

Metals for Clean Energy:

Pathways to solving Europe's raw materials challenge

SNAPSHOT OF REPORT OUTCOMES

Presentation by

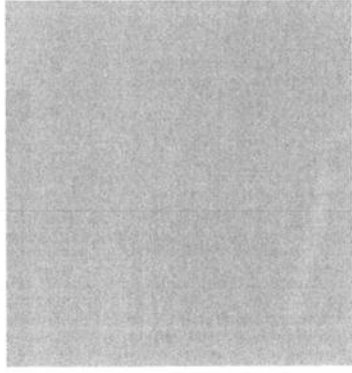
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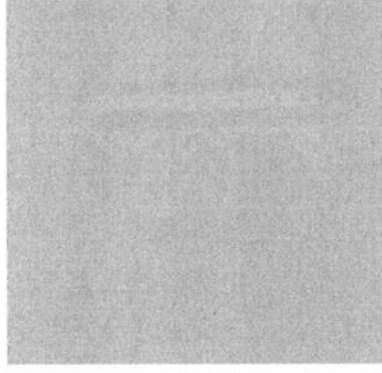
Eurometaux

15 June 2022 – Frans Timmermans Cabinet

Agenda



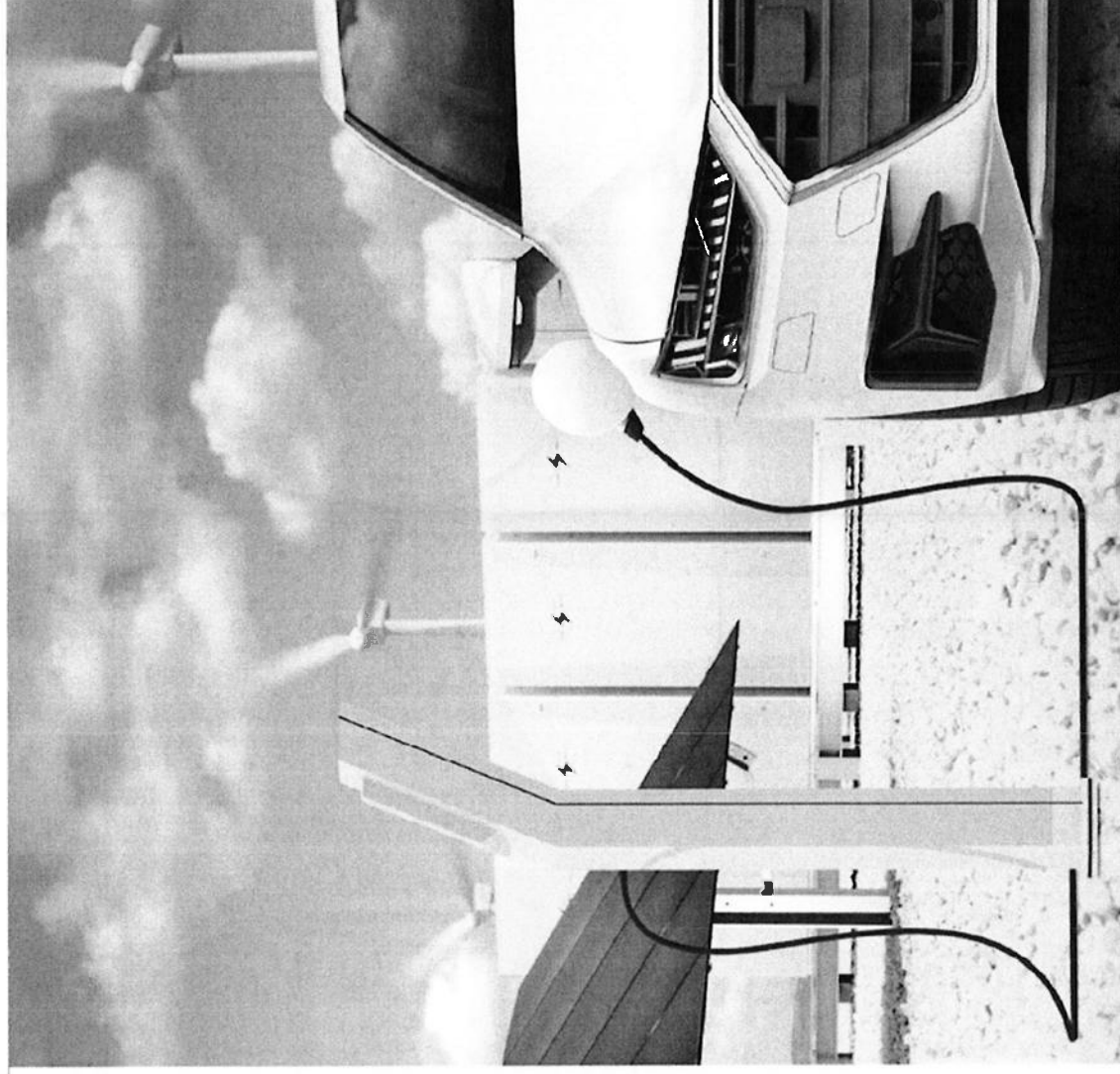
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A presentation in two parts

1. The metals demand of Europe's clean energy ambitions
2. Five pillars for bridging Europe's looming metals supply gap



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The energy transition is a commodities transition

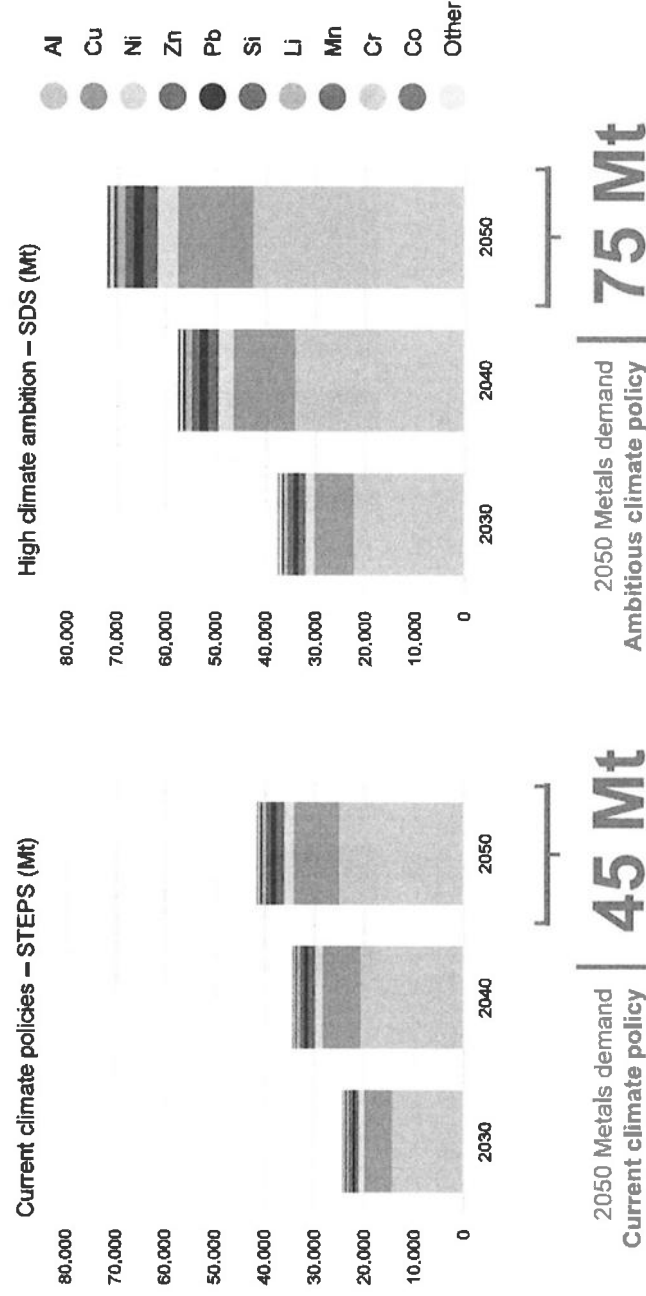
Fact

The faster the world decarbonises, the higher its metals requirements

Question

By how much?

Total metal demand by commodity in a STEPS and SDS scenario respectively (Mt)



Clean energy technologies will transform global metals markets

Fact

All based on metals:
Batteries, Solar PV,
Hydrogen, Magnets,
Electric Cars, Wind
Turbines, Power cables

Question

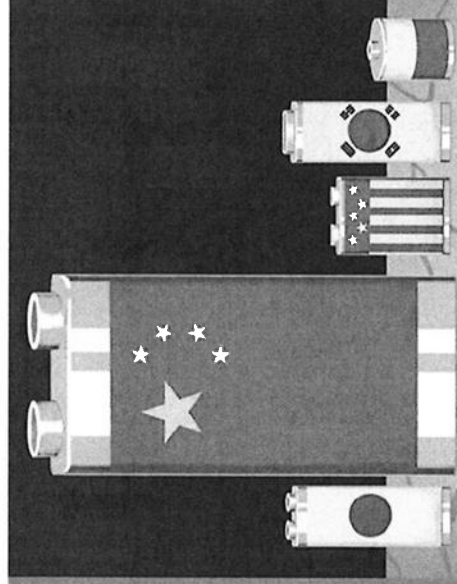
How will global demand
for metals shift?

% metal required in 2050 for clean energy technologies
vs. 2020 overall use (SDS ambitious climate scenario).

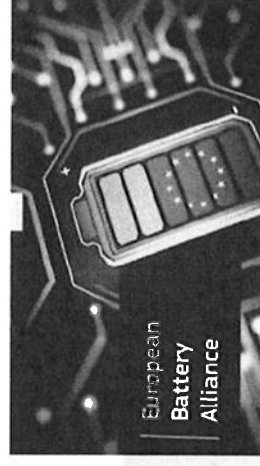
Li Lithium	2109%	Si Silicon	62%	Aluminium
Dy Dysprosium	433%	Tb Terbium	62%	Copper
Co Cobalt	403%	Cu Copper	51%	Zinc
Te Tellurium	277%	Al Aluminium	43%	Silicon
Sc Scandium	204%	Sn Tin	28%	Lithium
Ni Nickel	168%	Ge Germanium	24%	Nickel
Pr Praseodymium	110%	Mo Molybdenum	22%	Cobalt
Ga Gallium	77%	Pb Lead	22%	
Nd Neodymium	66%	In Indium	17%	Dysprosium
Pt Platinum	64%	Zn Zinc	14%	Neodymium
Ir Iridium	63%	Ag Silver	10%	Praseodymium

What about demand in Europe?

Until now,
batteries, solar
panels,
magnets have
been built
elsewhere...



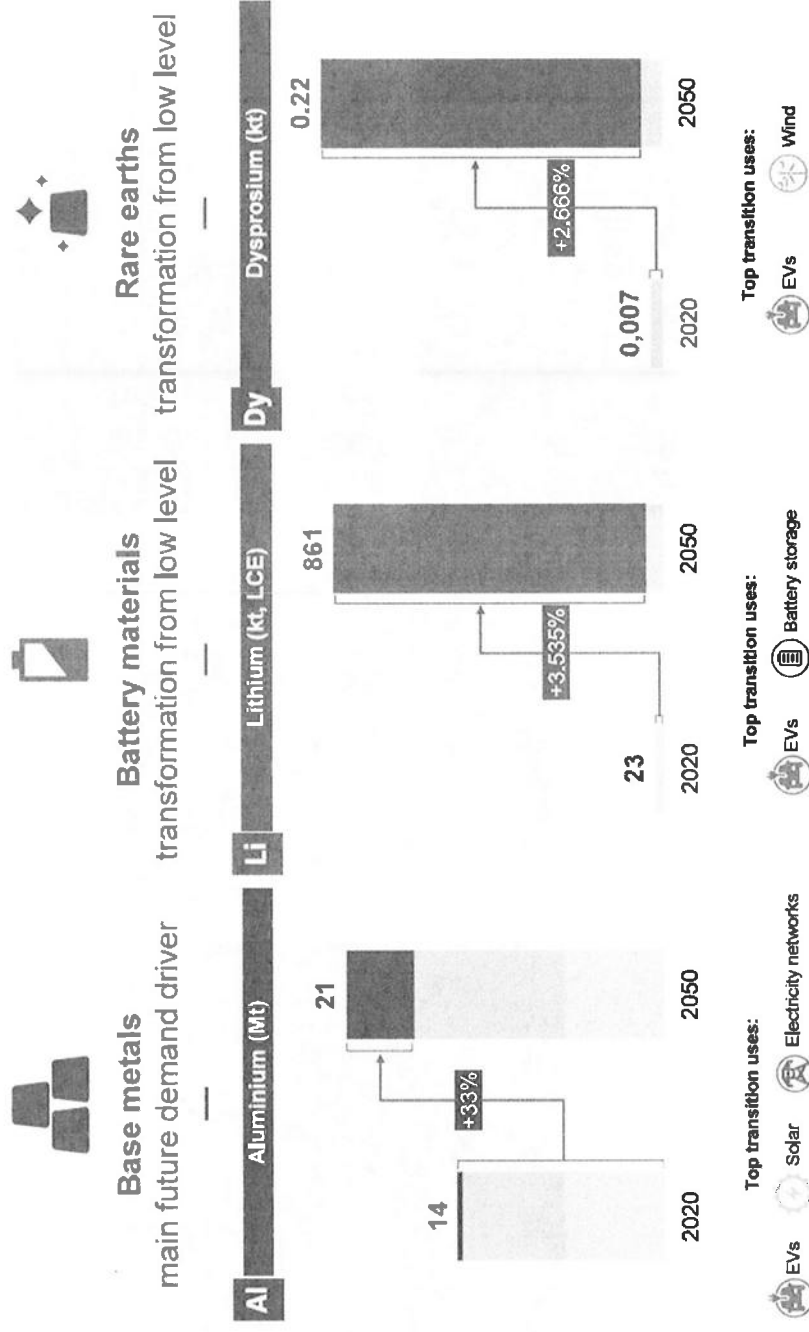
... But Europe
has concrete
industrial plans
to build its own
technologies



New European technology production will require a full supply chain

Fact

Europe's accelerated energy goals + concrete domestic technology plans = new metals requirements



Question

What will happen to Europe's metals markets?

Europe must avoid replacing its unsustainable fossil fuels dependency with a similar metals dependency

 Challenge 1	 Challenge 2	 Joint question
Without urgent action now, Europe's ability to secure the right level of strategic autonomy for energy transition metals beyond 2030 is at risk	Meeting clean energy metals demand only with increased imports from lower regulatory regimes isn't compatible with the EU's sustainability values	How can Europe bridge this real supply gap?

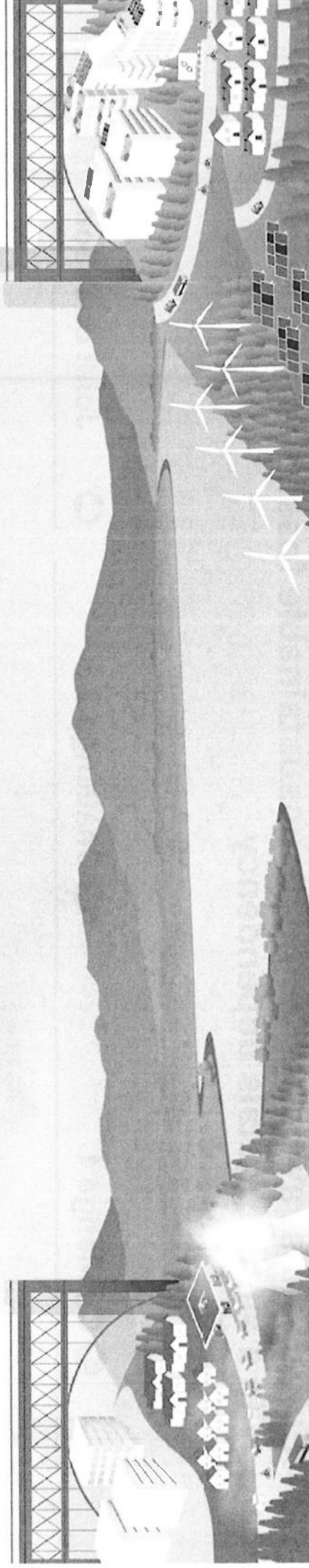
Bridging Europe's energy transition metals supply gap

STARTING
POINT
NOW

- Acceleration of clean energy transition
- Aim to improve strategic autonomy for energy

END
POINT
2050

- Clean energy system with higher level of strategic autonomy & right level of sustainability



Five necessary pillars for Europe's metals & clean energy bridge

**STARTING
POINT
NOW**

STRONGEST IMPACT: NOW → 2040

2035 ONWARDS

**END
POINT
2050**

PILLAR 1

Fulfil domestic mining potential

PILLAR 2

Maintain and increase domestic refining output

PILLAR 3

Secure sustainable imports from reliable partners

PILLAR 4

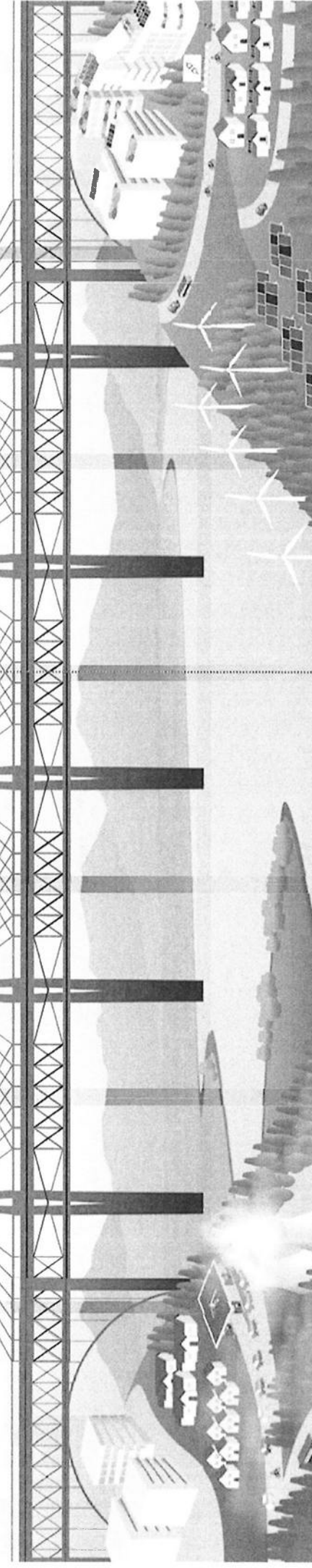
Maximise recycling, including new streams

PILLAR 5

Drive technological & behavioural change

■ Clean energy system with higher level of strategic autonomy & right level of sustainability

■ Acceleration of clean energy transition
■ Aim to improve strategic autonomy for energy



New primary supply is urgently needed between now and 2040

STRONGEST IMPACTS → 2040

PILLAR 1

Fulfilling domestic mining potential

PILLAR 2

Maintain and increase domestic refining output

PILLAR 3

Securing sustainable imports from reliable partners

Early stages of energy transition

Primary metals needed for new technologies



Europe must find right balance of domestic supply and imports

Pillar 1: Fulfil domestic mining potential

STARTING
POINT
NOW

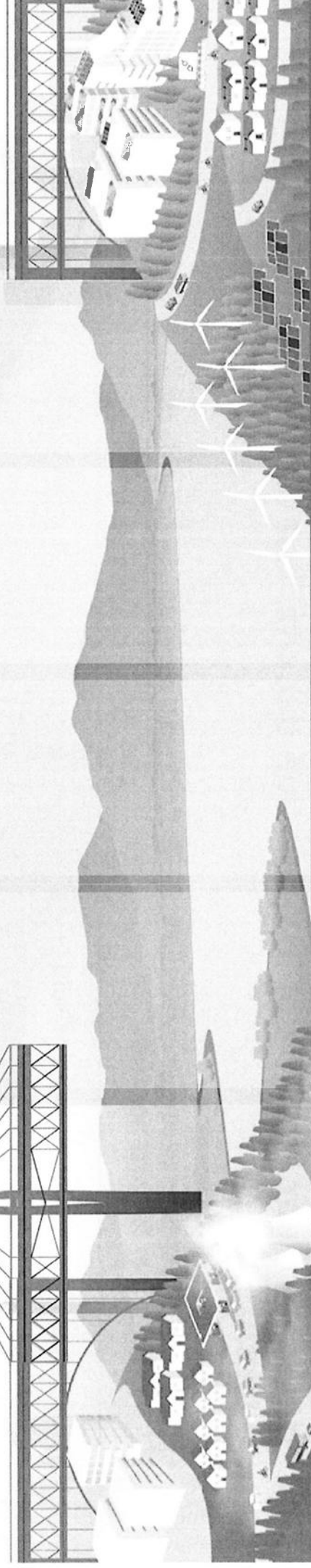
PILLAR 1

Fulfilling
domestic mining
potential

- Acceleration
of clean energy
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2050

- Clean energy
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New European mines could open this decade, but challenges must be overcome

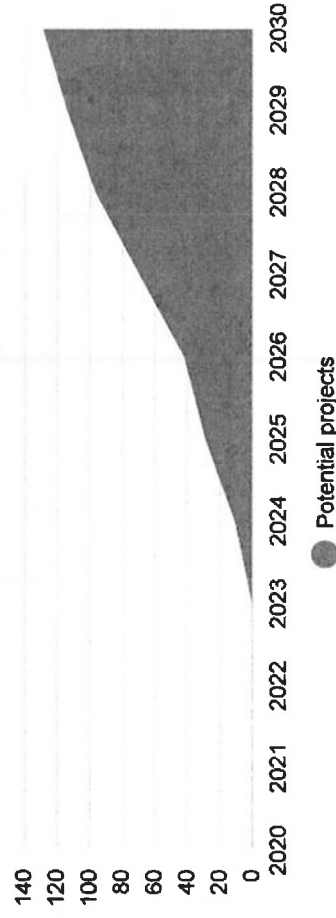
Lithium & rare earths

- Large project pipelines, which could supply:
 - 55% of 2030 cathode plans (lithium)
 - 80% of magnet plans (dysprosium)
- But with a high level of uncertainty

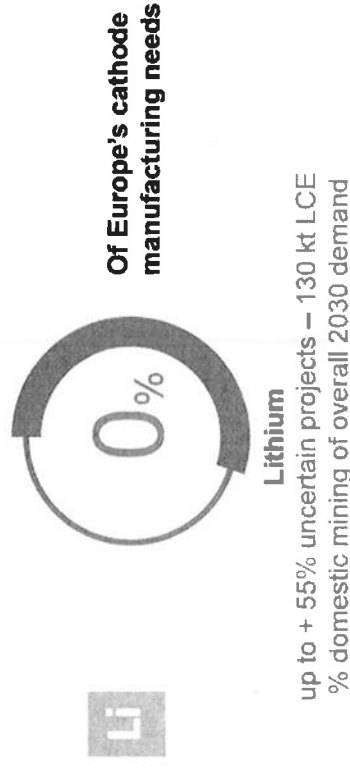
Challenges

Local opposition, challenging economics, permitting, untested technologies

Lithium - European mine output (kt LCE)



Lithium - European self-sufficiency rate



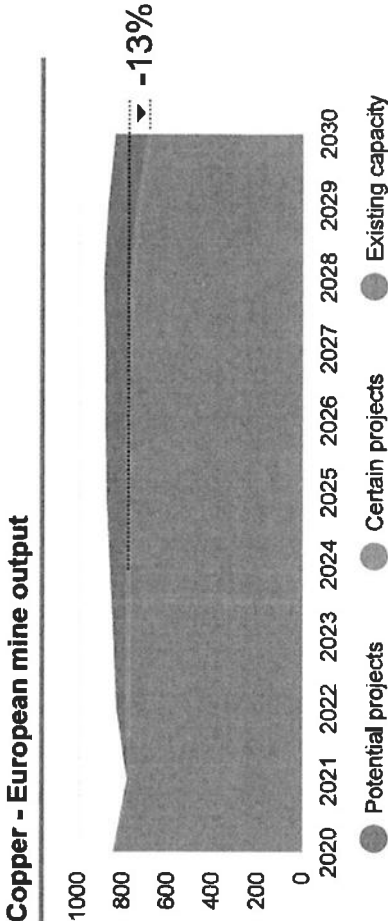
Without new mines opening in mature markets, Europe's self-sufficiency will decline

Copper, nickel, zinc, cobalt

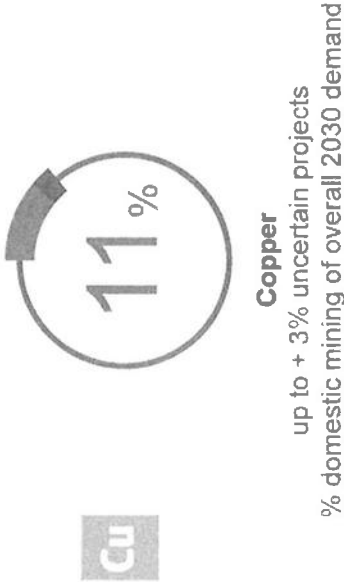
- Thinner project pipelines
- Limited 2030 self-sufficiency rate (4-25%)
- 2030 depletion ranges of up to 20%

Challenges

Local opposition, challenging economics, permitting, untested technologies



Copper - European self-sufficiency rate



Pillar 1: Fulfil domestic mining potential

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Key takeaway:

Political support
+ high ESG
standards
required
together

Pillar 2: Maintain and increase domestic refining output

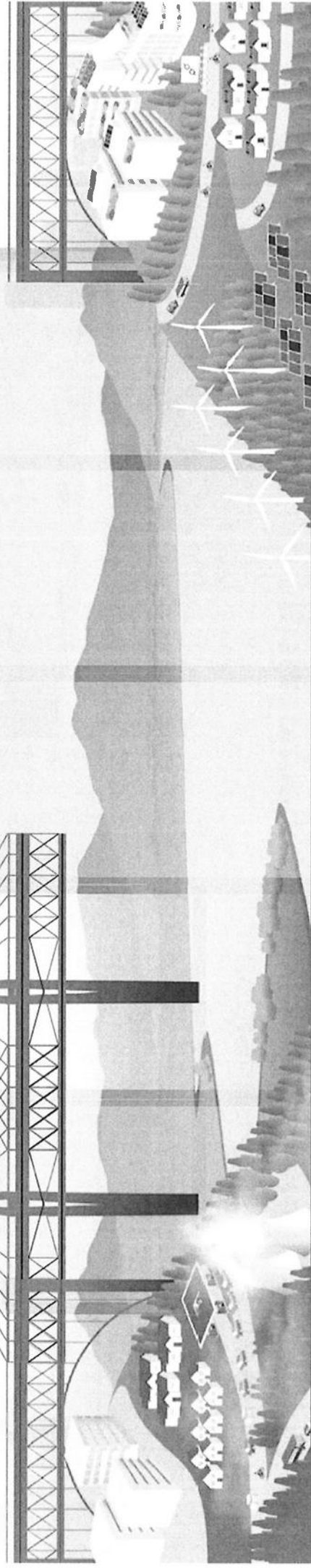
**STARTING
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- Acceleration of clean energy transition
- Aim to improve strategic autonomy for energy

PILLAR 2
Maintain and increase domestic refining output

**END
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2050**

- Clean energy system with higher level of strategic autonomy & right level of sustainability



Europe will need more refinery announcements in next 5 years to keep pace with energy transition

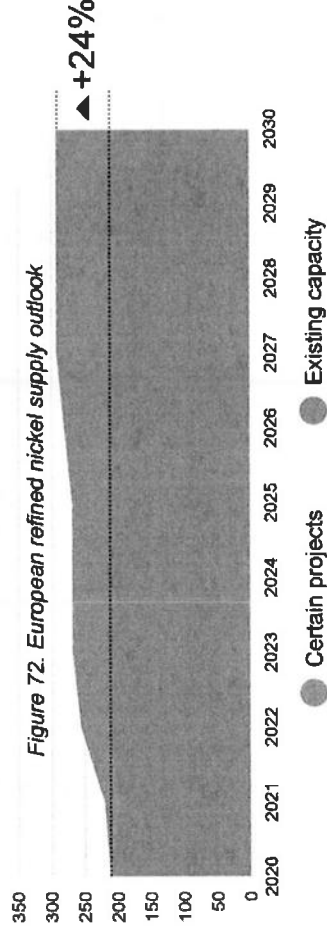
Nickel, lithium, rare earths

- New EU refining projects announced with medium-sized growth potential
- Allows European customers to bypass China route (and CO₂ impacts)

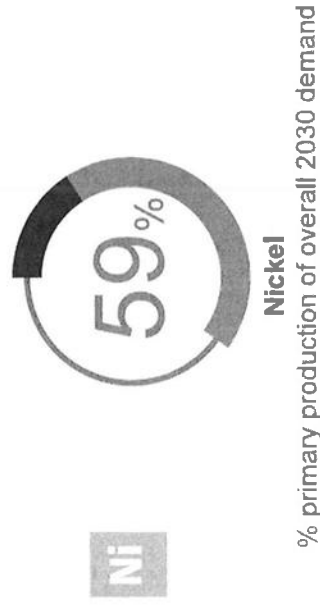
Question

Can Europe create competitive and predictable business conditions for long-term investment?

European metal output



European self-sufficiency rate



Keeping metals refining in Europe requires a fix to energy crisis

Aluminium, zinc, silicon

- High energy prices have big impact on power intensive smelters, leading to temporary closures (10-40%)
- Low-cost and subsidized China imports, require trade defence measures

European self-sufficiency rate

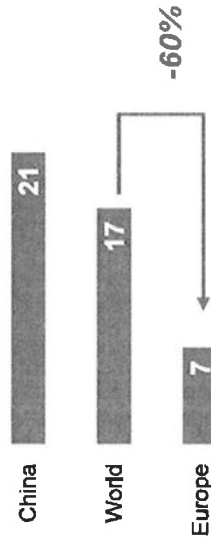


Aluminium

(-10% offline 2022)*

% primary production of Europe's overall 2030 demand

Average CO₂ footprint of primary production (tCO₂/t Al)



Question

Can Europe stop its existing supply being replaced by more carbon-intensive imports?

Pillar 2: Maintain and increase domestic refining output

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POINT
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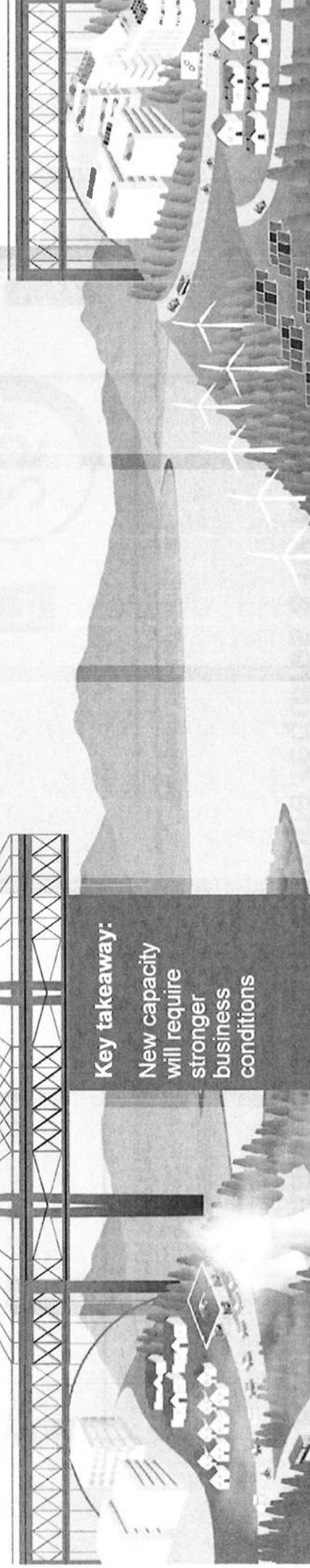
- Acceleration of clean energy transition
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PILLAR 2
Maintain and increase domestic refining output

Key takeaway:
New capacity will require stronger business conditions

**END
POINT
2050**

- Clean energy system with higher level of strategic autonomy & right level of sustainability



Pillar 3: Secure sustainable imports from reliable partners

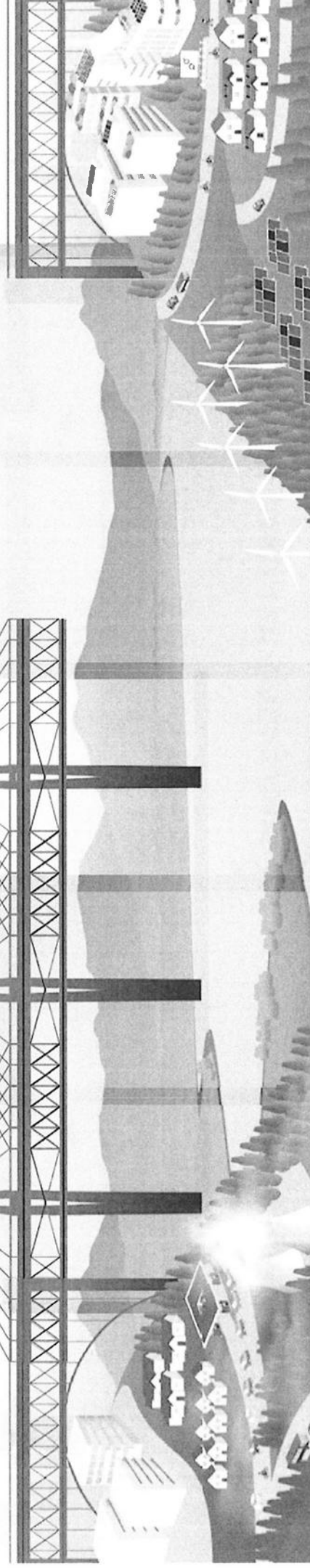
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PILLAR 3
Securing sustainable imports from reliable partners

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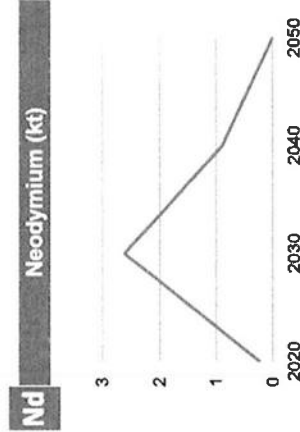
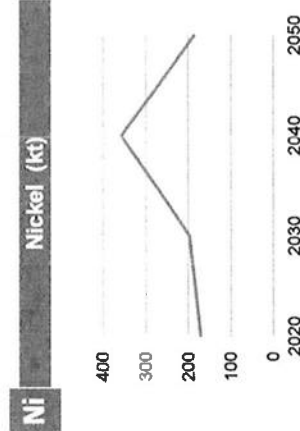
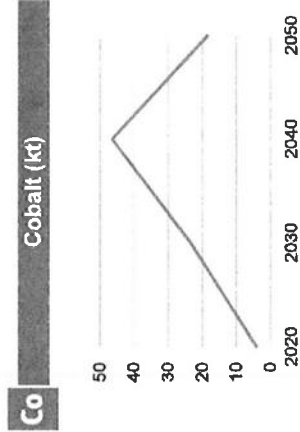
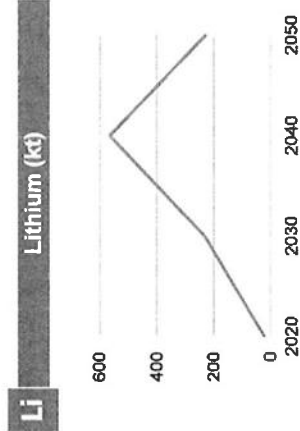
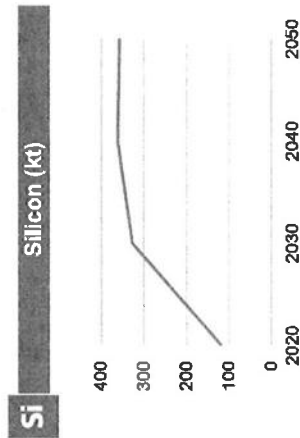
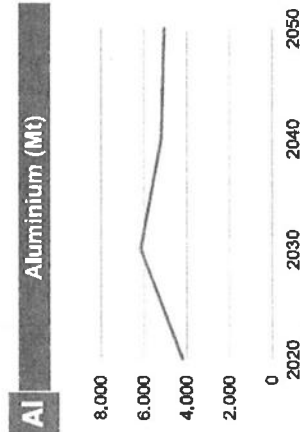
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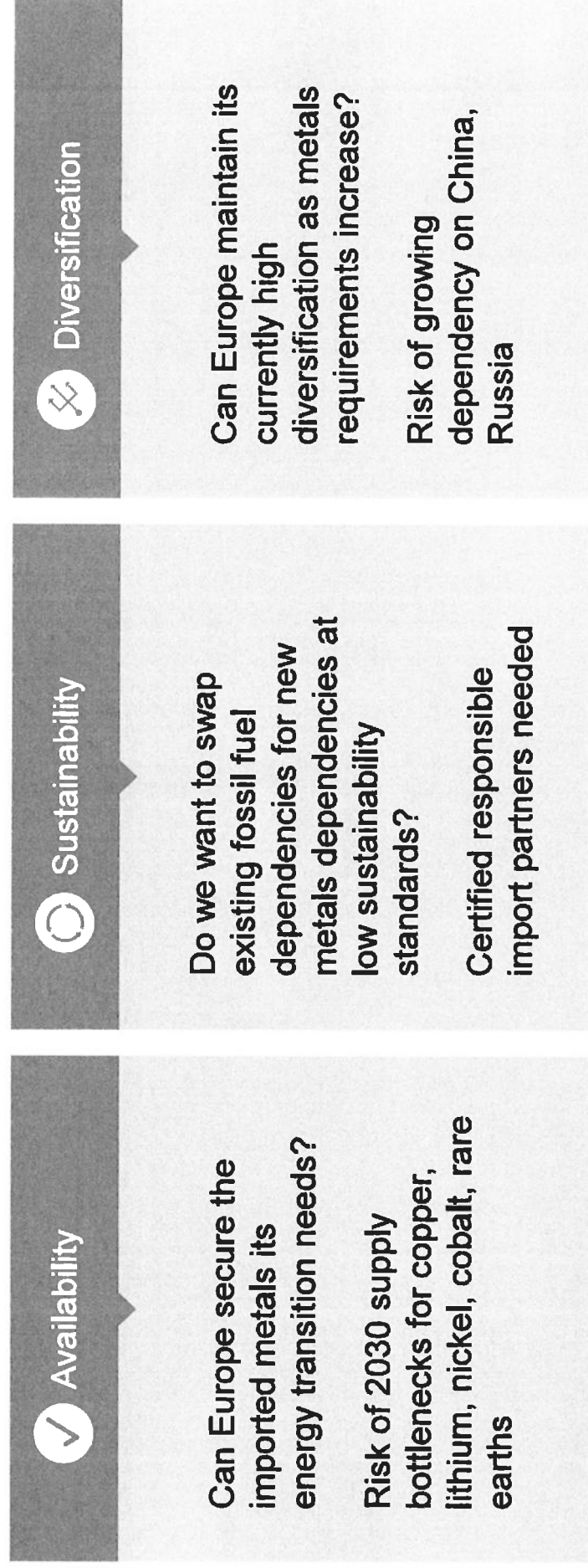
Europe will rely on imports for short-medium term demand growth

More limited import reliance

Strongly growing imports



Three key challenges to secure sustainable imports from reliable partners



Pillar 3: Secure sustainable imports from reliable partners

STARTING
POINT
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- Acceleration of clean energy transition
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PILLAR 3
Securing sustainable imports from reliable partners

END
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Key takeaway:
EU challenged to secure sustainable & diversified imports in tight global markets

Recycling and technology/behavioural change will take effect after 2035

STRONGEST IMPACTS

→ 2035-2050

PILLAR 4
Maximise recycling, including new streams

PILLAR 5
Driving technological & behavioural change

Later stages of energy transition

Metals from 1st generation products to start recycling loop



Recycling a permanent supply source to Europe's industries



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Pillar 4: Maximise recycling, including new streams

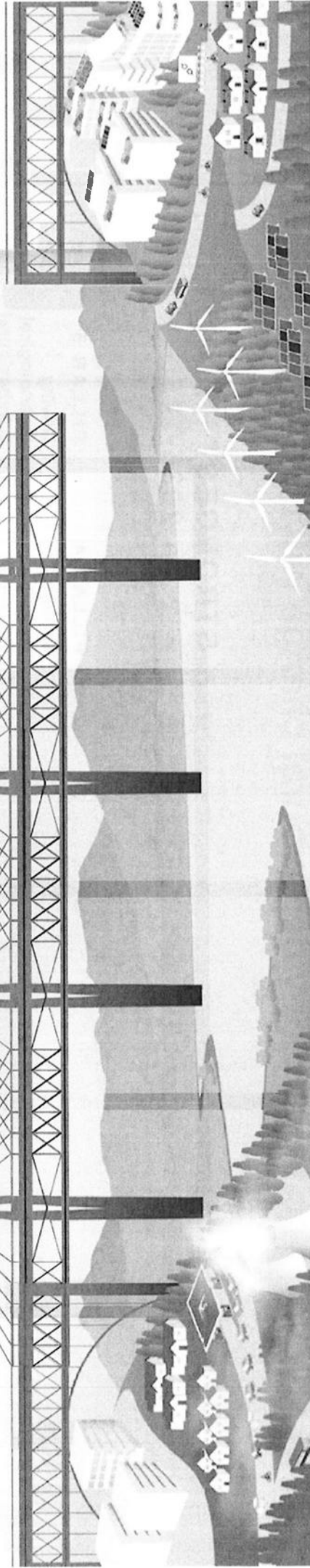
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Maximise recycling, including new streams

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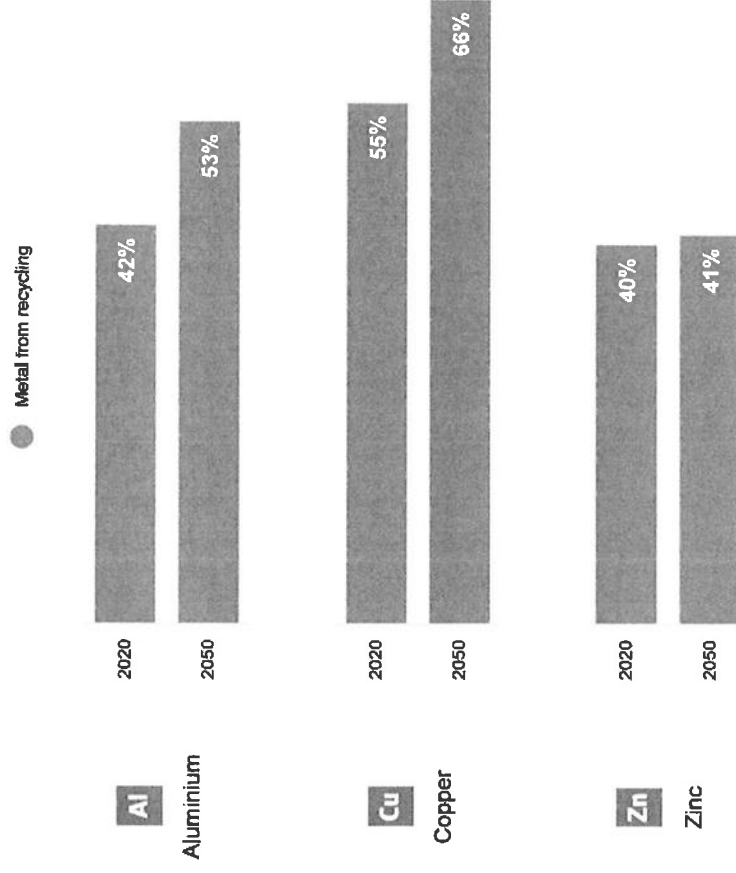
Recycling is Europe's key long-term driver in creating strategic autonomy

Circular Economy actions will raise base metals recycling rates

Mature markets

Aluminium, Copper, Zinc

- Recycling can supply 40-65% of Europe's higher base metals demand in 2050
- Recycling bottlenecks must be addressed to raise rates:
 - Improved collection and sorting systems
 - Smarter product design
 - Control of scrap leakage



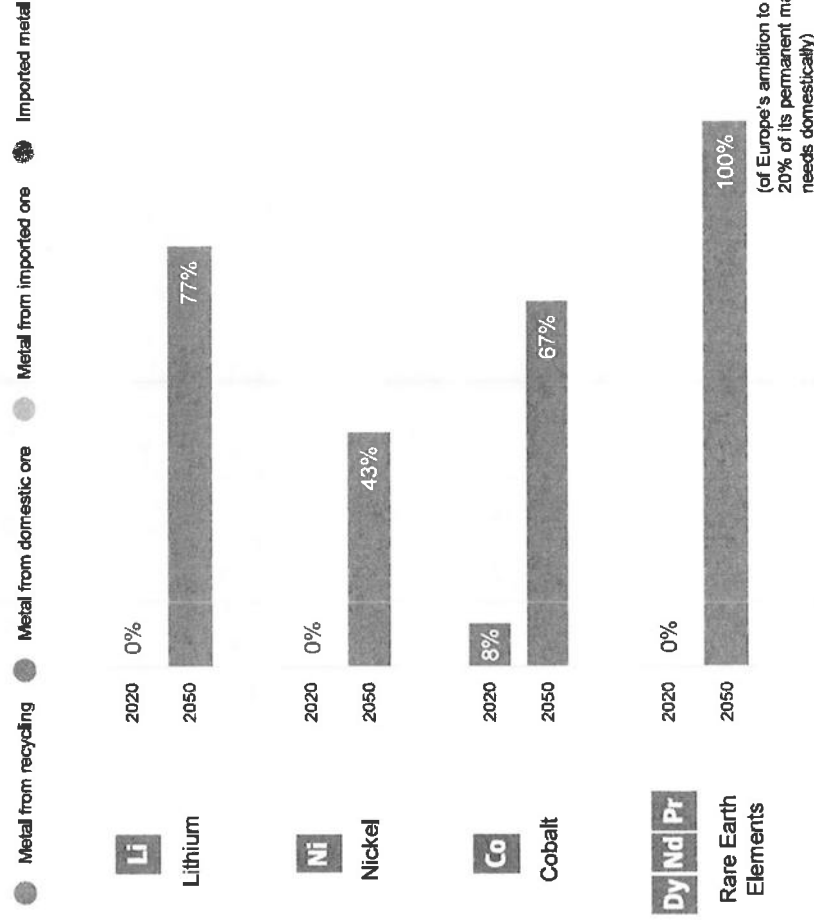
Recycling is Europe's key long-term driver in creating strategic autonomy

Massive potential after 2040 for new energy commodities

New energy commodities

Lithium, cobalt, nickel, rare earth elements

- Recycling volumes will rise after 2040, with potential for:
 - 65-75% of Europe's 2050 battery cathode needs*
 - 200% of Europe's 2050 rare earths needs*
- High supply from electric vehicles with 15 years expected lifetime
- Required:
 - New recycling capacity
 - Process improvements
 - Economic viability



Pillar 4: Maximise recycling, including new streams

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- Aim to improve strategic autonomy for energy

PILLAR 4
Maximise recycling, including new streams

END
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Key takeaway:

Recycling is Europe's major long-term self sufficiency potential, requiring action now

Pillar 5: Drive technological and behavioural change

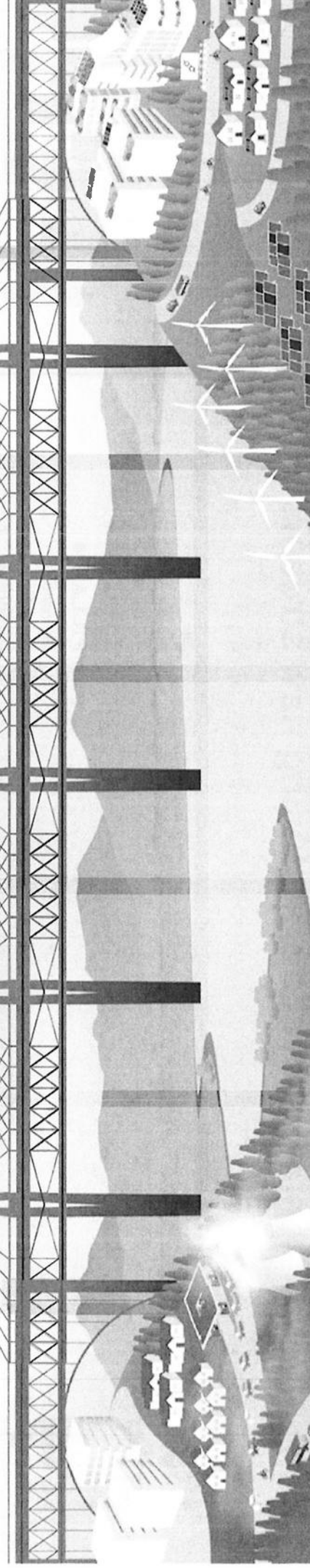
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PILLAR 5
Driving
technological
& behavioural
change

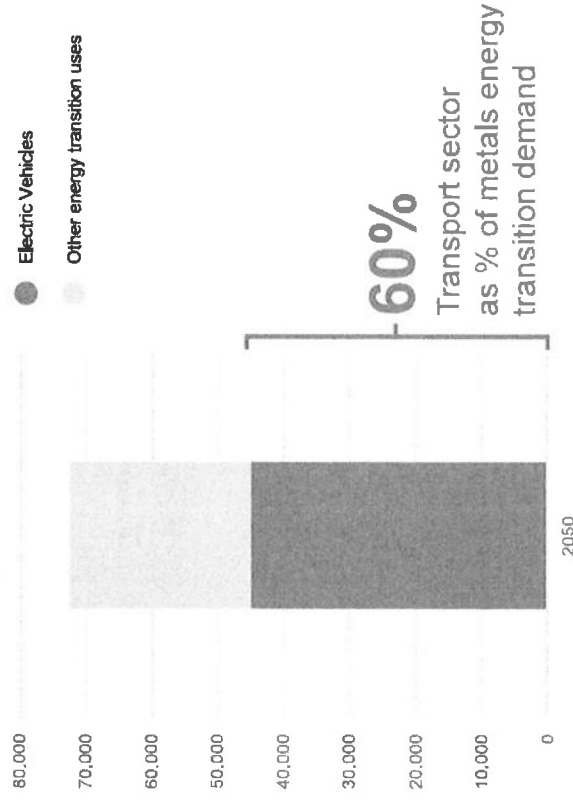
END
POINT
2050

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Technological and behavioral change can reduce our demand

Time is needed to achieve measurable impact



Impacts will be longer term



Innovation and substitution

- Europe: frontrunner in R&D to reduce metals intensities in products
- Substitution in focus: cobalt in batteries, non-rare earth magnets



Behavioral change

- Transport sector represents 60% of metals demand + big supply risks
- Shared economy can here make a real difference (but not quantified)

Pillar 5: Drive technological and behavioural change

STARTING
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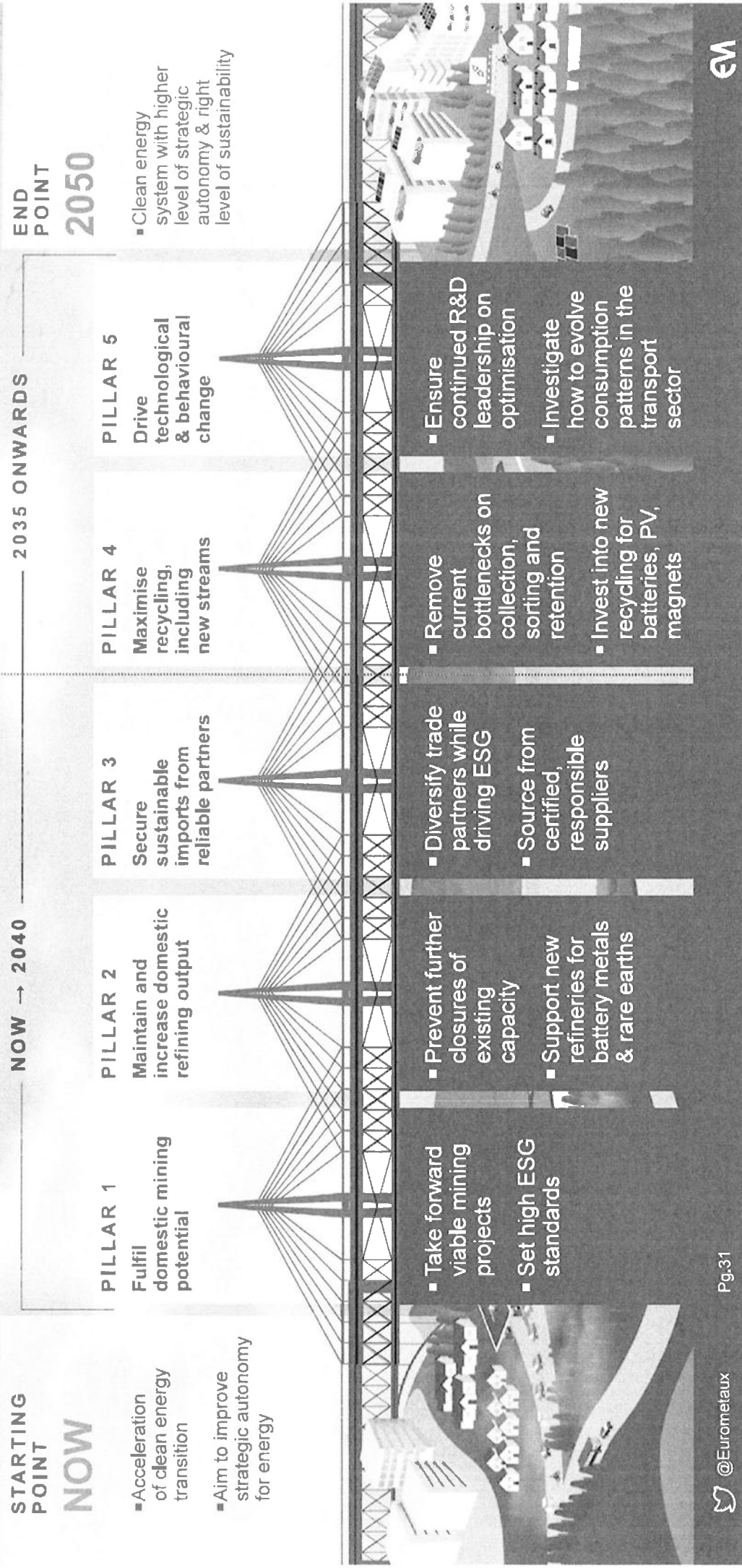
PILLAR 5
Driving technological & behavioural change

END
POINT
2050

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Key takeaway:
Further efforts needed if longer-term change will be realised

Conclusion: 10 EU actions to bridge its looming metals supply gap



Four action areas for a new EU raw materials strategy

1.

Stimulate new domestic investment

- **Finance:** Introduce new raw materials financing covering full value chain (e.g. dedicated risk-sharing fund, IPCEI)
- **Permits:** Improve and speed up permitting process, while upholding ESG standards
- **Dialogue:** Start multi-stakeholder dialogue around responsible European mining and appropriate benchmarks

3.

Be bolder globally

- **Projects:** Expand finance to support EU companies with (joint) ownership of global mines (with ESG conditionality)
- **Partnerships:** Strengthen partnership network of like-minded regions (e.g. Canada, Latin America)
- **Support:** Develop an EU model for supporting Africa & other growth markets in sustainable raw materials growth

2.

Improve business conditions

- **Energy:** Address long-term high EU power prices faced by refineries (key focus: renewable power purchase agreements)
- **Fair trade:** Set up trade defence for sectors at risk from China dumping: present (aluminium, silicon), future (rare earths)
- **Chemicals:** Ensure long-term predictability from REACH review for future markets and safe metals management

4.

Set foundations for future Circular Economy

- **Capacity:** Support investment into advanced collection/sorting & new recycling capacity for batteries, PV, magnets
- **Exports:** Prevent shipments of scrap, electronics, & batteries waste to destinations without equiv. ESG standards
- **Design:** Use sustainable products initiative to require that new products are designed ready for easy recycling



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Read more!



www.eurometaux.eu/metalscleanenergy

Metals for Clean Energy:

Pathways to solving Europe's raw materials challenge

POLICYMAKER SUMMARY

