Circular Economy and dependency from primary resources

Pier Luigi Franceschini, Director Innovation Hub South
EIT RawMaterials

11th September 2020, CIRCULAR ECONOMY AFTER THE EMERGENCY: CHALLENGES & OPPORTUNITIES

EIT RawMaterials is supported by the EIT, a body of the European Union

A PAN-EUROPEAN PARTNER NETWORK

- Coverage of the entire raw materials value chain
- World's largest community in the raw materials sector
- Over 120 core and associate partners and 180+ project partners
- 22+ countries
- 6 Innovation Hubs across Europe
- 8 Regional Innovation Hubs/Centers
- Headquarter in Berlin, Germany

Countries covered by EIT RawMaterials
EU countries
Innovation Hub
RIC (Regional Innovation Center)
RIS HUB (Regional Innovation Scheme)

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What we do

- Community animation at national and regional level
- Outreach to external stakeholders
- Project design and implementation support
- Start-ups scouting and coaching
- Events design, management and implementation

EIT RAWMATERIALS ACTIVITIES TO ACHIEVE THE STRATEGIC OBJECTIVES

EDUCATION

Students, Professionals & Wider Society

Entrepreneurial and innovation skills

Knowhow of raw materials for new technologies

19% funding (42 M EUR)

ACCELERATION

Innovation & Business Creation

Innovation and upscaling of technological advances

Business creation and entrepreneurship across value chains

59% funding (132 M EUR)

ECOSYSTEM

Partnership & Networks

Systemic change through synergies and matchmaking

Strong collaboration with wider European initiatives

22% funding (49 M EUR)

VISION OF EIT RAW MATERIALS

To develop raw materials into a major strength for Europe.

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RAW MATERIALS: KEY ENABLERS FOR EUROPE'S GREEN TRANSITION

Brown Economy

Fossil Fuels for combustion engines, generators and power stations: oil. gas, coal

Transition

Green Economy

Functional Materials in e-motors, energy storage, energy conversion containing, for example, Co, Li, Pt, REE, Ge, Ga, Si, V

IMMENSE INCREASE IN DEMAND FOR MINERALS AND METALS IN THE NEXT 30 YEARS

	2015	2030	2050
Electric passenger cars	1.2 million	200 million	965 million
Battery storage capacity	0.5 GW	175 GW	12 380 GW
Solar photovoltaic capacity	223 GW	2840 GW	8519 GW

Data from IRENA (International Renewable Energy Agency) 2018

CIRCULARITY CAN SUSTAIN ONLY A SMALL FRACTION OF THIS INCREASE

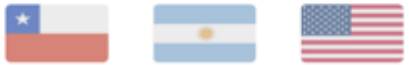
NEW SUSTAINABLE SOURCES AND SUPPLY CHAINS MUST BE FOUND

CIRCULAR ECONOMY INTRODUCES A RADICALLY NEW APPROACH TO THE USE OF RESOURCES

Circular Economy can help address some (not all) of these challenges by (example):

- Promoting **materials efficiency** (less materials use, longer lifetime)
- Designing parts that are easier to **disassemble**, whose parts are reusable
- Facilitating **recycling** as the ultimate solution to recover raw materials

UNTIL 2030, THE EUROPEAN UNION NEEDS TO IMPORT AN INCREASING SHARE OF STRATEGICALLY RELEVANT MATERIALS FROM VARIOUS COUNTRIES, PARTICULARLY CHINA AND RUSSIA

Material Initial ERMA focus	Demand growths from 2019 to 2030	Supply/Demand gap in 1,000 tons	Import reliance[1], % of EU demand imported	Time horizon until significant gap	Main suppliers to EU In 2019
Lithium hydroxide	1,400%	~120	~93	short	
Lithium[2]	570%	~210	~72	short	
Nickel sulfate	500%	~140	~78	long	EU currently net exporter
REO	240%[3]	~65[4]	~100	short	
Cobalt	62%	~40	~96	short	
Refined cobalt	62%	~20	~51	long	
Vanadium	58%	~20	~100	long	
Graphite	58%	~180	~99	medium	
Nickel	33%	~300	~84	long	
Copper	23%	~2,800	~81	long	
Primary aluminum	18%	~6,800	~77	medium	

Source: EIT RawMaterials

1 All imports, based on expected refined demand and current mined supply, incl. current scrap production
2 Assuming high case supply scenario with several lithium mines starting up in Europe
3 Assuming magnet production in Europe at 30% of world total in 2030
4 Neodymium gap

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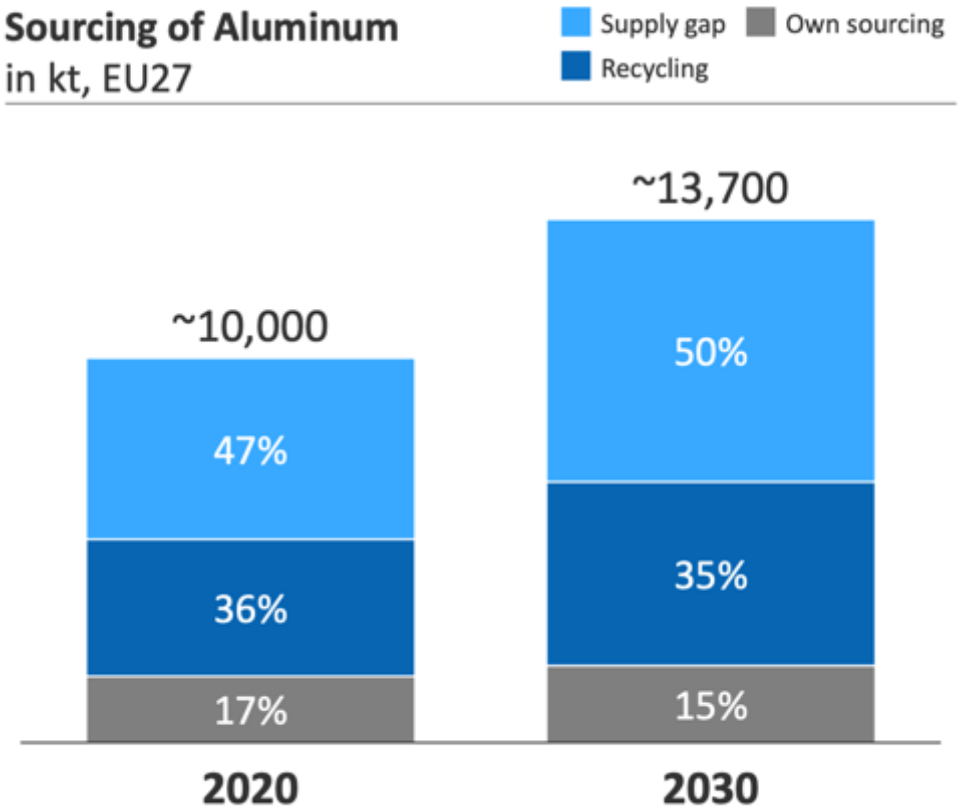
Supply gap of Aluminum cannot be compensated by recycling activities

Aluminum

Sourcing of Aluminum
in kt, EU27



Source: EIT RawMaterials

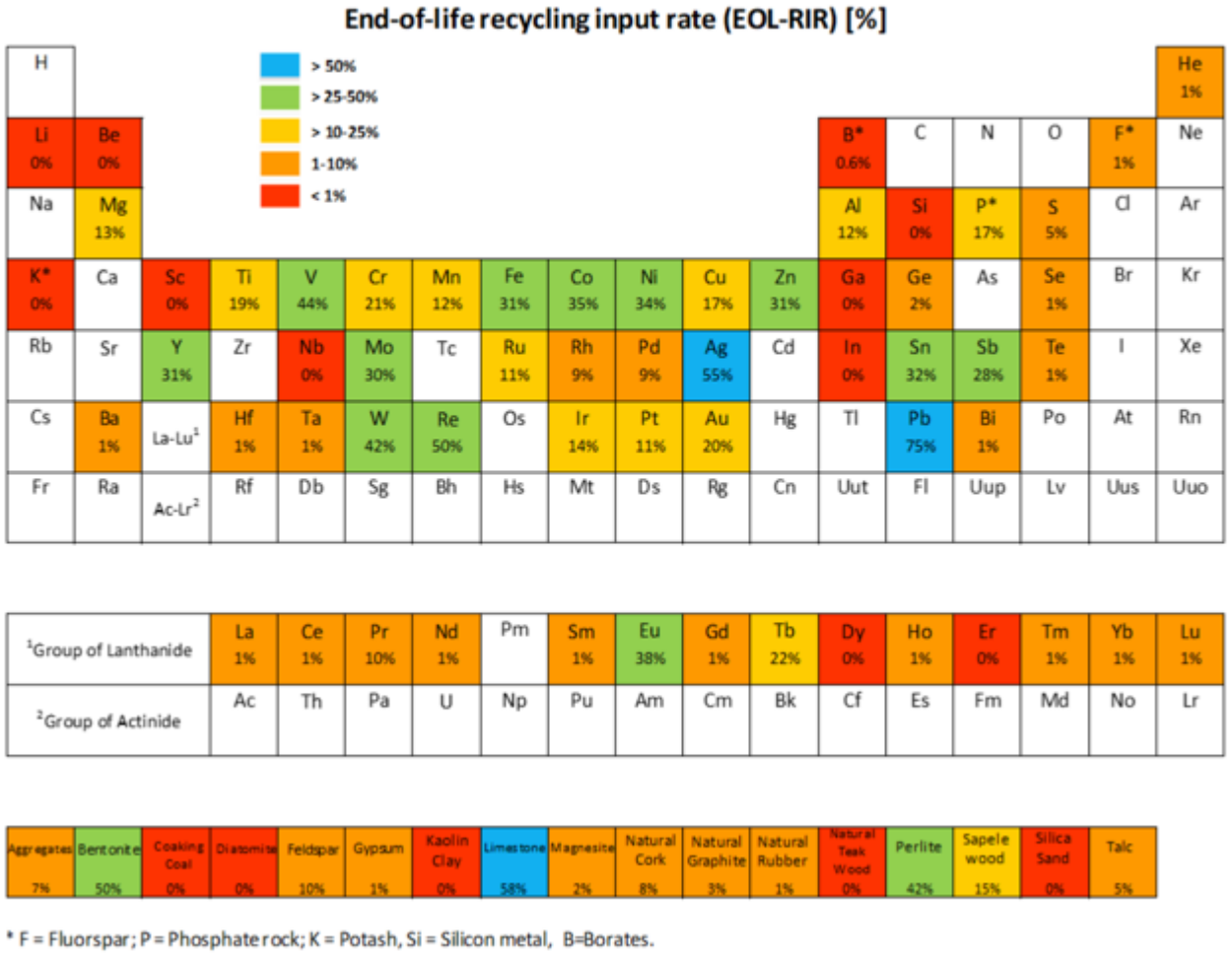
...while their overseas investments indicate a continuation of this trend

36% **Expected increase in demand** for Aluminum by 2030

35% Of demand expected to be **compensated by recycling**

50% Of demand to be **sourced** from **third countries**

CURRENT RECYCLING RATE OF TECHNOLOGICALLY RELEVANT CRM IS NOT ENOUGH



* F = Fluorspar; P = Phosphate rock; K = Potash, Si = Silicon metal, B=Borates.

Contribution of recycling to meet EU demand of CRMs: end-of-life recycling Input Rate (EOL-RIR): Source: JRC elaboration based on Deloitte Sustainability (2015 and 2017)

Talens Peiro, L., Nuss, P., Mathieux, F. and Blengini, G., Towards Recycling Indicators based on EU flows and Raw Materials System Analysis data, EUR 29435 EN, Publications Office of the European Union, Luxembourg, 2018

NEW LIST OF CRITICAL RAW MATERIALS: LAUNCHED ON 3RD OF SEPTEMBER 2020

Antimony	Hafnium	Phosphorus
Baryte	Heavy Rare Earth Elements	Scandium
Beryllium	Light Rare Earth Elements	Silicon metal
Bismuth	Indium	Tantalum
Borate	Magnesium	Tungsten
Cobalt	Natural Graphite	Vanadium
Coking Coal	Natural Rubber	Bauxite
Fluorspar	Niobium	Lithium
Gallium	Platinum Group Metals	Titanium
Germanium	Phosphate rock	Strontium

THE NEED FOR A (RENEWED) ALLIANCE ON RAW MATERIALS

Ursula von der Leyen,
European Commission

Press release | 9 December 2019 | Brussels

State aid: Commission approves €3.2 billion public support by seven Member States for a pan-European research and innovation project in all segments of the battery value chain

FINANCIAL TIMES

"EU industrial supply lines need strengthening, commissioner warns"

The commission will warn in an upcoming report that the EU faces "major challenges" to secure supplies of critical raw materials including lithium, cobalt and rare earth metals used in high-tech industrial goods. … The EU has gaps in its capacity to process, recycle and separate lithium and rare earths, and even when it mines certain materials within Europe these sometimes then have to leave the continent for further processing.

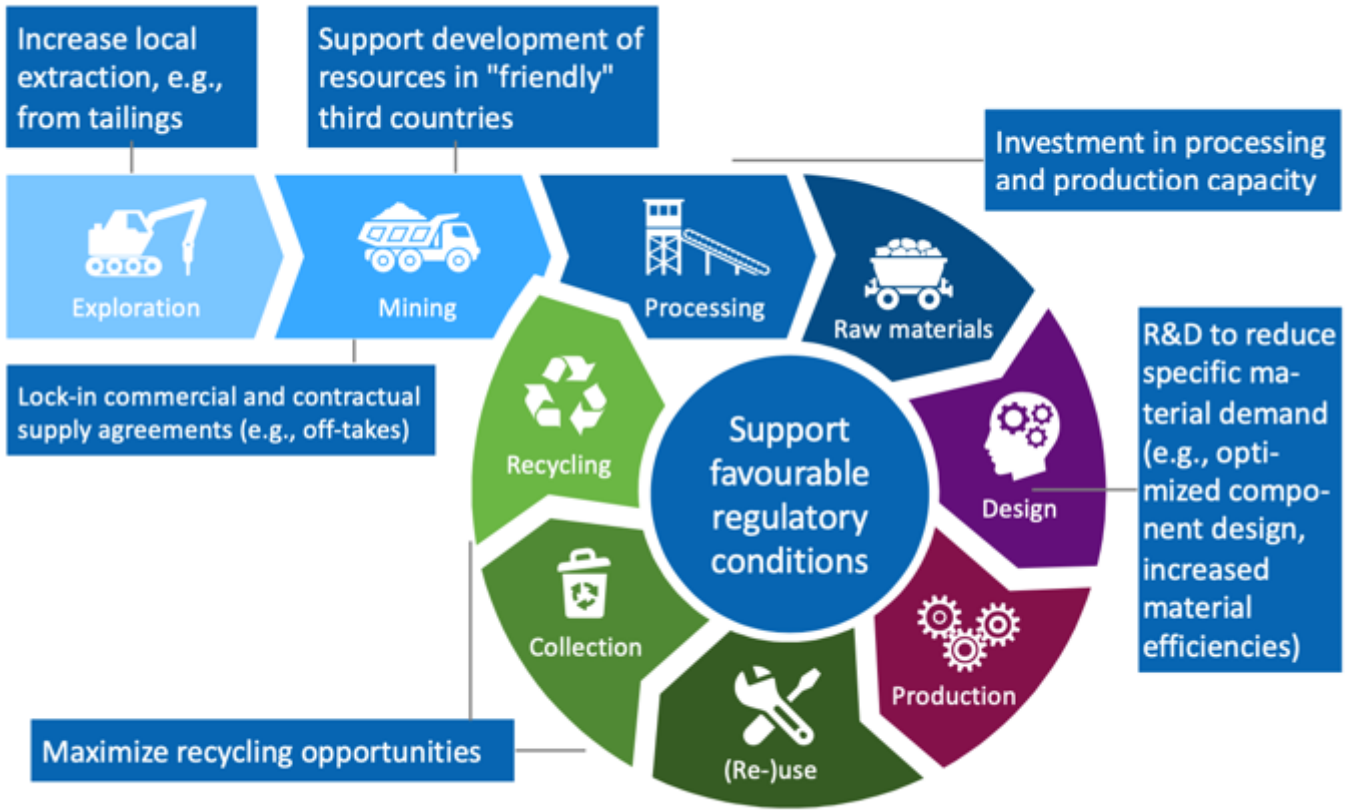
COM T. Breton,
European Commission

VP M. Šefčovič,
European Commission

"In addition, modelled on the EU Battery Alliance, we will set up a dedicated alliance aimed at removing bottlenecks in critical raw materials supply chains for EU industrial ecosystems; Why this is needed: for renewable energy, e-mobility, defence, and space, the EU is expected to need up to 18 times more lithium and 5 times more cobalt in 2030 compared to its current supply."

SUMMARY: TO TACKLE THIS SUPPLY CRITICALITY IT IS IMPORTANT TO ADDRESS THE WHOLE VALUE CHAIN INCLUDING MATERIALS DESIGN, CE AND RECYCLING

Examples for ERMA levers along the value chain



SOURCE: Ellen McArthur Foundation: Principles of Circular Econom; EIT RawMaterials

Recommendation for minitigation measures:

- **Diversify** RM supply
- **Boost** recycling
- Promote **materials efficiency**, also through **circular thinking**
- Make us of EU's mineral reserves promoting **sustainable exploration and mining**

THE GLOBAL INNOVATION AND TECHNOLOGY CONFERENCE IN THE RAW MATERIALS SECTOR

Connecting science, technology and innovation in the raw materials sector for the green energy transition

RAW MATERIALS SUMMIT 2020 GOES ONLINE

- **29-30 of September 2020**
- Hosting the official launch of ERMA!
- Three track: Innovation, Venture Forum, Education
- Register at https://www.eitrmsummit.com/
- 15% **discount code** for CIRCE2020 stakeholders:
  - **EITRMSCIRCE**

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