



CCUS in Clean Energy Transitions

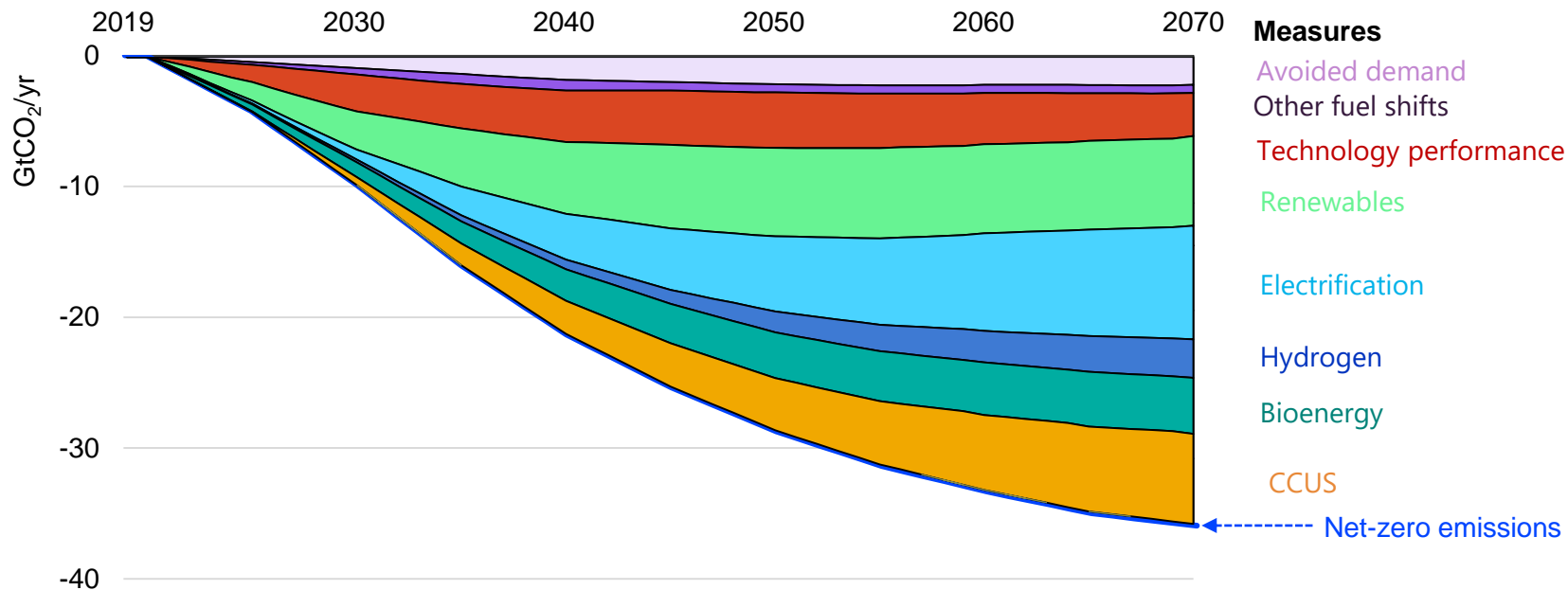
Samantha McCulloch, Head CCUS Unit, IEA

Japan CCUS and Hydrogen International Symposium, 11 March 2021

- Stronger investment incentives and climate targets are building new momentum behind CCUS:
 - More than 30 new projects announced recently
 - Governments and industry have committed more than USD 8 billion since early 2020
- CCUS can contribute to emissions reductions across the energy system, with **four strategic roles**:
 - Tackling emissions from existing energy assets;
 - A platform for low-carbon hydrogen production;
 - A solution for the most challenging emissions in sectors such as heavy industry & aviation; and
 - Removing carbon from the atmosphere

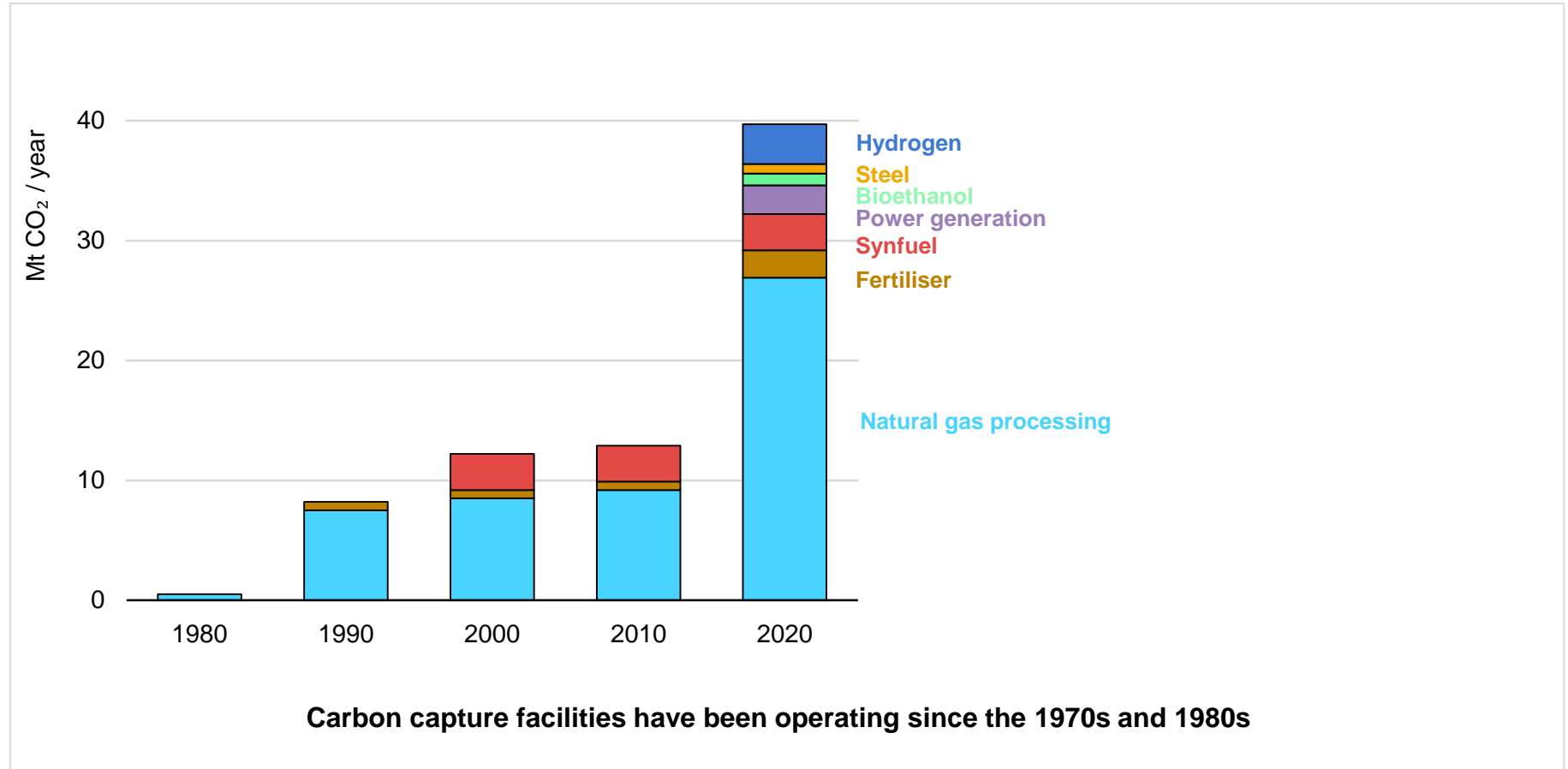
CCUS is part of a portfolio of technologies for net zero

Global CO₂ emissions reductions in the Sustainable Development Scenario, relative to baseline trends

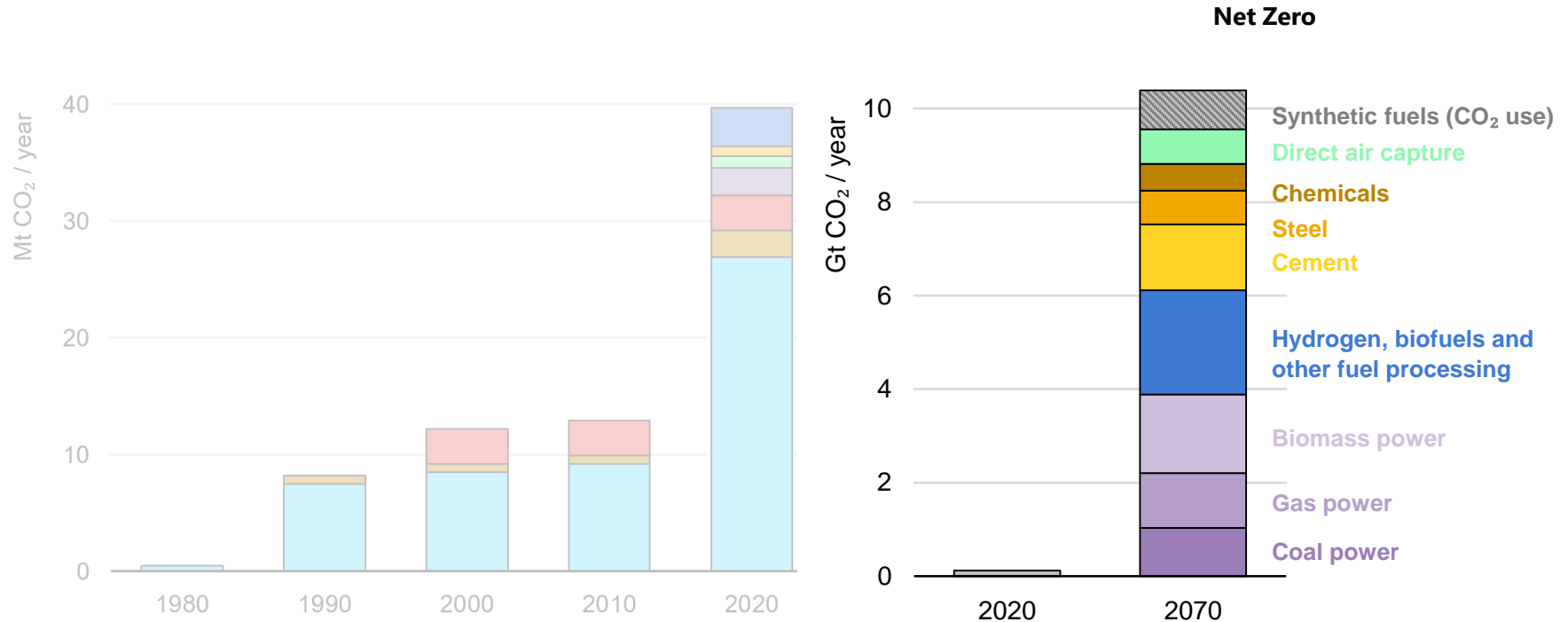


Clean energy technology progress in the power sector and with electric cars is encouraging, but alone not sufficient to reach climate goals. A broad portfolio of technologies will be needed for a transition to net-zero emissions.

Experience with CCUS has expanded in the last decade



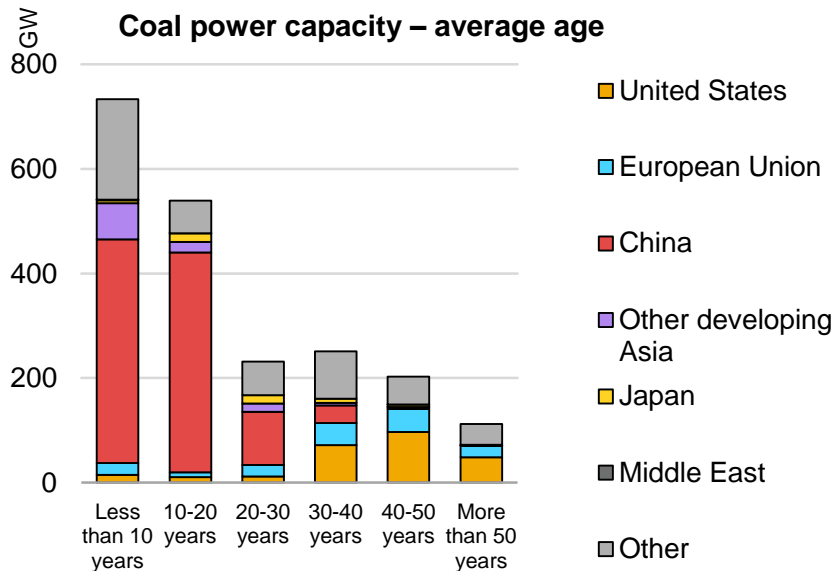
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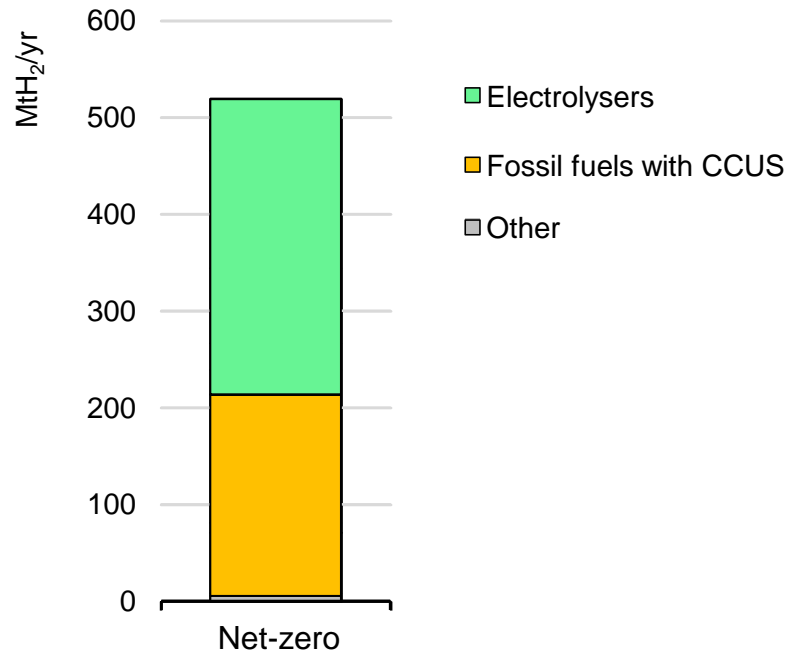
**Carbon capture facilities have been operating since the 1970s and 1980s
But a significant scale-up will be required for net-zero.**

Four strategic roles for CCUS

1. Tackling emissions from existing infrastructure



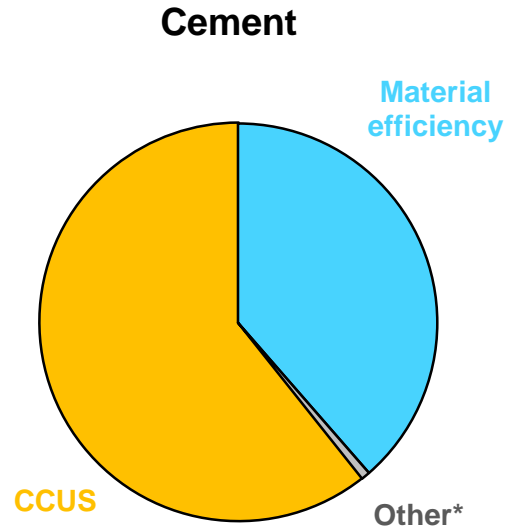
2. A platform for low-carbon hydrogen production



CCUS enables the continued operation of power and industrial plants – many of which have only recently been built
It is a low-cost option for low-carbon hydrogen production in many regions

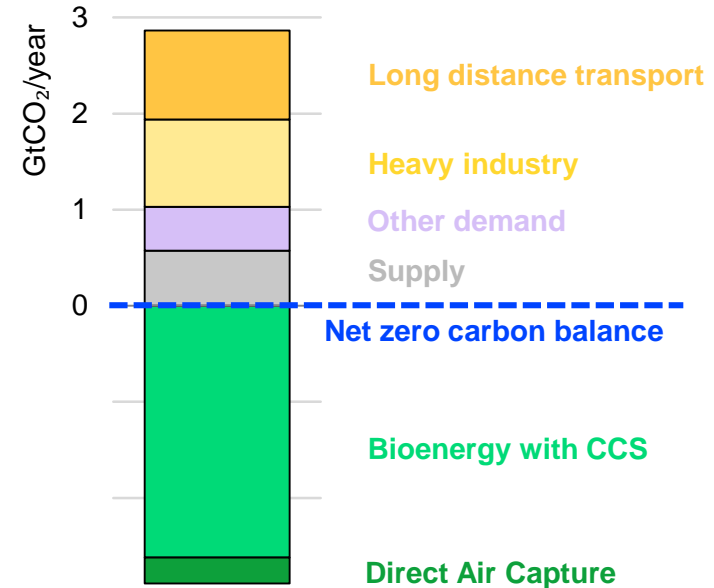
Four strategic roles for CCUS

3. A solution for the most challenging emissions



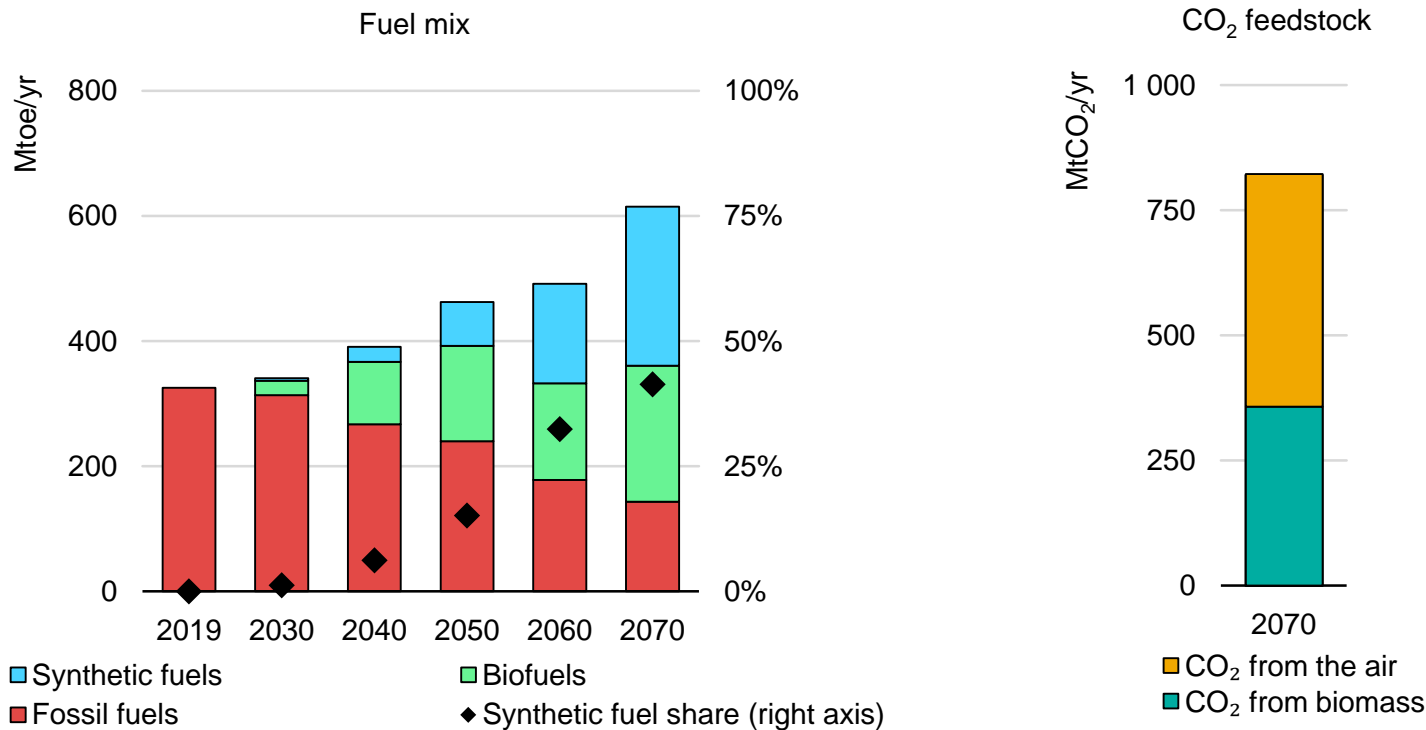
*Hydrogen, bioenergy, electrification, and fuel shifts

4. Removing carbon from the atmosphere



CCUS plays an indispensable role in heavy industry, particularly cement
Bioenergy with CCS and direct air capture can balance hard-to-abate emissions for net zero

CO₂ use for synthetic fuels

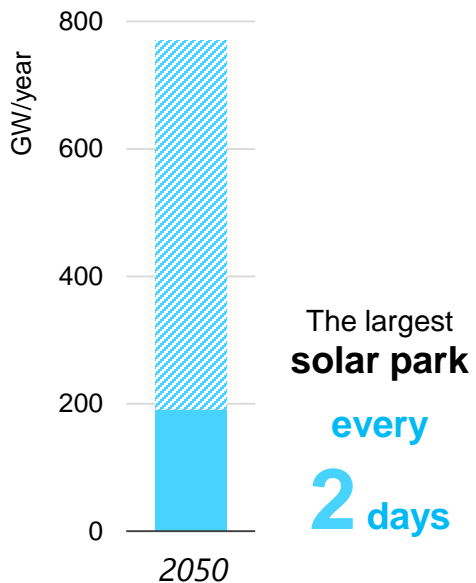


Synthetic fuels are needed in the aviation sector, but require large amounts of CO₂

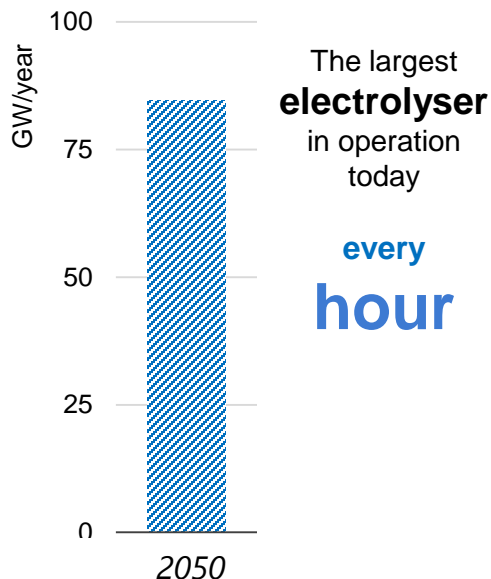
Net zero requires a major push to build clean energy infrastructure

Selected indicators to reach net-zero emissions by 2050 through technology

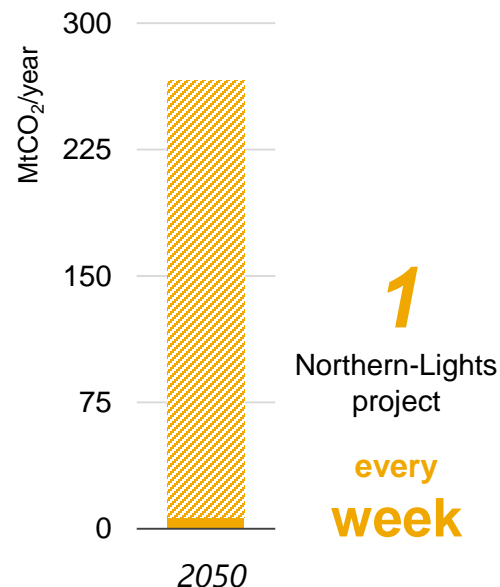
Renewable capacity additions



Electrolyser capacity additions



Additional CO₂ captured



Reaching net-zero emissions by 2050 would require a roll out of clean energy technologies & enabling infrastructure at unprecedented scale. Significant changes to consumer behaviour can moderate – but not eliminate – the needs.

- Four high-level priorities for governments and industry would accelerate the progress of CCUS over the next decade:
 1. Create the conditions for CCUS investment
 2. Target the development of industrial hubs with shared CO₂ infrastructure
 3. Identify and encourage the development of CO₂ storage
 4. Boost innovation for critical CCUS technologies

