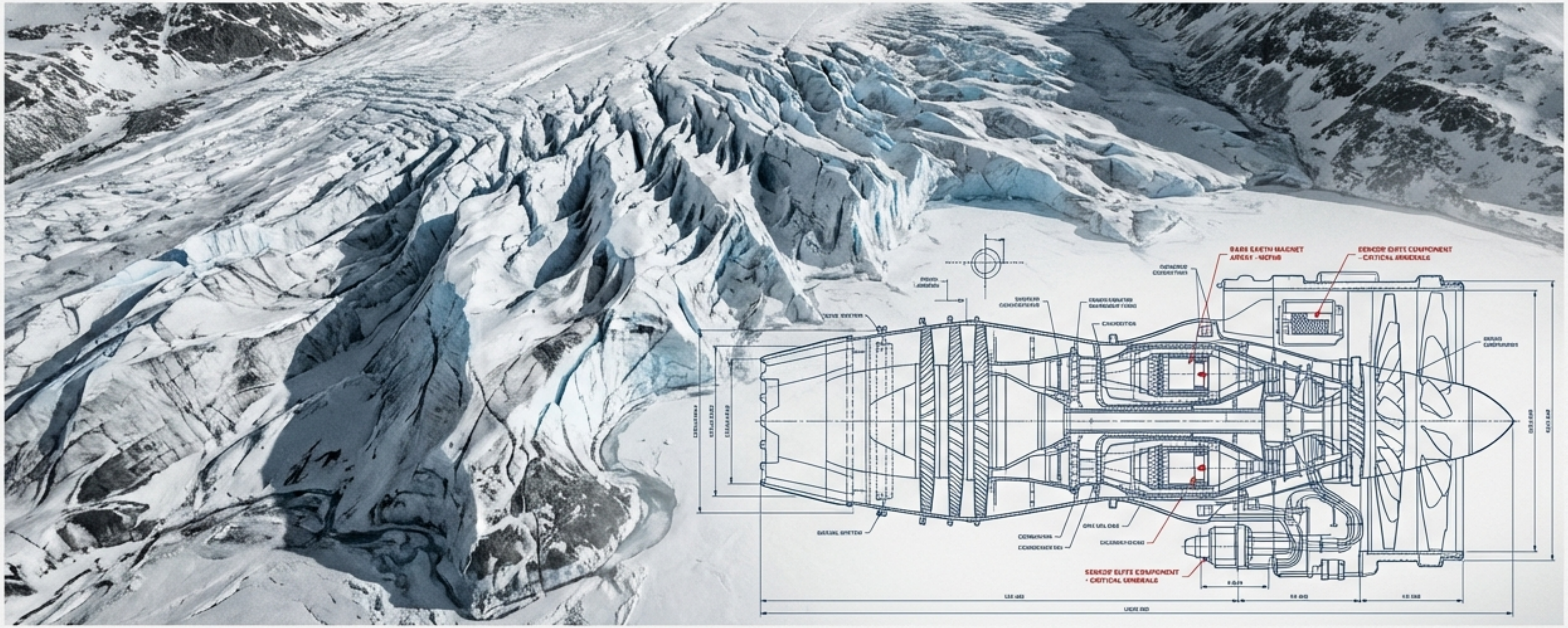
The Arctic Pivot: Strategic Rare Earths & The US Interest in Greenland

Securing the 'Mine-to-Magnet' Supply Chain in a Fragmented Geopolitical Landscape



Executive Summary: The Geopolitical Funnel

Why the road to energy independence leads to Greenland

Global Context

The Chokehold:
China controls ~90% of global refining. April 2025 export restrictions have weaponized the supply chain.

Strategic Gap

MP Materials

The Domestic Deficit:
The US has restarted mining, but lacks Heavy Rare Earths (Dysprosium/Terbium) needed for magnets.

The Solution

The Greenland Pivot:
1.5M tonnes of reserves. Uniquely rich in Heavy Rare Rare Earths. Located in North American/NATO security sphere.

Key Insight

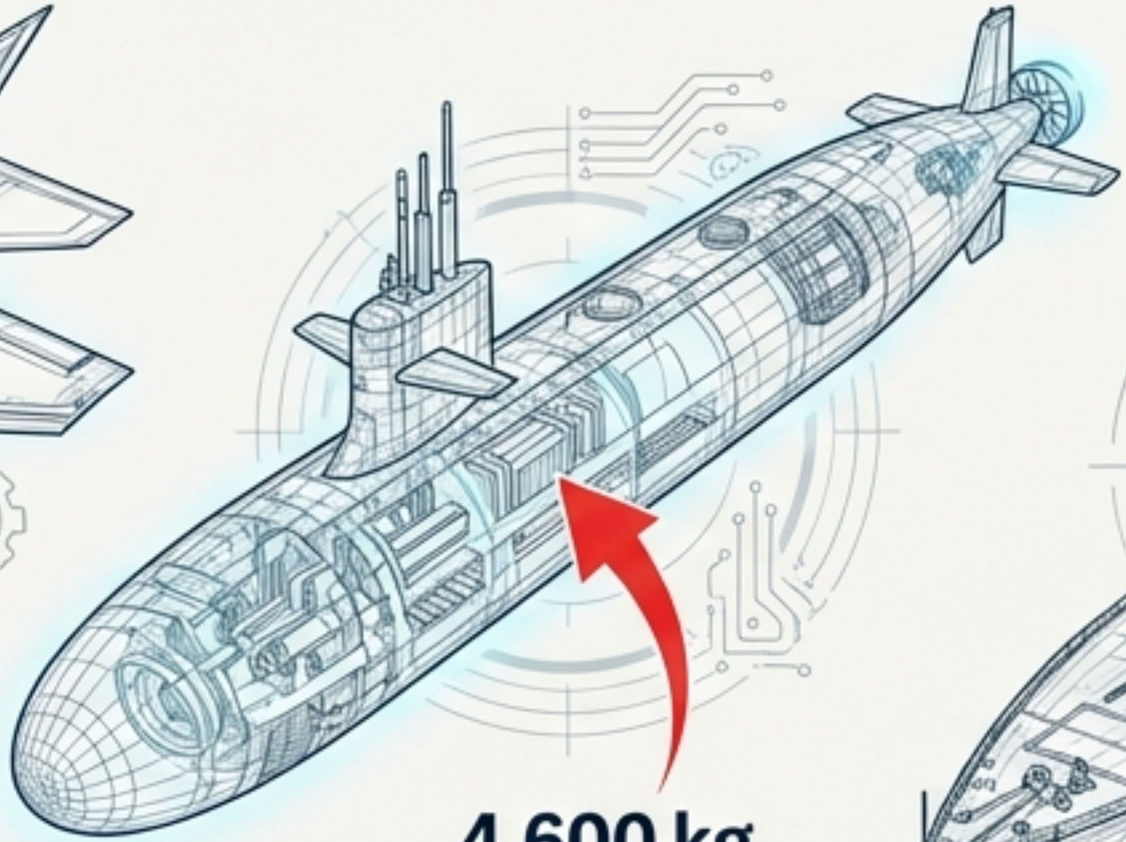
While environmental and political hurdles remain, Greenland represents the only scalable, friendly jurisdiction solution to the Heavy Rare Earth deficit.

The ‘Vitamins’ of Modern Power

Rare Earth Elements (REEs) are non-negotiable inputs for defense.

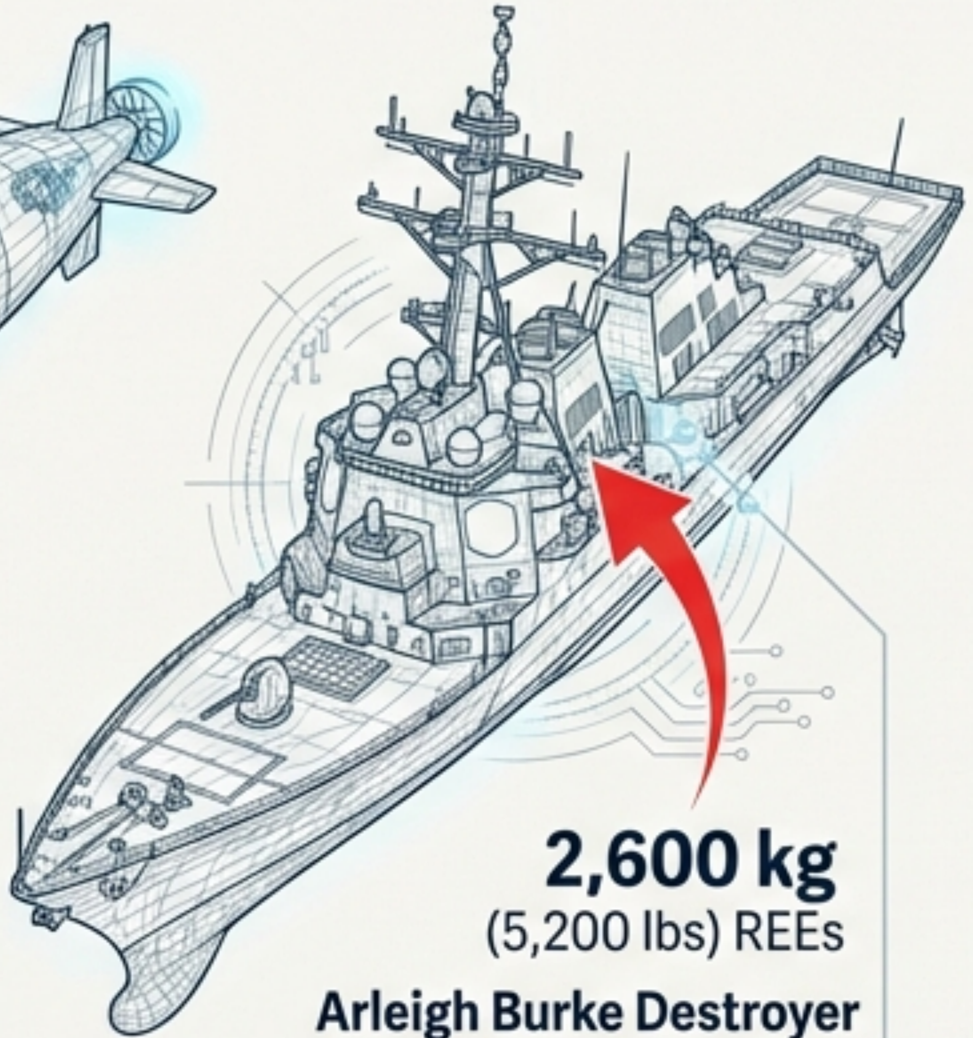
418 kg
(920 lbs) REEs

F-35 Lightning II Fighter Jet
Actuators, Radar,
Stealth Coatings



4,600 kg
(9,200 lbs) REEs

Virginia Class Submarine
Sonar, Drive Motors,
Stealth Systems



2,600 kg
(5,200 lbs) REEs

Arleigh Burke Destroyer
Radar, Missile
Guidance, Propulsion

DOD Investment: Since 2020, the Department of Defense has awarded $439M+ to establish domestic supply chains. Yet, processed metal supply for these platforms remains vulnerable.

The Critical Distinction: Light vs. Heavy

Not all Rare Earths are created equal. The US deficit is specific.

Light Rare Earths (LREE)

Lanthanum	Cerium	Praseodymium	Neodymium
La	**Ce**	**Pr**	**Nd**
Lanthanum	Cerium	Praseodymium	Neodymium

- **Abundant**. Mined at Mountain Pass (USA) & Mt Weld (Australia).

Heavy Rare Earths (HREE)

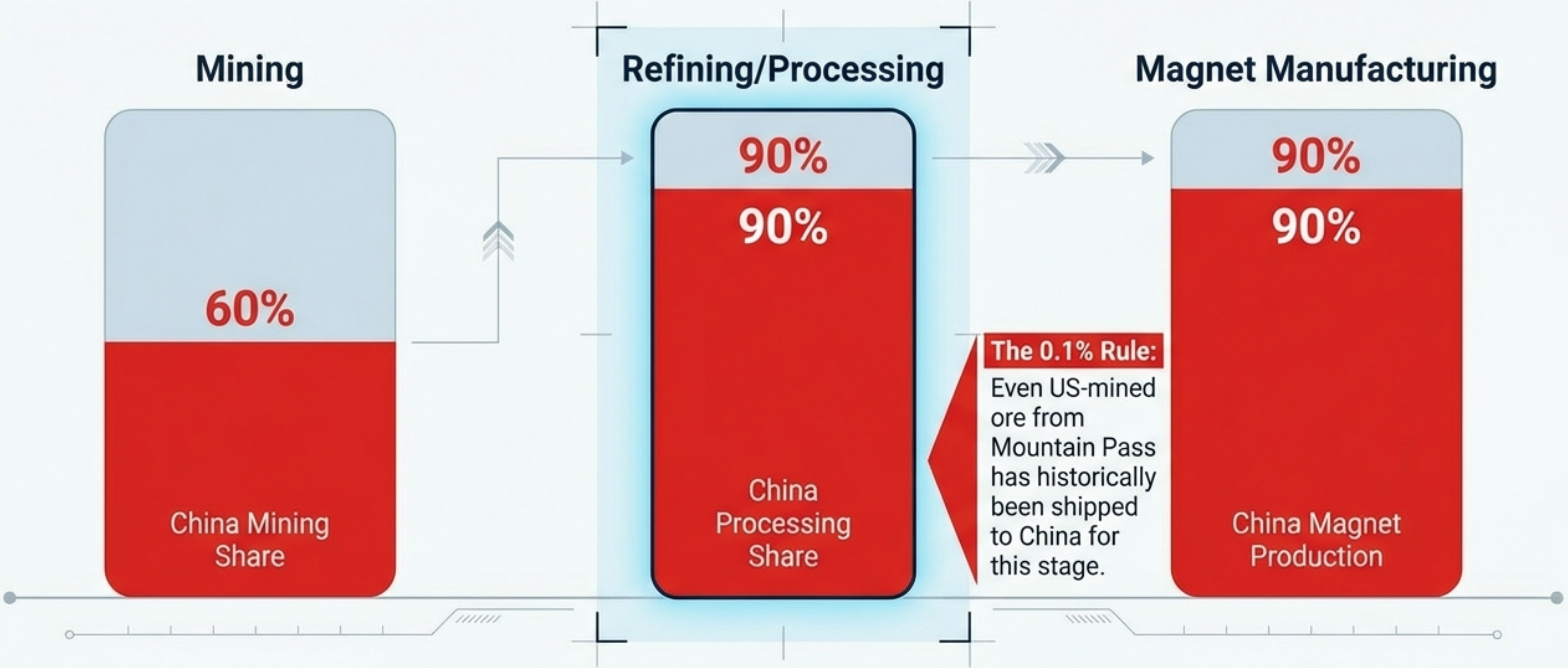
Terbium	Dysprosium	Holmium	Erbium	Yttrium
Tb	**Dy**	**Ho**	**Er**	**Y**
Terbium	Dysproslum	Holmium	Erbium	Yttrium

- **Scarce**. Critical for High-Temp Magnets. **China controls nearly 100%** of refining capacity.

Strategic Bottleneck: Dysprosium and Terbium are required for permanent magnets to operate in high-heat environments (EV motors, missiles).

The Industrial Fortress

China controls the processing, not just the dirt.



The 2025 Flashpoint

Weaponizing the supply chain through export restrictions.

April 4, 2025

MOFCOM Announcement 18

China imposes export restrictions on 7 key Rare Earths.

The Mechanism

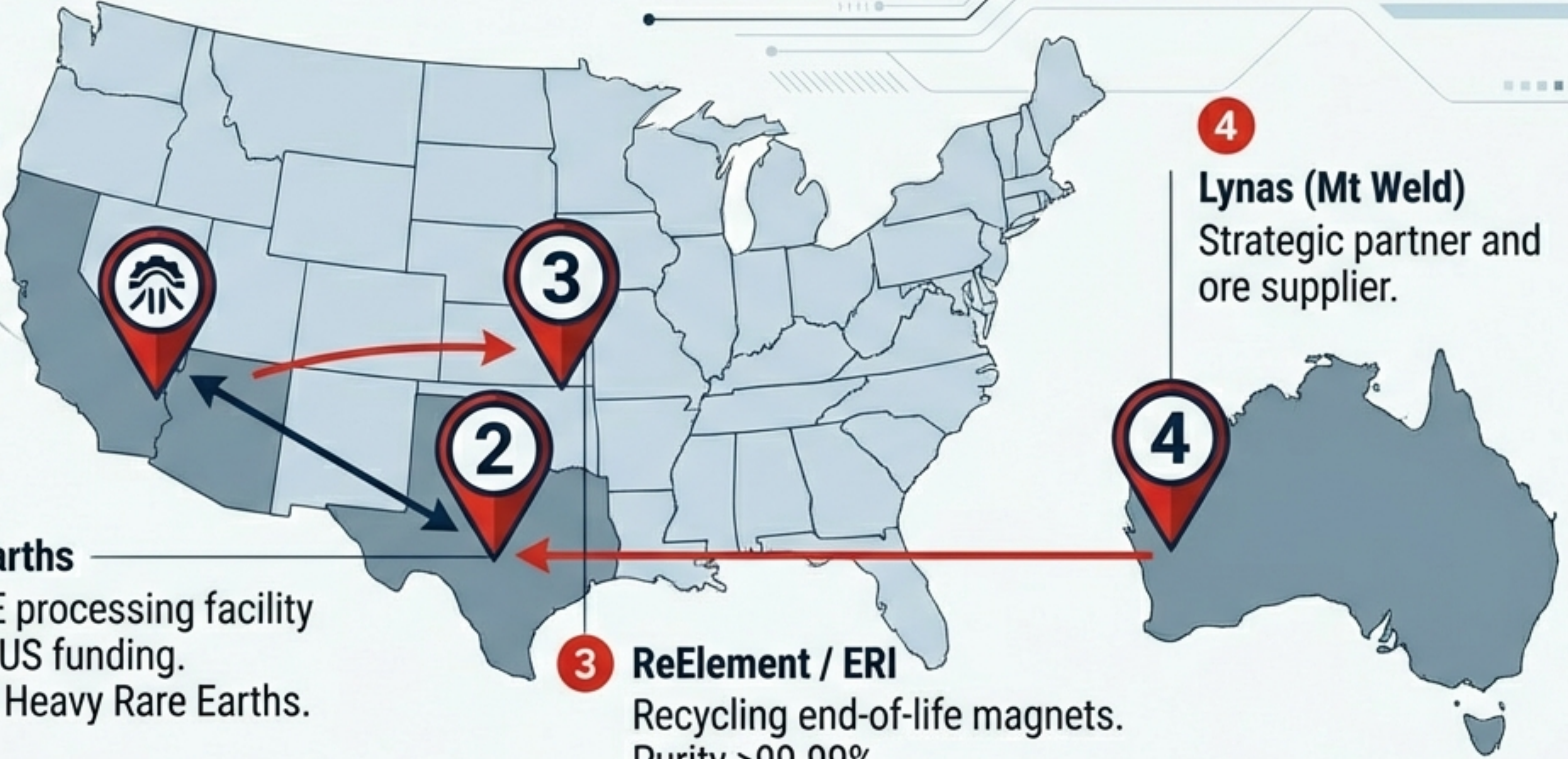
Strict monthly quotas and end-user license requirements enacted. Exporters must disclose IP production details.

The Impact

License applications stalling. Targeted disruption of US defense and high-tech manufacturing sectors.

The 'Mine-to-Magnet' Strategy

US and Allied efforts to re-shore capacity.



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MP Materials (Mountain Pass)

Received $45M DOD funding. Building "10X" facility for magnet production.

Currently the only integrated mine/oxide facility in the US.

Lynas Rare Earths

Building HREE processing facility with $288M+ US funding. Separation of Heavy Rare Earths.

3 **ReElement / ERI**

Recycling end-of-life magnets. Purity >99.99%.

4

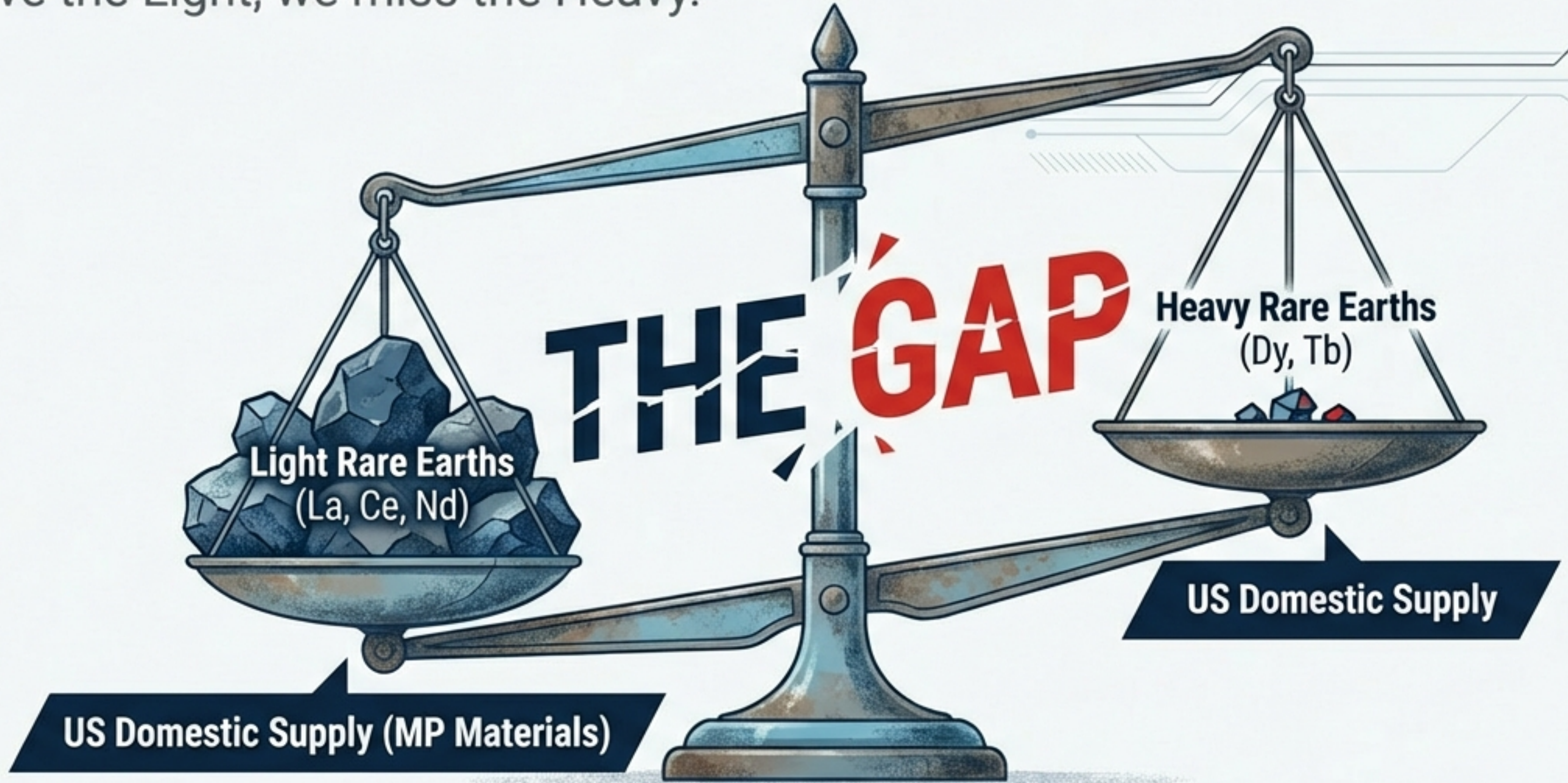
Lynas (Mt Weld)

Strategic partner and ore supplier.

Goal: Self-sufficient supply chain by 2027.

The Heavy Earth Deficit

We have the Light, we miss the Heavy.



"As of early 2026, no Western plant has achieved commercial processing of heavy rare earths." – Mordor Intelligence

Why Greenland? The Geology.

The ‘Wild Card’ in the global supply chain.

The Differentiator:

Unlike standard carbonatite deposits elsewhere, Greenland’s alkaline intrusions are uniquely enriched in the specific Heavy Rare Earths (Dy, Tb) the US lacks.

Strategic Proximity

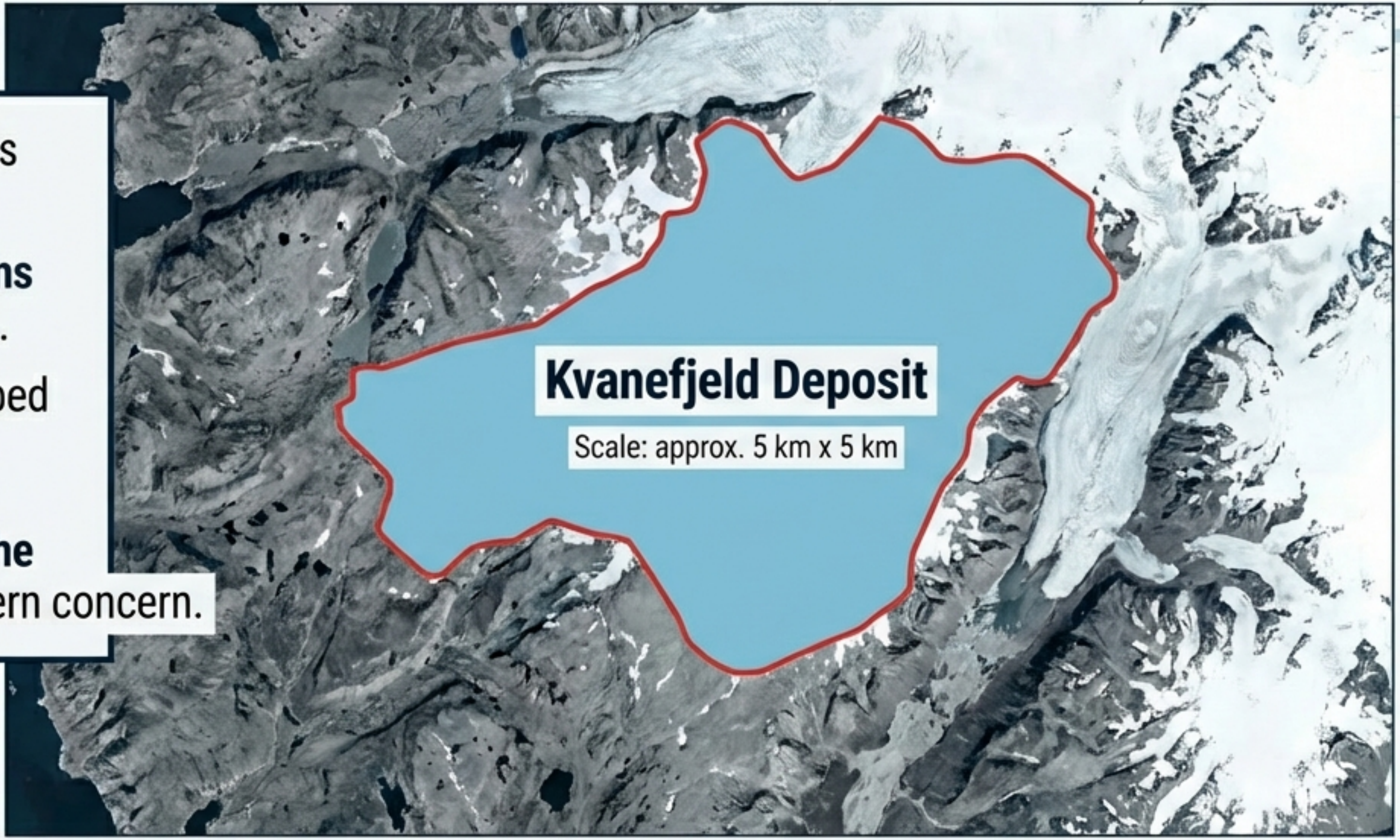
A NATO resource in North America's backyard.

Logistics & Security: Importing from Greenland avoids the geopolitical choke points of the South China Sea. It keeps the supply chain within the Western alliance sphere.

The Prize: Kvanefjeld (Kuannersuit)

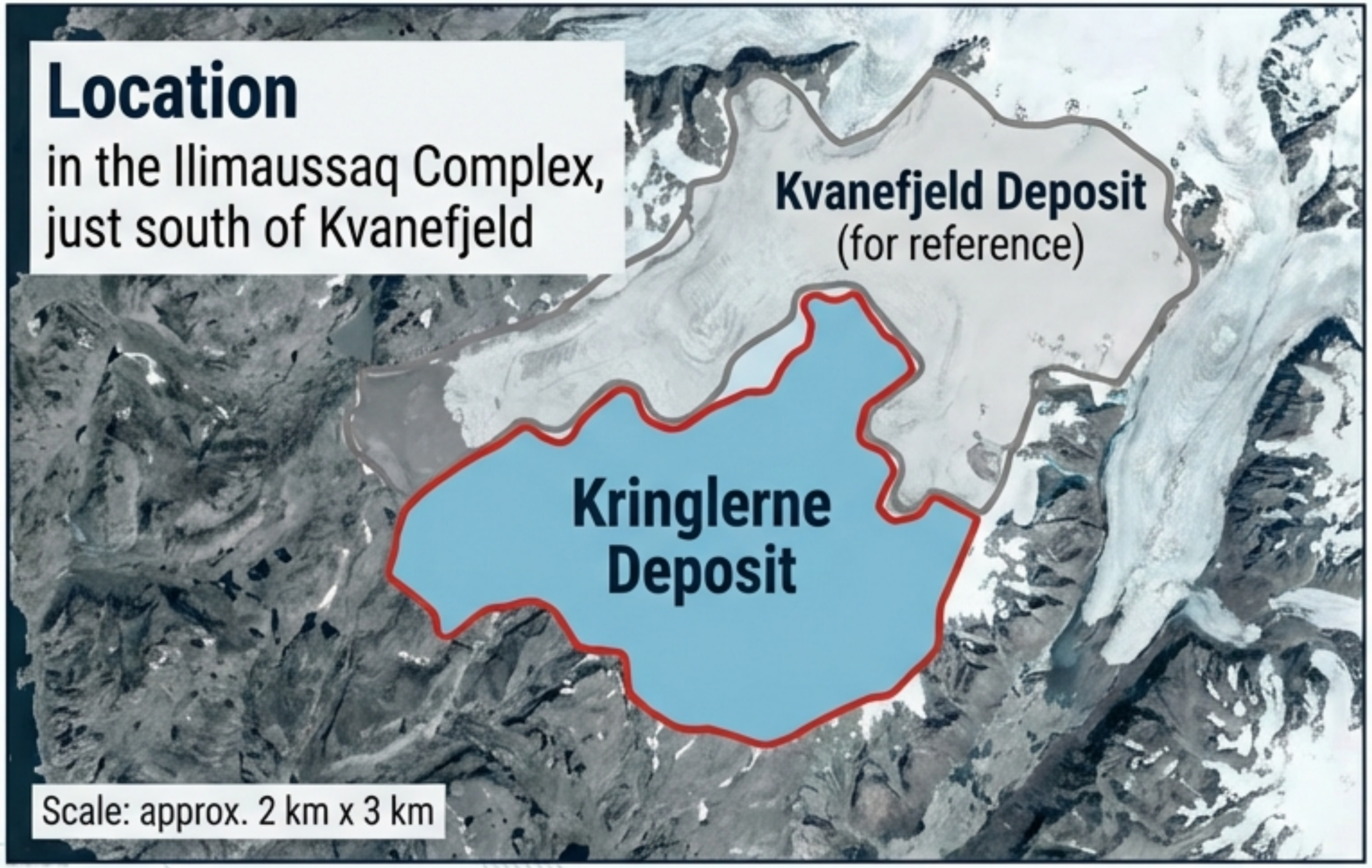
World's second-largest deposit of Rare Earth Oxides.

- **Multi-element deposit:** REEs + Uranium + Zinc
- **Uniquely high concentrations** of Dysprosium and Terbium.
- **Ownership History:** Developed by Greenland Minerals Ltd. Subject to intense Chinese investment interest (**Shenghe Resources**), sparking Western concern.



The Alternative: Tanbreez

Massive potential, lower controversy.



Key Advantages

1. Exploits ‘**Kakortokite**’ – rich in **REEs**, **Zirconium**, **Niobium**.
2. **Significantly lower Uranium/Thorium** content than Kvanefjeld.
3. **Politically** and **environmentally more palatable** for development.

Status: Cited as a potential massive source of **HREEs** without the radioactive ‘baggage’.

The Environmental Cost

Radioactivity and the Arctic Ecosystem.

2,000 tons of toxic waste per 1 ton of REE extracted.

The Kvanefjeld Issue: The ore is inextricably linked with **Uranium** and **Thorium**. Extracting the Rare Earths requires managing **radioactive byproducts** near fragile fishing grounds.

Political Resistance

The 'Zero Tolerance' Uranium Policy.

The Legislative Ban (2021): Greenland passed legislation banning mining of ore with uranium content higher than 100ppm.

Impact: Effectively stalled the Kvanefjeld project.

Tension: Economic independence vs. Environmental preservation and Indigenous rights.

The 'Green Paradox'

Destroying the Arctic to save the climate?

Diplomatic Engineering

Bypassing the hurdles through international cooperation.

US-Greenland
Joint Action Plans on mineral governance.

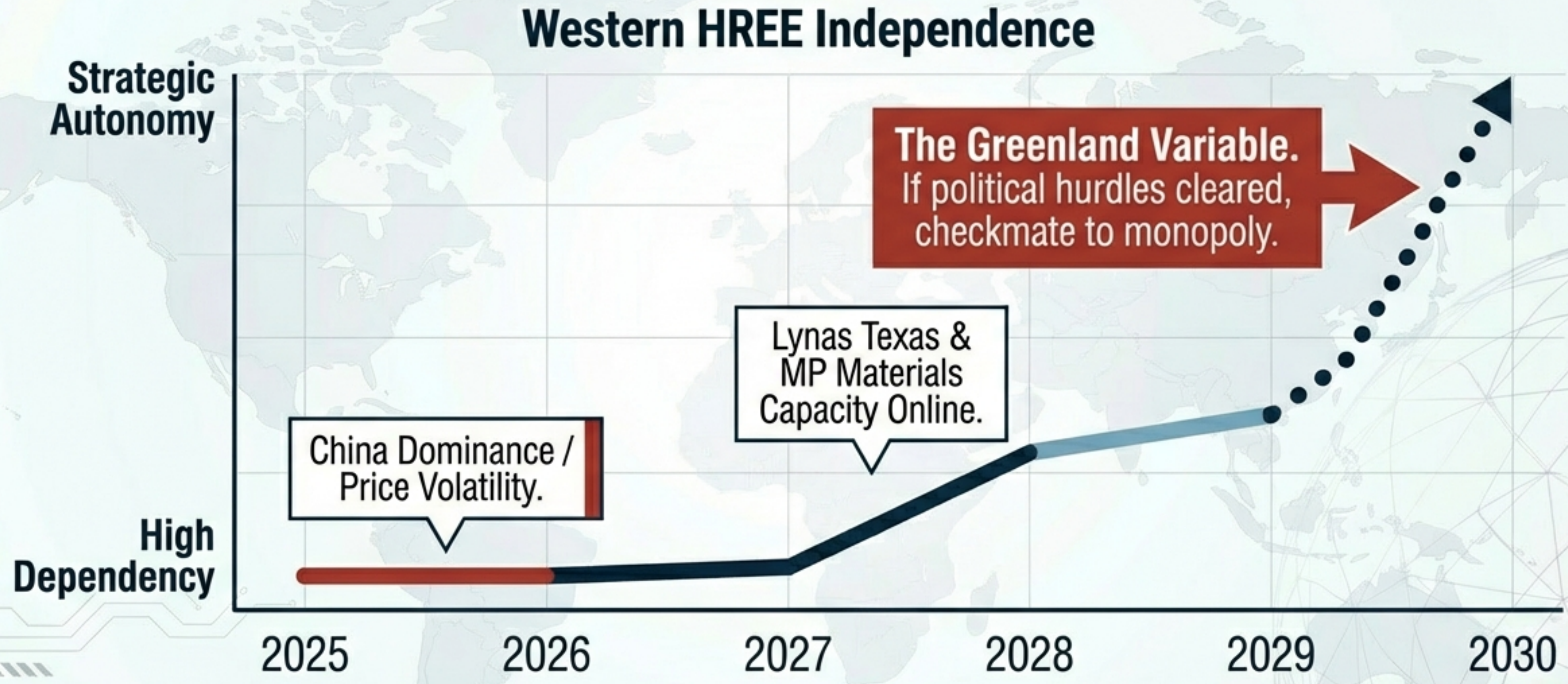
Processing Solution
Proposal: Ship raw ore **OUT** of Greenland.
Process in US/Canada.

Removes radioactive waste burden from Greenland.

Canada's Role
Neo Performance Materials / Ucore.
Developing separation tech to handle Greenlandic feedstocks.

Strategic Outlook: 2026-2030

The race against the quotas.



CONCLUSION

The High North is the New Front Line.

Success depends not on mining engineering, but on diplomatic engineering—balancing indigenous rights, environmental safety, and national security.

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- Mordor Intelligence: Rare Earth Elements Market Forecast