

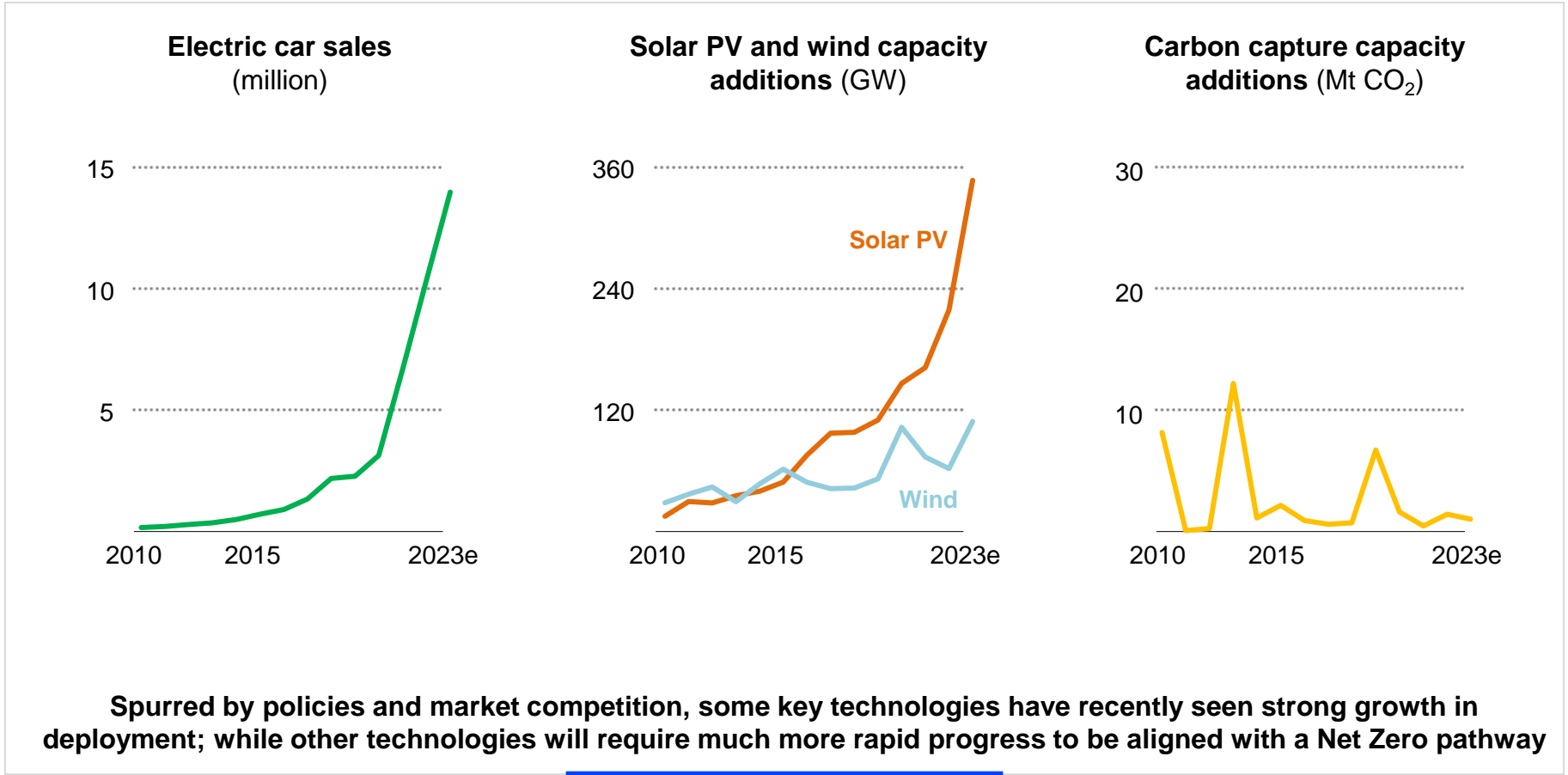


# The role of CCUS in net zero transitions

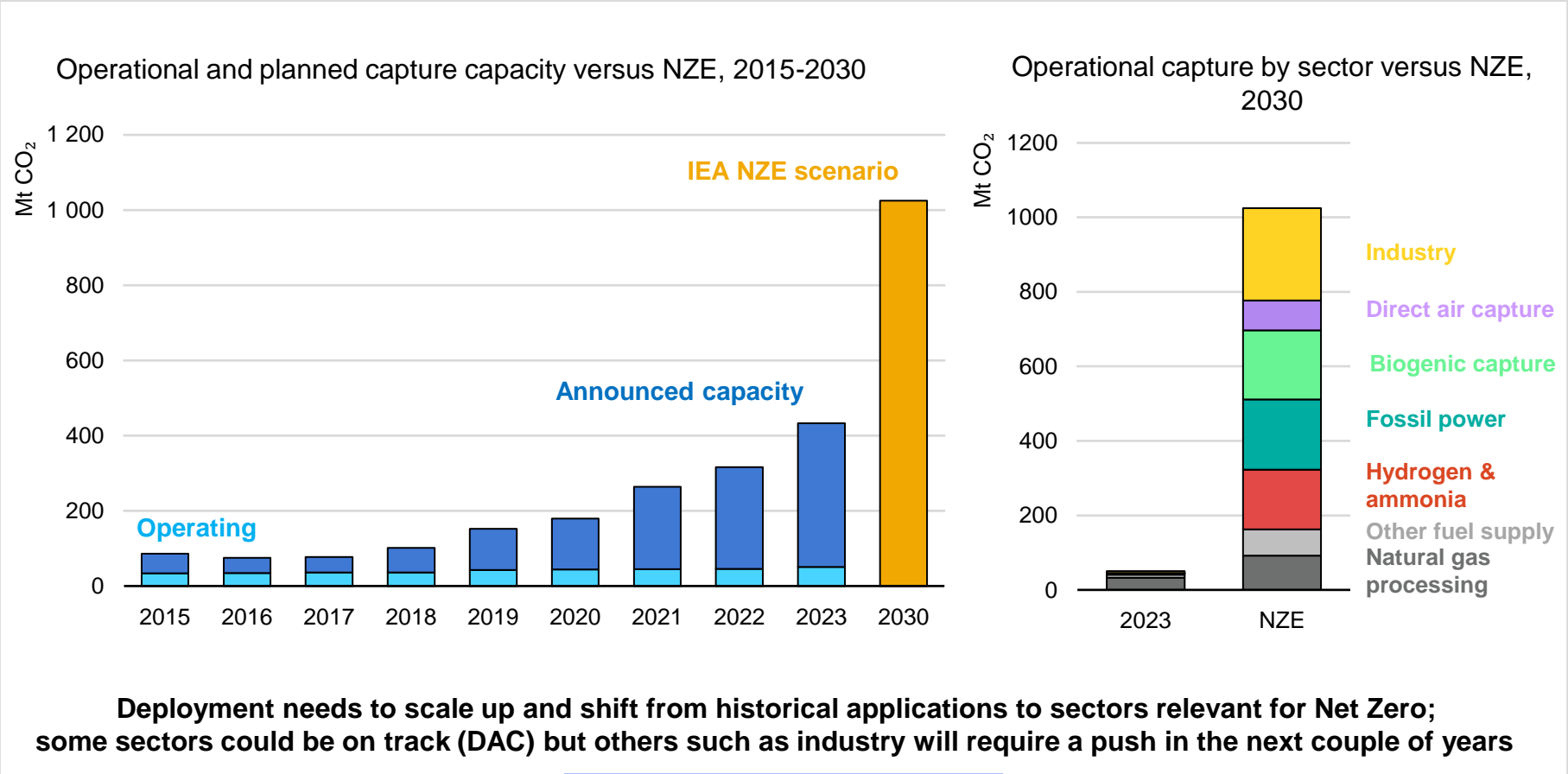
Simon Bennett

6 June 2024

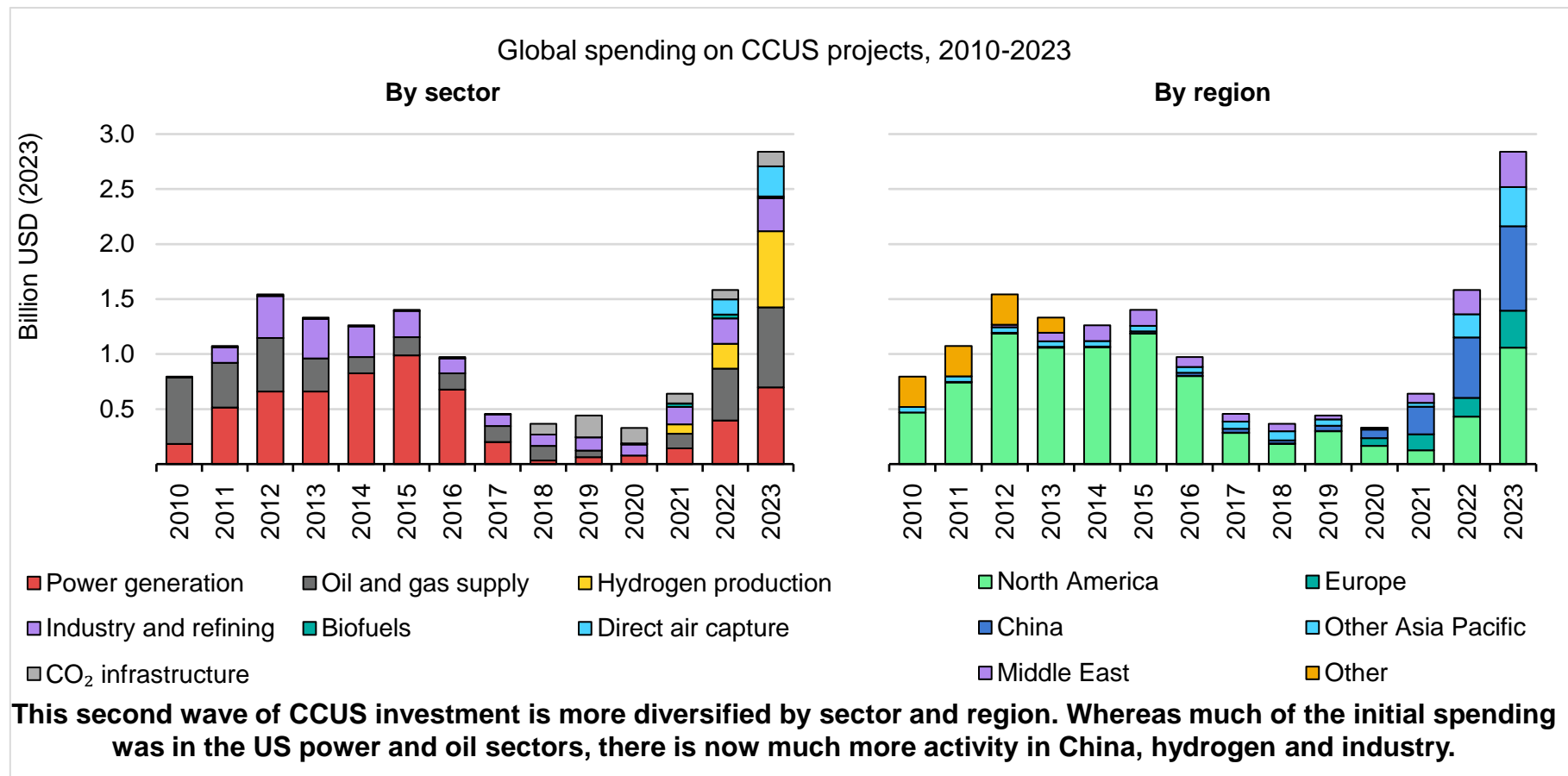
# Clean energy growth is keeping the door to 1.5 °C open



# Flat deployment but a growing momentum in CCUS

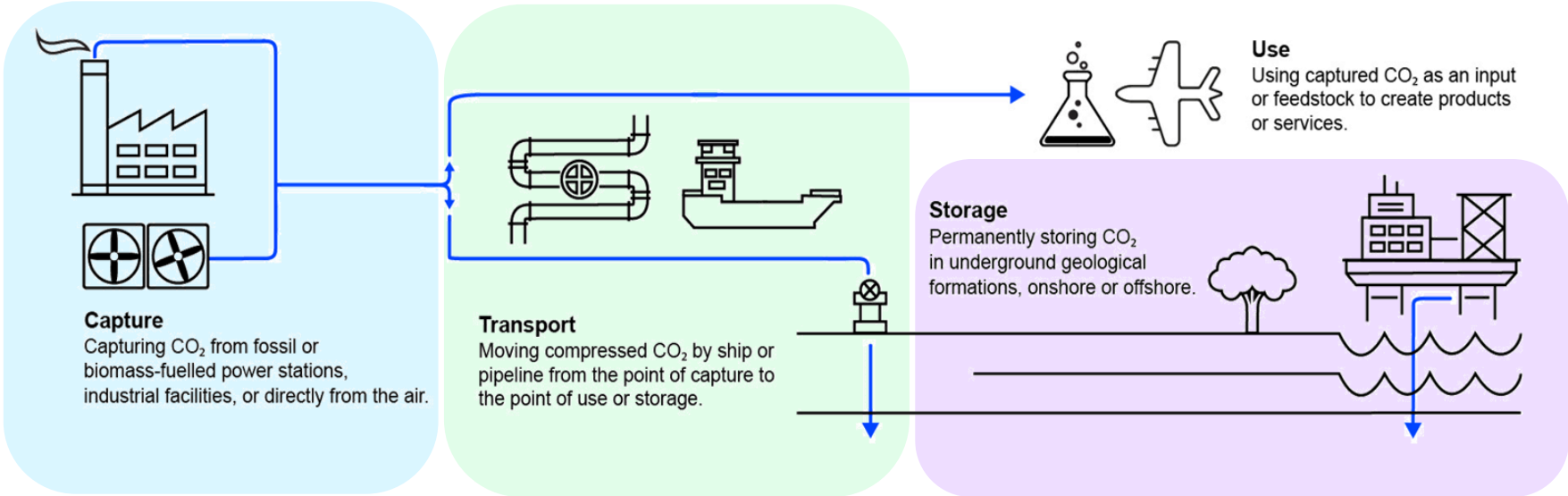


# Investment in CCUS is higher than, at nearly USD 3 billion in 2023



# From full-chain to part-chain business models

## CCUS value chain



Self-capture with third-party CO<sub>2</sub> offtake

Capture-as-a-service

CO<sub>2</sub> transport-as-a-service

CO<sub>2</sub> storage-as-a-service

**New players specialising in parts of the value chain are entering the market, allowing more emitters to access CCUS solutions**

# Existing policies are not enough to scale CCUS

Map of projects in operation and under construction and CCUS policies

### Project type

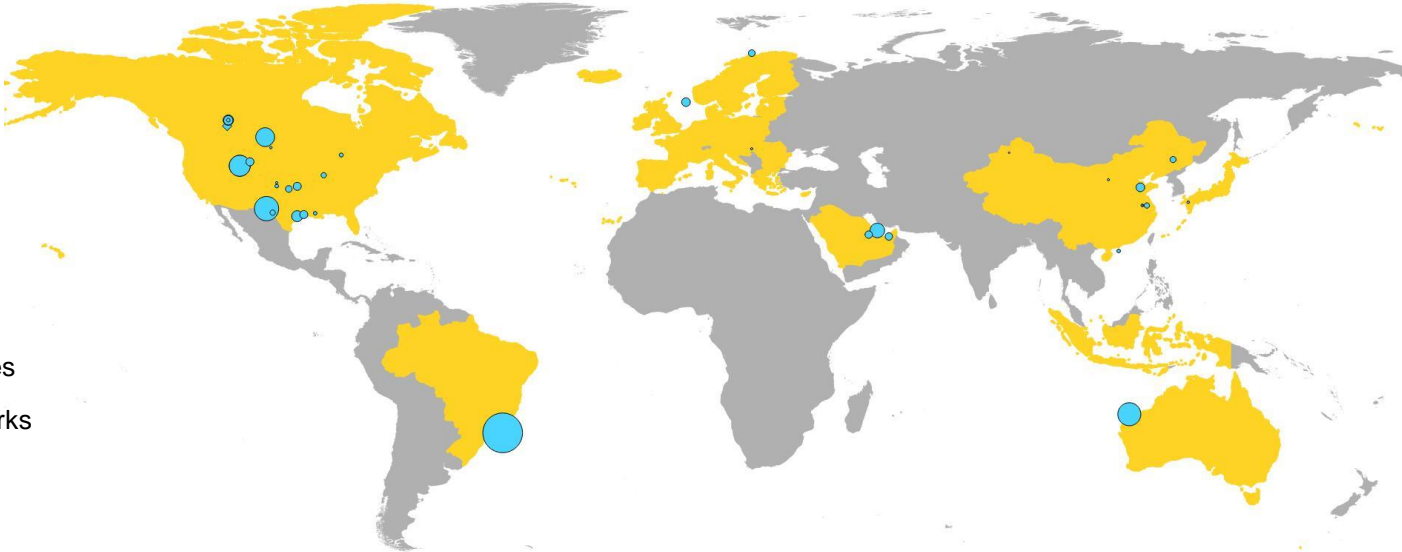
- Capture or full chain
- ◆ Storage

### Project Status

- Operating
- Under construction

### Policies

- Cost reduction measures
- Enabling legal frameworks
- Carbon management strategies in place and in planning



**Cost reductions and legal frameworks have helped many CCUS projects to date. But with less than 20% of captured CO<sub>2</sub> injected in dedicated storage, these alone cannot scale up CCUS in areas that are key for NZE**

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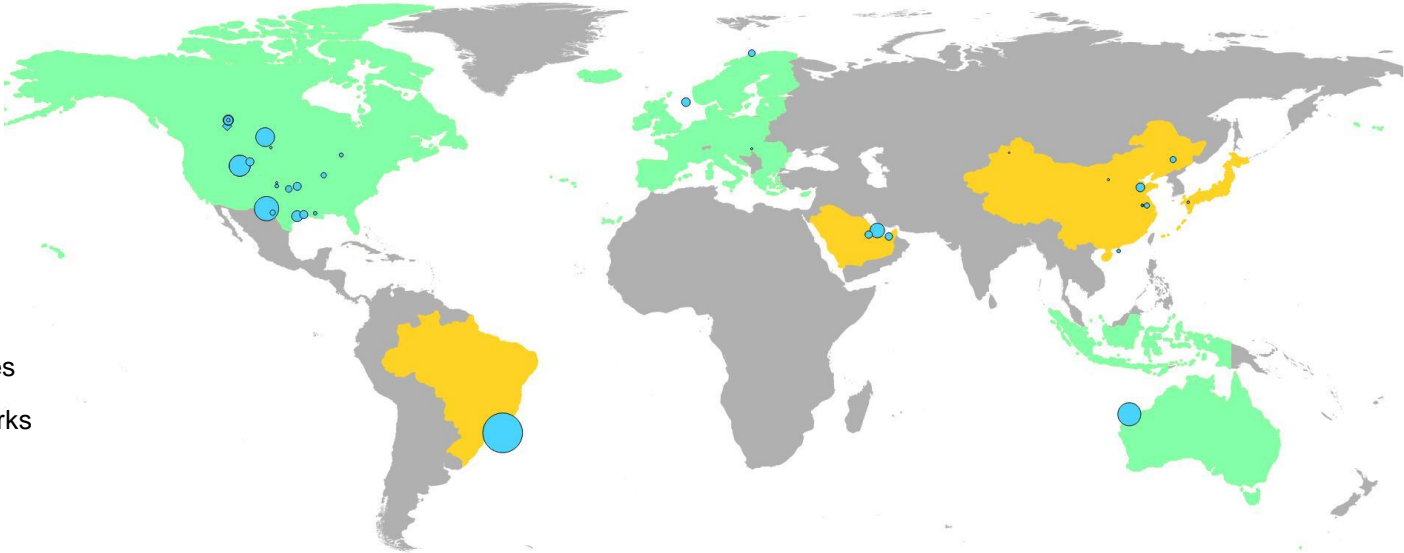
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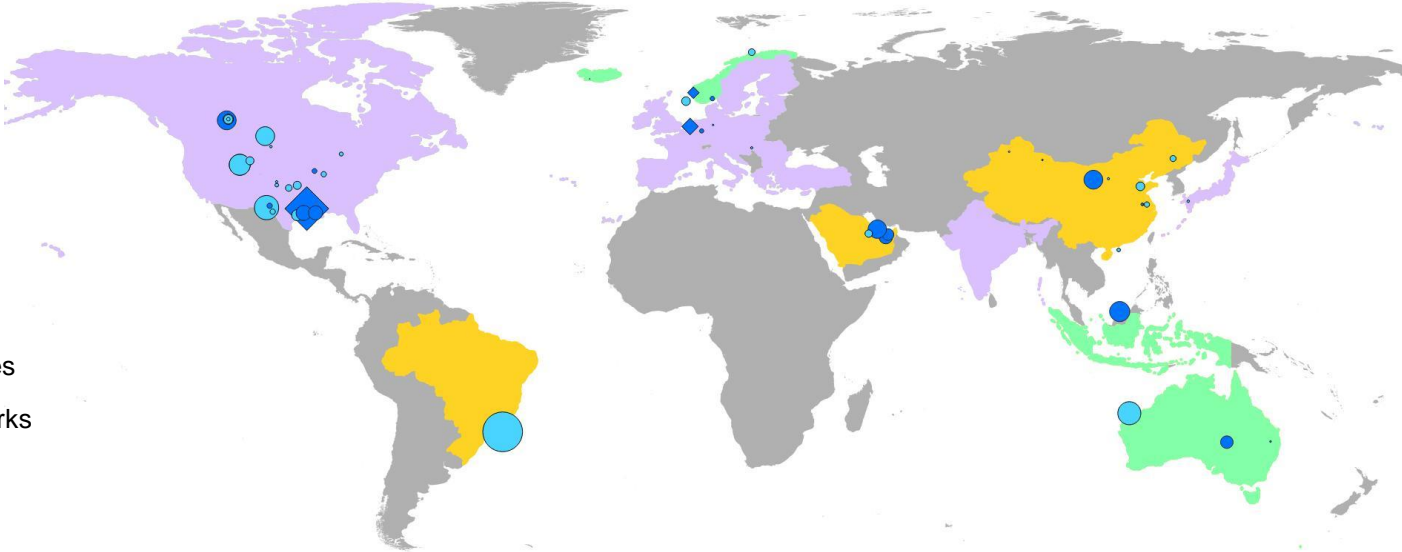
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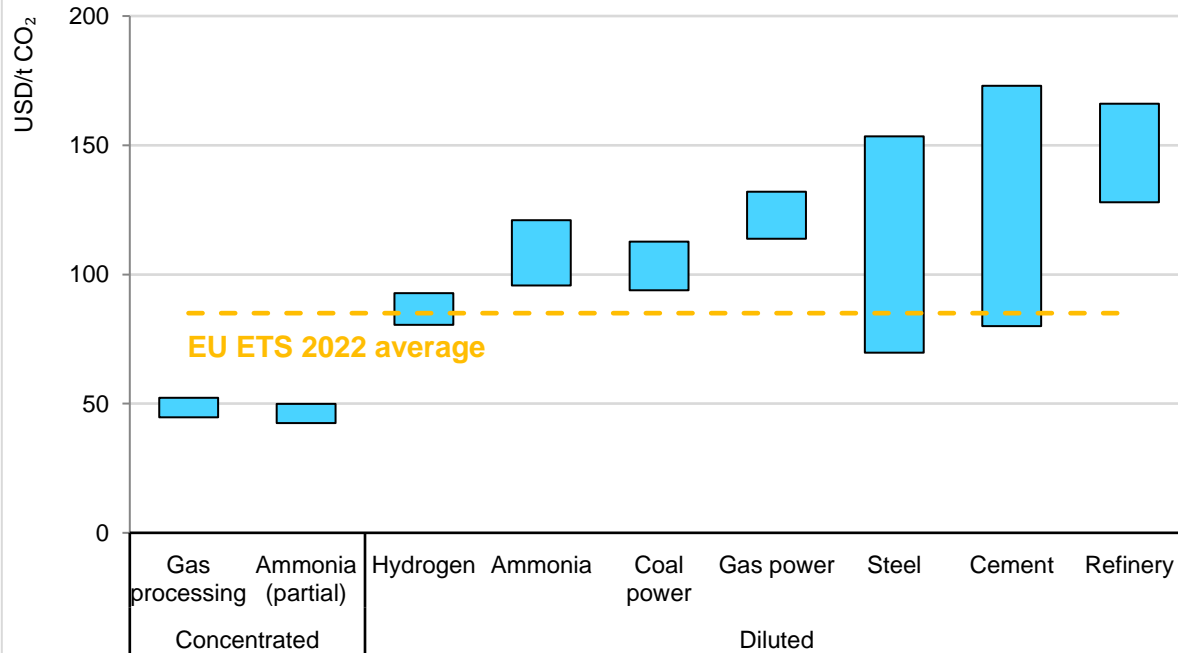
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# Challenge I: economic viability

Levelised cost of carbon avoided for a range of applications



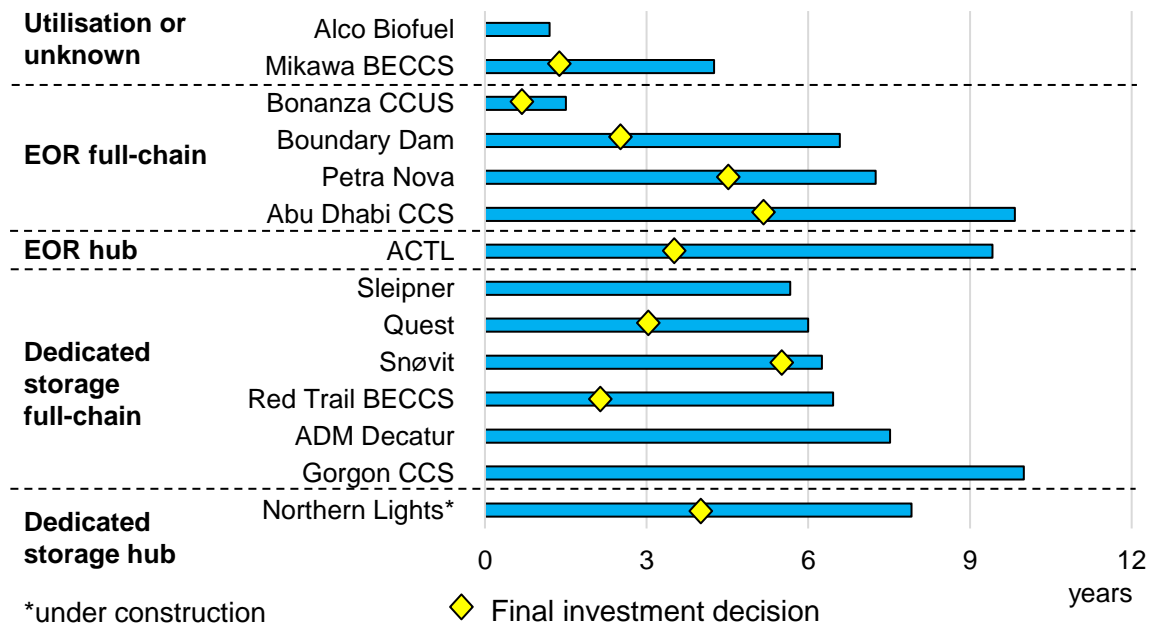
## Policy tools

- ✓ Grants, tax credits, loans
- ✓ State-owned enterprises
- ✓ Carbon pricing and leakage policy
- ✓ Public procurement and mandates
- ✓ (Carbon) contracts-for-difference
- ✓ Regulated asset base
- ✓ Emerging markets considerations

**Carbon prices in the European Union currently have limited ability to incentivise dilute applications. Policy tools are available to support higher-cost projects**

# Challenge II: reducing lead times

Lead times of projects in operation



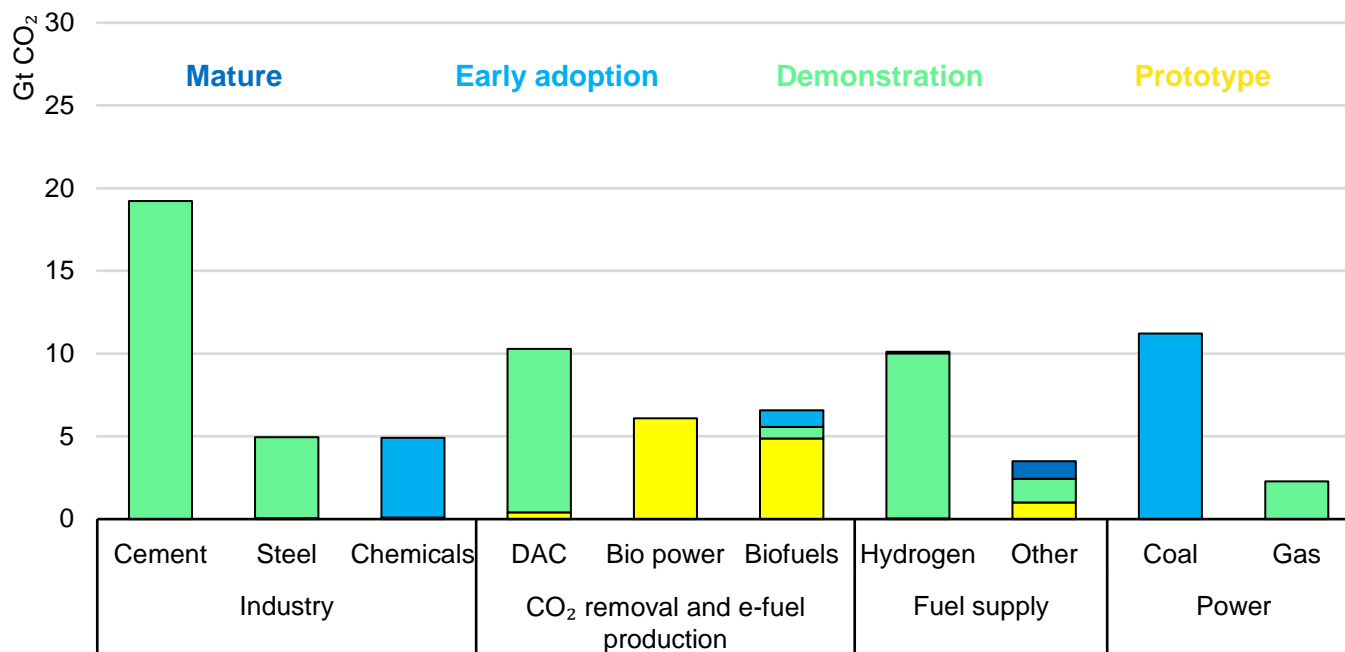
## Policy tools

- ✓ One-stop shop for permitting
- ✓ Clear approval timelines
- ✓ Regulatory capacity
- ✓ Precompetitive resource assessments
- ✓ Data sharing and transparency
- ✓ Community engagement

**Projects have taken between 2 and 10 years to reach completion, with a median around 6 years. Lead times can be reduced where infrastructure is in place (hubs), but efforts are required to streamline procedures**

# Challenge III: bridging the innovation gap

Cumulative capacity to 2050 in the NZE Scenario by maturity level



## Policy tools

- ✓ Research, development and demonstration
- ✓ Platforms for international co-operation
- ✓ Foreign direct investment for technology co-development

**75% of planned capture capacity to 2050 in the NZE is in applications that are at the demonstration stage or below. RD&D investment is required to bridge this gap and continue to reduce costs and energy penalty of CCUS**