

MTM

CRITICAL METALS

Innovating Critical Metal Supply

ASX: MTM

INVESTOR WEBINAR

02 December 2024

MTM Critical Metals Ltd is an **Industrial Technology Company** focused on commercialising the **Flash Joule Heating (FJH)** metal recovery and processing technology.



**KNIGHTHAWK
ENGINEERING**



ENGINEERING DESIGN & SCALE-UP

Houston, Texas, USA



MTM
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Flash Metals USA HQ (MTM)
Houston, Texas



RICE UNIVERSITY



FJH PIONEERS / R&D

Houston, Texas, USA

Perth Australia

MTM
CRITICAL METALS

MTM HQ
Perth Australia

MTM has a Global Licence Agreement for FJH with Rice University

Knighthawk was founded in 1991 and specializes in bespoke engineering design solutions

Coming Soon: U.S. listing of shares through OTC Market

- MTM is listed on the Australian Stock Exchange (Ticker ASX: MTM)
- The Company is exploring options to undertake a U.S. listing via the over-the-counter (OTC) markets, operated by **OTC Markets Group (OTCQB)**. This is expected to be finalised in the coming weeks



OTCQB:
Coming Soon



ASX



Comparable Companies on the ASX?

Date Reference: 21/11/20/24

PEERS	TYPE	Market Cap (A\$M)	Share Price (A\$)	Development Stage	STAGE (1-Early, 2-Development, 3-Commercial)
IPERION-X	Metal recovery tech (Hydromet)	\$1,369	\$4.57	Advanced pilot	2
SILEX	Metal processing tech (lazer)	\$1,361	\$5.74	Commercial scale production (Stage 1)	3
ALPHA HPA	Metal recovery tech (Titanium de-oxygenation)	\$1,106	\$0.98	Commercial scale production (Stage 1)	3
TITOMIC	Electric furnace tech	\$285	\$0.24	Advanced pilot	2
AMAERO	Alloy and titanium powders for additive manufacturing /powder metallurgy	\$212	\$0.35	Advanced pilot	2
CALIX	Additive manufacturing tech that coats surfaces with specialty metals	\$162	\$0.89	Advanced pilot for Li refining	2
MTM	Metal recovery tech (Rapid heating)	\$24	\$0.068	Prototype; Pilot plant design underway	1

IPERIONX

Silex

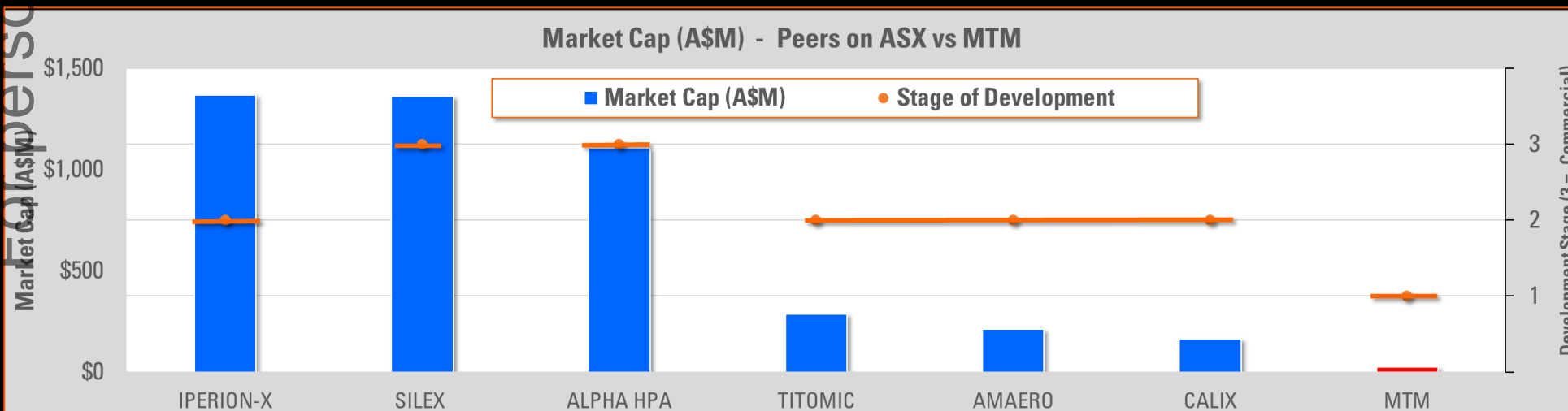
Alpha HPA

TITOMIC

AMAERO

calix

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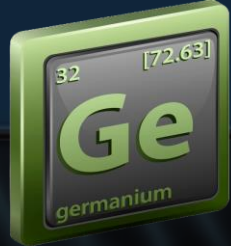
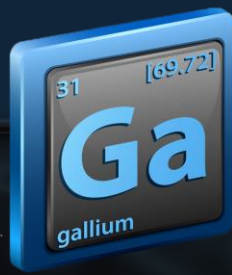


Business Update

Strategic Partnership with Indium Corporation

Global leader in Gallium, Germanium & Indium Metals since 1934 with HQ in New York

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Est. 1934

Global leader in metal refining

3,000+ Employees

16 Facilities across 8 Countries

Serving Semiconductor, Military Defence & several other industrial markets

A Major Milestone In MTM's Journey

VALIDATION

- **External Validation:** Endorsement of FJH tech by major company .
- **Feedstock Security for MTM:** ultra-high-value Ga, Ge, In: crucial for semiconductors & defence tech.
- **US Market:** Pivotal step in raising MTM's profile in the U.S. ahead of OTC market listing.
- Aligns with U.S. push to localise critical material supply chains, supported by a DOE grant.
- Surging global demand with geopolitics affecting supply of Ga & Ge – **both of which China controls 100%**



SIGNIFICANCE

- Strengthens MTM's position as a pioneer in sustainable metal recovery with strong U.S. backing.
- Boosts investor confidence by showcasing scalable and strategic industry collaboration.
- Establishes framework for advancing towards formal supply/offtake agreements, **de-risking path to revenue.**

Strategic Partnership with Indium Corporation

Strong external validation of FJH technology

Indium's Global Business Unit Manager Markus Roas commented:

“This partnership with MTM aligns with our commitment to enhancing U.S.-based supply chains for critical metals essential to modern technologies. FJH technology offers a novel and sustainable solution to recover these vital elements from waste materials, ensuring reliable access without relying on external sources.”

We are excited to support this collaboration in addressing the strategic needs of our country. At Indium, we believe that secondary raw materials and urban mining will become key pillars for the future, and we are excited to support this collaboration in addressing the strategic needs of our industry.”



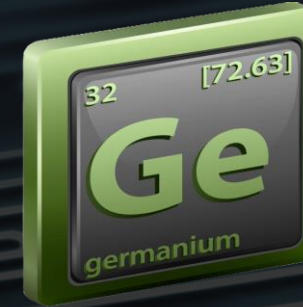
Access to ultra-high value scrap

Compare with typical primary sources of these metals, which are commonly recovered as secondary by-products from zinc or alumina ore mining

for internal use only



**150,000 ppm
(15%)**



**180,000 ppm
(18%)**



**200,000 ppm
(20%)**

Feedstock (Scrap)

Primary Source of Metal Globally

Typical Ore Grades

Bauxite ore

Zinc Ores

Zinc Ores

10 – 50 ppm

30 – 150 ppm

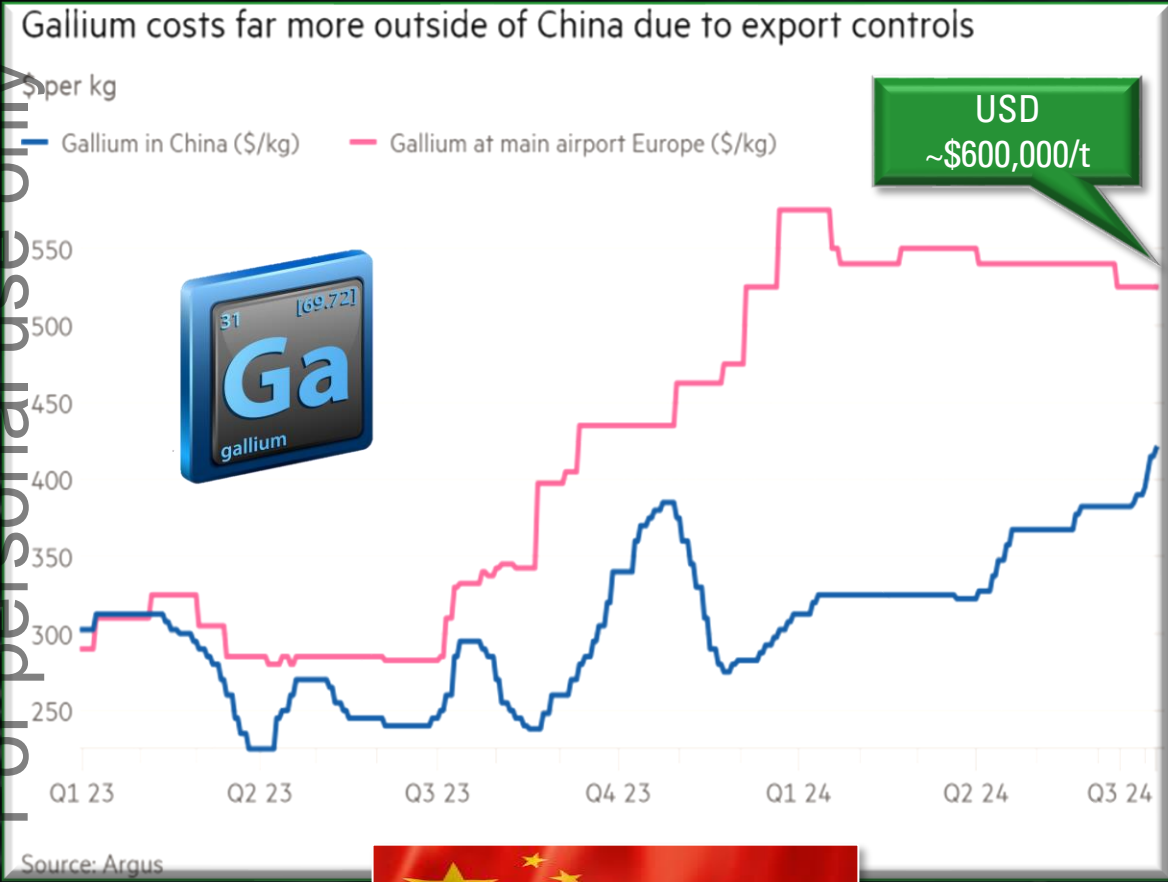
1 – 100 ppm

REFERENCES:

- Frenzel, M., Ketris, M.P., and Gutzmer, J. (2014). 'On the Geological Availability of Germanium', Minerals, 4(2), pp. 275–300.
- U.S. Geological Survey (2013). Critical Mineral Resources of the United States—Economic and Environmental Geology and Prospects for Future Supply, Chapter N: Gallium. Available at: pubs.usgs.gov.
- European Commission (2017). Study on the review of the list of critical raw materials: Critical Raw Materials Factsheets. Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs.

Geopolitical Metals

Critical importance in high-tech industries and concentrated production in China



98% of supply



60% of supply

REFERENCES:
 • Dempsey, H. and White, E. (2024). China's export curbs on semiconductor materials stoke chip output fears. Financial Times, 27 August 2024. Available at: <https://www.ft.com/content/9cd56880-4360-4e11-8c22-e810d3787e88>.
 • Lucas, L. (2024). Overcoming China's dominance in gallium will not be easy. Financial Times, 31 August 2024. Available at: <https://www.ft.com/content/20819d8e-5d2b-4a12-9a50-edbfd07336ef>.
 • U.S. Geological Survey (2024). Mineral Commodity Summaries: Gallium. Available at: <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-gallium.pdf>.

Strategic Metals

Critical importance in high-tech industries and concentrated production in China

- Semiconductors (e.g., NVIDIA chips).
- Military technology (e.g., radar systems, advanced communication).
- Renewable energy (e.g., solar panels).



Indicative Next Steps & Path to Revenue



Q4 2024

Q1-Q3 2025

Q4 2025

Ongoing Ga, Ge, In testing & Development

1 ton/day plant design finalisation

Plant procurement, construction & commissioning

Optimisation
Formal / binding supply & offtake agreements
Commercial operations



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Flash Joule Heating: A New Era of Sustainable Metal Extraction

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Introducing Flash Joule Heating (FJH)

- Originally developed by Dr James Tour at Rice University to produce graphene, FJH has evolved into a method for efficiently extracting metals from unconventional sources like e-waste & mine tailings.
- Potential to revolutionise metal recovery by reducing energy consumption, reagent use and waste, offering a more economical and environmentally friendly alternative.

Problems we are trying to solve: Traditional metal recovery methods are expensive, energy & reagent-intensive, and non-selective

Pyrometallurgy (high heat) ⇒ Ineffective, Non-Selective & Expensive

Hydrometallurgy (strong solvents) ⇒ Ineffective, Non-Selective & Expensive

Refractory Minerals – require significant energy & acids to process

The solution:
Breakthrough **Flash Joule Heating Platform**

WASTE

ORE

METAL

Legacy Recovery Techniques are Not Sustainable

Fossil-fuel powered kilns and trainloads of chemicals are not clean solutions

PYROMETALLURGY

Energy intensive, fossil-fuel powered

- Furnaces incinerate & oxidize valuable materials
- Creates slag and alloys needing further refining
- Requires several additional steps to remove impurities
- Non-selective



HYDROMETALLURGY

Chemical intensive, embedded emissions

- Significant consumable chemicals required (i.e., H_2SO_4 , H_2O_2)
- Embedded emissions from chemicals production & transport
- Non-selective
- Significant waste and problematic tailings



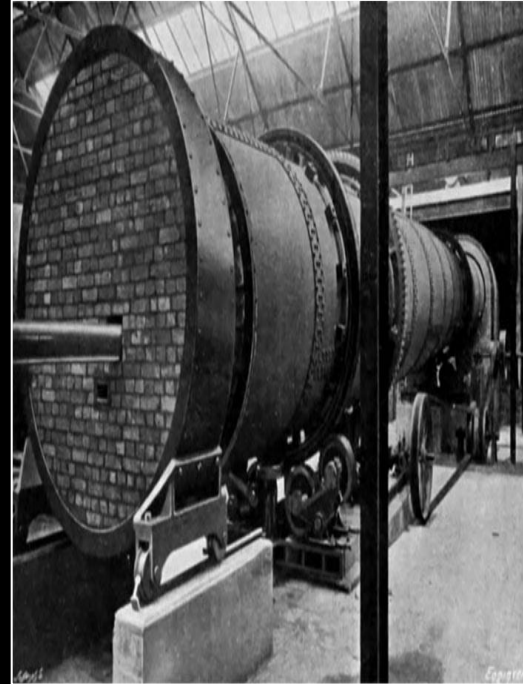
Processing Technology Breakthroughs that Changed History

Bessemer Converter
1856



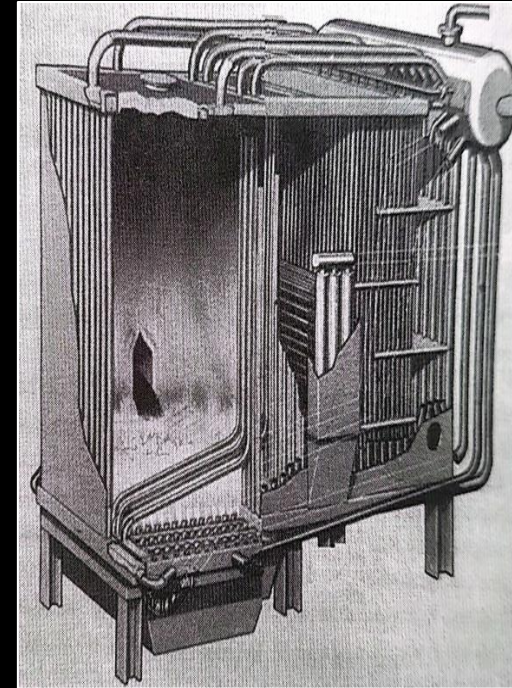
1st Inexpensive method
to mass produce steel

Modern Rotary Kiln
1885



Revolutionised
Continuous processing

Fluidized Bed
1921



Revolutionised
Petroleum cracking

ElecArc Furnace (MiniMill)
1955

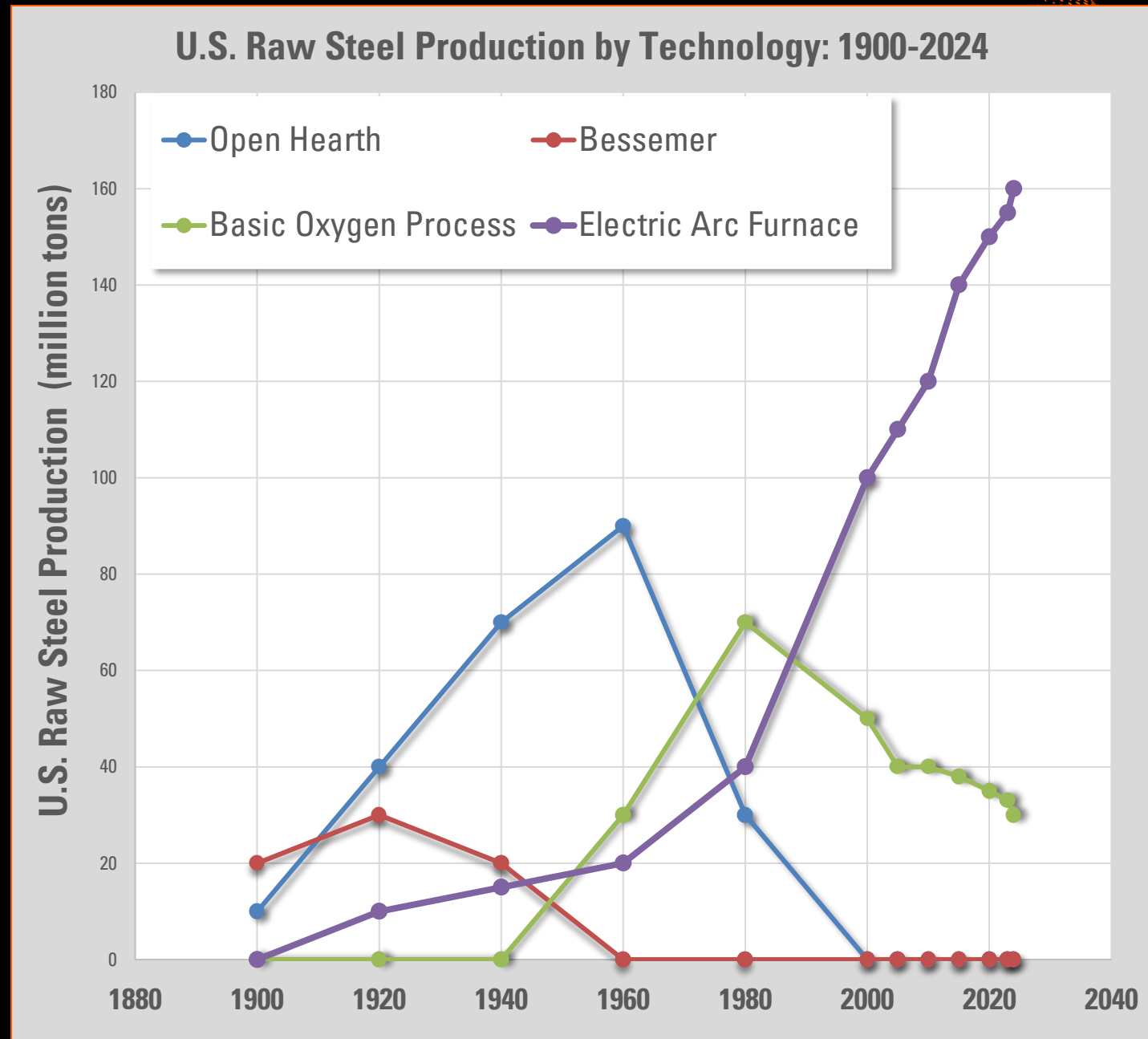


Revolutionised scrap
metal recovery.
Initially ridiculed

What's Next?.....

ElecArc Furnace (MiniMill)

- **Initial Skepticism:** Large steelmakers dismissed MiniMills, doubting their scalability.
- **Nucor's Vision:** adoption of MiniMill operations faced industry ridicule.
- **Breakthrough Success 1980s:** Nucor introduced thin-slab casting, disproving critics.
- **Industry Shift:** MiniMills scaled up challenging traditional steelmaking.
- **MiniMills now dominate U.S. steel production**



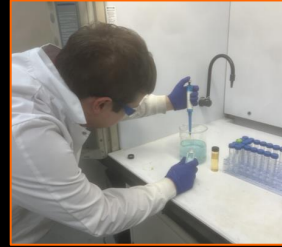
Review of H2 2024

Review of Last 6-Months

Over the past quarters, MTM has achieved significant milestones, reflecting its commitment to innovation and growth in critical metals processing and commercialisation:

Technological Breakthroughs

- Advanced the FJH technology with successful processing of REEs, e-waste, and lithium refining.
- Demonstrated high recovery rates for gold, silver, copper, palladium, and other critical metals.



Pilot Plant Development

- Progressed the design and planning of a 1-tonne-per-day FJH demonstration plant, showcasing readiness for industrial-scale operations.



Strategic Partnerships

- Progressed several relationships with major industrial players.

Corporate Growth

- Successfully raised \$8M in an oversubscribed funding round to accelerate growth initiatives.



Market and Stakeholder Engagement

- Delivered impactful presentations at key industry events like the COSM Technology Summit.
- Released multiple investor updates highlighting progress and strategic direction.



Review of Recent Price-Sensitive Announcements

- FJH Prototype Completion
- Board and Mgt Restructure
- FJH Tests Increase REE recovery
- License Agreement Rice
- Positive Metal Recovery TestWork

2024 Q2



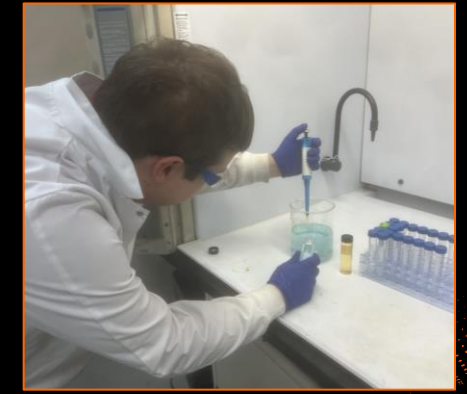
- New Corporate Presentation Deck
- Positive Lithium Extraction Results
- Addition of Chlorination to Licence
- FJH converts Spodumene to LiCl
- Gallium Recovered from Semiconductor Waste
- 1 TPD Demo Plant Update
- High Gold Recovery from E-Waste
- Further Advances in Li Refining
- High Silver & Copper - e-Waste

2024 Q3



- High Multi-Metal Recovery from E-Waste incl. Palladium & Tin
- 8M In Oversubscribed Raise to Accelerate Growth
- Progress update 1TPD Pilot Plant
- COSM 2024 Presentation
- Breakthrough in Rare Earth Element (REE) Processing
- Indium Inc collaboration
- More to come...

2024 Q4



Commercialisation Strategy

Outlook & Pathway to Revenue

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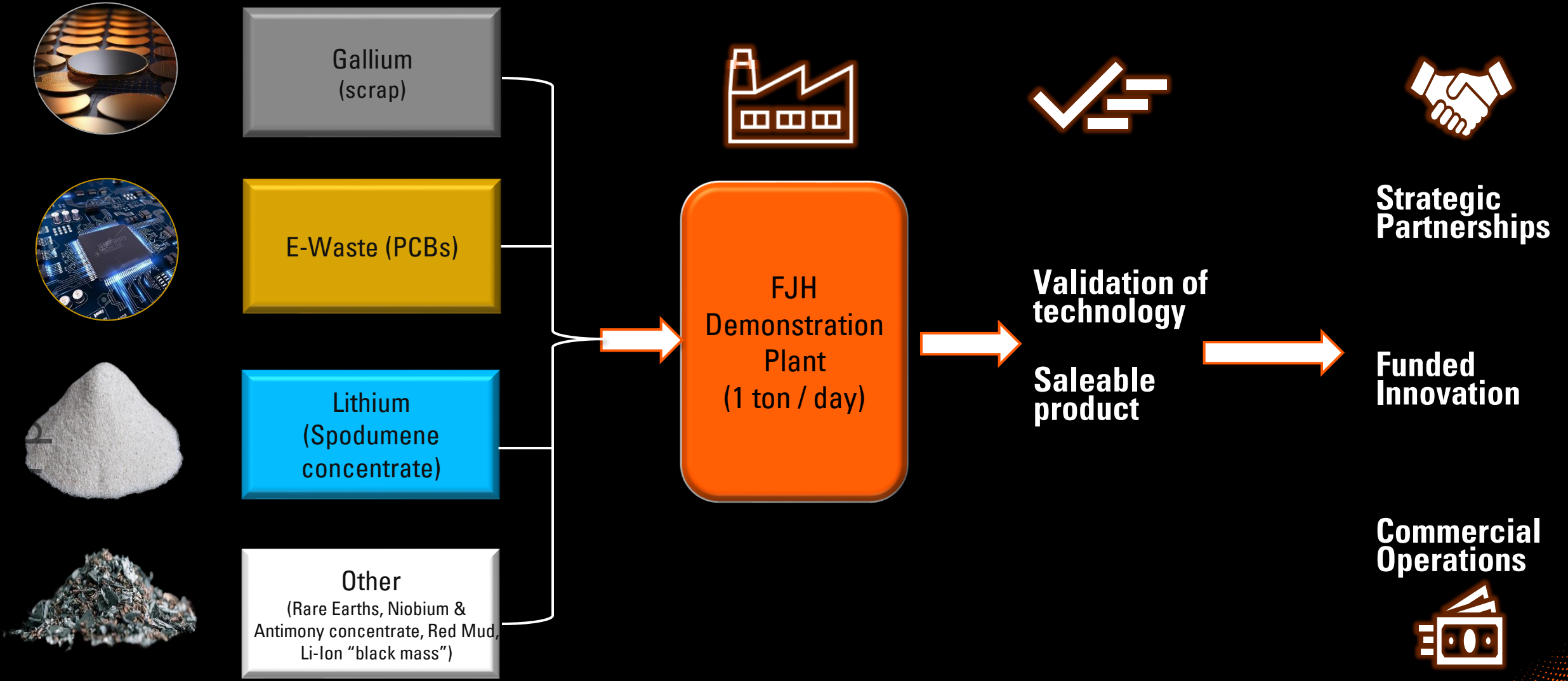
We are preparing for commercial scale-up with our **FJH Demonstration Plant (“FDP”)**

On track for design completion by Feb 2025



Initial plant to be located in Texas

The FDP is a major step towards scaling our business to **cashflow**, with capability to handle **multiple feedstocks**





**How does the new U.S. Administration Potentially Affect
MTM?**

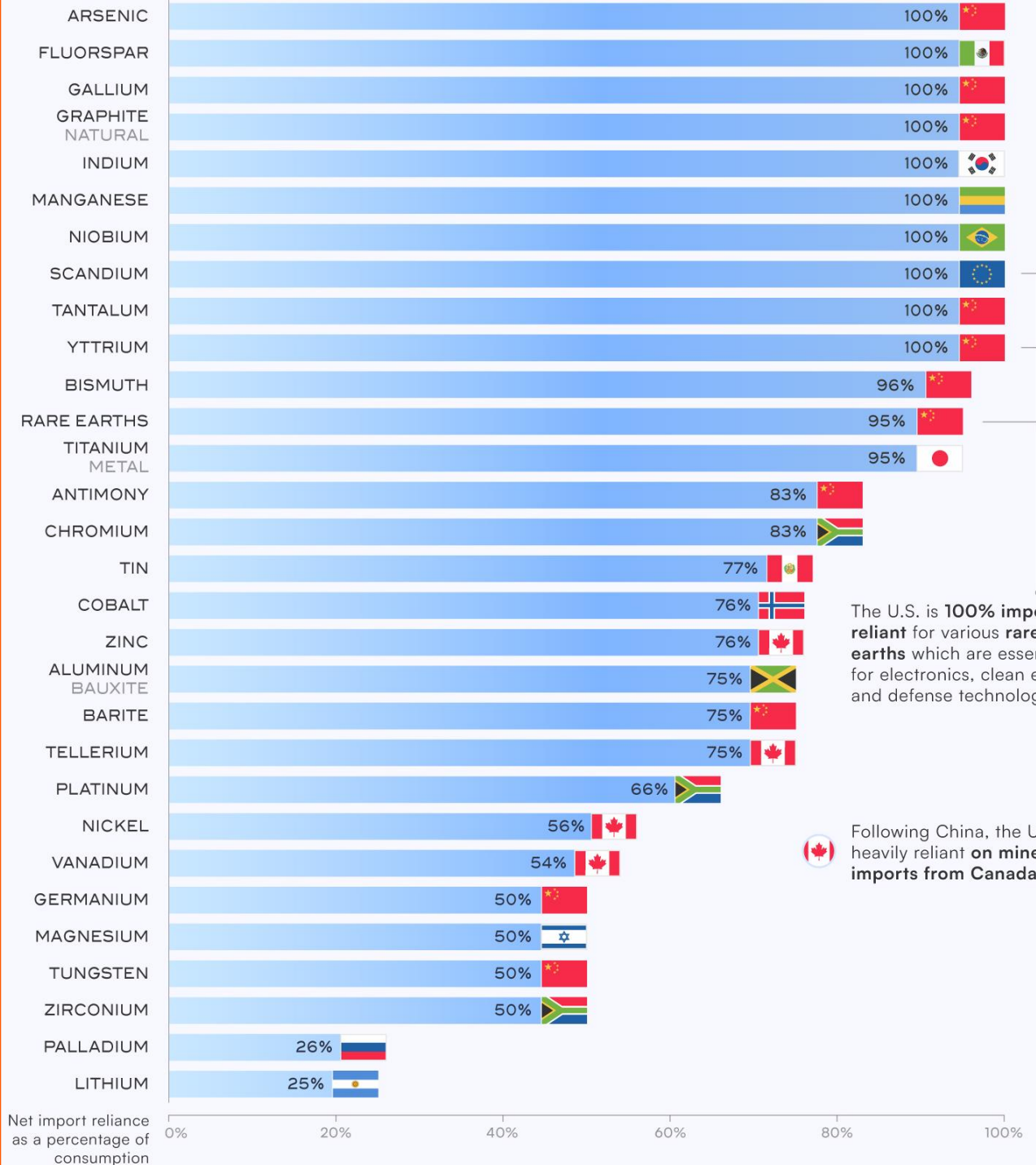
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Onshoring & Localising Critical Metal Supply Chains

U.S. Dependency on Critical Metals

>95% reliant on imports for the 13 most "critical" metals, with China being the primary import source for > 50% of these.



The U.S. is 100% import reliant for various rare earths which are essential for electronics, clean energy, and defense technologies.

Following China, the U.S. is heavily reliant on mineral imports from Canada.

EXAMPLE: Datacentres— The Silent Giants of Metal Consumption

Metal	Estimated Tonnes per MW
Copper (Cu)	27
Aluminium (Al)	10
Steel	40
Lead (Pb)	4
Lithium (Li)	0.1
Nickel (Ni)	0.5
Cobalt (Co)	0.2
Gallium (Ga)	0.05
Rare Earths	0.05

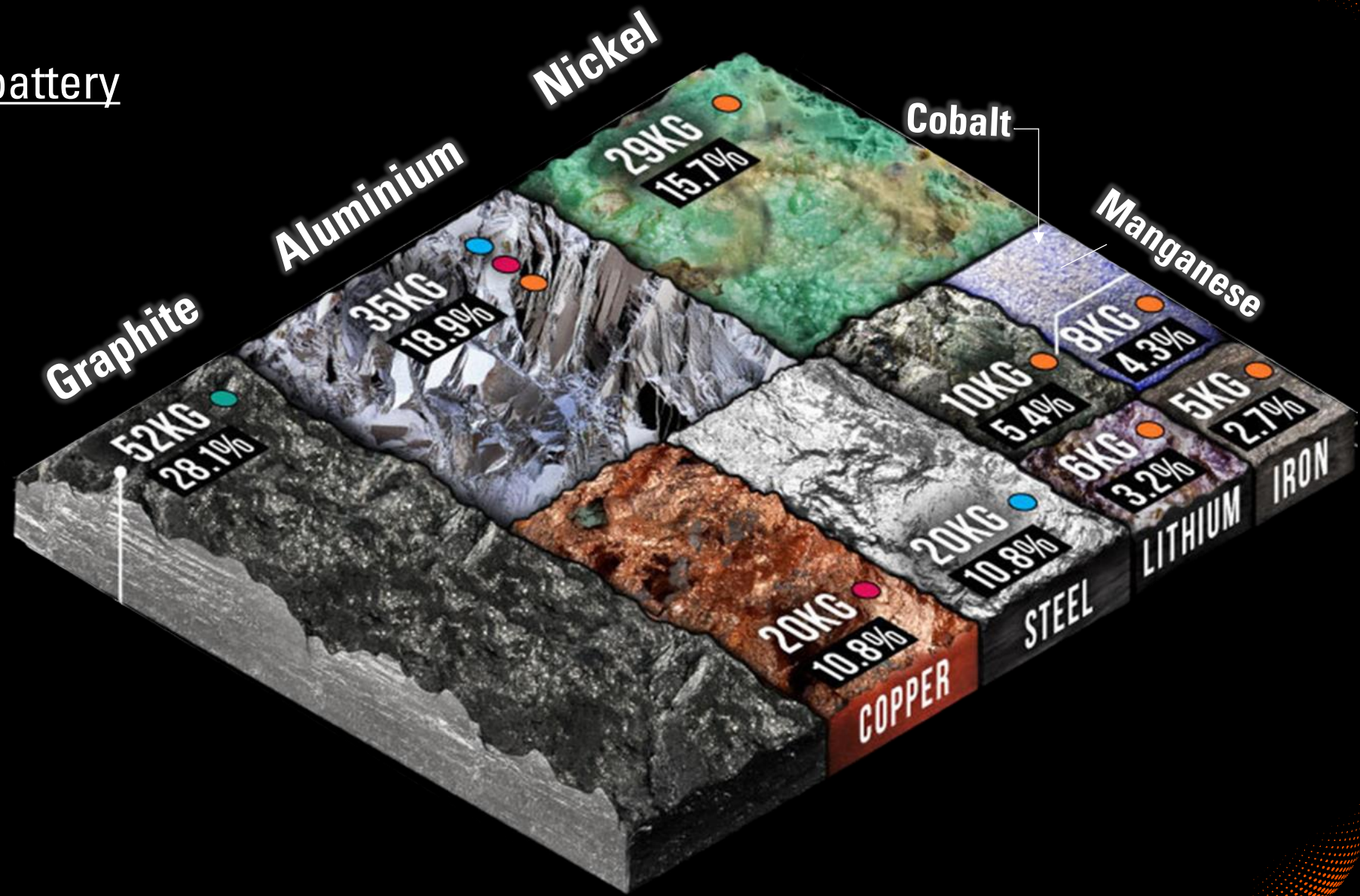
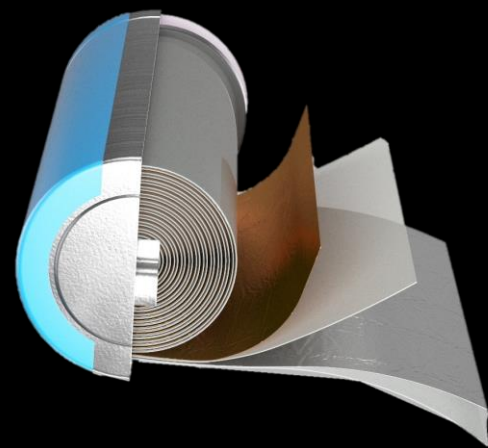


EXAMPLE: Metals in Electric Vehicle Battery

Typical 60 kWh 'NCMA' battery

185 kg metals

- 6 kg lithium
- 29 kg nickel
- 20 kg copper
- 8 kg cobalt



EXAMPLE: Rare Earth Elements

Crucial in Defence Applications

F-35



~420 kg REO

Arleigh
Burke-class
destroyer



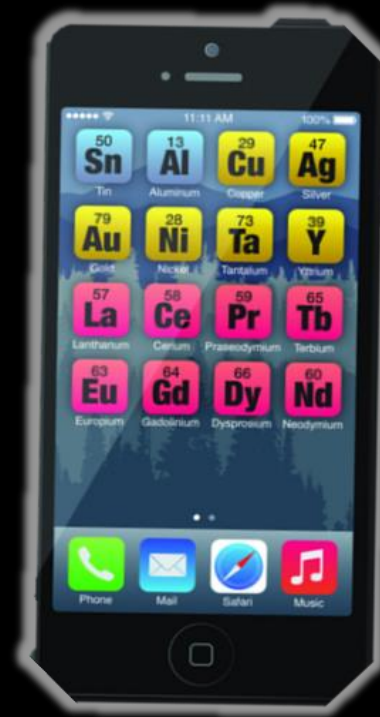
~2,400 kg REO

USS
Virginia



~4,200 kg REO

Smartphone
(iPhone)



16 REE Elements
0.05 kg REO

Wind Turbine
(3 MWh)



4 REE Elements
2,000 kg REO

Indicative Targets to Drive Value in Next 12 Months



Q4 2024

- OTC U.S. listing to access broader investment markets
- Testwork Updates
- Strategic Partnerships updates

Q1 – Q3 2025

- Finalising FJH demonstration plant design
- Plant procurement / construction
- Commissioning
- Testwork Updates
- Strategic Partnerships updates
- Non-Dilutive Funding: update on grant opportunities USA & AU

Q4 2025

- Binding offtake & supply agreements
- Commercialisation of recovered Gallium and other metals
- Pathway to revenue
- Ongoing testwork updates

Conclusion – FJH = New Era in Sustainable Metal Extraction

- External validation from a major player received
- The next generation of metal recovery technology
- Enhances national security by reducing reliance on imports.
- Sustainable solution for by converting waste into value
- Empowers industries with local access to critical metals for tech
- Scalable solution for growing demand

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U.S. Listing Coming Soon



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