

MINERAL COMMODITIES LTD

GLOBAL OVERVIEW



Skaland

Flake Graphite

Production – 10ktpa Flake Graphite

Concentrate



Perth

Corporate Headquarters

Munglinup

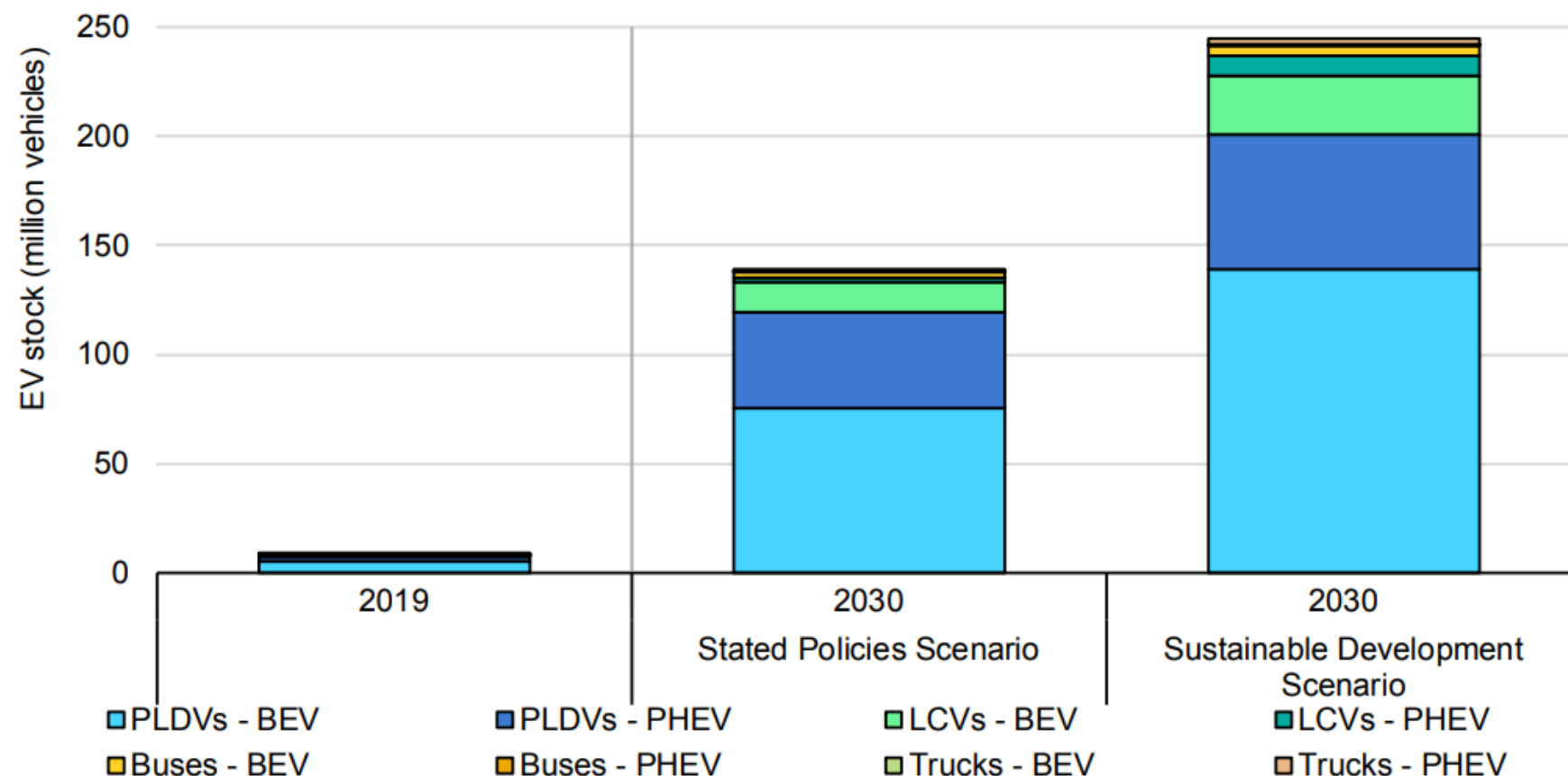
Graphite Development

Ore Reserve (Probable) of 4.24Mt at 12.8% TGC supporting mine life of 14 years with anticipated production of ~52ktpa of >95% purity graphite concentrate. Mineralisation open in all directions





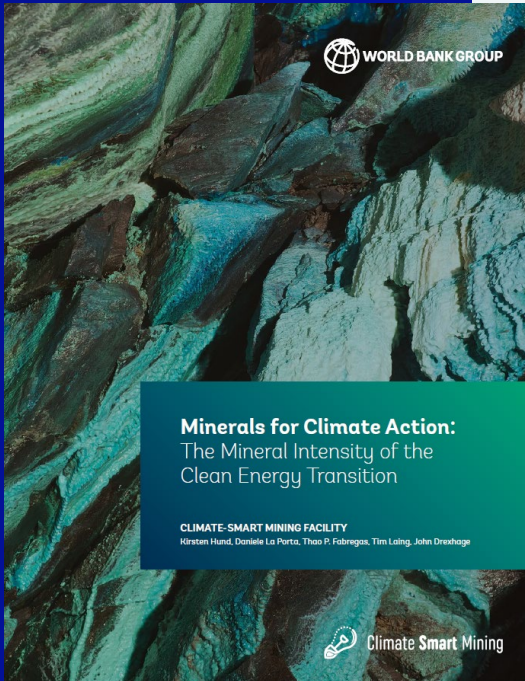
Global electric vehicle stock by scenario, 2019 and 2030



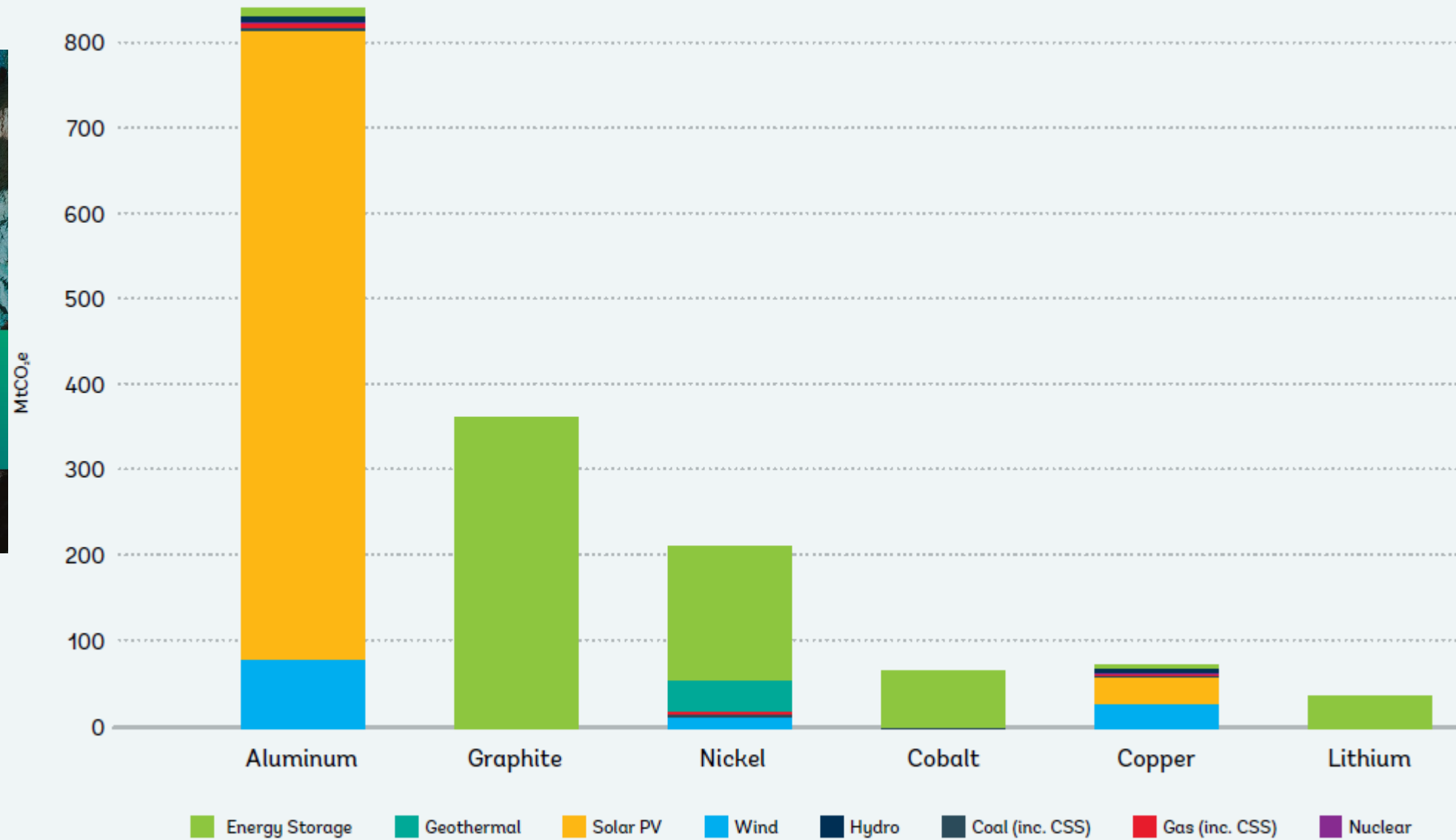
Notes: PLDVs = passenger light-duty vehicles; LCVs = light commercial vehicles; BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle.

Source: IEA analysis developed with the [IEA Mobility Model](https://www.iea.org/data-and-statistics/charts/global-electric-vehicle-stock-in-the-stated-policies-scenario-2019-and-2030-2).

By 2030, the global electric vehicle stock (excluding two/three-wheelers) is about 140 million in the Stated Policies Scenario, while the more ambitious Sustainable Development Scenario projects about 245 million electric vehicles.

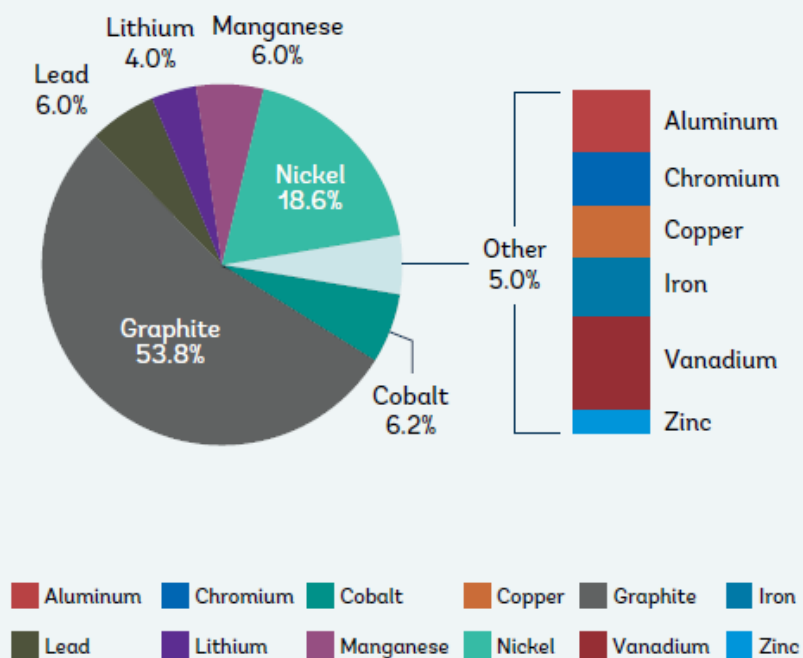


Cumulative Global Warming Potential from Extraction and Processing of Minerals, Not Including Operations, Using Cradle-to-Gate Through 2050 Under 2DS

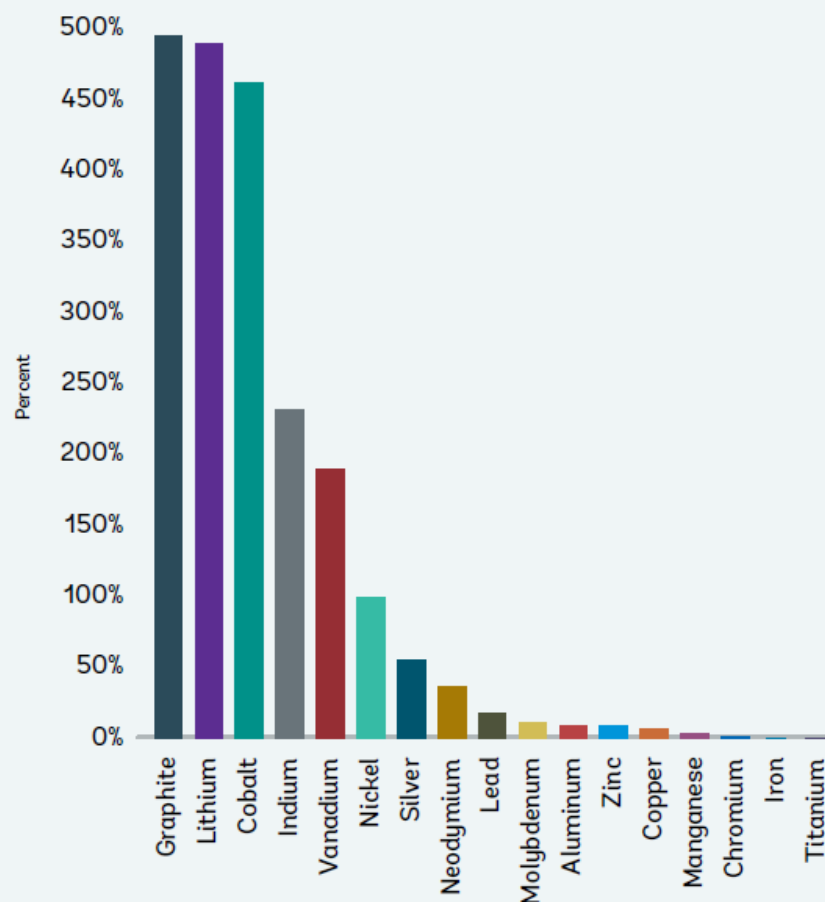


A low-carbon future will be very mineral intensive because clean energy technologies need more materials than fossil-fuel-based electricity generation technologies.

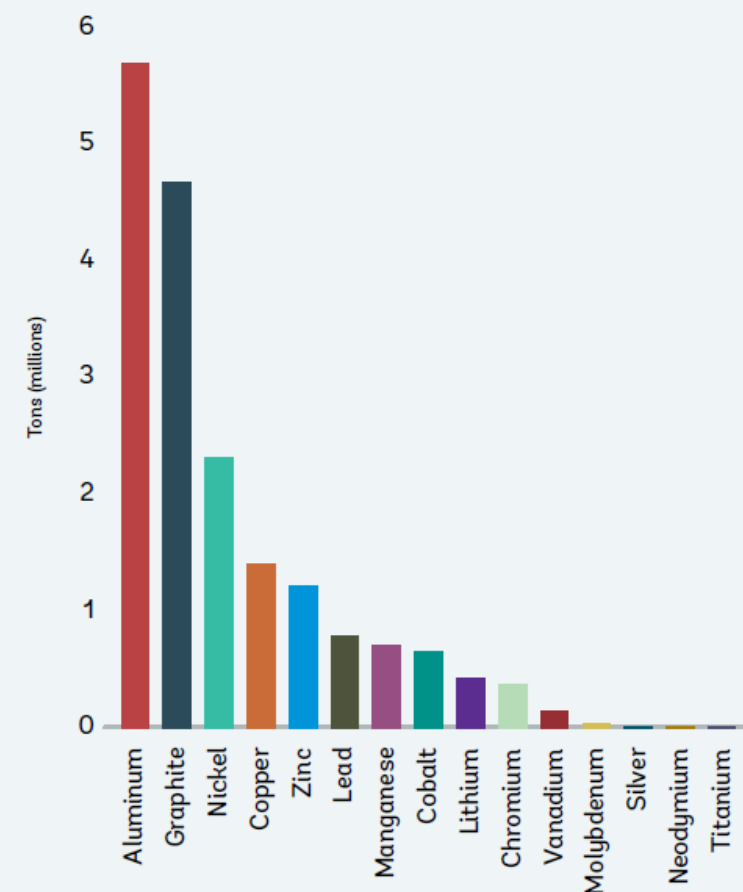
SHARE OF MINERAL DEMAND FROM ENERGY STORAGE UNDER IEA 2DS THROUGH 2050



a. 2050 annual demand from energy technologies as percentage of 2018 production



b. Annual demand from energy technologies in 2050



ANODE MATERIAL

Anode (Graphite) Material per vehicle



Tesla Model S

71kg



Audi e-Tron

67kg



Kia Niro EV

45kg



Hyundai Kona Electric SEL

45kg



Nissan Leaf S Plus

44kg



Chevrolet Bolt EV LT

43kg



BMW i3

30kg



Volkswagen e-Golf

26kg

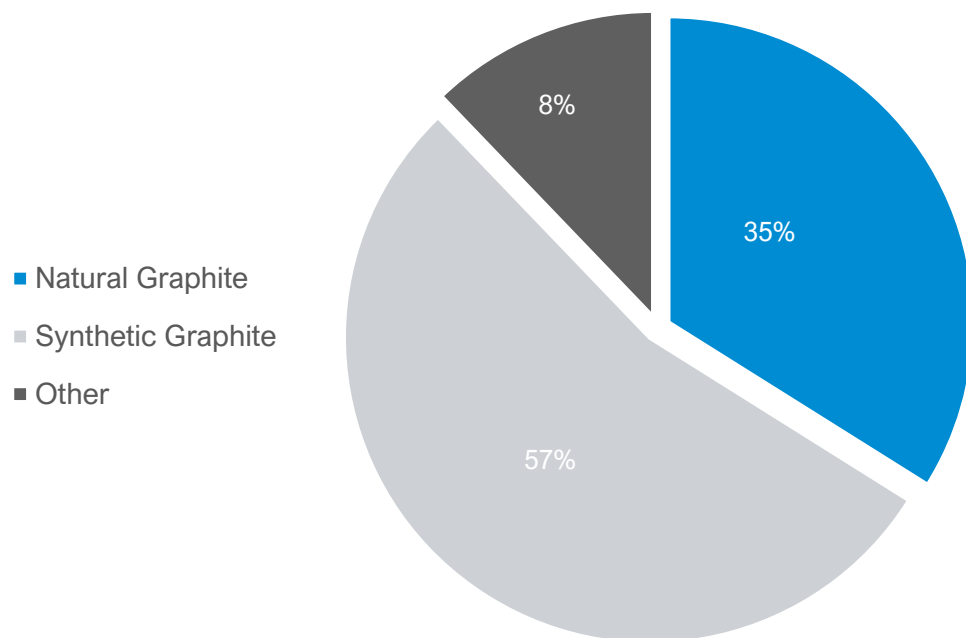
Credit – Richard Clark, Morgans Advanced Materials

Assumptions: operating voltage at 3.92V. “for optimum range” and 360 mAh/g average capacity. Actually: excess anode active material used (up to 20%); some use of 4 to 8% SiOx

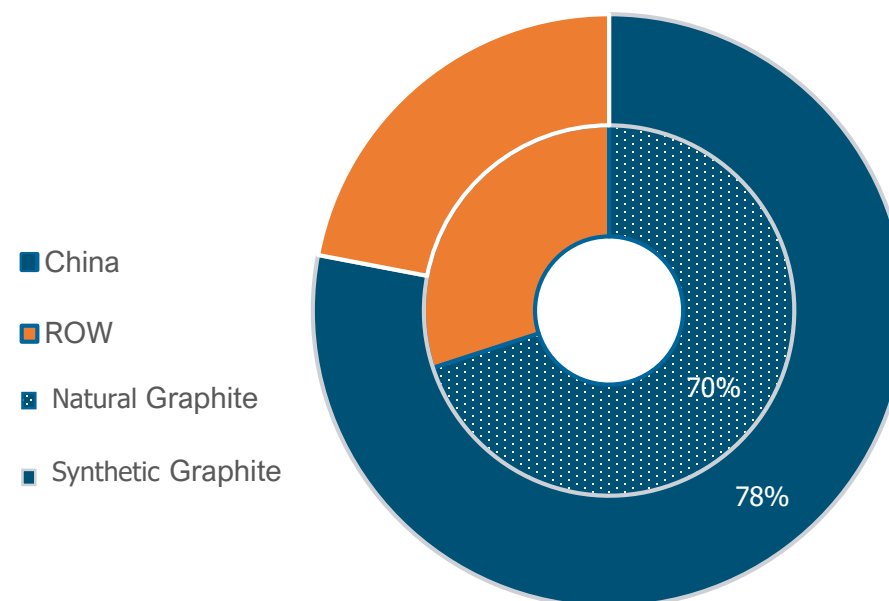
ANODE MATERIAL

Anode production is dominated by the Chinese producers with over 70% market share but with significant CO2 footprint.

Global LIB Anode Production 2018



Graphite Production 2018 by Region

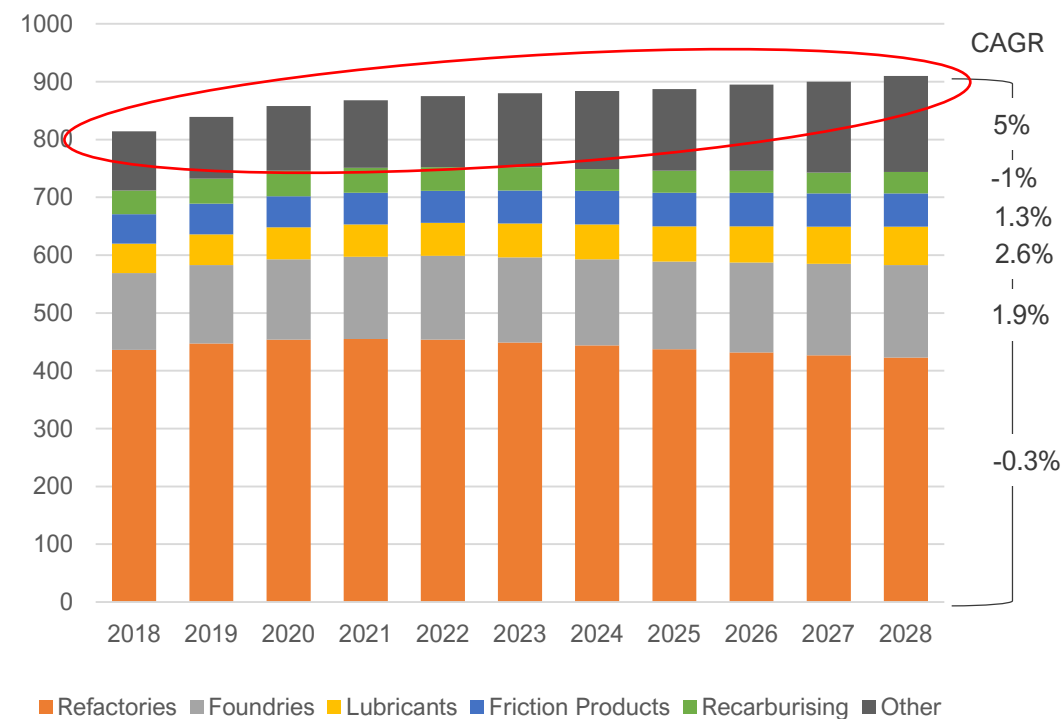


TRADITIONAL v BATTERIES NATURAL FLAKE GRAPHITE MARKET

10 year forecast – Traditional natural flake graphite demand is forecast to grow just 12%. Battery demand will grow by 483%.

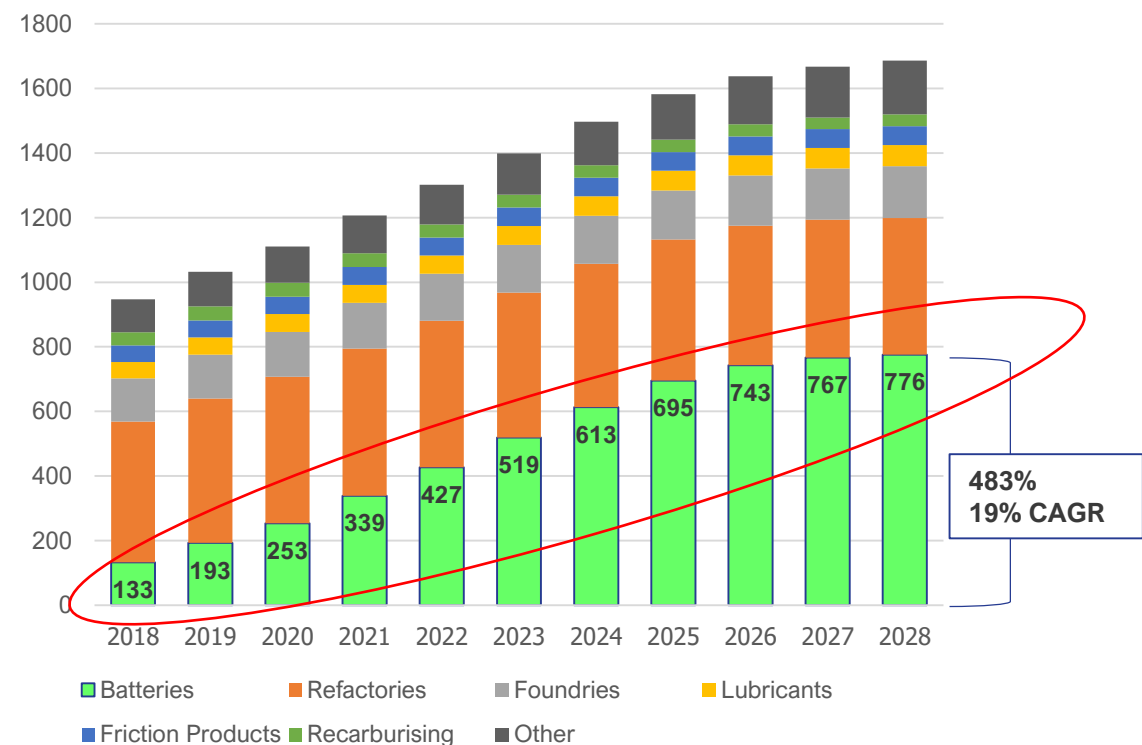
TRADITIONAL APPLICATIONS

12% Total Growth
1.12% CAGR



+BATTERY APPLICATIONS

483% Total Growth
19% CAGR



Source: Roskill, Base case, World Forecast demand for natural graphite by application, 2018-2028. Roskill Natural & Synthetic Graphite, Outlook to 2028, 12th Edition. July 2019



SKALAND

Unlocking MRC's Emerging Graphite Strategy



SKALAND GRAPHITE

Largest flake graphite producer in Europe and the highest-grade flake graphite mine in the world

Presently the world's highest grade operating flake graphite mine with mill feed grade averaging around 28%C

Skaland is the largest flake graphite producer in Europe and fourth largest producer globally outside China

- Current production ~**10Ktpa** of graphite concentrate accounts for ~2% of global annual natural flake graphite production
- Ore grades of 25%-33%C delivered to the plant
- Fully permitted operation allows for expansion to **16Ktpa** production
- Low-cost hydro power allows for expansion of operations and downstream processing
- Plant currently operates at 60% capacity. An increase to 85% utilisation rate will increase production to 15-16kpta
- Opportunity to improve current flowsheet to produce high grade, high value product. Initial testwork resulted in upgrading to 96%-99% TGC with additional attritioning and flotation



PROCESSING OPPORTUNITY

Concentrate Grade and Flake Size Distribution – the opportunity to add value

Maiden JORC Resource ¹

Total Mineral Resources for the Trælen Graphite Deposit (10% cut-off grade)

Classification	Tonnes Kt	Total Graphitic Carbon (TGC)	Tonnes Contained Graphite Kt
Indicated	409	26%	106
Inferred	1,376	21%	291
Total¹	1,785	22%	397

75% of the total contained tonnes reporting at 25% TGC at a 20% cut-off

Testwork on Skaland Fines Concentrate Sample

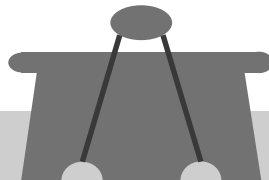
-150 micron Skaland concentrate @ 87% C production sample used

Additional milling and polishing in pilot scale testwork resulted in upgrading to

97%-98% C

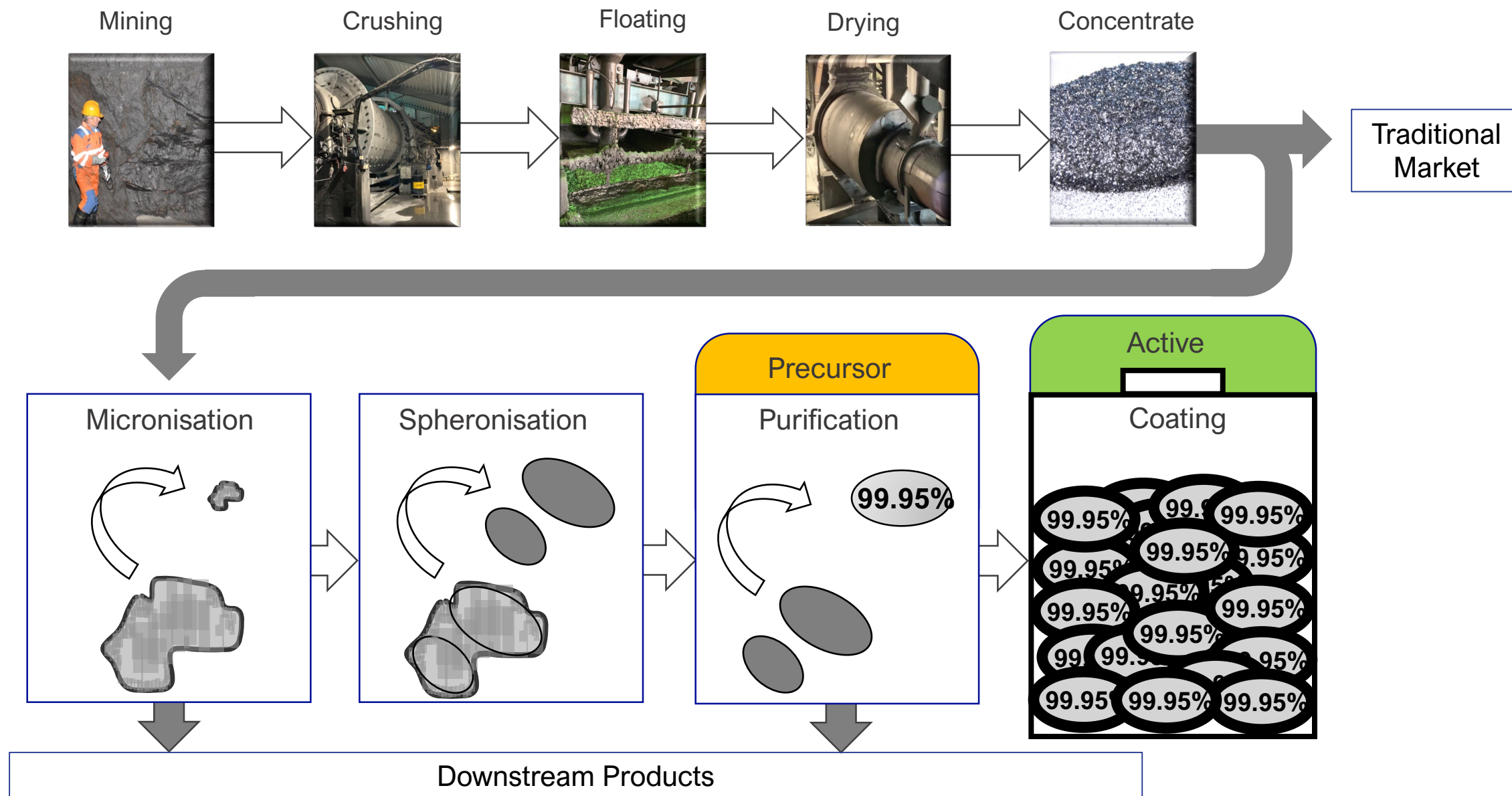
Very high grade feed suitable for downstream value-adding

Pilot testwork finalised and equipment procurement underway

- 
- ☒ Completed Maiden Resource
 - ☒ Increased flake size distribution
(43% Coarse/Medium from 36%)
 - ☒ Concentrate Optimisation -
Addition of 4th regrind &
cleaner stage, and optimisation
of existing plant.
- Installed Q1 2021

DOWNSTREAM PROCESS

Key Phases in making Anode from Natural Flake Graphite



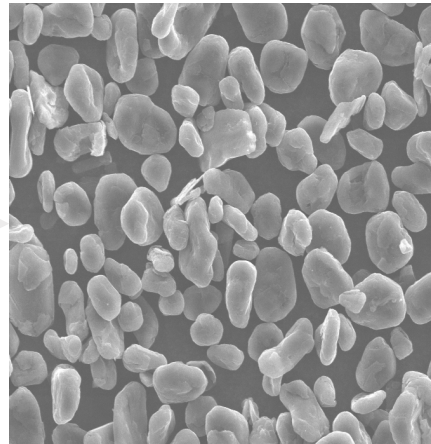
DOWNSTREAM STUDYWORK

Completed test work on Micronisation/Spheronisation, soon producing a value added micronised product at Skaland.

1

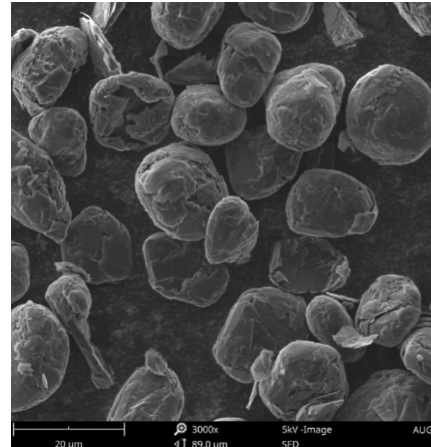
Upgrade Concentrate

Increase grade of fines to 96-98%C through addition of 4th regrind & cleaner stage, and optimisation of existing plant.



Micronisation

Micronise to size required for effective spheronisation. Large-scale testing underway at two equipment vendors as part of spheronisation equipment selection program



Spheronisation

Produce spherical graphite to meet customer PSD specifications. Vendor testing underway to select preferred partner. High yield testing also in progress

4

Purification

Two non-HF purification processes under development to optimise performance. Purities of 99.95%-99.98% achieved for Skaland

5

Coating

Conventional pitch coating to reduce technology risks. Collaborate on silicon-graphite composites to

TRL

7

9

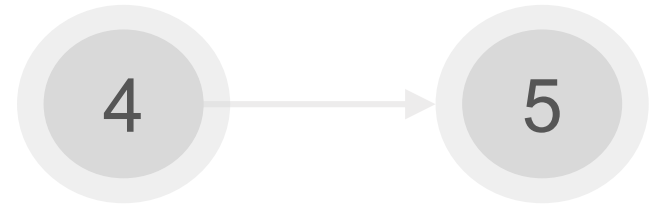
4-5

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PURIFICATION

Developed a method with achieving 99.97% purity from two different, environmentally sustainable, non-hydrofluoric processing options.



Purification

Two non-HF purification processes under development to optimise performance.
Purities of 99.95%-99.98% achieved for Skaland

Coating

Conventional pitch coating to reduce technology risks.
Collaborate on silicon-graphite composites to

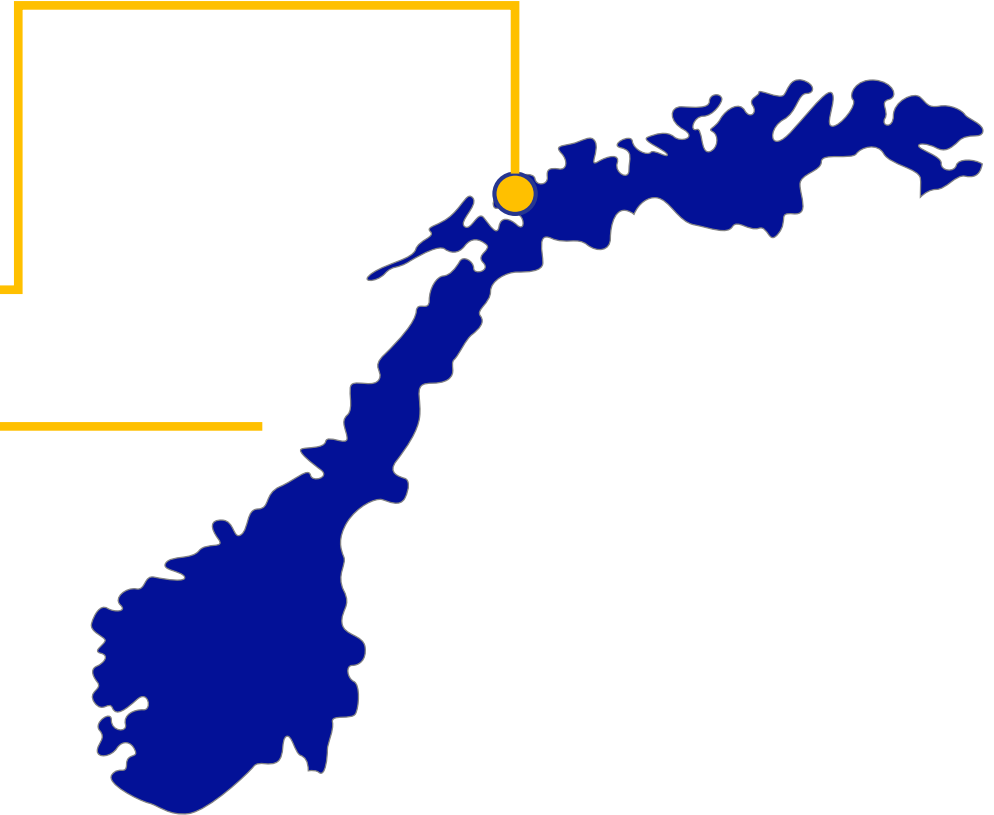
ANODE MANUFACTURING

MRC will build establish an Anode Manufacturing business and Brand in Norway

Skaland Operation



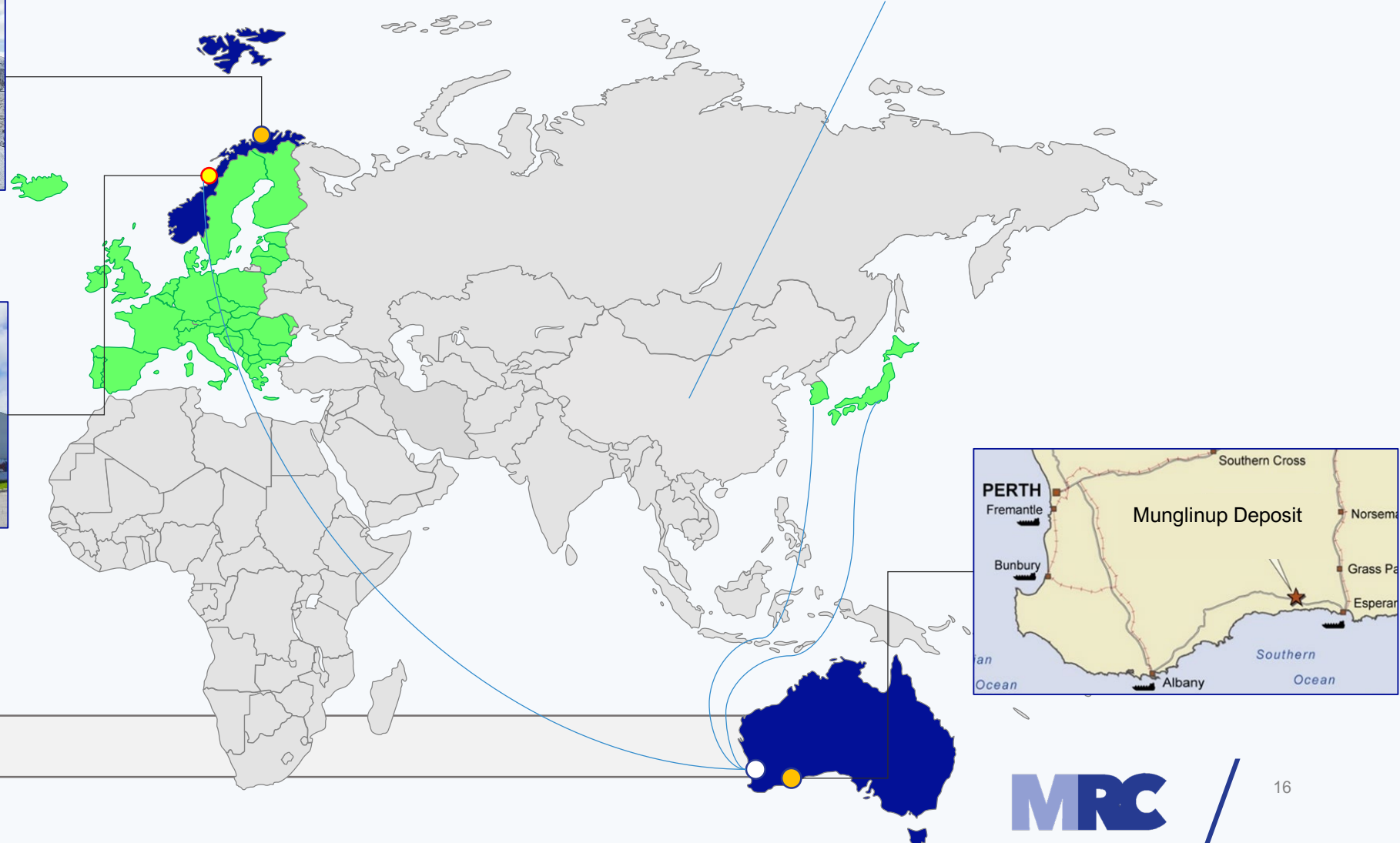
Anode Manufacturing Plant



DOWNSTREAM

Vertically Integrated Anode Production in the fastest growing Battery Manufacturing region globally

100% of all commercial production of Natural Spherical Graphite is in China



Skaland Operation



MORVOR

Norway, 2024
8 - 32 GWh



Sunderland, UK 2010
2.5 GWh



UK, 2023
10 - 35 GWh



Germany, 2024
16 - 24GWh



France, Germany
2023 8 -48GWh



Germany, 2020
1GWh



Germany, 2023
20 - 24GWh



Germany, 202?
4 - 8GWh



France, 2023
16 - 50GWh

northvolt

Sweden, 2021
32 - 40 GWh



Norway, 2023
32+2 GWh



Germany, 2021
8 -12 GWh



Germany 2021
16 - 30GWh



Poland, 2018
15 - 65 GWh



Germany, 2022
6-10 GWh



Germany, 2021
60-100 GWh



Slovakia, 2024
10 GWh



Hungary, 2020
16.5 GWh



Hungary, 2018
3 - 15 GWh



Europe, 202?
TBA

