



### Forward-looking statements

This document may contain forward-looking statements that are subject to risks and uncertainties. All statements that are not historical facts contained within are forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as "can", "might", "believe", "may", "estimate", "continue", "anticipate", "intend", "should", "plan", "should,", "could", "expect", "predict", "potential", or the negative of these terms or other similar expressions.

Forward-looking statements are based on information and assumptions that Project Blue had when those statements are made or its good faith belief as of that time with respect to future events. Forward-looking statements are subject to risks and uncertainties that could cause actual performance or results to differ materially from those in or suggested by the forward-looking statements. Except as required by law, Project Blue undertakes no obligation to update publicly any forward-looking statements after the date of this publication release, or to conform these statements to actual results or changes. While consideration has been taken in preparing the information published in this report, the content is provided without any guarantees, conditions, or warranties as to its accuracy, completeness, or reliability.

We accept no liability to third parties, howsoever arising. Although reasonable care and diligence has been used in the preparation of this report, we do not guarantee the accuracy of any data, assumptions, forecasts or other forward-looking statements



### Presentation outline



- Introduction to Project Blue
- Data centers hype or reality?
- > Offshore wind power
- Risk factors and market outlook
- Questions and Answers







## Unrivalled critical material coverage

Comprehensive supply chain coverage – from mine to market – enabling a deep understanding of industry dynamics.





## Unrivalled copper co-product and by-product coverage

Comprehensive supply chain coverage – from mine to market – enabling a deep understanding of industry dynamics.





### Detailed energy transition coverage

Data and supply chain analytics – designed to keep our clients up-to-date with the build out of energy transition supply chains.







A PROJECT BLUE
Critical materials and Energy transition intelligence















### Global average cost of producing mined copper estimated near US\$3/lb Cu in 2025



Source: Project Blue Copper Extractive Cost Service Note: All-In Sustaining Costs are expressed on a co-product basis





### Bespoke consulting solutions tailored to your requirements

For clients across the value chain



Miners, refiners, fabricators and recyclers



**OEMs** 



Industry associations and financial services



Jessica Fung Head of Consulting





Market analysis



Financing/investment support

ESG/sustainability analysis



Forecasting services



M&A/market entry support



Sourcing/offtake strategy



Feasibility studies



Strategic consulting



### We stay connected through global conferences and networking events

#### 2025 EVENTS

Cape Town



Frankfurt Johannesburg London Perth Seoul Santiago Sydney Tokyo Tokyo Yashington DC

### Project Blue's thoughts on the recent copper sell off...

- Copper did lose 10% of its value in one week has the world economic outlook deteriorated so much?
- Copper was probably overvalued; it seems the sell off overdone.
- Markets hate uncertainty; traders get burnt. Uncertainty and volatility are king.
- Scrap release usually abruptly dries up; cathode demand ultimately benefits.
- Lower prices are good news for emerging consumers in China, India, ASEAN and the Middle East.
- Likely to further delay the timing of brownfield and greenfield mine projects.
- Secondary projects are probably less impacted (lower risk in all respects).



## Copper demand in data centers and AI – hype or reality?



## What is a data center? What is driving this investment?

- A data center is a physical facility housing multiple computer servers connected via high-speed networks that allows for parallel processing in ultra-fast times.
- It enables the rapid collection, processing, storage and retrieval of data required to effectively process complex AI machine-learning (ML) algorithms.
- Al requires 10x the resources of cloud computing.
- Driven by computational applications (BI, ML) and storage consumer applications (e.g. Netflix, SatNavs).
- Data centers are extremely energy intensive to operate, both for power (60%) and cooling (40%).
- The investment surge has been called a 'gold rush,' but it is not thought to be experiencing a 'bubble'!?



### Different sizes of data centers – from Tiers I to IV (hyperscale). 8,000 worldwide in 2023.



CLN Data centre Phase I & 2, Dublin, Ireland

Microsoft Hyperscale Data centre, Kroon, Netherlands

![](_page_12_Picture_4.jpeg)

## My due diligence – walk the Expo

CLOUD & AI

INFRASTRUCTURE

THE

DEVOPS

LIVE

![](_page_13_Picture_1.jpeg)

techshowlondon.co.uk

PORTANT TECHNOLOGY EVENT FOR BUSINESS IN THE UK

BIG DATA & AI WORLD DATA CENTRE

CLOUD & CYBER SECURITY EXPO CloserStill

### Key design characteristics of data centers

Solutions for ultra fast data processing, storage & retrieval

![](_page_14_Picture_2.jpeg)

- Location: utility power infrastructure & water.
- Proximity to fibre optic networks, internet traffic.
- Land is costly near big cities, so footprint is small.
- Reliability is paramount 24/7/365. Zero downtime.
- Safety, security, easy access for maintenance.
- Efficient, scalable, modular, futureproof, sustainable, flexible. UPS scaling from KW to GW to MW.
- Size is a function of IT load, redundancy, growth, types of services offered and overall efficiency.
- Space optimisation. 3:4 width/length building ratio. High density sites. Agility to grow or reconfigure.

### Data center clusters – surrounding big cities (map by Cushman & Wakefield, DataCenterHawk)

![](_page_15_Figure_1.jpeg)

## Electricity, data centers and copper – a linear relationship

![](_page_16_Figure_1.jpeg)

- Rack units are 19 wide x 1.75 inches high. A server stack of 42-48 in a hyperscale unit.
- 120 houses worth of electricity demand contained within a single rack is not unusual.
- Laws of thermodynamics energy cannot be created or destroyed only converted.
- Air cooling is insufficient, so direct liquid cooling or immersion cooling is now needed.
- 1.5M litres of water per day for a hyperscale's cooling and humidification requirements.
- 1.4% share of world electricity use in 2024. Forecasted at 13% by 2030; 4-5x growth rate.
- Creating 'an arms race in the supply chain'.
- 465kt (est.) copper consumption in 2024.

### Different types of data centre solutions – copper power & data cables, bus bar, ACR tube...

![](_page_17_Figure_1.jpeg)

#### Service provision

- Electricity Supply
- Building Automation
- HVAC Systems
- Network Infrastructure
- Fire Prevention
- Security Protection
- Energy Efficiency
- Communications

### Who owns, operates and invests in data centers?

![](_page_18_Figure_1.jpeg)

Project Blue 2025 Source: Data Centre Magazine

## Offshore wind power – sustainable energy solutions

![](_page_19_Picture_1.jpeg)

### The trend is towards larger, more powerful offshore wind turbines in deepwater

![](_page_20_Figure_1.jpeg)

### Offshore wind - numerous supply side constraints despite multi-million US\$ investments

#### LS Greenlink - a \$681M project in Chesapeake, VA, 2027

![](_page_21_Picture_2.jpeg)

#### NKT Eleonora, launching 2027

![](_page_21_Picture_4.jpeg)

### North America & Asian investments in submarine power cables & grid interconnectors

![](_page_22_Figure_1.jpeg)

### Recent European investments in HVDC & HVAC submarine power cables and interconnectors

![](_page_23_Figure_1.jpeg)

![](_page_23_Picture_2.jpeg)

### Risk factors and the market outlook

![](_page_24_Picture_1.jpeg)

### Copper and Tin prices moving together – the dawn of a new bronze age!?

![](_page_25_Figure_1.jpeg)

Project Blue 2025

• First used to create bronze, an alloy than was stronger than either pure copper or pure tin. Used for weapons. coins and jewelry.

- Tin's relative density is similar to copper (7.29 vs 8.96). The price ratio between tin and copper is currently in the range of 3.5-4.0.
- Tin is used as a plating for its corrosion resistance when combined with lead or steel e.g for tin cans and tin plated copper in electrical and electronic applications. Like copper, tin is a technology metal.
- Used in tough alloys including pewter, soft solder and bronze. As with copper, secondary tin is a vital source of supply >30%.
- The global tin market is around 370kt per year, only 1% by volume of the copper market, but 4% by value.
- Main sources of primary mined tin are from China, Indonesia, Myanmar, Malaysia, Bolivia, Brazil, Nigeria and the DR Congo.
- Primary supply is concentrated in just a few companies, so it is even more vulnerable than copper to supply disruptions. The Myanmar earthquake and a Malaysian gas pipeline explosion have been supply shocks and disruptions over the past fortnight.

### The copper market and price outlook – A summary of the risks

![](_page_26_Picture_1.jpeg)

#### Geopolitical tensions

- US tariffs spark wide retaliation and a ignite a global trade war
- US tariffs cripple the Canadian and Mexican copper supply chains
- Copper is officially recognised as a critical material in the US and EU
- Resource nationalism (e.g. Cobre Panama, Indonesian smelters)
- Russian copper cathode supply is dislocated from the global market

![](_page_26_Picture_8.jpeg)

#### Price factors

- Lower prices help demand growth in China, India & ASEAN
- High and volatile prices trigger substitution in emerging markets
- Higher prices spur a frenzy of M&A amongst copper producers
- Volatility and uncertainty are key
- Chinese NFSRA strategic reserve tactics (buy or sell cathode)

![](_page_26_Picture_15.jpeg)

#### Cost pressures

- Chinese smelters refuse to cut output despite low spot TC/RCs
- The rising prohibitive cost and risk of developing greenfield mines
- Inflationary labour and mine costs result in margin compression

![](_page_26_Picture_20.jpeg)

#### Renewable raw materials

- High COMEX prices isolate US copper scrap pools
- EU Waste Shipment Regulations are rushed and badly implemented
- European copper scrap exports to non-OECD nations are barred

![](_page_26_Picture_25.jpeg)

![](_page_27_Picture_0.jpeg)

# It is now time for Q & A...

![](_page_28_Picture_0.jpeg)

## Market intelligence on critical materials for energy transition

![](_page_28_Figure_2.jpeg)

### Hot spots - recent regional investments in new semis capacity

![](_page_29_Figure_1.jpeg)

![](_page_29_Picture_2.jpeg)

### The spotlight on multiple secondary projects

![](_page_30_Figure_1.jpeg)