



**BEOWULF MINING plc**

# European Critical Raw Materials for the Green Transition

Q1 2026



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# Investment case – right assets, location and timing

## Developing a European portfolio of critical minerals



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### Delivering minerals critical for Europe's green transition

- Diversified portfolio offers development optionality
- Strategic and political support to bolster supply chains
- Focused on delivering shareholder returns

AIM

London  
Stock Exchange

SPOTLIGHT



Jokkmokk Iron

### Iron ore for Green Steel

- Sweden's largest undeveloped iron ore project
- To produce high-grade, low-impurity concentrate
- Growing demand from decarbonisation of the steel industry

26

Fe

Iron  
55.8



GRAFINTEC

### Graphite anode material for Li-ion batteries

- Developing Graphite Anode Materials Plant
- Demand driven by growing Li-ion battery sector
- One of Europe's largest flake graphite resources

6

C

Carbon  
12.0



### Portfolio of European exploration assets

- Targeting discovery of critical minerals
- Highly prospective but under-explored licence package
- Seeking sale or JV to realise value from portfolio

29  
Cu  
Copper  
63.5

30  
Zn  
Zinc  
65.4

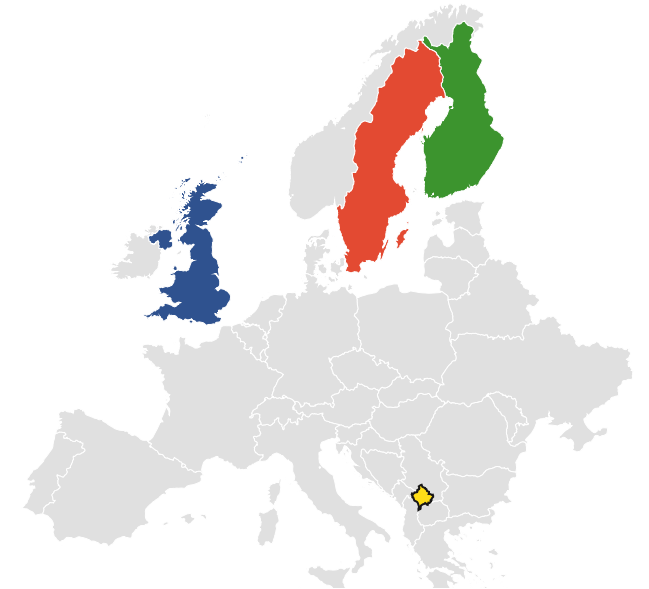
3  
Li  
Lithium  
6.9

47  
Ag  
Silver  
107.9

27  
Co  
Cobalt  
58.9

28  
Ni  
Nickel  
58.7

79  
Au  
Gold  
197.0



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# Funding strategy for 12 to 24 months

Targeting non-dilutive finance to deliver growth

## Short-term funding:

- Secured in December:

£0.5m

## Longer-term strategy – a number of catalysts pending:

- Sale of 100% of Vardar\* (non-binding offer received): £3.5m
- Grafintec
  - Business Finland R&D Loan\* (under review): £6.1m
  - Equity match funding\* (local advisers appointed): £4.3m
  - Total: £10.4m
- Ongoing discussions with multiple strategics
- Additional source of funding including EU-backed schemes

\* the sale of Vardar and funding for Grafintec are both at an early stage and there can be no certainty that the transactions will be successfully concluded.

## Funding requirements and use of proceeds:

- Beowulf corporate (12 months): £0.8
- Jokkmokk Iron (12 months):
  - Technical including Pre-Feasibility Study: £1.1m
  - Environmental including Permit application: £0.9m
  - Corporate: £0.5m
  - Total: £2.5m
- Grafintec (18-24 months)
  - Pilot plant and pilot testing: £7.8m
  - Environmental including Permit application: £0.2m
  - Definitive Feasibility Study (“DFS”): £0.6m
  - Corporate & Site costs: £0.4m
  - Total: £9.0m



# Building blocks for a sustainable future

ESG embedded throughout the company as a core value

Sustainability approach driven by:

- Transparency and Accountability
- Meaningful Stakeholder Engagement
- Environmental Stewardship
- Corporate Governance
- Innovation and Technology

Beowulf plans to:

- Build a sustainable minerals business
- Adopt innovation and technology
- Target carbon neutrality
- Support the green transition
- Generate value for all stakeholders







Jokkmokk Iron

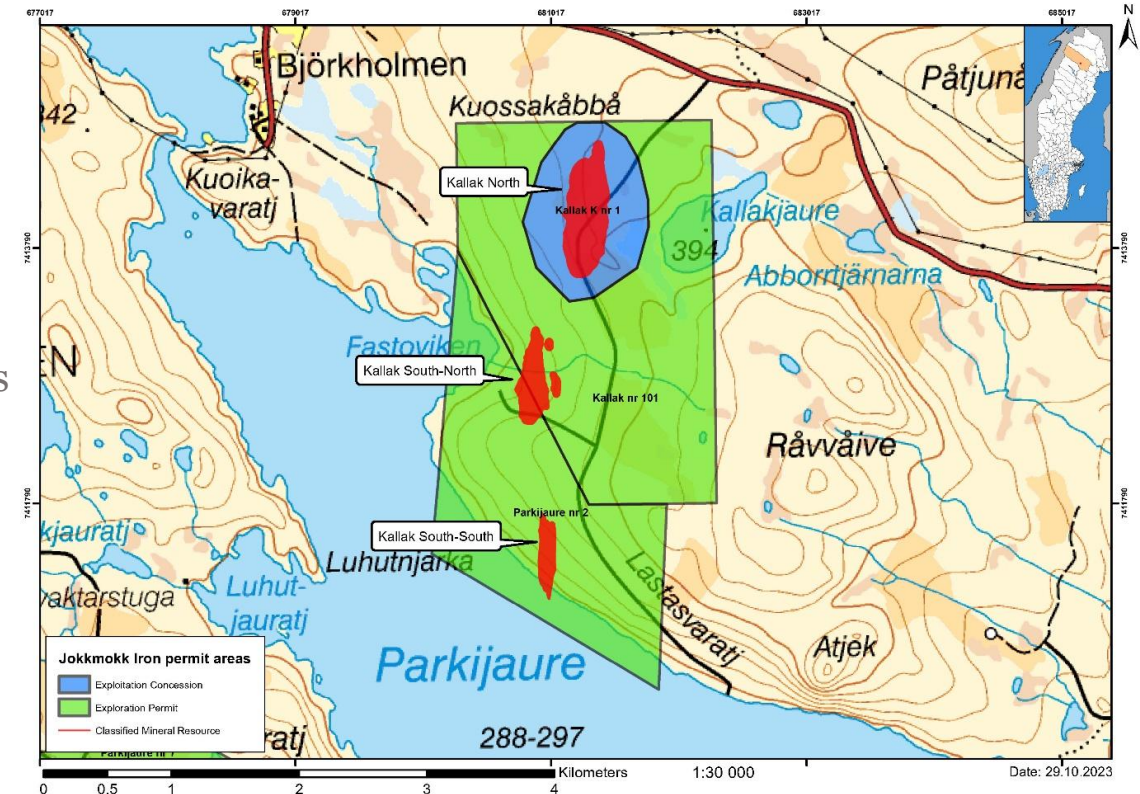




# Kallak: high-grade, low-impurity iron ore

Critical product to decarbonise the steel industry

- Sweden's “largest undeveloped quartz banded iron ore deposit” and “of national interest”<sup>1</sup>
  - Measured & Indicated Resource<sup>2</sup>: 111Mt @ 28% Fe
  - Inferred Resource<sup>2</sup>: 25Mt @ 28.3% Fe
  - Significant exploration upside
- Potential to produce high-grade, low impurity concentrate
  - ~2.7Mtpa at >70% Fe with low gangue
  - Growing demand from domestic and international markets
- Well-located for existing iron ore infrastructure
  - Rail within 40km and multiple port options
  - Access to low-cost, clean energy
  - Skilled local work-force
- Significantly de-risked
  - Exploitation concession received
  - PFS and Environmental Permit application well-advanced



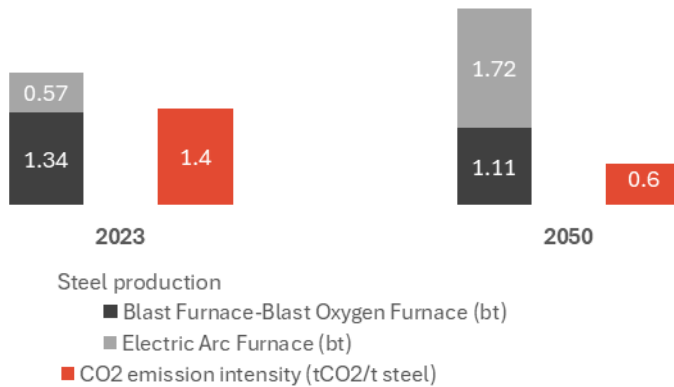
1: Government statement released on 18 January 2024

2: Based on 2021 PERC compliant Mineral Resource Estimate for Kallak North

# High-grade iron ore: demand forecast to grow

Decarbonisation of steel to drive demand of low carbon feedstocks, primarily DRI

## Steel industry:

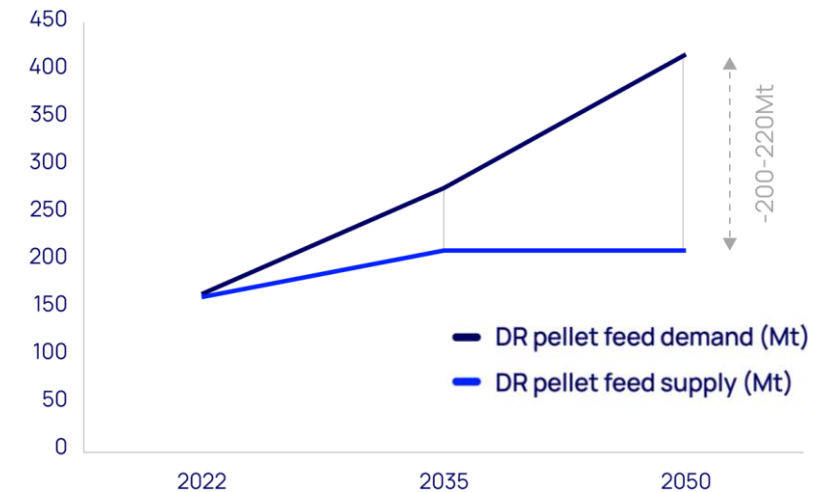


- Steel industry currently accounts for ~7% of global CO<sub>2</sub> emissions
- Industry targeting 60% decrease in CO<sub>2</sub> emission intensity by 2050 (and 90% by 2070)
- Electric Arc Furnaces (EAFs) are replacing highly polluting Blast Furnaces (BFs)
- Low-carbon feedstocks, primarily Direct Reduced Iron (DRI), will be essential to support EAF capacity
- DRI produced with green hydrogen offers a real route to delivering low-carbon steel

Source: IEA Sustainable Development Scenario

- DRI currently accounts for ~5% of supply to steel industry
- Significant supply deficit forecast
- Mines capable of supplying sufficiently high-quality material for DRI will not meet demand
- DRI will also likely need to be produced from lower quality iron ore but at a cost
- Supply constraints to drive premiums for high-quality concentrate

Source: McKinsey, Wood Mackenzie





# Kallak North Iron Ore Project

## Basic project parameters

### Open pit mining<sup>1</sup>:

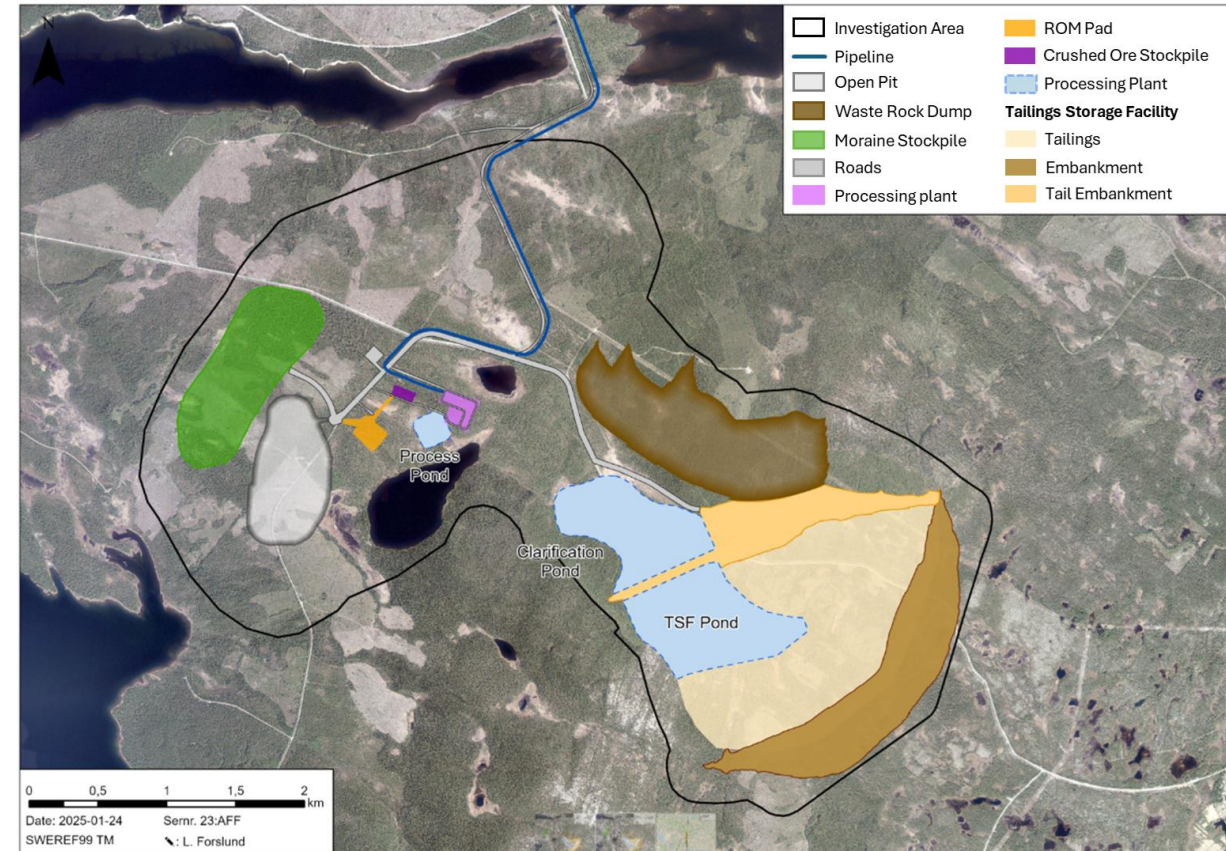
- 9 Mtpa of ore
- Ore from surface
- Low strip ratio of 0.5 : 1

### Processing<sup>2</sup>:

- Standard crush, grind and physical separation
- Magnetic separation to 69% Fe product
- Final physical beneficiation to upgrade to DRI product

### Concentrate<sup>2</sup>:

- 2.7 Mtpa of concentrate
- >70% Fe, low impurities and <2.5% SiO<sub>2</sub> & Al<sub>2</sub>O<sub>3</sub>
- Conventional tailings management



<sup>1</sup>: Kallak North Scoping Study, January 2023

<sup>2</sup>: Updated as part of the ongoing Pre-Feasibility Study

# Location advantage

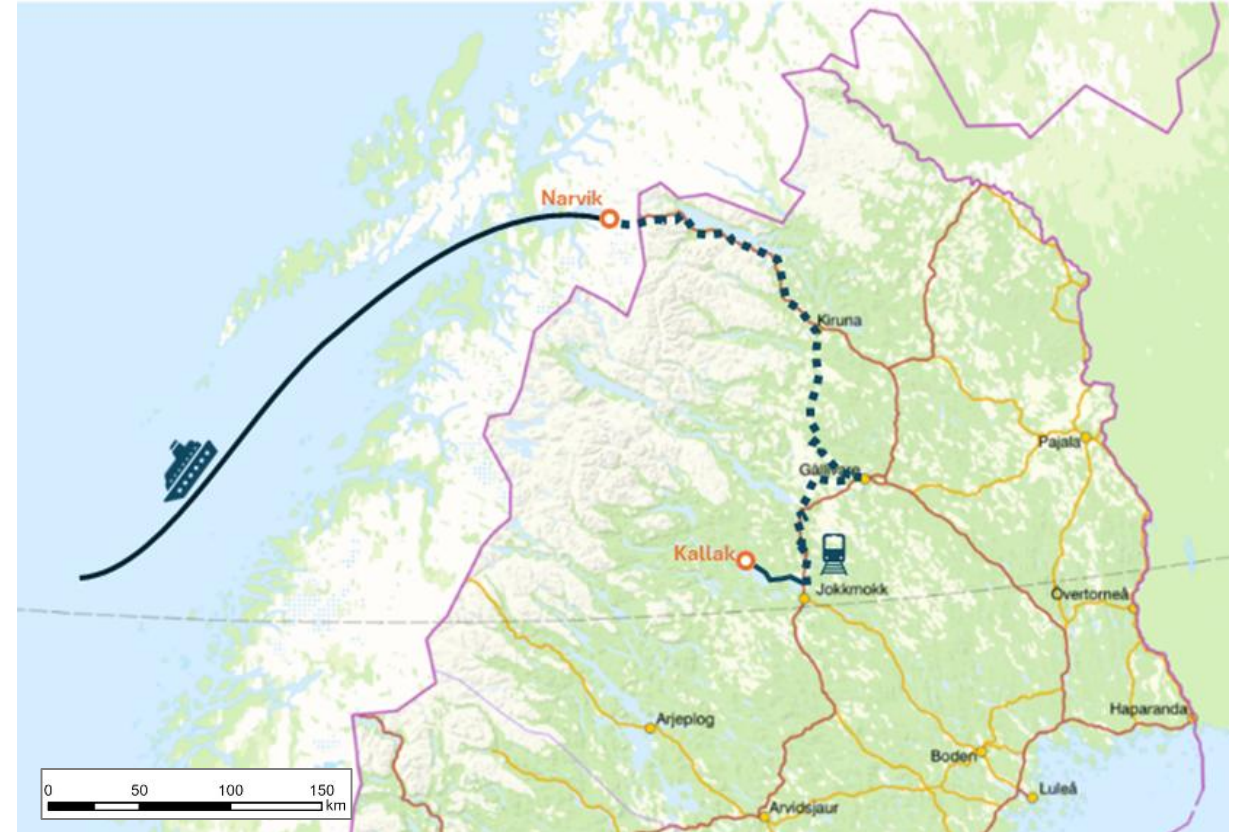
Well-located for domestic and international markets

Transportation solution:

- Mine-site to rail terminal - 40km slurry pipeline<sup>1</sup>
- Rail to Narvik (deep-water and ice-free)
- Access to international markets

Northern Sweden - multi-decade history of iron ore mining

- Existing infrastructure
- Low-cost, renewable energy
- Skilled and experienced workforce
- Political support for sector
- Significant investment in Green Steel
- CBAM<sup>2</sup> – a future benefit



<sup>1</sup> Preferred option although subject to further technical and environmental studies

<sup>2</sup> Carbon Border Adjustment Mechanism

# Project significantly derisked

Focus on developing a world class mine

## Environmental Permit Application:





- ❖ Public consultation
- ❖ Nature and water baseline 
- ❖ Hydrogeology 
- ❖ Noise
- ❖ Vibration and rock fall 
- ❖ Air quality
- ❖ Cultural heritage 
- ❖ Reindeer Herding Analysis
- ❖ World Heritage Impact Assessment
- ❖ Social Impact Assessment
- ❖ Ecological Compensation
- ❖ Transport corridor

## Ongoing Activity:

- ❖ Stakeholder Engagement
- ❖ Environmental Monitoring

## Pre-Feasibility Study:

- ❖ Infill drilling
- ❖ Mineral Resource Estimate
- ❖ Mine Planning
- ❖ Metallurgy 
- ❖ Mineral Processing 
- ❖ Waste Management
- ❖ Water Management
- ❖ Infrastructure 
- ❖ Logistics and Transportation
- ❖ Marketing
- ❖ Economic Analysis

Pending activity		x3
Initiated/ongoing		x5
Substantially complete		x8
Complete		x7



# Kallak advantage

## Targeting a premium product

### Enhanced economics:

- Premium product - critical for decarbonising steel industry
- Highly sought after for domestic and international markets
- Focus on developing a sustainable world class mine
- Increased mine life potential from exploration upside

Scoping study base case parameters <sup>1</sup>		Management Case 4
NPV at 8%:	US\$177m	<b>US\$829m</b>
IRR:	14.5%	<b>31.8%</b>
Payback period:	4.5 years	<b>2.7 Years</b>
Concentrate production:	2.5 Mtpa	2.7 Mtpa <sup>4</sup>
Concentrate split:	67% BF <sup>2</sup> , 33% DR <sup>2</sup>	100% DR <sup>4</sup>
Iron Ore Benchmark Price	US\$80/dmt <sup>3</sup>	US\$97/dmt <sup>4</sup>
BF premium:	US\$29/dmt <sup>3</sup>	
BF price:	US\$109/dmt	
DR premium:	US\$45/dmt <sup>3</sup>	US\$45/dmt <sup>3</sup>
DR price:	US\$125/dmt	US\$142/dmt



Source: <https://tradingeconomics.com/commodity/iron-ore>

### Notes:

1. Scoping Study assumes initial capital expenditure of US\$386m and 14-year mine life
2. BF - Blast Furnace feed and DR - Direct Reduction feed
3. Scoping Study pricing assumptions assume premia archived over Platts 62% Fe benchmark price of US\$80/dry metric tonne ("dmt")
4. Management Case assumes:
  - 100% DR production and 2.7 Mtpa based on PFS Metallurgical test-work
  - All other project inputs based on Scoping Study numbers including the DR premium
  - Consensus 2029 62% Fe benchmark pricing



# Exploration upside

## Untested potential

### Kallak North

- M&I resource<sup>1</sup>: 111Mt @ 28% Fe
- Inf resource<sup>1</sup>: 25Mt @ 28.3% Fe
- *Exploration target<sup>2</sup>: 3-7.5Mt @ 20-30% Fe*

### Kallak South

- M&I resource<sup>1</sup>: 21Mt @ 26.9% Fe
- Inf resource<sup>1</sup>: 14Mt @ 24.9% Fe
- *Exploration target<sup>2</sup>: 25-75Mt @ 20-30% Fe*

### Parkijaure nr. 6

- *Exploration target<sup>2</sup>: 45-135Mt @ 20-30% Fe*

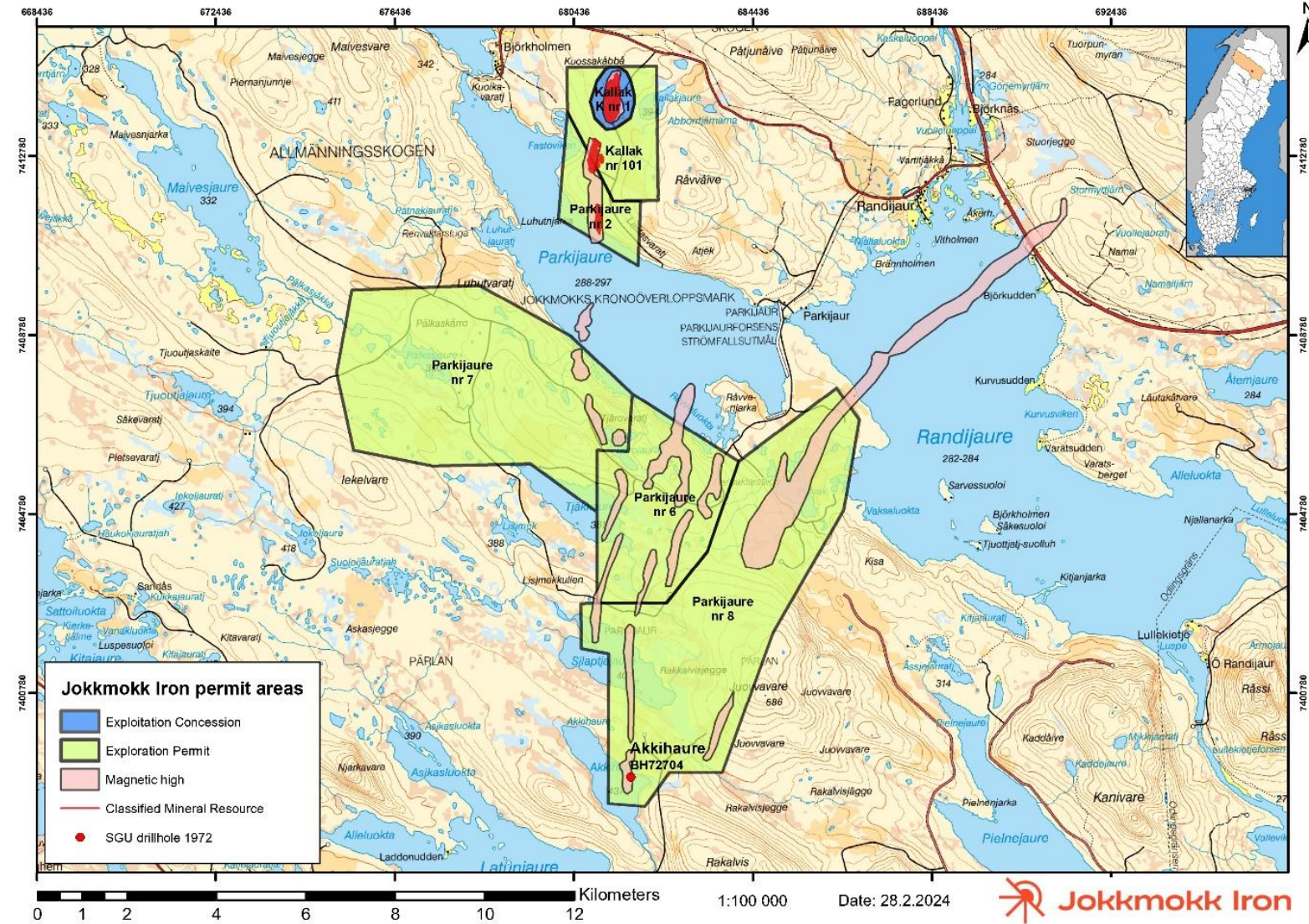
### Parkijaure 6, 7 & 8

- *Exploration potential<sup>3</sup>: 700Mt @ 21% Fe*

<sup>1</sup>: Based on 2021 PERC compliant Mineral Resource Estimate

<sup>2</sup>: Defined as part of 2021 Mineral Resource Estimate

<sup>3</sup>: Defined by consultant Geovista in 2017







**GRAFINTEC**



# Grafintec

Aiming to be a European leader in the sustainable supply of anode material

- Development of anode materials production facility in Finland
  - Creating secure domestic supply chain to support growing European lithium-ion battery sector
  - PFS completed in March 2025
    - Post-tax NPV8 of €924 million and IRR of 37% over 25 years (Phase 1)
    - Competitive operating costs at €2,381/ tonne of product
- Site reserved in Kotka, Finland offering
  - Low-cost renewable energy
  - Skilled work force
  - Excellent infrastructure & proximity to growing market
- Further upside
  - Phase 2 expansion
  - Integration of Grafintec's graphite projects - Aitolampi is one of Europe's largest flake graphite resources
  - EU and Finnish initiatives to support decarbonisation agenda including grants and tax incentives

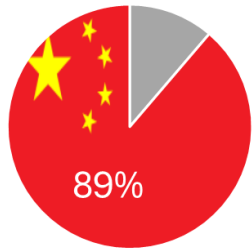


# European graphite market

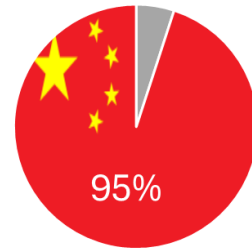
## Supply / demand imbalance

### China dominates graphite supply

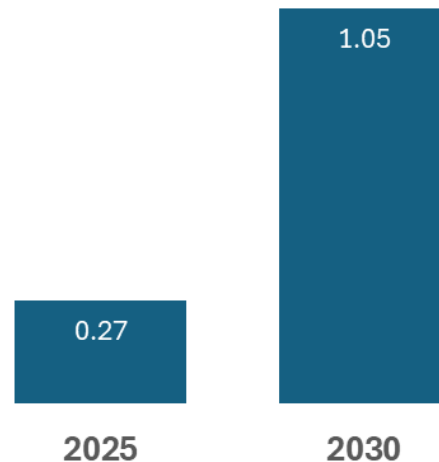
Total graphite supply  
(natural and synthetic)



Refined battery-grade supply  
(spherical and synthetic)

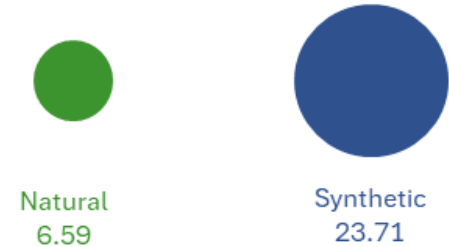


### Demand for Graphite for Li-ion Battery sector in Europe forecast to grow rapidly (Mtpa)



### Natural Graphite offers significant environmental advantages over Synthetic Graphite

Carbon Intensity  
(tonne CO<sub>2</sub>/ tonne uncoated graphite)



### EU Critical Raw Materials Act to secure EU supply:

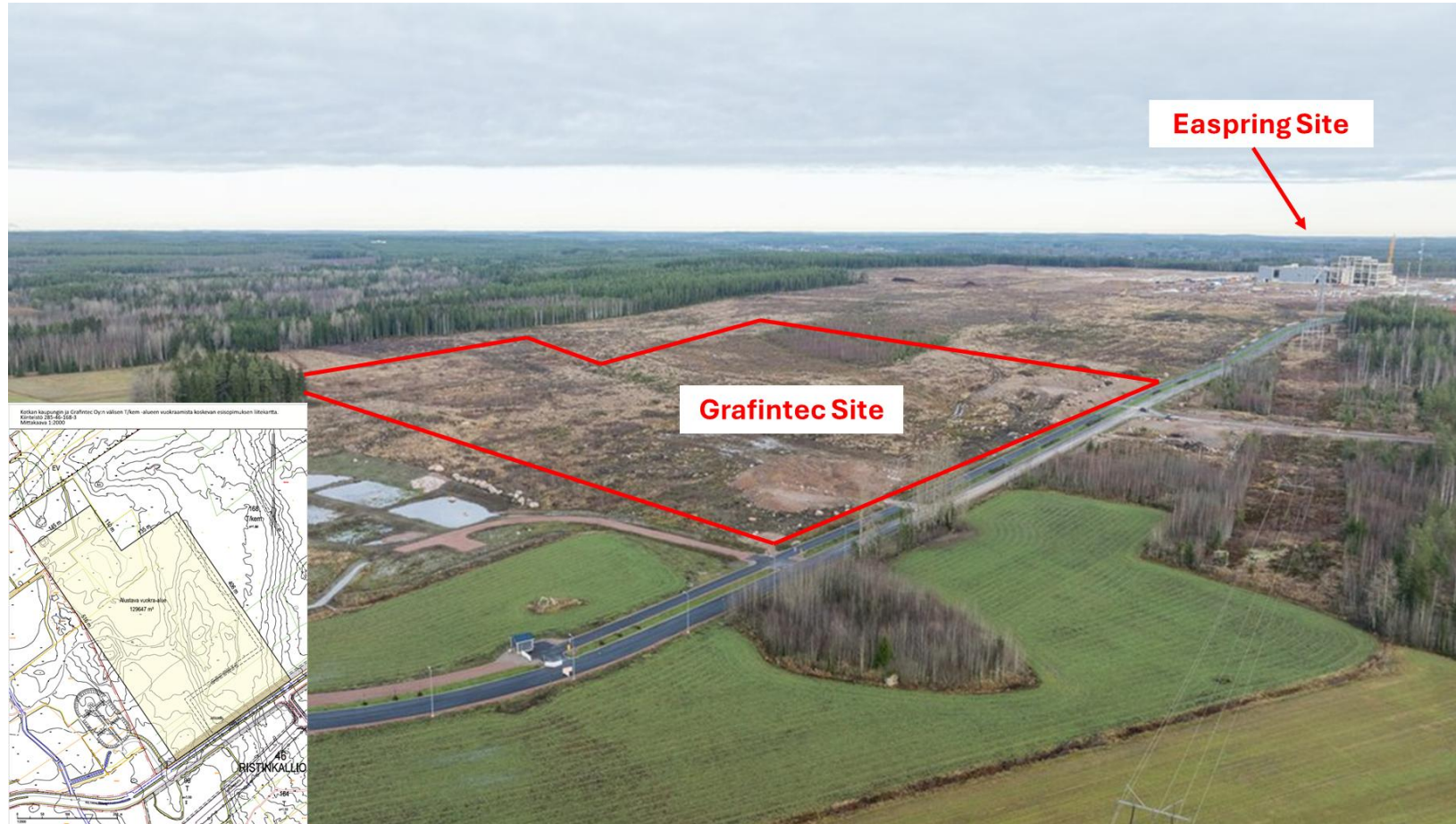
- >10% extracted from EU
- >40% processed within EU
- >25% from recycling
- <65% from a single country



EU production (t)	2023	2030 target
Mined:	650	>200,000
Processed:	0	>800,000

# Graphite Anode Materials Production

Finland offers significant advantages



Dedicated sites  
for battery technologies



Excellent infrastructure



Low-cost renewable  
energy



Skilled workforce



Proximity to  
European customers



State and EU support:  
grants and tax incentives



# Graphite Anode Materials Production

Pre-Feasibility Study completed March 2025



Physical parameters (tonnes/ annum)	Phase 1	Phase 2
Plant throughput	42,000	126,000
Production of CSPG-18 <sup>2</sup>	19,743	59,229
Production of CSPG-8 <sup>3</sup>	5,379	16,137
Production of by-product fines	16,878	50,634
<b>Total production of CSPG<sup>1</sup></b>	<b>25,122</b>	<b>75,366</b>
<i>Electric vehicles supplied</i>	<i>357,000</i>	<i>1,071,000</i>

<sup>1</sup> CSPG: Coated Spherical Purified Graphite

<sup>2</sup> CSPG-18: CSPG with particle size of 18 µm

<sup>3</sup> CSPG-8: CSPG with particle size of 8 µm

**ANZAPLAN**  
dorfner group



# Graphite Anode Materials Production

Pre-Feasibility Study completed March 2025: robust economics

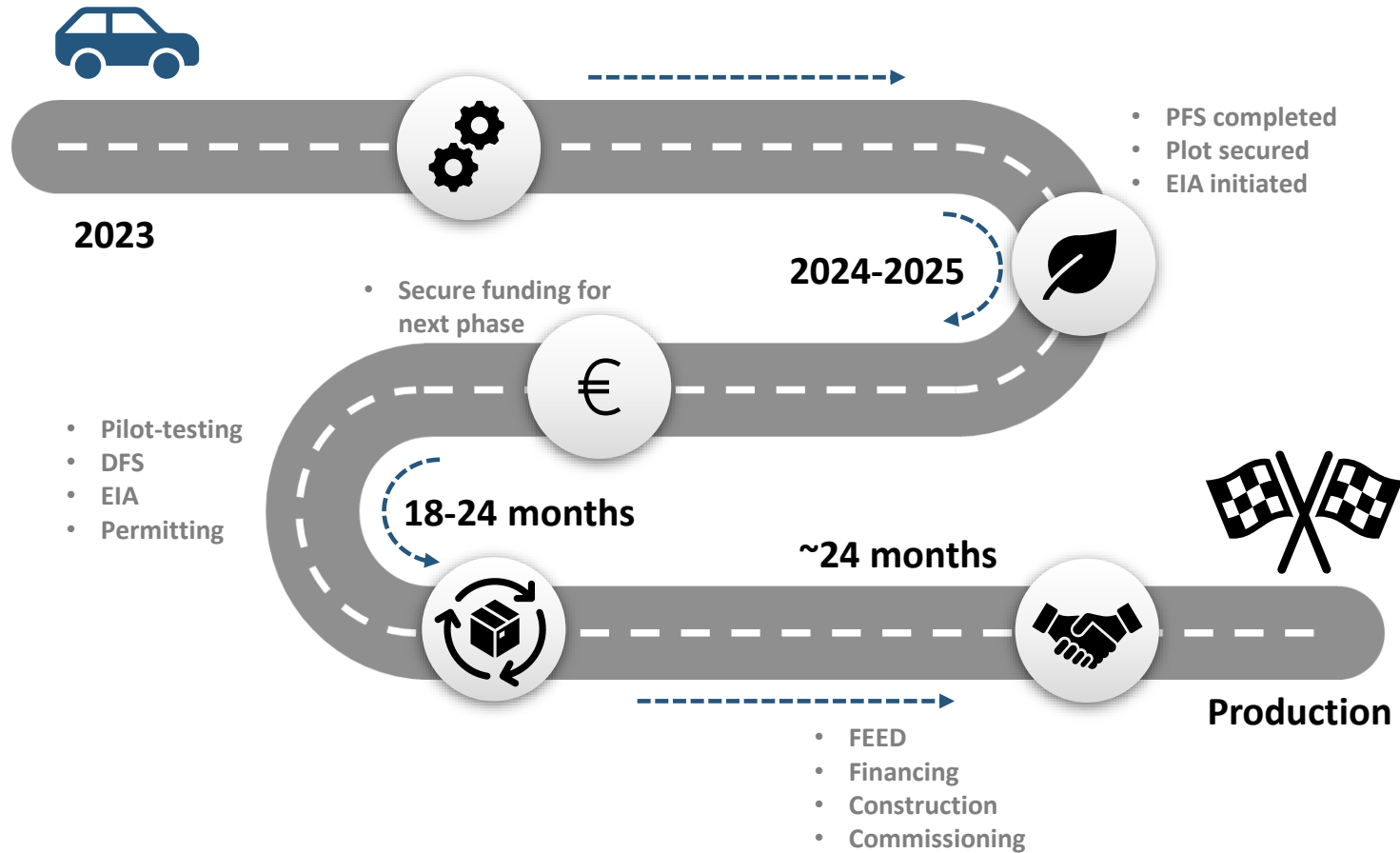
Economic parameters	Phase 1	Phase 2
Post-tax NPV <sub>8</sub>	<b>€924m</b>	<b>€2,178m</b>
Post-tax IRR	<b>37%</b>	<b>38%</b>
Pre-tax NPV <sub>8</sub>	€1,173m	€2,763m
Pre-tax IRR	42%	42%
Capital expenditure	€225m	€675m
Payback period	2.9 years	
Life of operation	25 years	25 years
Revenue per year	€218m	€653m
Operating cost per year	€60m	€179m
EBITDA per year	€150m	€451m
Free cash flow per year	€120m	€361m

Unit prices and costs	US\$/ tonne
Concentrate purchase price	568
Operating cost per tonne feed	1,424
Operating cost per tonne product	2,381
CSPG-18 realised price	7,800
CSPG-8 realised price	10,260
Fines realised price	500

Operating cost breakdown	
Supply of concentrate	41%
Power	12%
Water	4%
Reagents	14%
Maintenance	7%
Laboratory & Other	5%
Sustaining Capital	11%

# Development Timeline

## Environmental and Technical Workstreams



With the successful conclusion of the Environmental and Technical workstreams, the GAMP project will enter Front-End Engineering Design (FEED), financing and ultimately construction phases ahead of first production.



# Strategic resources

One of Europe's largest flake graphite deposits

## Aitolampi

Mineral  
resource

Metallurgical  
testwork

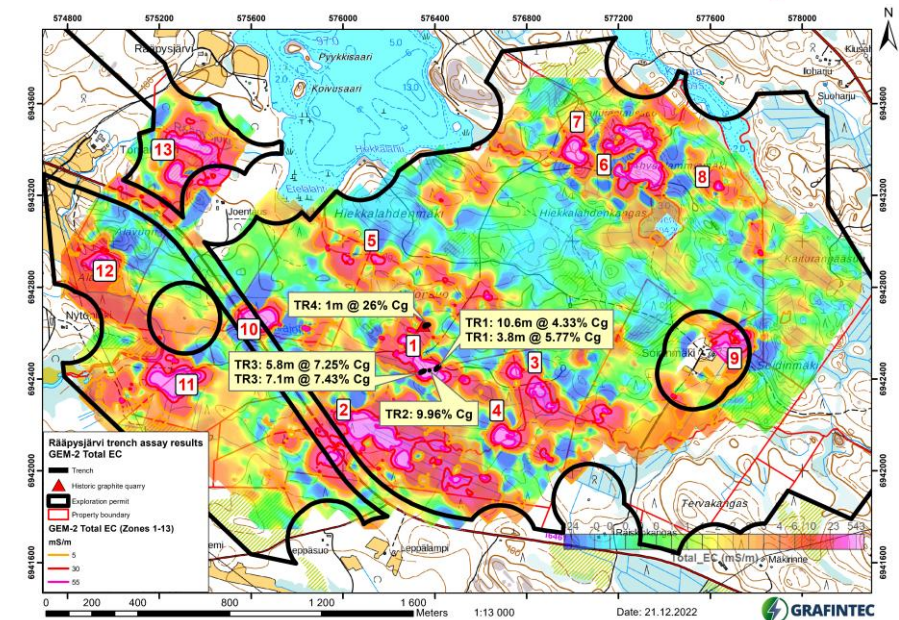
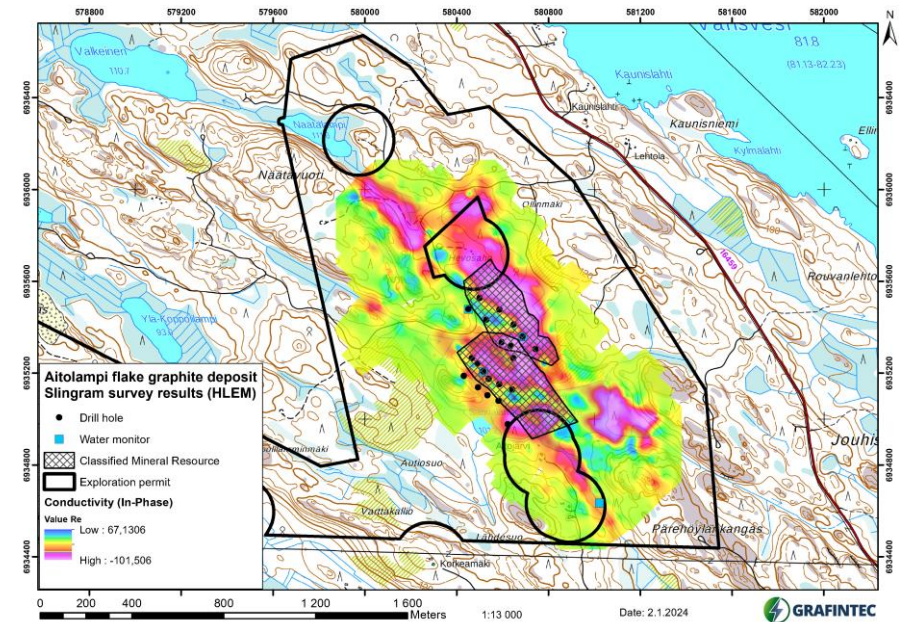
- Indicated and Inferred 26.7Mt at 4.8% graphite for 1,275,000 tonnes of contained graphite (Indicated and Inferred)
- Several untested EM conductive areas
- 96.8% to 97.5% graphite concentrates produced suitable as a pre-cursor for graphite anode materials production
- Purification tests achieved >99.95% graphite
- Spheronisation and battery application tests completed

## Rääpysjärvi

Exploration  
work

- Located 8km from Aitolampi
- EM conductive anomalies are more extensive - potential for a larger tonnage of graphite mineralisation in the area
- >50% graphite assayed (*limitation of the analysing methodology*) from grab sample at historic graphite quarry at Zone 1 - potential for localised very high-grade mineralisation
- Four trenches revealing significant flake graphite mineralization, including 1.0m at 26.00% graphite & 7.1 m at 7.43% graphite
- Composite surface grab sample with a head grade of 19.8% graphite
- 97.4% graphite concentrate produced with 18.8% in the large/jumbo flake fraction

Metallurgical  
testwork







# Exploration Assets

# Vardar – *non-binding offer received for sale*

## Tethyan Belt – a major metallogenic province

### Timok deposit (Zijin), Serbia:

- Zijin acquired Nevsun Resources Ltd. for US\$1.4b in 2018, after Nevsun acquired Reservoir Minerals Inc. for US\$365m in 2016
- Total resources of 1.8bt @ 0.9% Cu & 0.2g/t Au
- Forecast 2023 production of 3Mt for 181kt Cu & 156koz Au

### Skouries deposit (Eldorado Gold), Greece:

- Total resource of 308Mt @ 0.6g/t Au & 0.5% Cu

### Stan Terg mine (Trepca), Kosovo:

- Reported historic resource of 63Mt @ 3.5% Pb, 2.3% Zn & 80g/t Ag

### Sasa deposit (Central Asia Metals), North Macedonia:

- Acquired for US\$402.5m in 2017
- Total resources of 22.3Mt @ 4.2%Pb, 2.5% Zn & 20.5g/t Ag
- 2022 production of 807kt @ 3.6% Pb & 3.2% Zn

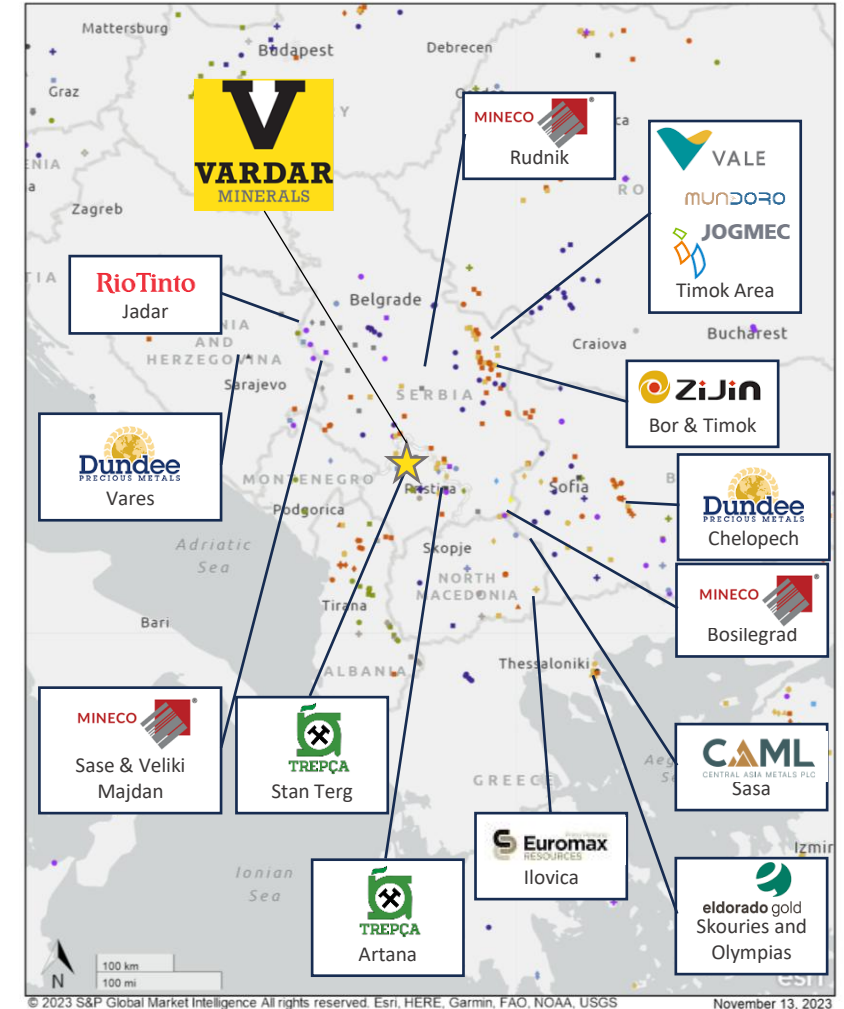
### Vares deposit (Dundee Precious Metals), Bosnia & Herzegovina:

- Adriatic Metals acquired by Dundee in September 2025 for US\$1.3b
- Adriatic discovered project in 2017 and achieved commercial production in 2024 with forecast production of 15Moz Ag equivalent pa for first 6 years
- Total resource of 21.1Mt @ 156g/t Ag, 4.3% Zn, 2.8% Pb, 1.2g/t Au, 0.4% Cu, 0.2% Sb & 27%BaSO<sub>4</sub>

### Jadar deposit (Rio Tinto), Serbia:

- Total mineral resource of 144Mt at 1.8% Li & 14.3% B<sub>2</sub>O<sub>3</sub>

Source: Company websites and reports





# Vardar – *non-binding offer received for sale*

First-mover in highly prospective Kosovo, systematic exploration completed

Kosovo:

- Highly prospective for base and precious metals
- Limited to no exploration since the 1980s

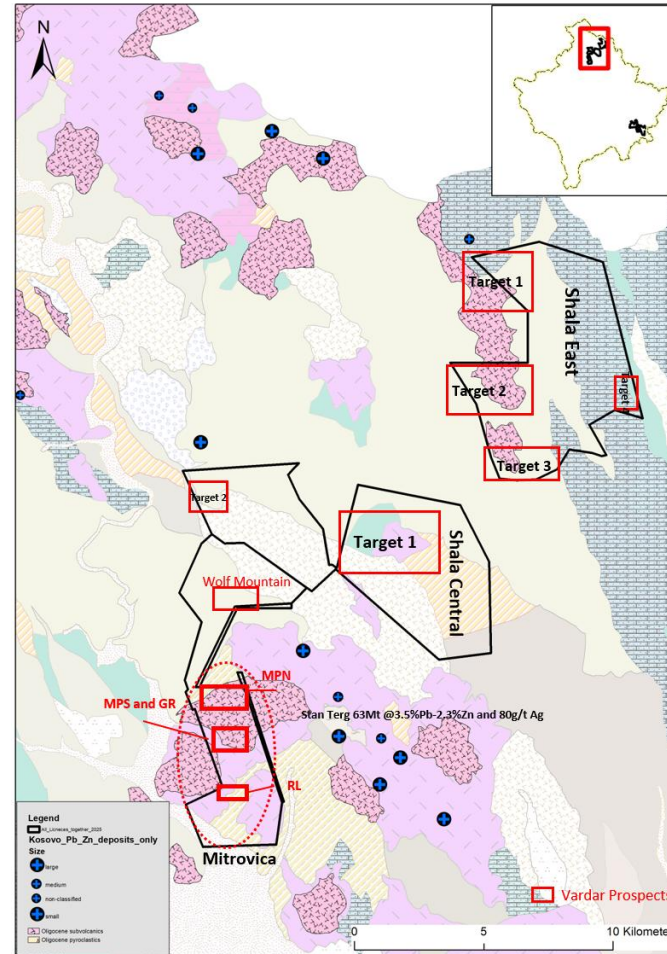
Mitrovica licence area:

- Km-scale hydrothermal alteration systems identified - comparable in size to world-class base and precious metals deposits
- Multiple high-quality targets defined by mapping, geochemistry, geophysics and drilling
- Red Lead priority Zn target yet to be drilled, similarities and proximal to Stan Terg
- Significant drill results to date include:
  - MP6: 10.8m at 0.48 g/t Au, 0.1% Cu and 18 g/t Ag
  - MP6: 6.8m at 4.1% Pb, 0.6% Zn and 15 g/t Ag
  - MP15: 44.4m at 0.2 g/t Au

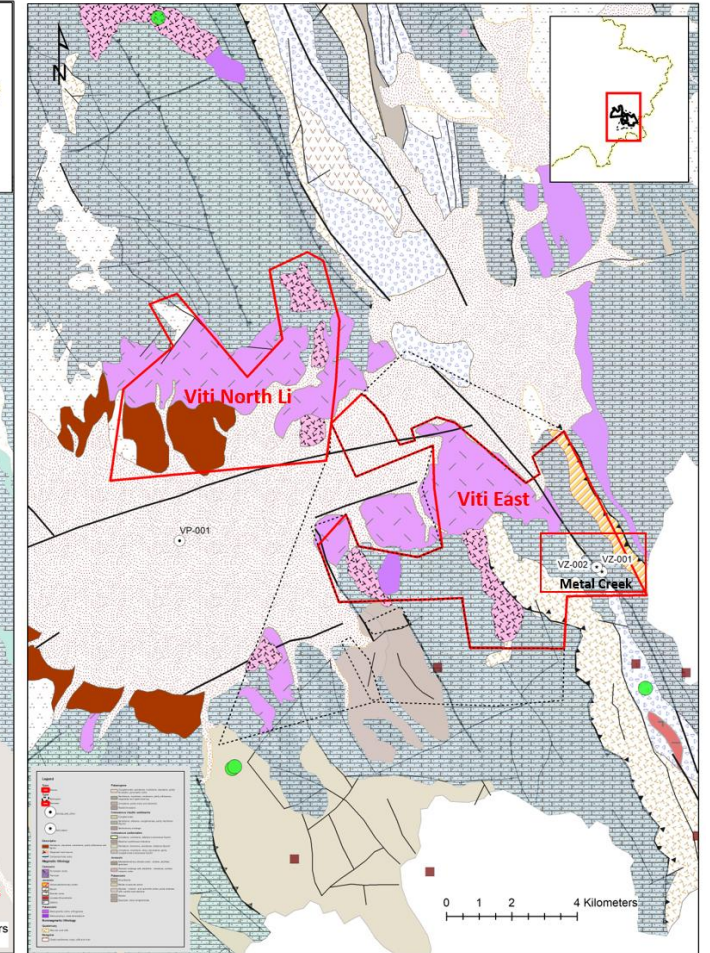
Viti licence area:

- Anomalous copper and gold from surface sampling and drilling
- Potential for Jadard-like lithium mineralization - up to 1,260 µg/l Li and 10,500 µg/l B from spring water

Mitrovica licences



Viti licences



Note: All licences are currently under application

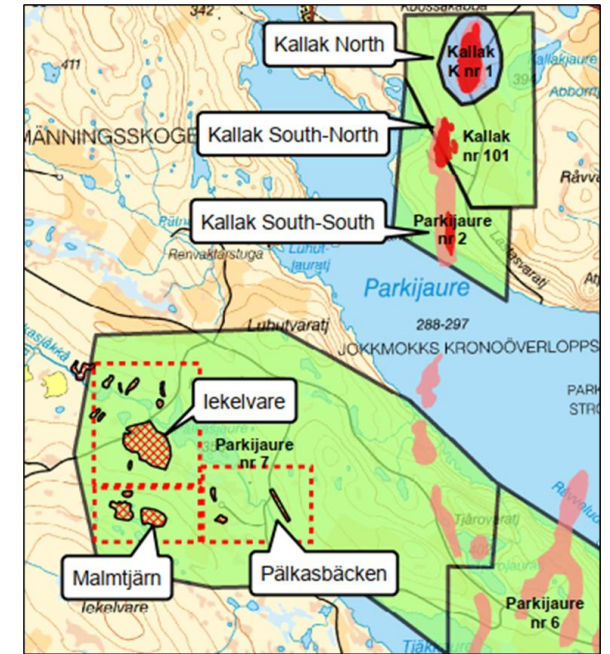


# Exploration assets

## Optionality and leverage

### Parkijaure nr 7, Sweden – possible IOCG copper target

- **14.6% copper, 0.56% zinc, 119g/t silver and 0.35g/t gold** boulder sample (March 2024)
- **6.2m @ 1.53% Cu** from 133.08m (including **3.6m @ 2.45% Cu**) and **2.6m @ 0.96% Cu** from 95.59m in diamond drillhole 74002
- **110m of 0.42% Cu, 0.54g/t Au and 0.16% Zn** from 34.80m (including a higher-grade zone of **37.6m at 0.63% Cu, 0.87g/t Au and 0.21% Zn** from 91.4m) in diamond drillhole MAJ04001.
- 22.12 km<sup>2</sup> exploration license, 7 km to the south-west of the Kallak North Exploitation Concession



### Emas, Finland – nickel-cobalt target

- **10.5 m @ 0.8% Ni and 0.11% Co** from 32.5m, including **2.15 m @ 2.79% Ni, 0.58% Co, 0.14% Cu and 0.32 ppm Au** from 33.7 m
- Identified by the Geological Survey of Finland (GTK) in 2019
- GTK completed ground magnetic, multi-frequency electromagnetic (EM) and gravity surveys before 2 drilling campaigns



# Summary and Outlook

Right commodities in the right place at the right time

## **Core assets supporting the Green Transition:**

- Kallak has the potential to produce a market-leading, high-grade, low impurity iron concentrate
- Grafintec aims to develop graphite anode material plant and holds one of Europe's largest flake graphite resources
- Both assets advancing through permitting and technical studies

## **Prime location to establish secure European supply chains:**

- Nordic assets are located close to leading Green Steel and Gigafactory investments
- Access to low-cost and clean energy, established infrastructure and skilled work force
- Kosovo is located at the heart of the highly prospective Tethyan Belt

## **Asset development aligned with demand fundamentals:**

- Demand being driven by supply chain security and decarbonisation agenda
- Core assets at major de-risking inflection points, exploration portfolio provides optionality
- Value driven by forecast supply deficits in core minerals

**Targeting sale of Vardar and fund raise at Grafintec to advance core assets through next 12-24 months**





An aerial photograph of a wind farm during the 'golden hour' of sunset. The scene is bathed in warm, orange and yellow light. In the foreground on the right, a large white wind turbine is partially visible, with its nacelle and one blade extending towards the center. A dirt road or path winds through the green fields. In the middle ground, several other wind turbines are scattered across a rolling landscape of green fields and patches of dark forest. The background shows distant hills and a small town or village under a hazy, sunlit sky. The overall mood is peaceful and highlights renewable energy in a natural setting.

# Appendices

# Corporate summary

## Experienced Board & Management

### Market Data (as at 31 December 2025)

Listing	AIM/ Spotlight
Ticker	BEM/ BEO
Share price	11p/ SEK 1.50
Shares outstanding	59.7 million
Market Capitalisation	£6.6 million
Cash (30 September 2025)	£0.4 million
Debt (30 September 2025)	Nil
Shares held in Sweden	73%
Average daily volume (3 months)	137,000

*Note: Beowulf entered into an unsecured convertible loan for £0.5 million on 22 December 2025*



#### Johan Röstin

##### Non-Executive Chairman

Former CEO of shipping and port companies with significant experience in infrastructure, logistics, capital investments and permitting processes



#### Ed Bowie

##### Chief Executive Officer

Over 20 years' experience in corporate, advisory and fund management roles and across a broad range of commodities and jurisdictions



#### Mikael Schauman

##### Non-Executive Director

Former SVP Commercial for Lundin Mining responsible for worldwide sales, with more than 40 years' experience of base metals



#### Chris Davies

##### Non-Executive Director

Exploration geologist with over 40 years' experience across multiple commodities and jurisdictions



#### Dmytro Siergieiev

##### Project Director, Kallak

Former team leader of Sweco's mine environment team with extensive experience in environmental and permitting assignments



#### Rasmus Blomqvist

##### MD, Grafintec

Exploration geologist with significant experience across Scandinavia. Founder of Grafintec



**BEOWULF MINING plc**

# Supply chain security

## Political initiatives

EU Critical Raw Materials Act to secure EU supply:

- >10% extracted from EU
- >40% processed within EU
- >25% from recycling
- <65% from a single country



US Inflation Reduction Act (IRA) to support clean-energy industries and supply chains:

~US\$370 billion in spending and tax credits



EU's Carbon Border Adjustment Mechanism (CBAM):

- Carbon tariff on industrial goods entering the EU



UK Critical Minerals Strategy



Canada's Critical Minerals Strategy



Australia–India Critical Minerals Cooperation Agreement



US–Japan Critical Minerals Agreement on battery minerals (lithium, nickel, cobalt, graphite and manganese):

- to help Japanese automakers and critical minerals processors access the benefits of the 2022 US Inflation Reduction Act.



The Indian Ministry of Mines JV company, Khanij Bidesh India Ltd. (KABIL) to ensure the supply of critical minerals:

- actively seeking offtake agreements and has already signed with Argentina and Australia



Minerals Security Partnership (MSP)

- led by the US Department of State, to stimulate government and private-sector investment
- Partner governments include Australia, Canada, Finland, France, Germany, Japan, South Korea, Sweden, the UK, the US and the EU.





# Supply chain security

## Driving investment in critical minerals

 <b>PORSCHE</b> Supply agreement from 2026  October 2023	<b>VOLVO</b> Supply agreement from 2026  September 2023	<b>STELLANTIS</b> €9.2m investment for 11.5% and 40% offtake for 5 years  April 2023	 Mercedes-Benz 10ktpa of lithium hydroxide for 5 years' worth ~€1.5b  October 2022	<b>TESLA</b> 75kt nickel concentrate over 6 years  January 2022
 US\$2.9b battery JV  October 2023	 Mercedes-Benz JV on battery recycling plant  August 2023	 general motors US\$650m investment  January 2023	<b>STELLANTIS</b> €50m investment for 8%  June 2022	<b>Renault Group</b> 6-17ktpa of lithium offtake  August 2021
<b>STELLANTIS</b> US\$155m investment for 14.2%  October 2023	 <b>SCANIA</b> Supply agreement from 2027  June 2023	<b>STELLANTIS</b> US\$30m and 45ktpa manganese sulphate offtake for 5 years  January 2023	<b>Renault Group</b> 5ktpa of cobalt sulphate for 7 years  June 2022	<b>Renault Group</b> Nickel sulphate supply for 200,000EVs or 15GWh pa  October 2021



# High-grade iron ore: demand forecast to grow

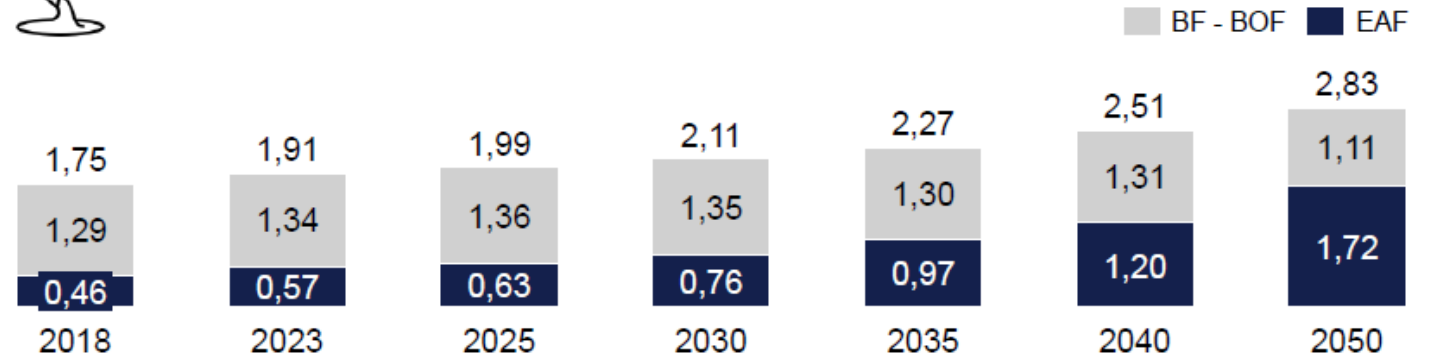
Decarbonisation of steel to drive demand of low carbon feedstocks, primarily DRI

- Electric Arc Furnaces (EAFs) are replacing highly polluting Blast Furnaces (BFs)
- Low-carbon feedstocks, primarily DRI, will be essential to support EAF capacity.
- DRI produced with green hydrogen offers a real route to delivering low-carbon steel
- New hubs will develop in countries with abundant low-cost renewables energy and competitive green hydrogen capacity

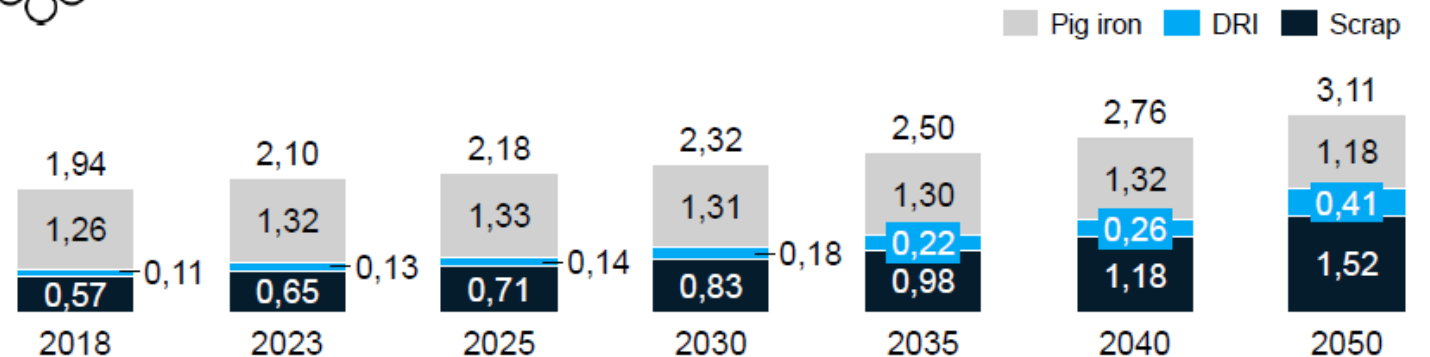
Source: Wood Mackenzie, Fastmarkets and Emirates Steel



## Crude steel production, bn tons

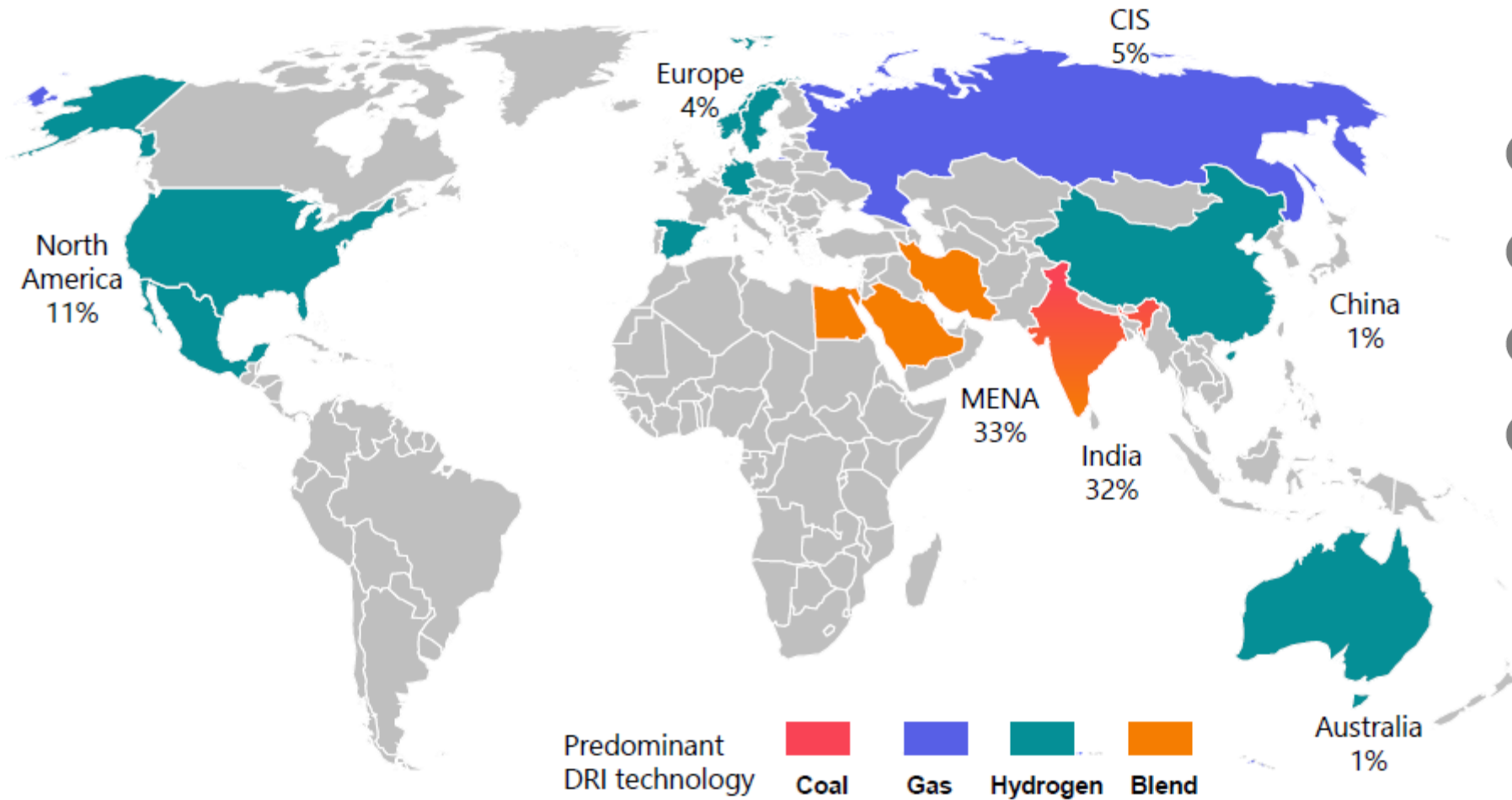


## Metallics consumption, bn tons



# Forecast growth in steel from DRI

DRI production share of expected hubs (2030, 180 Mt)



## The “4” big risks to greening DRI

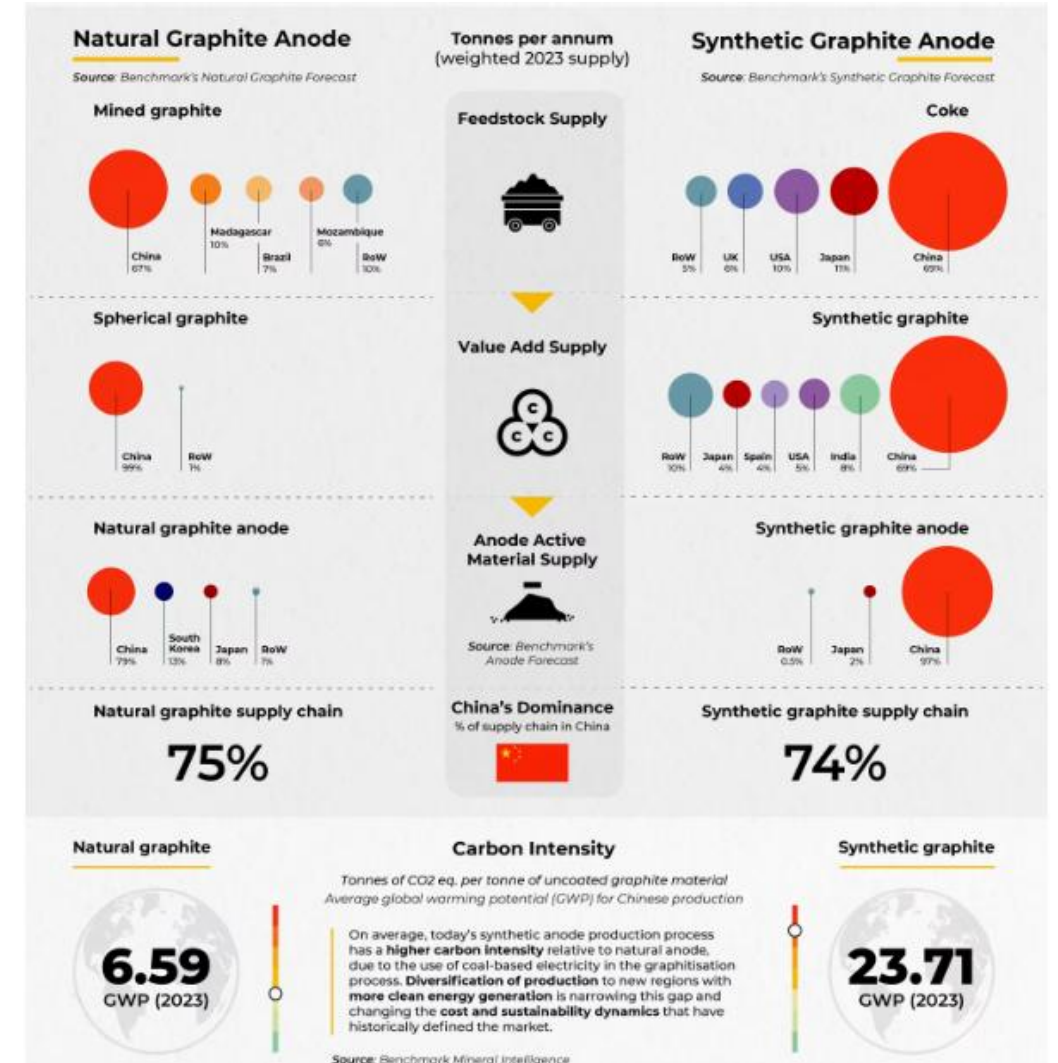
- 1. Limited supply of DR grade iron ore**  
R&D is needed to enhance existing unlocked reserves and resources and make it suitable for DRI use
- 2. Hydrogen scalability, transportation and storage**  
The scalability of expensive electrolyzer units is yet to be ascertained; hydrogen infrastructure and transportation to be key challenges
- 3. Electrification challenges**  
Intermittency and variability in patterns; high LCOH and capital costs necessitates policy changes and incentives to achieve targets
- 4. Increased greening costs**  
Decarbonisation is costly and requires incentives and stricter carbon policies across the globe for early breakeven



# Global Graphite Supply

Dominated by China

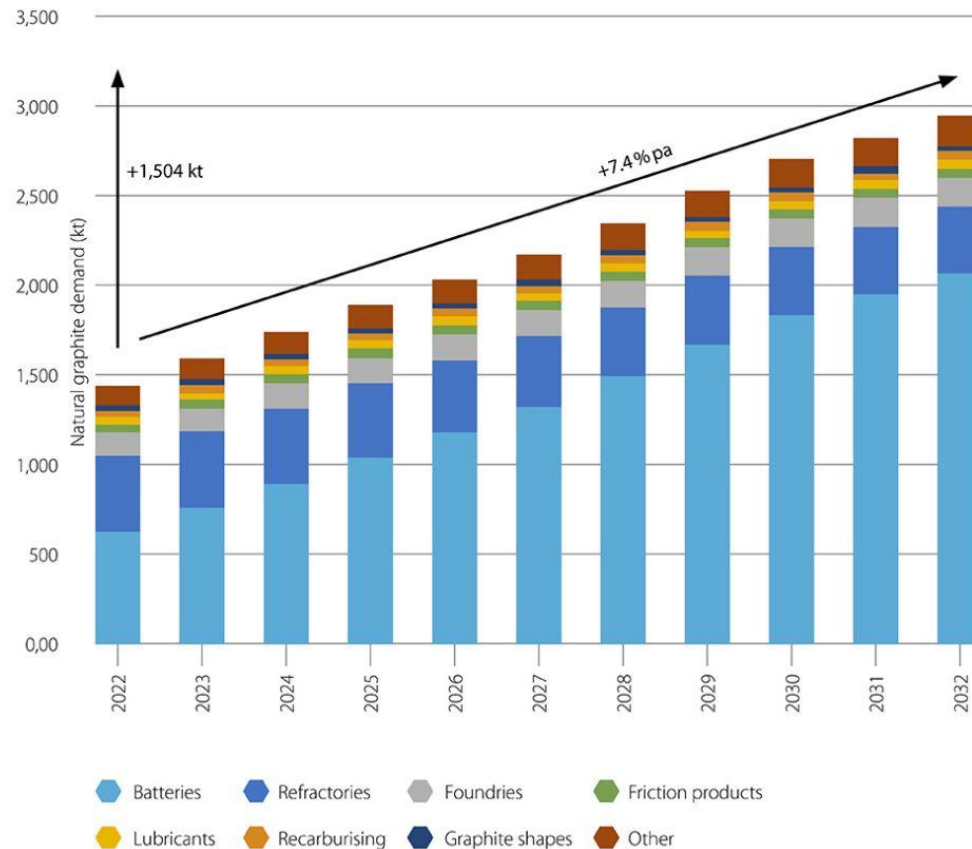
## Top 10 Producers of Natural Graphite



# Global Graphite Demand

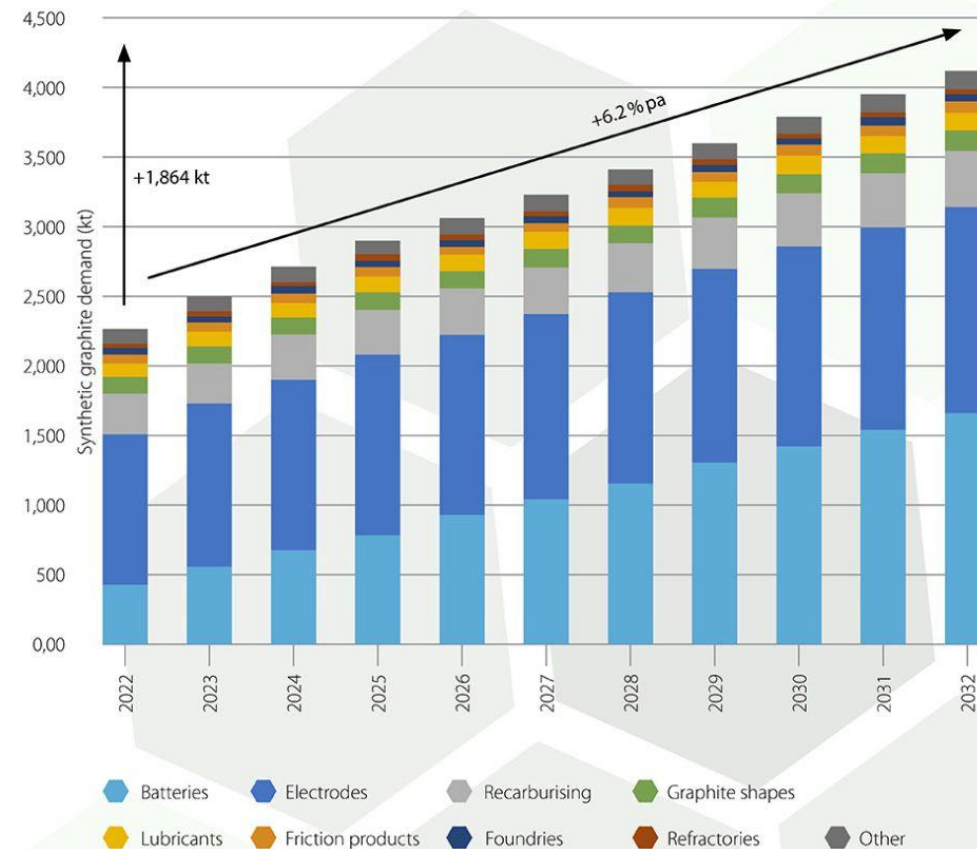
Dominated by China

Global demand of natural graphite



Source: Wood Mackenzie

Global demand of synthetic graphite



Source: Wood Mackenzie

# Notes







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