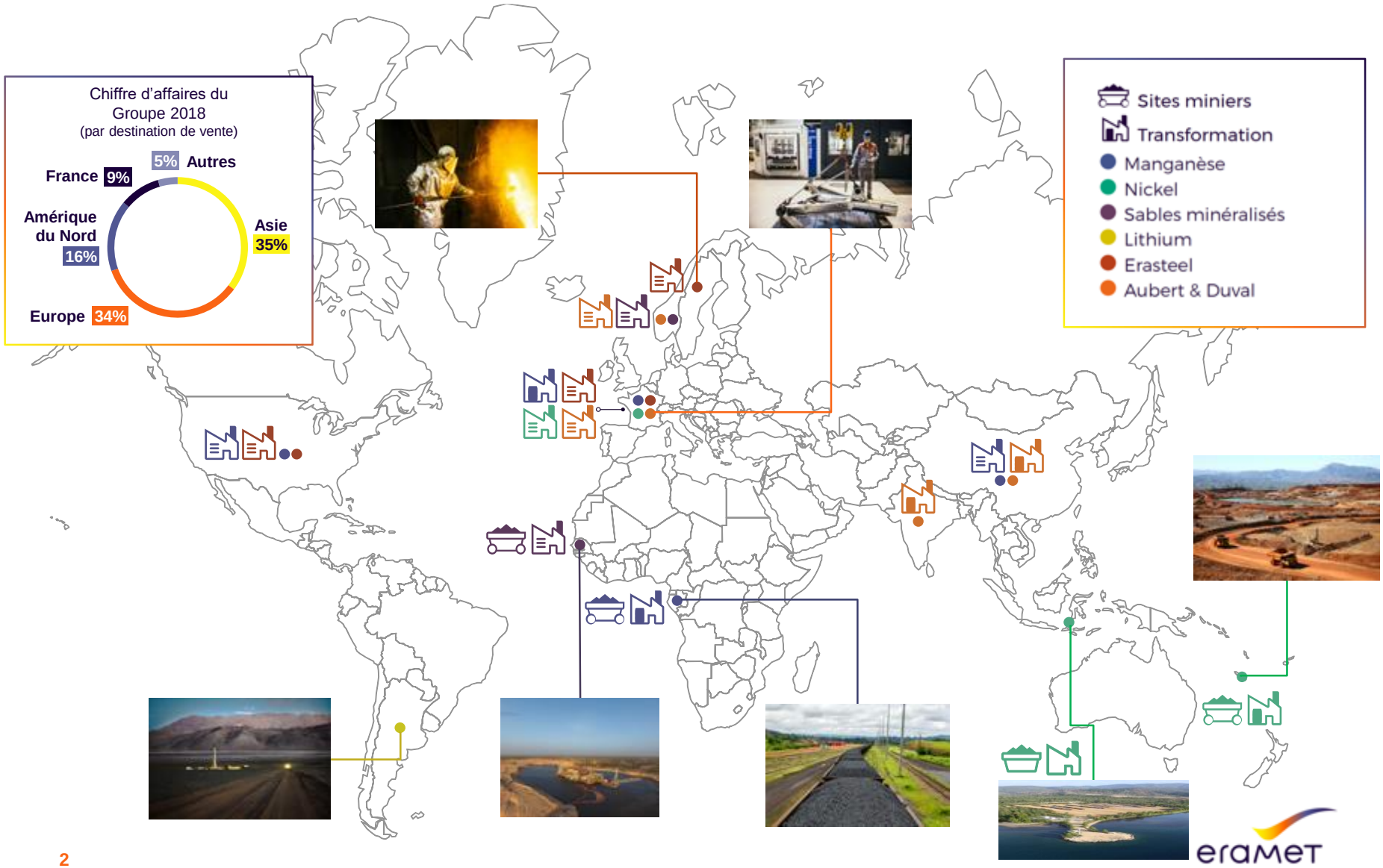
Quelle souveraineté minérale pour supporter le développement d'une filière batterie européenne

Batteries électriques : comment produire en masse des batteries plus légères, plus fiables et respectueuses de l'environnement ?

Fondation Tuck - Groupe "Quel Carburant pour demain"

16 DECEMBRE 2019

A global geographic footprint



Eramet positioning in the battery value chain is upstream (supply of raw materials) **and downstream** (recycling)

Eramet market segment

- Ni, Li, Co and Mn deposits
- Ni salts (NiSO4)
- …

Raw materials → **Manufactured products** → **Batteries** → **Vehicles** → **Second life** → **Recycling**






Circular and sustainable economy

Eramet market segment

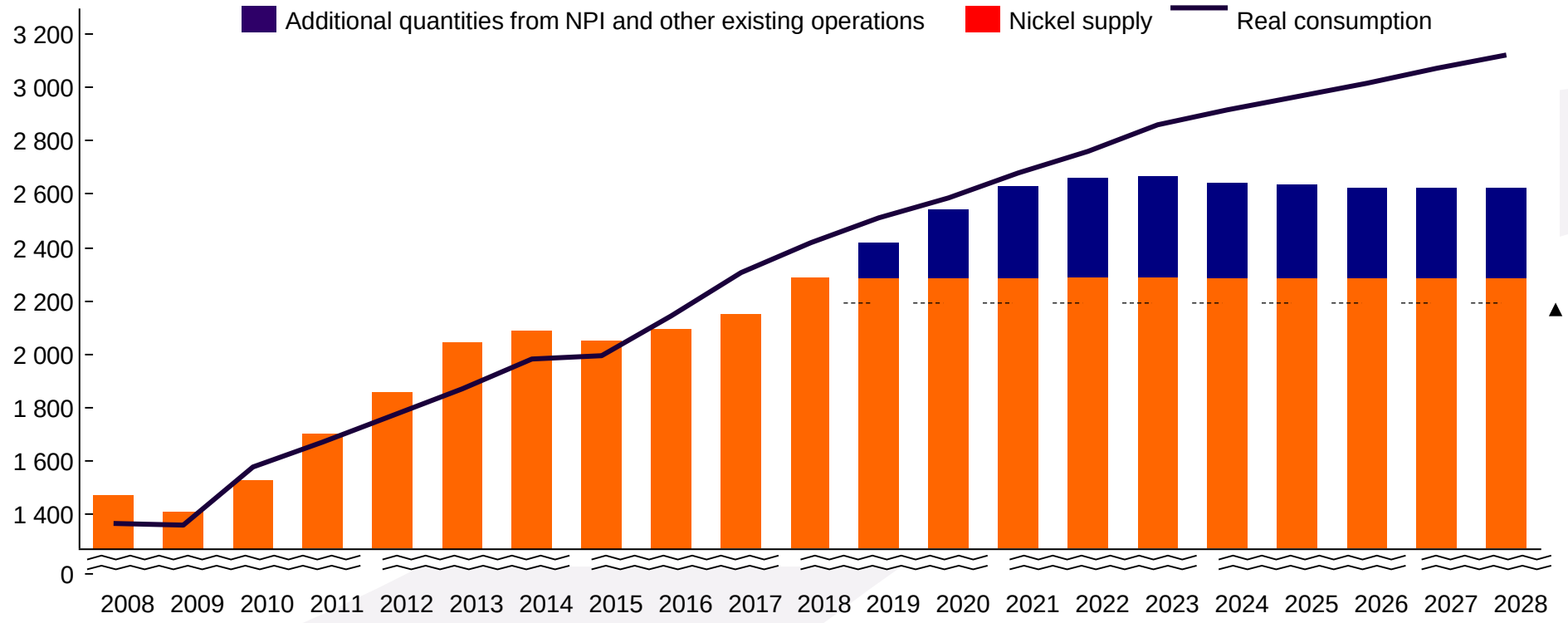
- Batteries recycling
- Metal production


Nickel
Cobalt
for batteries
erdmet

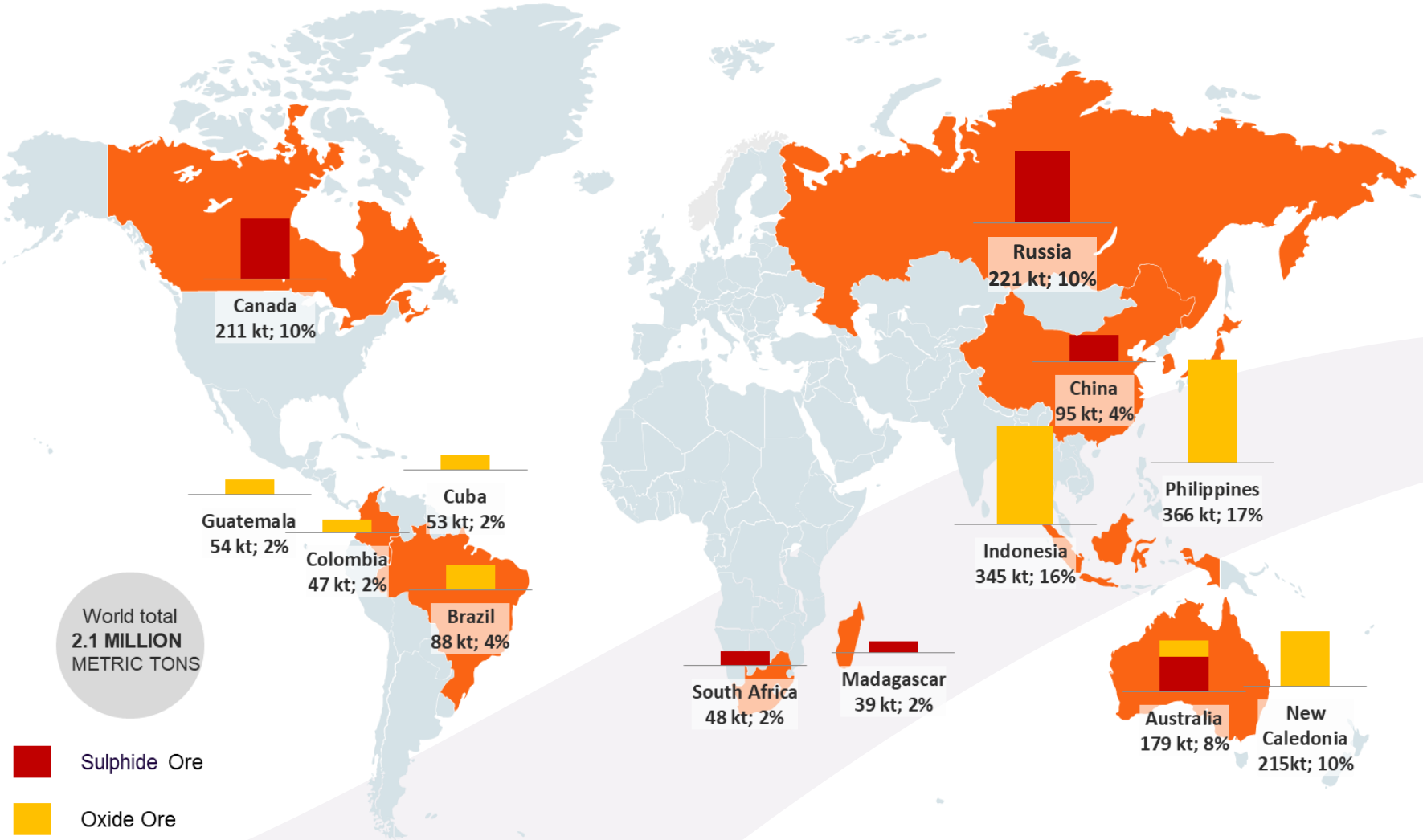
Nickel market balance in deficit

- Projects from existing producers (ramp-up / re-start) and new production already identified will **not be enough to cover the rising demand, especially from the EV sector**

2018 – 2028 Nickel balance (kt-Ni)

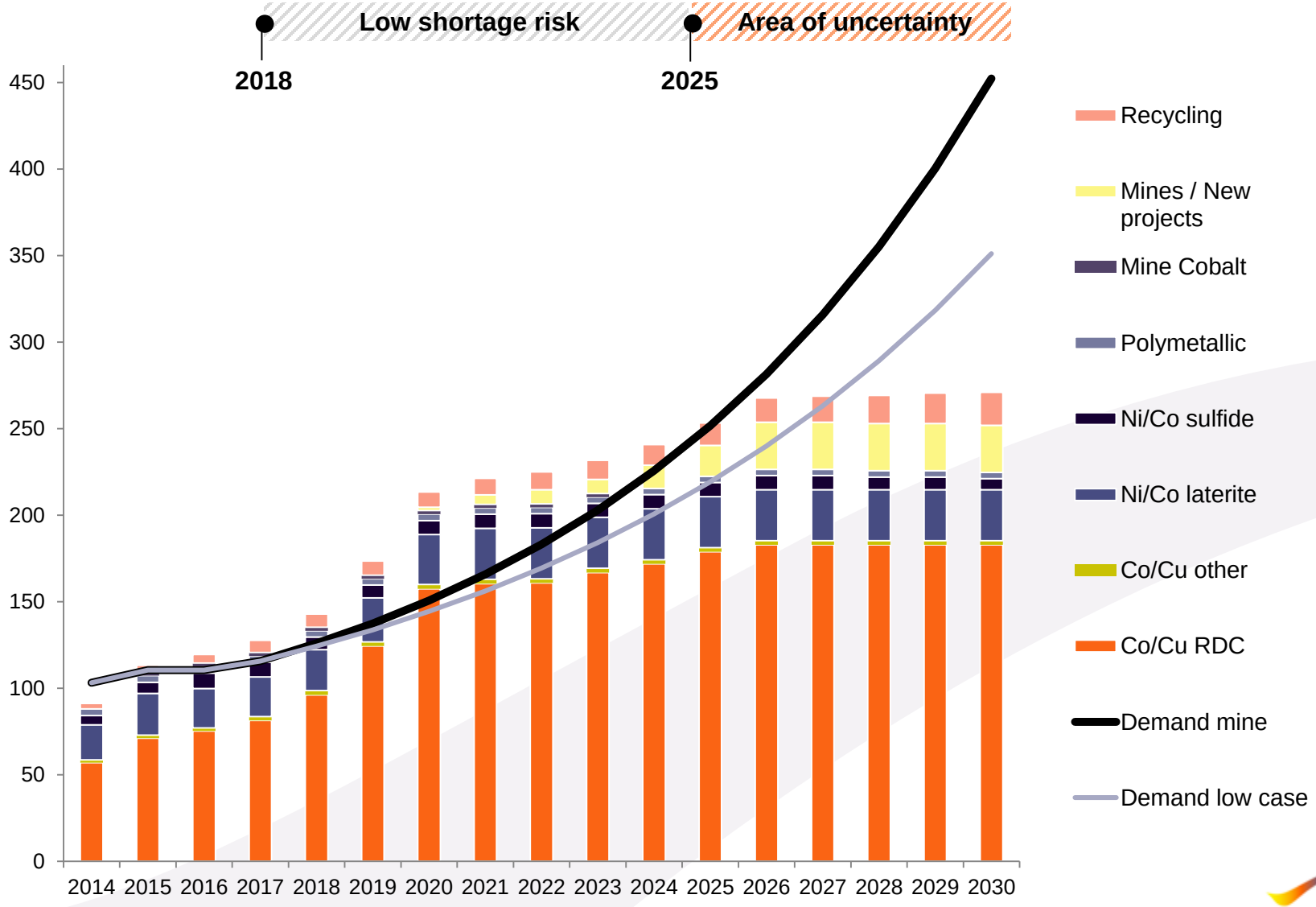


Nickel extraction increase expected mainly out of Indonesia from mines mainly developed by Chinese operators

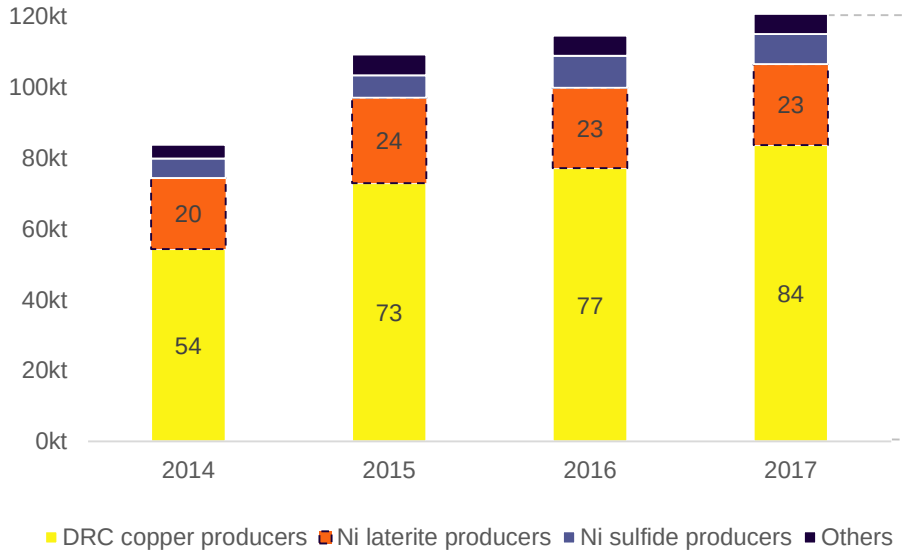


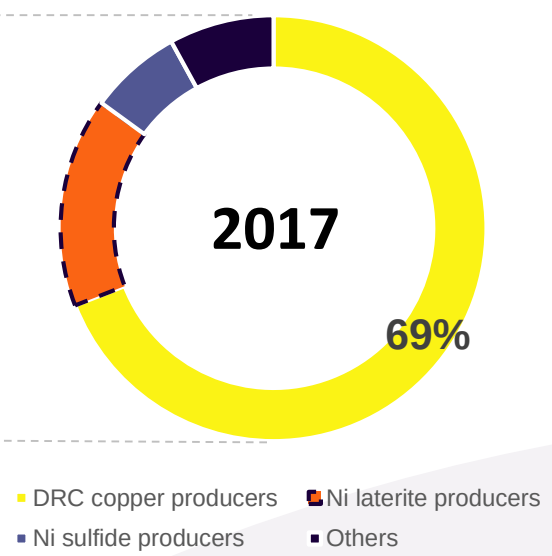
Source: INSG

Cobalt supply-demand is a delicate equation

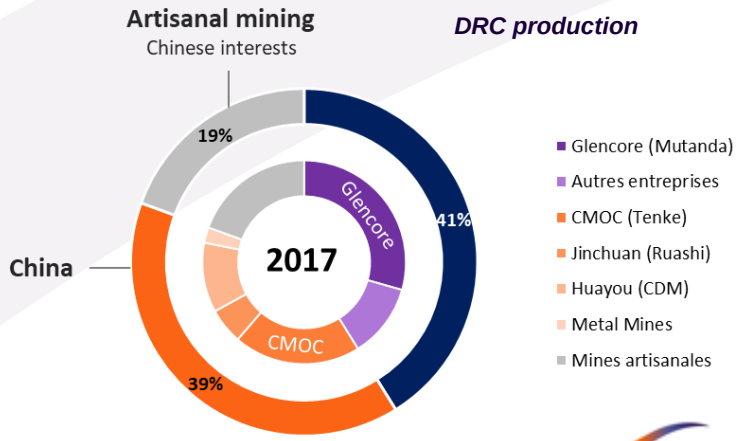


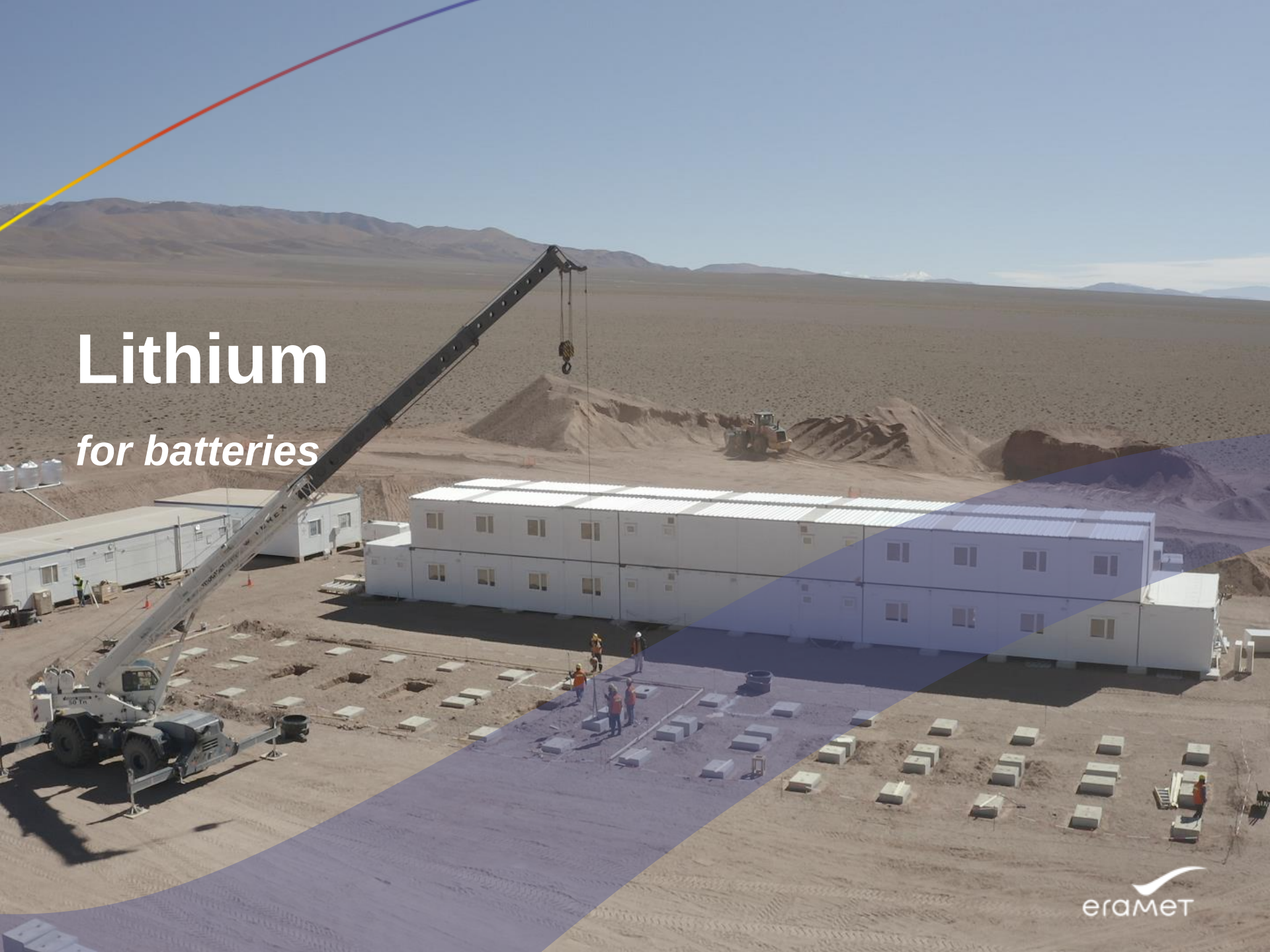
2/3 of cobalt production is supplied by copper producers in DRC





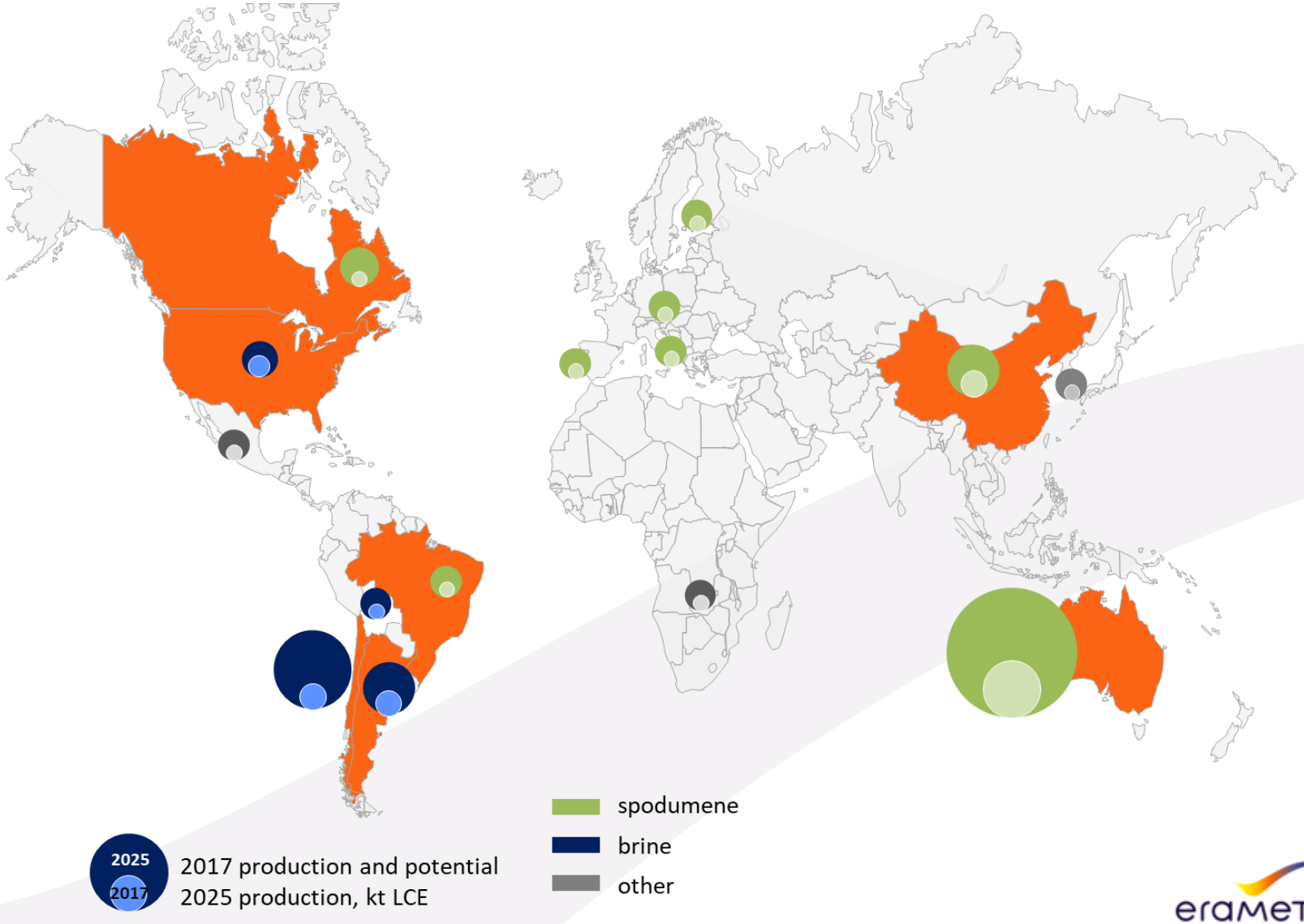
- Chinese companies control worldwide:
  - ~ 45% of cobalt mining production (inc. artisanal mines in DRC).
  - ~ 60% of refined cobalt production




Lithium
for batteries
eramet

A booming lithium market over the next years

Lithium production diversified around South America and Australia



Recycling

of Lithium-ion batteries

ReLieVe: Recycling Li-ion batteries for electric Vehicles

A project supported by

eit RawMaterials

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation

4,7 M€

2020-2021
6 pilot trials

CHALLENGE: To develop a « closed-loop » integrated process to produce battery grade metallic salts from highly reactive and complex materials

SUEZ — eramet — BASF We create chemistry

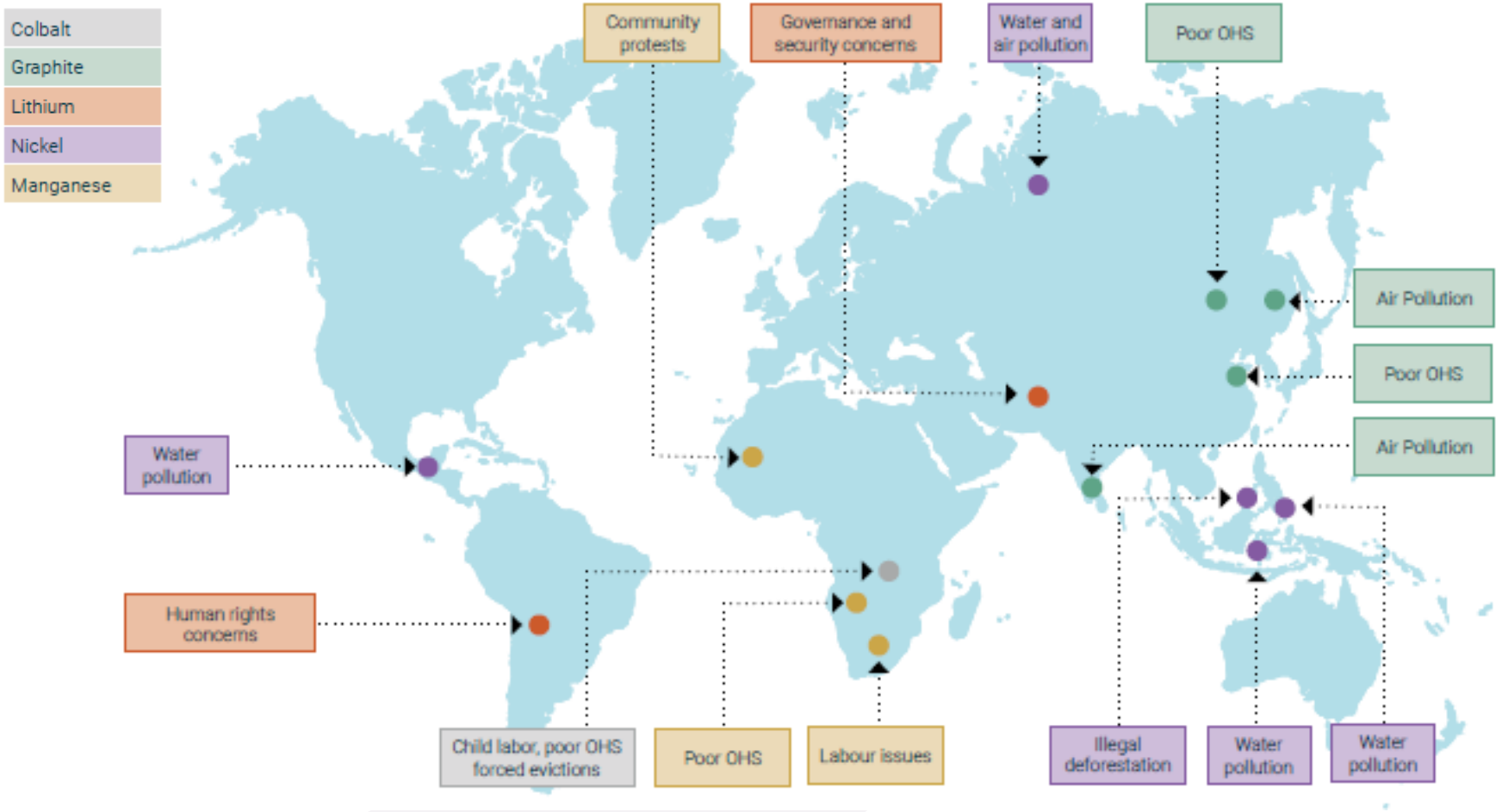
Collecting & Dismantling	Recycling	Producing new electrode materials

Academic support : NTNU — Chimie Paris ParisTech — PSL Research University Paris

eramet

CSR & CO2 impact of nickel, cobalt, lithium extraction and first transformation

Global snapshot of risks associated with battery metals identified by mainstream medias



Rising public scrutiny and concern regarding cobalt

15 months

January 2016	Amnesty International publishes cobalt report
September 2016	Washington Post publishes cobalt investigation
October 2016	Apple re-classifies cobalt as conflict mineral
November 2016	RCS publishes cobalt supply chain risk report Global Electronic Industry Citizen Coalition (EICC) launches Responsible Raw Materials Initiative (RRMI) to expand responsible sourcing beyond 3TG
January 2017	Responsible Cobalt Initiative (RCI) is being launched and includes Apple, Samsung SDI and Chinese companies
February 2017	Sky News publishes a report on working conditions within the upstream in DRC
March 2017	Apple temporarily stops buying cobalt from ASM sites in DRC
May 2017	OECD publishes a report on 22 raw materials, including cobalt, and plans to extend due diligence guidelines EPRM (*European Partnership for Responsible Minerals*) begins to consider cobalt as a conflict mineral

Environmental damage now as the first industry concern

Likelihood of presence in Li-ion battery supply chain

- Being the 'riskiest' battery metal, cobalt is for now **the only one provided with a well investigated supply chain.**
- The other battery metals, such as nickel, will likely follow the same path and see their risk levels change, leading notably to an increased public perceived risk.

Nickel, cobalt, lithium CO2 impact can be reduced significantly depending of technical routes chosen

BEV

12 t CO2 émis sur la vie d'un **BEV**

80g CO2/km

(150 000km; 60kWh)

Battery & car manufacturing
35 kg Nickel

10 tCO2

Use (recharge)

2 tCO2

13,5 tCO2

Thermique

31 t CO2 émis sur la vie d'une **ICE**

200g CO2/km

(150 000km)

Car manufacturing

4,5 tCO2

Use

26,5 tCO2

Nickel pour batteries (de la mine au produit fini nickel)

Lithium pour batteries (de la mine au produit fini lithium)

Voie pyrométallurgique

2,5 tCO2

Eq. to ~16 g /km

Voie hydrométallurgique

0,5 tCO2

Eq. to ~4 g /km

Gisement saumure

< 0,15 tCO2

Eq. to < 1 g /km

Sources: Carbone 4, Eramet

« Construire un acteur mondial durablement performant et reconnu,
une référence dans l'extraction et la métallurgie responsables,
et dans la transition énergétique »