International Energy Agency

CCUS in Clean Energy Transitions

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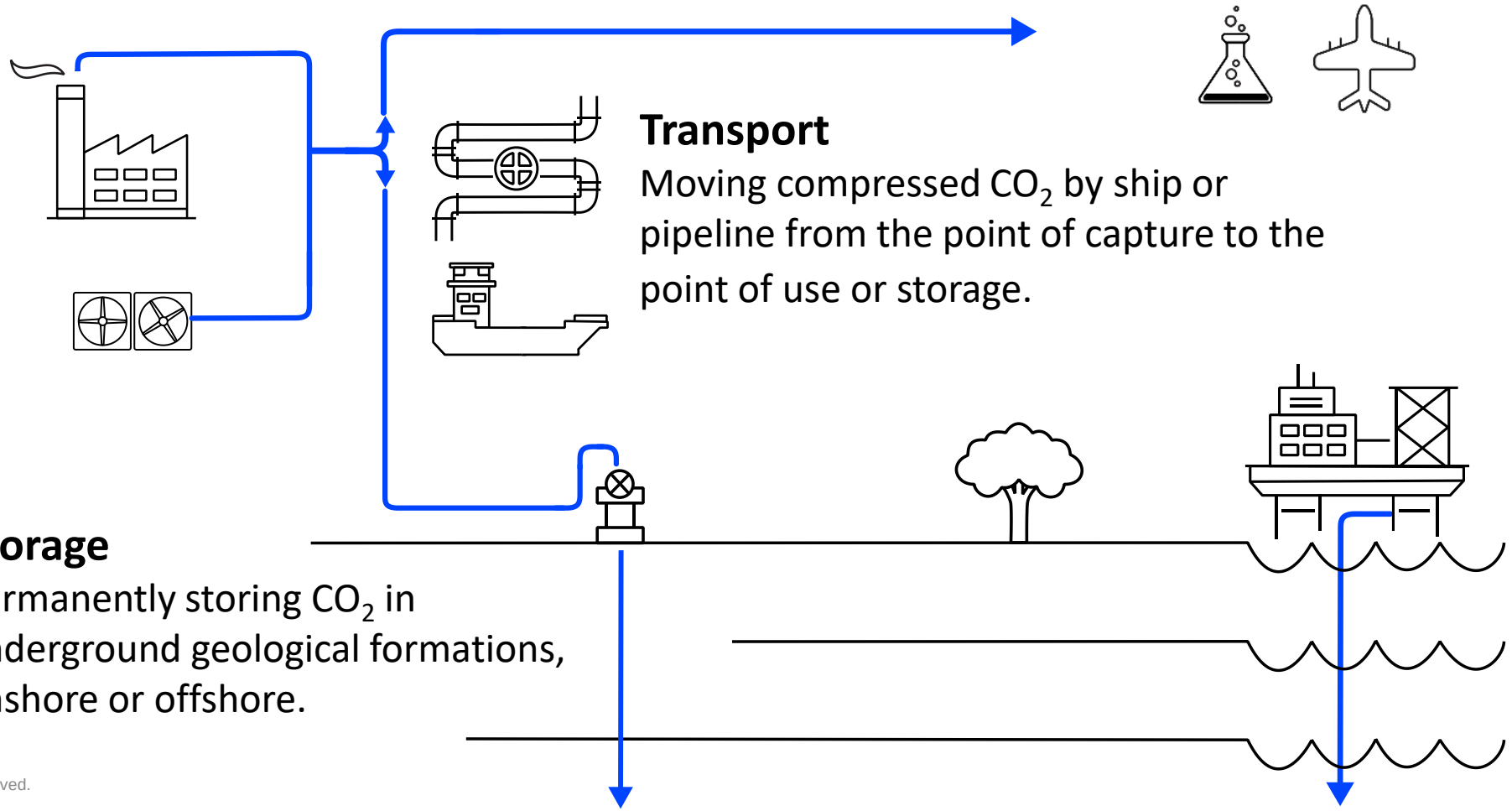
Carbon capture, utilisation and storage: an overview

Capture

Capturing CO_2 from fossil or biomass-fuelled power stations, industrial facilities, or directly from the air.

Use

Using captured CO_2 as an input or feedstock to create products or services.



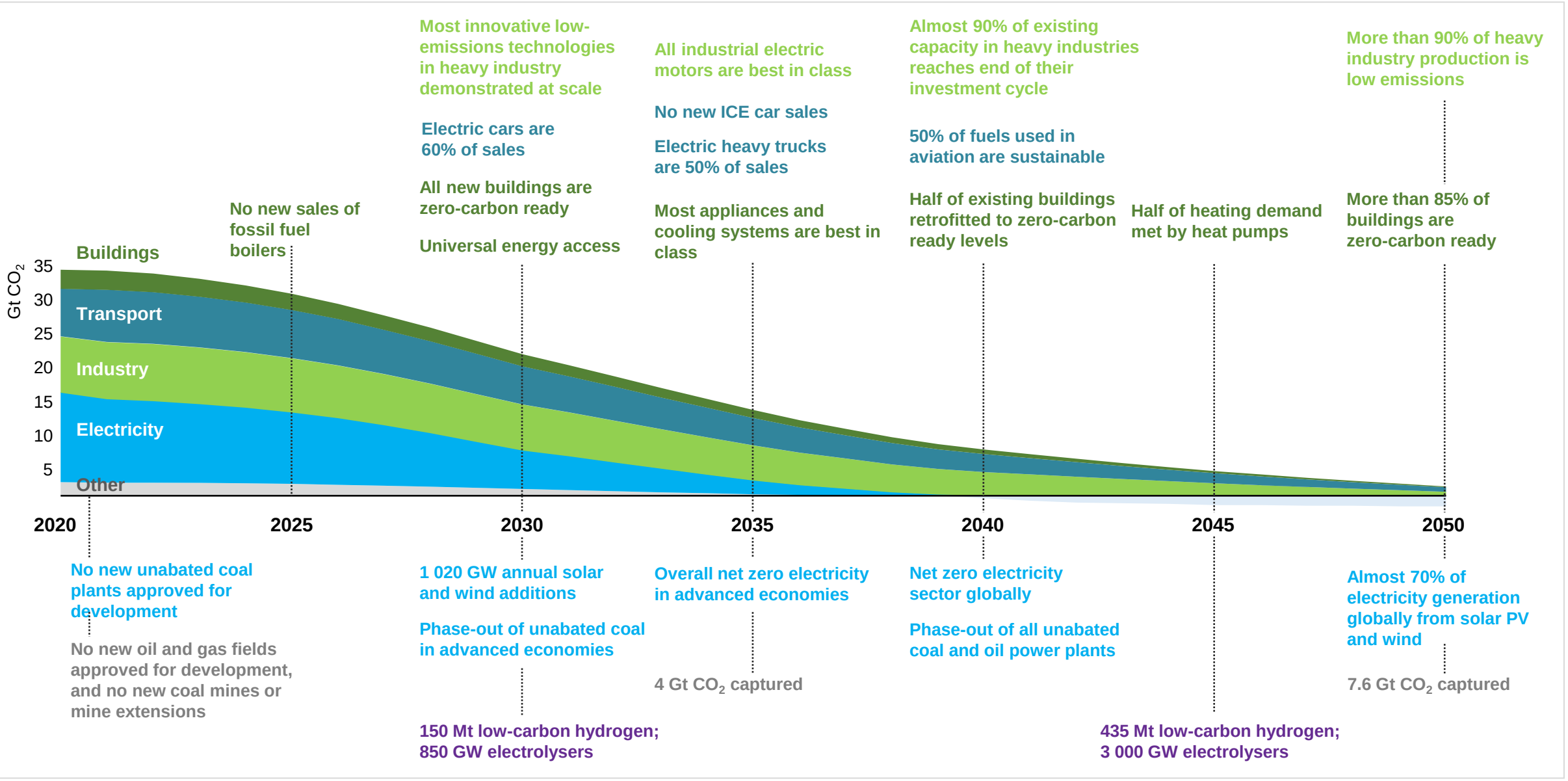
Transport

Moving compressed CO_2 by ship or pipeline from the point of capture to the point of use or storage.

Storage

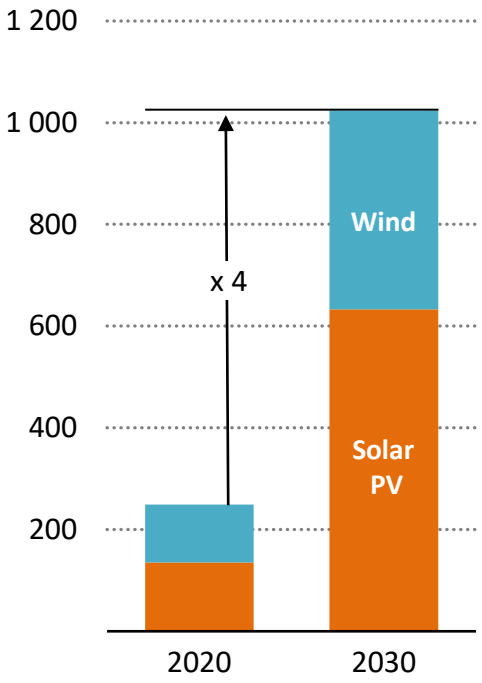
Permanently storing CO_2 in underground geological formations, onshore or offshore.

Set near-term milestones to get on track for long-term targets

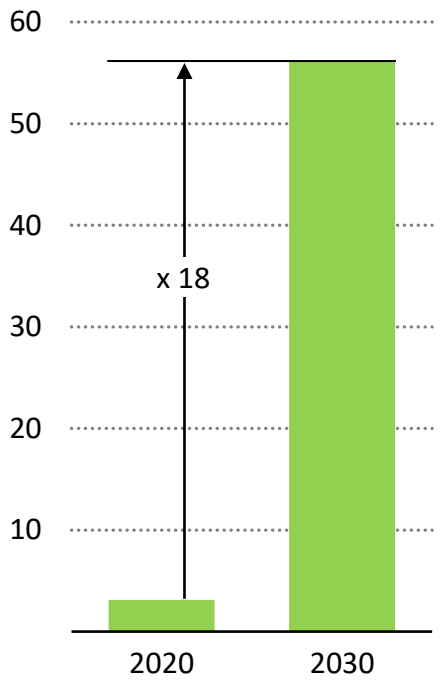


Make the 2020s the decade of massive clean energy expansion

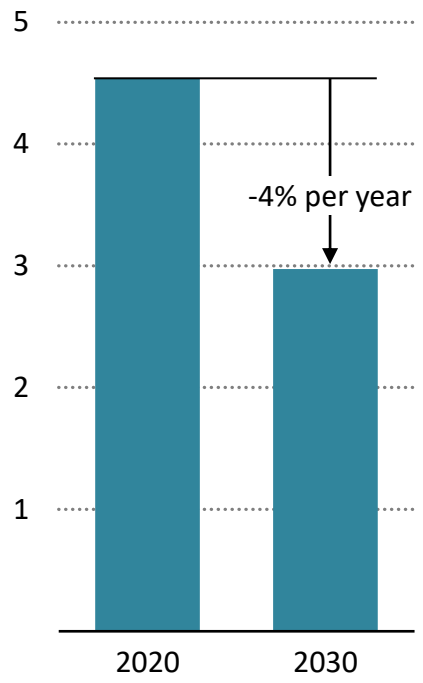
Solar PV and wind capacity additions (GW)



Electric car sales (millions)

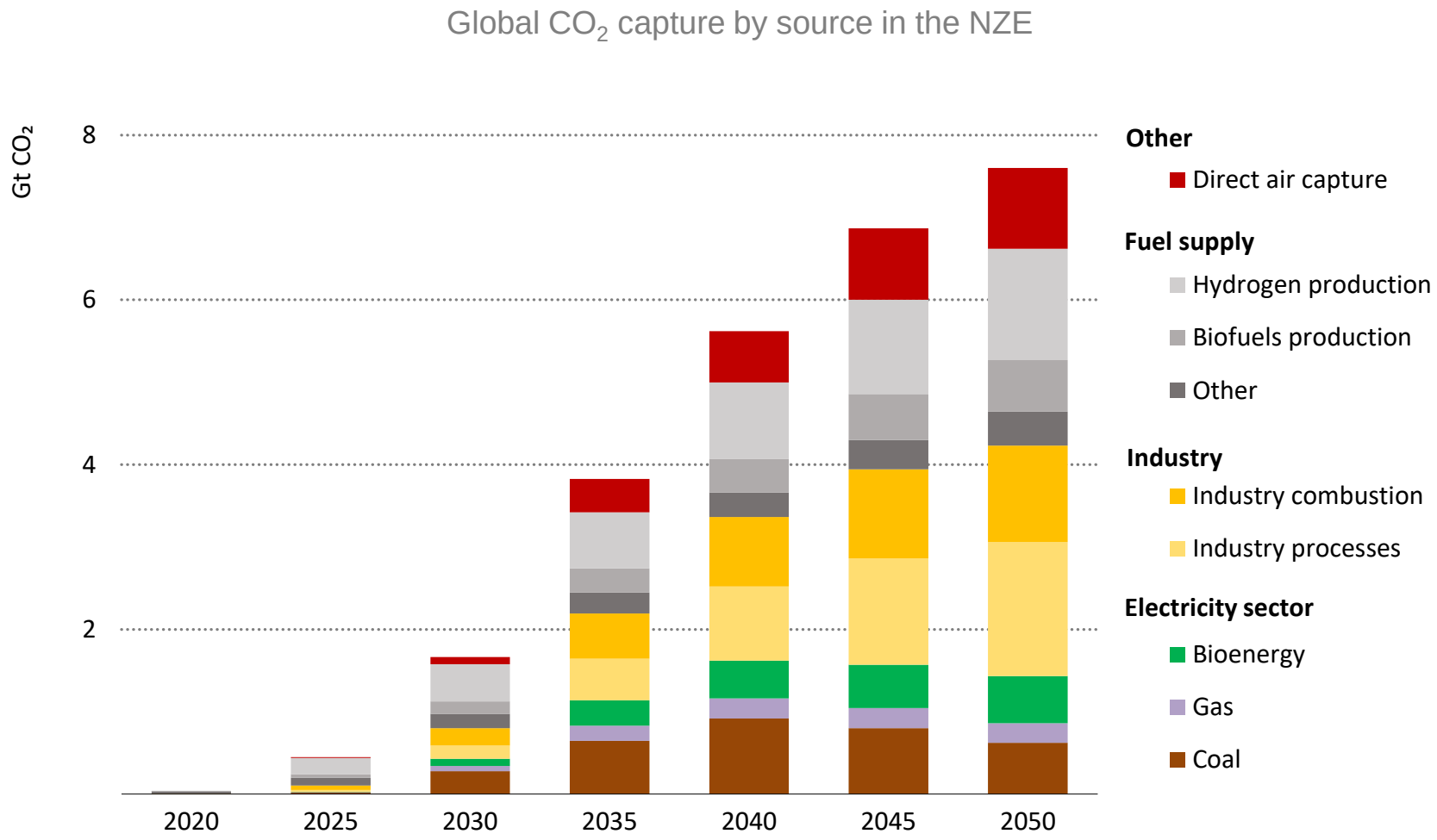


Energy intensity of GDP (MJ per USD PPP)



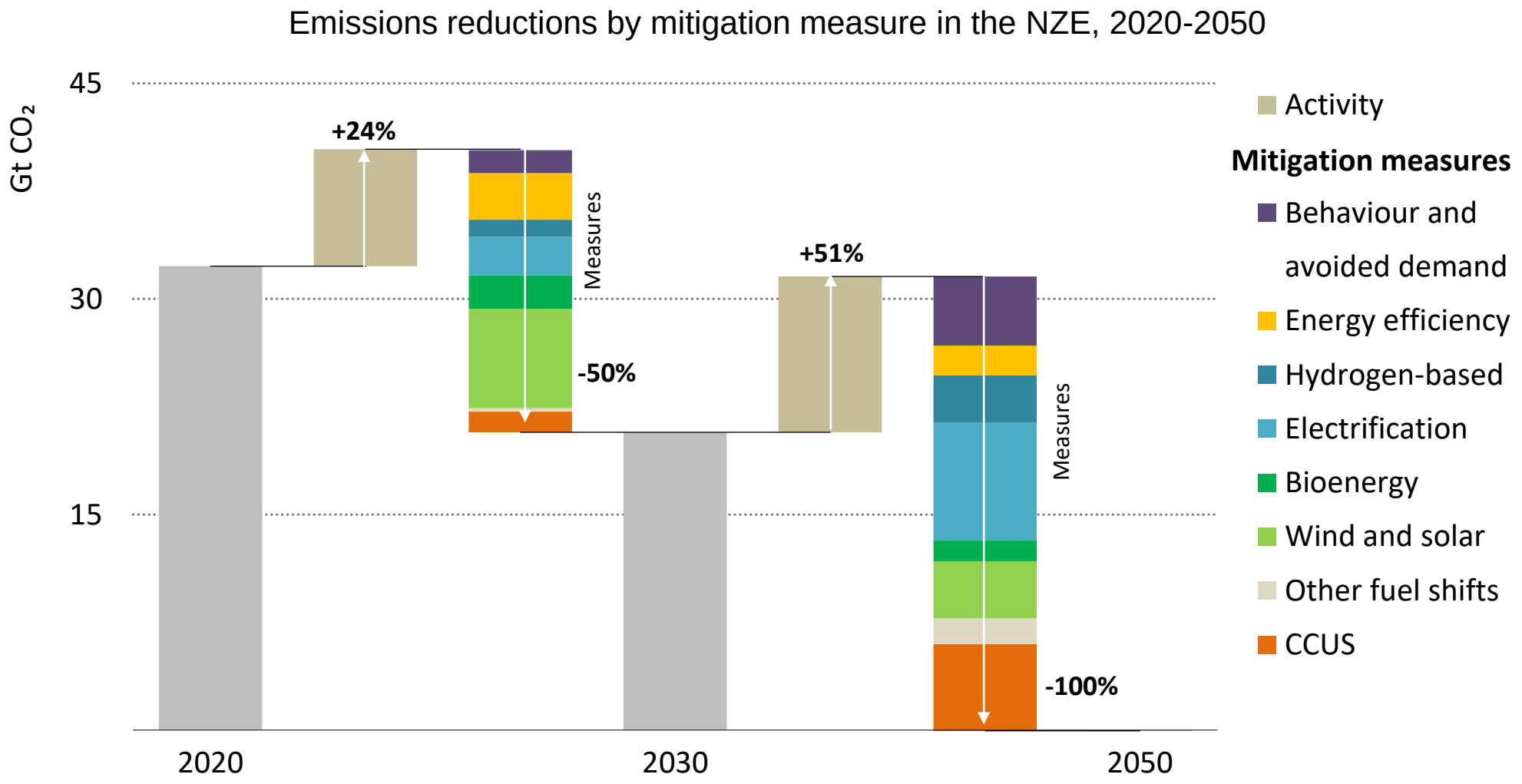
Technologies for achieving the necessary deep cuts in global emissions by 2030 exist, but staying on the narrow path to net-zero requires their immediate and massive deployment.

A rapid scale-up of CCUS is required



By 2050, 7.6 Gt of CO_2 is captured per year from a diverse range of sources
2.4 Gt CO_2 is captured from bioenergy use and DAC, of which 1.9 Gt CO_2 is permanently stored

CCUS is only part of the solution



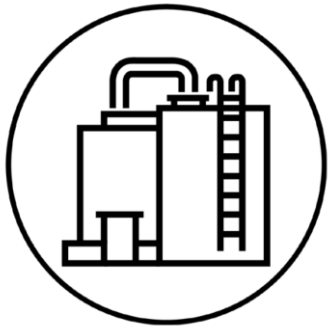
Solar, wind and energy efficiency deliver around half of emissions reduction to 2030, while electrification, hydrogen and CCUS ramp up thereafter. CCUS delivers 15% of emissions reductions in the 2020-50 period.

Four strategic roles for CCUS in energy transitions

1. Tackling emissions from existing infrastructure

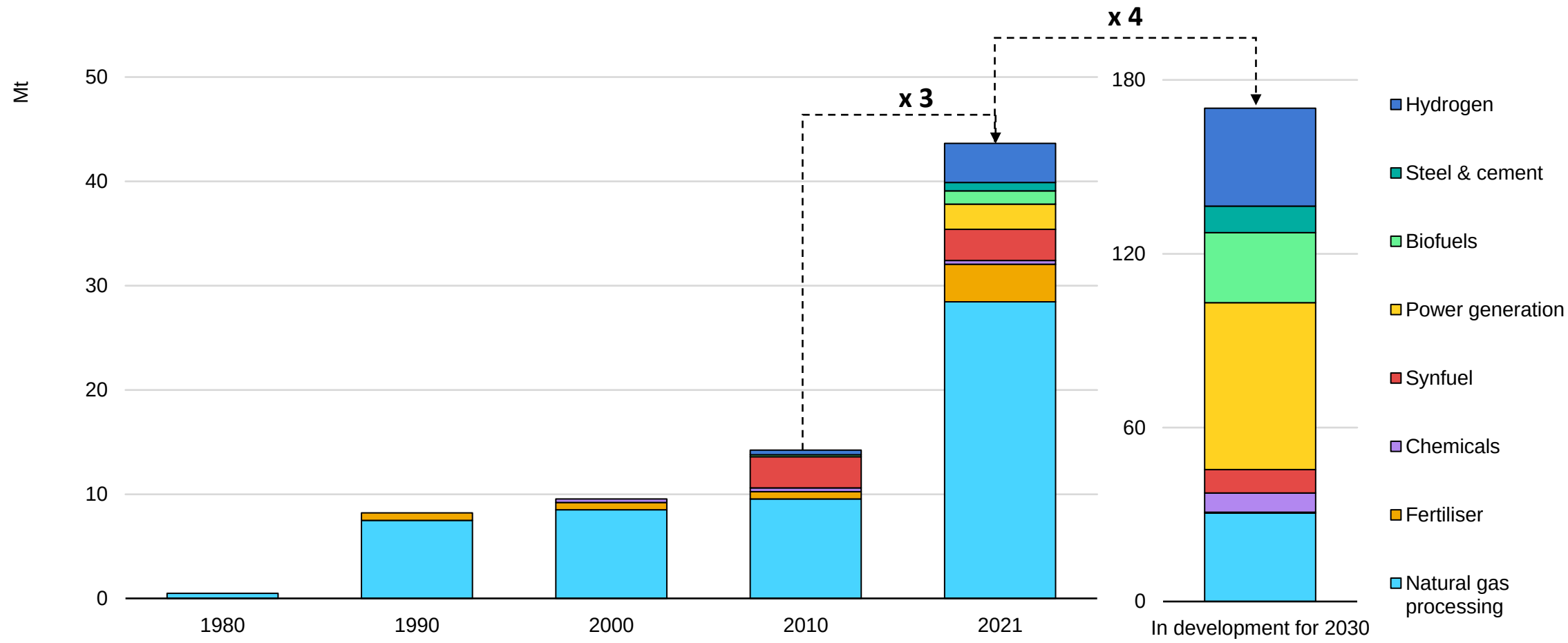
2. A solution for hard-to-abate emissions

3. Platform for low-carbon hydrogen production



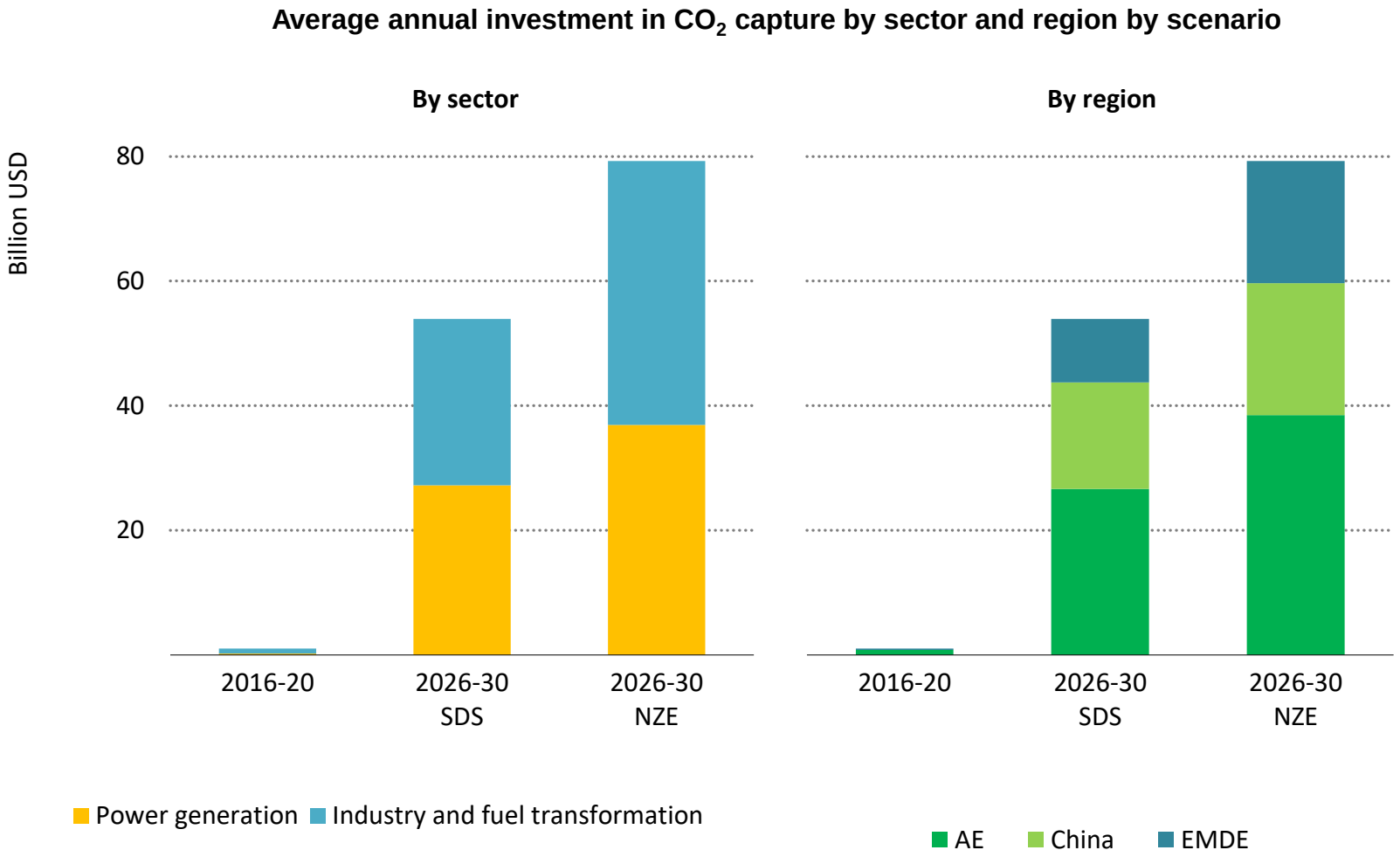
4. Carbon removal

CCUS industry has expanded in the last decade and keeps growing



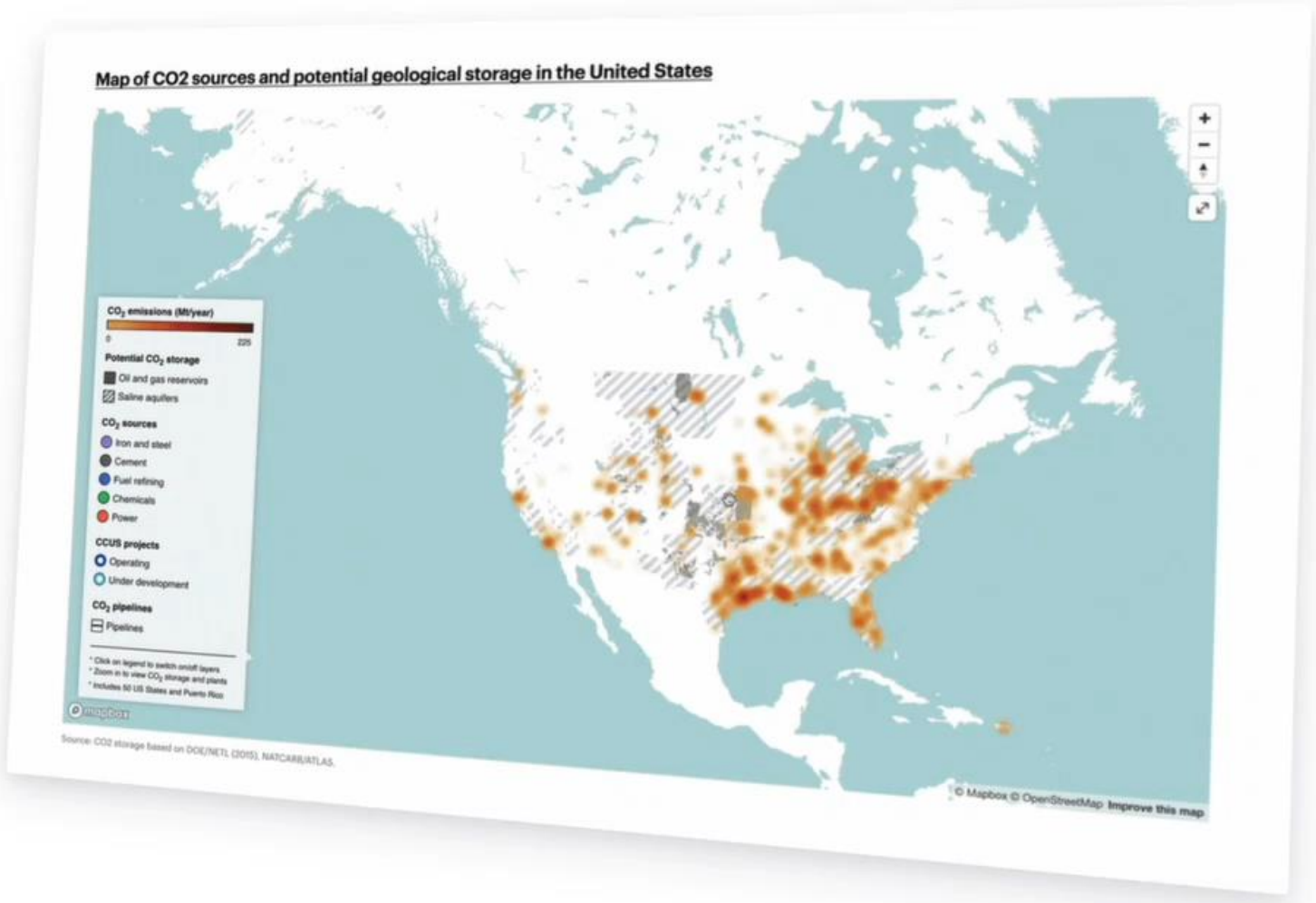
Carbon capture facilities have been operating since the 1970s, with the number and type of applications expanding in the last decade. If all announced projects go through, capacity could quadruple by 2030.

Investment in CCUS ramps up quickly



Meeting emissions reduction goals in climate-driven scenarios requires a ramp-up in CCUS investment in power, industry and hydrogen production.

Shared CO_2 infrastructure can accelerate deployment



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Government and industry action this decade is crucial

- 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

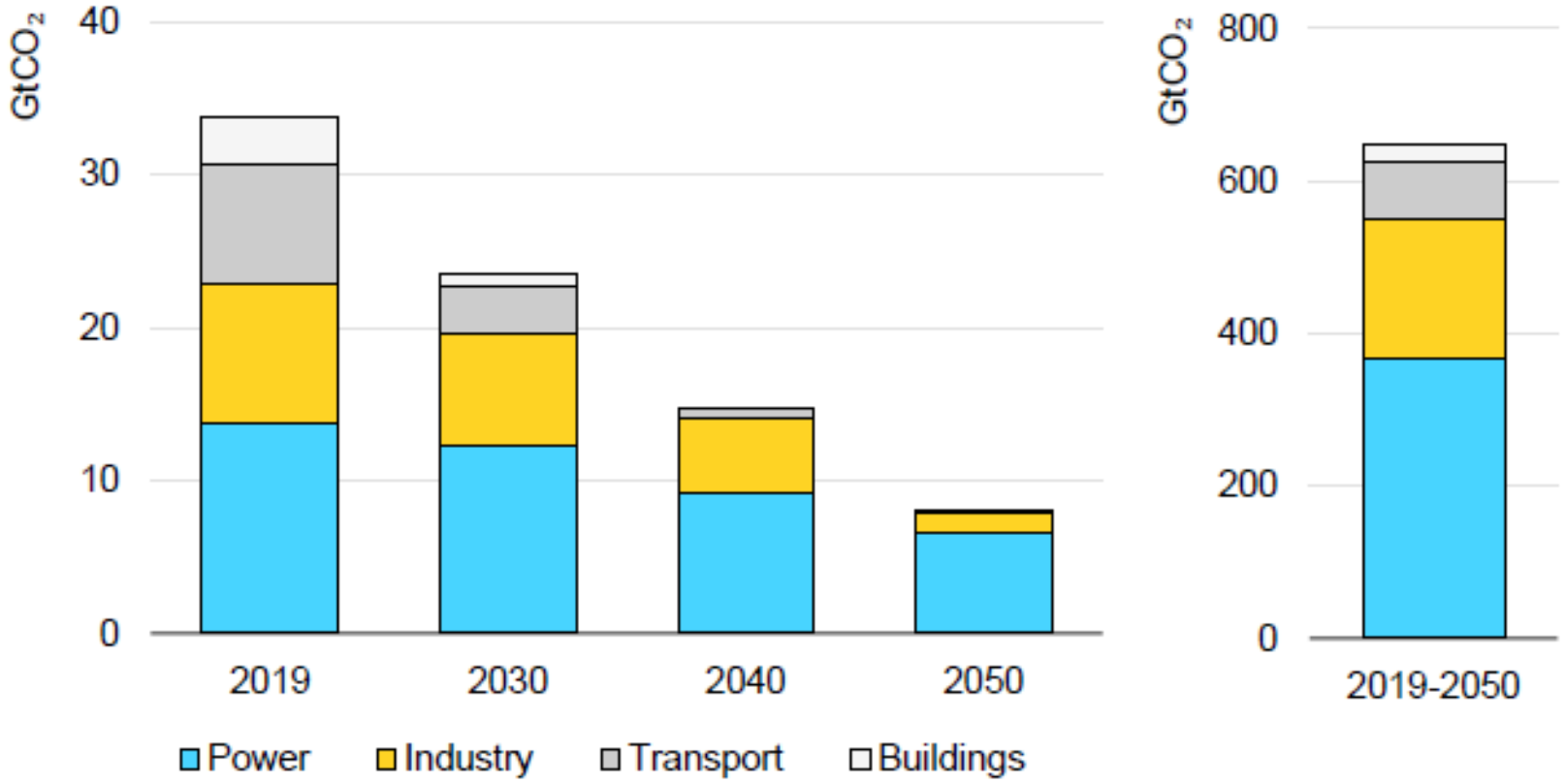
2. Target the development of industrial hubs with shared CO_2 infrastructure

3. Identify and encourage the development of CO_2 storage

4. Boost innovation for critical CCUS technologies

Tackling emissions from existing energy assets

Global energy sector CO_2 emissions from existing power and industrial facilities, 2019-50



Emissions from today's power and industrial assets could still be generating around 8 Gt of CO_2 in 2050, if allowed to operate until the end of their technical lives.