# The essential role of mining-tech in meeting emerging global demands and how IMDEX is positioned to benefit



9 MARCH 2021

"We need to get to the point where society views mining as necessary for the wellbeing of its own existence."

TONY O'NEIL, ANGLO AMERICAN 10 NOVEMBER 2020

# A quick review of the trends that are driving activity in commodities

# Megatrends shaping commodity markets over the coming decade

| | Megatrend | Description |
|---|---|---|
|  | **Middle class development** | Rise in urbanization and growing share of middle classes wealth globally will continue to drive demand for metals |
|  | **China** | Increasing role of China as a global leader, with growing impact on commodity markets |
|  | **Consumer habits** | COVID behavioral changes expected to remain e.g. remote working, partial reverting of sharing economy, etc. |
|  | **Electrification** | Step change in power availability in undeveloped regions (i.e. currently "off-the-grid") |
|  | **Recycling** | Increase in recycling rates expected, driven both by carbon footprint & scrap availability |
|  | **ESG** | Increasing importance of Environmental Social and Governance aspects which have lasting impact on the mining sector |
|  | **Resource nationalism** | Increasing resource nationalism through protectionism measures (e.g. import tariffs, export restrictions, royalty changes) |
|  | **Digitization** | Increasing pace of digitization across the value chain to increase efficiency and maximize profits |

Source: McKinsey Basic Materials Insights, MineSpans

**COVID-19 has compressed** events that were expected to play out over the next **several years into a short few months**

54 countries have responded with **>USD 10 tr in stimulus**

- **China** to focus on **infrastructure upgrades with high-tech applications** e.g. big data centers, 5G infrastructure, EV charging **– IO, coal, Cr, Ni, Zn, Cu, Al**
- **EU Green Deal** to set aside 25% of EU funds for **climate action** e.g. renewable energy, electric vehicles, and sustainable buildings **– Li, Co, Ni, Cu, Al**

**USA**, under Joe Biden, to fast-track the transition to renewables and **clean energy – Li, Co, Ni, Cu, Al**

"COVID-19 is accelerating key trends shaping the global economy

McKinsey & Company 4

**MEGATRENDS RELATED TO DECARBONISATION**

# Decarbonisation — reaching a tipping point

A genuine commitment to decarbonisation is being driven from all corners of our global economy

What minerals will be impacted?

What are the opportunities for IMDEX?

CONSUMERS ARE BECOMING INCREASINGLY CONCERNED ABOUT ENVIRONMENTAL ISSUES AND ARE DEMANDING SUSTAINABLE CHOICES

GOVERNMENTS ARE MANDATING CHANGE AND ARE INVESTING IN RESEARCH AND DEVELOPMENT AND INFRASTRUCTURE

DOWNSTREAM CUSTOMERS ARE SECURING CONTINUITY OF SUPPLY FOR CRITICAL METALS

INVESTORS AND FINANCIAL INSTITUTIONS SUPPORTING SUSTAINABILITY

# The growing role of minerals for a low carbon future

| | Power Applications | | | Automotive | Industrial Applications | | |
|---|---|---|---|---|---|---|---|
| | Wind | Solar Photovoltaic | Energy Storage | Electric Vehicles | Electric Motors | Carbon Capture and Storage | Light Emitting Diodes |
| Aluminum | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Chromium | ✓ | | | | | ✓ | ✓ |
| Cobalt | | | ✓ | ✓ | | ✓ | |
| Copper | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Nickel | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Silver | ✓ | | | ✓ | | | ✓ |
| Lead | ✓ | ✓ | | | | | ✓ |
| Lithium | | | | ✓ | | | |
| Zinc | | ✓ | | | | | ✓ |
| Indium | | ✓ | | | | ✓ | ✓ |
| Neodymium | ✓ | | | ✓ | | | |
| Molybdenum | ✓ | ✓ | | | | ✓ | ✓ |

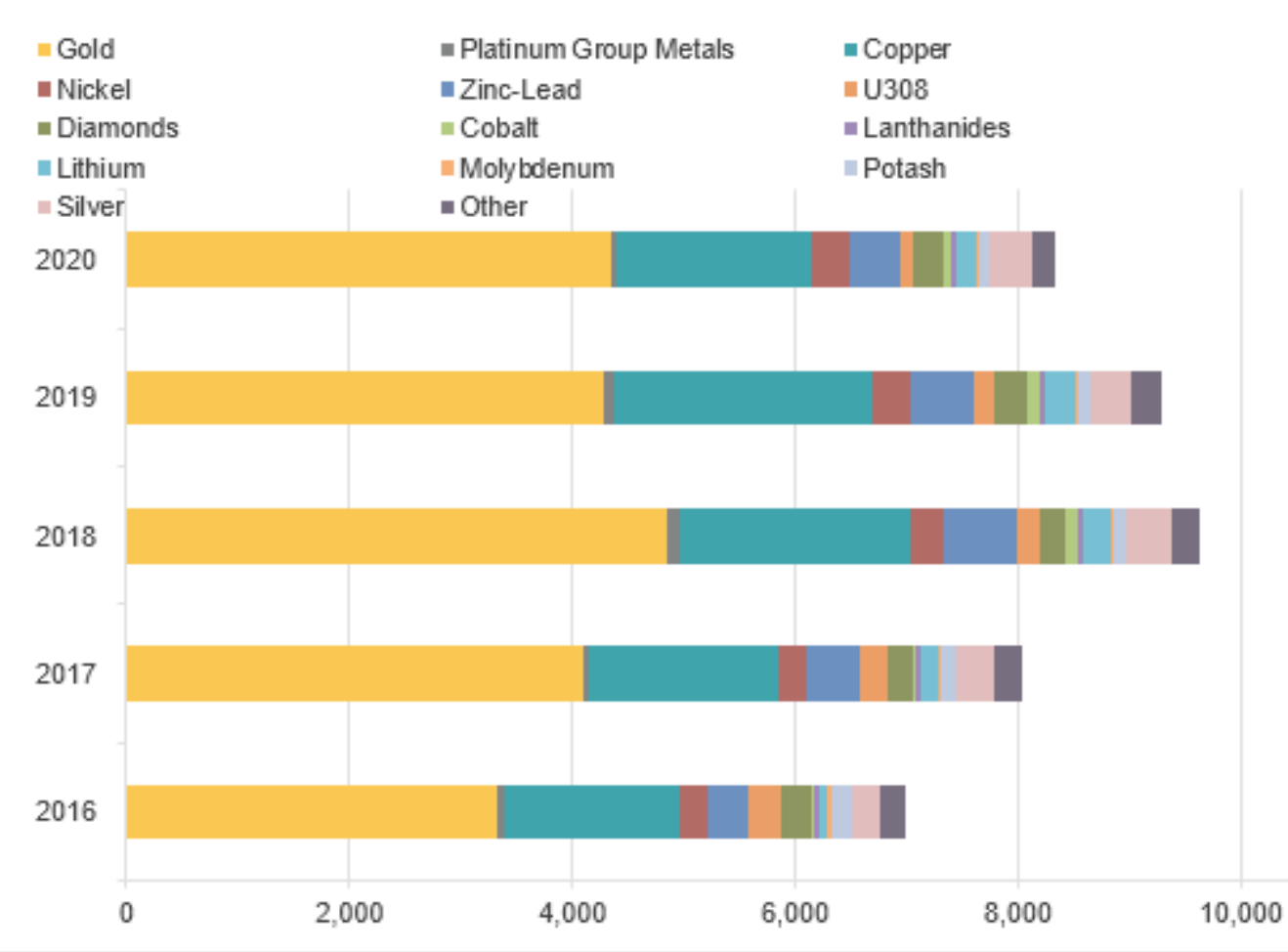
"One can argue about both the pace and scale of the energy transition but the criticality of metals to its realisation is without question... the energy transition starts and ends with metals.

If you want to generate, transmit or store low/no-carbon energy you need aluminum, cobalt, copper, nickel and lithium."

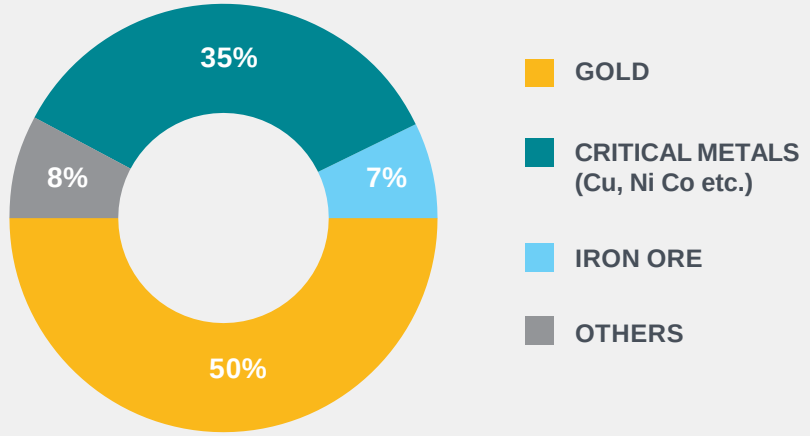
WOOD MACKENZIE

# Exploration budgets and commodity exposure

## GLOBAL EXPLORATION BUDGET BY COMMODITY ($M)




## IMDEX ESTIMATED COMMODITY EXPOSURE



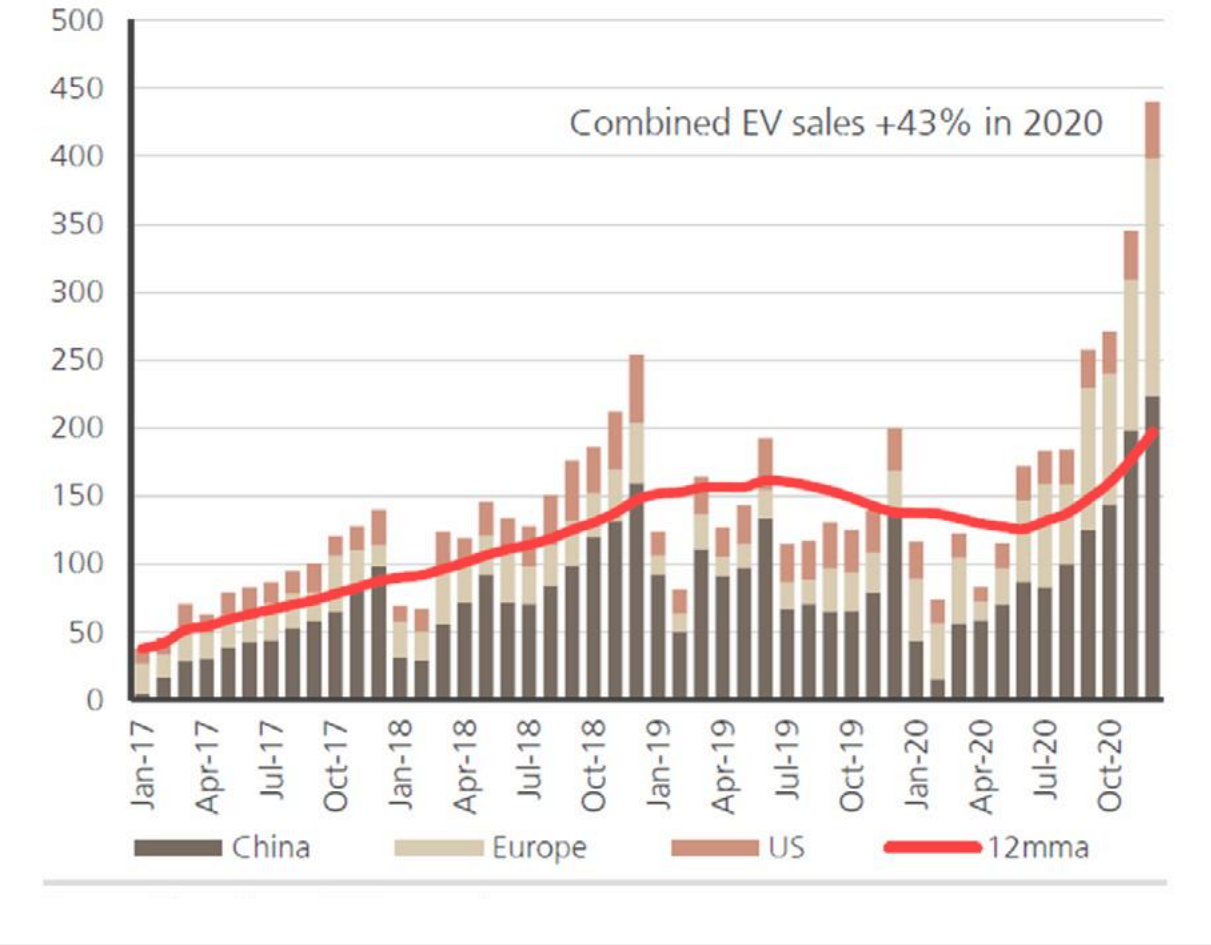

- IMDEX commodity exposure is representative of global exploration budgets
- ~35% of IMDEX revenue currently comes from critical metals
- Exploration expenditure on critical metals is expected to grow at a faster rate
- IMDEX product offering is commodity agnostic and is applicable throughout the mining value chain

S&P Global Market Intelligence

# DEMAND DRIVERS

# Demand drivers – consumers

**CHINA/EUROPE/US ELECTRIC VEHICLE SALES (K UNITS)**




- Electric vehicle sales are tipped to increase, pushed higher by improved batteries, more charging infrastructure, new markets and prices compared with internal combustion engine vehicles
- Electric vehicles are predicted to be 10% of global passenger sales by 2025; 28% in 2030; and 58% in 2040
- Bloomberg forecasts by 2040 there will be a need for 12 million charging points, each requiring about 10 kg of copper

Bloomberg, UBS research

# Demand drivers – governments

NATIONAL GOVERNMENTS SPEND ~$15 BILLION ANNUALLY ON R&D FOR CLEAN ENERGY TECHNOLOGIES

INFRASTRUCTURE DEVELOPMENT INCLUDING ELECTRIC TRANSITION LINES OR HYDROGEN PIPELINES

PROCUREMENT PRACTICES INCREASINGLY FAVOUR LOW CARBON CONTENT

FISCAL SUBSIDIES TO REDUCE THE COST OF DECARBONISATION FOR BUSINESSES

MANDATES PROHIBITING THE USE OF FOSSIL FUELS OR REQUIRING THE USE OF LOW-CARBON TECHNOLOGIES

CARBON PRICES AND INCENTIVE PROGRAMS TO CUT EMISSIONS

**US POLICY**

The new US administration aims to be carbon neutral by 2050 by investing $2 trillion in clean energy and decarbonising the power sector by 2035

**EU POLICY**

The EU aims to be climate neutral by 2050, to be enforced via a European Climate Law

**CHINA POLICY**

China plans to be carbon neutral before 2060

# Demand drivers – downstream customers

## TESLA'S RELUCTANT COMMITMENT TO COBALT A WARNING TO OTHERS.

"Tesla's not the first auto company to lock in future cobalt supplies with a miner. BMW did the same last year, also with Glencore as well as with the Bou-Azzer mine in Morocco."

REUTERS
JUNE 2020

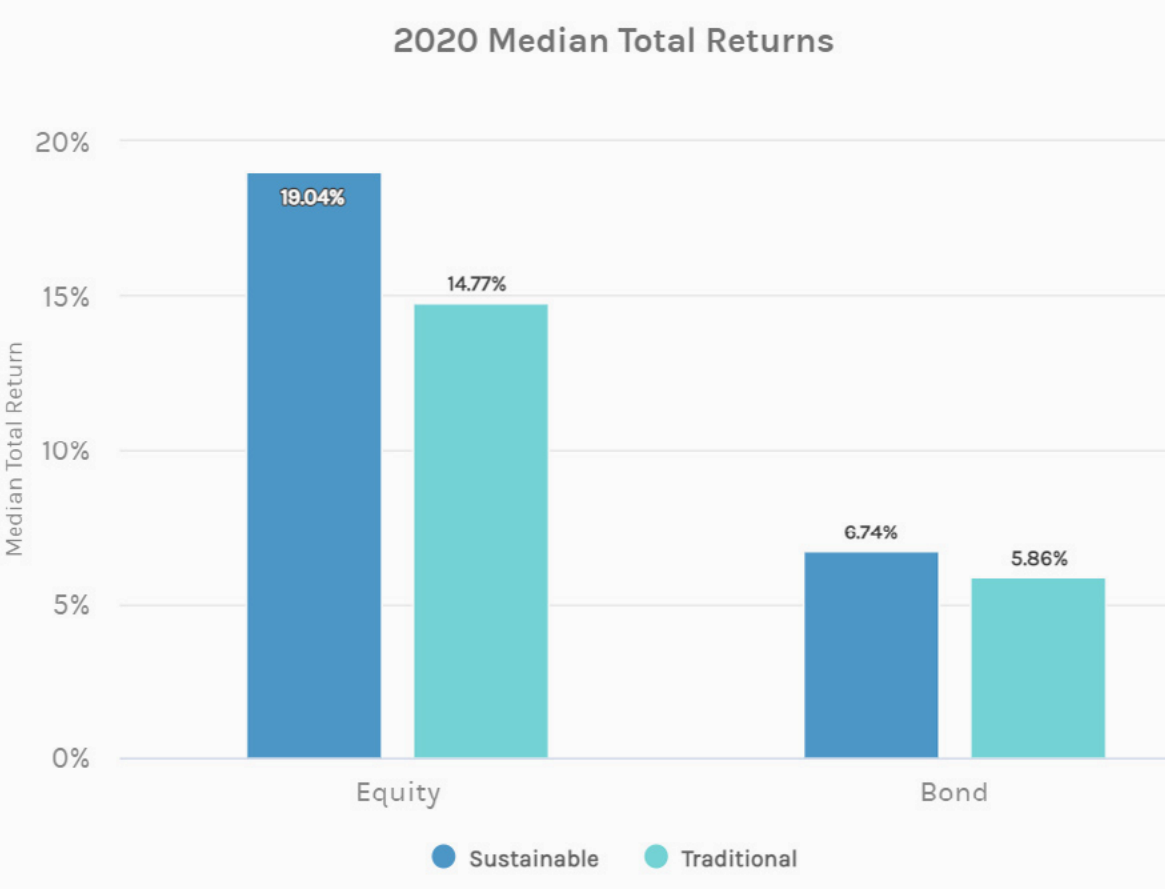
## TESLA PLANS TO USE GLENCORE COBALT IN NEW GIGAFACTORIES.

"Glencore, which is the largest industrial supplier of cobalt in the world, could provide Tesla with up to 6,000 tons of cobalt a year under the long-term partnership."

NBC
JULY 2020

# Demand drivers – investors and financial institutions

## ANALYSIS OF 3000 US MUTUAL AND EXCHANGE TRADED FUNDS




Morgan Stanley February 2021

"Assets in sustainable investment products in Europe are forecast to reach €7.6tn over the next five years, outnumbering conventional funds, as investors' growing focus on risks including climate change and social inequality pushes these strategies into the mainstream.

According to research by PwC, in a best-case scenario, ESG funds will experience a more than threefold jump in assets by 2025, increasing their share of the European fund sector from 15 per cent to 57 per cent."

FINANCIAL
TIMES
OCTOBER 2020

## COLLECTIVE COMMITMENT TO CLIMATE ACTION

38 banks from across all six continents have committed to align their loan portfolios with global climate goals.

With more than $15 trillion in assets, these Banks are fast-tracking the commitment all UN Principles for Responsible Banking signatories have made to align their business strategy with the goals of the Paris Agreement.

# SUPPLY CONSTRAINTS

# Let's just look at copper

IN THE NEXT 15 YEARS WE WILL CONSUME MORE COPPER THAN WE DID IN THE LAST 100 YEARS COMBINED

WORLDWIDE COPPER USAGE JUMPED 38% OVER THE LAST DECADE, FROM 17.8MT IN 2009 TO 24.5MT IN 2019 AND COULD RISE TO OVER 80MT BY 2050

ON AVERAGE IT TAKES 20 YEARS TO BRING A COPPER MINE INTO PRODUCTION. WINU IS ON TRACK TO BE FASTER AT ~5 YEARS – STILL A LONG TIME

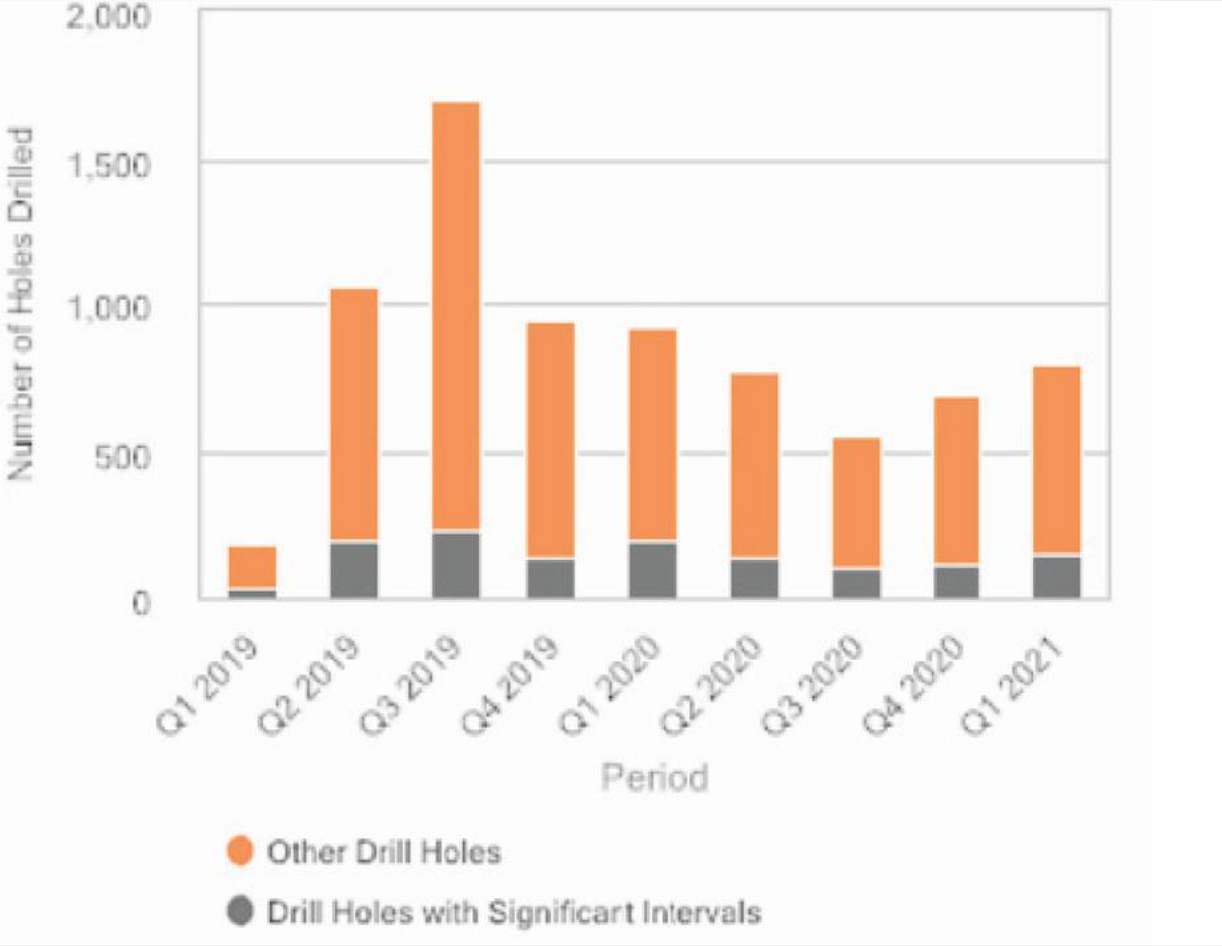
TESLA ALONE SOLD ~500,000 ELECTRIC VEHICLES IN 2020 – UP 36% ON 2019

500 MILLION ELECTRIC VEHICLES ARE EXPECTED TO BE ON THE ROAD BY 2040 REQUIRING 42.5 MT OF COPPER – ROUGHLY TWICE THE CURRENT VOLUME PRODUCED

ELECTRIC VEHICLES REQUIRE ~85KG OF COPPER – 5 TIMES MORE THAN STANDARD PETROL VEHICLES

# Diminishing drilling, copper discoveries, reserves and inventories

**GLOBAL DRILLING ACTIVITY — COPPER**




Goldman Sachs recently reported that the copper market is facing the largest deficit in a decade this year, with a high risk of scarcity over the coming months.

S&P Market Intelligence

# How hard is it to extract copper?

**THIS IS WHAT 4.1 MILLION TONNES OF COPPER LOOKS LIKE**

Palabora is the largest open-pit mine in South Africa, established in the 1950s

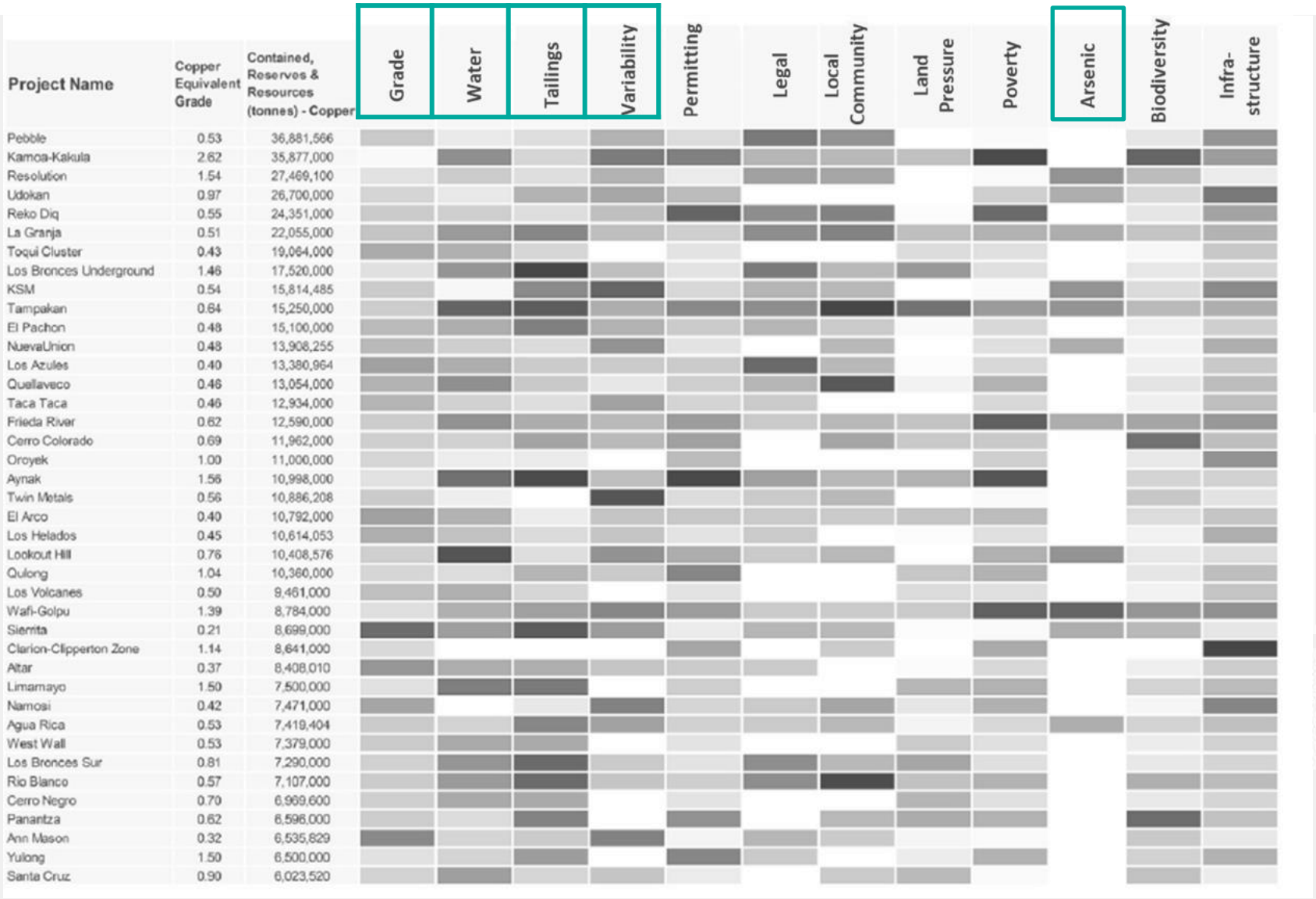
Finding, defining and mining that much copper, requires a lot of drilling, earth moving and processing

Doing it efficiently is more critical today than ever before

# SO, LETS JUST GO AND FIND MORE COPPER... RIGHT?

# EVEN IF YOU DRILL MORE, THERE ARE MULTIPLE CHALLENGES

# Stranded copper assets – multiple constraints



| Project Name | Copper Equivalent Grade | Contained, Reserves & Resources (tonnes) - Copper | Grade | Water | Tailings | Variability | Permitting | Legal | Local Community | Land Pressure | Poverty | Arsenic | Biodiversity | Infra-structure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pebble | 0.53 | 36,881,566 | | | | | | | | | | | | |
| Kamoa-Kakula | 2.62 | 35,877,000 | | | | | | | | | | | | |
| Resolution | 1.54 | 27,469,100 | | | | | | | | | | | | |
| Udokan | 0.97 | 26,700,000 | | | | | | | | | | | | |
| Reko Diq | 0.55 | 24,351,000 | | | | | | | | | | | | |
| La Granja | 0.51 | 22,055,000 | | | | | | | | | | | | |
| Toqui Cluster | 0.43 | 19,064,000 | | | | | | | | | | | | |
| Los Bronces Underground | 1.46 | 17,520,000 | | | | | | | | | | | | |
| KSM | 0.54 | 15,814,485 | | | | | | | | | | | | |
| Tampakan | 0.64 | 15,250,000 | | | | | | | | | | | | |
| El Pachon | 0.48 | 15,100,000 | | | | | | | | | | | | |
| NuevaUnion | 0.48 | 13,908,255 | | | | | | | | | | | | |
| Los Azules | 0.40 | 13,380,964 | | | | | | | | | | | | |
| Quellaveco | 0.46 | 13,054,000 | | | | | | | | | | | | |
| Taca Taca | 0.46 | 12,934,000 | | | | | | | | | | | | |
| Frieda River | 0.62 | 12,590,000 | | | | | | | | | | | | |
| Cerro Colorado | 0.69 | 11,962,000 | | | | | | | | | | | | |
| Oroyek | 1.00 | 11,000,000 | | | | | | | | | | | | |
| Aynak | 1.56 | 10,998,000 | | | | | | | | | | | | |
| Twin Metals | 0.56 | 10,886,208 | | | | | | | | | | | | |
| El Arco | 0.40 | 10,792,000 | | | | | | | | | | | | |
| Los Helados | 0.45 | 10,614,053 | | | | | | | | | | | | |
| Lookout Hill | 0.76 | 10,408,576 | | | | | | | | | | | | |
| Qulong | 1.04 | 10,366,000 | | | | | | | | | | | | |
| Los Volcanes | 0.50 | 9,461,000 | | | | | | | | | | | | |
| Wafi-Golpu | 1.39 | 8,784,000 | | | | | | | | | | | | |
| Sierrita | 0.21 | 8,699,000 | | | | | | | | | | | | |
| Clarion-Clipperton Zone | 1.14 | 8,641,000 | | | | | | | | | | | | |
| Altar | 0.37 | 8,408,010 | | | | | | | | | | | | |
| Limarnayo | 1.50 | 7,500,000 | | | | | | | | | | | | |
| Namosi | 0.42 | 7,471,000 | | | | | | | | | | | | |
| Agua Rica | 0.53 | 7,419,404 | | | | | | | | | | | | |
| West Wall | 0.53 | 7,379,000 | | | | | | | | | | | | |
| Los Bronces Sur | 0.81 | 7,290,000 | | | | | | | | | | | | |
| Rio Blanco | 0.57 | 7,107,000 | | | | | | | | | | | | |
| Cerro Negro | 0.70 | 6,969,600 | | | | | | | | | | | | |
| Panantza | 0.62 | 6,596,000 | | | | | | | | | | | | |
| Ann Mason | 0.32 | 6,535,829 | | | | | | | | | | | | |
| Yulong | 1.50 | 6,500,000 | | | | | | | | | | | | |
| Santa Cruz | 0.90 | 6,023,520 | | | | | | | | | | | | |

**IMDEX TECHNOLOGIES DIRECTLY ADDRESS THESE OREBODY CONSTRAINTS**

High Risk

Moderate Risk

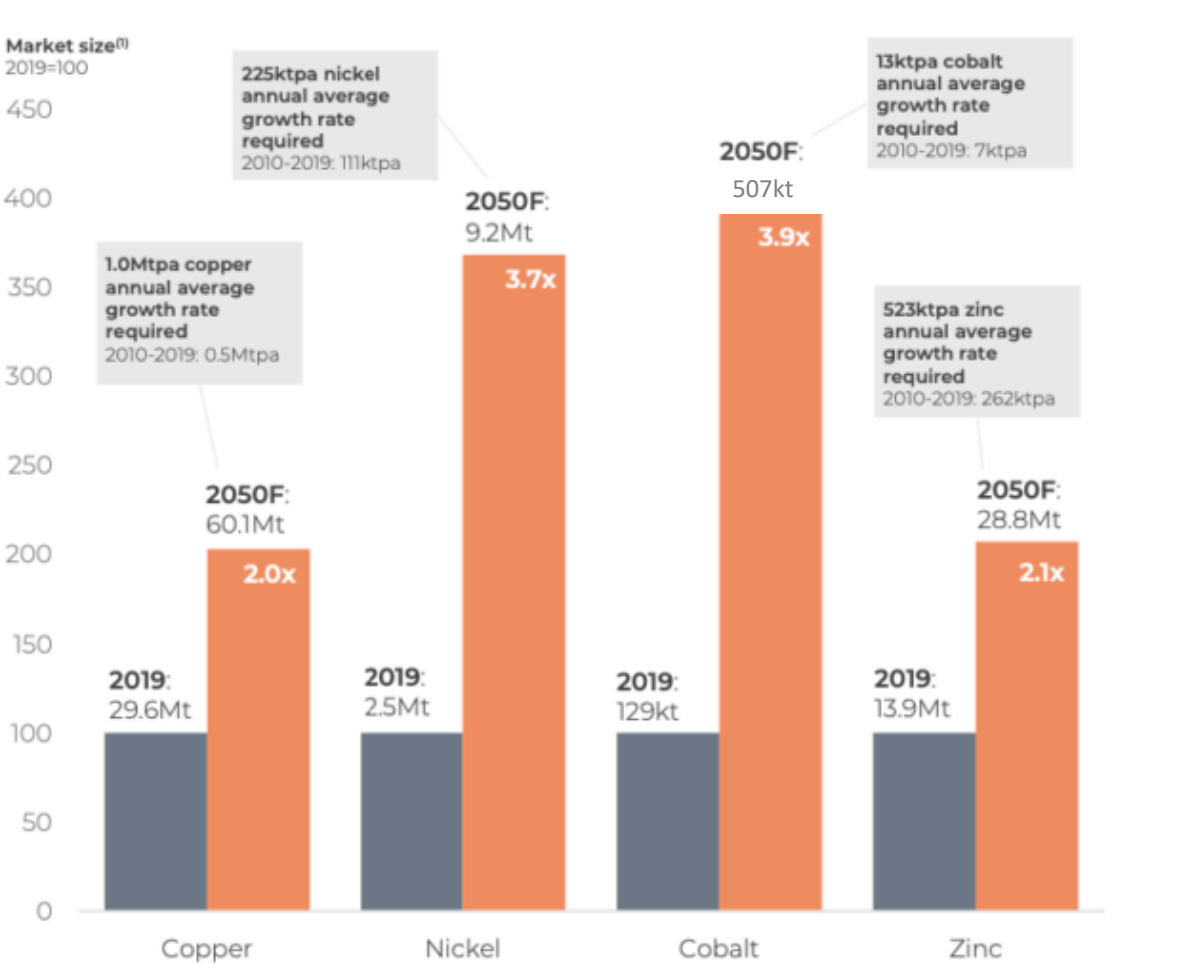
Low Risk

Re-thinking complex orebodies: Consequences for the future world supply of copper

R.K. Valenta [a], D. Kemp [b, *], J.R. Owen [b], G.D. Corder [c], É. Lèbre [b]

# It's not just a copper story

## FORECAST COMMODITY DEMAND




"$1 trillion of investment is needed in key energy transition metals — aluminum, cobalt, copper, nickel, and lithium — over the next 15 years to meet the growing demands of decarbonization."

WOOD MACKENZIE

Glencore modelled future demand for battery metals out to 2050

# HOW DOES IMDEX'S TECHNOLOGIES AND STRATEGY FULFIL THIS SUPPLY DEMAND GAP

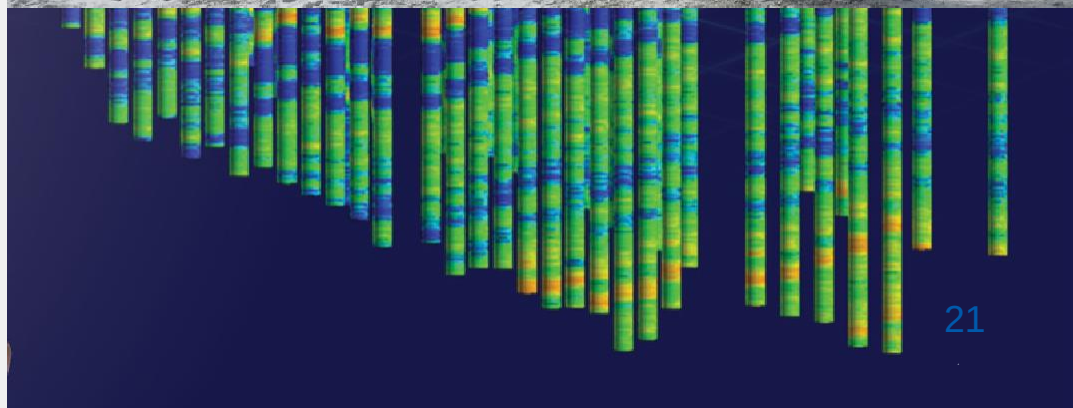
# Importance of mining-tech

> Rapid technological advances in AI, robotics and automation, analytics, and the Industrial Internet of Things are beginning to transform supply and demand dynamics in the energy and resources sector, and will raise productivity, increase energy efficiency and unlock value of $900 billion to $1.6 trillion by 2035.

MCKINSEY & COMPANY FEBRUARY 2017

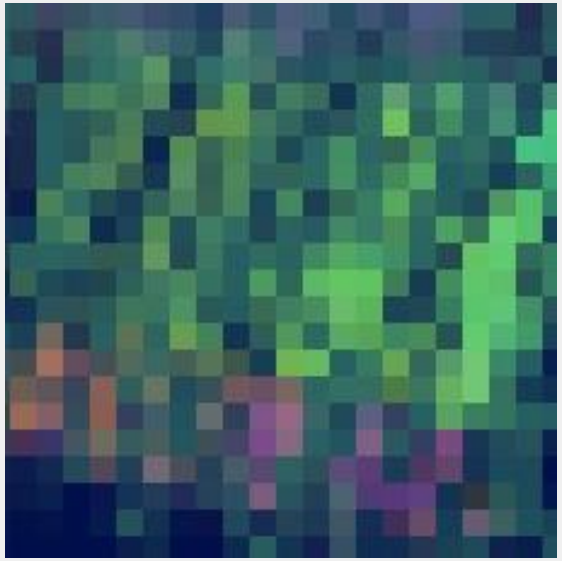
> Mining technologies that enable clients to find, define and mine with precision and at speed are becoming increasingly critical.

DAVE LAWIE
CHIEF GEOSCIENTIST, IMDEX

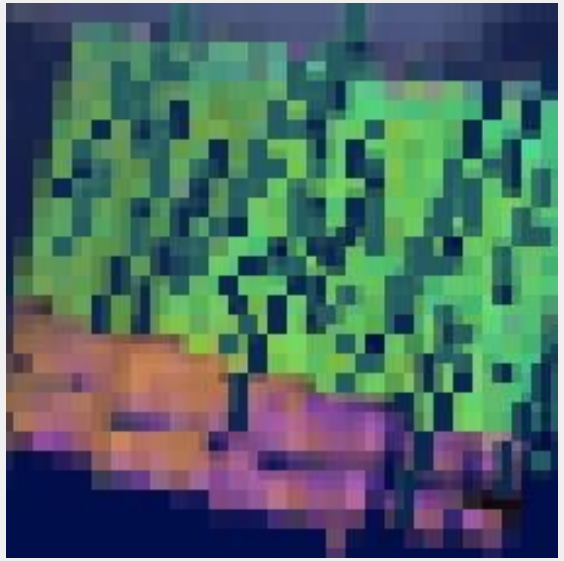
# The value of moving decisions upstream from where they are today

**MANY $BN MINING INVESTMENT DECISIONS ARE MADE HAVING SAMPLED ONLY 1% OF 1% OF THE ORE BODY.**

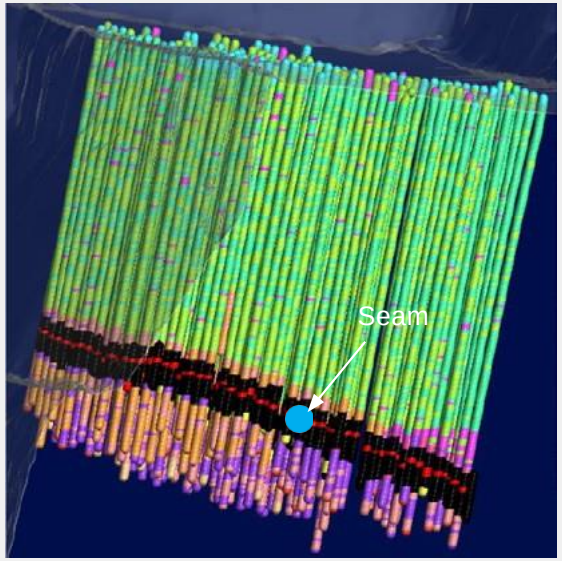


Rock knowledge is an understanding of location, texture, grade and mineralogy.

It answers the question where to drill next and how processing can be optimised.



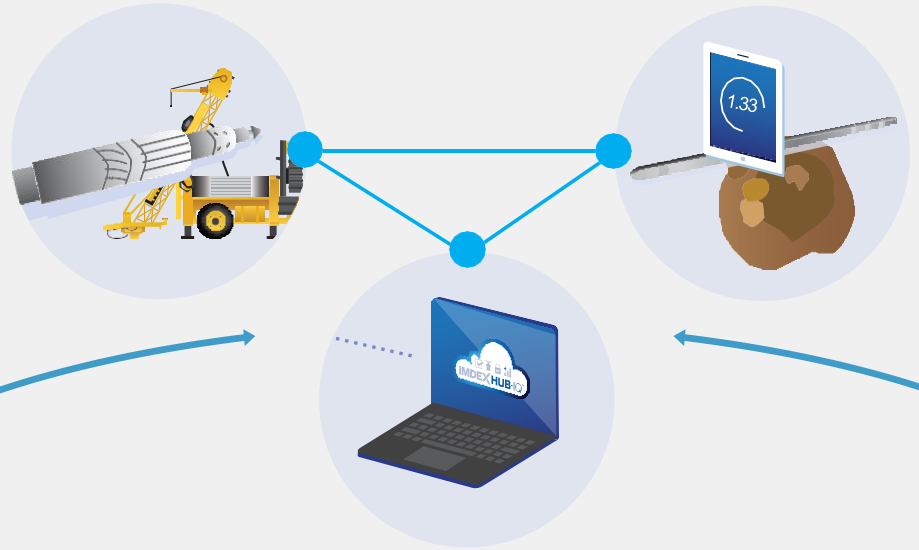
We enable the timely delivery of quality data, giving clarity on the nature of the rock to allow real-time decisions to be made, rather than having to wait weeks or months.



# Enabling clients to find, define and mine — with precision and at speed

- Drilling productivity and rig alignment technologies
- Automated and remote drilling fluid testing technologies
- Data collection and advanced reporting software

## Drilling Optimisation

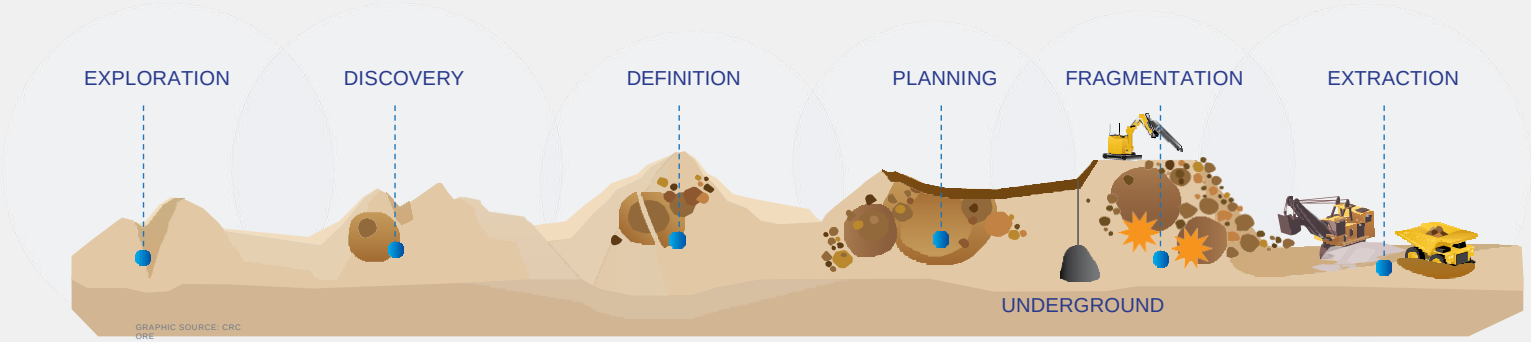


## Rock Knowledge Sensors

- Downhole survey sensors
- Core orientation and gamma logging technologies
- In-field sampling and analysis technologies

## Real-time Data and Analytics

- Secure cloud-based services
- Real-time subsurface visualization
- Interpretive software – geological data



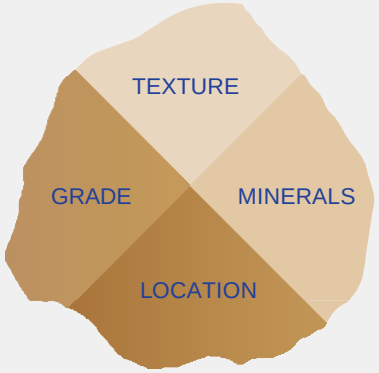

EXPLORATION & DEVELOPMENT

Applicable across whole mining value chain

MINING & PRODUCTION

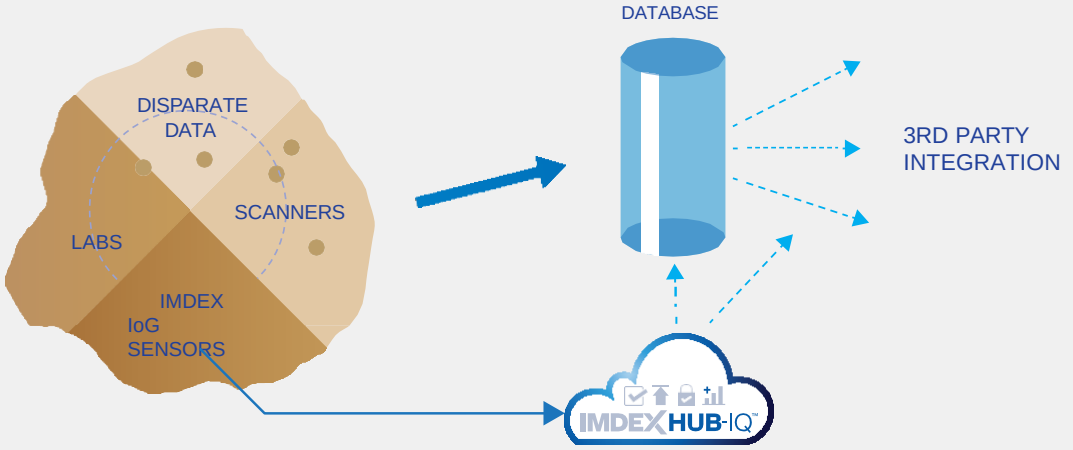
# Why rock knowledge is important

## What is rock knowledge?

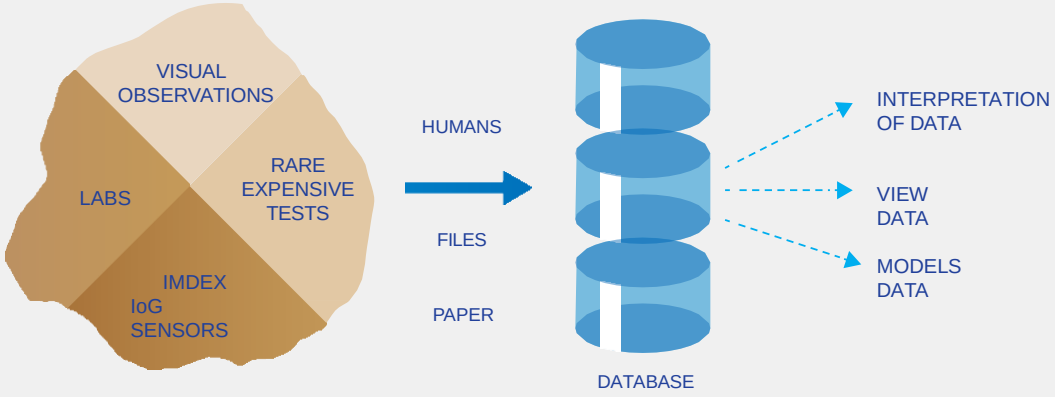



WE USE THESE PROPERTIES FOR:
- MINERALISATION POTENTIAL
- GRADE
- HARDNESS/BLAST-ABILITY
- PROCESSING ORE ETC

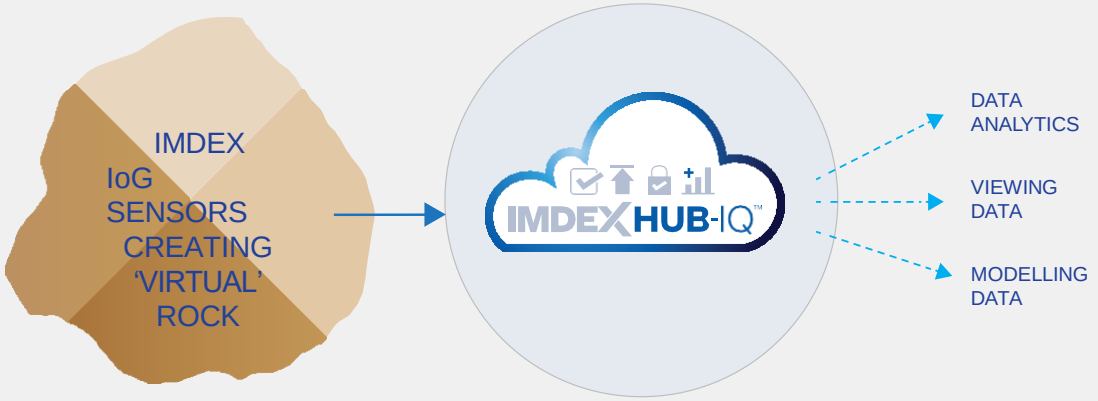
## Current world view of rock knowledge




## Traditional view of rock knowledge




## Why IMDEX Is building rock knowledge



# The value of IMDEXHUB-IQ™ in providing integrated rock knowledge

Timely information for critical decision making

## QUALITY DATA

- Industry leading sensors
- QA/QC at point of data collection
- Digital workflows remove risk of human error
- AI and machine learning remove human subjectivity

## REPRESENTIVITY

- Cost effective methods allowing data to be collected for every metre drilled
- Repeatable sensor-based data (IoG)

## TIME SAVINGS

- Actionable information in real-time
- Driller operable instrumentation – not reliant on third-party service providers
- More efficient digital workflows

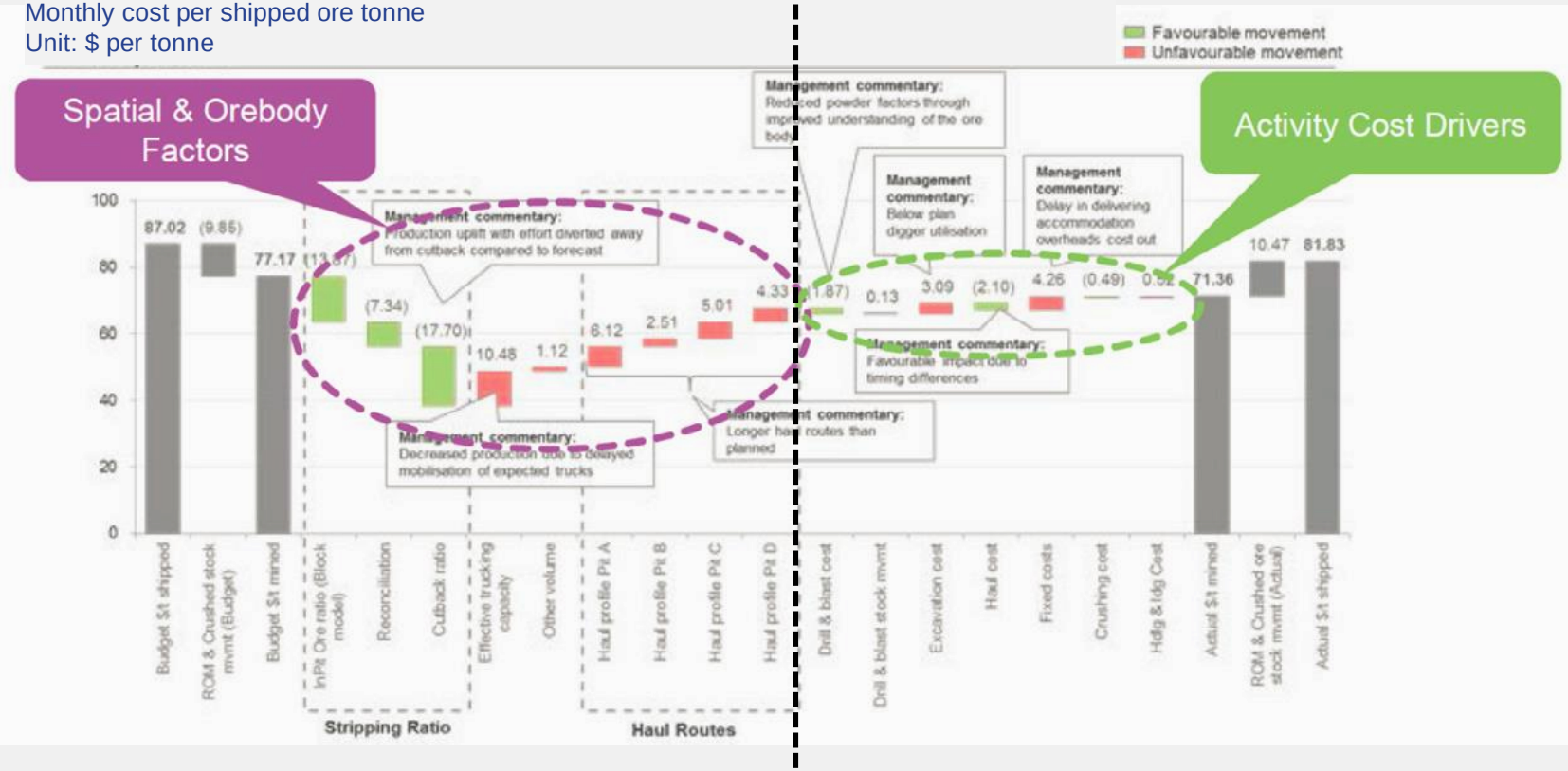
# The value of rock knowledge

IMDEX™

## IoG

## IoT

Monthly cost per shipped ore tonne
Unit: $ per tonne

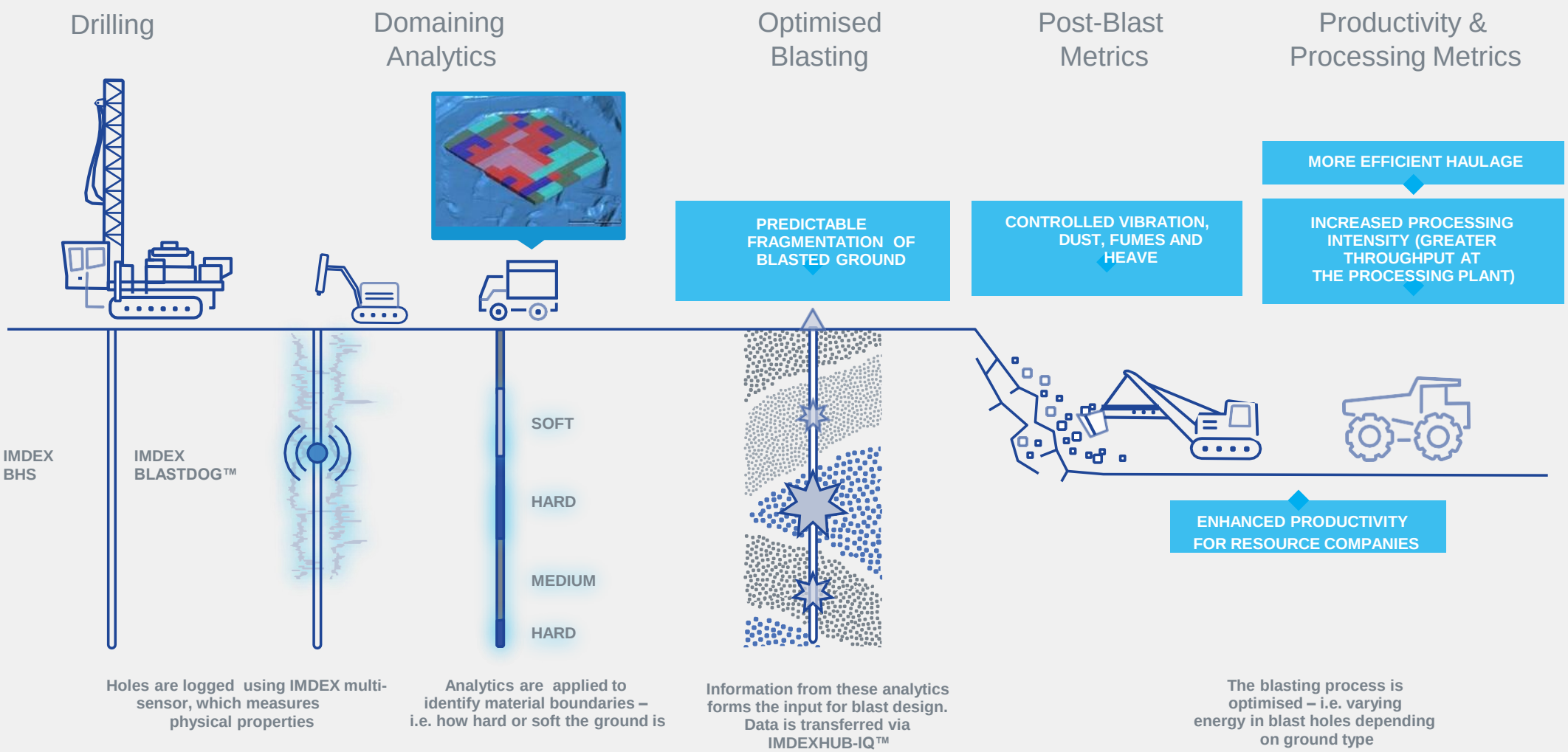



"We are putting geoscience into blasting via the Internet of Geosensing by measuring what is important."

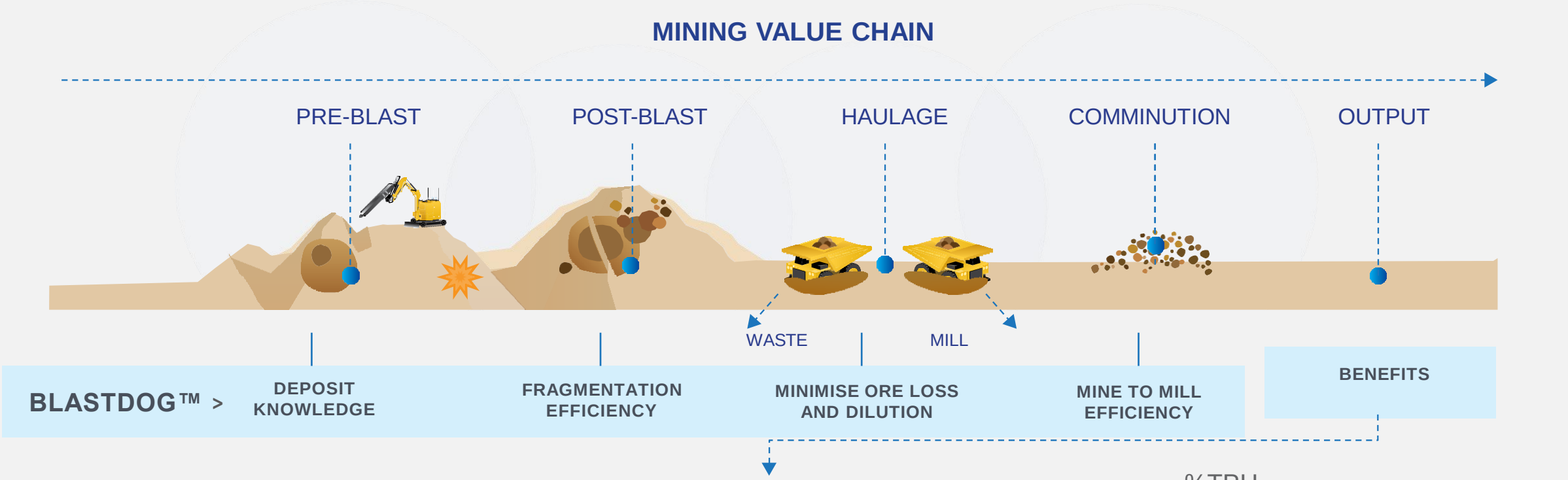
DAVE LAWIE
CHIEF GEOSCIENTIST, IMDEX

KPMG Leveraging data for improved productivity
David Rose, 11 November 2015

# Mining Technologies - BLASTDOG™
# Optimised blasting and material tracking



# IMDEX BLASTDOG™ and the big levers of IoG



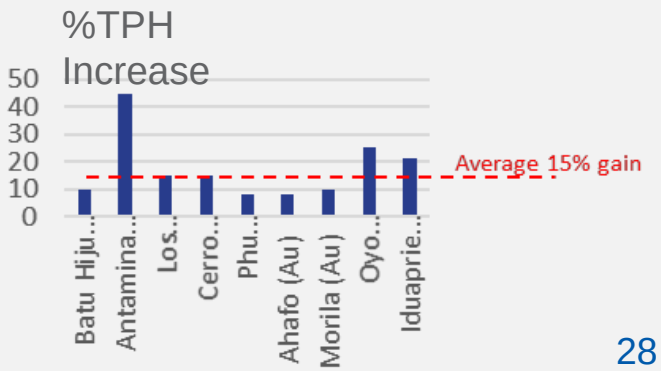

**SIGNIFICANT PRODUCTIVITY, COST AND SAFETY BENEFITS INCLUDING A**

**↑ 15 – 20%**

**GAIN IN MINE TO MILL EFFICIENCY**

"There have been numerous studies which have demonstrated that AG/SAG mill throughput can be increased by 15–20% as a result of changed blasting practices"

MCKEE 2013, *Understanding Mine to Mill*, CRCORE



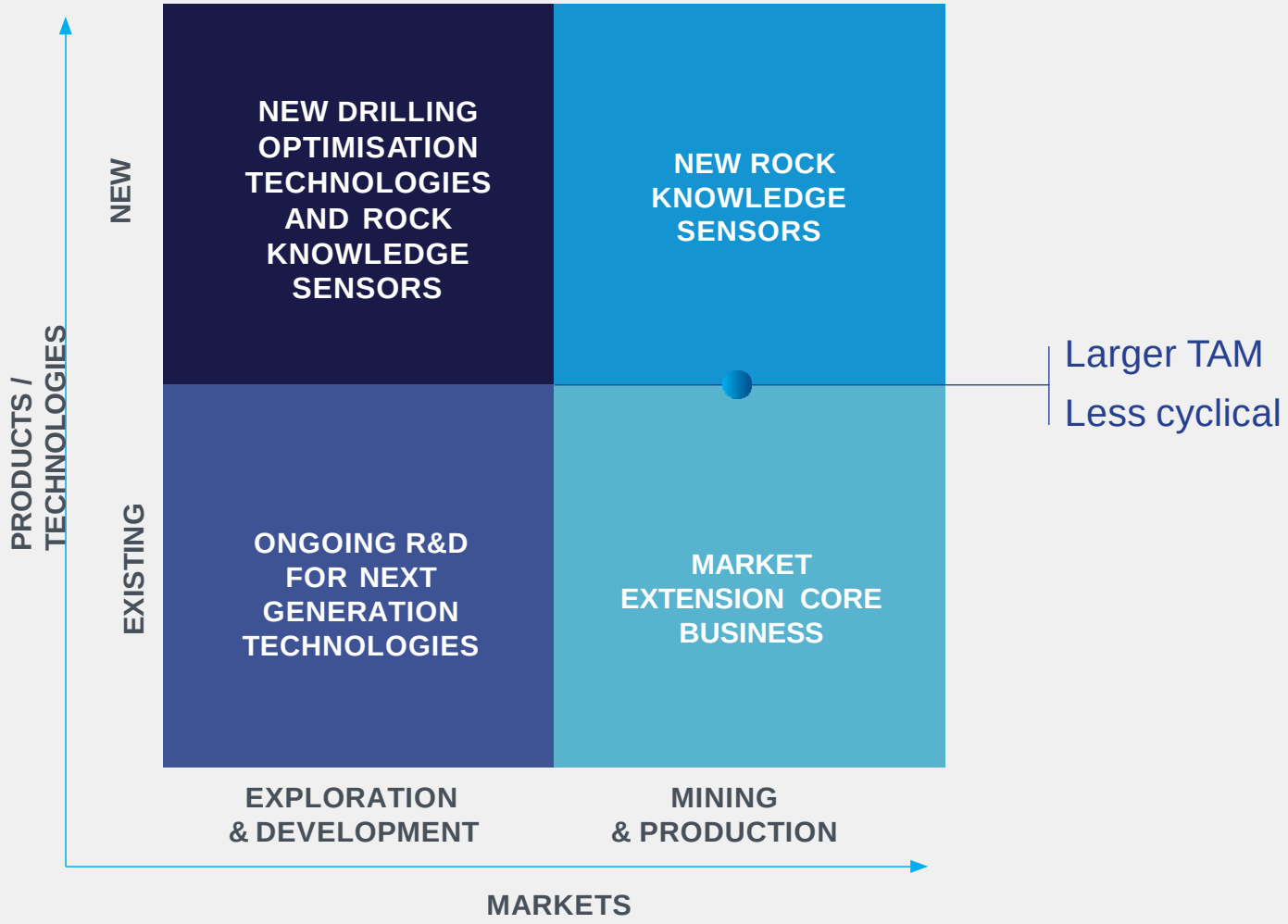
# Industry drivers are accelerating IMDEX's compelling growth strategy

Growing core business by enhancing technical leadership and embedding value for clients

Expansion within the larger, less cyclical production stage of the mining value chain

Three pathways to growth

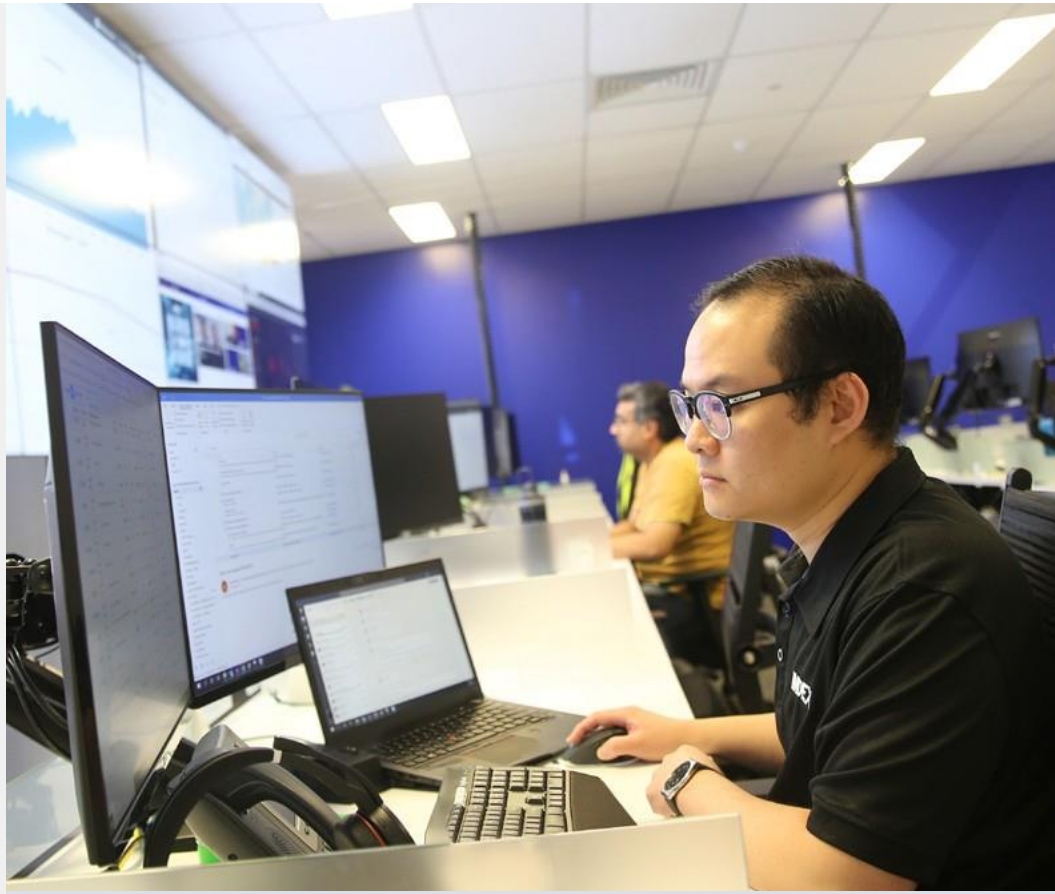
- Acquire
- Build
- Collaborate



# OUTLOOK

# Outlook for FY21

- The outlook for mining-tech is stronger than it has ever been
- We remain watchful and ready to respond to the risks and opportunities presented by COVID-19
- We remained positioned to benefit from increasing demand for real-time orebody knowledge
- Clients are well funded and are focused on increasing and sustaining activity
- Positive start to 2H21 with a record December and January (traditional seasonal low). Instruments on rent now exceeding October 2020 highs
- Our company has a compelling growth strategy and is in a strong position to leverage its unique competitive position and strong industry fundamentals



*IMDEX's Customer Care Network Operating Centre allows remote support anywhere in the world*

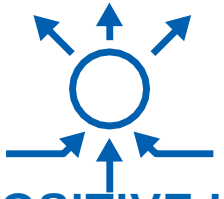
# Positioned to deliver attractive returns

## STRONG CORE BUSINESS

- Outperforming market growth
- Strong financial platform
- Sustainable dividend policy
- Established global presence
- World-class R&D and geoscience capabilities
- Unique product offering
- Experienced leadership team

## A GROWTH COMPANY

- Strong pipeline of new technologies and software
- Ability to pursue strategic acquisitions
- Expansion within the larger, less cyclical production stage of the mining value chain
- IMDEX technologies offer real sustainable value



## POSITIVE INDUSTRY DRIVERS

- Resource companies are well funded with increasing budgets
- Reserves are being depleted at a faster rate than discoveries
- New discoveries are likely to be at depth resulting in larger drilling campaigns
- Resource companies are embracing innovation and new technologies enable remote working
- Strong multi-sector demand driving commodity prices
- Decarbonisation trend gaining momentum

# Thank you



FOR FURTHER INFORMATION
PLEASE CONTACT:

KYM CLEMENTS
IRO & CORPORATE COMMUNICATIONS
KYM.CLEMENTS@IMDEXLIMITED.COM