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The new EU Battery Regulation - value chain significance

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New study on value chains

Published in September 2023,
English long version in preparation.

Identification of the critical transformation technologies:

- Photovoltaics,
- Wind power,
- Lithium-ion batteries,
- Permanent magnets,
- Electrolysers,
- Heat pumps,
- Green steel (DRI plants)

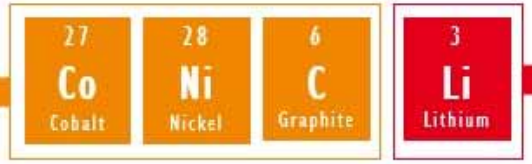
Lithium-ion batteries - supply chain challenges

High market power of China

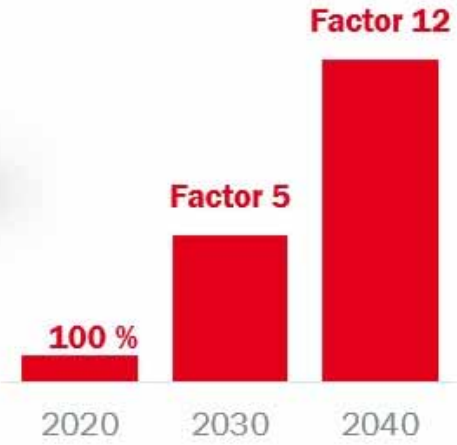
Raw material extraction	Raw material processing	(Sub-)components	Goods
Lithium Australia 52%	**Lithium** China 73%	**Cathode materials** China 71%	**Battery cells** China 77%
Cobalt DR Congo 72%	**Cobalt** China 75%	**Anode materials** China 91%	
Graphite China 73%	**Graphite** China 100%		
Nickel Indonesia 38%	**Nickel** China 55%		

Picture: Volkswagen

Share of countries with the largest production capacity in world production



Lithium bottleneck: world demand to increase fivefold by 2030



Increase in demand for lithium due to electromobility compared to 2020

Source: Buchert, M.; Wünsch, M.; Ziegenhagen, I. et al: Securing Germany's Sovereignty – Resilient supply chains for the transformation to climate neutrality by 2045; commissioned by Climate Neutrality Foundation 2023.

Lithium: Key element No.1 for electromobility

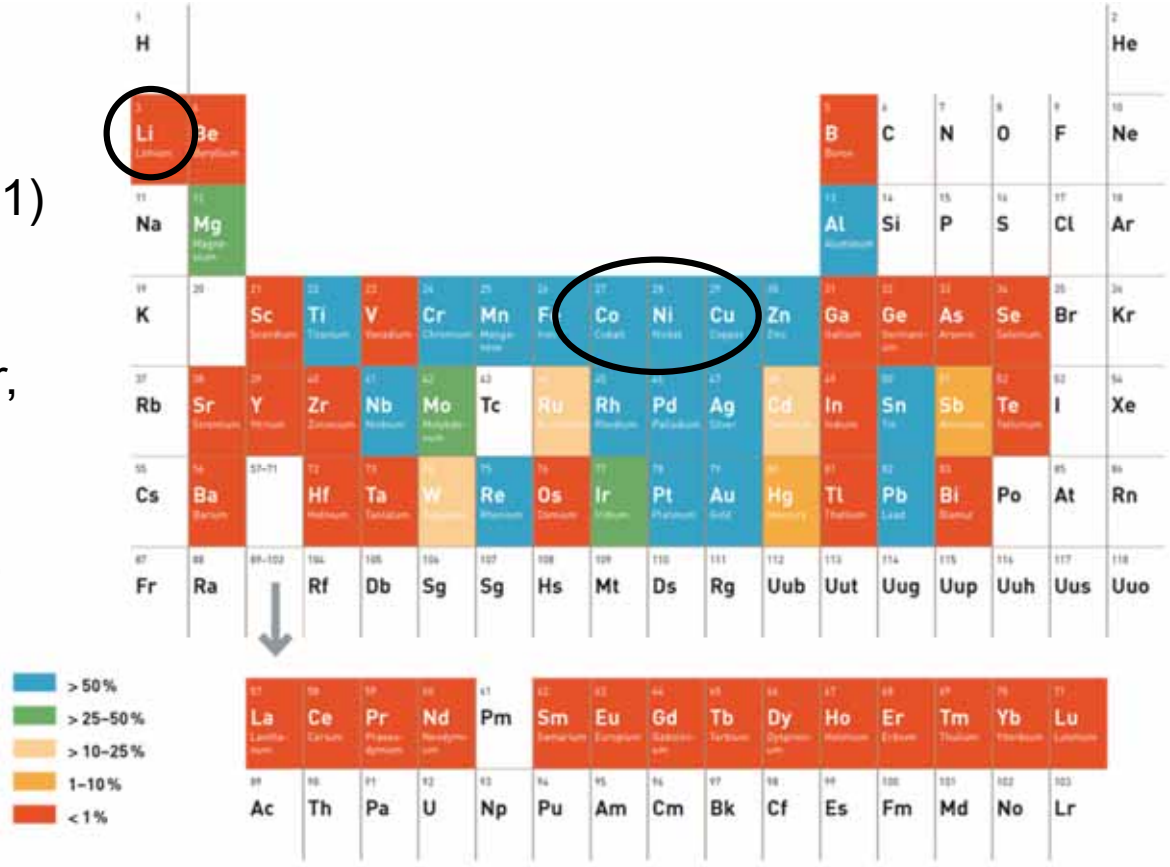
Lithium and rare earths will soon be more important than oil and gas. Our demand for rare earths alone will increase fivefold by 2030. […] We must avoid becoming dependent again, as we did with oil and gas. […]
We will identify strategic projects all along the supply chain, from extraction to refining, from processing to recycling. And we will build up strategic reserves where supply is at risk.

Blog of Commissioner Thierry Breton, Brussels, 14 September 2022

End-of-Life Recycling Rates: Status 2011 (global)

Recycling of lithium did not play a role in the year of publication of "Recycling Rates of Metals" (2011)

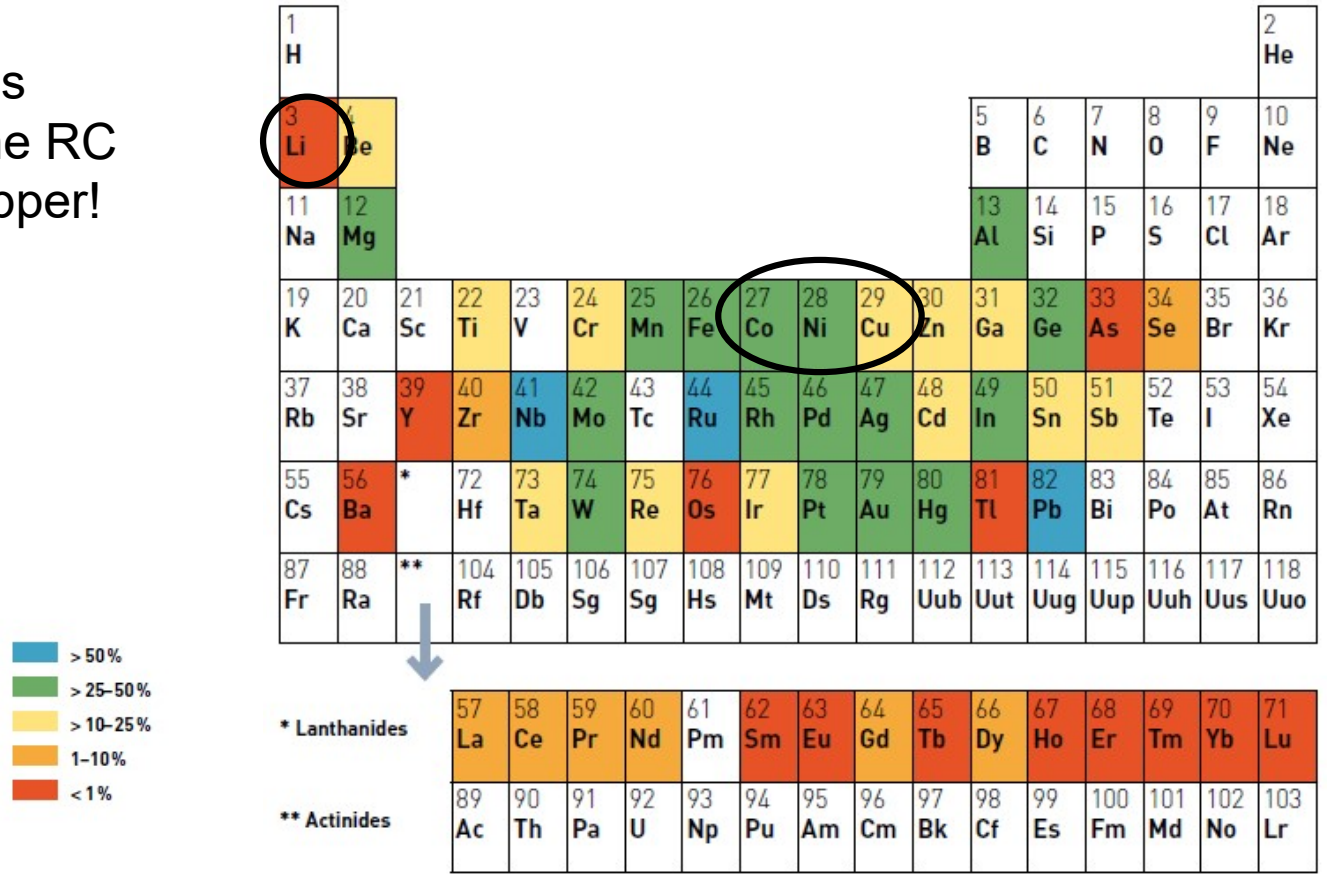
The good recycling rates for copper, nickel and cobalt are obtained from other applications such as cables, industrial catalysts, superalloys etc. LIB recycling played only a very minor role!



UNEP (2011): Recycling Rates of Metals – A Status Report, A Report of the Working Group on the Global Metal Flows to the International Resource Panel, Graedel, T.E.; Birat, J.-P.; Allwood, J.-P.; Reck, B. K.; Sibley, S.F.; Sonnemann, G.; Buchert, M.; Hagelüken, C.

Recycled content (RC): Status 2011 (global)

Recycling of lithium-ion batteries did not play a role in 2011 for the RC of lithium, cobalt, nickel and copper!



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The evolution to the new EU Batteries Regulation I/III

- Previous framework : EU Battery Directive (BD) 2006*
- Step 1: Evaluation (2018) of the BD reveals many weaknesses
- BD is in urgent need of reform, especially due to the dynamics of lithium-ion batteries (electromobility, etc.).

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* DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC

The evolution to the new EU Batteries Regulation II/III

- Step 2: 2019 - 2020: comprehensive work* on behalf of the EC to prepare the reform of the BD: including intensive stakeholder consultations in early summer 2020.

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- Step 3: 10 Dec. 2020: EC publishes comprehensive proposal for a new EU Batteries Regulation (EU BR)

https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2312

The evolution to the new EU Batteries Regulation III/III

- Next Steps: 2021 - 2023: EU trilogue process
- Following amendments proposed by the EU Parliament and the EU Member States, the EU Parliament and the EU Council reached an agreement on the remaining contentious issues in December 2022!
- An important point of agreement concerns the recovery rates for lithium!
- 17 August 2023: the new EU Batteries Regulation* enters into force!**

* https://eur-lex.europa.eu/eli/reg/2023/1542/oj , Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC

** https://environment.ec.europa.eu/news/new-law-more-sustainable-circular-and-safe-batteries-enters-force-2023-08-17_en

EU BR: A new dimension in environmental policy

- The EU BR wants to pave the way for sustainable batteries over the entire life cycle, i.e.
  - Ambitious environmental and social standards for primary raw materials,
  - Minimising the carbon footprint in the manufacturing chain,
  - Increasing useful life, safety and second use,
  - Significantly improved recycling by increasing collection and recycling rates.
- Once adopted, an EU regulation has immediate effect for all EU member states: better harmonisation for all actors!

EU BR Key measures I/IV

- 1: Classification and definition
  - Clearer definitions: portable battery (≤ 5kg), industrial battery (≥ 5kg), LMT* battery (≤ 25kg), electric vehicle battery, stationary battery energy storage system
- 2: Re-use of batteries
  - Comprehensive regulations on the re-use of batteries
- 3: New collection targets for portable batteries
  - By the end of 2023, 2027, 2030: 45%, 63%, 73%, based on average weight placed on the market during the three preceding calendar years

* LMT battery = light means of transport battery means a battery that is sealed, weighs 25 kg or less and is specifically designed to provide electric power for the traction of wheeled vehicles that can be powered by an electric motor alone or by a combination of motor and human power,….

EU BR Key measures II/IV

- 4: Collection rates for starter, LMT*, EV and industrial batteries
  - All starter, EV and industrial batteries should be collected, LMT* batteries: By the end of 2028, 2031: 51%, 61%, based on average weight placed on the market during the three preceding calendar years
- 5: Recycling efficiencies and specific recovery rates
  - For lithium-ion batteries: Recycling efficiency 65% by 2025, 70% by 2030, Specific recovery rates of 90% for Ni, Co, Cu and 50% for Li in 2027, 3 x 95% and 80% (Li) in 2031.
- 6: CO_2 footprint for rechargeable industrial, LMT* and EV batteries
  - CO_2 footprint performance classes and max. limits for batteries as a condition for placing on the market

* LMT battery = light means of transport battery means a battery that is sealed, weighs 25 kg or less....

EU BR Key measures III/IV

- 7: Performance and lifetime of rechargeable industrial, LMT and EV batteries
  - Information requirements on performance and durability, minimum requirements
- 8: Non-rechargeable device batteries
  - Minimum requirements for performance and service life as well as minimum threshold values
- 9: Secondary metal content in industrial (> 2 kWh), EV and starter batteries
  - Lithium-ion batteries 2031/2036: Li: 6%/12%, Co: 16%/26%, Ni: 6%/15%

EU BR Key measures IV/IV

- 10: Extended producer responsibility
  - Level playing field through better and more specific requirements
- 11: Design requirements for portable and LMT batteries
  - Readily removability and replaceability from devices
- 12 Provision of information
  - Provision/exchange of resilient information: Digital battery passport
- 13: Supply chain due diligence for batteries
  - Mandatory due diligence obligations of economic operators*

* does not apply to economic operators that had a net turnover of less than EUR 40 million in the financial year preceding the last financial year….

LIB-Recycling potentials until 2045 in Germany - Lithium

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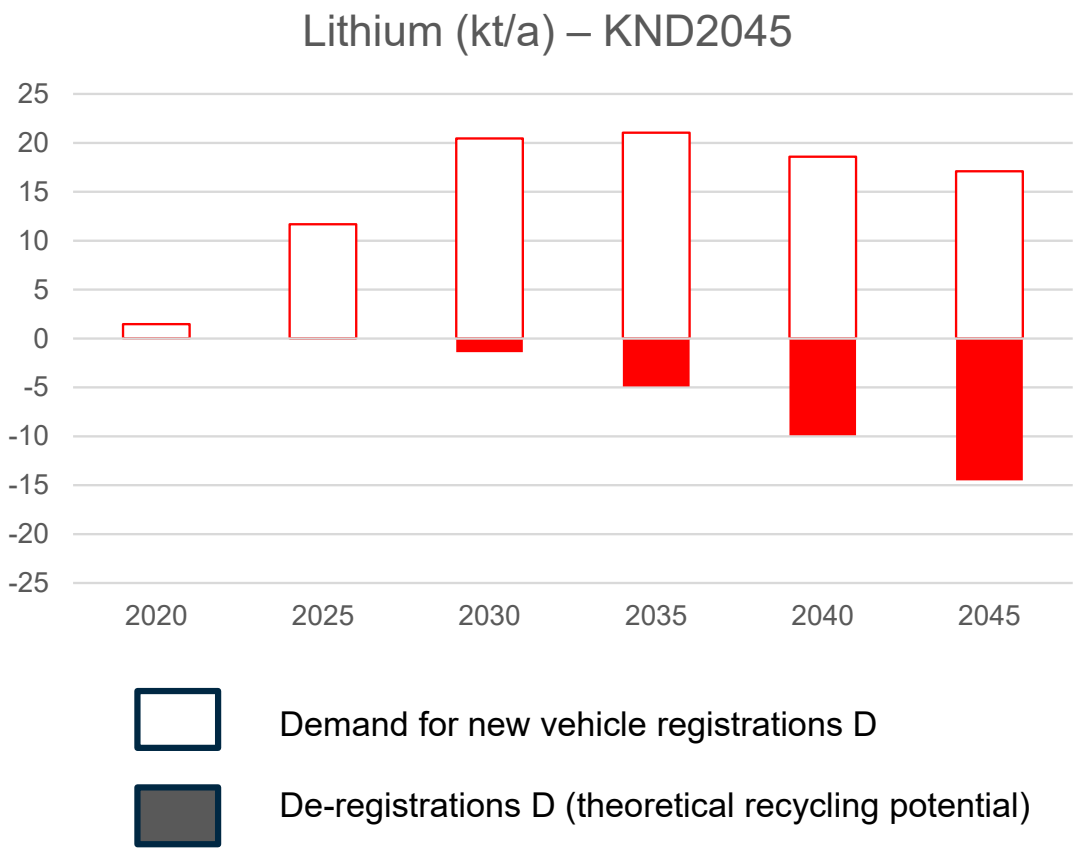
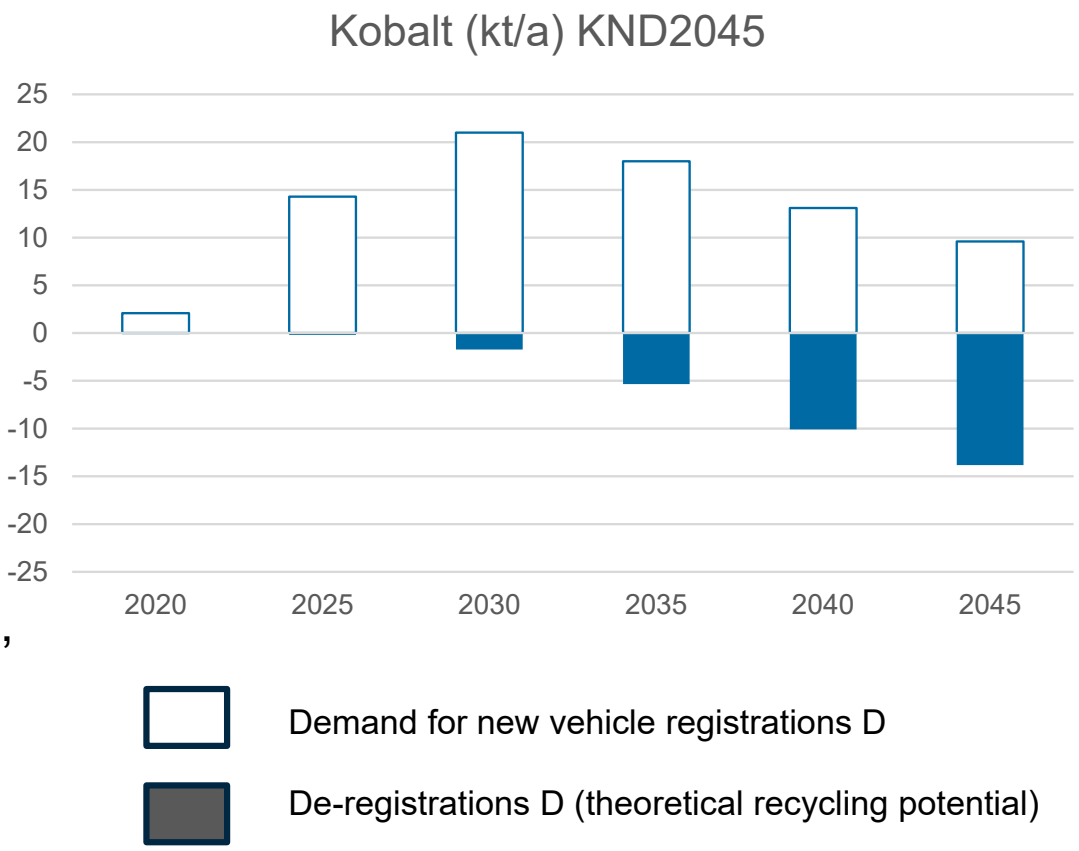
- The KND2045 scenario* assumes a higher share of public transport for passenger and freight transport!
- Li demand is mainly driven by the passenger car sector!
- The dynamic electrification of road vehicles will ensure a massive increase in demand for lithium by 2030/2035!
- The at least theoretical recycling potential will increase rapidly from 2030 onwards!



* Source: Buchert, M.; Wünsch, M.; Ziegenhagen, I. et al: Securing Germany's Sovereignty – Resilient supply chains for the transformation to climate neutrality by 2045; commissioned by Climate Neutrality Foundation 2023.

LIB-Recycling potentials until 2045 in Germany - Cobalt

- The dynamic electrification of road vehicles will ensure a massive increase in demand for cobalt by 2030!
- Due to the increasing market shares of low-cobalt (NMC811) and cobalt-free (LFP) LIBs, cobalt demand will decline after 2030!
- Due to the return of used cobalt-rich LIBs, the secondary raw material potential for cobalt is growing faster!



Source: Buchert, M.; Wünsch, M.; Ziegenhagen, I. et al: Securing Germany's Sovereignty – Resilient supply chains for the transformation to climate neutrality by 2045; commissioned by Climate Neutrality Foundation 2023.

Conclusions

- The implementation of the EU BR requirements is a great challenge but also a great opportunity to contribute to resilient value chains for LIBs!
- Many provisions of the EU BR still must be concretized in the next few years via delegated legal acts!
- The framework conditions of the EU BR will not least provide investment incentives for the recycling of LIB!
- Recent investment decisions or announcements for LIB recycling plants in Europe are promising!

Note: Driving force for LIBs: Crude oil production and environmental damage

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Many thanks for your attention!

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