GREEN CRITICAL MINERALS

ASX:GCM

Advancing Our Downstream Strategy

Driving growth with breakthrough VHD Technology and Single Crystal Mullite Fibres

gcminerals.com.au →

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This document has been authorised for release by the Company's Board of directors.

Investment Highlights

Why Green Critical Minerals is Exciting

VHD Graphite represents cutting-edge innovation
Developed by leading materials scientist Professor Charles Sorrell (UNSW)

Wholly owned revolutionary process
Speed to market: Targeting customer qualification commencing in H2 2025

World class, award-winning team in materials scientists and engineers

Vertically integrated opportunity in specialised, high margin graphite
Significant reduction in energy consumption whilst producing superior properties

Applications in Data Centers, AI, Supercomputers, Electronics, Clean Energy, Nuclear

Introduction and Strategic Overview

01

VHD Graphite Technology

Potential to Disrupt a

+$700 B

US Market [1] (2023)

with Superior Graphite Blocks at Fraction of the Time and Cost [2]

Raw Ingredients

VHD Graphite Technology Process

Proprietary Technology

Low Energy Input

Fast and Inexpensive Process

VHD Graphite Blocks

Graphite Blocks with Superior Properties

Produced at a Fraction of the Price

- Nuclear Sector
- Defense Sector
- Thermal Energy Storage
- Tech Sector
- Industrial Sector

[1]Refer slide 12

[2]The VHD Graphite technology is not yet produced at a commercial level. The technology is in the development phase with the aim to commercialise within the next 12 months

Why VHD Graphite is the Future of Advanced Materials

Faster, More Affordable, and Superior to Pyrolytic and Nuclear Graphite

Superior Properties

Superior or comparable properties to Pyrolytic and Nuclear Graphite blocks.

Superior thermal conductivity and electrical resistivity.

Directional control of heat and electricity.

Very High Density / Extremely low porosity.

Advanced Stage of Development

VHD Graphite can achieve initial product commercialisation in around 12 months

Targeting the growing demand for:

Thermal management advances to support **Data Centres, AI, Supercomputers, Electronics, Automotive.**

Solar-Thermal Energy storage advances to support renewable energy and decarbonisation.

Scalable

Further R&D has the potential to open additional markets:

- Aerospace
- Defense
- Nuclear
- Batteries
- Fuel Cells
- Industrial Applications

Potential to scale **manufacturing globally.**

Strategic Acquisition Enabling Rapid Commercialisation of VHD Graphite

Supports Rapid Commercialisation

VHD Graphite represents cutting-edge innovation

Developed by leading materials scientist Professor Charles Sorrell (UNSW)

Lower energy input, faster production and exceptional properties makes VHD graphite products attractive to a wide range of industries and markets.

Exclusive acquisition of 100% rights

To a breakthrough process for producing very-dense VHD graphite shapes and blocks.

Wide range of potential applications

Including Defense, Thermal Management, Solar-Thermal Energy Storage, Nuclear, Batteries, Fuel Cells and Industrial Applications.

Attractive terms agreed with no upfront consideration payable by GCM

Consideration based on revenue milestones, payable over three milestones and capped at $5M.

No cost to GCM until revenue is generated.

Revolutionary manufacturing process

With a production period of **24-36 hours** and at moderate graphitisation temperatures (1500 °C), compared with **up to twelve weeks for existing competitors at high temperatures up to 2900°C.**

Research and Development Team

World Class Materials Scientist and Materials Engineers

Professor
Charles Sorrell

Inventor of VHD Graphite (UNSW)

- Professor, School of Materials Science & Engineering, University of New South Wales.
- Winner of the 2006 Pfiel Award, Institute of Materials, Minerals, & Mining
- Published 100+ peer-reviewed journal articles and 20+ book chapters in the last five years, showcasing global leadership in materials innovation

Professor
Andrew Ruys

Head of Research and Development

- World-class ceramic engineer with a PhD from the University of New South Wales
- Previously Professor of Engineering at University of Sydney (School of AMME, Centre for Advanced Materials Technology and Discipline of Biomedical Engineering)
- Co-founder of Modern Ceramics Pty Ltd, a global leader in silicon carbide ceramics manufacturing, and a pioneer in scaling advanced materials technologies.
- Foundation member of Sirtex Limited (ASX:SRO), scaled from a $15M IPO in 2000 to a $1.9B acquisition by CDH Genetech in 2018.

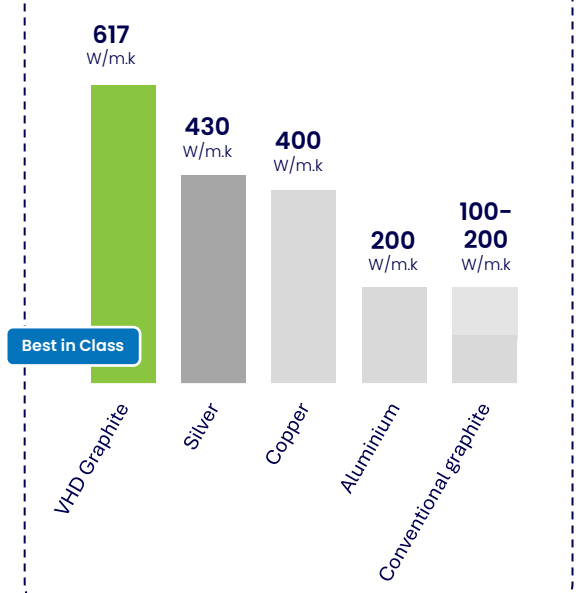
Innovative Technologies and Competitive Advantages

02

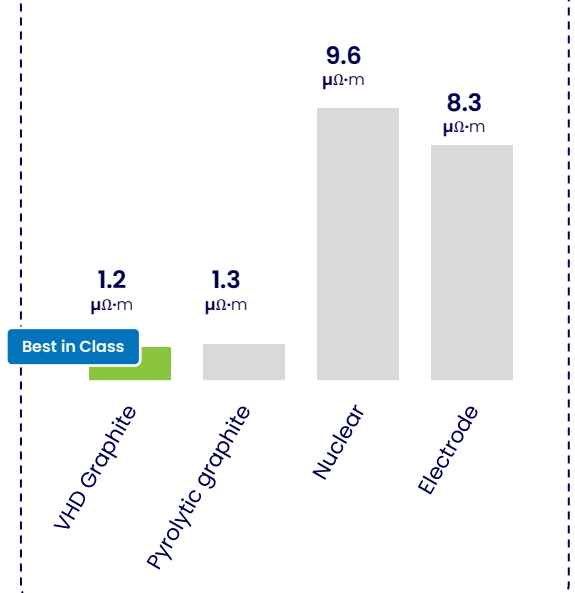
VHD Graphite's Properties[3]

Superior Material Properties from a Simple Manufacturing Process

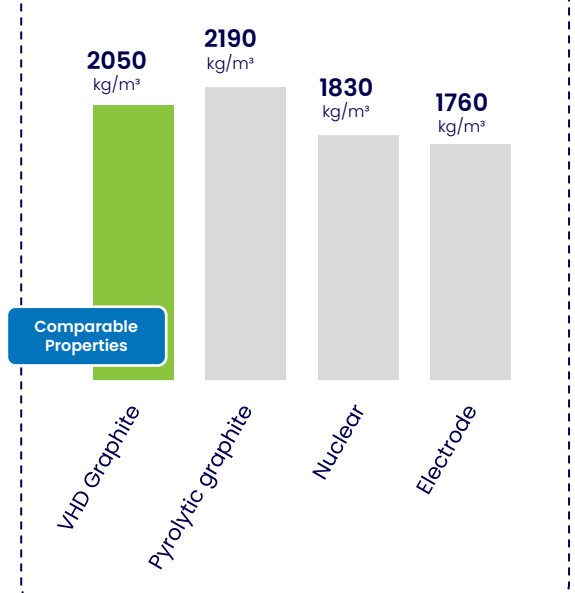
Thermal Conductivity
(for heat dissipation)



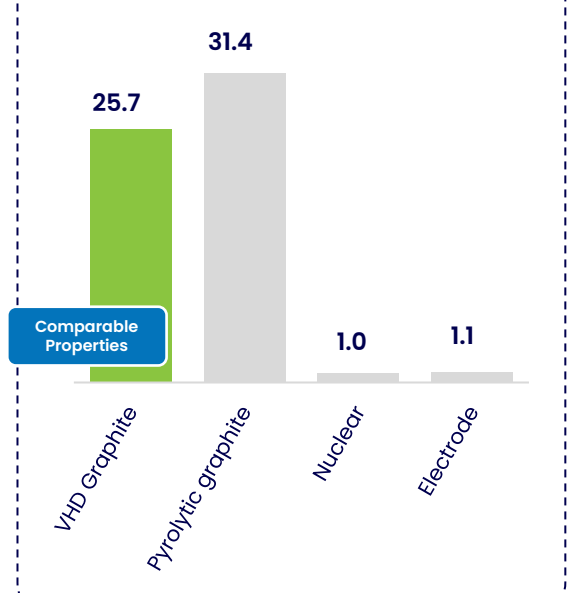
Electrical Resistivity
(along the grain)



Bulk Density



Degree of Anisotropy[4]
(electrical resistivities)



[3]Determined from test work performed at the UNSW laboratories and not at a commercial scale at this stage. UNSW is ranked 31 in the entire world (and number 1 in Australia) for engineering & technology (QS World University Rankings by Subject 2024: Engineering & Technology).
[4]Determined by comparison of electrical resistivities across grain and along grain: [racross grain/ralong grain]

A Simple, Scalable & Fast Manufacturing Process

Whilst Reducing Waste and Emissions[5]

Efficient to Produce

Can Be Produced In 24-36 Hours

Of any block graphite material - ideal for heat management applications.

Significantly Lower Graphitisation Temperature For Production Of 1,500 ° C

Compared to up to 2,900 ° C for primary synthetic graphite.

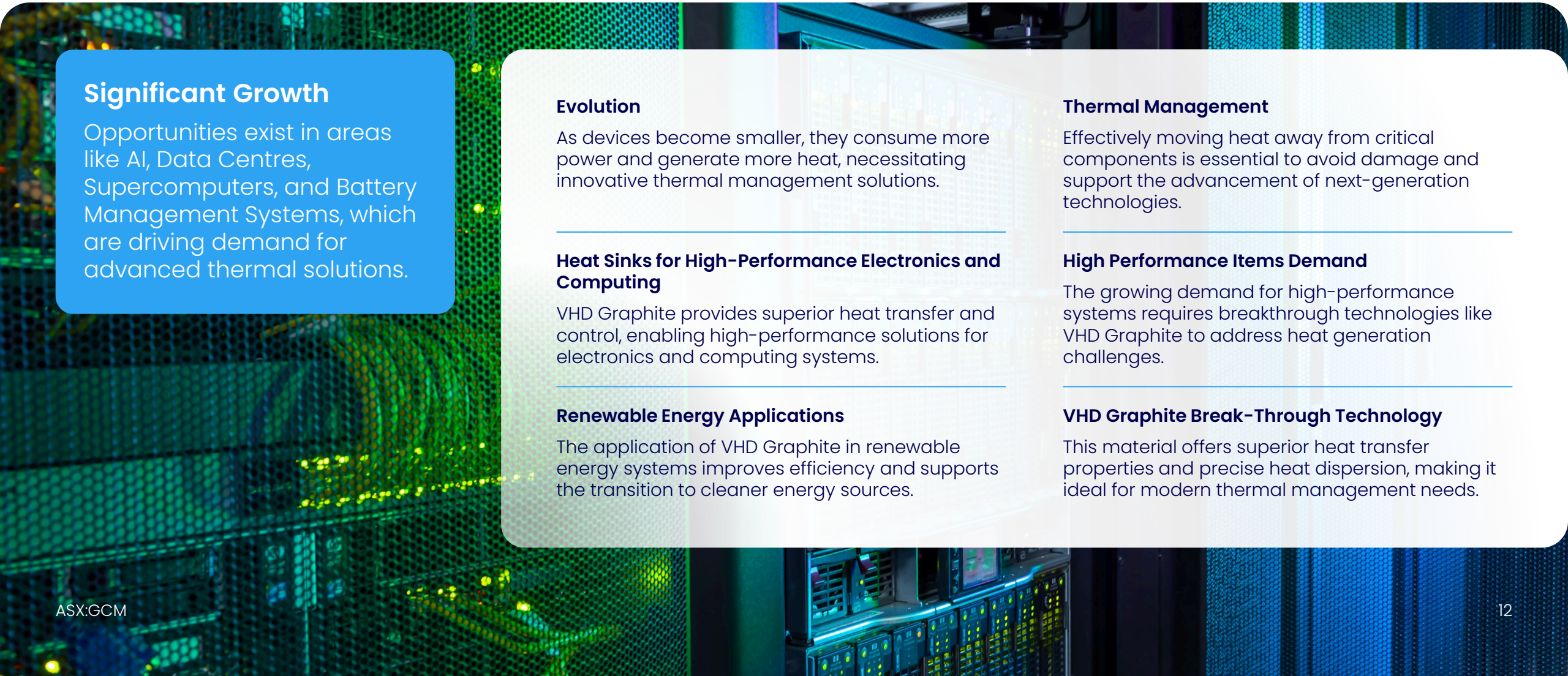
No Specialised Infrastructure Or Complex Manufacturing Techniques Required

Potential to replicate globally and grow rapidly.

VHD Graphite is not just another form of carbon block. It represents a new class of material with properties that are tailor-made for high-value applications.

[5]Determined from test work performed at the UNSW laboratories and not at a commercial scale at this stage. UNSW is ranked 31 in the entire world (and number 1 in Australia) for engineering & technology (QS World University Rankings by Subject 2024: Engineering & Technology).

Thermal Management Applications Immediate Opportunities



Significant Growth

Opportunities exist in areas like AI, Data Centres, Supercomputers, and Battery Management Systems, which are driving demand for advanced thermal solutions.

Evolution

As devices become smaller, they consume more power and generate more heat, necessitating innovative thermal management solutions.

Thermal Management

Effectively moving heat away from critical components is essential to avoid damage and support the advancement of next-generation technologies.

Heat Sinks for High-Performance Electronics and Computing

VHD Graphite provides superior heat transfer and control, enabling high-performance solutions for electronics and computing systems.

High Performance Items Demand

The growing demand for high-performance systems requires breakthrough technologies like VHD Graphite to address heat generation challenges.

Renewable Energy Applications

The application of VHD Graphite in renewable energy systems improves efficiency and supports the transition to cleaner energy sources.

VHD Graphite Break-Through Technology

This material offers superior heat transfer properties and precise heat dispersion, making it ideal for modern thermal management needs.

Focused R&D to Leverage Product Expansion and to Power Growth

GCM Intends To Become A Leading Supplier Of Graphite Products Across Defense, Aerospace and Nuclear

GCM will produce samples, initiate engagement with strategic customers, and conduct product testing to support the successful commercialisation of VHD Graphite technologies.

New Energy Source

The development of VHD Graphite slabs and collaboration with power generation companies will enable the introduction of a new, clean constant energy source.

Decarbonisation of Energy Grids

Innovative thinking and cutting-edge technology are essential to transform energy grids and reduce carbon footprints globally.

Energy Storage Solutions

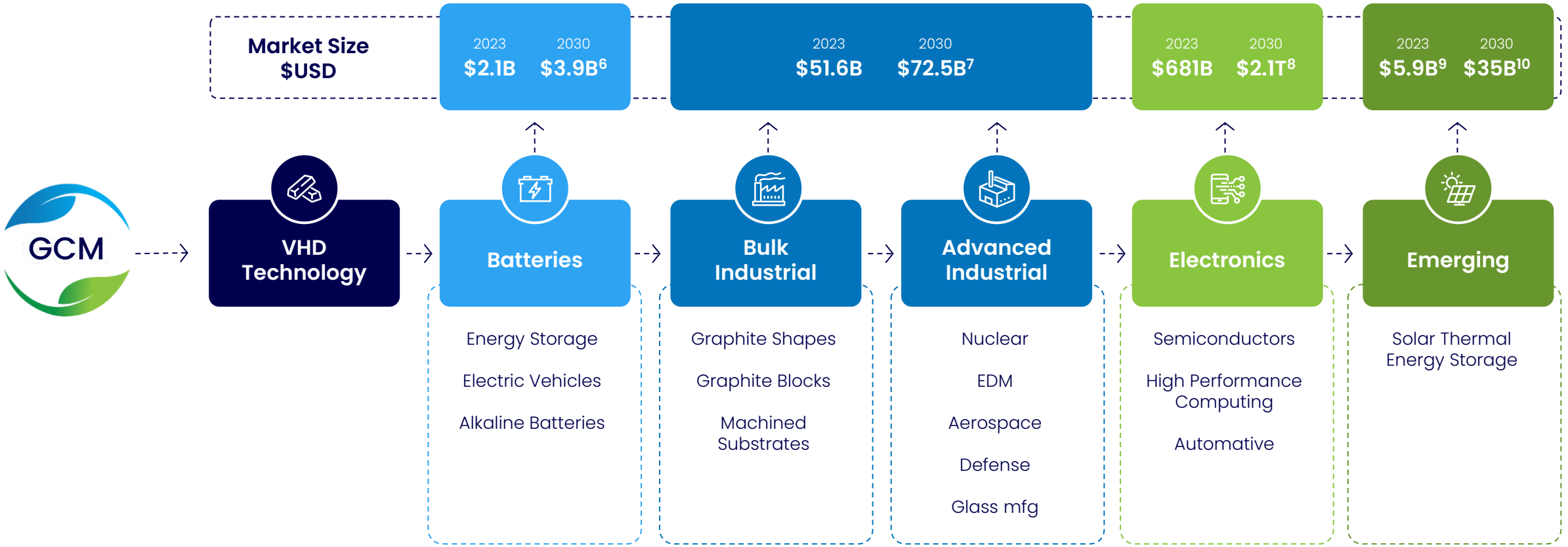
Renewable energy sources depend on advanced storage solutions to meet base load power demands and enhance reliability.

Clean Energy

VHD Graphite facilitates the production of consistent, clean energy, contributing to global sustainability efforts.

Immediate and Scalable Market Opportunities

Global Demand across Rapidly Growing Markets



[6]Wood Mackenzie, October 2024 | [7]Lone Star Technical Minerals October 2024 | [8]Yahoo Finance October 2024 | [9]Fortune Business Insights September 2024 | [10]Allied Market Research, Solar Thermal Market Research 2031

Grant Funding Opportunities

Opportunities Identified and Discussions Commenced

VHD Technology Produces An Extremely Versatile Material

Universally used in products in demand today.

Graphite Is Recognised Universally As A Critical Mineral

With a wide range of applications to the technology and renewable energy sectors.

Opportunity to accelerate the commercialisation process without diluting shareholder equity.

Australia and the USA provide grant funding opportunities, via agencies such as:

Australian Government
Australian Renewable Energy Agency

ARENA

Roadmap and Commercial Strategy

03

Near Term Milestones

To Support Commercialisation and Transition to Revenue

Personnel

Appoint a Head of Research and Development to lead R&D activities.

Pilot Plant

Commission pilot plant capable of producing graphite blocks for use in heat sinks and also for solar-thermal applications. Binding heads of agreement signed, furnace acquired, pilot plant design progressed.

Customer Qualification

Provide graphite blocks for customer product testing, prototyping, and acceptance.

Non-Dilutive Funding

Progress grant funding applications to provide off-balance sheet funding.

Strategic Partnerships

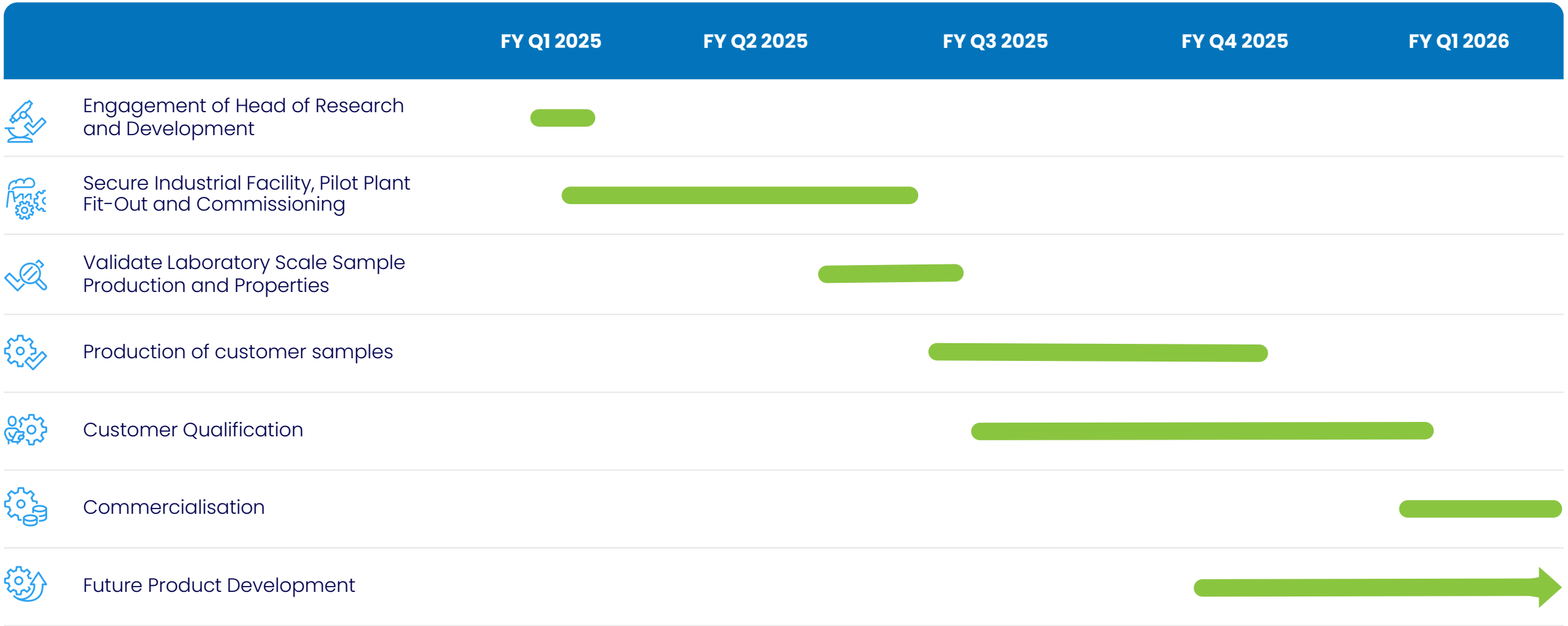
Engage with tier one end users of graphite block products to open new markets for graphite blocks e.g. solar-thermal, defense, aerospace.

Commercialisation

Customer acceptance of VHD Graphite blocks and transition to supply phase and production scale-up.

- **Professor Andrew Ruys appointed.**
- **Industrial facility leased and GCM have possession.**
- **Acquisition of key pilot plant equipment complete.**
- **Pilot construction commenced.**
- **ARENA funding opportunities identified, and preliminary discussions initiated.**

Fast Track to Commercialisation[11]



[11]Not to scale.

Introducing Single Crystal Mullite Fibre

04

Single Crystal Mullite Fibres

Regarded as the “holy grail” of composite reinforcement materials, offers exceptional properties

High-Temperature Stability

Preserves structural integrity at elevated temperatures, critical for aerospace and industrial applications.

Superior Mechanical Strength

Delivers high tensile strength and fracture toughness, enhancing the durability of composite materials.

Low Density

Supports lightweight composites, essential for weight-sensitive applications.

Chemical Resistance

Exhibits strong resistance to corrosion and chemical degradation, extending the lifespan of components.

A Vital Material

For reinforcing metal matrix composites (MMCs) and ceramic matrix composites (CMCs), ensuring superior performance in extreme environments.

High-end Non-oxide Ceramic Fibre

Such as silicon carbide (SiC) fibres, are similarly renowned for their exceptional properties, including high-temperature stability, strength, and oxidation resistance. These attributes make them ideal for reinforcing metal and ceramic matrix composites used in industries such as aerospace, automotive, and defense.

Market Potential and Size[12]

MMC Growth

The global metal matrix composites (MMC) is experiencing steady growth, driven by rising demand across key industries such as **automotive, aerospace, and defense.**

$810M 2023 Market Value in USD

$2.9B+ 2032 Projected Market Value in USD

12.4% Compound Annual Growth Rate (CAGR)

Delivering Advantages

This growth reflects the increasing demand for materials offering superior performance in extreme environments, with MMCs delivering clear advantages over traditional options for aerospace, defense, and industrial applications.

Pricing

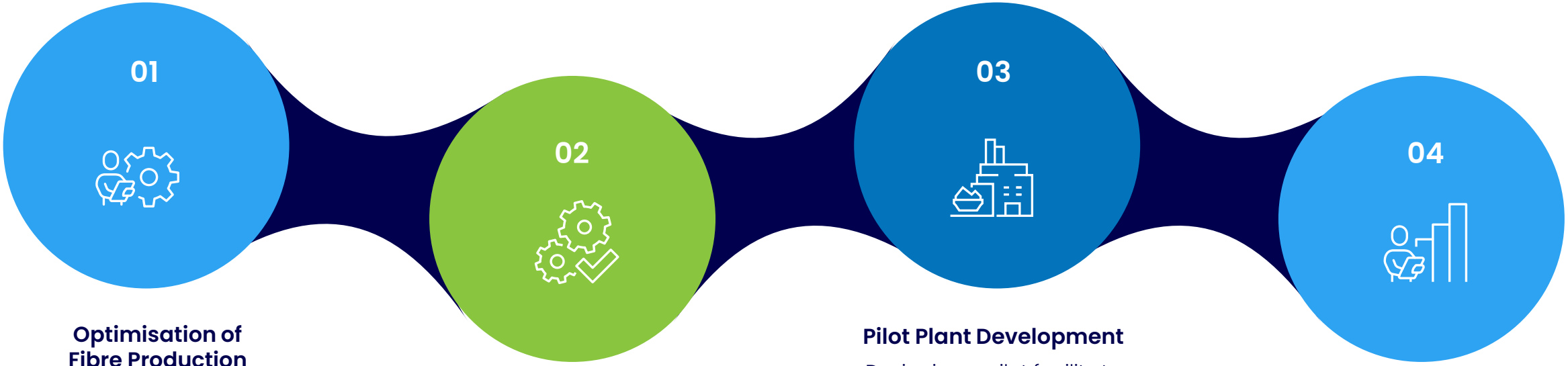
The pricing of these advanced fibres depends on manufacturing processes, quality, and intended applications. For example, chemical vapor deposited (CVD) silicon carbide (SiC) monofilaments are among the most expensive ceramic fibres, with prices reaching up to €8,000 per kilogram (approximately USD 11,000 per kilogram).

[12]GCM ASX Announcement 27th November 2024

Single-Crystal Mullite Fibres

Work Program Overview

GCM is initiating a comprehensive work program to advance single-crystal mullite fibre technology, based on prior research recommendations



Optimisation of Fibre Production

Refining parameters like porosity control, calcining temperatures, and infiltration techniques to ensure consistent and scalable manufacturing.

Validation in MMCs and CMCs

Conducting live testing in metal and ceramic matrix composites to confirm performance under real-world conditions.

Pilot Plant Development

Designing a pilot facility to transition from laboratory research to commercial-scale production.

Market Assessment

Collaborating with industry leaders to identify key applications and secure strategic partnerships for adoption.

Unlocking the Potential of Single-Crystal Mullite Fibres

Single-crystal offering unparalleled properties:

Exceptional strength, corrosion resistance, and stability in both reducing and oxidising atmospheres.

High melting point

1828°-1890°C

Low coefficient of thermal expansion

6.03 x 10^{-6} °C^{-1} (20°-1600°C)

Low thermal conductivity

3.89 $Wm^{-1}K^{-1}$ at 1400°C

Not Yet Commercially Available

Despite its remarkable attributes. Previously, the only commercially produced single-crystal fibre was alumina, developed by Sapphicon in the early 2000s at a cost of **US$100,000/kg.**

3-Year Australian Research Council Linkage Grant (ARC)

Secured by CML's wholly owned subsidiary, TopFibre Pty Ltd, in partnership with the UNSW School of Materials Science and Engineering, to address this gap.

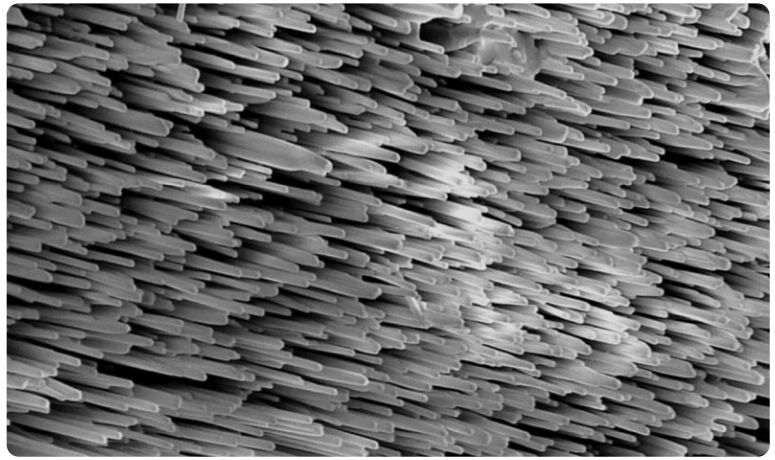
Previous Work Performed

The program's core objective was to pioneer scalable methods for producing commercial quantities of single-crystal mullite fibres from topaz. This work was specifically tailored for use in metal matrix composites (MMCs) and ceramic matrix composites (CMCs).

Proof of concept was successfully achieved,

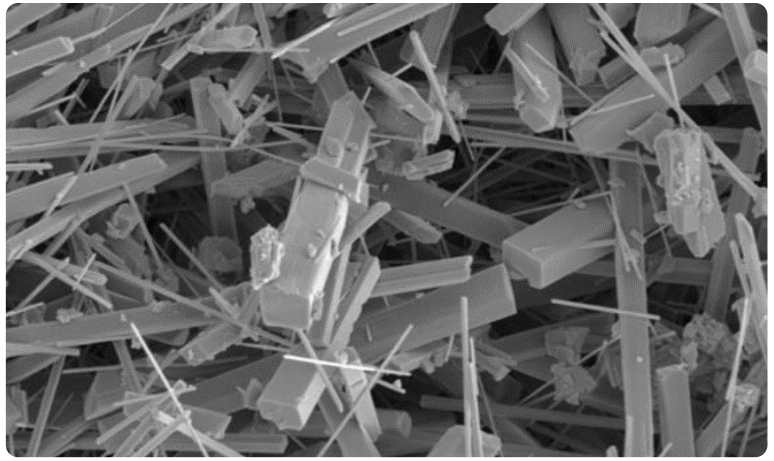
Demonstrating the feasibility of this innovative approach and laying the groundwork for further development and commercialisation.

Advancements in Single-Crystal Mullite Fibre Development



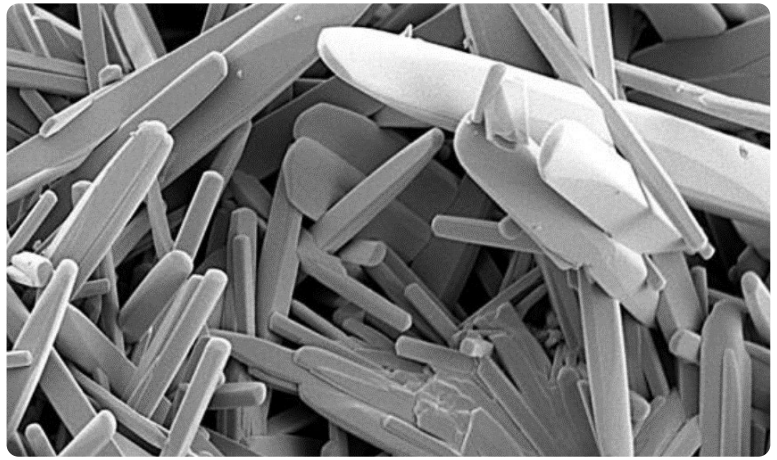
Template-Grown Fibre Proof-of-Concept

Demonstrates the feasibility of fabricating parallel, separable fibres.



Fibre Coarsening Potential

Conversion from thin whiskers to thicker fibres (≥ 4μm) is technically feasible – GCM has identified potential pathways for the next research stage.



Fibre Length Achievement

Fibres with a maximum length of ≤35 μm have been successfully fabricated

Corporate Overview

05

Corporate Snapshot

Board of Directors

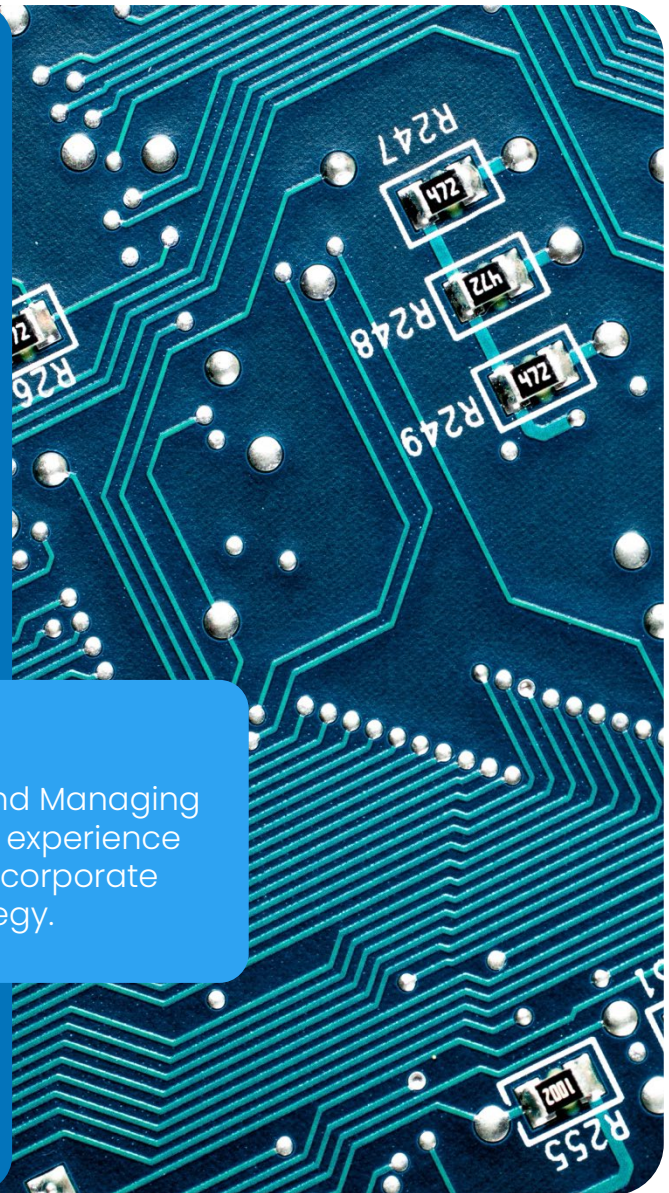
Charles Thomas
Non-Executive Chairman

Christopher Zielinski
Non-Executive Director

Clinton Booth
CEO and Managing Director

New Leadership

Clinton Booth appointed as CEO and Managing Director in 2024, bringing extensive experience in mineral exploration, project and corporate development, and corporate strategy.



Commitment to Growth

With a robust leadership team and solid financials, we are well-positioned to advance our strategic initiatives and deliver value to our shareholders.

Market Capitalisation

$9.54M AUD

As of 4th December 2024

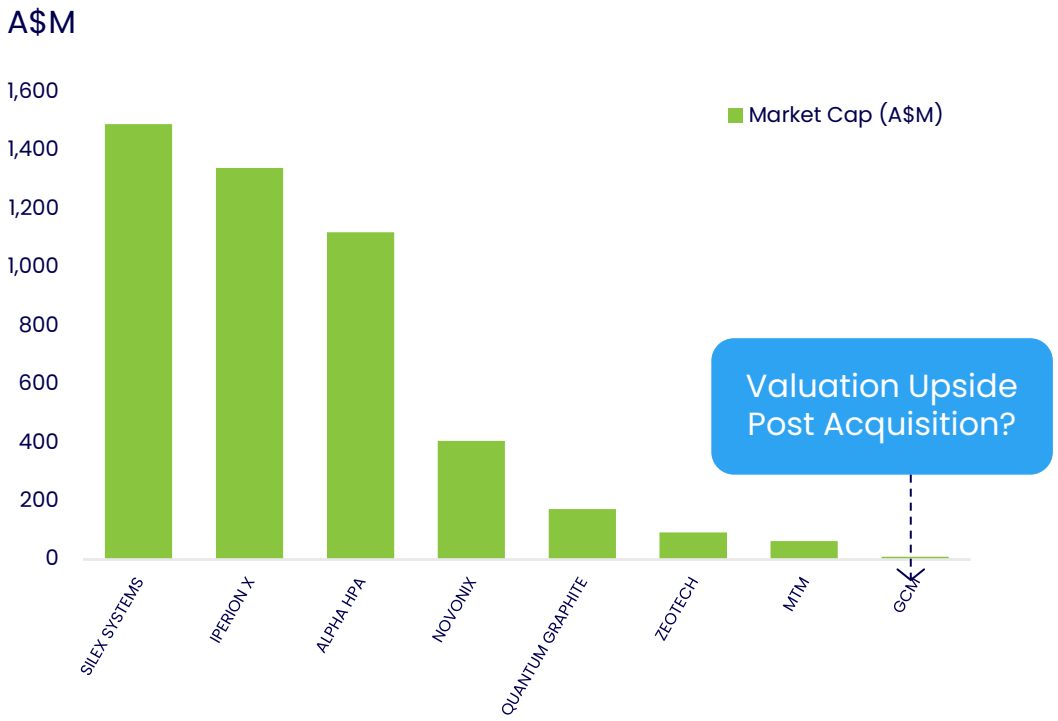
Cash on Hand

$3.12M AUD

September Quarterly Report + Capital Raise in November 2024

Comparable ASX Listed Companies[13]

Market Cap Comparison[14]



Company	ASX Code	Market Cap[14]	Stage
Silex Systems Limited	SLX	$1.49Bn	Production
Alpha HPA Limited	A4N	$1.12Bn	Production
Zeotech Limited	ZEO	$92.69M	Production
IperionX Limited	IPX	$1.34Bn	Pilot
Novonix Limited	NVX	$405.92M	Pilot
Quantum Graphite Limited	QGL	$172.49M	Pilot
MTM Critical Mineral Limited	MTM	$63.02M	Pilot
Green Critical Minerals Ltd	GCM	$9.54M	Pilot

[13]The peer comparison presented in this slide is subjective and based on GCM's internal assessment of industrial tech companies operating within similar sectors of mineral processing and extraction. This comparison does not necessarily adhere to any industry-recognised standards and should not be interpreted as an exact like-for-like comparison in terms of stage of development, market cap, or technology maturity. GCM's VHD Graphite technology is currently at a development / pilot plant stage. The companies compared are in various stages of development (as noted in the table), and their progress is based on publicly available information as of the date of this presentation. The development stages referenced in this comparison are for indicative purposes only and are not meant to represent a formal independent analysis based on industry standard.. GCM notes that entities listed may be selling different commodities (compared to GCM) or may be selling to different customers / end users Investors are advised to consult independent sources for a detailed assessment of each company's projects and their stage of development. GCM does not warrant the accuracy of third-party data used for this comparison.

[14]As at 04/12/2024, Yahoo Finance

ASX:GCM

Thank you

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