SICAPERMA

Sustainable Innovation Investment Catapult for Permanent Magnets

What is SICAPERMA?

Project presentation

Project ID: 101160837 | CALL: I3-2023-INV2A

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Project presentation

Title

Sustainable Innovation investment Catapult for Permanent Magnets

Duration **Oct 2024 – Sep 2027**

Overall Budget **6 244 986 €**

EU Contribution **4 371 482 €**

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I3 Interregional Innovation Investments Instrument

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The problem

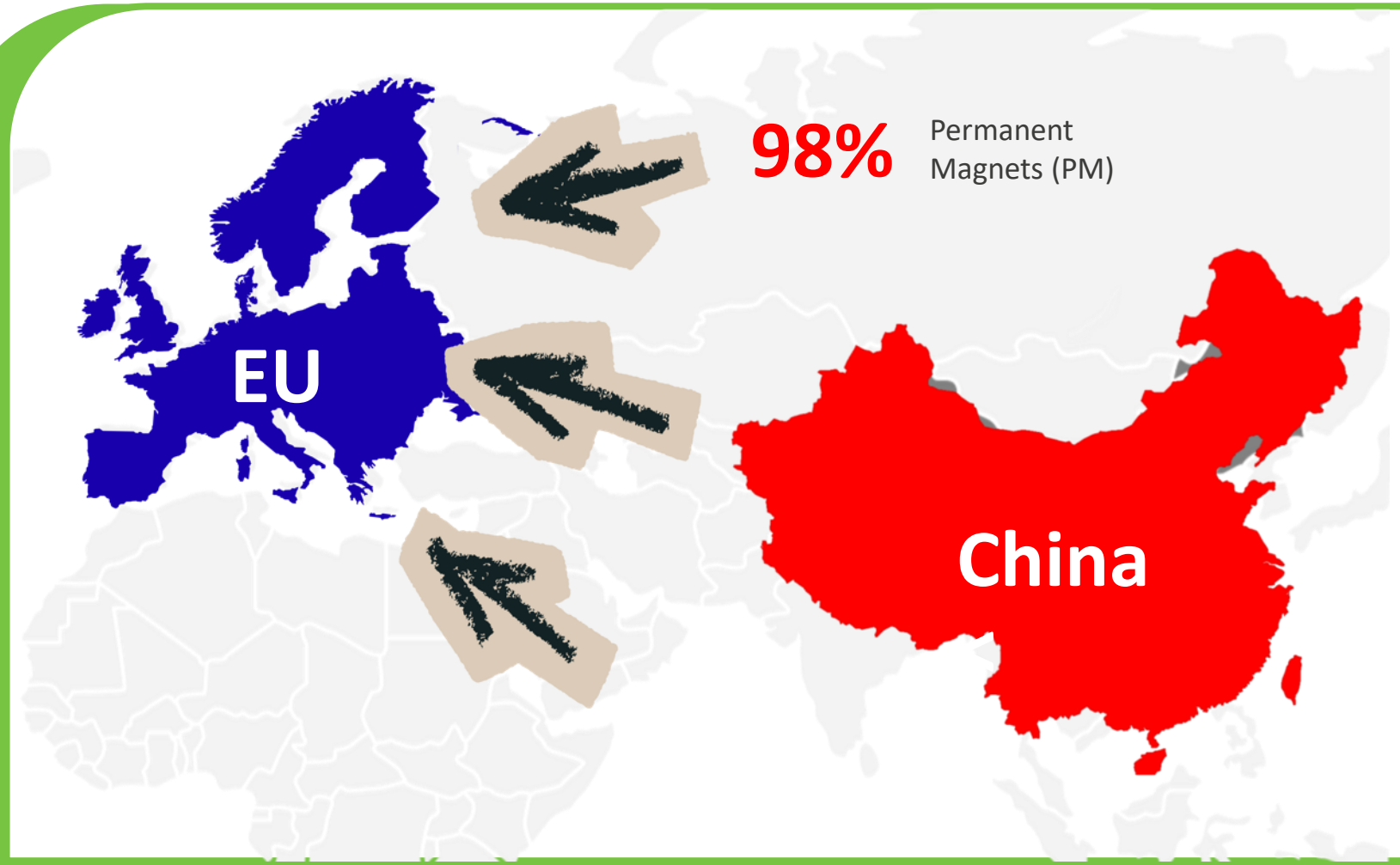
China controls 98% of PM supply

Only 1% of PM are recycled

Demand of PM will triple by 2024

PM are key for the Green Transition

Strategic dependency from a single and strong source



The problem

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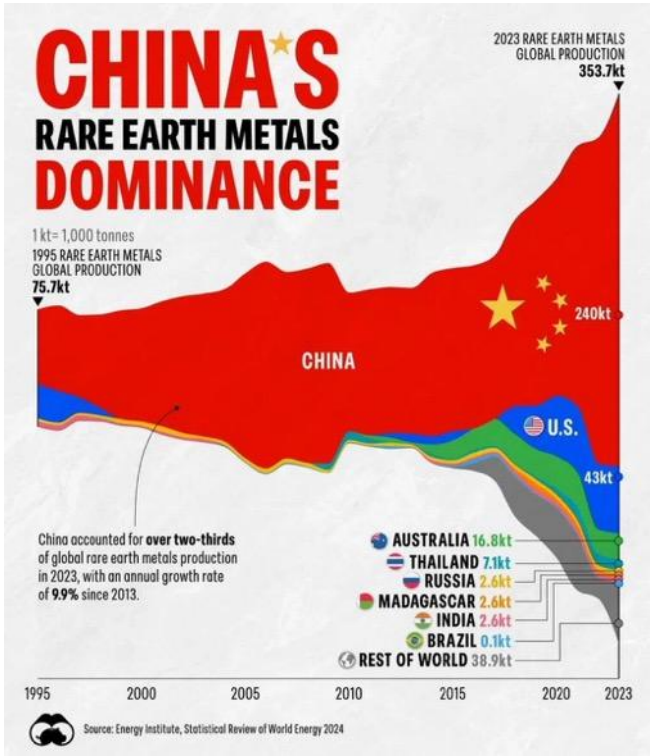
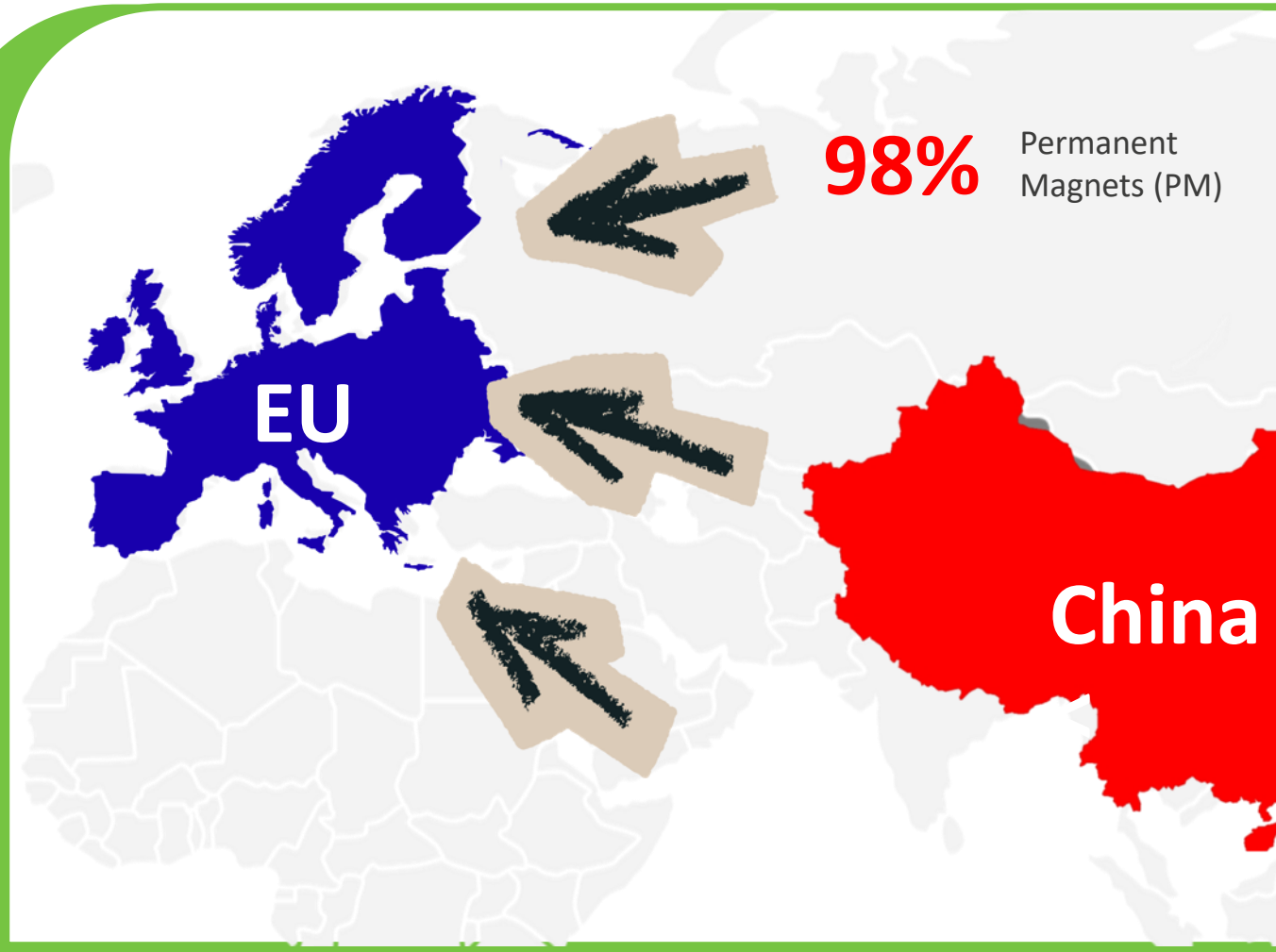
Strategic dependency from a single and strong source

China controls 98% of PM supply

And is making use of this dominance





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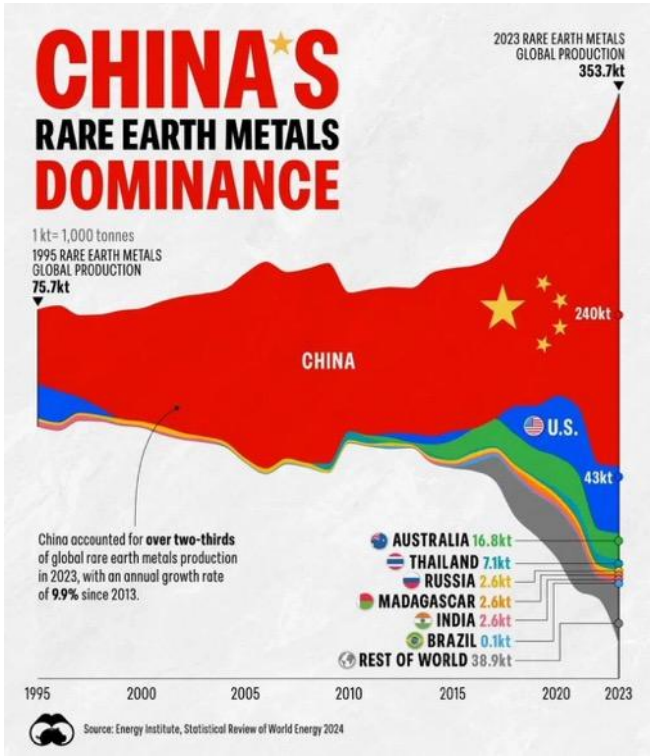

98% Permanent Magnets (PM)

EU

China

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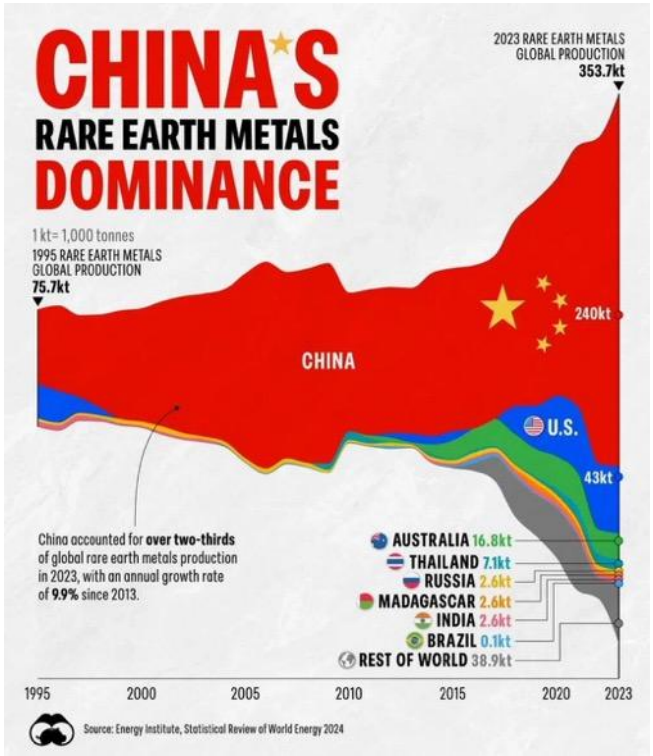

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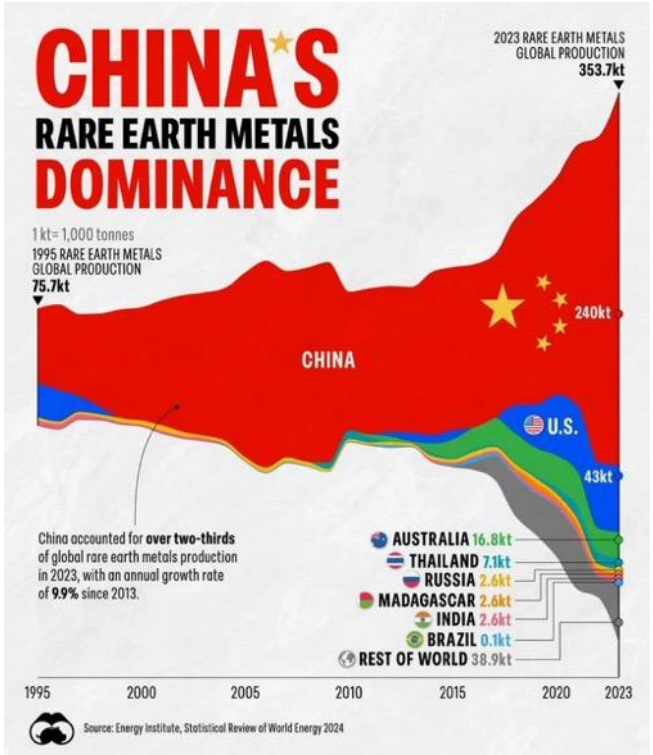

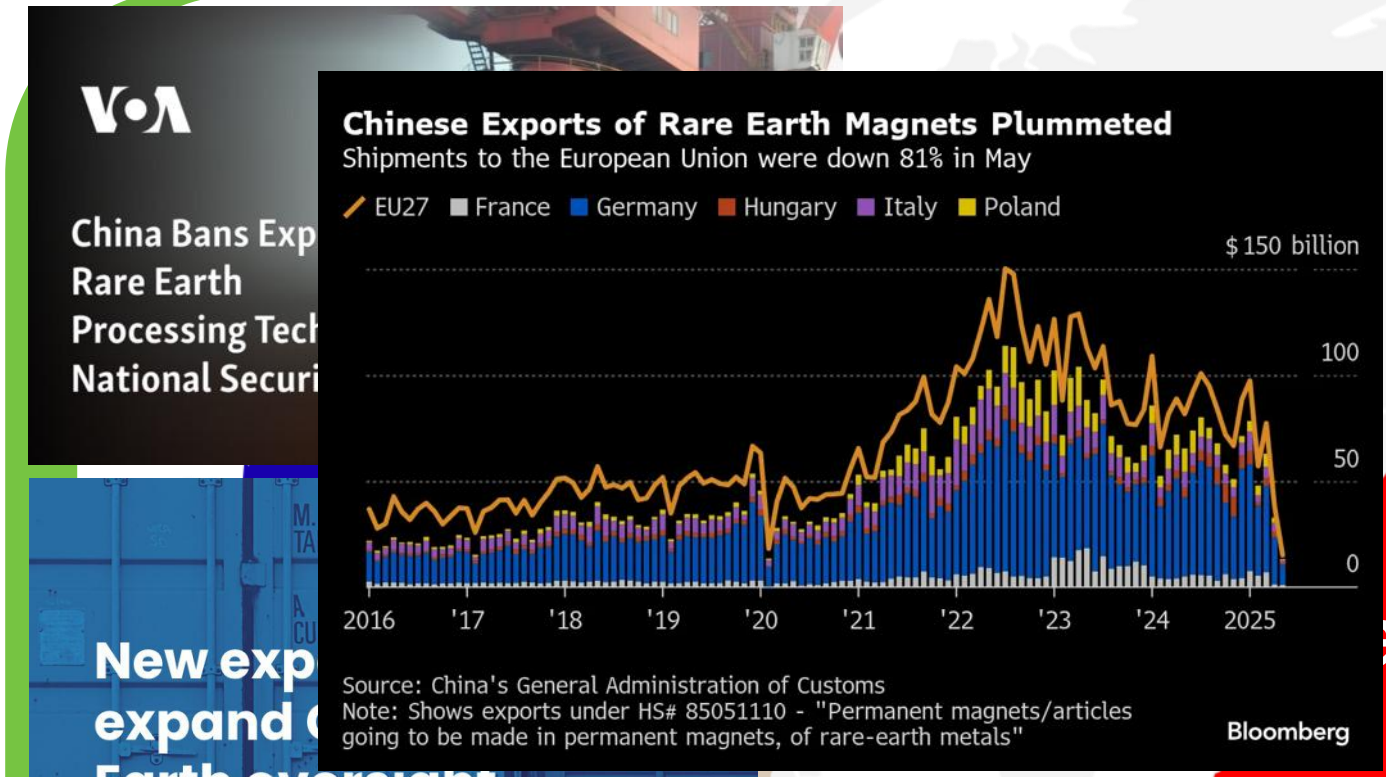

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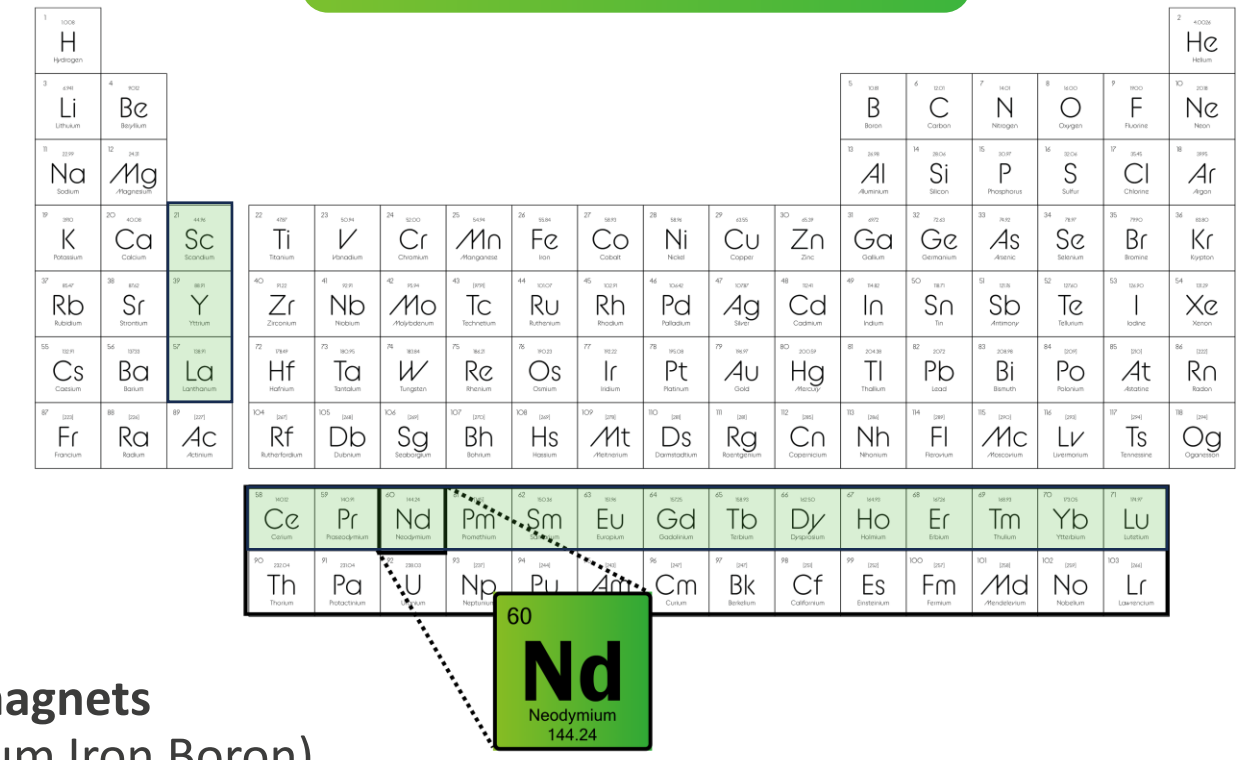
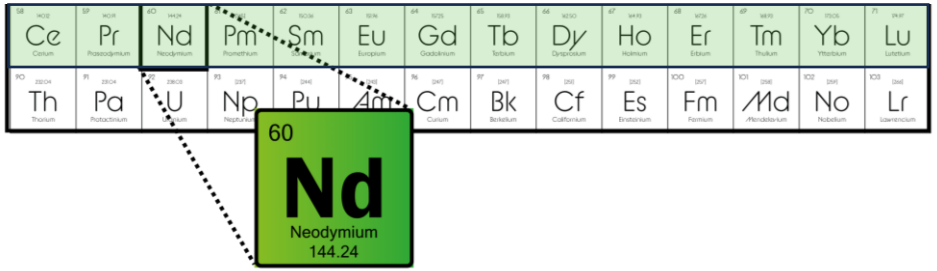


Rare earth elements (REEs) are a group of 17 chemically similar metallic elements (15 lanthanides plus scandium and yttrium) **crucial for high-tech devices**, electric vehicles, and defense systems.

Nd-Fe-B magnets
(Neodymium Iron Boron)

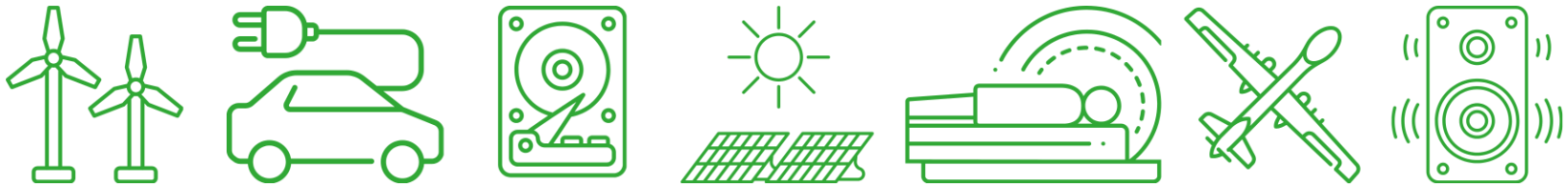
are the strongest type of commercially available permanent magnets, known for exceptional magnetic strength, high coercivity (resistance to demagnetization), and relatively low cost compared to other high-performance magnets.

The problem



Nd-Fe-B magnets
(Neodymium Iron Boron)

And therefore, they are essential to a wide range of modern technologies, including electric motors, sensors, consumer electronics, renewable energy systems, electric vehicles (EVs), medical devices, and defense applications.



The solution (or part of it)

Consumption and demand

The European Union (EU) is one of the largest consumers of rare-earth magnets, such as neodymium-iron-boron magnets, due to its focus on clean technologies.

Demand will not decrease.

Research and development

Europe is **investing on R&D into technologies for recycling** and replacing rare earth elements, including neodymium and boron.

Reducing dependency

The EU has launched projects and strategies, such as the *European Raw Materials Alliance (ERMA)*, to secure supply, **diversifying** imports, and strengthening the **circular economy**.

Policy initiatives and regulation

The EU has strict regulations on mining and environmental impact, which makes it difficult to extract rare earths locally but **encourages recycling** and efficient use of these materials.

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But this is not an easy task... How do we do it?

What

is

SICAPERMA?

The project

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SICAPERMA aims to

establish Europe’s first fully integrated circular value chain for recycled permanent magnets (Nd-Fe-B).

The project specifically focuses on empowering Less Developed Regions (LDRs) in Europe to become leaders in this high-tech field, reducing the EU's dependence on China for these critical materials.

First fully integrated circular value chain for recycled permanent magnets.

Scaling up technological maturity from TRL 7 to 9. Industrial-scale market deployment.

Interregional Resilience: Unlocking the "hidden" technological capabilities of less developed regions to strengthen European autonomy.

The consortium

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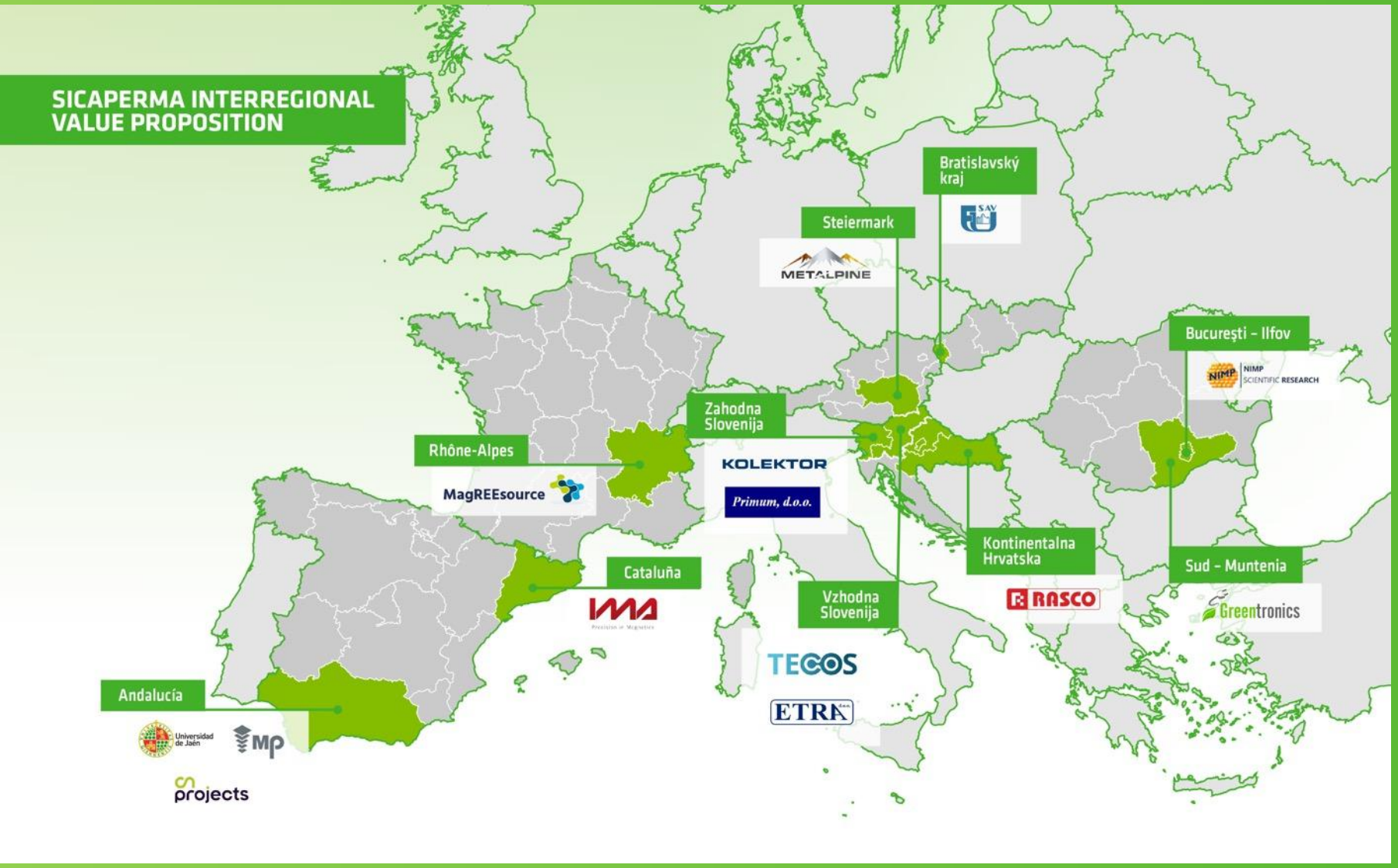

14 PARTNERS

7 COUNTRIES

Spain

France

Romania

Slovenia

Slovakia

Austria

Croatia

PROJECT PHASES

Three pilots to close the loop

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3 Industrial Pilots

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3 Industrial Pilots

Pilot 1

Demonstrating Multi-Stream Permanent Magnet (PM) **Dismantling & Processing** Tech

3 Industrial Pilots

Pilot 1

Demonstrating Multi-Stream Permanent Magnet (PM) **Dismantling & Processing** Tech

Pilot 2

Demonstrating Innovative **Sintered and Bonded PM Production** from Recycled materials

3 Industrial Pilots

Pilot 1

Demonstrating Multi-Stream Permanent Magnet (PM) **Dismantling & Processing** Tech

Pilot 2

Demonstrating Innovative **Sintered and Bonded PM Production** from Recycled materials

Pilot 3

Demonstrating the **integration** of Recycled PM **into motors and sensors**

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SICAPERMA VALUE CHAIN

SICAPERMA offers the first specialisation area where Less Developed Regions can become the leaders in EU Resilience: Nd-Fe-B Recycling Technologies

PM COLLECTION

MagREEsource

Greentronics

Universidad de Jaén

TECOS

PILOT 2

Demonstrating Innovative Sintered and Bonded PM Production from Recycled materials

MagREEsource

KOLEKTOR

IMA

NIMP SCIENTIFIC RESEARCH

INTERREGIONAL VALUE CHAIN STRUCTURING

STEP ONE 01

STEP TWO 02

STEP THREE 03

STEP FOUR 04

IMPACT DEPLOYMENT MULTIPLICATOR

PILOT 1

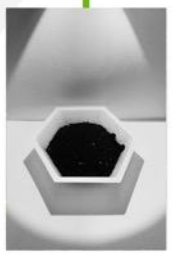
Demonstrating Multi-Stream PM dismantling & Processing Tech

MagREEsource

METALPINE

SLOVENSKÁ AKADÉMIA VIED

SAV



PILOT 3

Demonstrating the integration of Recycled PM into motors and sensors

MP

Primum, d.o.o.

RASCO

ETRA

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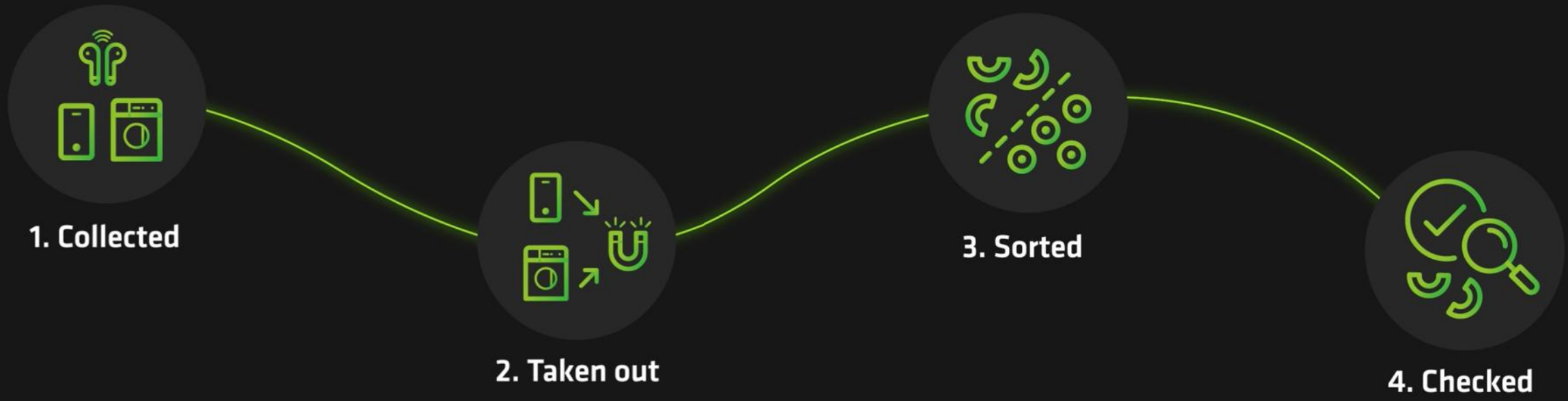
Step 01
Collection, Dismantling & Sorting



Step 01
Dismantling & Sorting

Two main collection sources

✗ **Small Household Appliaces, Electrical and Electronic Tools & Air Conditioning**

✓ **Hard Disc Drives (HDDs)**

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Step 01
Dismantling & Sorting

Some challenges

50 tons
of HDDs

50 kg
of PM

Step 01
Dismantling & Sorting

Some challenges

As there is sensitive data in HDDs, they use to be shredded leaving valuable components out of the loop.

It is important to stablish secure lines to recover PM with HDD owners.

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Step 01
Dismantling & Sorting

Future perspectives

70.000 tons of PM

from decomissioned
European wind turbines

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Step 02
Processing

IMA

MagREEsource

NIMP

KOLEKTOR

METALPINE

SAV

SICAPERMA

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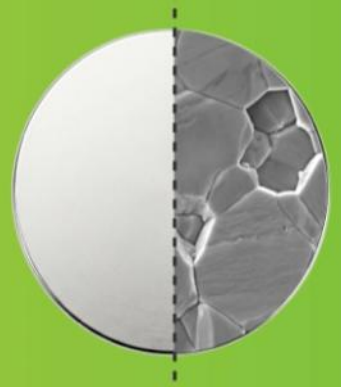
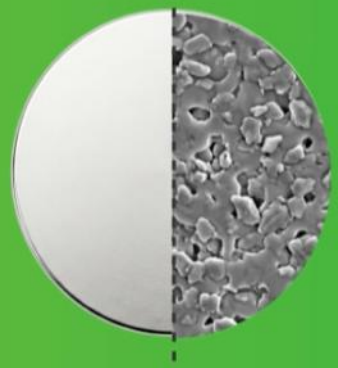
Step 03

Manufacturing routes for recycled magnets



Sintered magnets



Bonded magnets

IMA

MagREEsource

NIMP

KOLEKTOR

METALPINE

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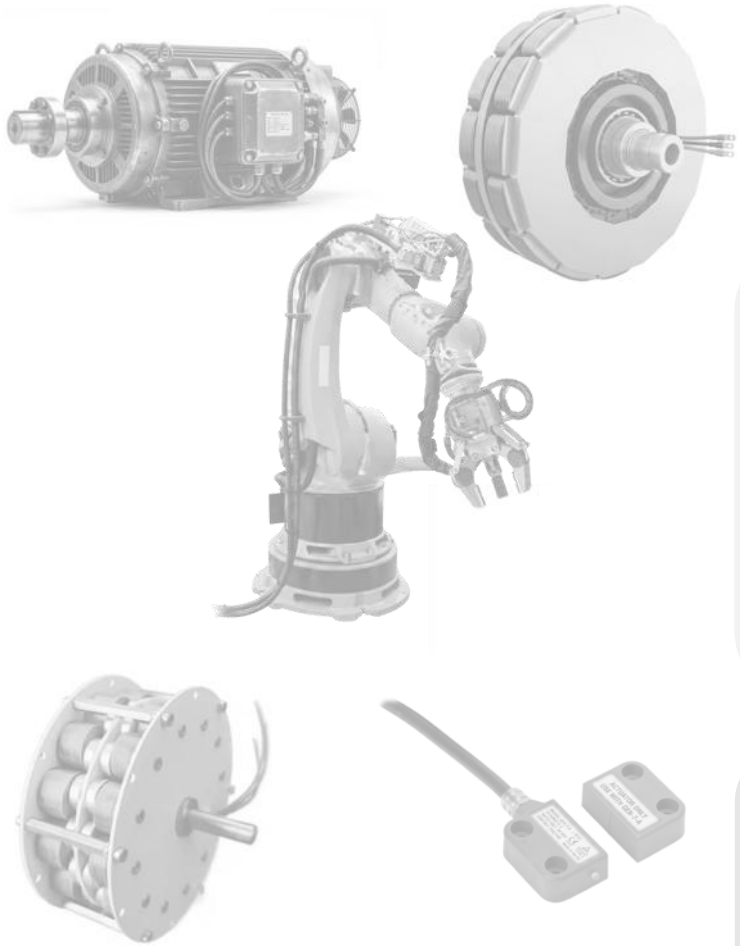
Step 04
Integration



Primum, d.o.o.

ETRA

RASCO

MagREEsource

Universidad de Jaén

& Analysis

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Committee of investors

Review of legislation

Demos

Recycling strategy

Regional hubs

Interregional Impact Deployment & Value Chain Structuring

Business investment plan

Exploitation sessions

Portfolio

Market asessment

Capacity-building

Risk capital funds

Clustering

Policy recommendations

TECOS

MagREEsource

Universidad de Jaén

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Sustainable Innovation
Investment Catapult
for Permanent Magnets

Thank you for your attention!

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