# GREENROC

MINING PLC

Amitsoq: Graphite anode material for Li-ion batteries from a world-class graphite mine in South Greenland – strong PEA economics

November 2023

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### GreenRoc Mining Plc

Fast tracking the development of critical mineral projects in Greenland

Key Information			
Ticker	GROC.L		
Index	AIM		
Shares In Issue	146,682,710		
Share Price*	4.50 pence		
Market Capitalisation*	£6.23 million		
Significant Shareholders*			
Alba Mineral Resources	42.97%		
Kadupul Limited	14.32%		
Monecor (London) Limited, t/a OvalX	5.27%		
Securities Not In Public Hands	58.40%		
*As of November 1, 2023			



TBS (titanium)

Qaanaaq Melville Bay (iron)

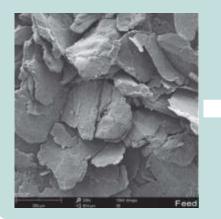
4 Corporate Presentation November 2023

### Graphite use in battery anodes

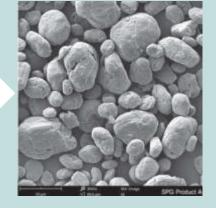
#### Electric car batteries need graphite

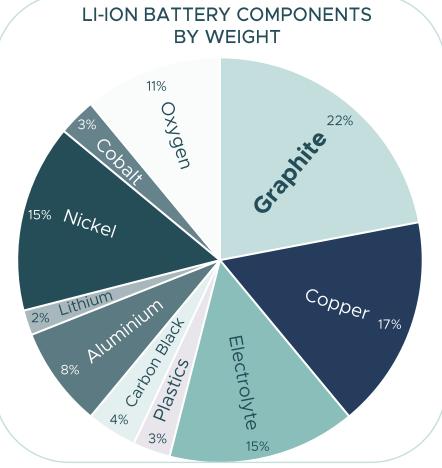
- EV Li-ion batteries contain more graphite than any other raw materials component by weight\*
- An average EV battery carries 40-80kg of coated high purity spherical graphite (cSPG) or ca 1kg cHPSG per kWh
- Production of 1kg cSPG requires 2-3kg flake graphite\*

China is world leader supplying nearly 100% of cSPG demand for GigaFactories – no Western domestic production at present time









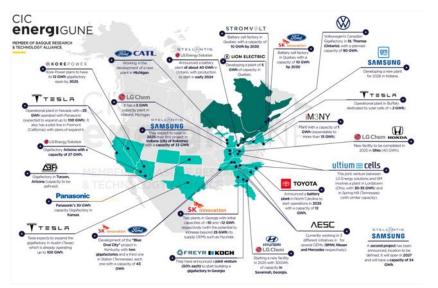
#### American Chemical Soc.

\*The Hague Centre for Strategic Studies, Graphite, 2022

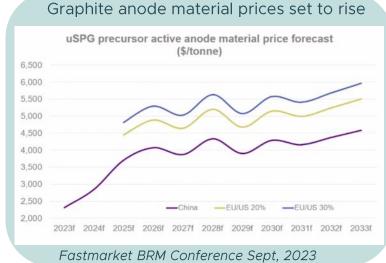


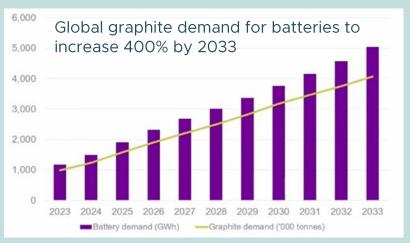
## EV battery sector growth

- By 2030, more than 40 gigafactories with a total capacity of nearly **1.0 TWh\*** will be in production **in Europe**
- In **USA**, nearly 30 gigafactories will be in production by 2030 with a capacity of **0.8 TWh**\*\*
- Unlike most other components in Li-based batteries, graphite anode material cannot be recycled



\*Data from Faraday Institute, UK, May 2022; \*\* CIC Energigune





#### Fastmarket BRM Conference Sept, 2023



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#### **Corporate Presentation November 2023** 6

China covered 70% of the world's natural graphite output in 2022 and >90% of processed graphite

*China introduces restrictions to export of battery grade* graphite of all kinds by 1 December 2023

China controls on exports of natural and synthetic graphite, citing national security

The Chinese move highlights the importance of establishing reliable, long-term coherent and integrated supply chains for European and American Gigafactories

#### FINANCIAL TIMES Oct 20, 2023

US COMPANIES TECH MARKETS CLIMATE OPINION WORK & CAREERS LIFE & ARTS HTSI

#### US-China trade dispute Added

#### China imposes export curbs on graphite

Restrictions on critical electric vehicle battery material set to escalate trade tensions with US

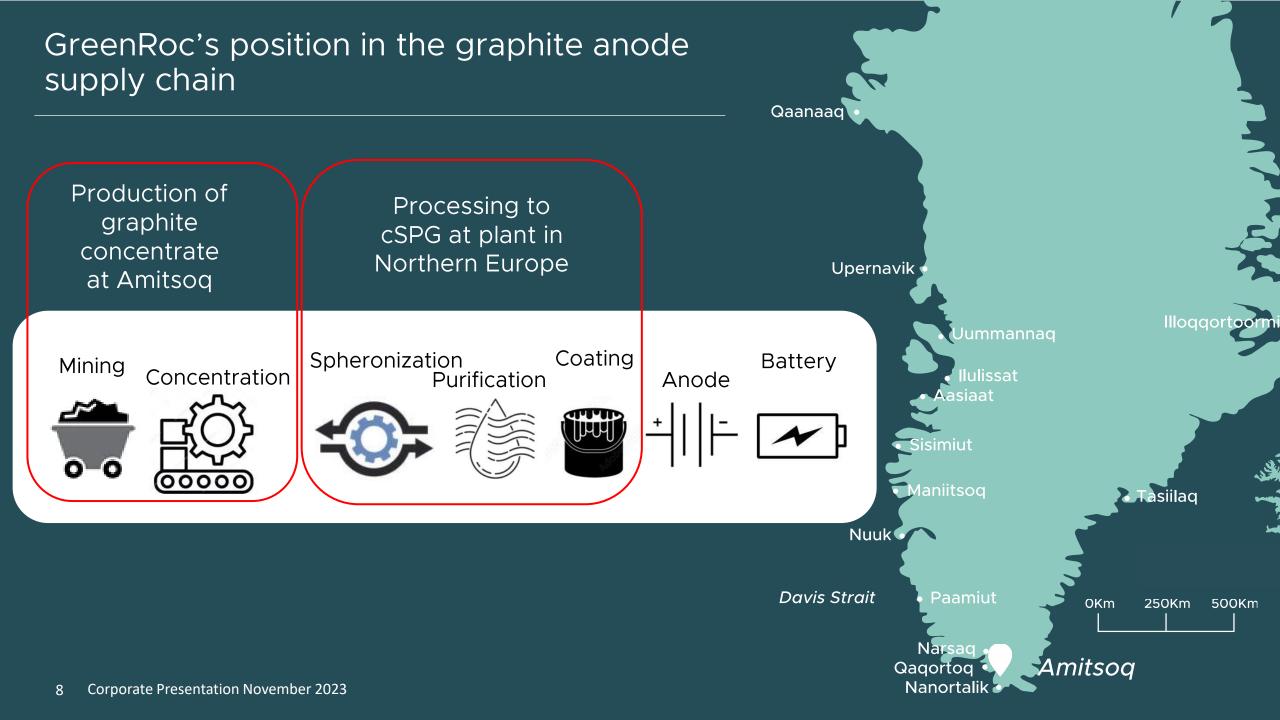


Car battery modules at BMW's factory in Dingolfing, Germany. Graphite is a key material in electric-vehicle batteries © Krisztiai Bocsi/Bloomberg

Edward White in Seoul, William Langley in Hong Kong and Harry Dempsey in London OCTOBER 20 2023







## Amitsoq: A world-class, brownfield deposit and graphite district

#### Amitsoq: a producing graphite mine 1914-1922

#### Amitsoq Island (primary deposit)

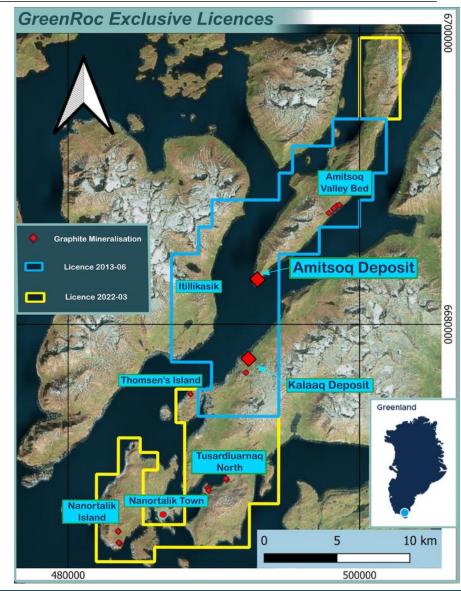
- In Nanortalik region of South Greenland
- Ice-free year round enabling easy shipping
- Previously operating mine with extensive underground development
- Graphite grades >20%

#### Kalaaq (secondary deposit)

- Discovered 2017, with grades of 17.4 - 33.1% graphite
- As yet undrilled

Several other high-grade deposits, all under GreenRoc licences, signal Nanortalik region to be a worldclass graphite district

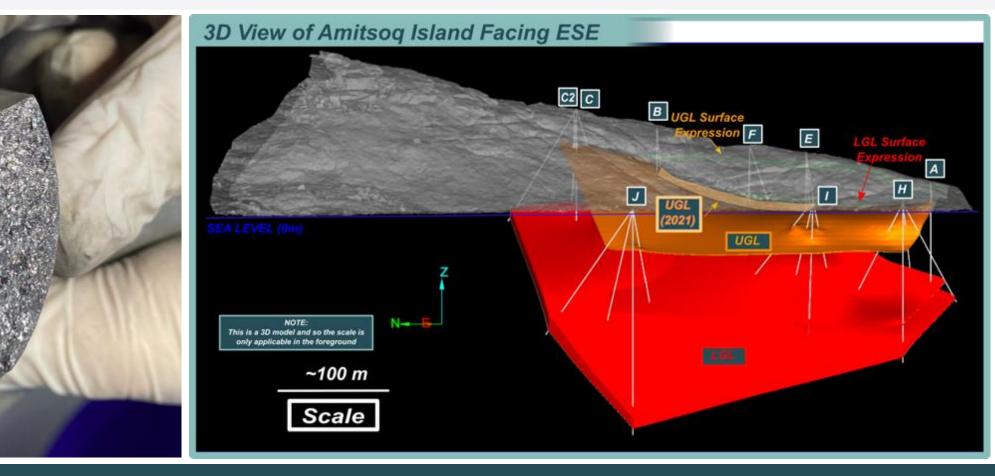






## Simple orebody geometry and consistent graphite grades

- Two drilling phases conducted in 2021 and 2022 defines
  Mineral Resource
- Two main orebodies: Upper Graphite Layer (UGL) and Lower Graphite Layer (LGL)
- Consistent mineable widths of 3-8m in UGL and 5-15m in LGL– and in places up to 20m widths
- Deposit remains open in three directions potential for further significant resource upgrades





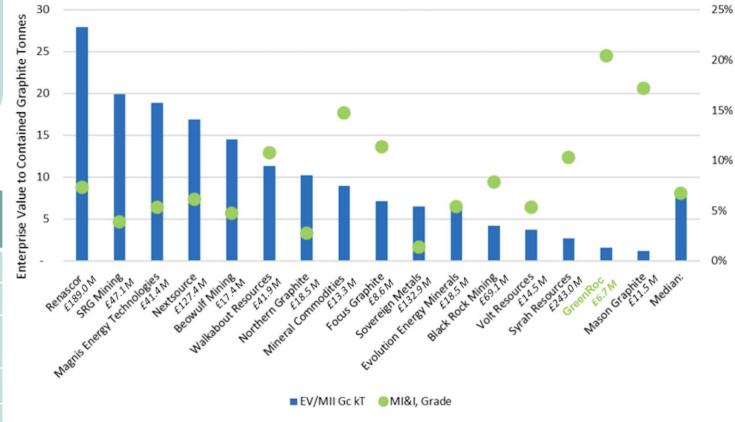
#### Amitsoq: World-class grade and tonnage

Averages ore grade of 20.41% means Amitsoq deposit ranks in the top league for graphite deposits worldwide

JORC Resource estimate, January 2023

2023 Resource Update	Mt ore	%C(g)	Mt graphite
Measured	1.26	22.05	0.28
Indicated	6.12	21.04	1.29
Total Measured + Indicated	7.38	21.21	1.57
Inferred	15.67	20.04	3.14
Total Resources	23.05	20.41	4.71

Enterprise value/contained graphite tonnage multiples vs grade



Source: Bloomberg/SP Angel/ Company filings

## Amitsoq Project Economics

Preliminary Economic Study (PEA) published 31 October 2023 "Confirms robust economics for Amitsoq Graphite Project"

- Initial capital cost (Capex): US\$ 131M inclusive of 25% contingency
- Av. operating costs (Opex): US\$ 121/t of milled ore, including shipping
- Av. annual production of 77,000t concentrate of >94% graphite
- Cut-off grade of 18.7% graphite
- Av. Net Revenue is US\$ 89.8M per year throughout the 22-year mine life
- 4-year payback period after production start
- Life of mine (LOM) is 22 years with potential extension



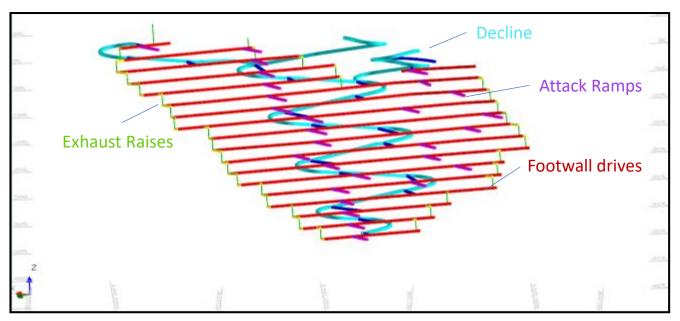
Pre-Tax IRR	31.1%	US\$ '000
Pre-tax <b>NPV</b>	at 6% discounting	314,144
Pre-tax <b>NPV</b>	at 8% discounting	235,122
Pre-tax <b>NPV</b>	at 10% discounting	176,997

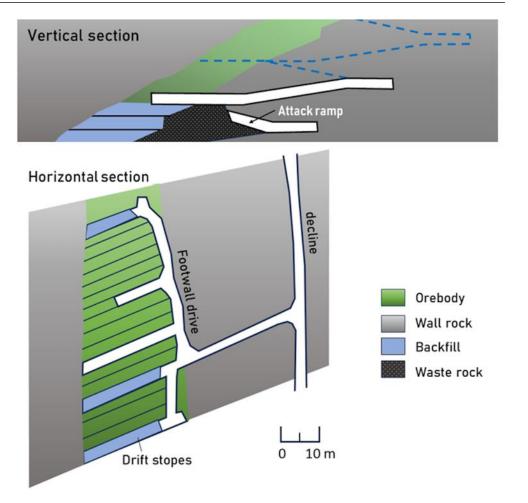
After-Tax IRR 26.7%	US\$ '000
After-tax <b>NPV</b> at 6% discounting	243,365
After-tax <b>NPV</b> at 8% discounting	179,166
After-tax <b>NPV</b> at 10% discounting	132,107



## Amitsoq mining method

- Drift and Fill is the preferred mining method
- Mining stopes accessed from one single decline
- Production planned from the LGL only for the first 22 years of mine life – UGL provides upside
- Ore levels from 10 meters above sea level to 320m below sea level





• Full mining capacity of ca 400kt/y is reached in year two after start of production



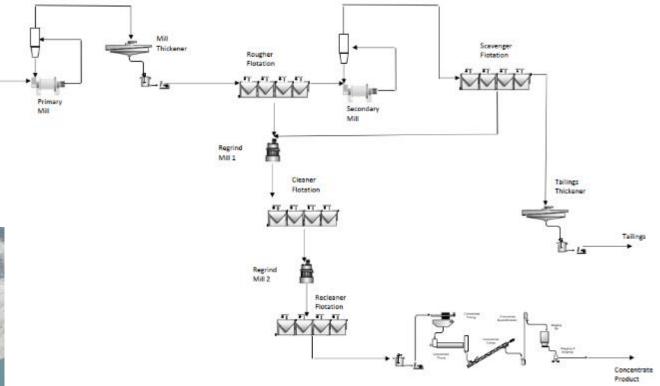
## Amitsoq processing method and tailings storage facility

From Crushed

Ore bin

- Crushing capacity at 50t/h
- Two crushers jaw (1st) and cone (2nd)
- Three ball mills and flotation plants
- Final concentrate product of >94% graphite





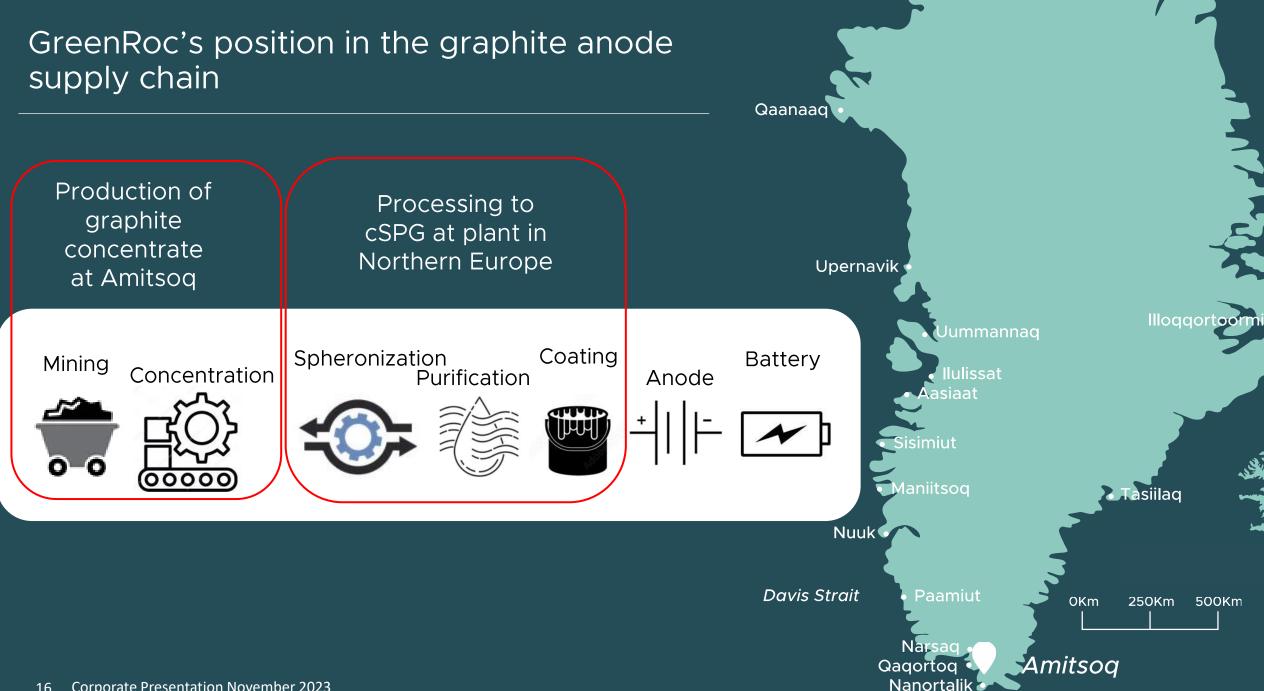
- Backfill paste plant with 23m<sup>3</sup>/d capacity consumes up to 86% of all tailings
- Only 14% remain to transport to tailings storage facility several options are considered

- Mine employees, including off-duty, will be ca. 135 crew and 37 staff, total ca. 172
- At any one time, the mine will have ca. 45 crew and 19 staff present, total ca. 64
- All infrastructure, processing plants and accommodation to be placed at Amitsoq with some off-site support functions run out of Nanortalik (20km from the mine)
- Frequent barge-transport between Amitsoq and Nanortalik with provisions and graphite concentrate
- Onward shipment of graphite concentrate from Nanortalik harbour to destination ports





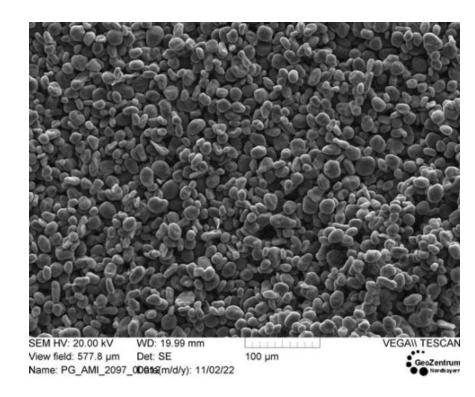




- Feasibility Study for an Active Anode Material (AAM) processing plant underway. To be concluded Q2 2024
- Supported by a c. £250k grant to GreenRoc from the UK's Advanced Propulsion Centre
- GreenRoc acts as project manager, with input from four expert consultants: Benchmark Mineral Intelligence, SLR, ProGraphite and Decision Risk Analytics
- Feasibility Study will provide a business case for a vertically integrated production of AAM using high quality graphite mined at Amitsoq
- Further upside to GreenRoc's Amitsoq project



www.apcuk.co.ul



Spheronized Amitsoq graphite, prepared by ProGraphite, Germany



Discussions with potential industry partners

Over the past months talks have been initiated or have been ongoing with:

- car manufacturers
- battery companies
- chemical and engineering conglomerates
- raw material traders
- government agencies

in North America, Europe and Japan

Potential offtaker has tested Amitsoq graphite samples and found that it complies with all technical requirements





## Amitsoq graphite production to support demand from European gigafactories

#### Amitsoq annual production: 400,000t ore @ 20% graphite for ca 80,000t graphite concentrate (>96% graphite)

#### Annual delivery of ca 50,000t of cSPG

European gigafactories' 1TWh capacity by 2030 will need 1-2Mt graphite annually

\*Data from Faraday Institute, UK, May 2022

#### **Present** and **projected** European flake graphite production\*\*:

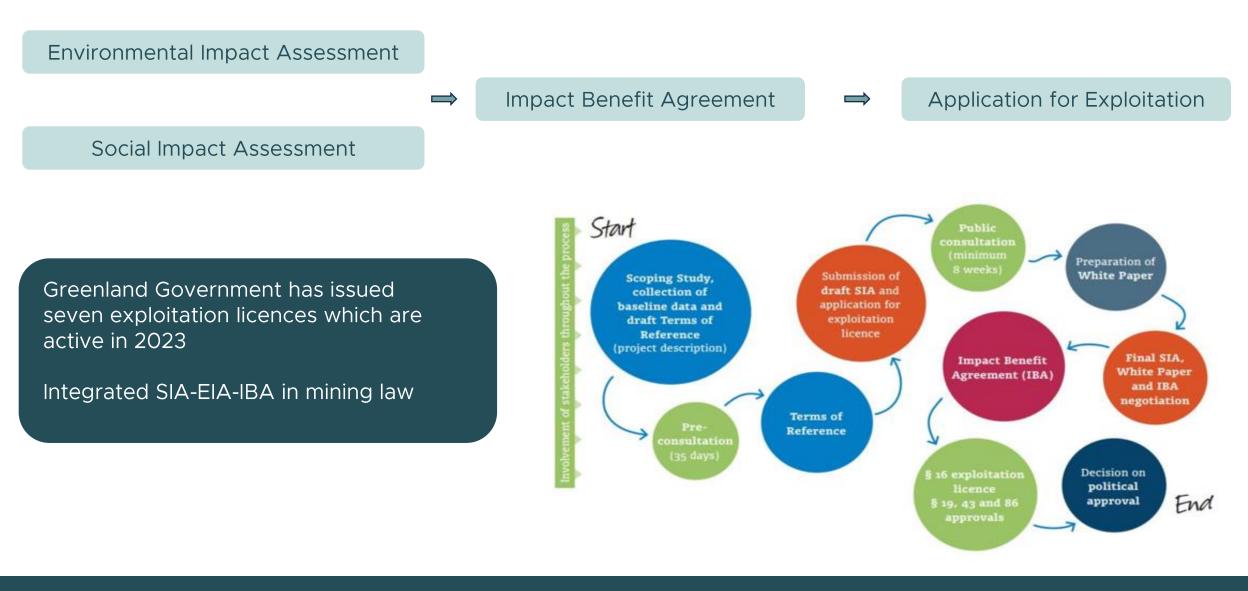
- Skaland graphite (Norway): 15kt/y
- GreenRoc/Amitsoq (Greenland): 80kt/y
- Talga/Vittangi (Sweden): 84kt/y
- Leading Edge/Woxna (Sweden): 15kt/y
- Grafintec/Aitolampi (Finland): 20-100kt/y

#### Total European production by 2030: < 300kt/y

\*\*Data from companies' websites

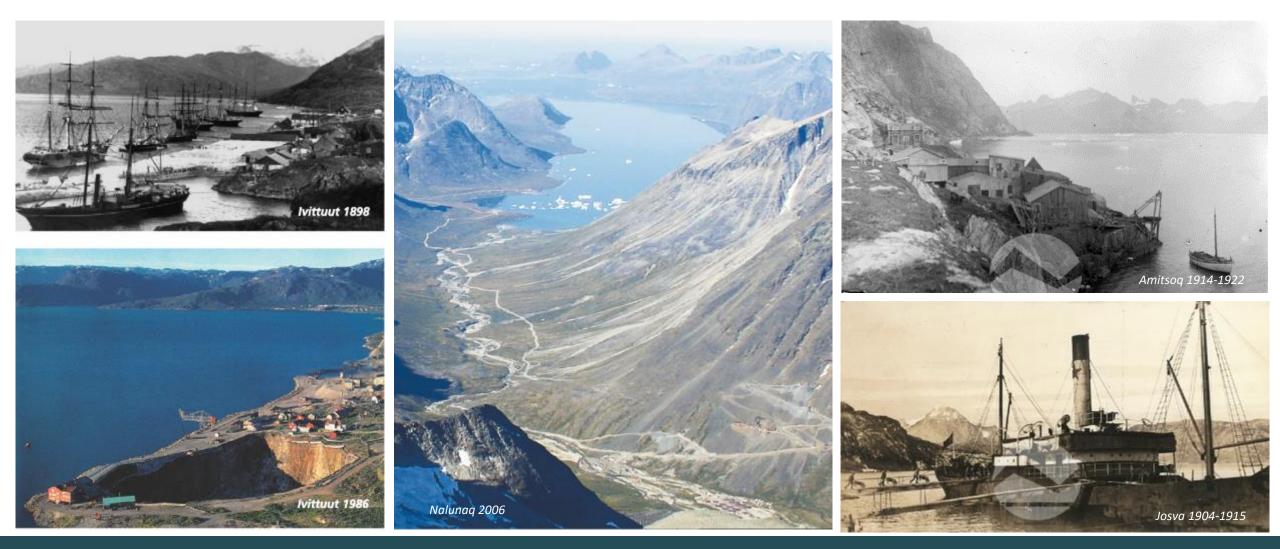


### Greenland: A well-regulated, mining-friendly jurisdiction





## South Greenland: A long mining history





## Support from Greenland Government and Nanortalik community



GreenRoc's CEO Stefan Bernstein has information meetings scheduled in November 2023 with <u>Government of Greenland</u>, <u>Kommune Kujalleq</u> (South Greenland) and with local population in <u>Nanortalik</u>







RAW MATERIALS ALLIANCE



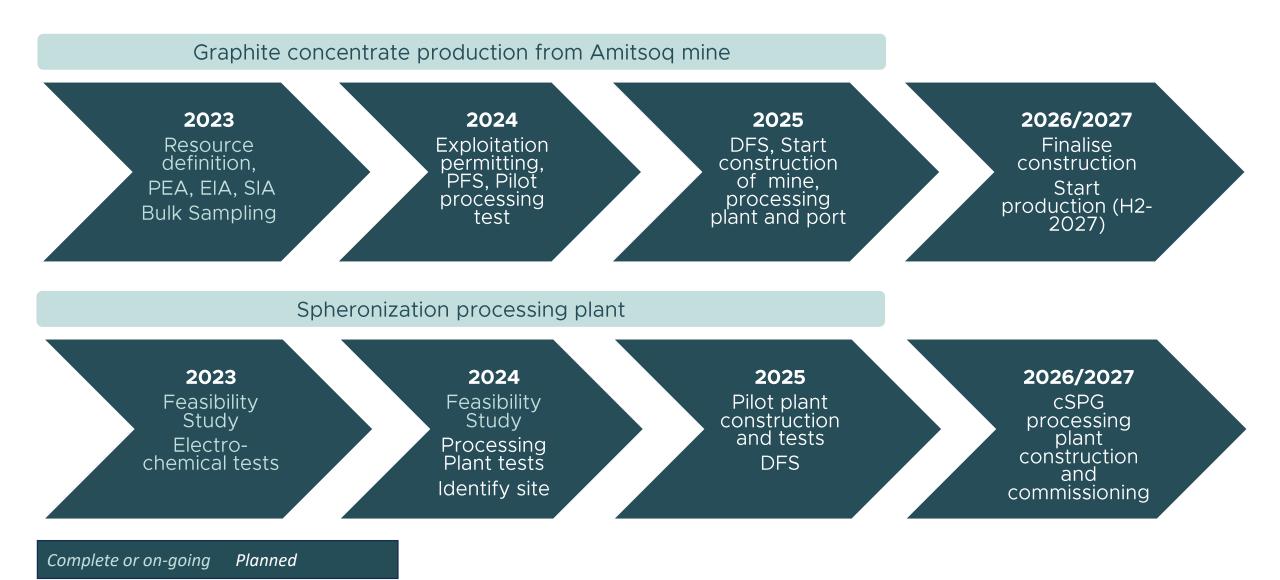
RawMaterials Connecting matters

European Raw Materials Alliance (ERMA) letter of support Feb 7, 2023

"GreenRoc's graphite resource is of global importance and, ....., will enable the European Union to achieve a certain level of independence for the electrical vehicle supply chain. European Raw Materials Alliance has approved the Amitsoq Graphite project and will engage to support its development and financing to produce these critical raw materials for the benefit of the European Union goals"



### Amitsoq roadmap to primary concentrate and cSPG production





### Contacts

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