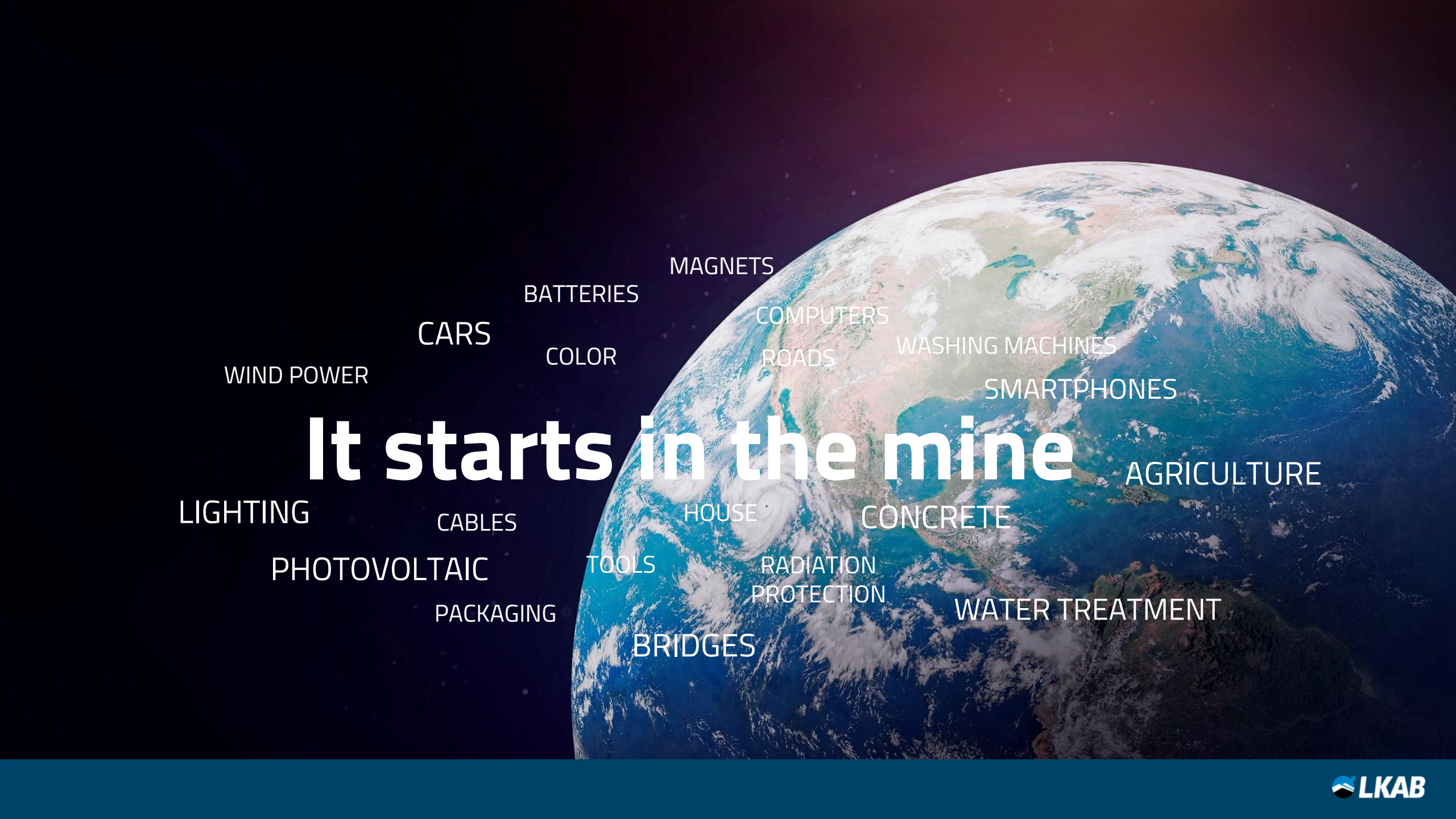


From mining waste to critical raw materials – LKAB ReeMAP Project

Prof. Pär Jonsén CTO

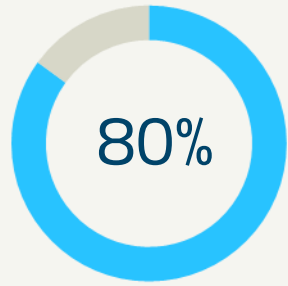
LKAB Special Products



It starts in the mine

WIND POWER
CARS
BATTERIES
MAGNETS
COMPUTERS
ROADS
WASHING MACHINES
SMARTPHONES
AGRICULTURE
CONCRETE
HOUSE
CABLES
LIGHTING
PHOTOVOLTAIC
PACKAGING
TOOLS
RADIATION PROTECTION
WATER TREATMENT
BRIDGES
COLOR

Europe's leading mining and minerals group



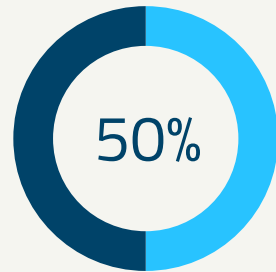
LKAB mines around 80 % of all iron ore within the EU

1890

LKAB is one of Sweden's oldest industrial companies and is owned by the Swedish state

33

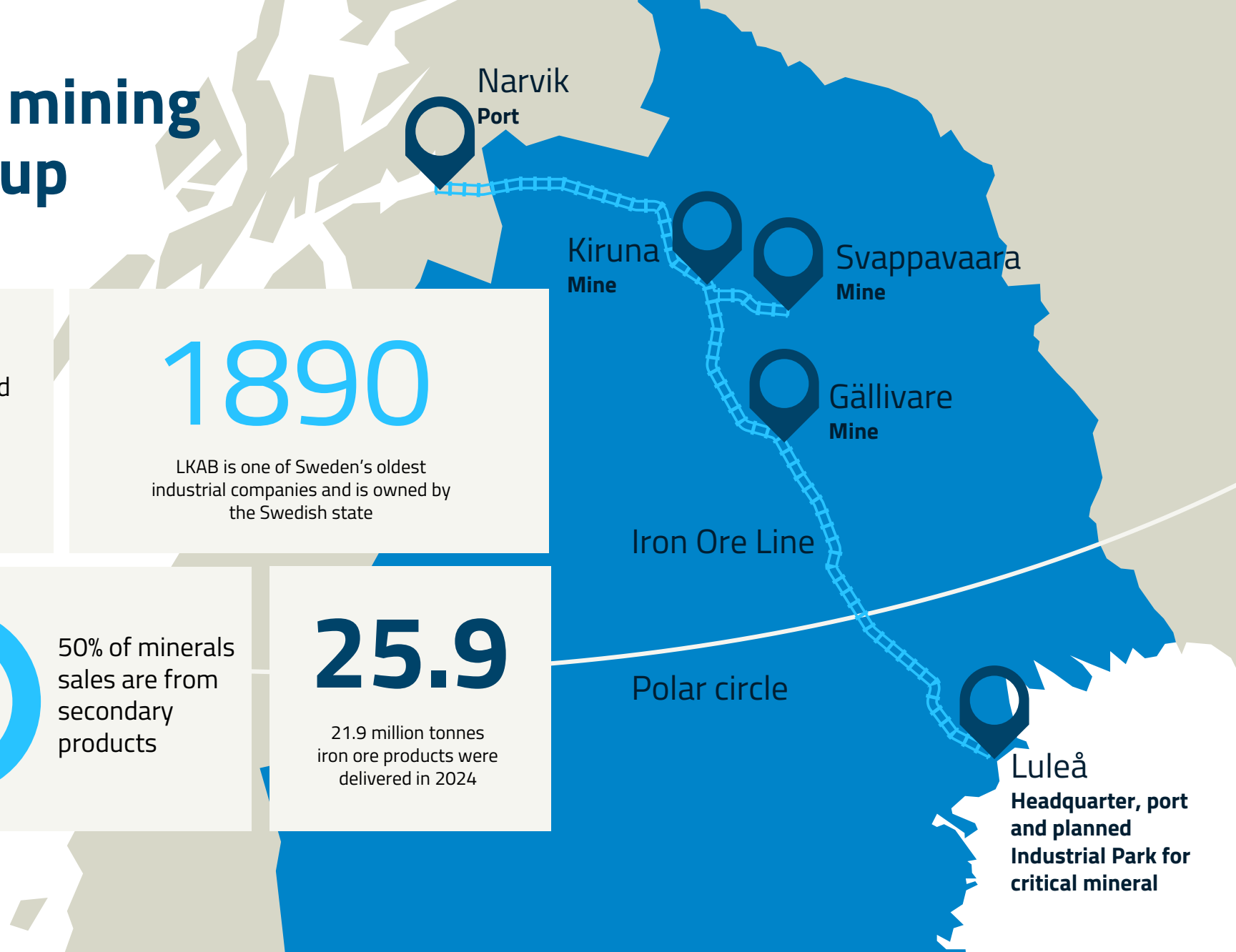
Net sales of SEK 33 billion in 2025



50% of minerals sales are from secondary products

25.9

21.9 million tonnes iron ore products were delivered in 2024



Three important areas are leading the transformation



**New world standard
for mining**

**Carbon-free sponge iron
with hydrogen technology**

**Extract critical minerals
from mine waste**

We create new value from today's mine waste



**Phosphorous for
food production**



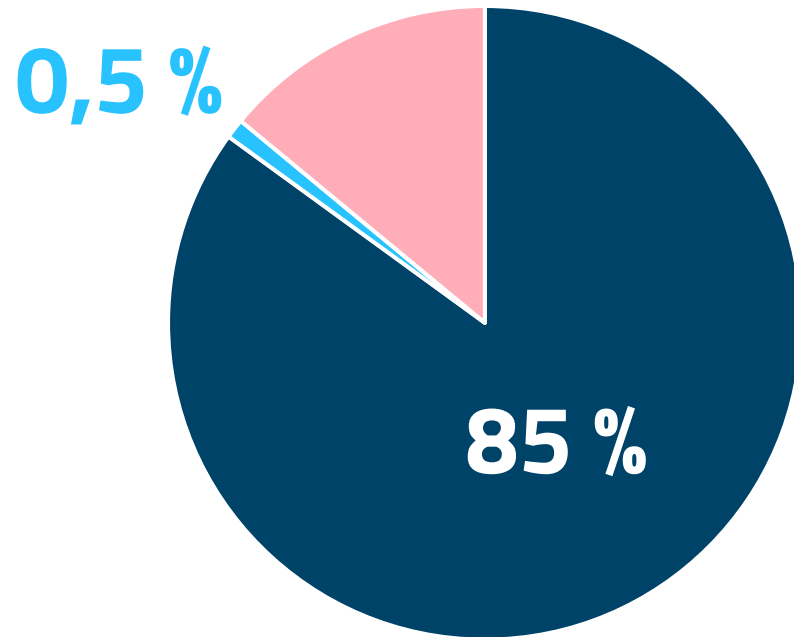
**REE for
electric motors**



**Gypsum for
construction**

Phosphorus demand and strategic importance increases

Global P-rock production < 200 Mt

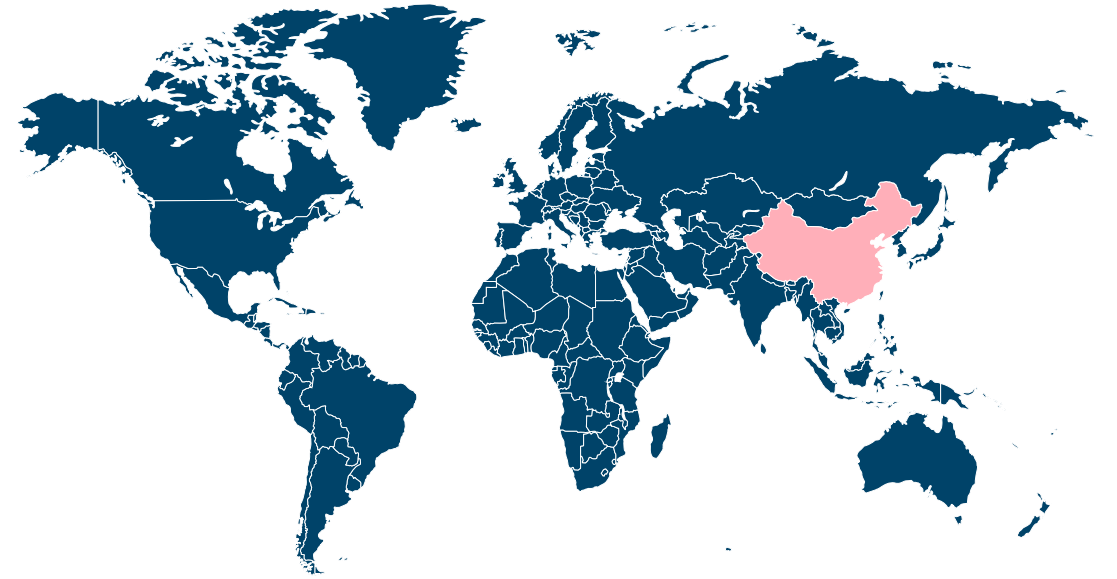


■ Big 5 ■ Europe ■ ROW

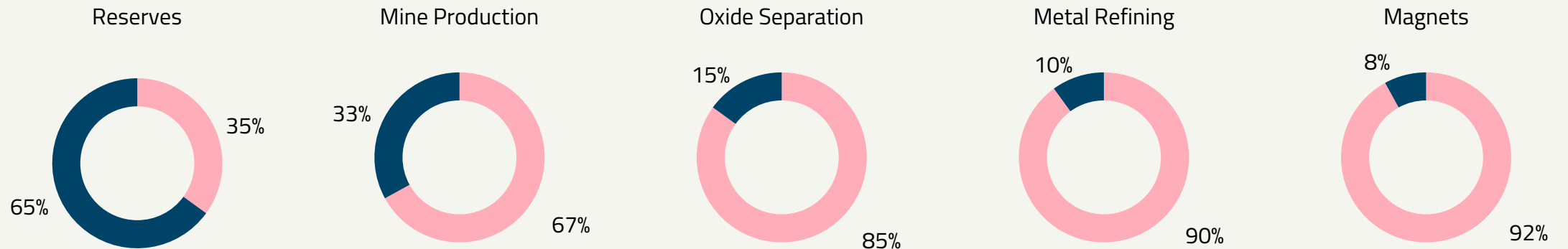
Big 5: China, Morocco, Middle East, USA, Russia

- High and volatile phosphate rock pricing 2022-2023; geo-politic and company strategies

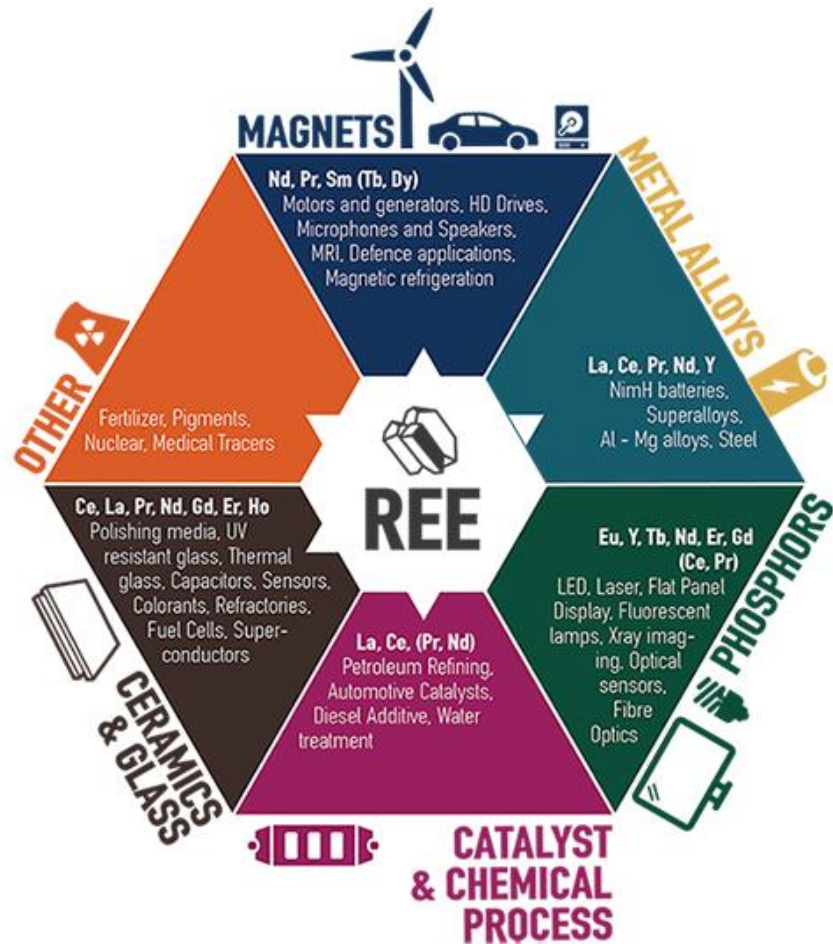
China dominates the value chain for rare earth element (REE)



China Rest of world

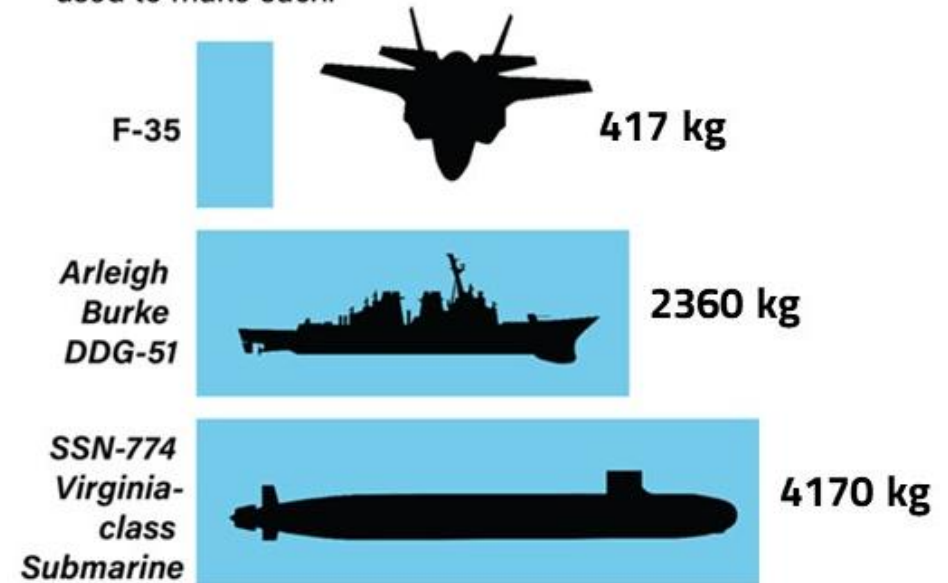


Rare Earth Elements – 17 metallic elements critical for electrification, digitalisation and defence



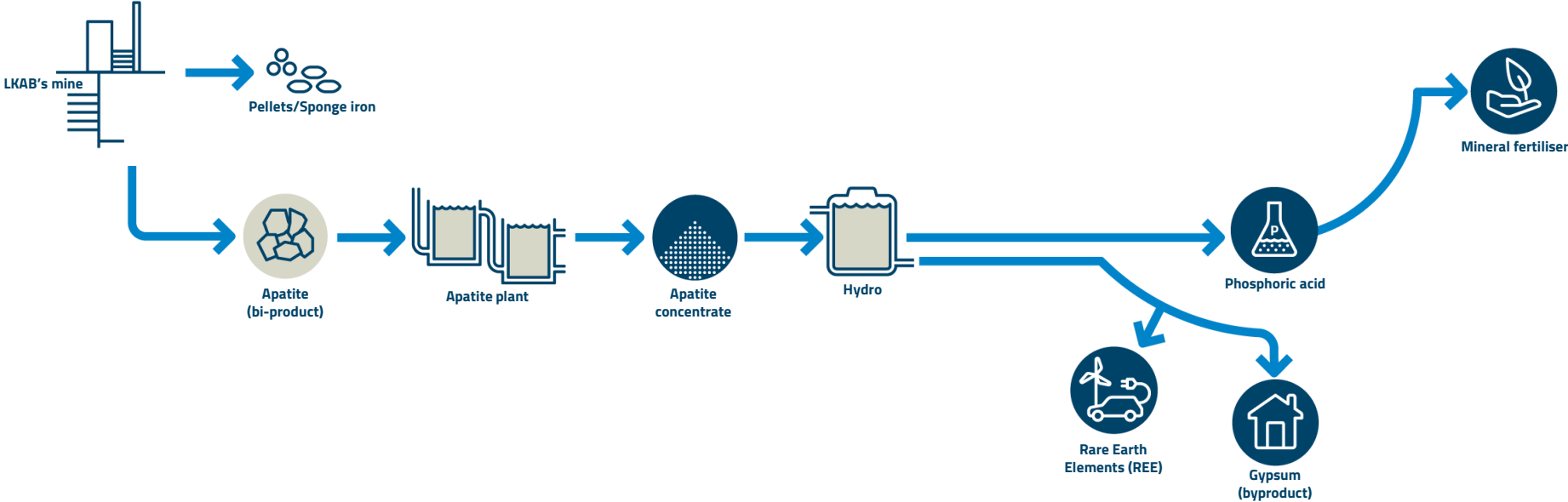
Rare Ingredients

Here is the breakdown of rare-earth materials used to make each.

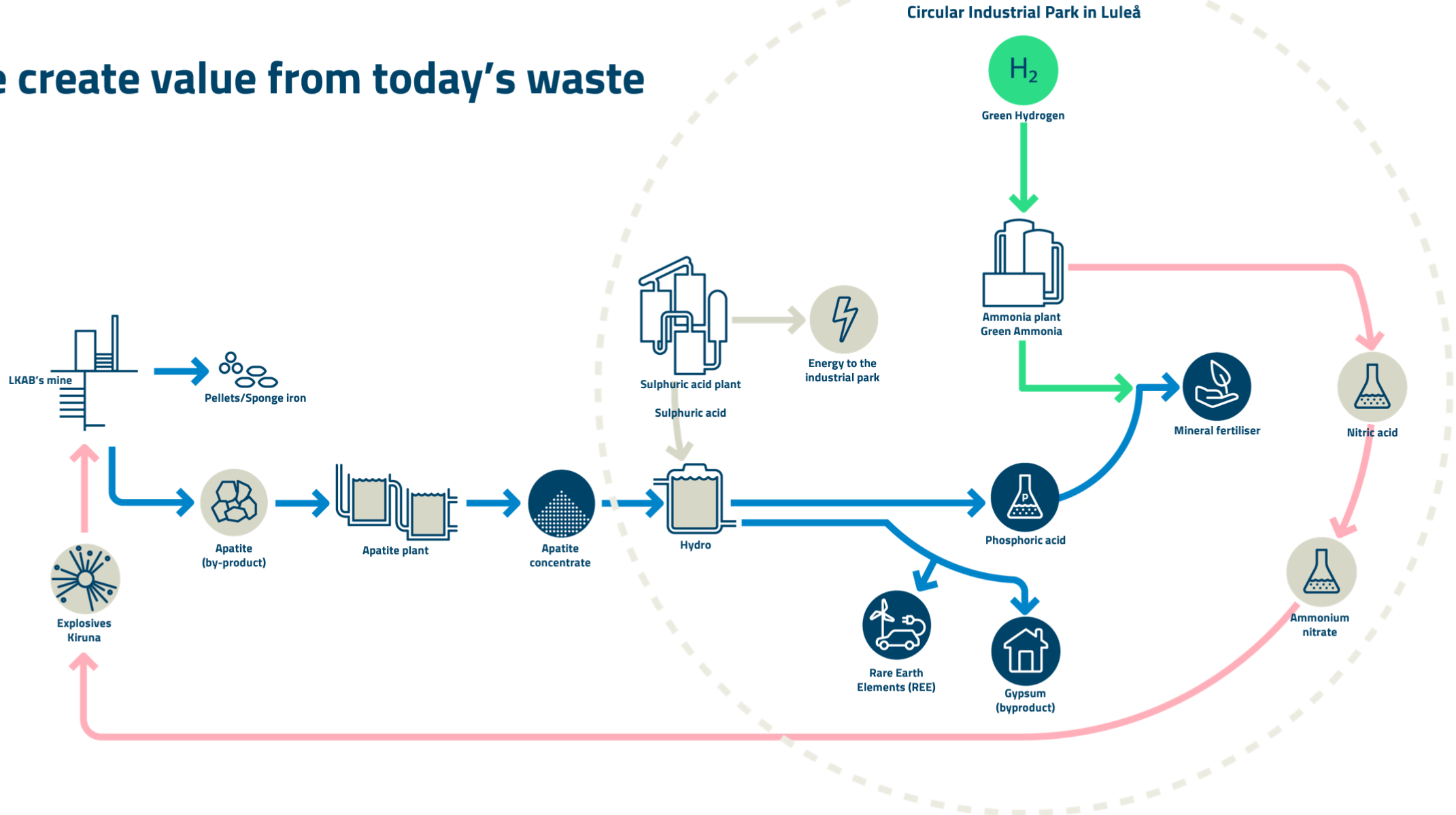


Source: Congressional Research Service

How we create value from today's waste

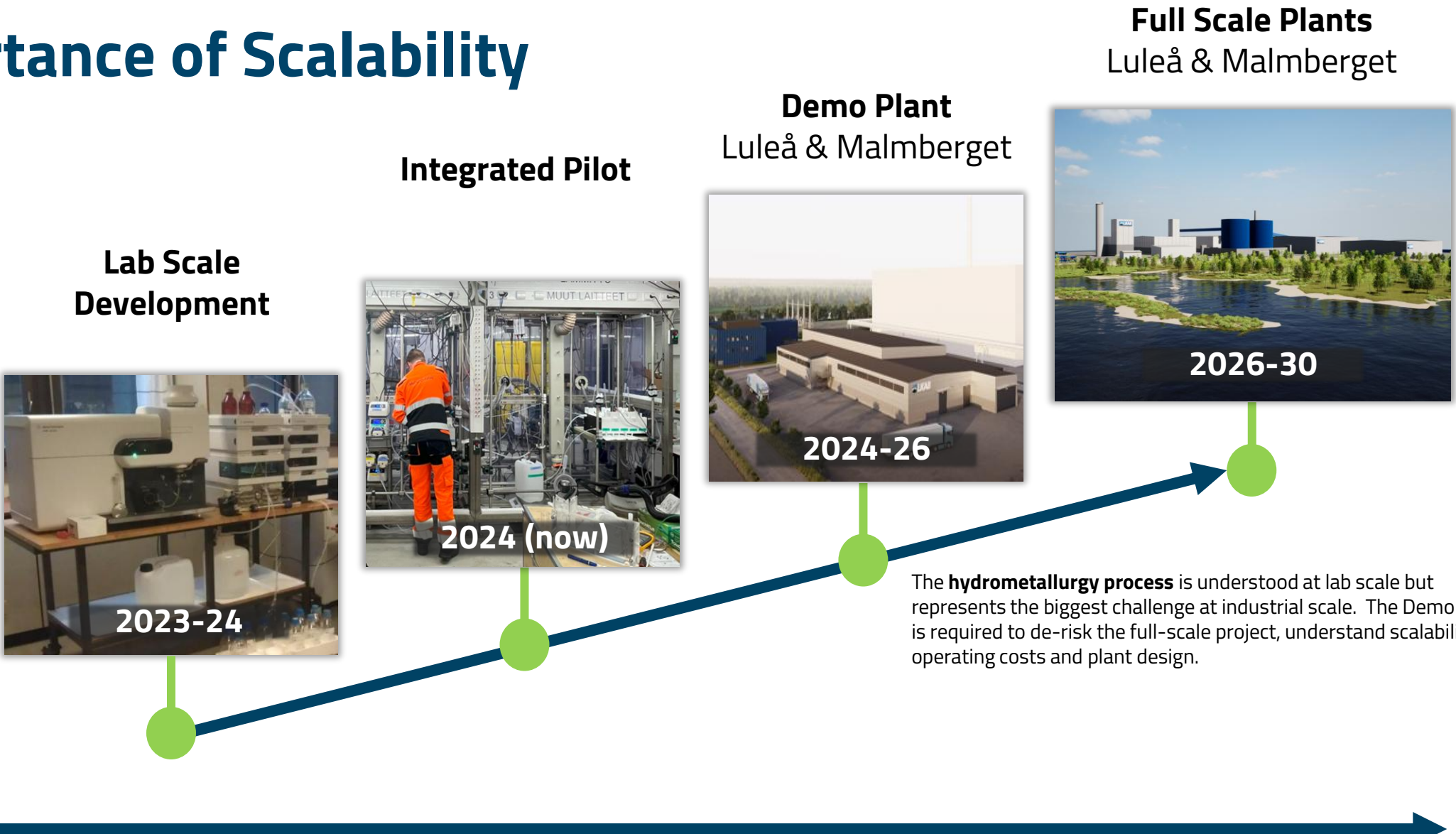


How we create value from today's waste



Importance of Scalability

Process Characteristics

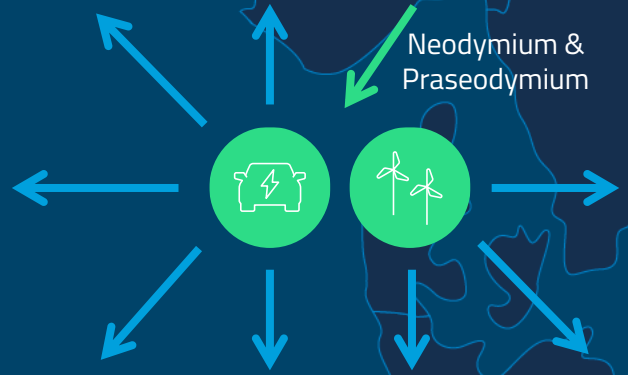


Scale of Operation

LKAB – A Key Player in Europe's Strategic Raw Materials Supply

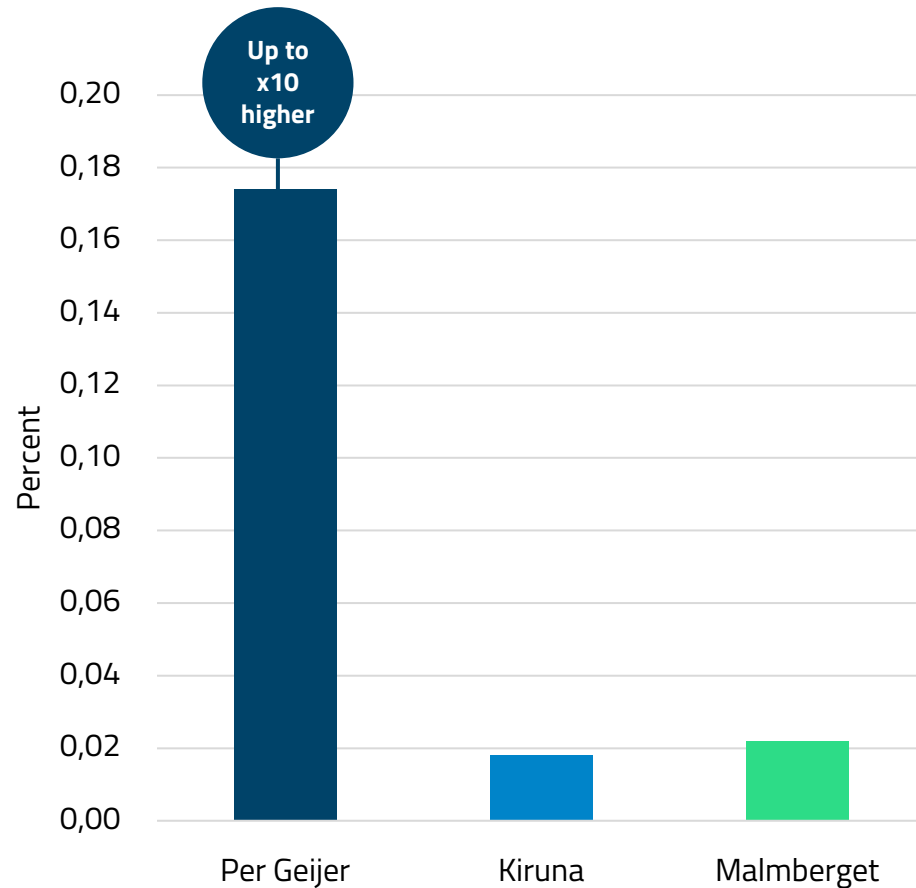


Neodymium & Praseodymium

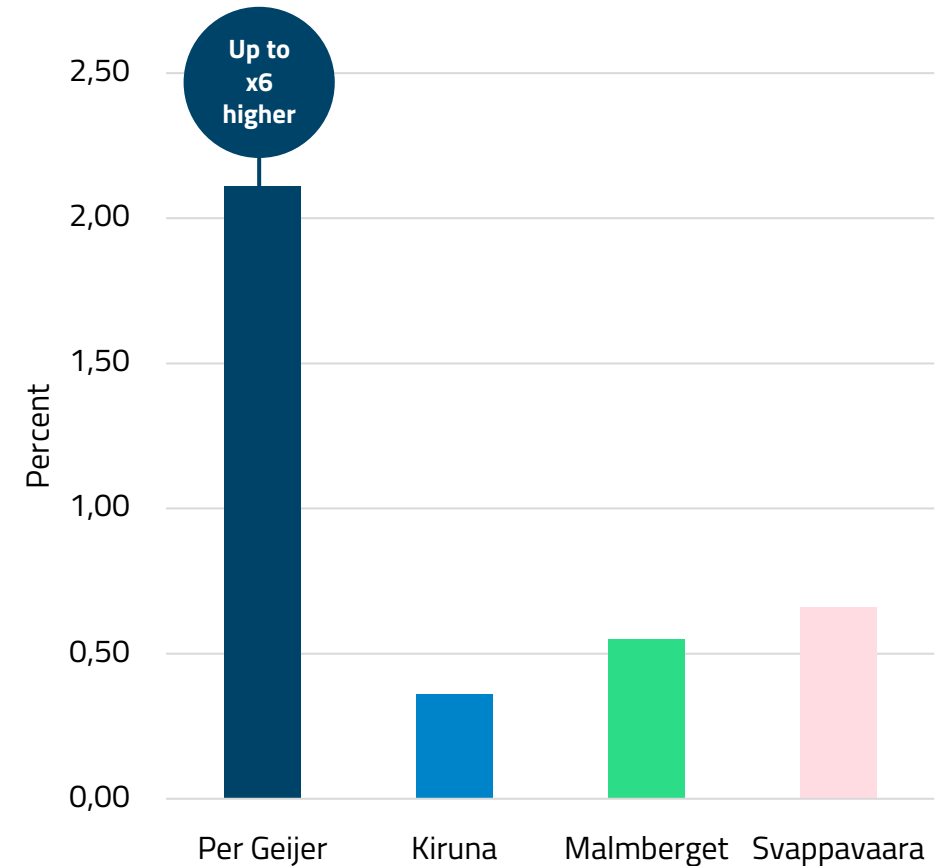


One of Europe's largest deposits of rare earth elements – potential for expansion

Rare Earth Elements (TREO)



Phosphorus



LKAB takes the next step in its investment in critical minerals

LKAB invests SEK
0.8 billion to
establish an
R&D center and
**demonstration
plant** for processing
phosphorus and
rare earth elements

The investment
marks an important
step in LKAB's
ongoing transition
and investment in
the **extraction of
critical minerals**.
Start scale up: 2029



The REE value chain



Rare earth & Permanent Magnet value chain

The REE value chain



Rare earth & Permanent Magnet value chain



LKAB