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The need for a Circular Economy to support the rapid sustainable clean energy expansion

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The background and challenge

- EU achieved about 0.8% annual GHG reductions 1990-2019

- 60% cut of GHG in EU (w/o sinks) equals an annual average reduction of ca. 3.6% GHG between 2020 and 2030 based on 1990 baseline

- The Commission proposal of 55% (including sinks) equals ca. 2.5% annual reductions.

- This requires w/o international carbon trading and as energy is responsible for about 75% of all GHG, a significant growth in all RES of up to 50% and underlying infrastructure (grids, storage), and up to 80% RES in electricity sector by 2030 – mostly wind, solar, geothermal

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Mineral resource constraints (environment)

- Most mineral and mining growth for wind, solar, battery ingredients
- 10% of mined silver is for solar PV production
- WB 2018: Low carbon scenarios imply at least a 10-15 fold increase in global mining activities for essential minerals
- IEA 2019: Global EV to go from 3 to 150 million by 2030.
- Estimated up to 300% growth in Co and Li consumption in EU by 2025
- Present mining for essential minerals highly water-intensive in dryer areas (Li in South America), violation of human rights (Co in DCR), copper (toxic in aquatic environments), Rare Earth with large toxic footprint (China)
- Global marine waters subject to detrimental (biodiversity) deep sea mining, concessions about 2x size of France – for “low carbon” development.

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The bottlenecks and way forward

- ISSD (2019) Global Li and Co full recycling and for reuse is about 5%, higher rates in China, South Korea
- UNEP: About 34 crucial elements and essential for magnets, batteries and other applications have recycling rates of 1%

- FORTUM – 80% Li recycling; Panasonic, Tesla banning Co completely
- EU – legislation for 50% Li recycling mandatory
- Companies using conflict minerals – certification development!

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The questions

- How do we better embed circular economy principles into the energy system?
- How do we embed circular economy principles into the planning of energy infrastructure along the entire supply chain?
- How does the sharing economy impact energy demand in the future?