



RawMaterials

Connecting matters

L'importanza del recupero dei metalli in Europa per la transizione energetica e digitale

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MATERIE PRIME: ELEMENTI CHIAVE PER LA TRANSIZIONE ENERGETICA

Brown Economy

Combustibili fossili per motori a combustione, generatori e centrali elettriche: olio, gas, carbone

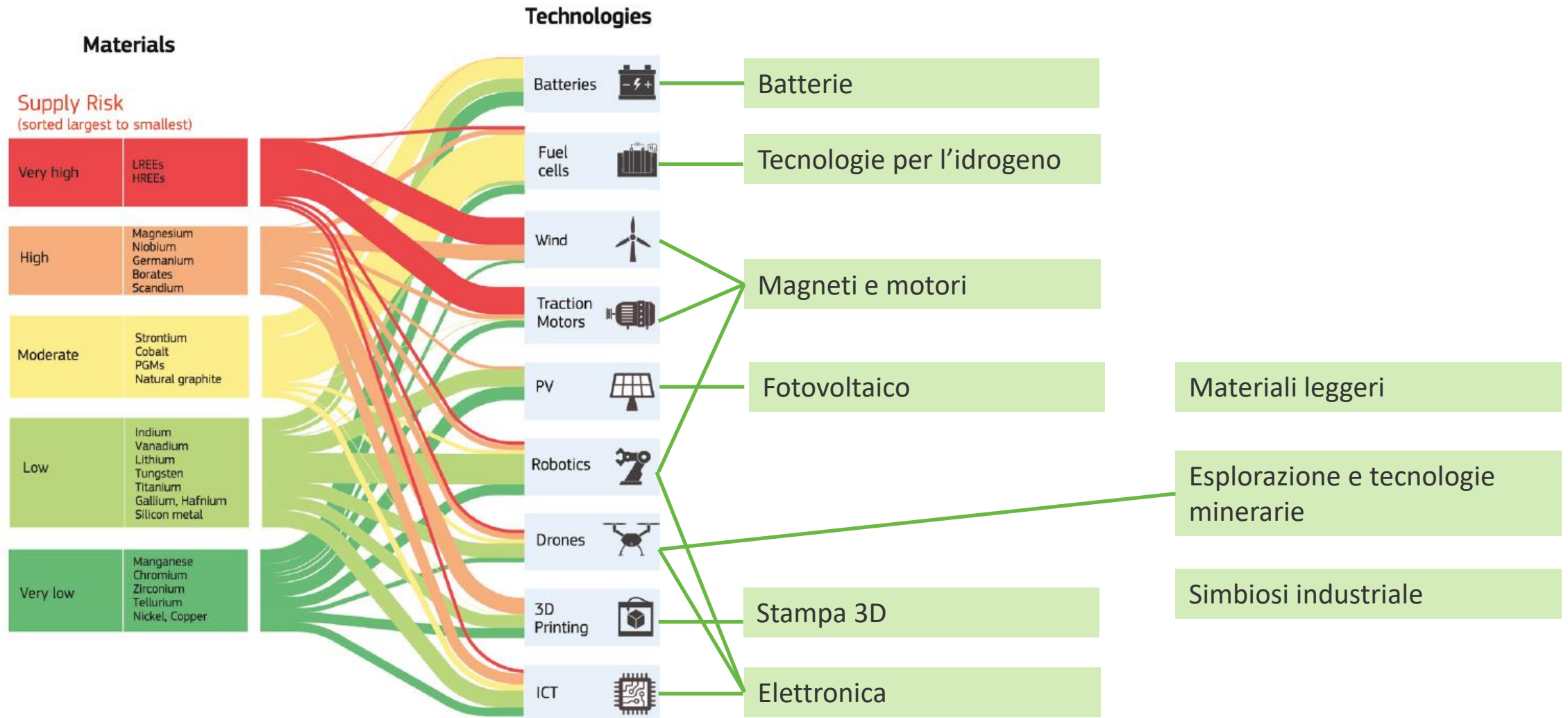
Transizione

Green Economy

Materiali funzionali per motori elettrici, accumulo di energia, conversione di energia contenenti, ad esempio, Co, Li, Pt, REE, Ge, Ga, Si, V

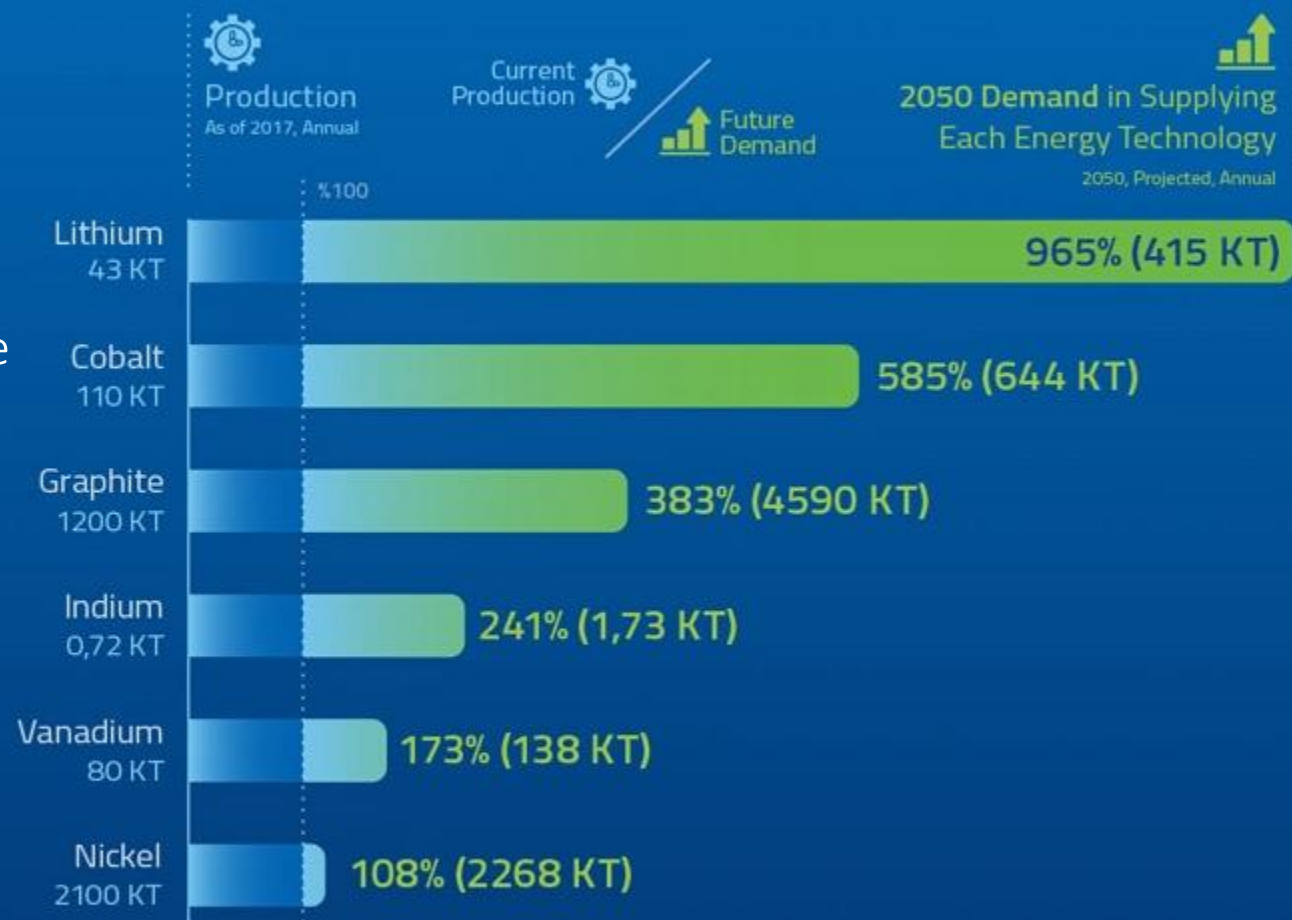


FILIERE STRATEGICHE PER LA TRANSIZIONE ENERGETICA



La transizione verso l'energia verde comporta una crescente domanda di minerali e metalli

- Le energie rinnovabili comportano una Maggiore intensità di utilizzo di metalli e minerali
- L'Europa è altamente dipendente dall'approvvigionamento di queste materie prime
- Per affrontare questa sfida, l'Europa deve investire in innovazione e nuove tecnologie, lungo tutta la filiera



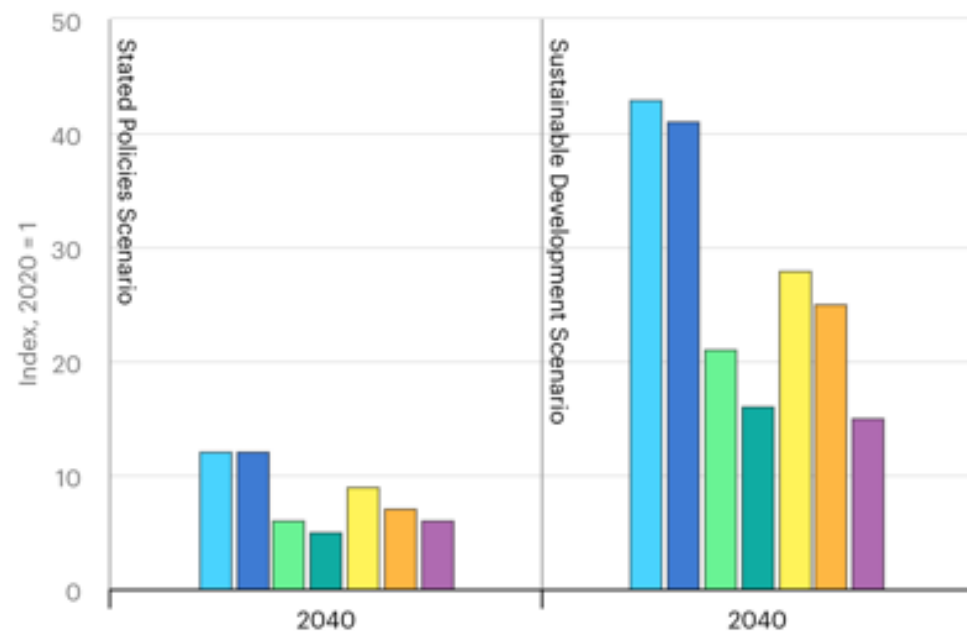
Source: World Bank Group 2019 "Climate Smart Mining" infographic

DOMANDA DI MINERALI CRITICI (REPORT IEA, MAGGIO 2021)

“....il mondo va verso **il raddoppio del fabbisogno complessivo di minerali** per le tecnologie energetiche verdi entro il 2040. Uno sforzo concertato per raggiungere gli obiettivi dell'accordo di Parigi (stabilizzazione del clima a "un aumento della temperatura globale ben al di sotto di 2°C") significherebbe quadruplicare il fabbisogno di minerali per le tecnologie energetiche pulite entro il 2040. La transizione, per raggiungere lo zero netto a livello globale entro il 2050, richiede un apporto di minerali sei volte maggiore nel 2040 rispetto a oggi”

Fonte: The Role of Critical Minerals in Clean Energy Transitions, IEA

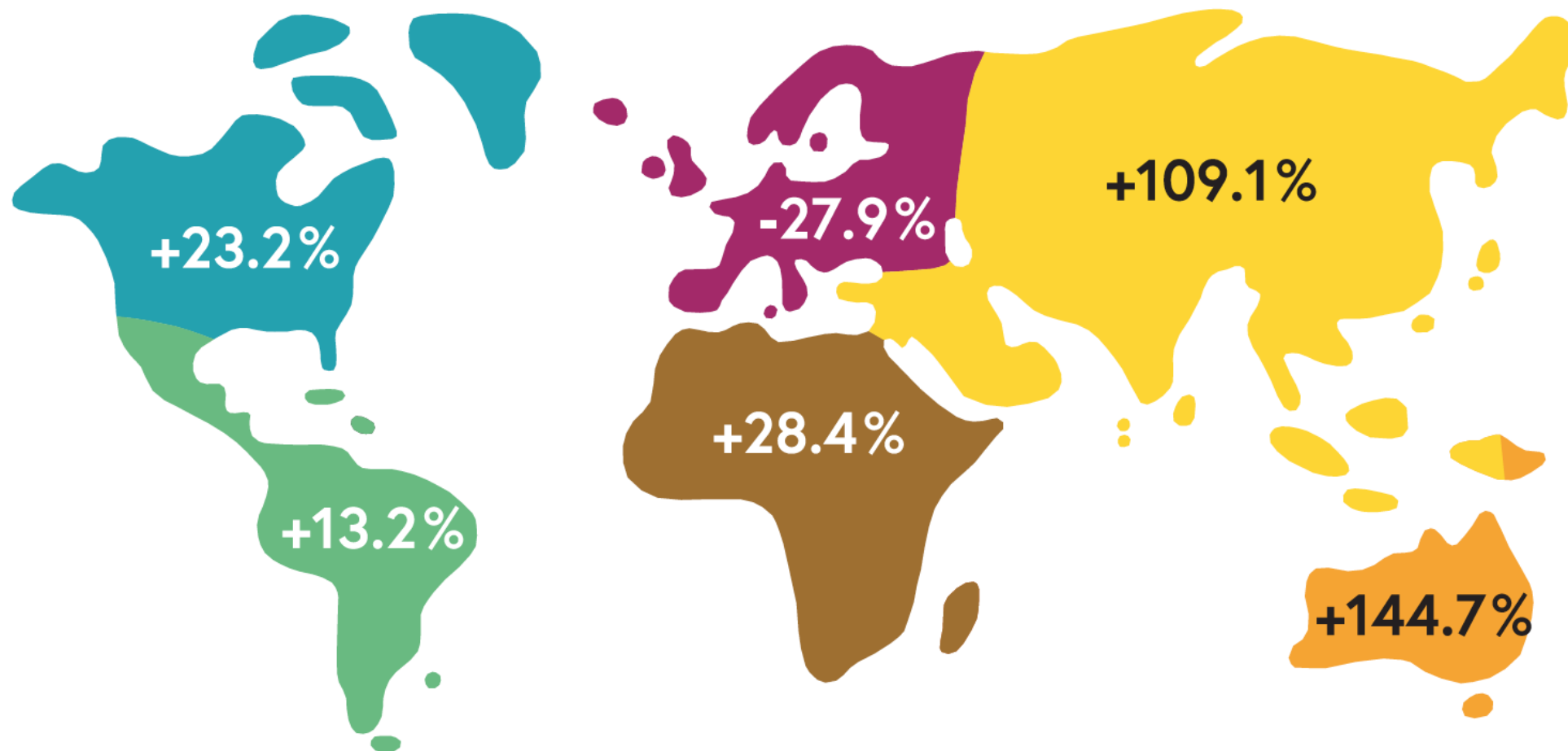
Mineral demand growth from new EV sales by scenario, 2040 compared to 2020



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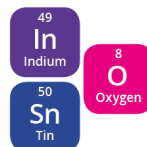
● Lithium ● Nickel ● Cobalt ● Manganese ● Copper ● Graphite
● Rare earth elements

DECLINO DELLA PRODUZIONE MINERARIA IN EUROPA DAL 2000 AD OGGI



ELEMENTI IN UNO SMARTPHONE

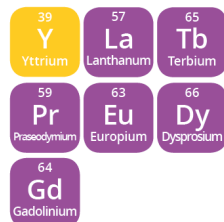
SCREEN



Indium tin oxide is a mixture of indium oxide and tin oxide, used in a transparent film in the screen that conducts electricity. This allows the screen to function as a touch screen.



The glass used on the majority of smartphones is an aluminosilicate glass, composed of a mix of alumina (Al_2O_3) and silica (SiO_2). This glass also contains potassium ions, which help to strengthen it.



A variety of Rare Earth Element compounds are used in small quantities to produce the colours in the smartphone's screen. Some compounds are also used to reduce UV light penetration into the phone.

BATTERY



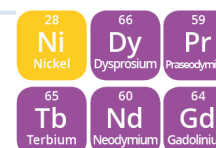
The majority of phones use lithium ion batteries, which are composed of lithium cobalt oxide as a positive electrode and graphite (carbon) as the negative electrode. Some batteries use other metals, such as manganese, in place of cobalt. The battery's casing is made of aluminium.

ELECTRONICS

Copper is used for wiring in the phone, whilst copper, gold and silver are the major metals from which microelectrical components are fashioned. Tantalum is the major component of micro-capacitors.



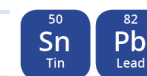
Nickel is used in the microphone as well as for other electrical connections. Alloys including the elements praseodymium, gadolinium and neodymium are used in the magnets in the speaker and microphone. Neodymium, terbium and dysprosium are used in the vibration unit.



Pure silicon is used to manufacture the chip in the phone. It is oxidised to produce non-conducting regions, then other elements are added in order to allow the chip to conduct electricity.



Tin & lead are used to solder electronics in the phone. Newer lead-free solders use a mix of tin, copper and silver.



CASING

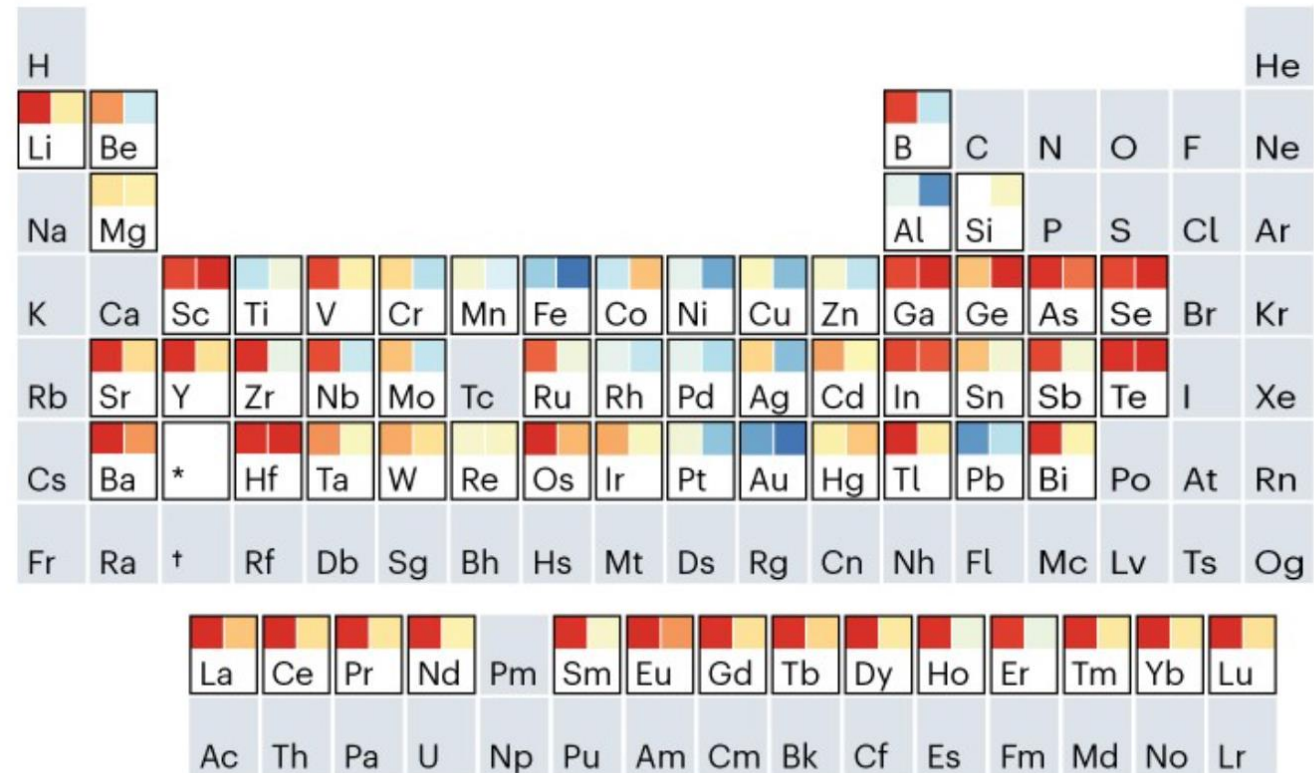
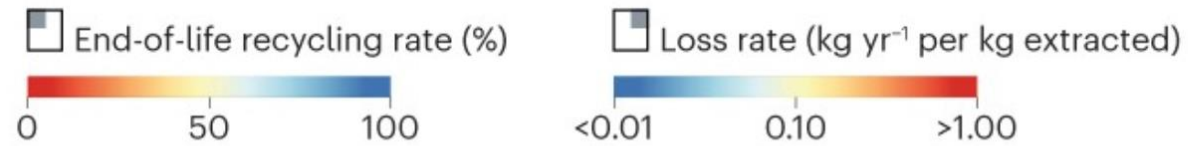


Magnesium compounds are alloyed to make some phone cases, whilst many are made of plastics. Plastics will also include flame retardant compounds, some of which contain bromine, whilst nickel can be included to reduce electromagnetic interference.

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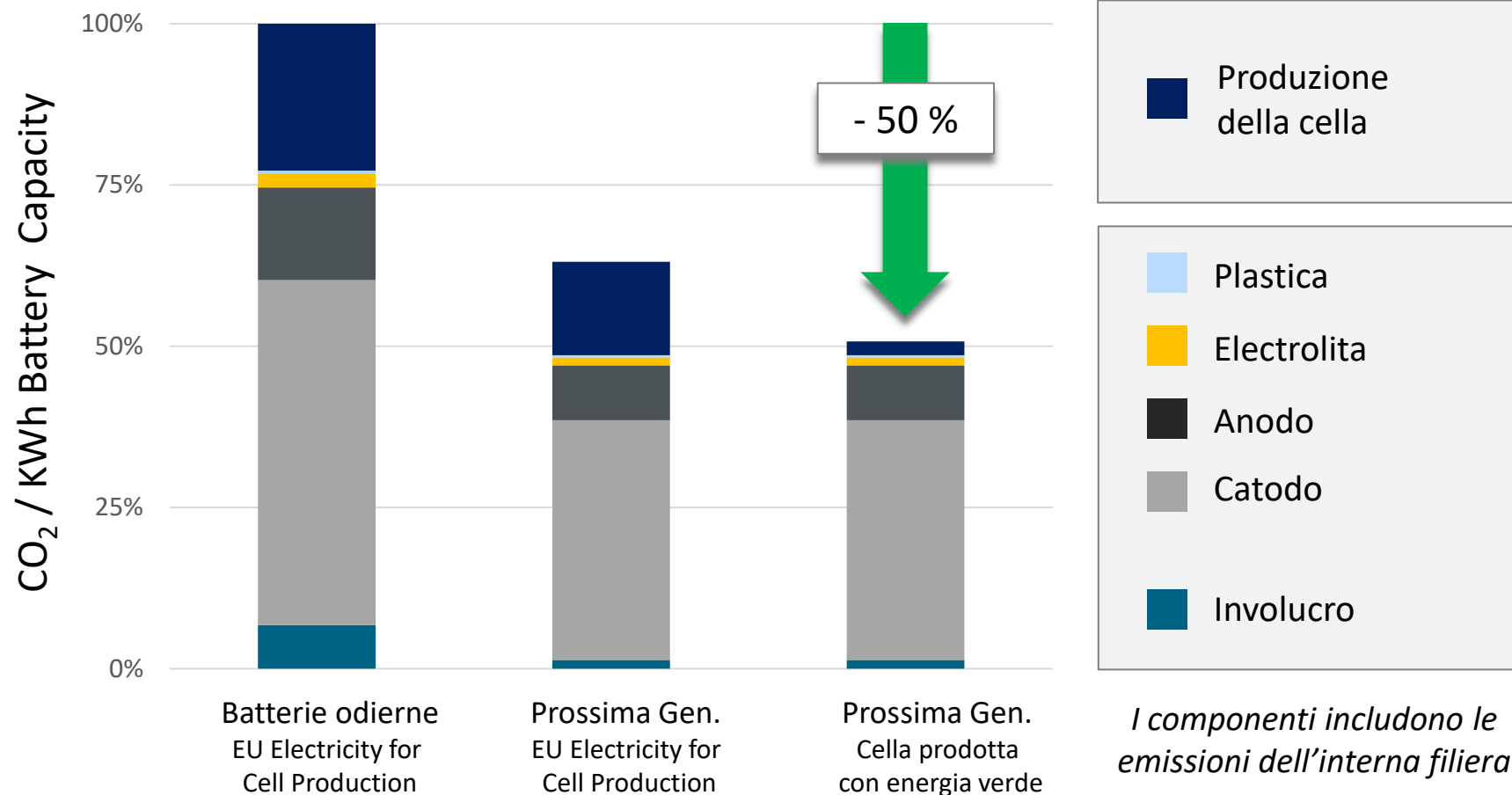


TASSI DI RICICLO E TASSI DI PERDITA PER VARI METALLI



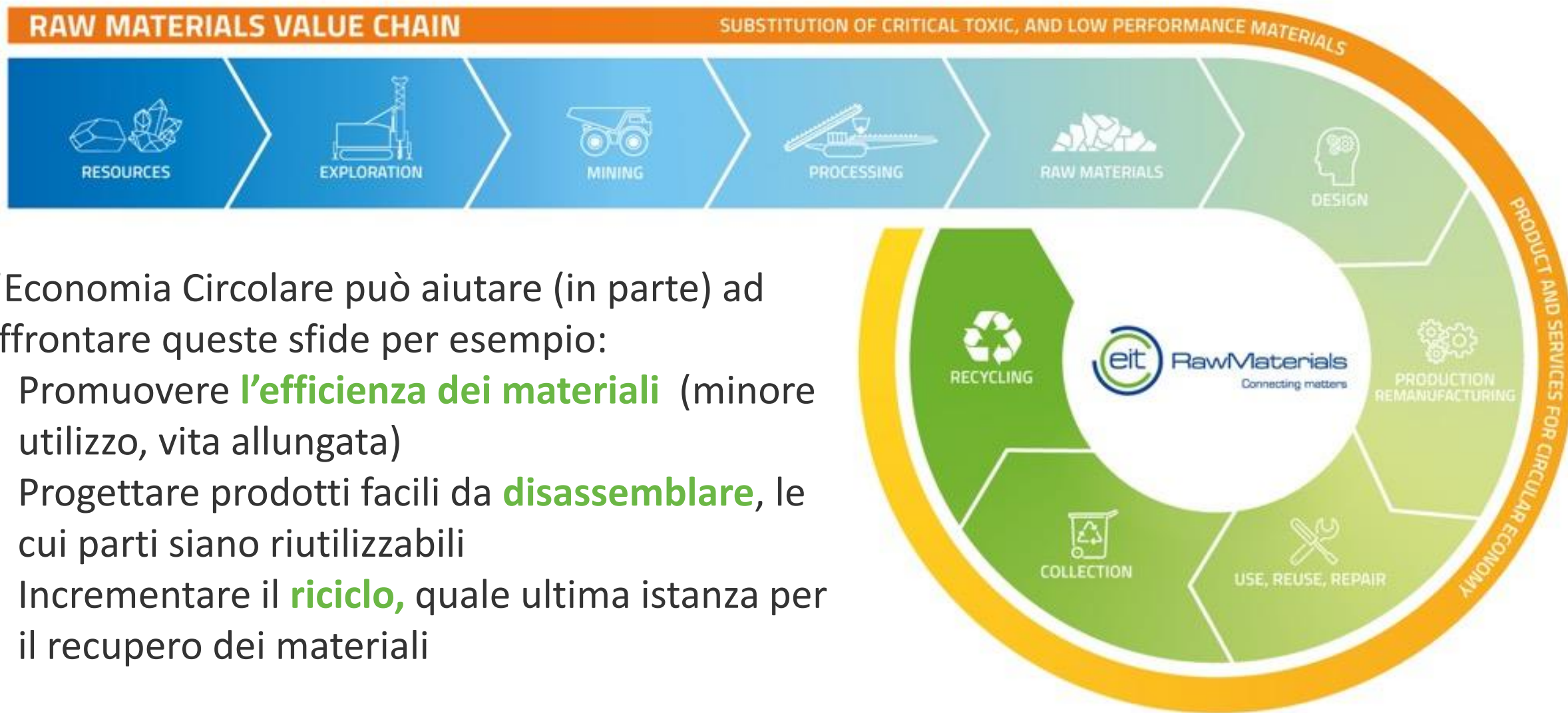
Source: Charpentier Poncelet, A. *et al. Nature Sustain.* <https://doi.org/10.1038/s41893-022-00895-8> (2022).

EFFICIENZA DEI MATERIALI E RECUPERO



L'impronta di CO₂ di una batteria è in larga parte dovuta ai materiali, in particolare anodo e catodo

L'ECONOMIA CIRCOLARE INTRODUCE UN APPROCCIO COMPLETAMENTE DIVERSO ALL'USO DELLE RISORSE



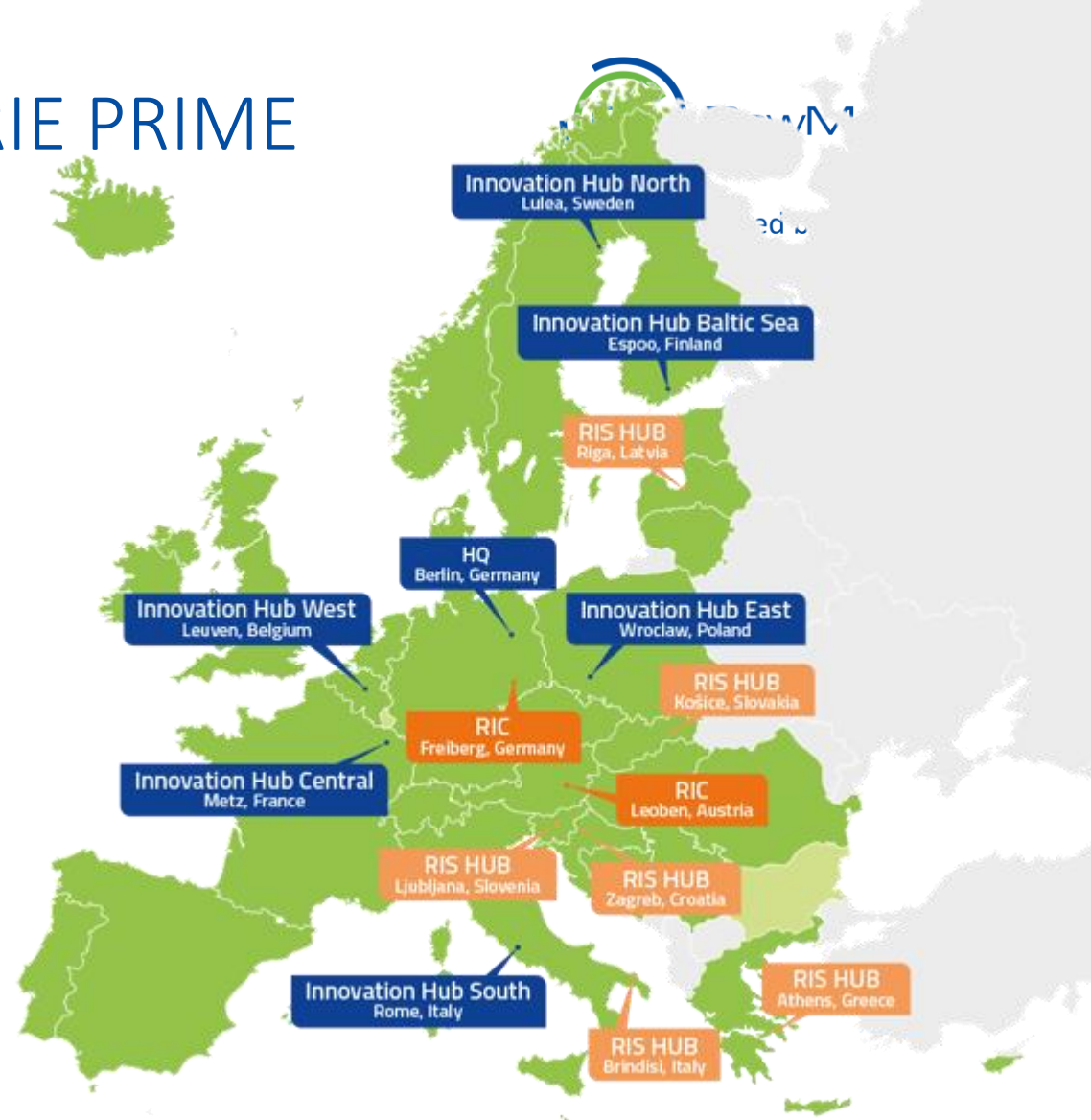
L'Economia Circolare può aiutare (in parte) ad affrontare queste sfide per esempio:

- Promuovere **l'efficienza dei materiali** (minore utilizzo, vita allungata)
- Progettare prodotti facili da **disassemblare**, le cui parti siano riutilizzabili
- Incrementare il **riciclo**, quale ultima istanza per il recupero dei materiali

UN NETWORK EUROPEO SULLE MATERIE PRIME

- Il più grande network mondiale nelle materie prime
- Copertura di tutta la filiera
- Quasi 300 partner
- 22+ paesi
- 6 Innovation Hubs in tutta Europa
- Headquarter a Berlino, Germania

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





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GRAZIE PER L'ATTENZIONE



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