AISESA
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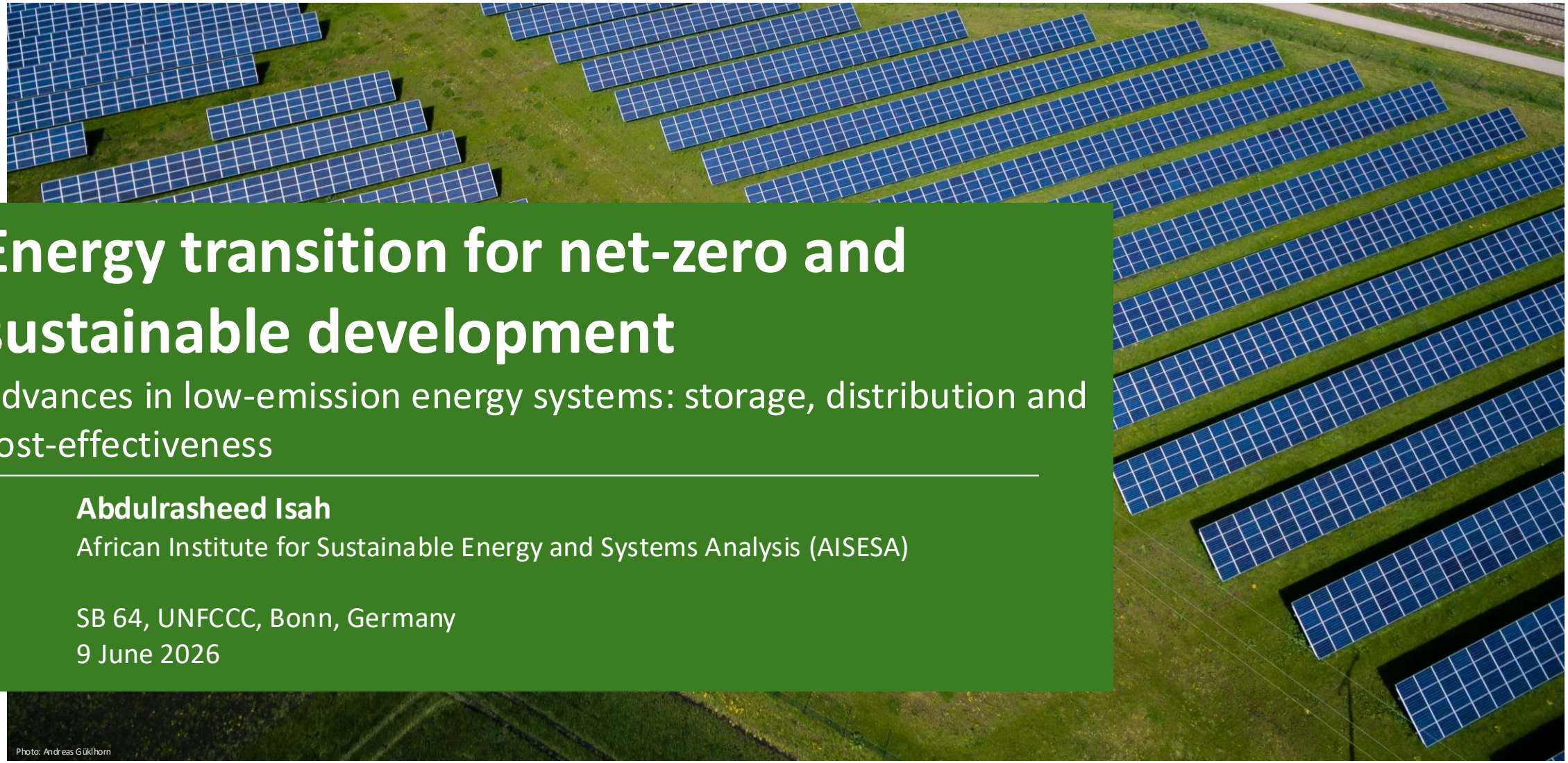


Energy transition for net-zero and sustainable development

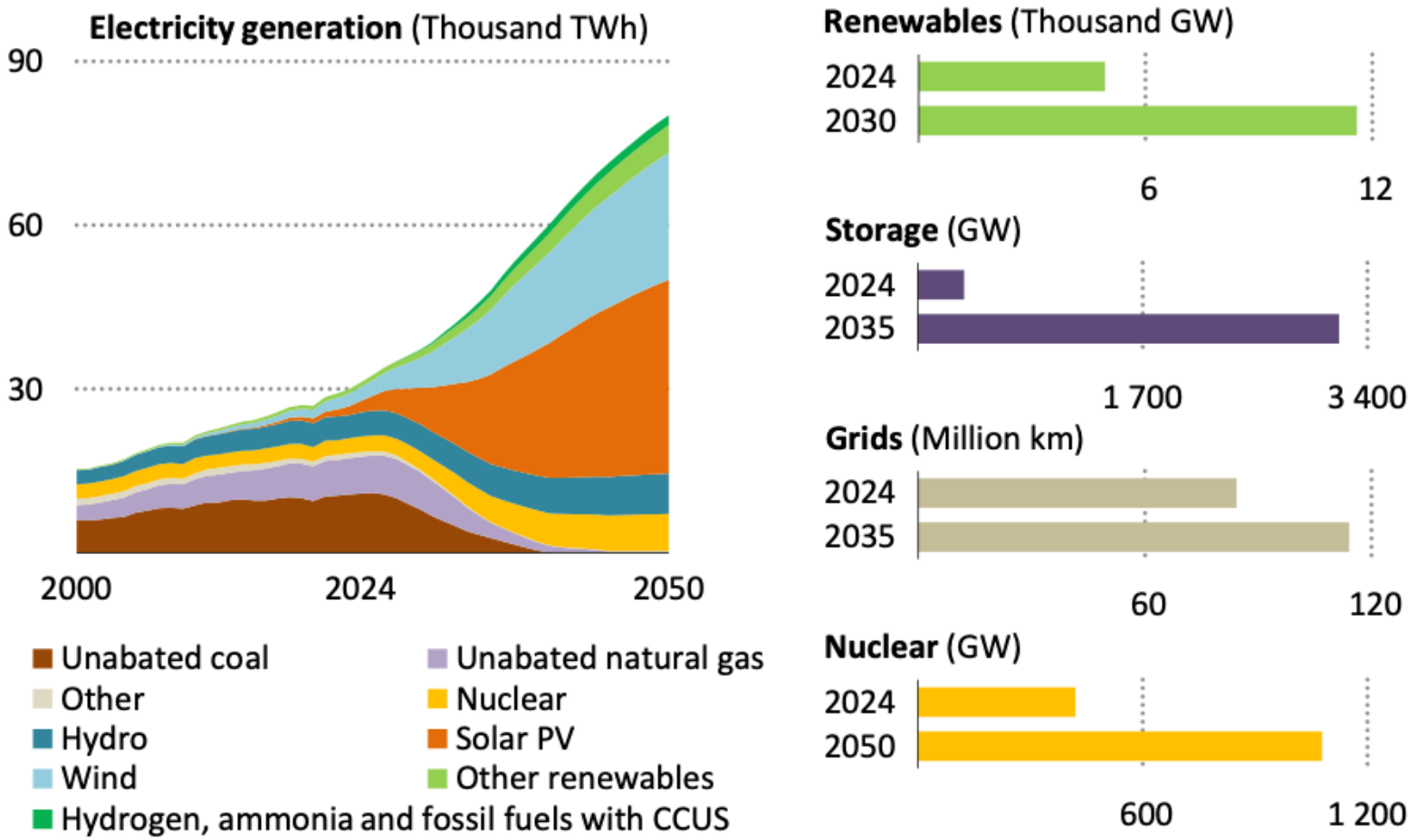
Advances in low-emission energy systems: storage, distribution and cost-effectiveness

Abdulrasheed Isah
African Institute for Sustainable Energy and Systems Analysis (AISESA)

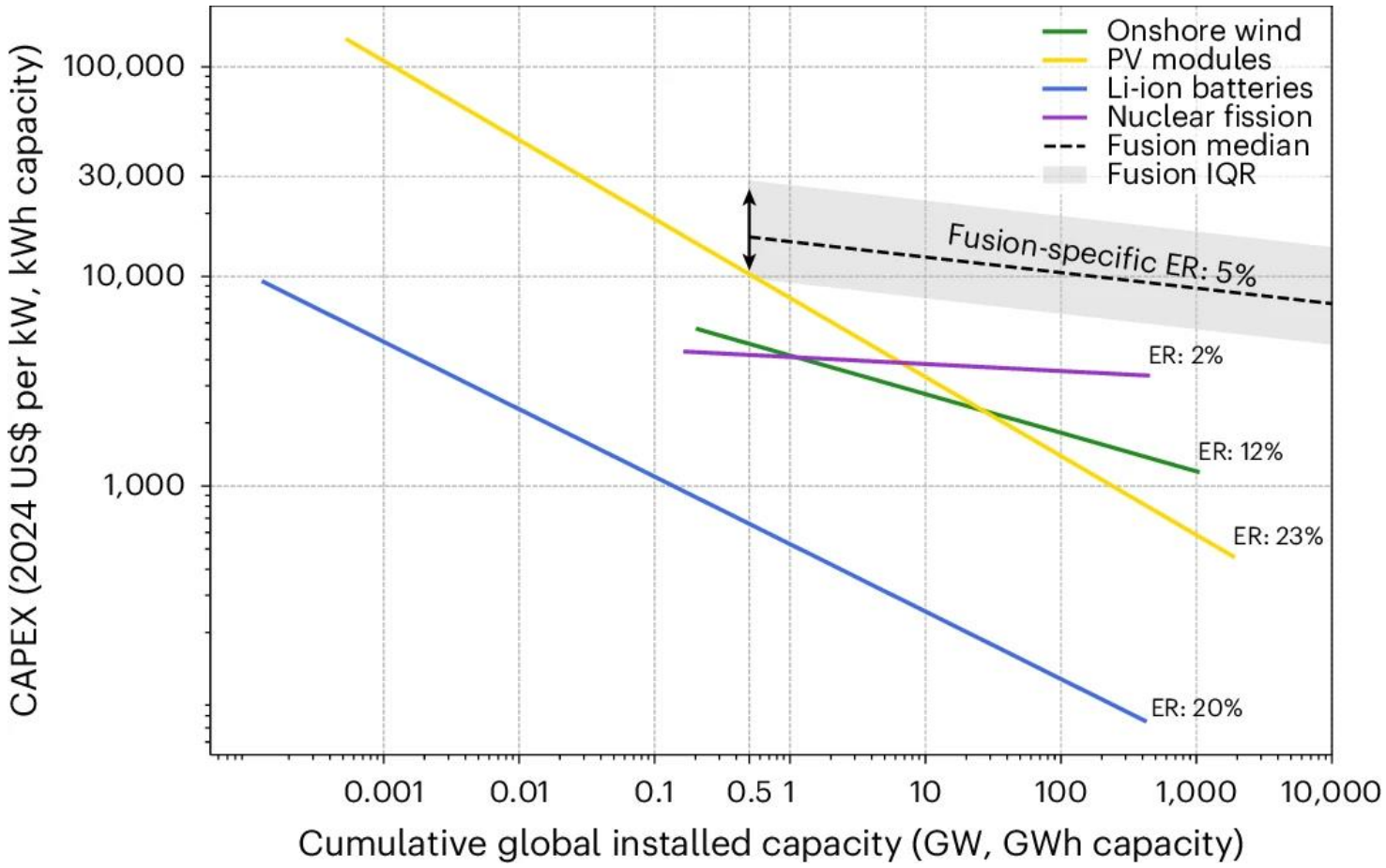
SB 64, UNFCCC, Bonn, Germany
9 June 2026

Photo: Andreas Gücklhorn

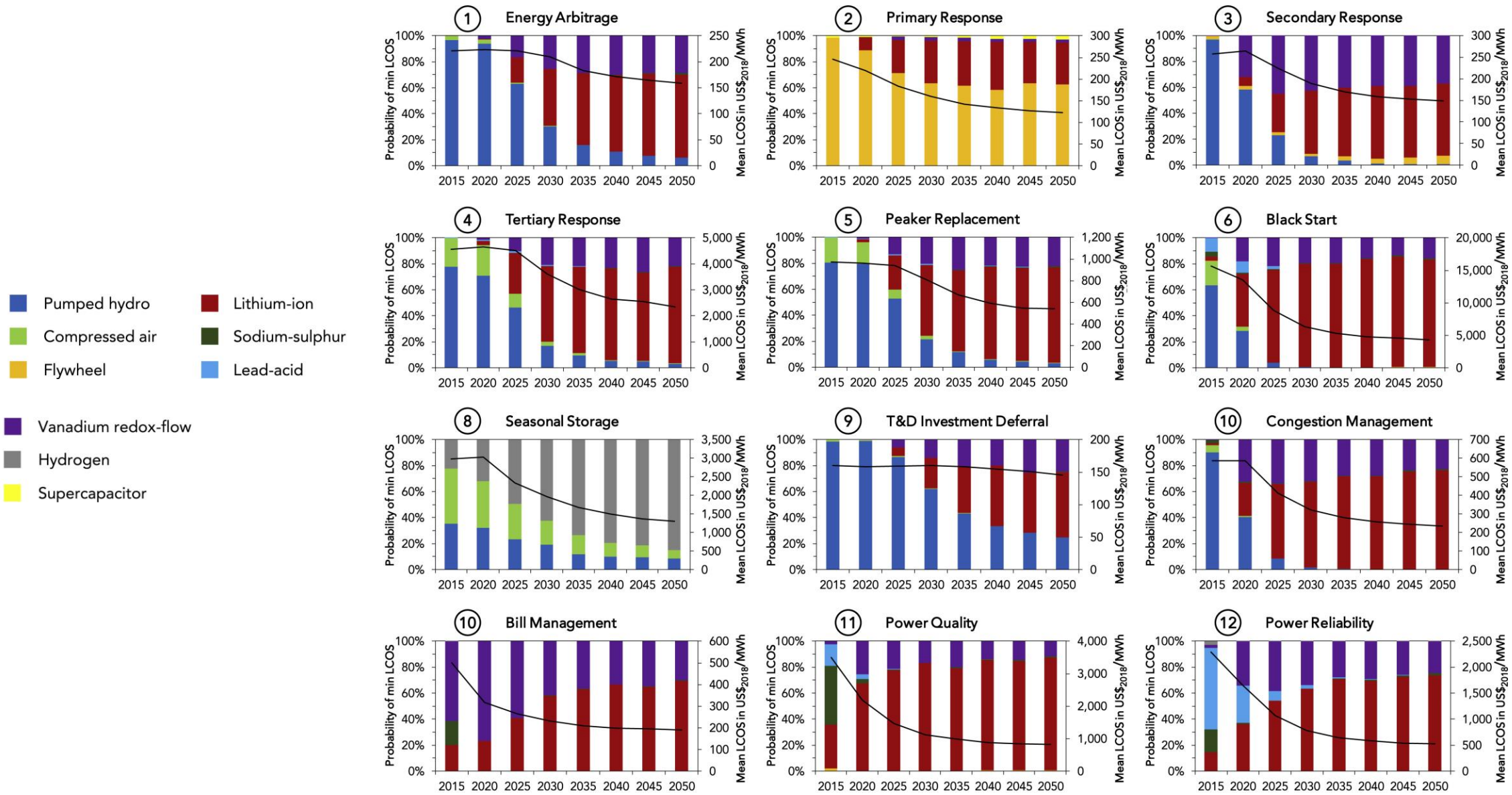
Global net-zero requires increased deployment of clean technologies



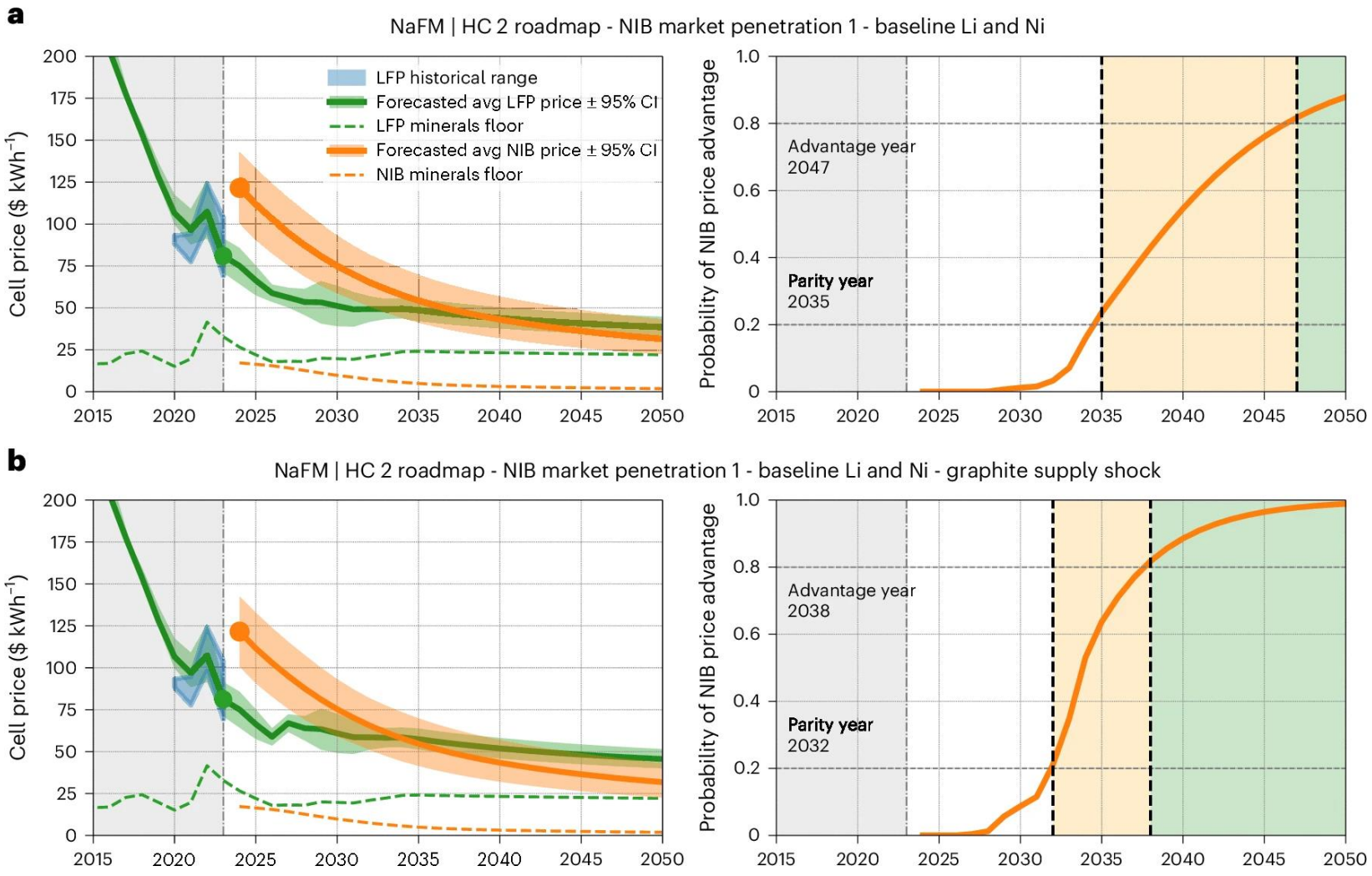
Cost of clean technologies has substantially declined



Lithium-ion batteries are most competitive in majority of applications

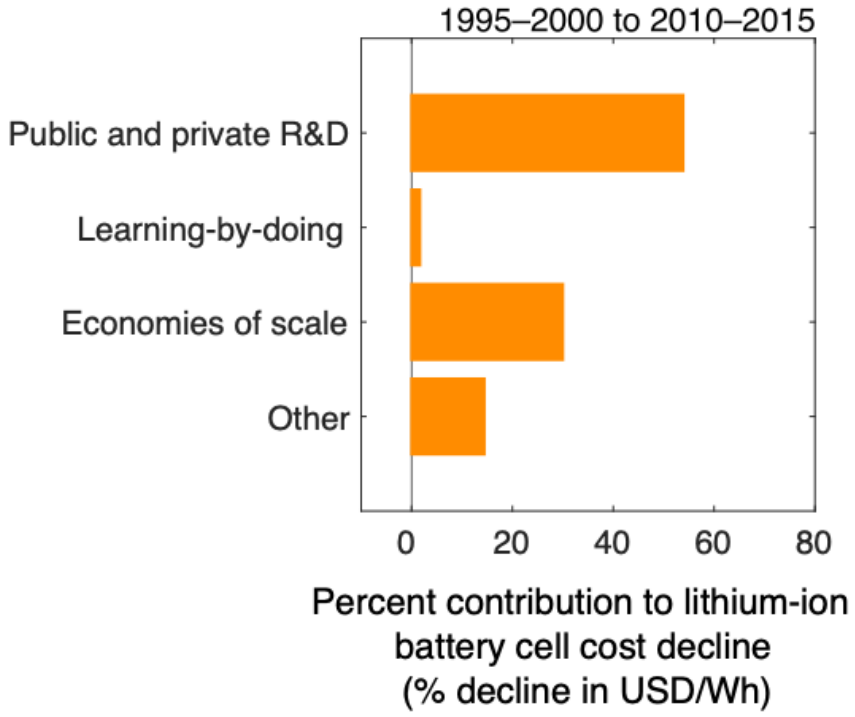


Sodium batteries could be cost-competitive with li-ion batteries by 2030s

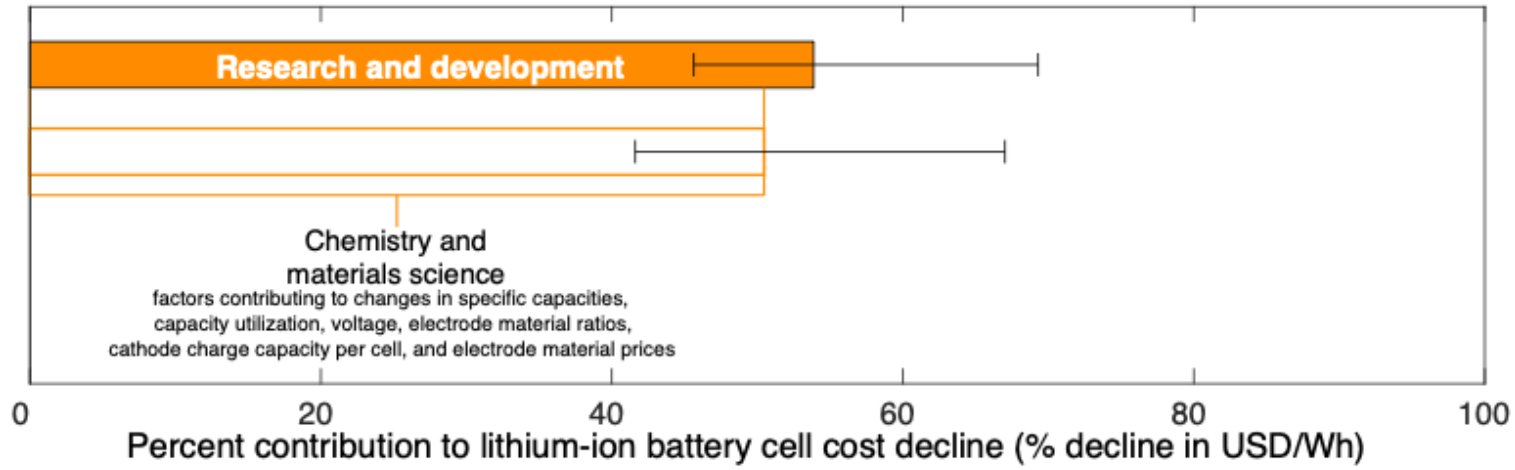


R&D is the biggest driver of cost declines of lithium-ion batteries

a, Contributions to the cost decline of lithium-ion battery cells



b, Underlying sources of R&D mechanisms

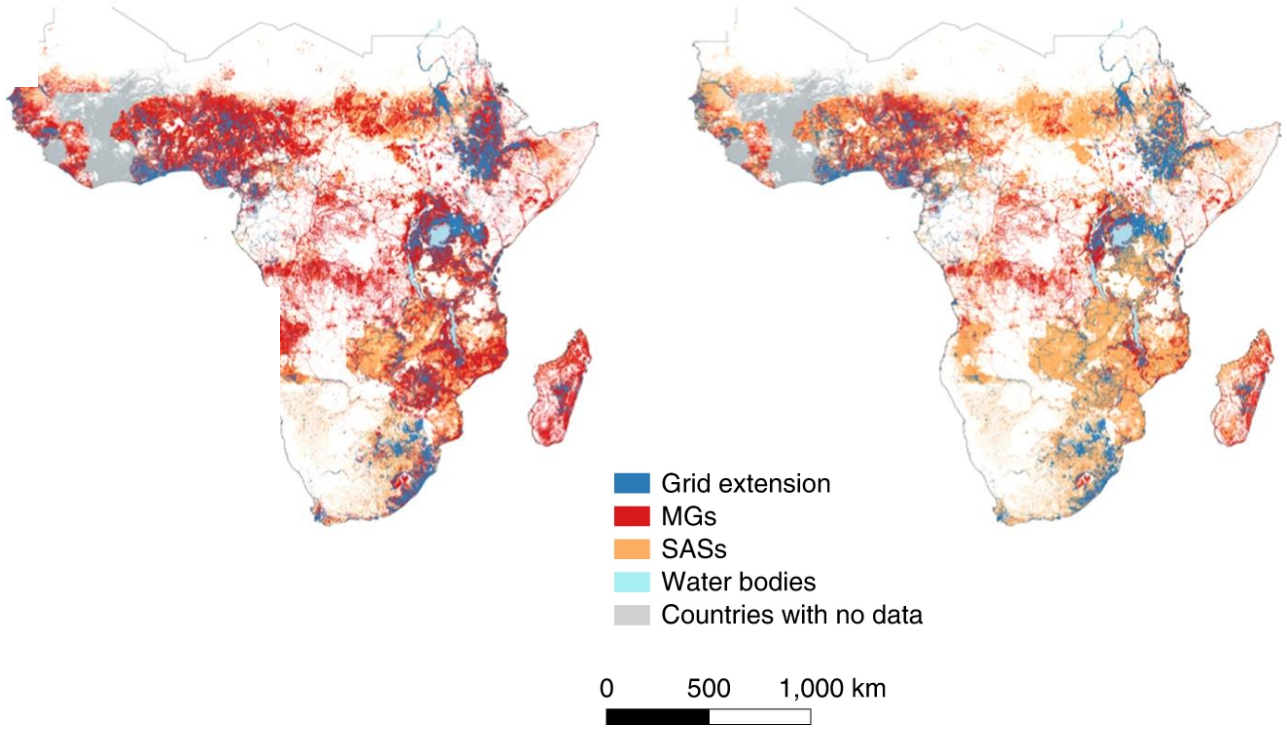


Distributed technologies and cost of capital are crucial in SSA

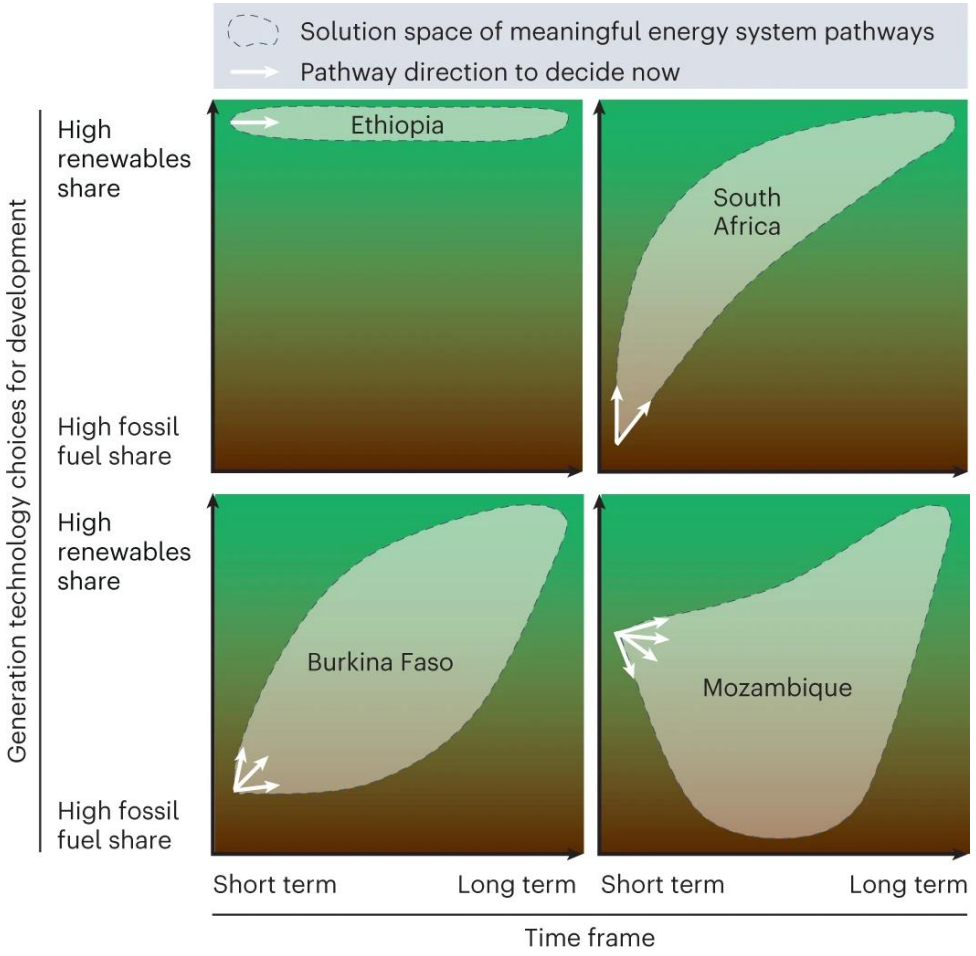
Pathways to electrification in SSA

Uniform finance

Niche finance

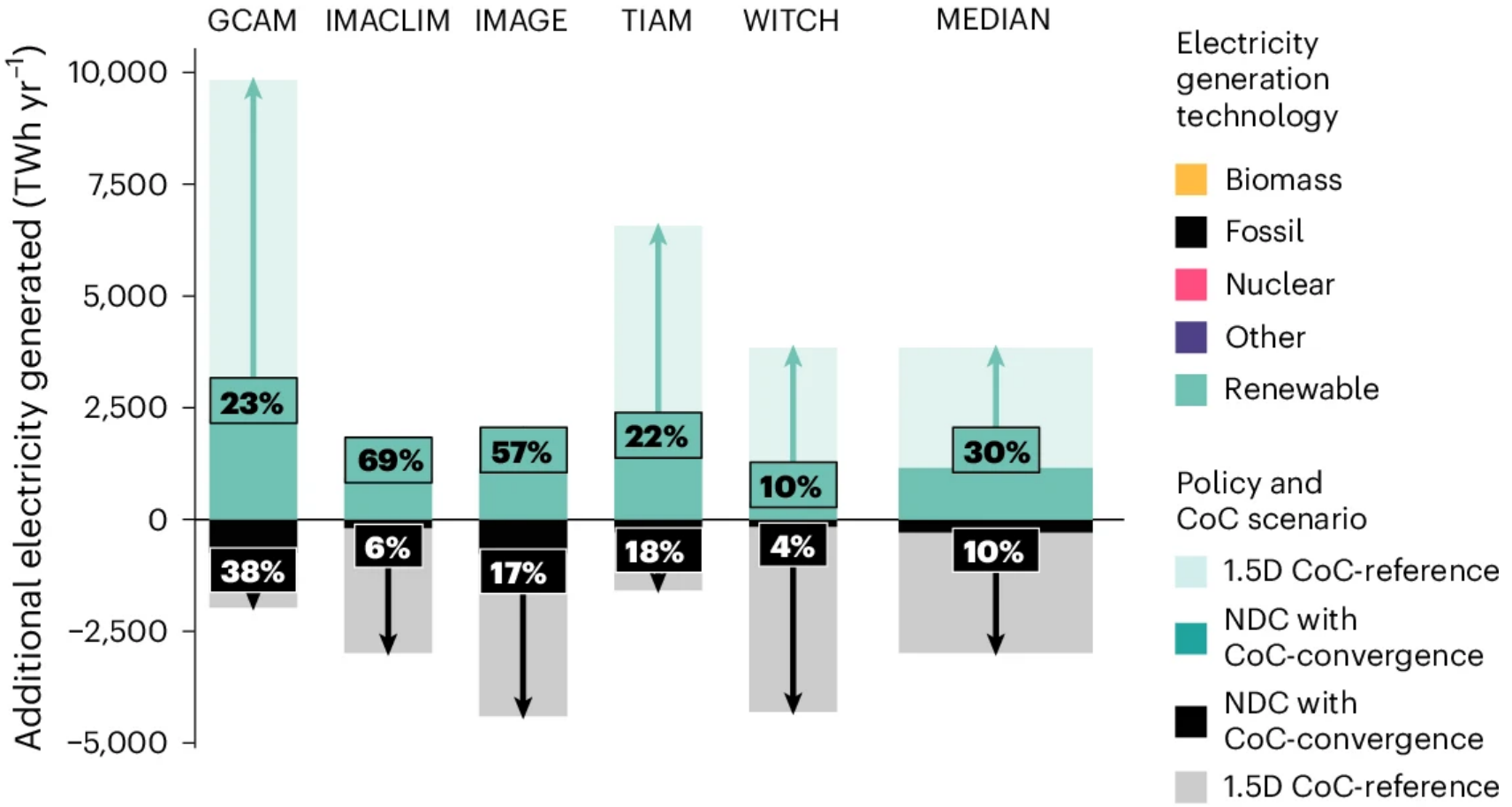


Net-zero pathways to differ



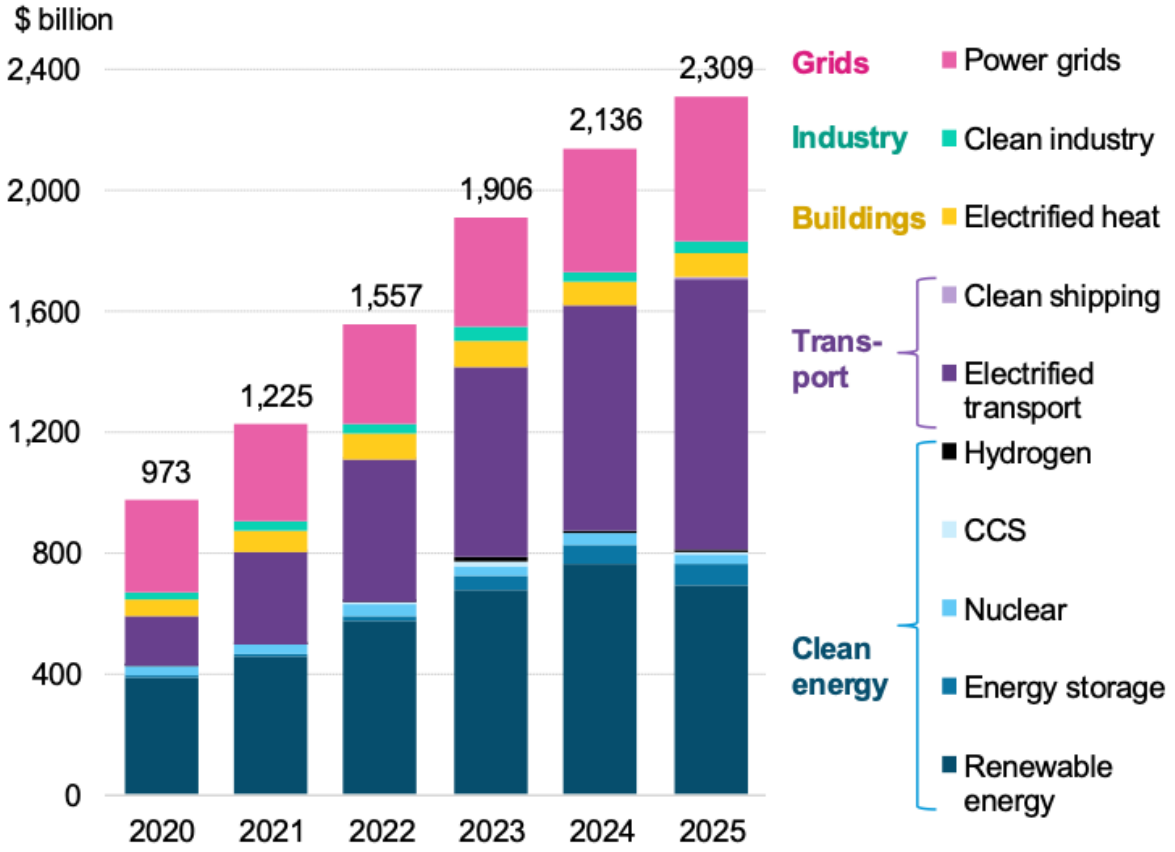
Agutu et al. 2022. *Nature Energy;* Mulugetta et al. 2022. *Nature Energy;*

Lower cost of capital would accelerate the deployment of renewable energy in developing economies globally

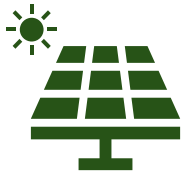


Increasing investments into emerging technologies, but still insufficient

- Electrified transport is the largest sector of the transition in 2025
- **Grid investment** jumped 17% to $483 billion
- **Energy storage** grew at a slow pace



Summary of existing research



- Clean energy technologies are cost-competitive with fossil fuels
- Deployment of storage technologies and grid infrastructure are key to net-zero energy systems

- Cost of storage has substantially declined, especially lithium-ion batteries for short duration
- Sodium technologies could be cost-competitive with lithium-ion by 2030s.

- Enhancing grid infrastructure, cross-border exchange, and distribution are essential for net-zero
- Distributed technologies and lower cost of capital are essential to scaling clean energy in developing economies

THANK YOU!

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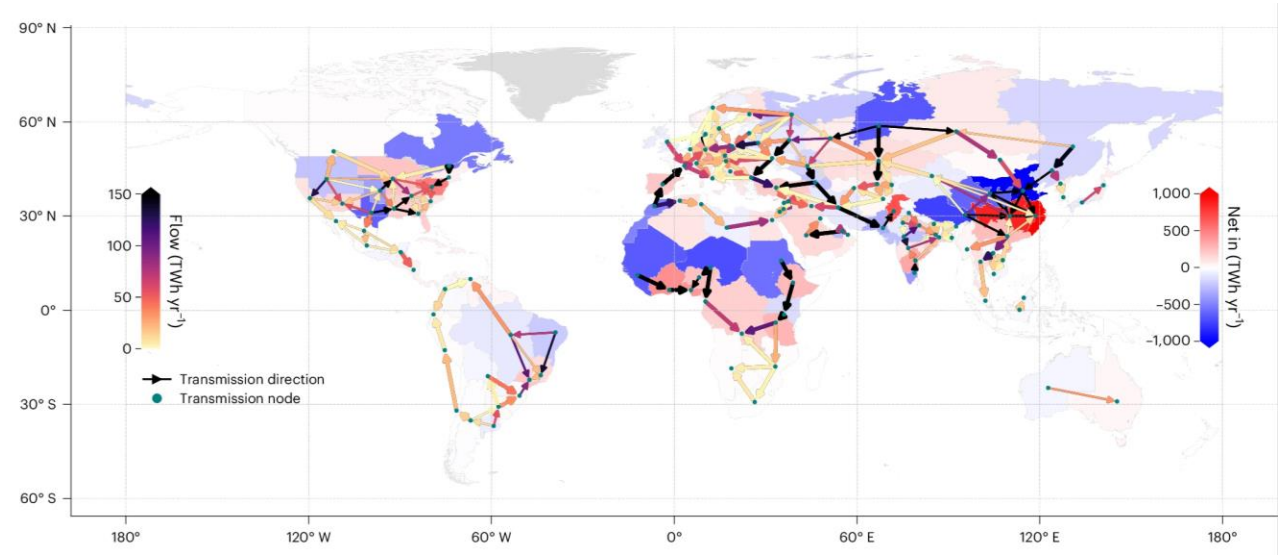
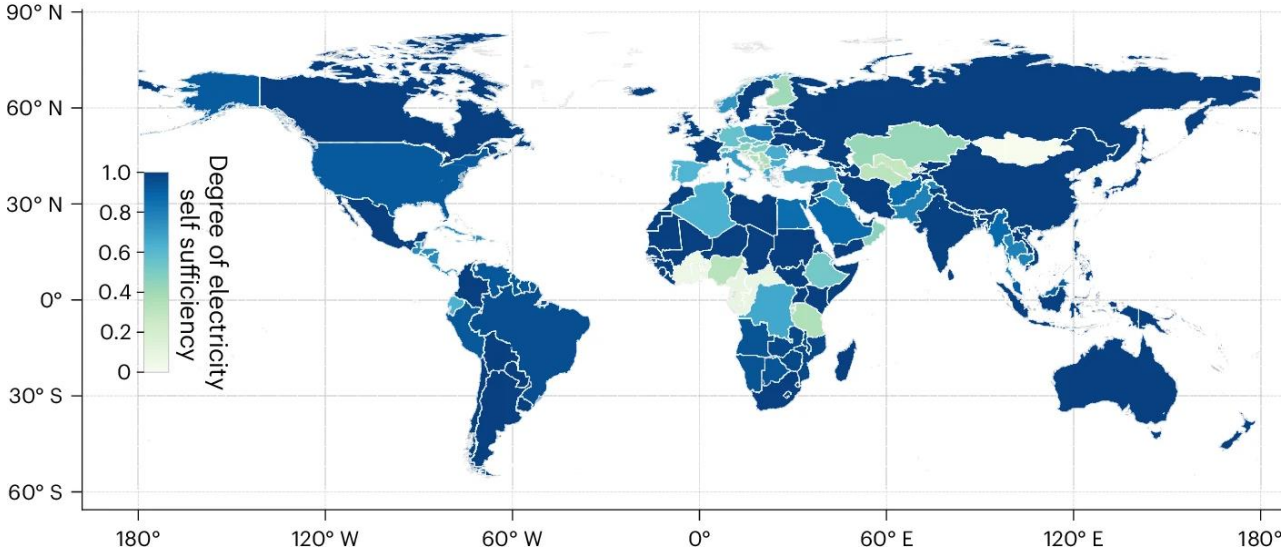
Appendix

Cross-boarder clean power distribution would lead to energy security

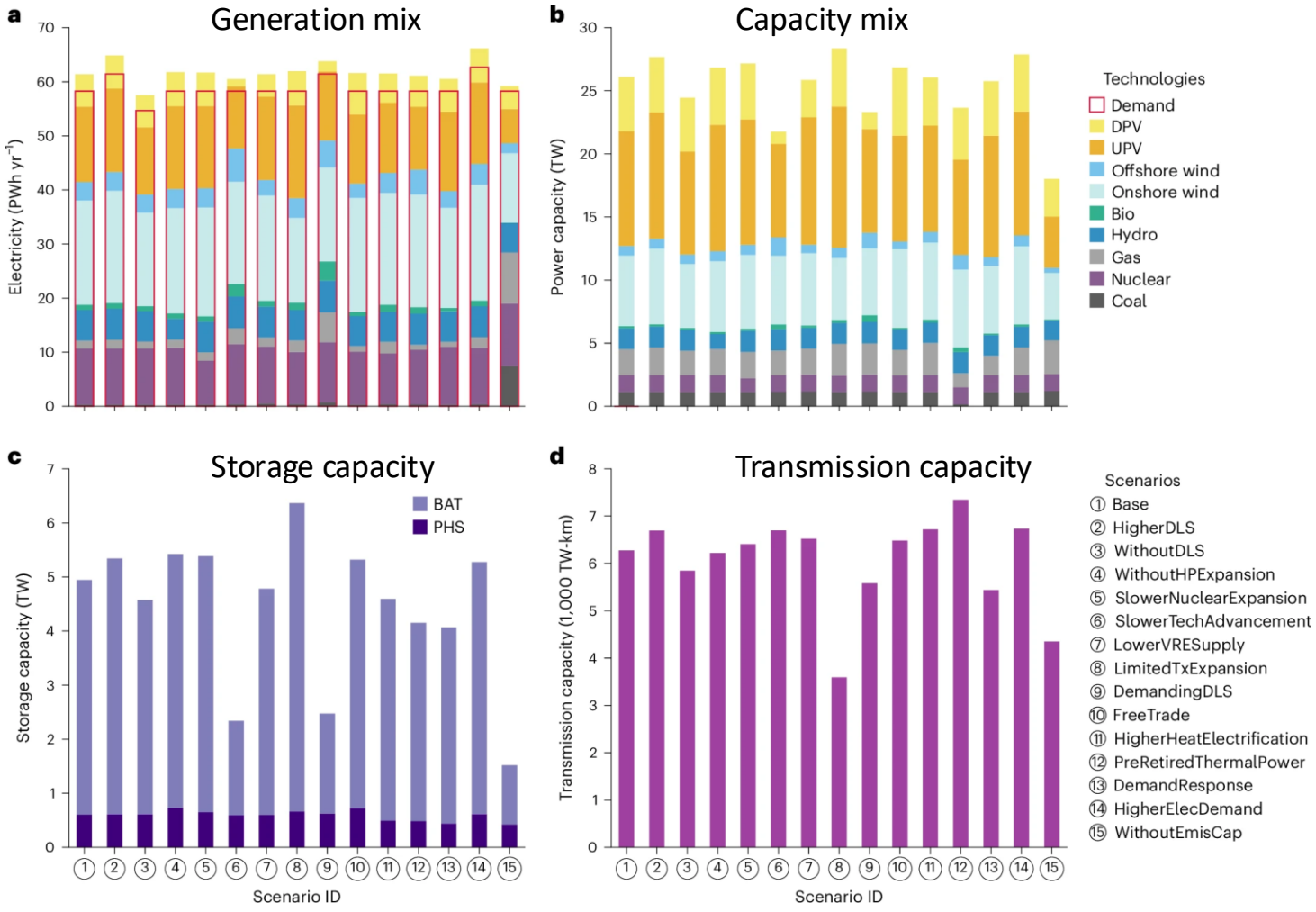
Transmission infrastructure in net-zero power systems globally



Degree of electricity self-sufficiency for each power region

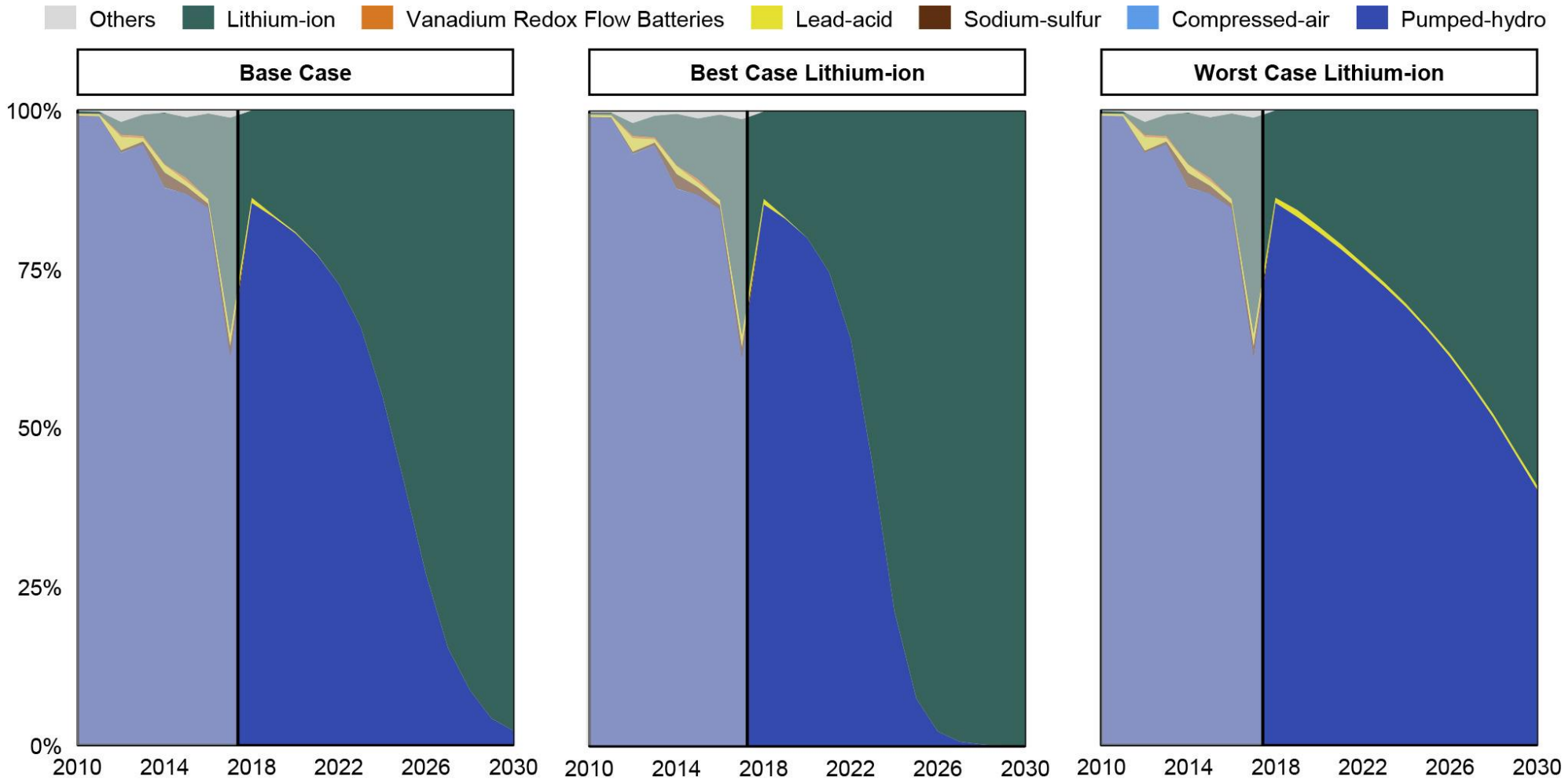


Increased deployment of batteries and transmission infrastructure is necessary



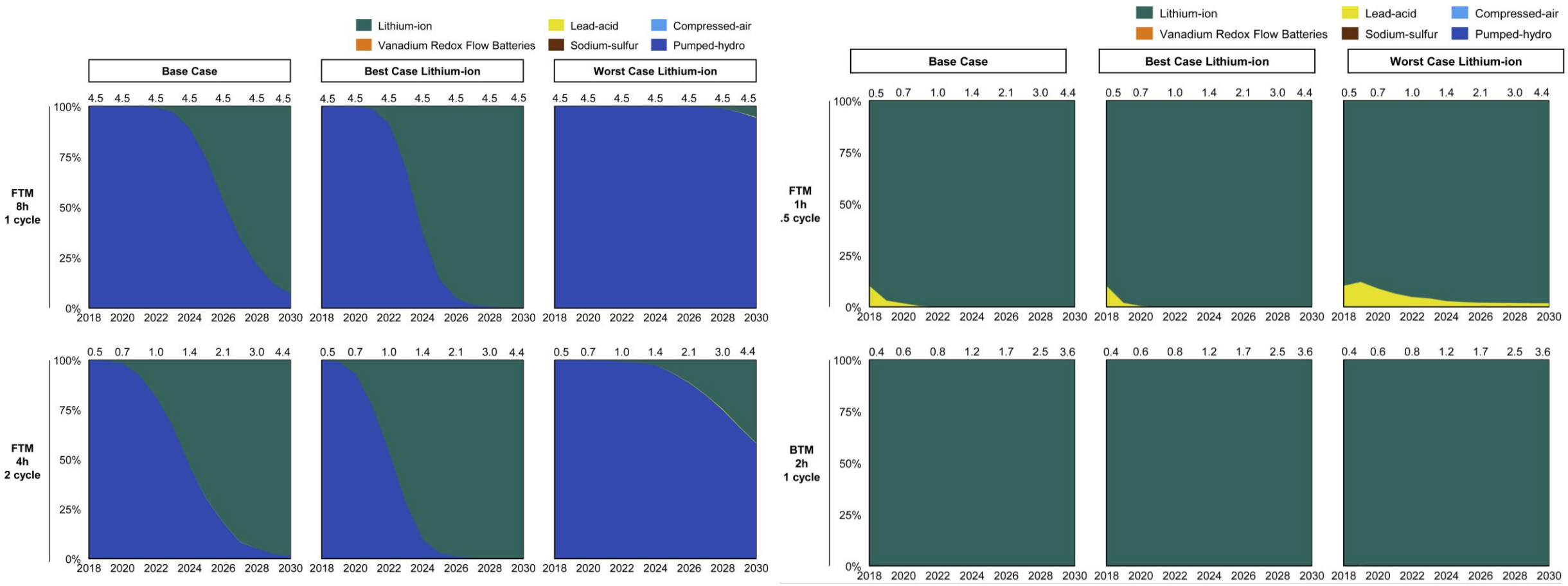
BAT = battery storage
PHS = pumped hydro storage

EV deployment crucial for li-ion battery cost-competitiveness projections



Beuse et al. 2020. *Joule*

Duration dispatch crucial for li-ion battery cost-competitiveness projections



Distributed technologies and cost of capital are crucial in SSA