 trillion in 2019.

Recent regulatory updates have enabled 100% foreign ownership and prioritised sustainability.

R. Shami discussed $2 billion in investments toward geological data acquisition and advanced surveys, aiming to enhance transparency and attract global interest.

Ameen Alghamdi outlined key incentives, such as streamlined licensing, digital platforms, and financial grants of up to $2 million designed to attract investors.

The panel stressed the importance of unified efforts between the Ministry, SGS, and Esnad to create a seamless and attractive investor experience. Notable achievements include raising exploration spending from 80 SAR/km² in 2018 to 230 SAR/km² by 2024 and launching the National Geological Information Database. However, challenges such as workforce development, scaling infrastructure, and encouraging financial investment remain priorities for future growth.

Panel Two:
The second panel focused on the role of junior exploration companies in Saudi Arabia's mining sector. Ines Scotland and Bill Brody highlighted the country's untapped mineral wealth, streamlined regulations, and Vision 2030 support as primary motivators for entry into the market. Panellists praised the improved mining codes, collaboration opportunities, and the overall business-friendly environment, which have bolstered exploration initiatives.

Challenges such as educating investors about the sector's potential and managing the resource-intensive nature of exploration were acknowledged. Companies like Metal Bank and Saudi Discovery Company have adopted strategies such as rapid exploration, leveraging partnerships, and diversifying portfolios to address these challenges. Key achievements include awarding exploration licenses to Saudi Discovery Company and the increased participation of the private sector, which now accounts for 75% of exploration spending. Despite these successes, building investor confidence and ensuring the timely completion of projects remain crucial.

Session Summary
The discussions underscored Saudi Arabia's commitment to establishing itself as a global leader in the mining sector. Vision 2030 reforms, coupled with the active involvement of junior exploration companies, have created a vibrant and thriving investment environment. Nonetheless, sustaining growth will require continuous focus on workforce development, infrastructure expansion, and financial education to meet the sector's evolving needs.

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