Marketplace ProAcció Green

Economia Circular gencat

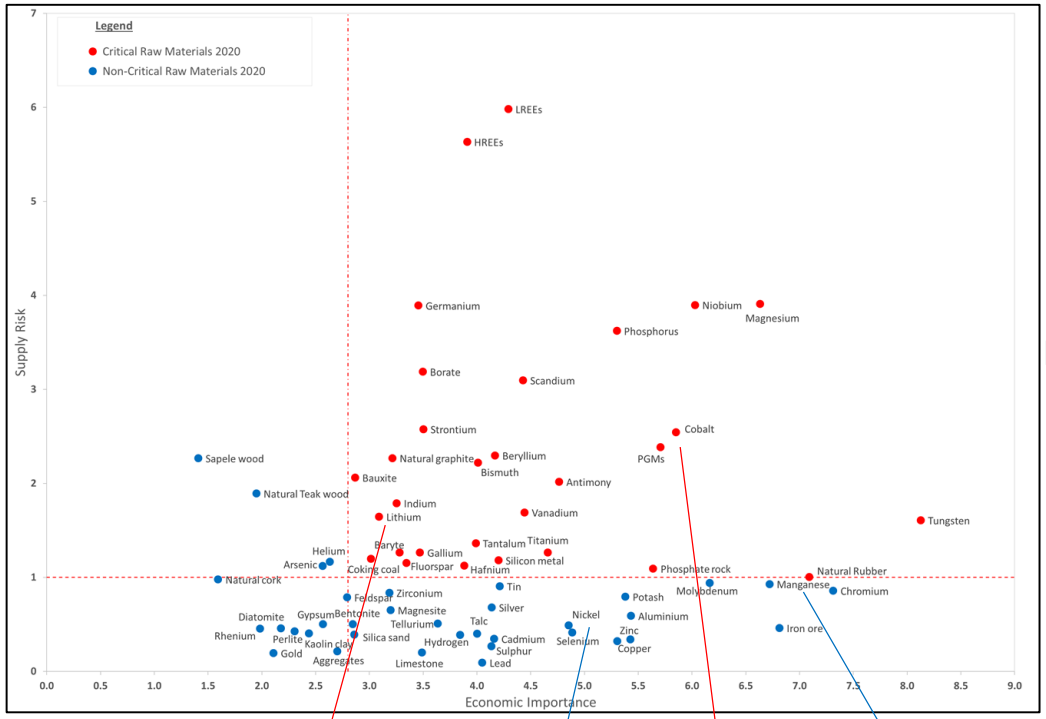
“Solucions per allargar la vida de les bateries: projectes COBRA i MARBEL”
Barcelona – 22 de junio de 2022

Dr. Victor Ferreira

IREC

Shaping Energy for a Sustainable Future

Materials in the clean energy economy



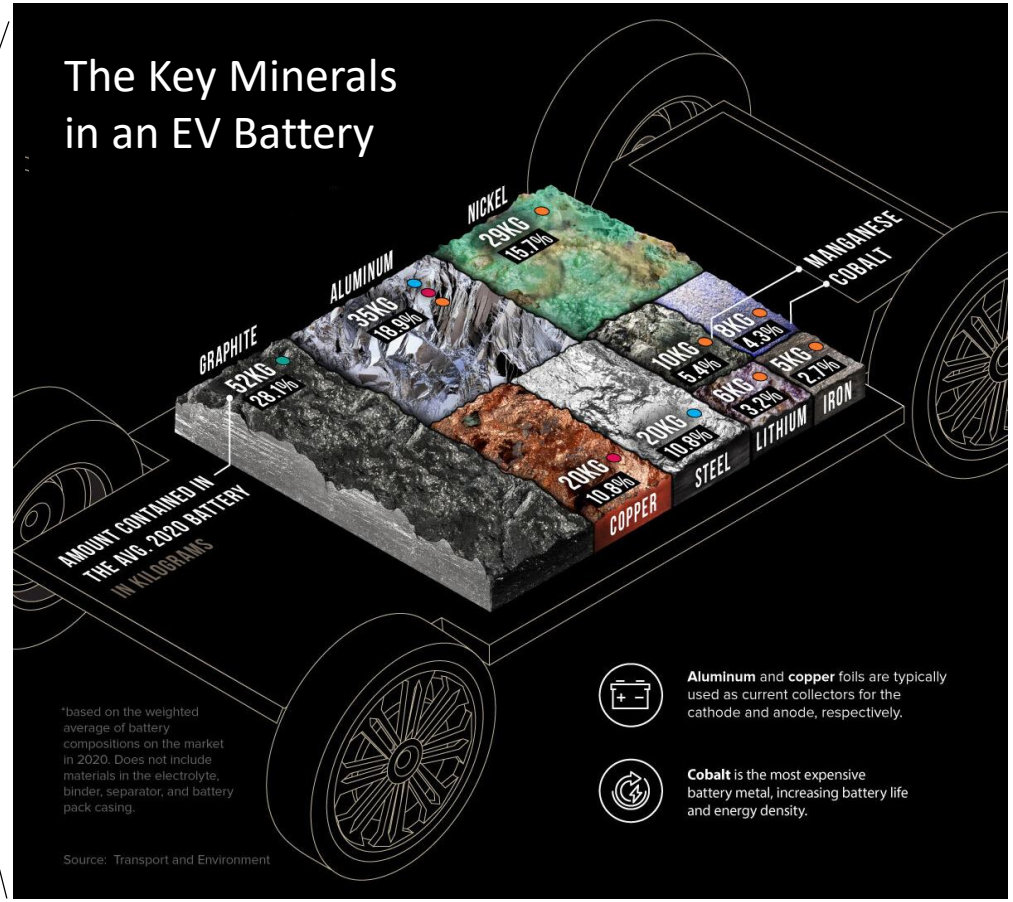
Source: https://rmis.jrc.ec.europa.eu/?page=crm-list-2020-e294f6

Turbines

Electric vehicles (EVs)

Photovoltaic (PV) thin films

Energy-efficient lighting



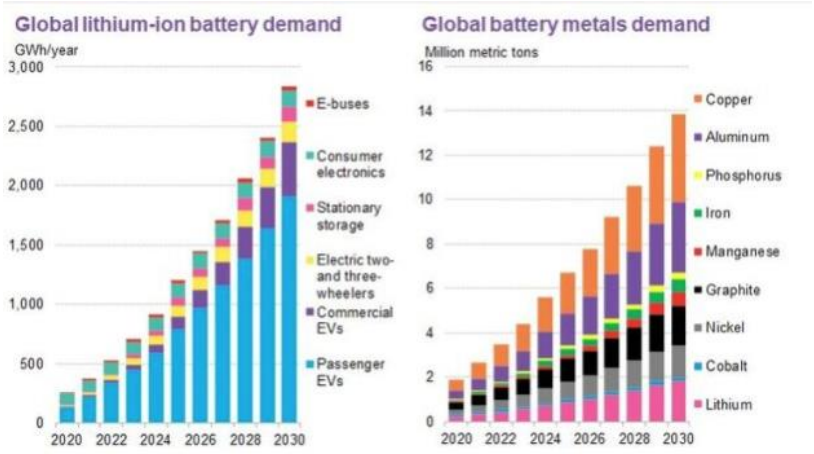
Source: https://elements.visualcapitalist.com/the-key-minerals-in-an-ev-battery/

Lithium Nickel Cobalt Manganese …

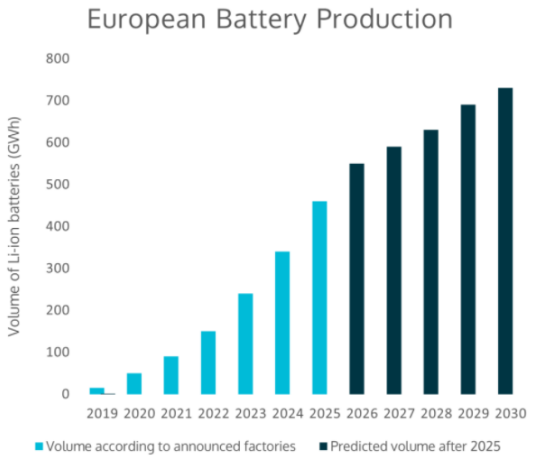
Why are they CRM?

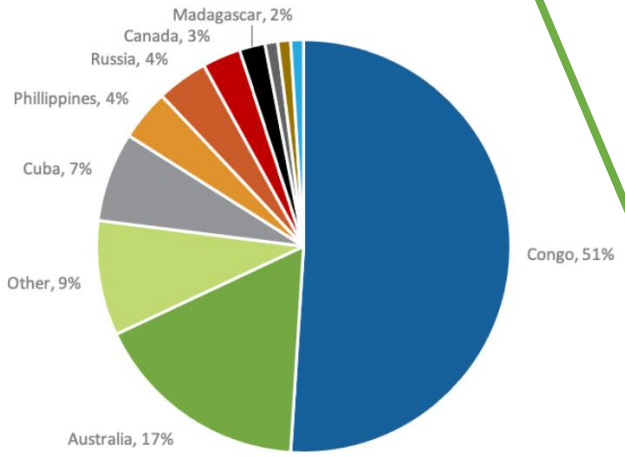
- **Significant economic importance for key sectors in the European economy**
- **High-supply risk**
- **Lack of (viable) substitutes**

The electric transition of the automotive industry and its environmental and social performance



Metals demand occurs at mine mouth, one-year before battery demand. All metals expressed in metric tons of contained metal, except lithium, which is in lithium carbonate equivalent (LCE).





Global Cobalt Reserves (219 Estimates)

Lithium, manganese, nickel, and natural graphite have moderate reserves to cover the expected 10% share of electric vehicles in the global fleet in the next years. However, **they are not enough reserves to cover the expected increase in demand, pushing up market prices**

Considering an extreme scenario for 100% electrification of the world's vehicle fleet, under continuous growth conditions, having enough reserves of cobalt and potentially lithium is unlikely

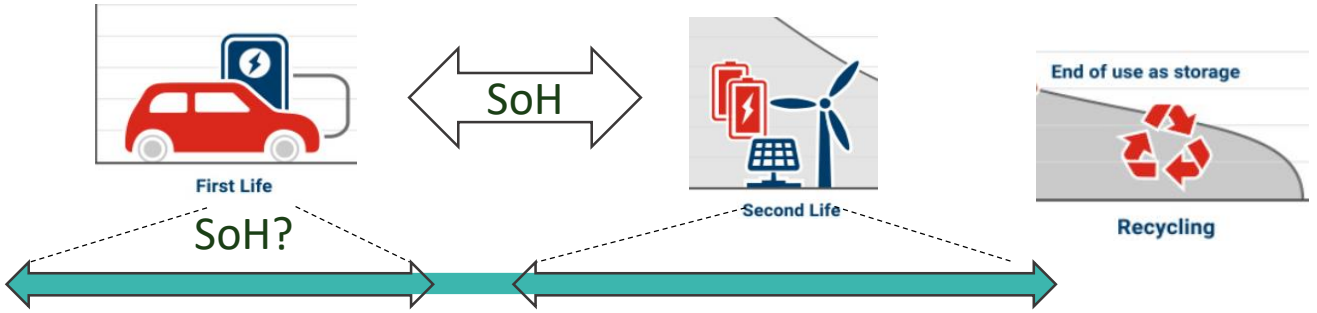
Li-ion batteries show that particularly cobalt and nickel (used in the cathode) increase significantly the environmental footprint

Cobalt is extracted mainly from the Democratic Republic of the Congo, a region historically characterized by political instability and social impacts in the mining sector

Child work, safety mining conditions (with many illegal extractions and uncountable deaths

https://batterybay.eu/background/how-european-lithium-could-make-batteries-more-sustainable/
https://www.transportenvironment.org/

The residual capacity of batteries allows them to be used in additional applications, extending their life



Residual capacity is estimated to be 60- 75% of its initial capacity

Repurposing & Refurbishing & Remanufacturing

Second life applications

Storing energy generated from renewable sources to support the government grid, and others

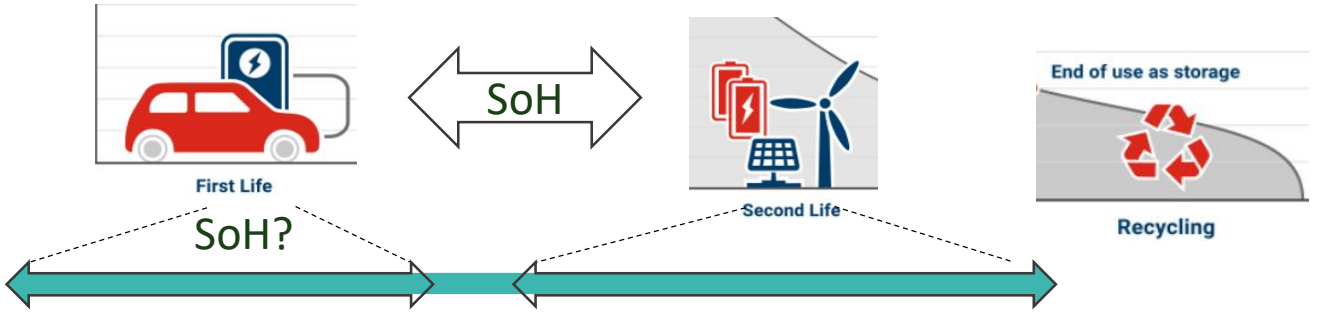
The residual capacity of batteries allows them to be used in additional applications, extending their useful life

COBRA

Total Budget
€ 11 857 352,50
Duration 2020-2023
https://projectcobra.eu/#cobra

MARBEL

Total Budget
€ 9 888 796,39
Duration 2021-2024
https://marbel-project.eu/



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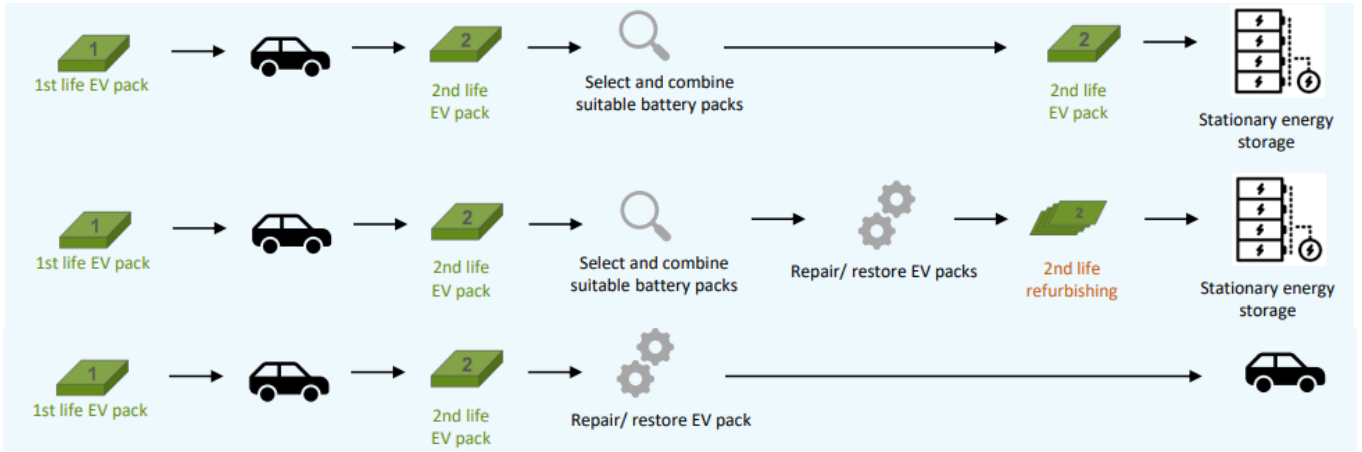
Repurposing & Refurbishing & Remanufacturing



2nd Life is a good option for:

1) To keep the materials in the battery chain as much as possible

2) It would give some time to recycling companies to develop cost and energy-efficient methods

Life Cycle Assesment (LCA) Capabilitites in IREC

Energy Systems Analytics
Research Group

ENERGY ANALYTICS

- Grid modelling, simulation and analysis
- AI applied to energy data forecast: load, generation, flexibility
- Renewable energy, electric vehicles and storage systems caracterization

MODELING AND OPTIMISATION

Advanced Energy Management Systems for:

- Local Energy Communities
- Smart Cities
- Smart Grids
- Demand Aggregators
- EV Grid Integration

LCA AND ENERGY ECCONOMICS

- Economic and sustainability assessment
- Life cycle assessment (LCA-LCC)
- Energy markets simulation and assessment
- Policy recommendation and evaluation

ISO 14040/44

- *Methodical, systematic and scientific vision for the calculation of life cycle impacts*
- *It is a useful tool to promote and communicate the sustainable development of companies and their relationship with their clients*

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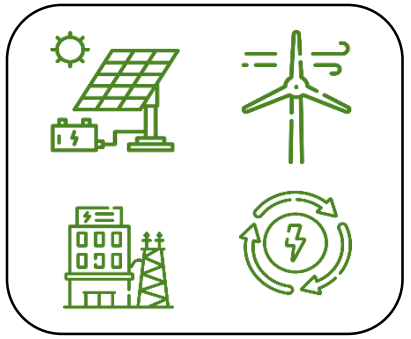
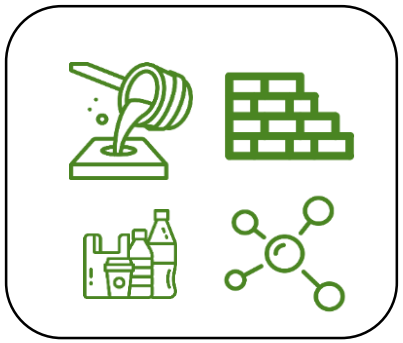
Areas where we apply the LCA

- **Full LCA analysis**
- **Life Cycle Costing (LLC) analysis**
- **ECODESIGN**
- Advice on obtaining environmental product certification **(Environmental Product Declarations)**
- **Carbon Footprint calculation**
- **Circular Economy**

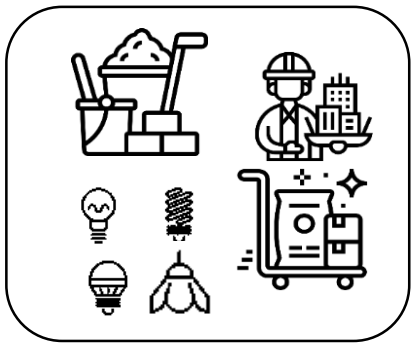
E-mobility & Battery



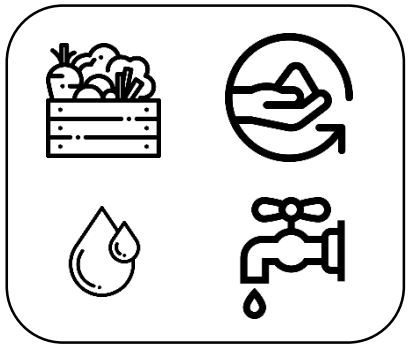
Renewable energies



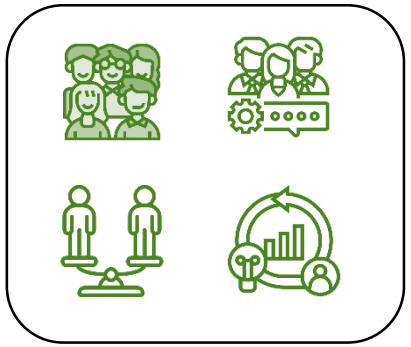
Materials



Construction & Building



Agri-food & water



Social Life cycle

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Gràcies per la vostra atenció!