State of Energy Innovation

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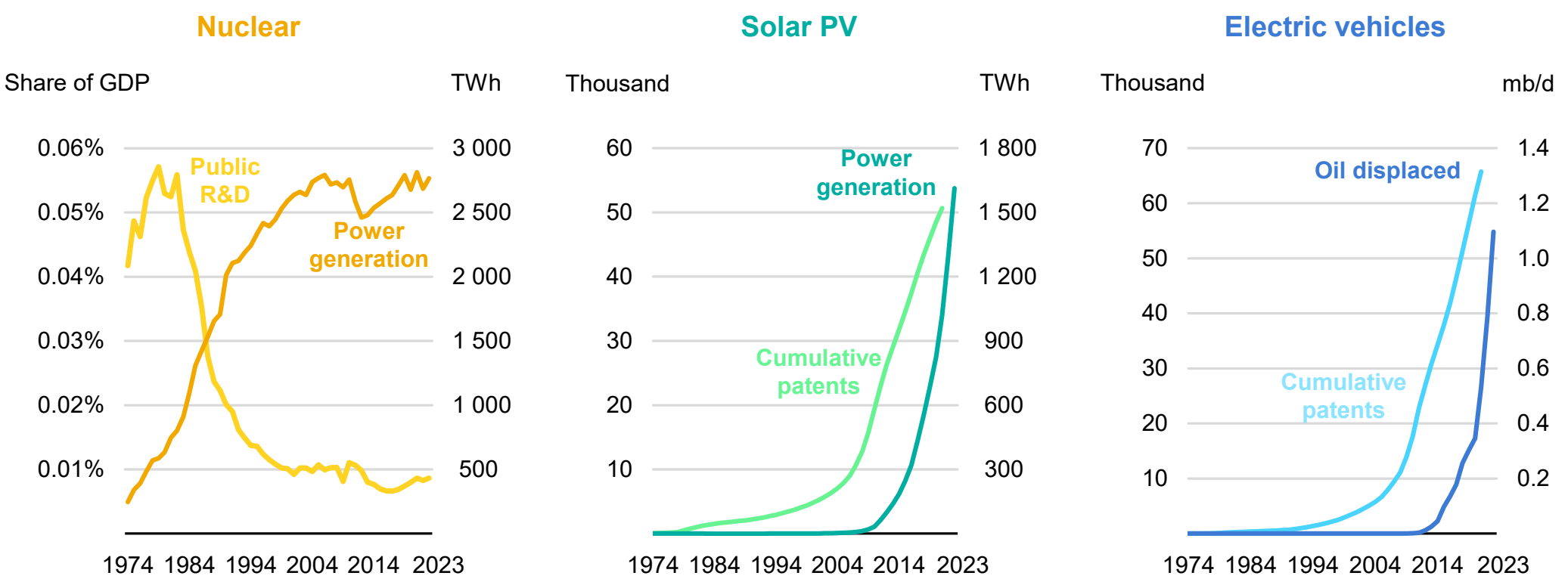
Session 3 Innovations to Overcome the Gap between Ideals and Reality

Energy R&D has major real-world impacts on the energy system



Energy innovation covers many stages – from research to scale-up – and continues after products hit the market. It boosts diversification, affordability and sustainability in diverse parts of the energy system.

Energy R&D has impacts on society and the wider economy

Mass-market spillovers from energy R&D

Initial Li-ion battery R&D was for storing renewable power

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Li-ion batteries for smartphones and electronics

Processing seismic data to find oil and gas

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Processing musical data for auto-tune

Unconventional oil and gas technologies

2000: USA **imports** 46% of its oil & gas needs

↓

2024: USA **exports** the equivalent of 10% of its needs

Battery, EV and manufacturing technologies

2024: Share of EVs in car sales in China reaches 50%

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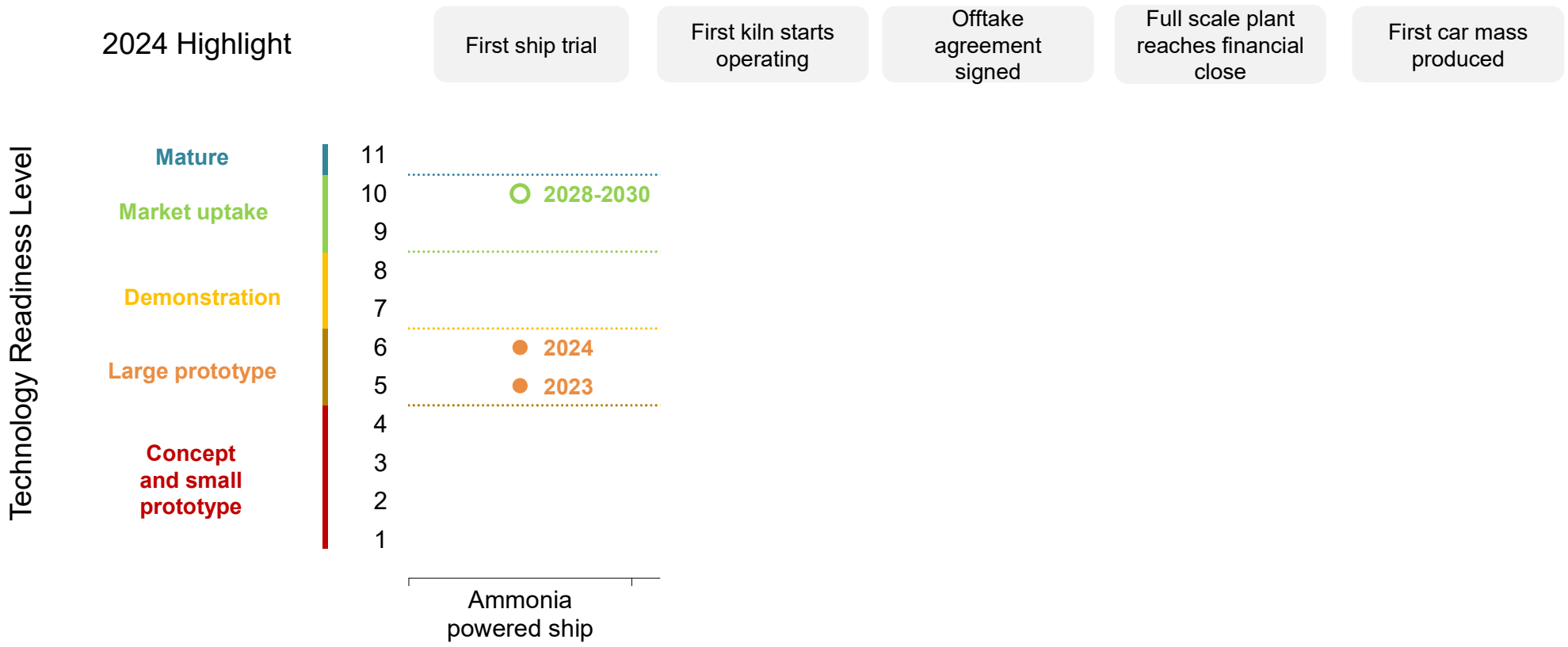
2024: China **imports** 8% **less oil**

The effects of energy R&D are felt far beyond the energy sector, with spillovers and trade impacts driving competitiveness and new industries.

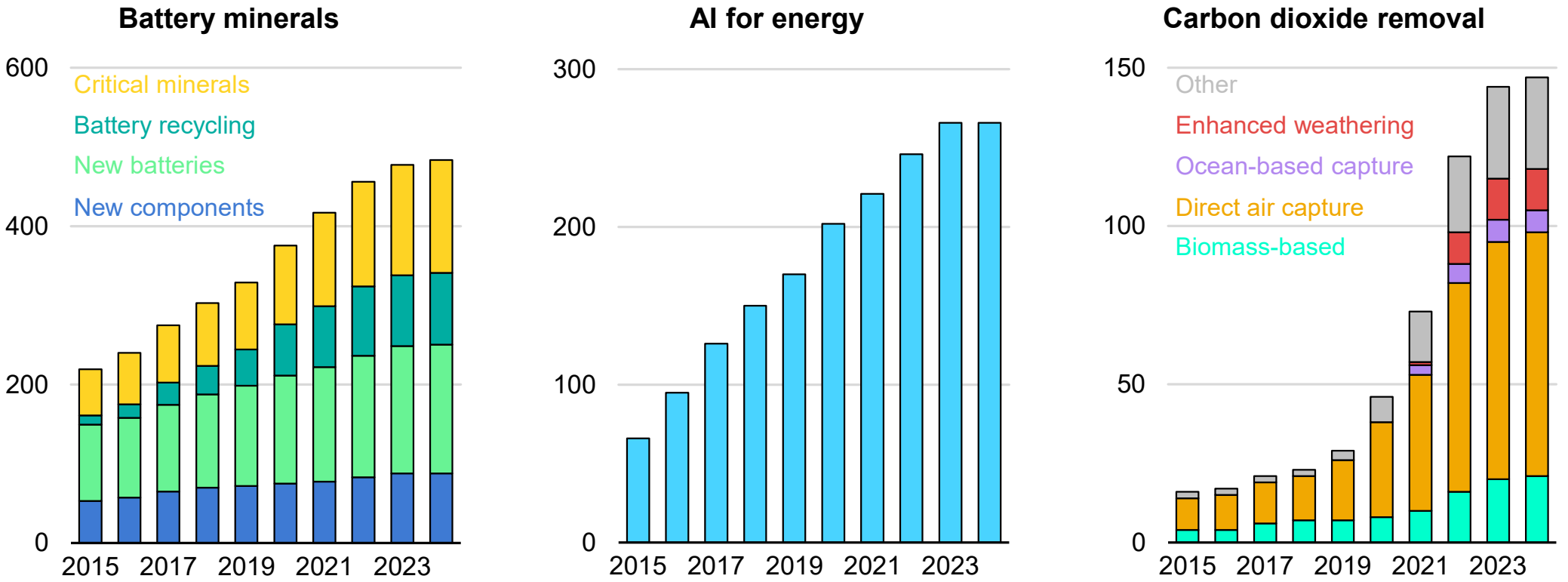
A wealth of energy technology highlights from the past 12 months



We have identified over 150 innovation highlights from the past year, covering different types of advances: from R&D breakthroughs to funding commitments, real-world trials and new product launches.

Three dynamic areas in focus: battery minerals, AI and CDR

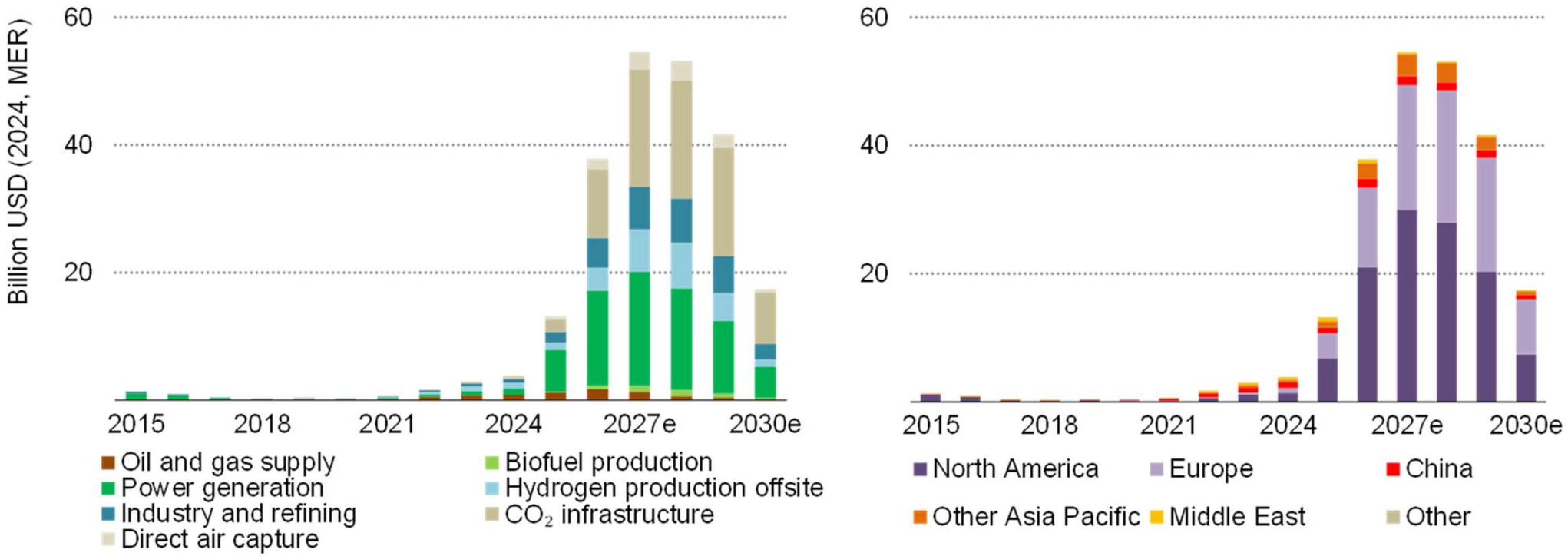
Number of known start-ups, 2015-2024



There have been sharp increases in the numbers of start-ups being founded, but each sector must overcome unique challenges and policy needs to achieve widespread deployment.

A strong pipeline of new CCUS projects

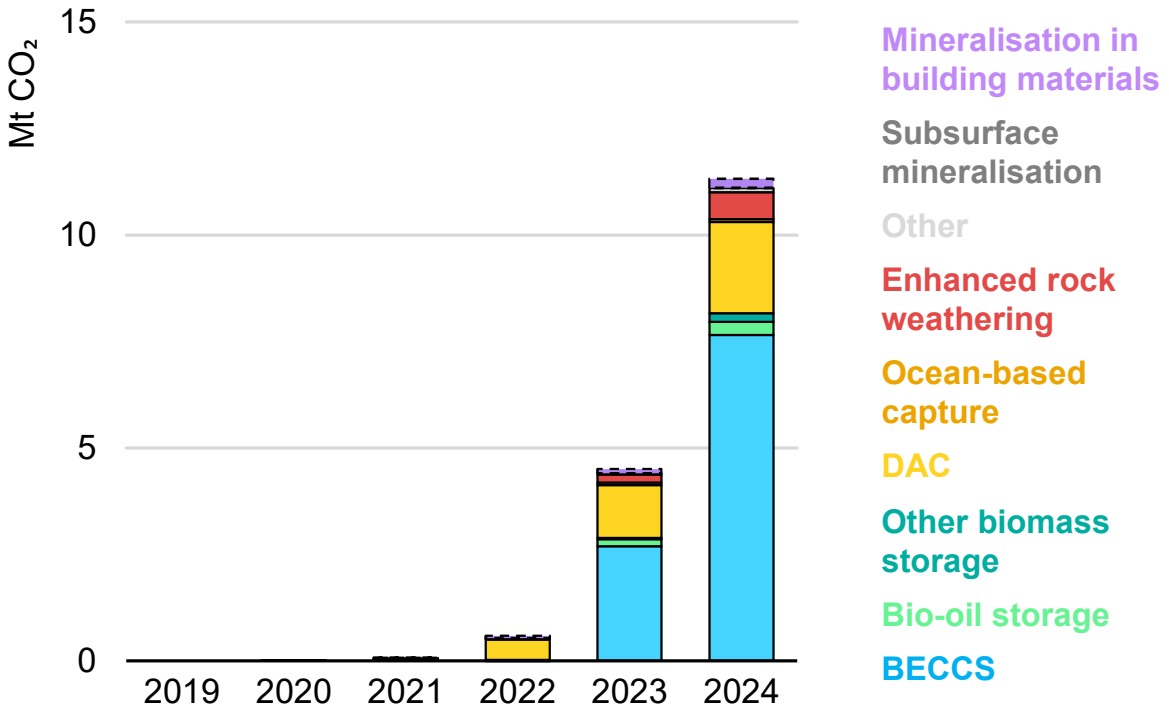
CCUS investment pipeline by type (left) and region (right) based on announced projects, 2015-2030e



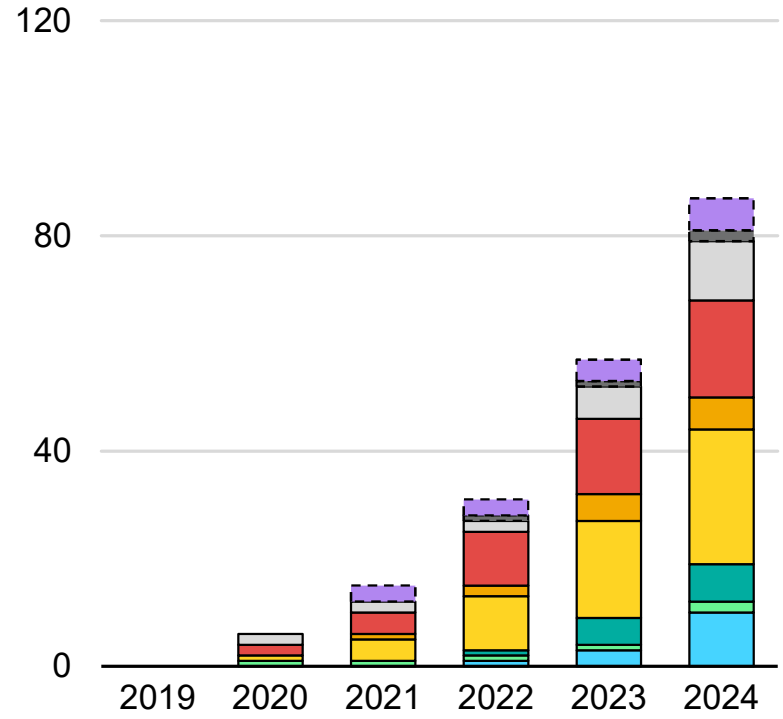
Successfully developing them would mean CCUS investment rising more than tenfold over the next three years

Voluntary carbon markets have been critical to support expansion

Cumulative CDR credits sold for selected CDR approaches, 2019-2024



Number of companies selling credits 2019- 2024



Advanced purchase agreements for CDR credits more than doubled between 2023 and 2024. BECCS and DACS make up three-quarters of cumulative credits sold, but other CDR approaches are growing their presence on markets.

Policies can support innovation in CDR

1. A global portfolio of pilot and demonstration projects
2. Open-access testbeds for CDR
3. Public procurement of CDR
4. Two-way flow of project data and research to improve MRV