81st International Scientific Conference of the University of Latvia 2023

Energy transition ambition and path to hit the goal

Session: Energy Transition: Gap between Ambition and Action

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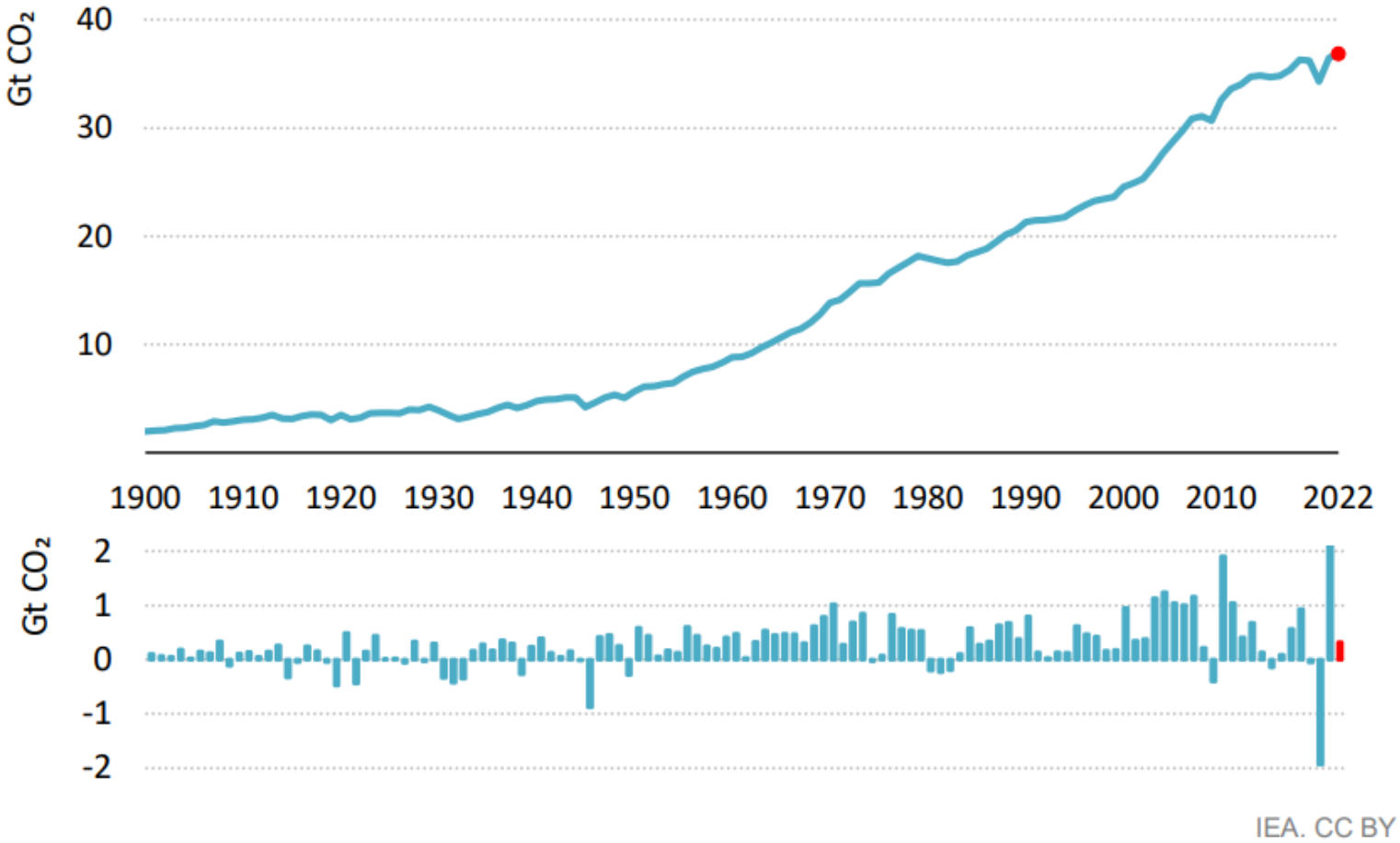
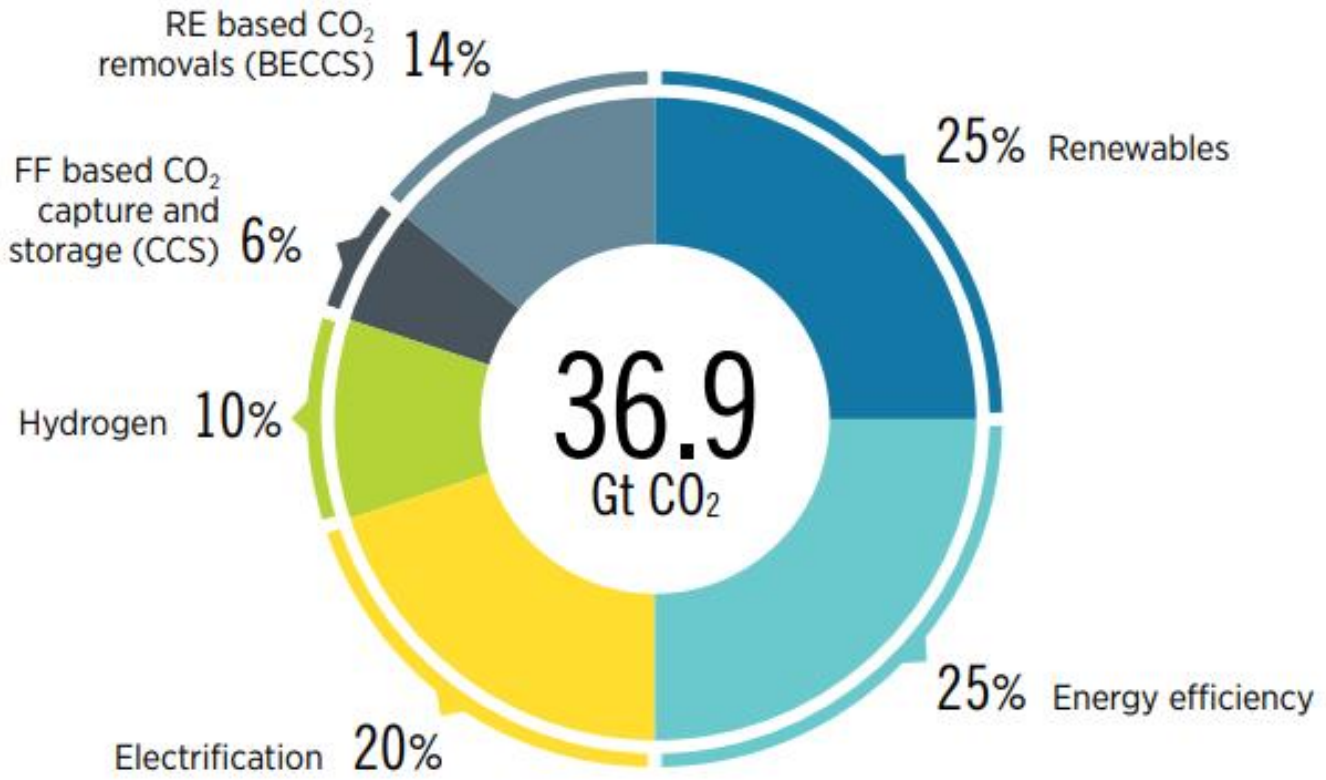
Riga, 27.03.2023.

Global CO2 emissions from energy combustion and industrial processes



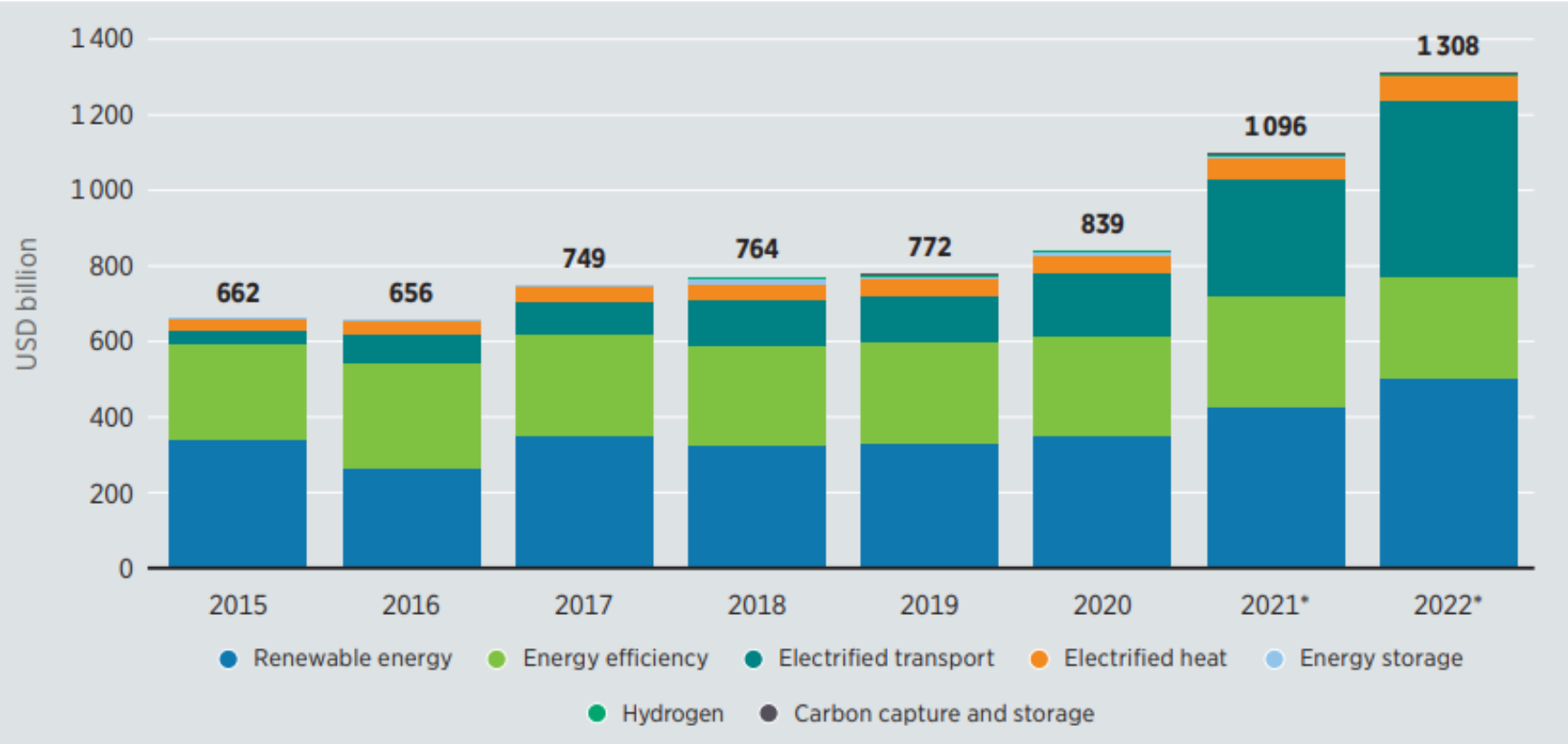
Source: IEA, CO2 Emissions in 2022, https://www.iea.org/reports/co2-emissions-in-2022

Reducing emissions by 2050 through six technological avenues



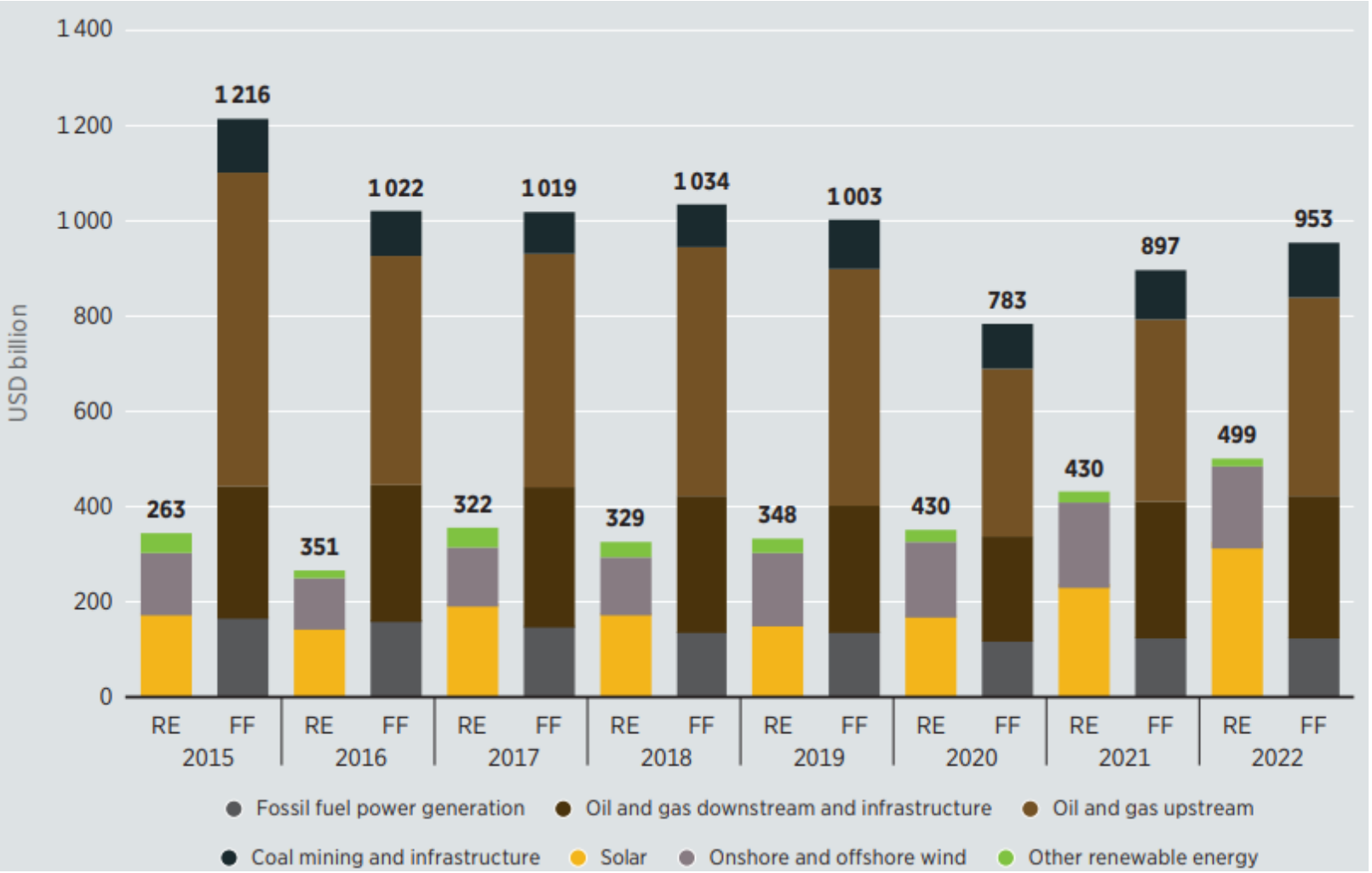
Source: *World Energy Transitions Outlook 2022*.

Annual global investment in renewables



Avots: IRENA - Global landscape of renewable energy finance 2023
https://www.irena.org/Publications/2023/Feb/Global-landscape-of-renewable-energy-finance-2023

Annual global investment in renewables vs fossils



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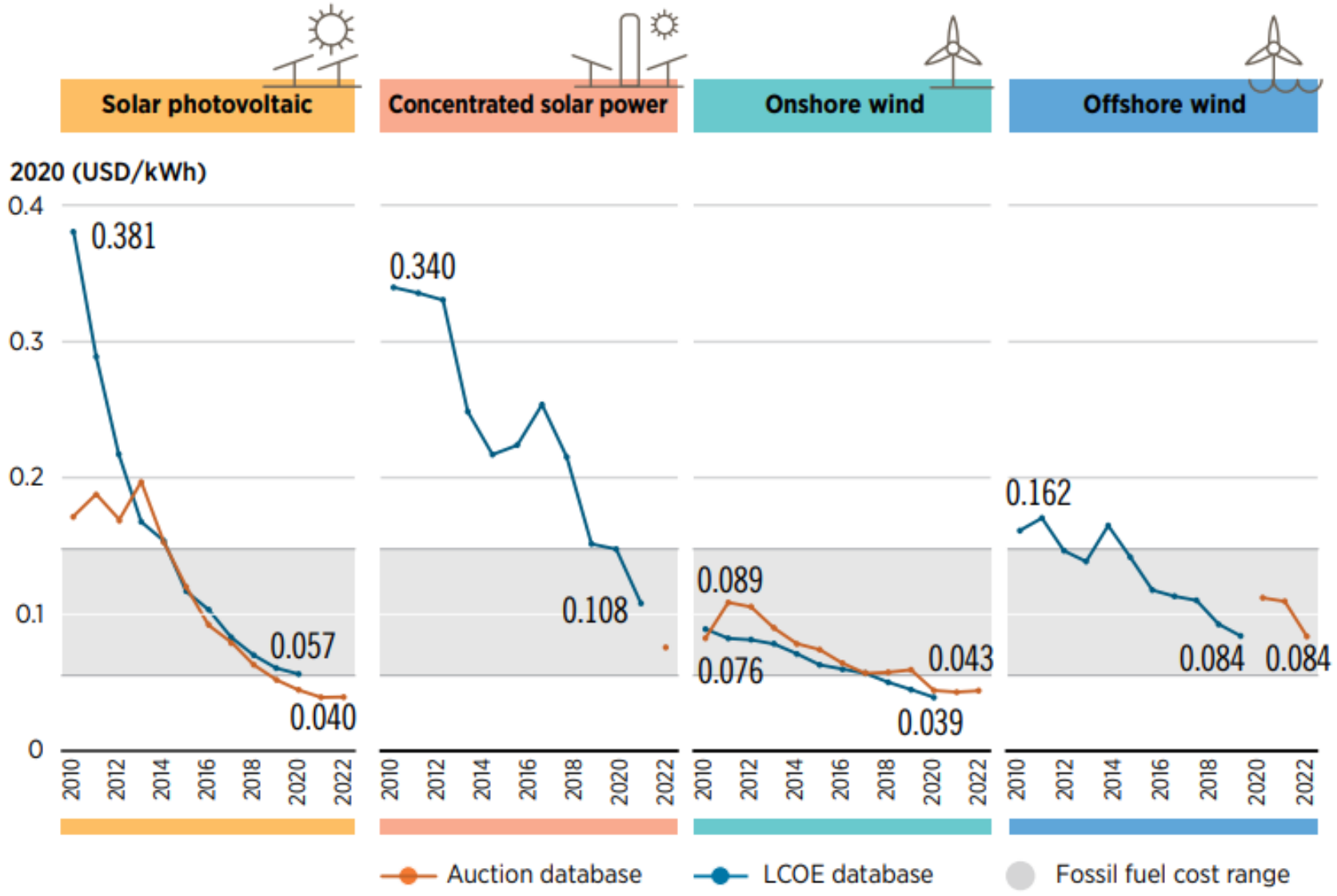
The global weighted-average LCOE and PPA/auction prices for renewables



Source: *World Energy Transitions Outlook 2022*. (Data for February 2022 futures contracts)

Challenges

Resilience

Lack of generation capacity

Lack of electric grid infrastructure and energy storage

Increased weather dependence

Demand / supply flexibility

Resources

High mineral and fossil energy supply dependencies

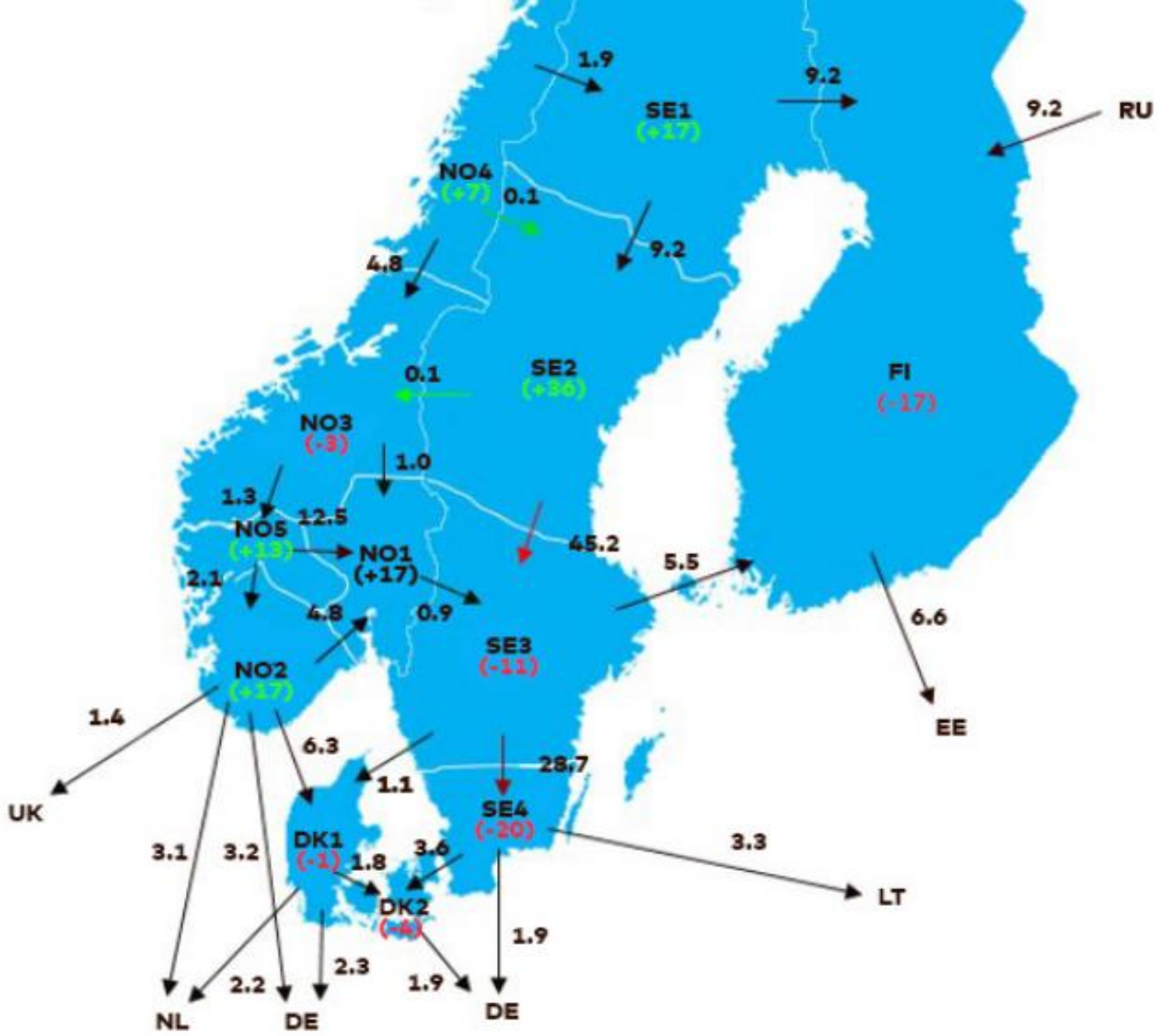
Low workforce availability

Regulation and social factors

Electricity market design and permits approval process

Unchanged consumer behavior

Net electricity flows in the Nordic countries in 2021



Source: *The Nordic Energy Trilemma repo*
https://www.nordicenergy.org/wordpress/wp-content/uploads/2023/03/Final-report-Energy-Trilemma.pdf

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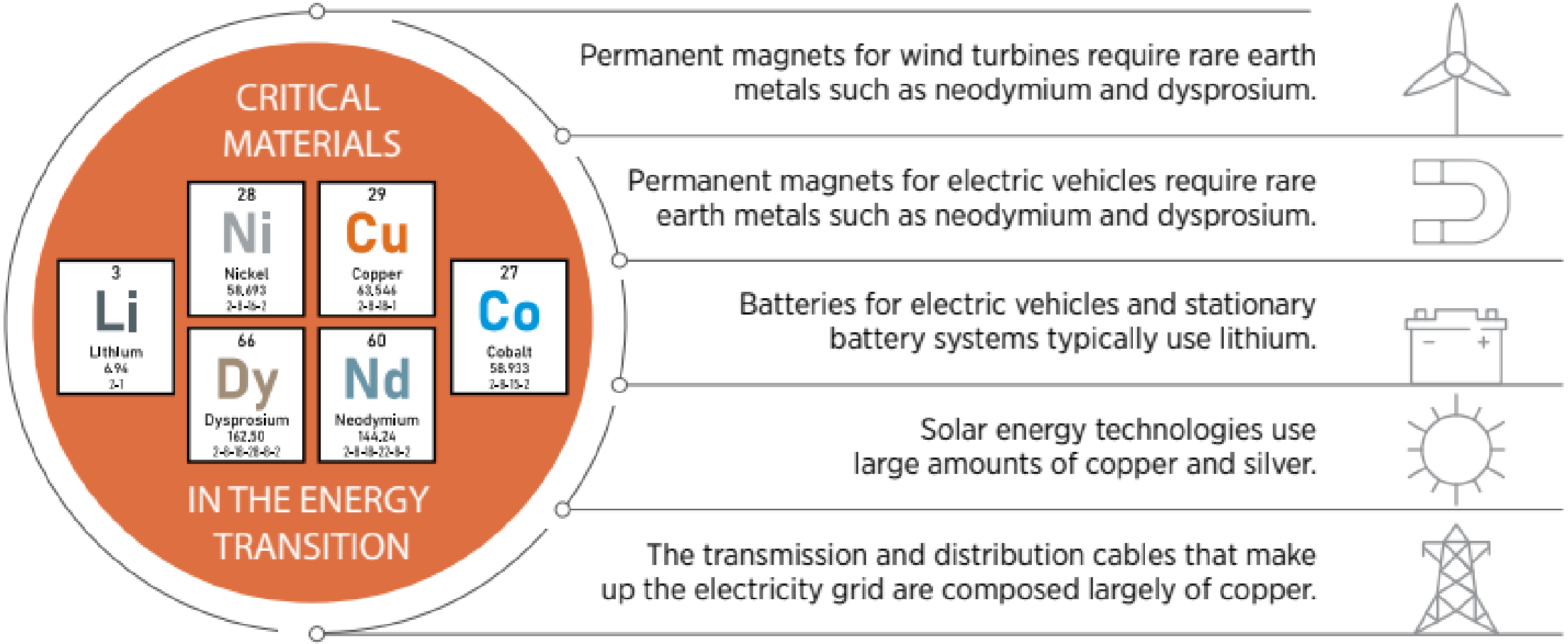
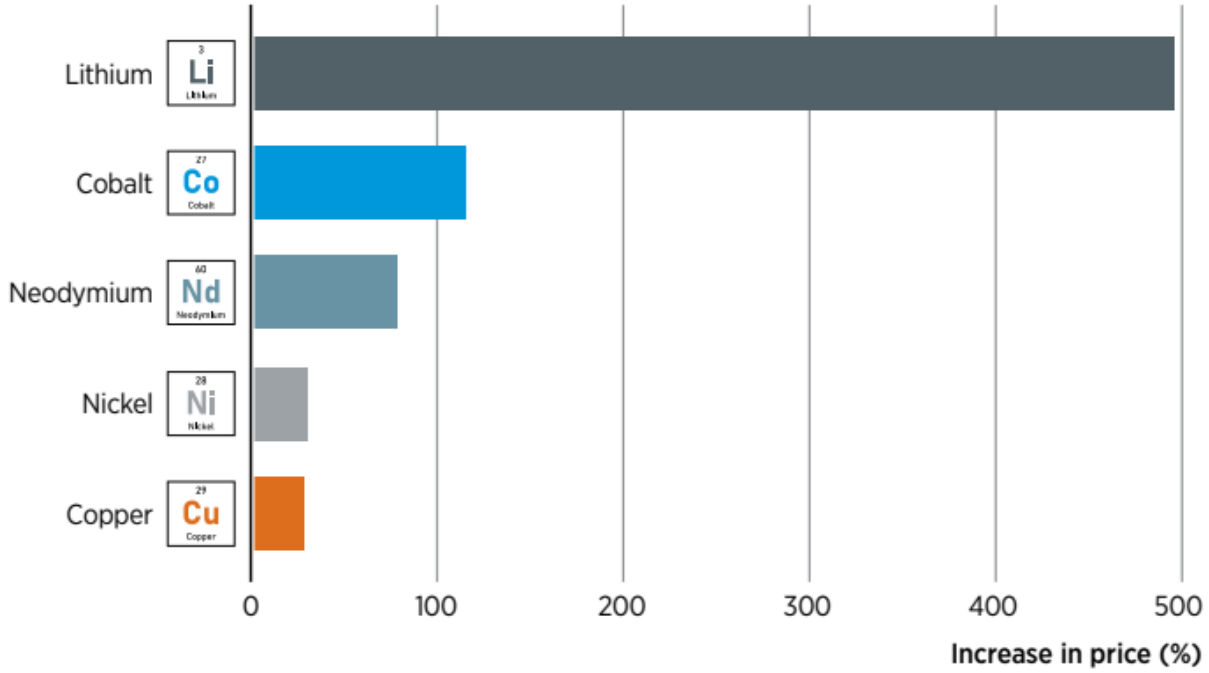
Main technologies increasing demand for critical materials



Source: *World Energy Transitions Outlook 2022*.

Increases in the prices (2021) and demand (2050)

Material	Demand in 2021 (Mt/year)	Demand in 2050 (Mt/year)
29 Cu Copper 63.546 2 8 18 1 — Copper	30 Mt/yr	50-70 Mt/yr
28 Ni Nickel 58.693 2-8-16-2 — Nickel	2.77 Mt/yr	5-8 Mt/yr
3 Li Lithium 6.94 2-1 — Lithium	0.3 Mt/yr	2-4 Mt/yr
60 Nd Neodymium 144.24 2-8-18-22-8-2 — Neodymium	0.03 Mt/yr	0.2-0.5 Mt/yr



Source: *World Energy Transitions Outlook 2022*.

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Directions

- ✓ **Goal-oriented** impact assessments as a basis for decision-making
- ✓ **Diversify** sources of energy generation, carriers, and storage
- ✓ Fixed timelines and **shorten permitting processes**
- ✓ Support a **flexible demand-side** response
- ✓ Recycling of new materials such as lithium, neodymium, and dysprosium, developing a **circular economy**
- ✓ High-quality **labour for the energy sector**: longterm national roadmaps

Thank you for your attention!