Cyclic Materials

ATF Professional presentation

May 2024

www.cyclicmaterials.earth

Rare Earth Elements (REE) and base metals production

Supporting circular economy of critical materials for the energy transition

Cyclic Materials

Creating a Circular Supply Chain for Rare Earth Elements

"We are helping the world transition to an environmentally responsible future by recovering rare earth elements from the difficult-to-recycle products."*

*Ahmad Ghahreman – Cyclic Materials CEO, President & Co-Founder

Introduction to Cyclic Materials

Experienced team from mining, metallurgy, and recycling

Ahmad Ghahreman – CEO & co-founder

- Co-designed technology for lithium-ion battery (LIB) recycling. **Valued > $1B USD**
- Co-inventor of **Jetti Resources Inc.** technology for copper extraction. **Valued $2.5B USD**.
- Consultant to USA and Canadian Govts for rare earth mining and supply chain analysis

Patrick Nee – SVP Strategic Partnerships & co-founder

- Massachusetts Institute of Technology undergraduate studies in engineering.
- Tokyo Institute of Technology graduate studies and robotics research.
- Numerous startups in mining and metals, industrial biotechnology, telemedicine, tele-education.

Green tech venture investment support

BMW iVentures

ENERGY IMPACT PARTNERS™

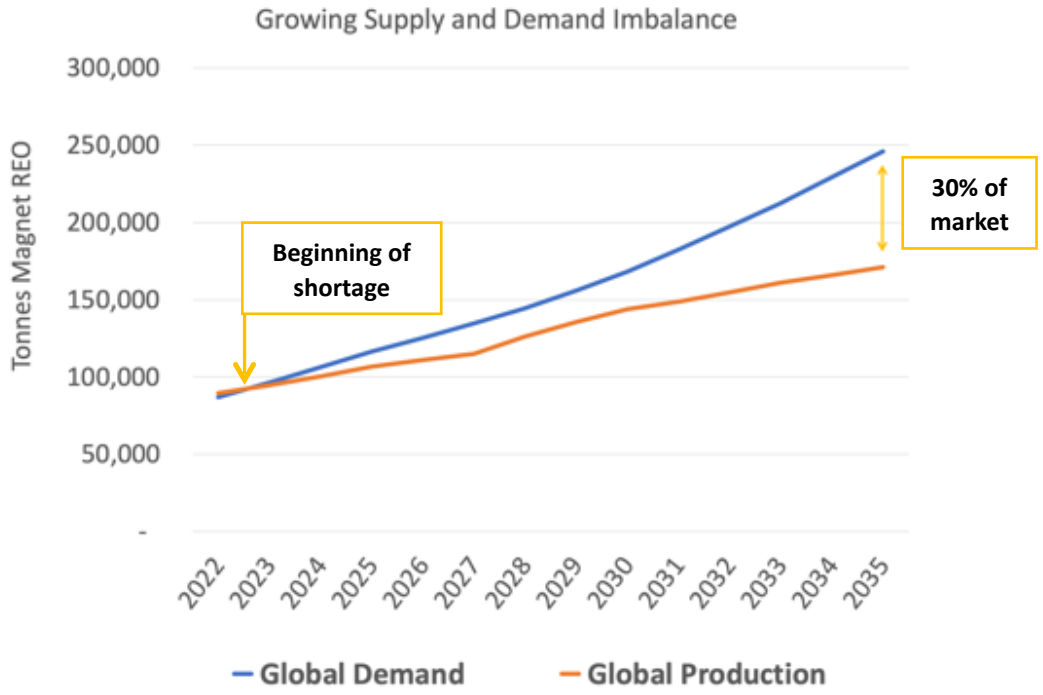
FIFTH WALL

Planetary TECHNOLOGIES

Over 45 team members between employees and contractors

Opportunity: Rare Earth Elements (REE) in Demand

Why recycled rare earth elements are in high demand



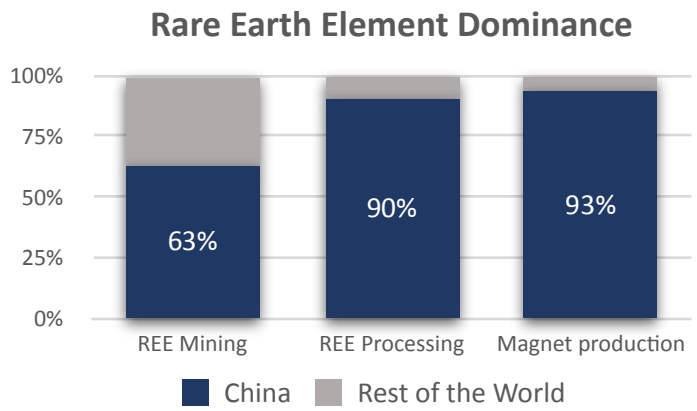
Global demand for Rare Earth Oxides (REO) will grow from **$15.1 billion** in 2022 to **$46.2 billion** USD in 2035, but REEs production will not meet this demand[1].

REE Permanent magnets are critical components of clean tech and energy (electric vehicles, wind turbines, etc).

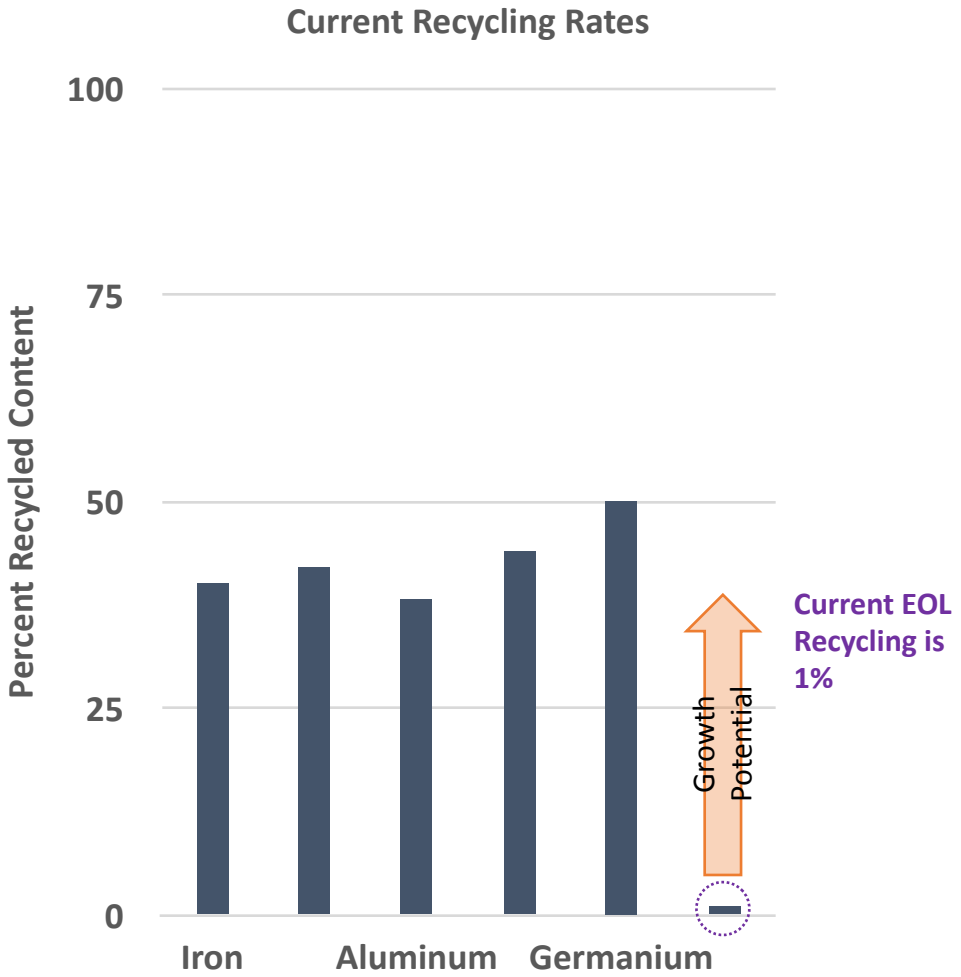
1. Adamas Intelligence. Rare Earth Magnet Market Outlook to 2035, Q2 2022.

Metal Recycling: Supply Pressure Relief

Rare earth element recycling may grow 40-fold



China dominates the rare earth element oxide supply chain, leaving the rest of the world without a reliable domestic source of magnets.



- Industrial metals average > **40%** recycling.
- Rare Earths Elements **only 1%**

Source:
Iron/Steel: https://www.resourcepanel.org/file/381/download?token=he_rldvr
Copper: https://www3.epa.gov/ttnchie1/ap42/ch12/final/c12s09.pdf
Aluminum: https://www.clintonaluminum.com/primary-and-secondary-aluminum
Vanadium: https://pubs.usgs.gov/circ/circ1196-S/
Germanium: https://pubs.usgs.gov/circ/c1196v/

Cyclic Materials Approach

Recovering critical materials and high-quality base metals, via a Spoke-Hub model

EOL Feedstock

ICE + EV motors, power tools, wind turbines, hard drives, etc.

Manufacturing Off spec

Cutting Grinding Manufacturing Waste

Spoke

Magnet Extract

Hub

High Quality Spoke Products

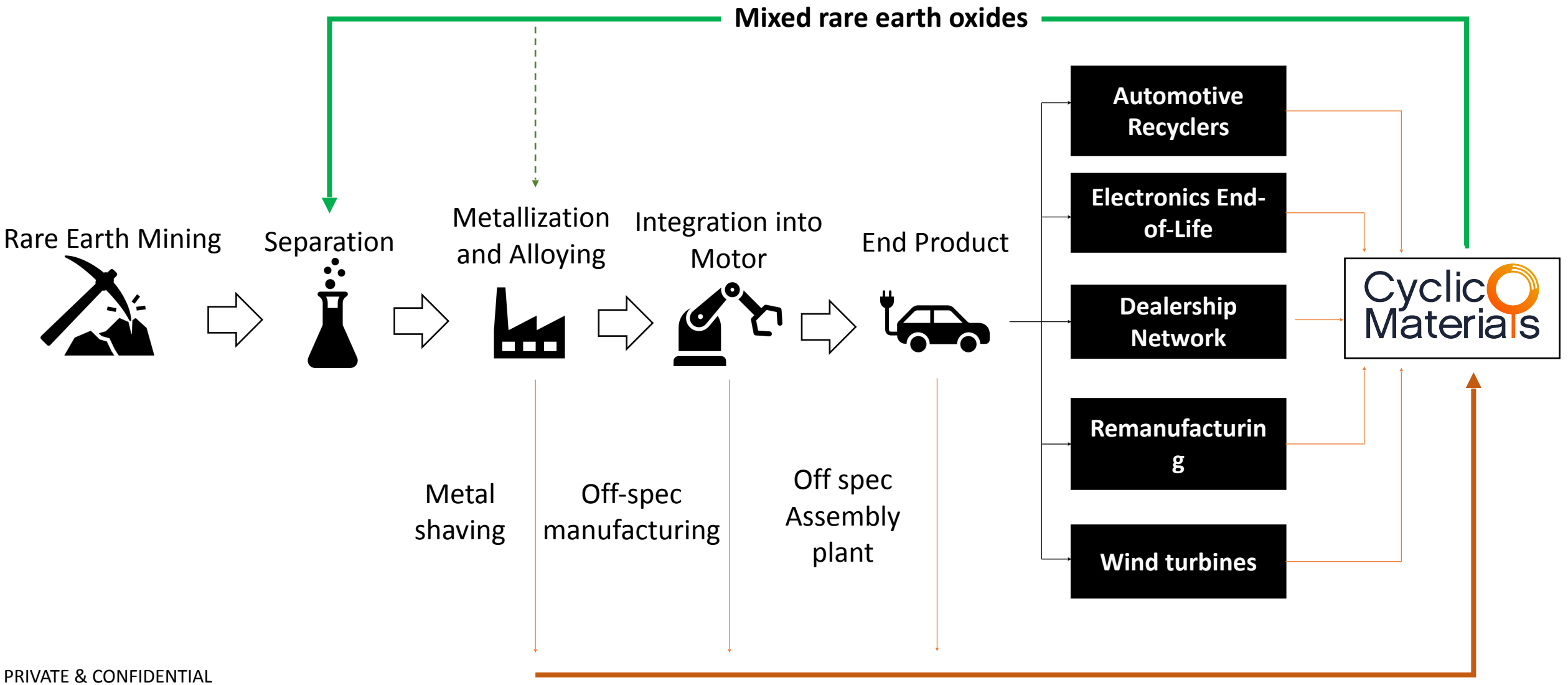
- Copper
- Aluminum
- Steel

High Quality Hub Products

- Rare Earth Oxides
- Cobalt – Nickel
- Boron

Supply Chain Integration

Cyclic Materials approach



Feedstock: ICE, EV, and Hybrid Motors

Harvesting the whole car

Numerous micromotors are of interest in all vehicles, including Evs, Hybrids and ICE vehicles

Electric Water Pump

Electric Power Steering (EPS)

Electronic Brake

Starter/Generator

Water Pump

Automated Manual Transmission

PEV, HEV Drive Motor and generator

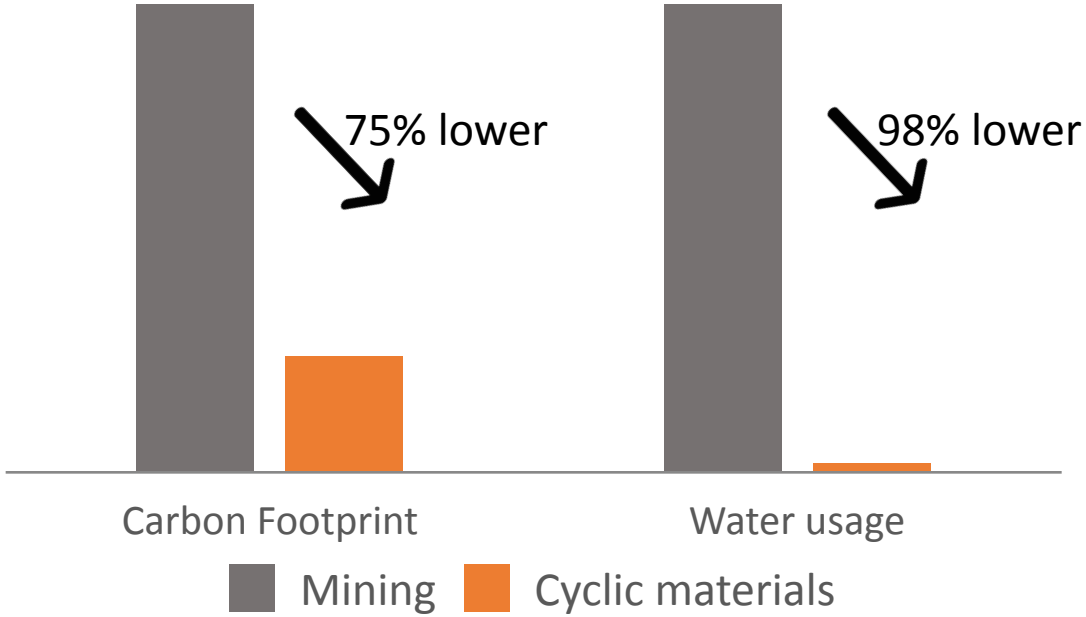
Speakers

Environmental impact

Achieving high quality product with minimal impact

Direct impact

- **75% less** carbon footprint*
- **98% less** water usage*
- **No radioactive** elements in our MREO



Social impact

- Goal of **zero waste** commercial plants.
- No soil disturbed (no mining)
- At full scale, Cyclic Materials produce enough materials to **remove the need of up to 4 new rare earth mines**
- Our process Eliminate the use of harsh chemicals normally use in the rare earth mining industry

*Preliminary internal environmental impact calculations. Cyclic Materials is currently undergoing a 3rd party life cycle assessment (LCA) Data available Q1 2024

2024 North American Plan

Spokes and Hub create North American Mesh

Cyclic Materials processes:
50,000 tonnes EOL devices
2,000 tonnes of magnets

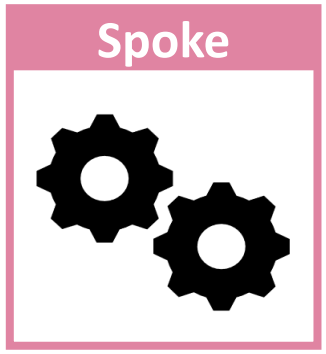
Cyclic Materials produces:

600 tonnes of MREO*
Primarily Magnet Metals: Nd-Pr-Dy-Tb

N.A. Mesh

Physical Processing Plant (**Spoke**)

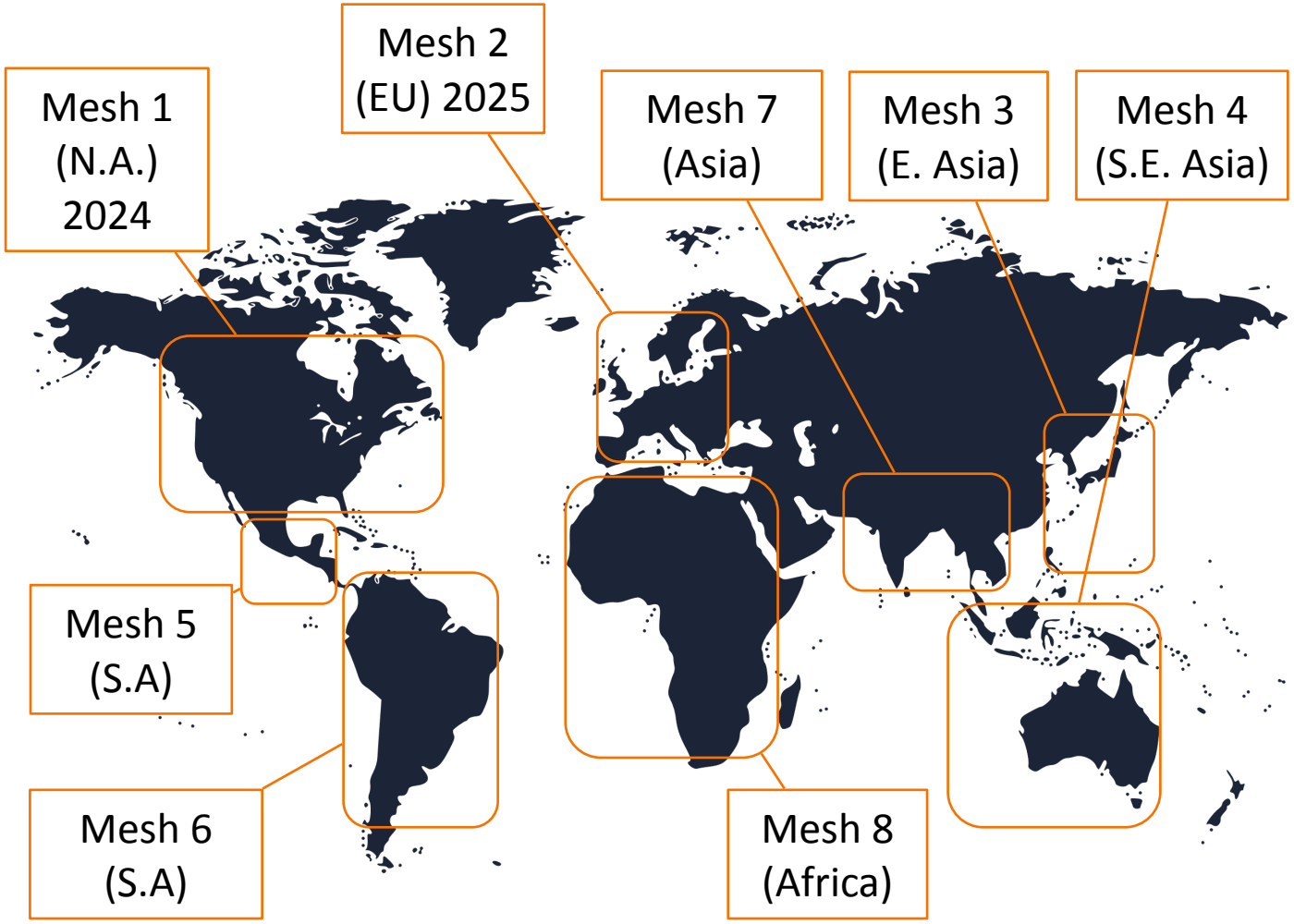
Chemical Processing Plant (**Hub**)



* Output figures for full scale North American mesh

Cyclic Materials' Growth Vision

2030 Global Growth Plan



Cyclic Materials produces:

3,150 tonnes of MREO

Primarily Magnet Metals: Nd-Pr-Dy-Tb

Equivalent number of EVs[2] = 6,300,00

[2] Assuming 2 kg magnet per car, and 25% REEs in magnet.

Thank you!