On the energy transition during geopolitical turmoil

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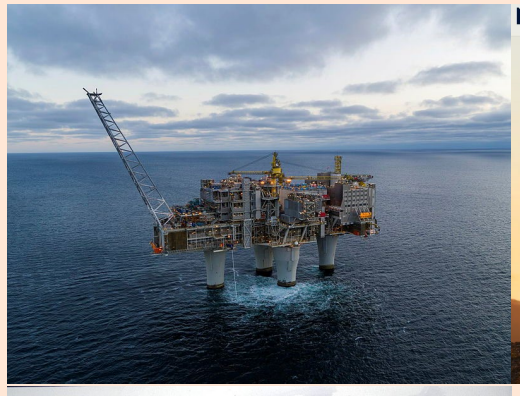
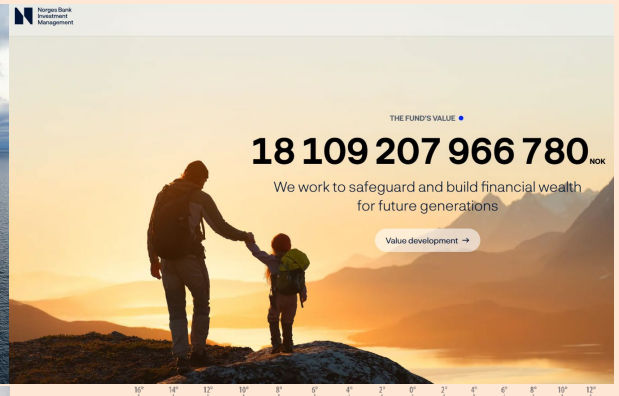
First, a little on the importance of oil and gas in Norway…

First and foremost, a fantastic success story…

- 60% of goods export revenues
- 20-25% of investments, 20 BEUR per year
- 30% of total state revenues, 60 BEUR, 11 KEUR/cap.
- 2-7% of labour force (65000/210000 employees)
- One of the largest sovereign wealth funds in the world (1500+ BEUR, 250 KEUR/cap.)
- 3% of fund can be spent to finance public budget deficits (45 BEUR, 7.5 KEUR/cap.)
- Has made it possible to keep a decentralized population structure, with high quality of life, in a country with 18 people per km^2
- Impact on productivity development discussed eagerly…





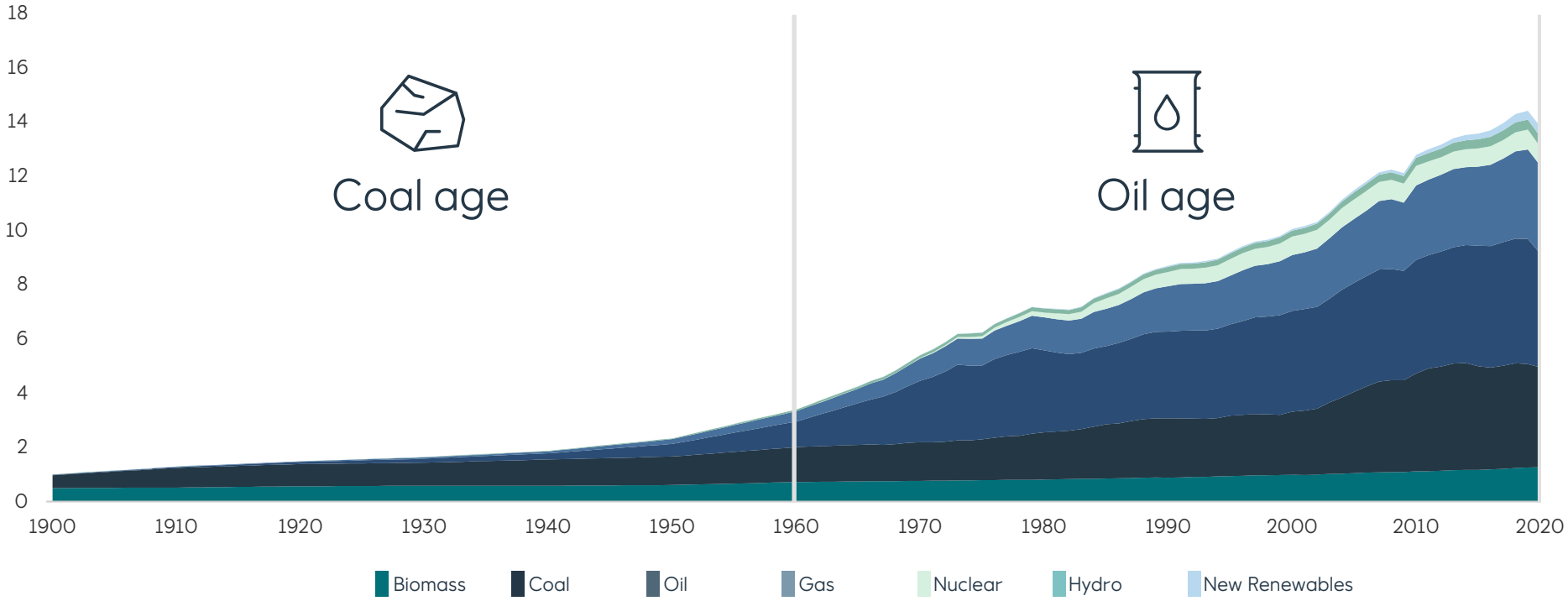
Open

What does the energy transition hold?

A sustainable future requires an unprecedented transition, and the avoidance of further demand additions

Total primary energy demand

Gtoe



Source: Our World in Data, IEA (history), Equinor (projections)

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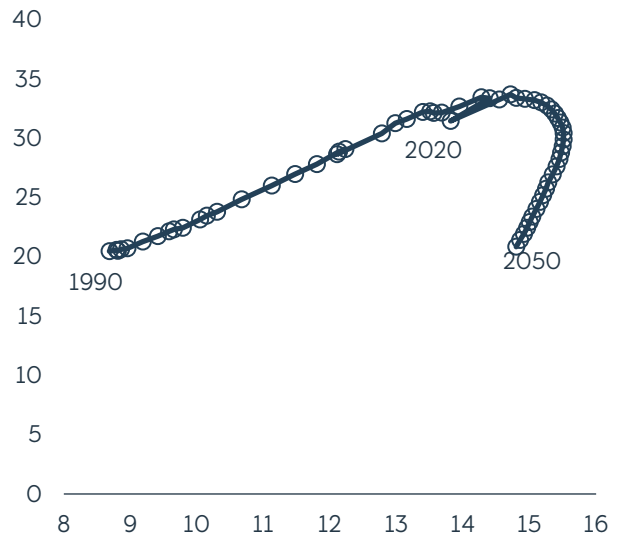
Walls is NOT BAU, but a 2.2°C scenario with significant energy transition…

Energy efficiency, electrification, decarbonisation, decline in fossil fuel demand

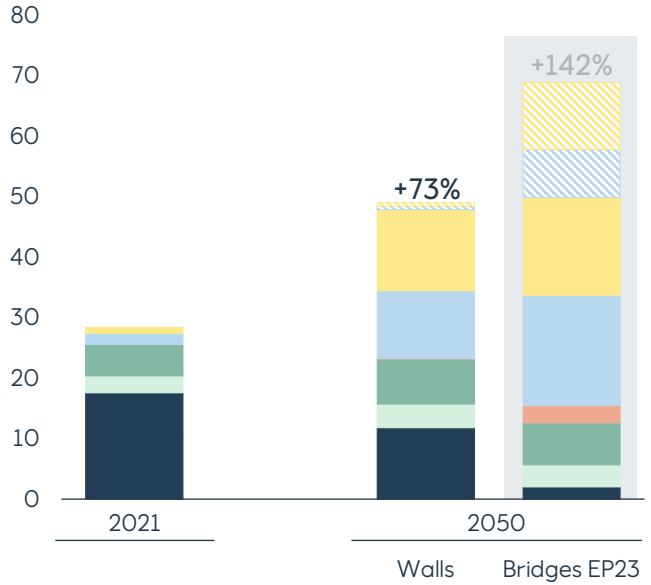
Total emissions vs total primary energy demand

Gt CO_2 (y) Gtoe (x)



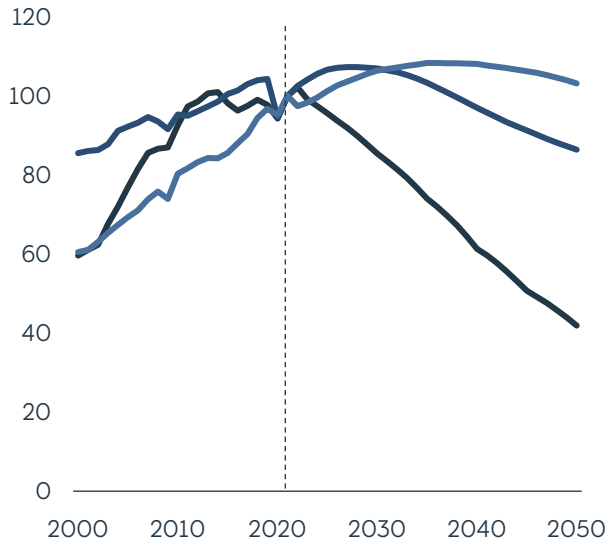
Electricity generation

Thousand TWh



Fossil fuel demand

Indexed to 100 in 2021



Walls

Fossil fuels | Nuclear | Other | Hydrogen | Wind | Solar | Wind to H_2 | Solar to H_2

Coal | Oil | Gas

Source: IEA (history), Equinor (projections)

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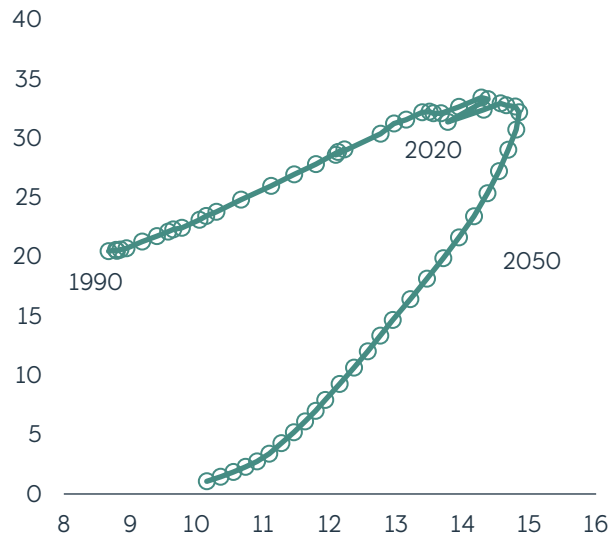
Bridges requires a complete transformation of the world we see today

Energy efficiency, electrification, decarbonisation, decline in fossil fuel demand

Total emissions vs total primary energy demand

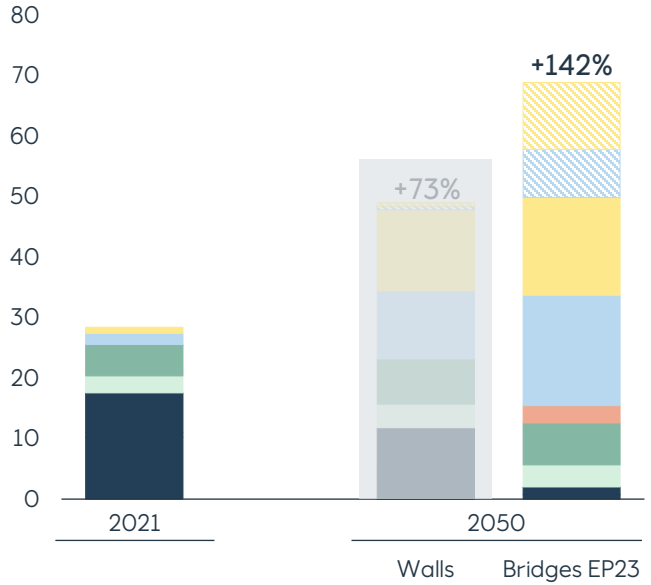
Gt CO_2 (y) , Gtoe (x)



Bridges EP23

Electricity generation

Thousand TWh



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Fossil fuel demand

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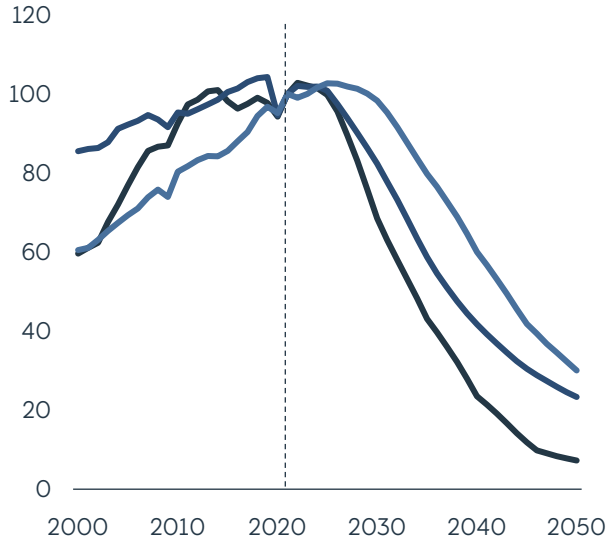
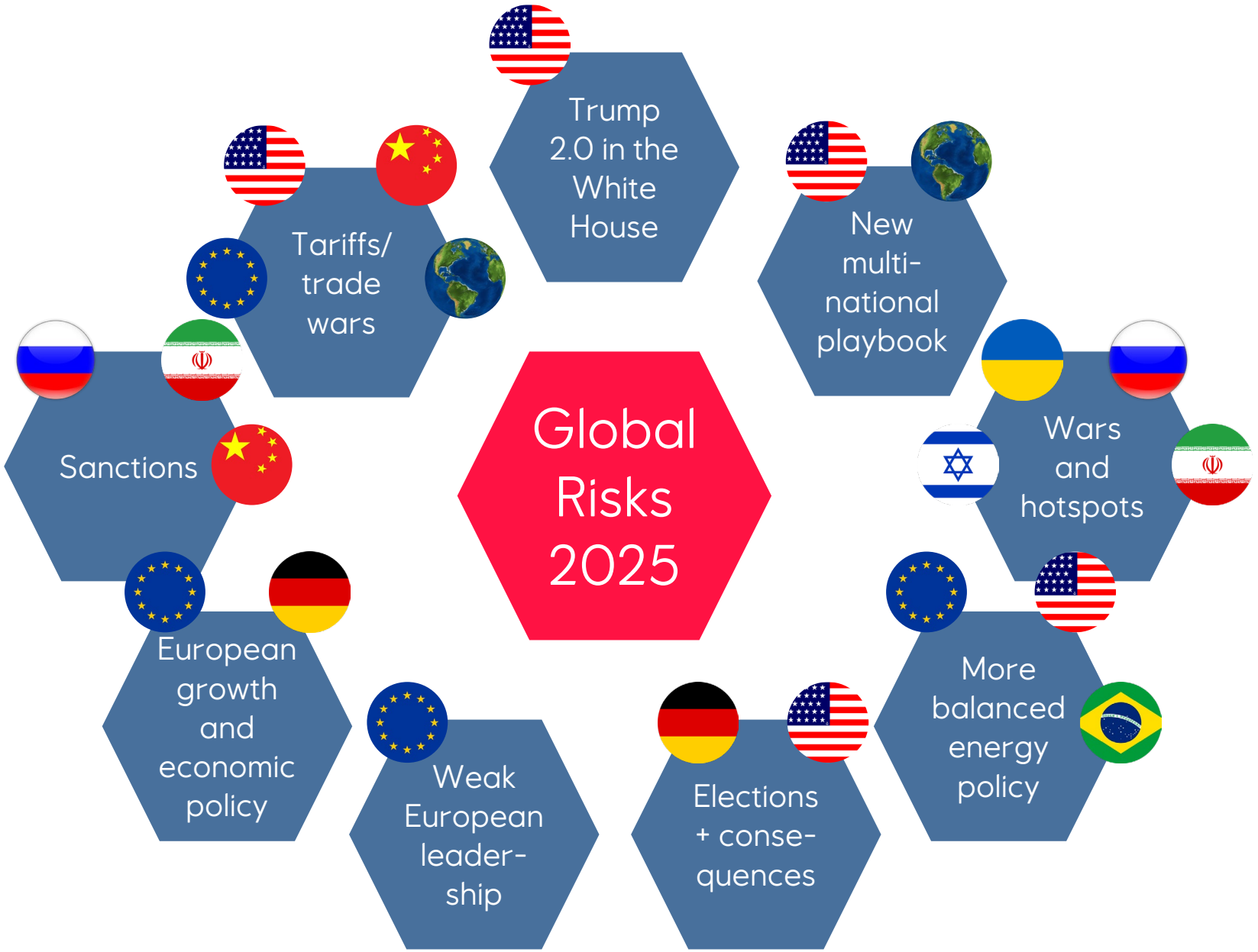


Coal | Oil | Gas

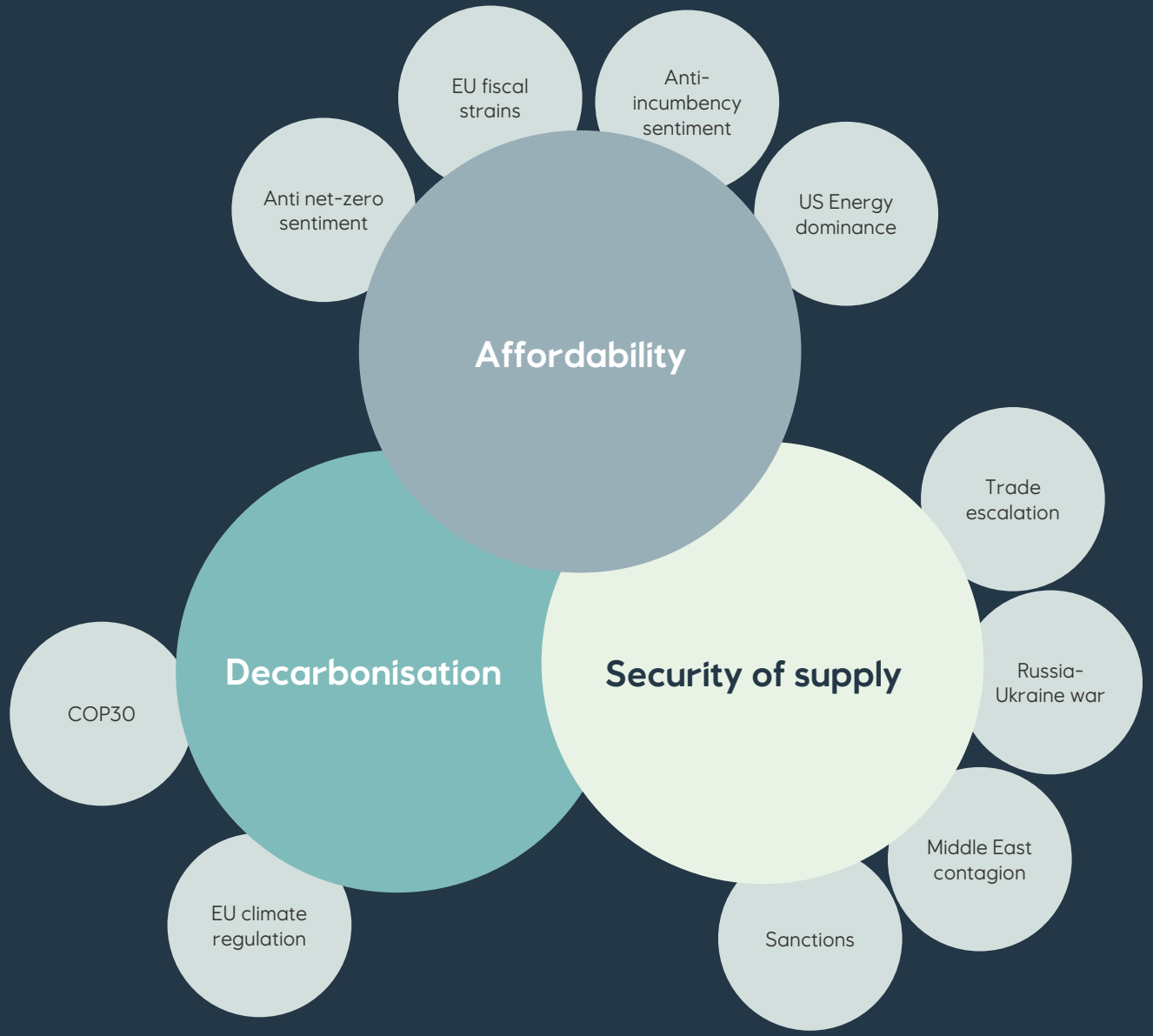
Source: IEA (history), Equinor (projections)



A (Brave) new world

- Shift in US geostrategy and policy
- Large powers in intensified competition, trade wars, etc.
- Bilateral transactionalism in a zero-sum setting
- Volatility, higher risk premiums, lower growth
- Wide range of outcomes

The energy trilemma

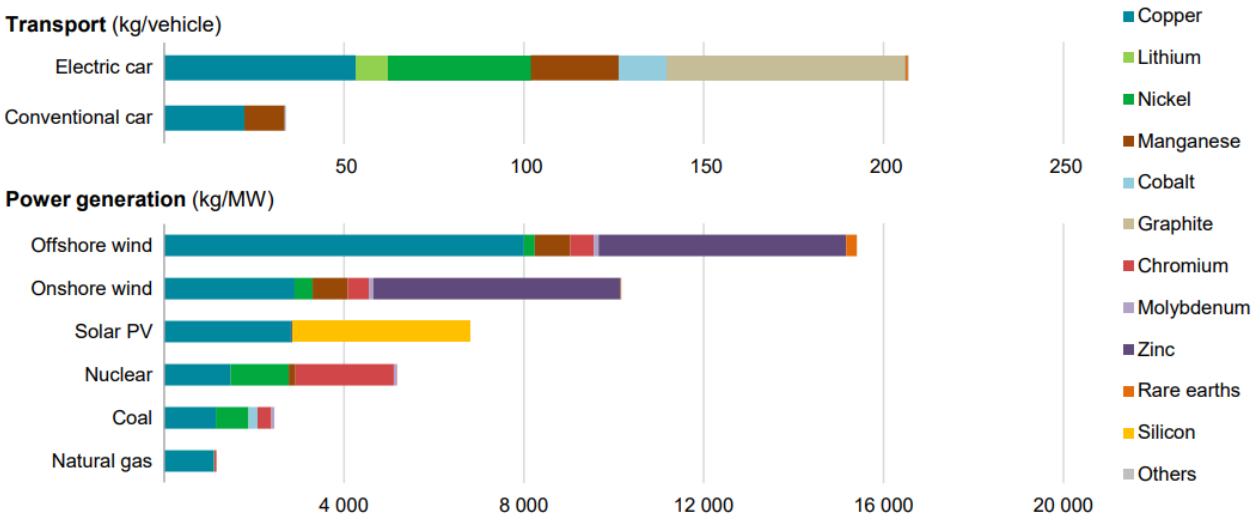


- Fragmentation and multipolarity
- Chinese green tech overcapacity

China dominates markets for minerals and rare earth elements

Crucially important, given the growing demand implied by the energy transition

Minerals used in selected clean energy technologies



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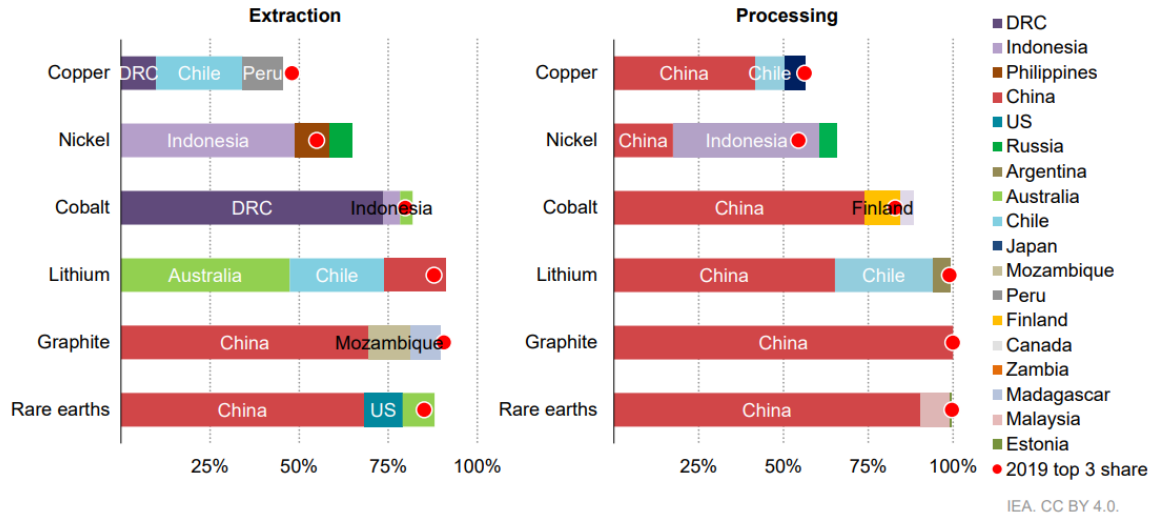
Notes: kg = kilogramme; MW = megawatt. Steel and aluminium not included. See Chapter 1 and Annex for details on the assumptions and methodologies.

Share of top three producing countries in total production for selected resources and minerals, 2022



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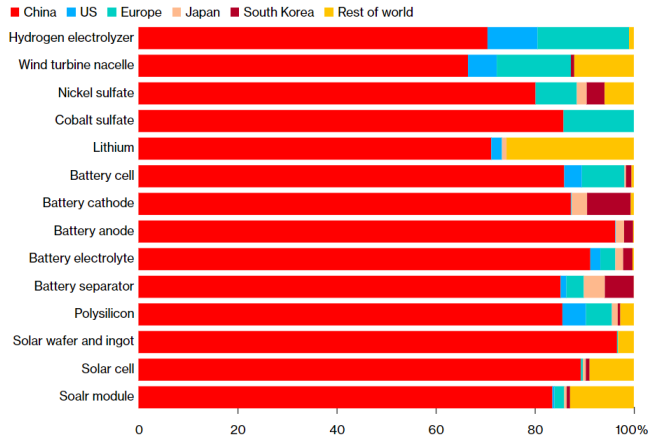
Notes: DRC = Democratic Republic of the Congo. Graphite extraction is for natural flake graphite. Graphite processing is for spherical graphite for battery grade.
Sources: IEA analysis based on S&P Global, USGS (2023), Mineral Commodity Summaries and Wood Mackenzie.

China Extends Dominance of Clean-Tech Supply Chains
Its share of global manufacturing capacity is now above 80% in 11 clean-tech segments



Irrespective of geopolitical climate, the energy transition requires new sources of minerals and rare earth elements

Source: IEA, BNEF

Opportunities and challenges in the energy transition

A large opportunity for the energy and resource industries

- Providing energy services to a growing, richer population
- Energy efficient solutions in power, mobility, logistics, buildings, manufacturing
- Solving the emissions challenges (CH_4, CO_2) – leakages, capture, transport, storage
- Electricity networks (generation, infrastructure, storage)
- Finding, extracting, and processing minerals
- Developing the H_2 economy where it makes sense

Some challenges

- The geopolitical climate is bad for any new investments
- Deliver on energy efficiency – will digitalization help?
- Market design challenges for the new energy solutions
- Missing money – and less capacity to subsidize
- NIMBY/BANANA

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