International Energy Agency

Opportunities for CCUS in Southeast Asia

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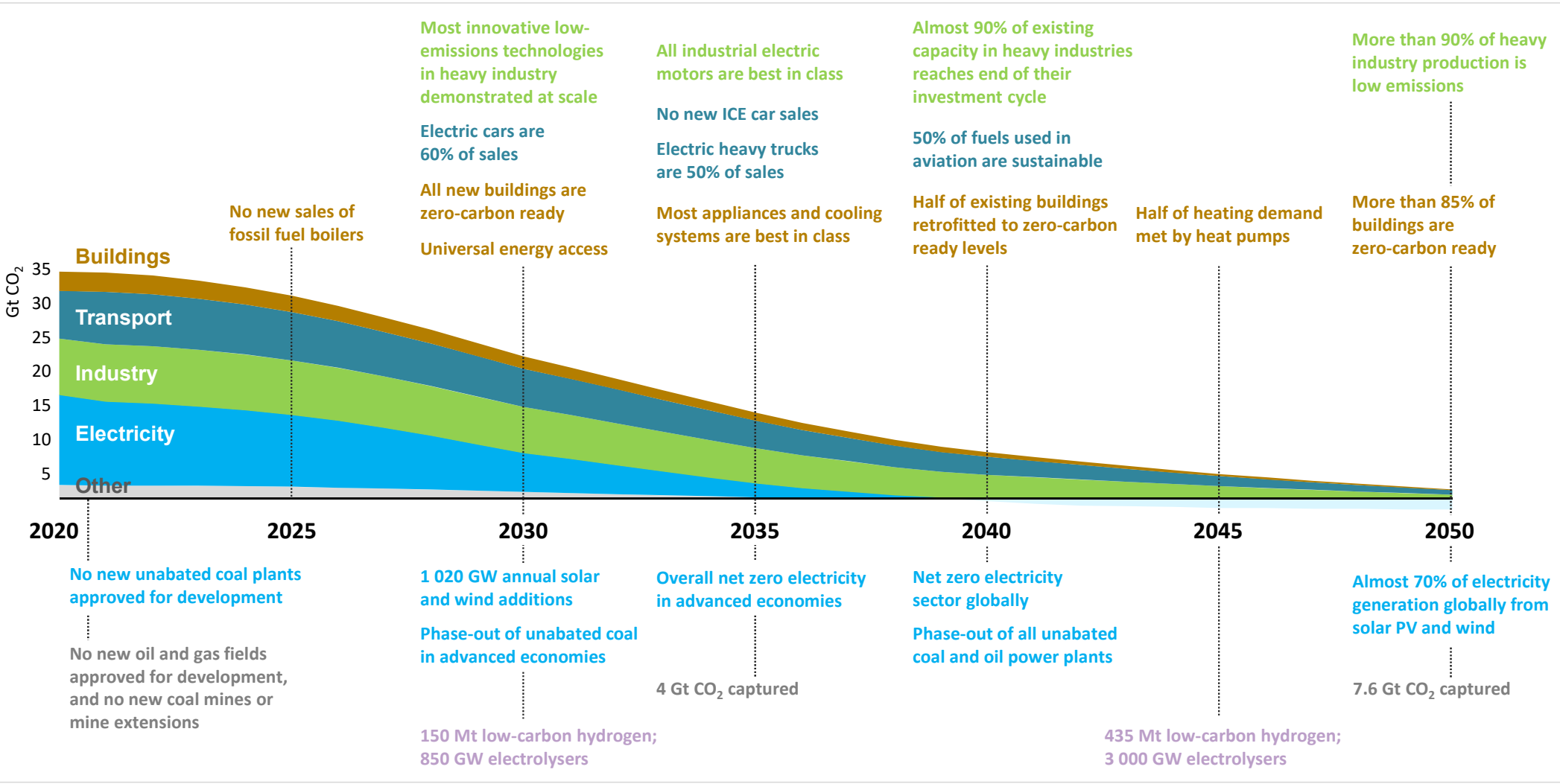
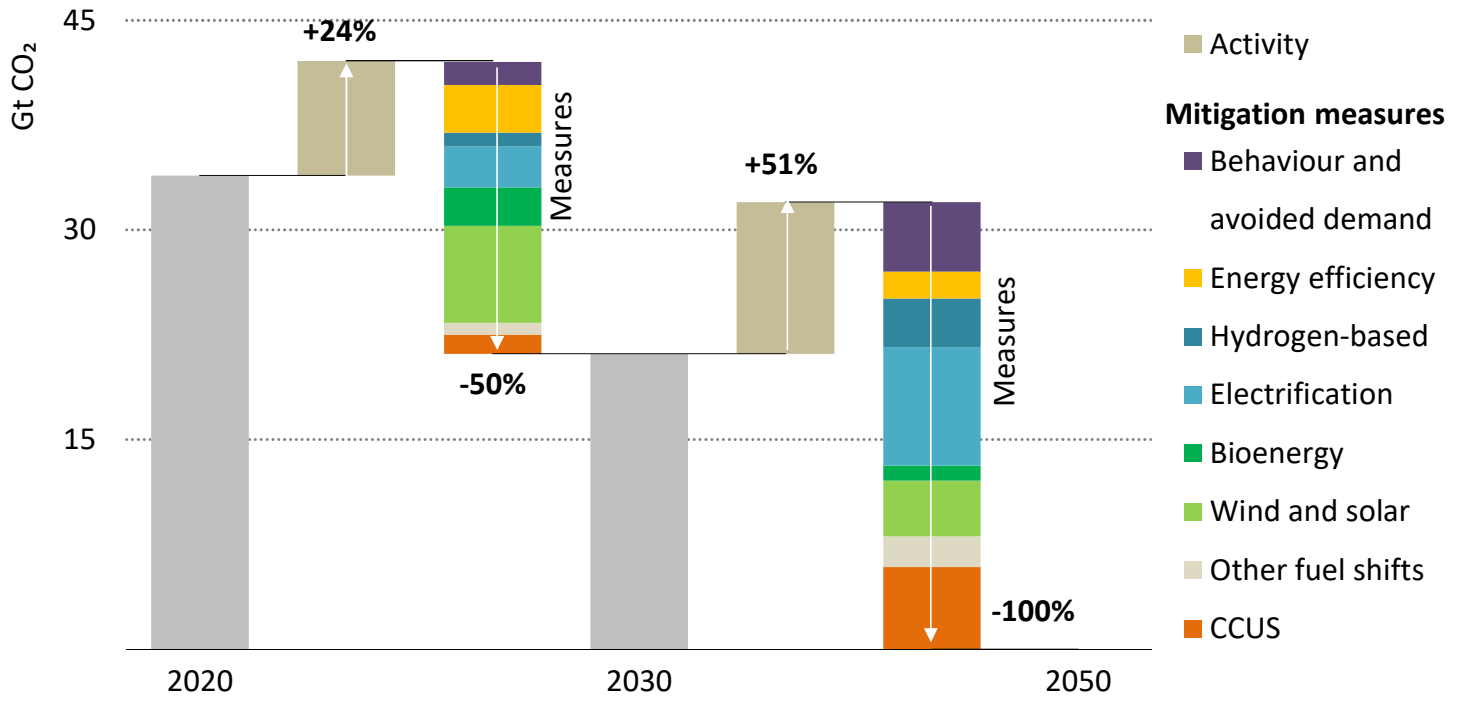
Set near-term milestones to get on track for long-term targets



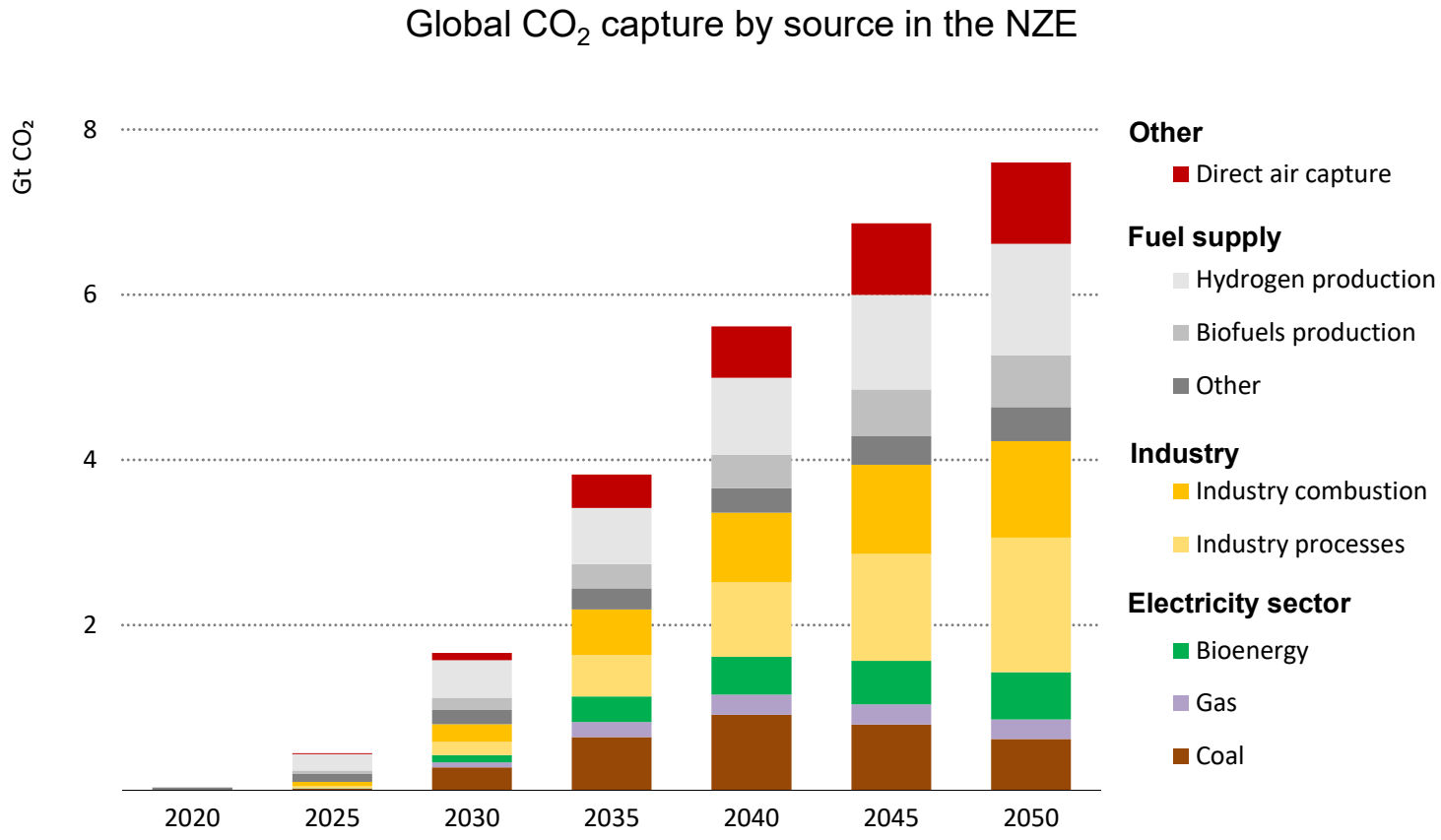
CCUS: a necessary pillar in the transition to net zero

Emissions reductions by mitigation measure in the NZE, 2020-2050



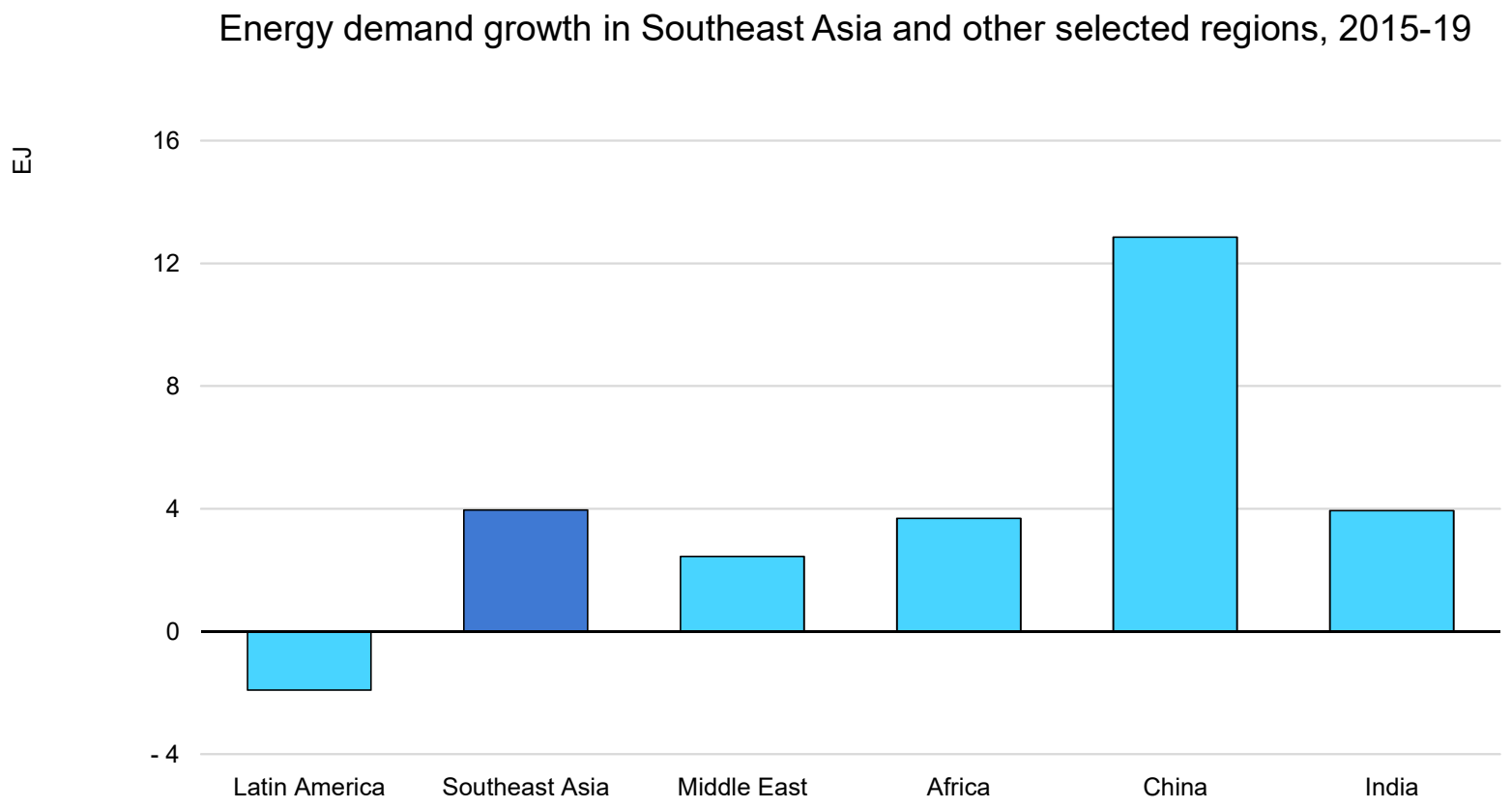
Solar, wind and energy efficiency deliver around half of emissions reductions to 2030 in the NZE, while electrification, CCUS and hydrogen ramp up thereafter

CCUS is needed to reach net-zero emissions



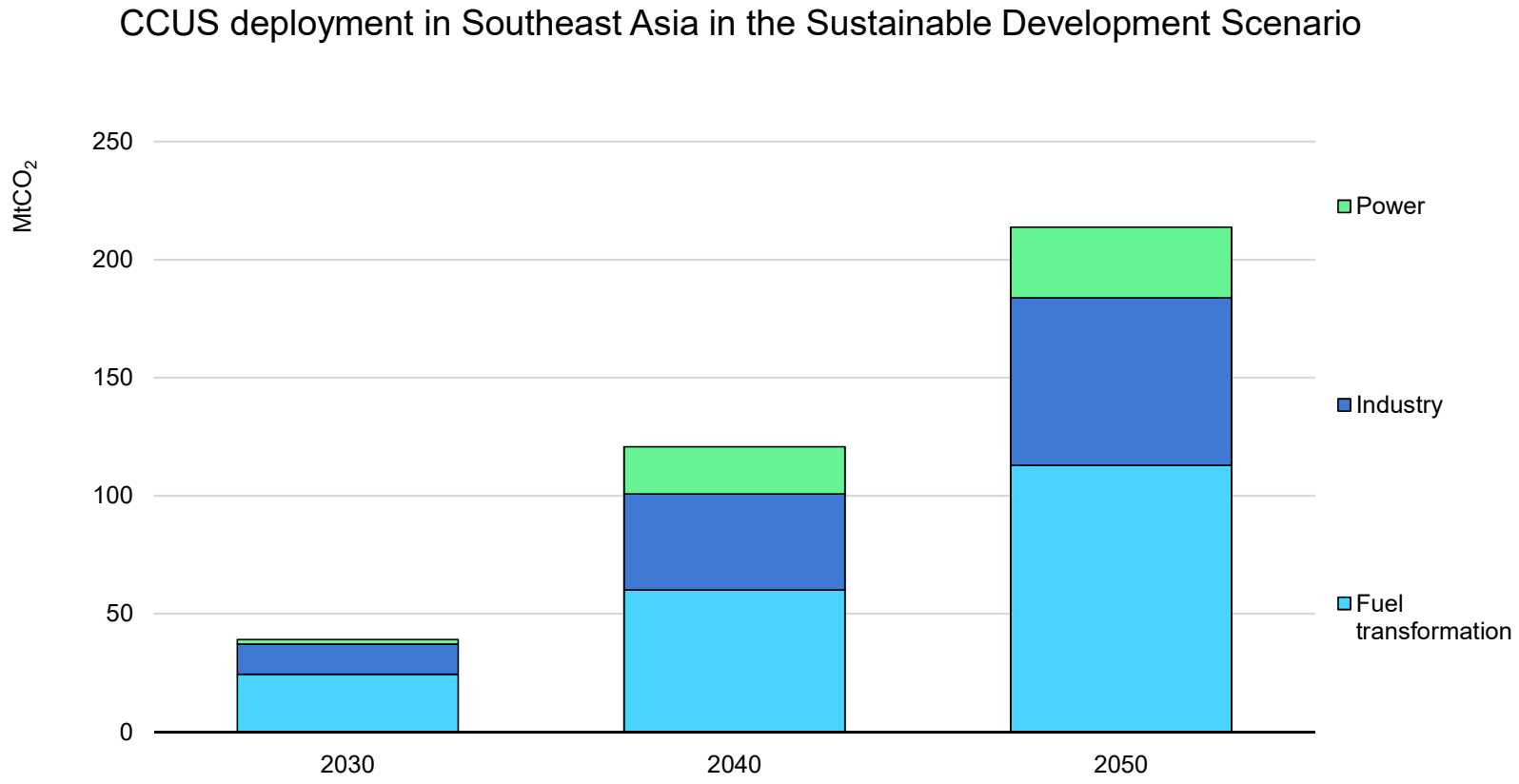
By 2050, 7.6 Gt of CO2 is captured per year from a diverse range of sources. A total of 2.4 Gt CO_2 is captured from bioenergy use and DAC, of which 1.9 Gt CO2 is permanently stored

A fast-growing region reliant on fossil fuels



Energy demand growth in Southeast Asia has been heavily reliant on fossil fuels: 90% of the growth since 2000 has been fuelled by coal, natural gas or oil.

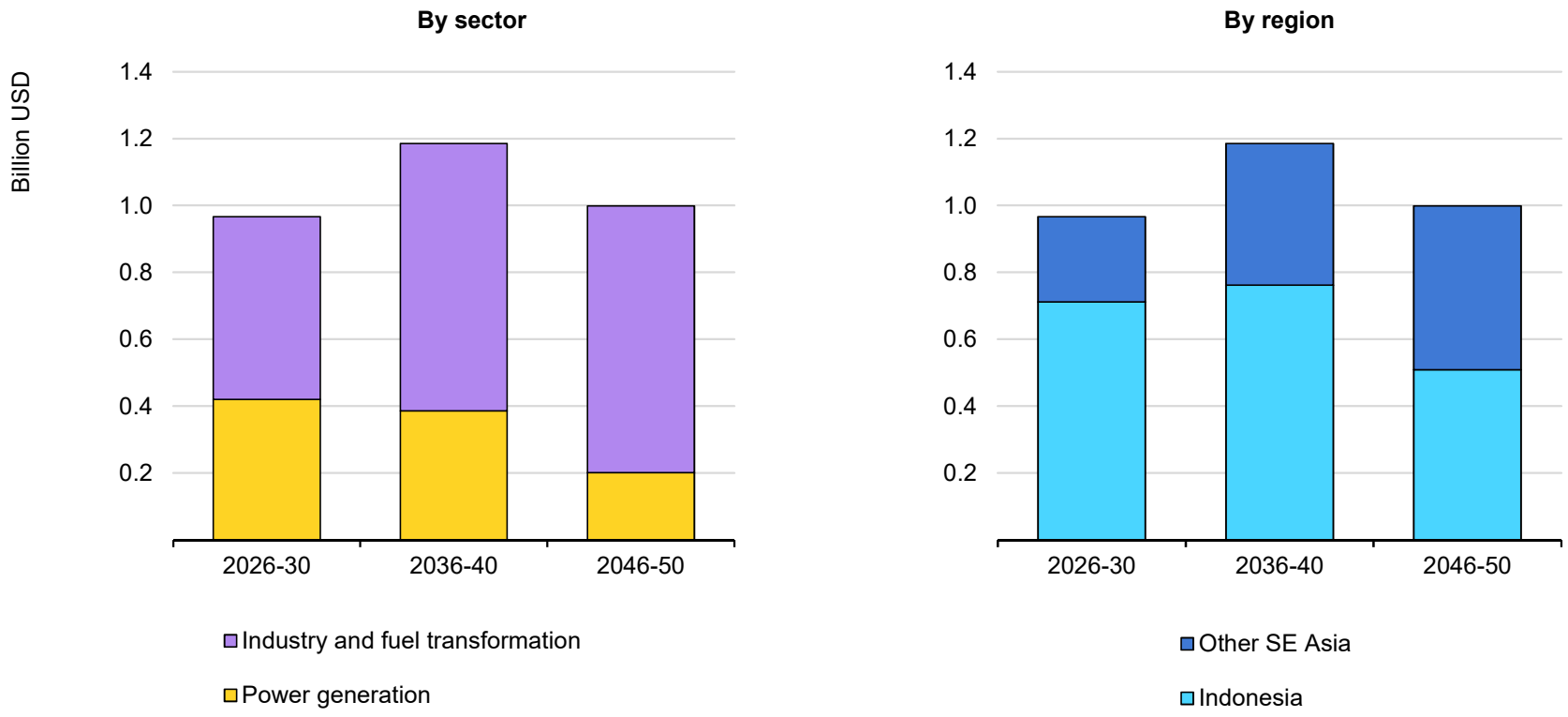
CCUS picks up strongly in Southeast Asia clean energy pathways



CO_2 capture would reach at least 35 Mt CO_2 in 2030. This includes early and lower-cost retrofit opportunities in industry, capture opportunities in fuel supply sectors, as well as retrofitting of coal power plants.

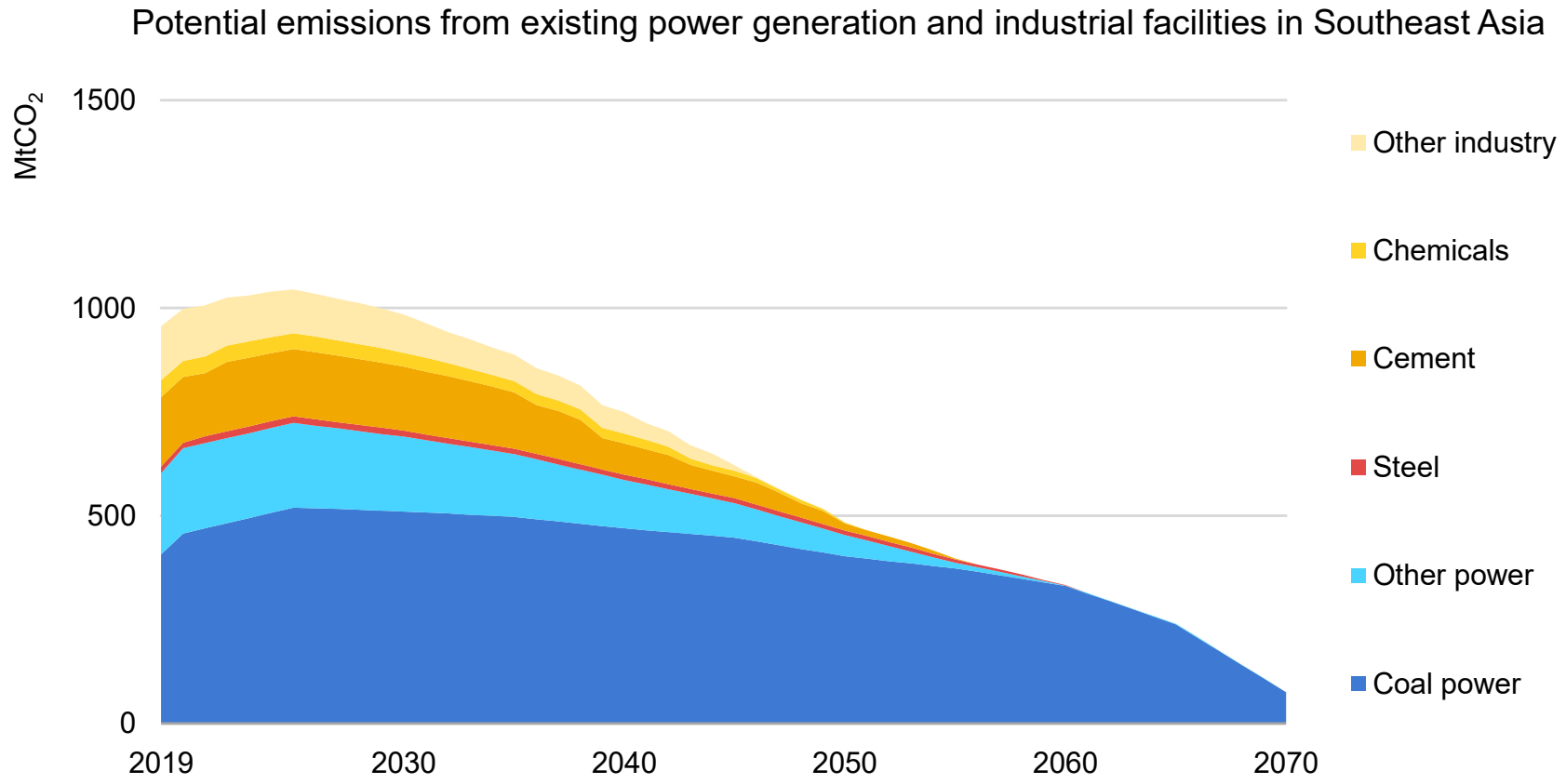
A surge in CCUS investment in Southeast Asia

Average annual CO_2 capture investment by sector and region in the Sustainable Development Scenario



Achieving ambitious CCUS deployment targets in Southeast Asia will require considerable investment, growing to an average of almost USD 1 billion per year for CO_2 capture facilities by 2030.

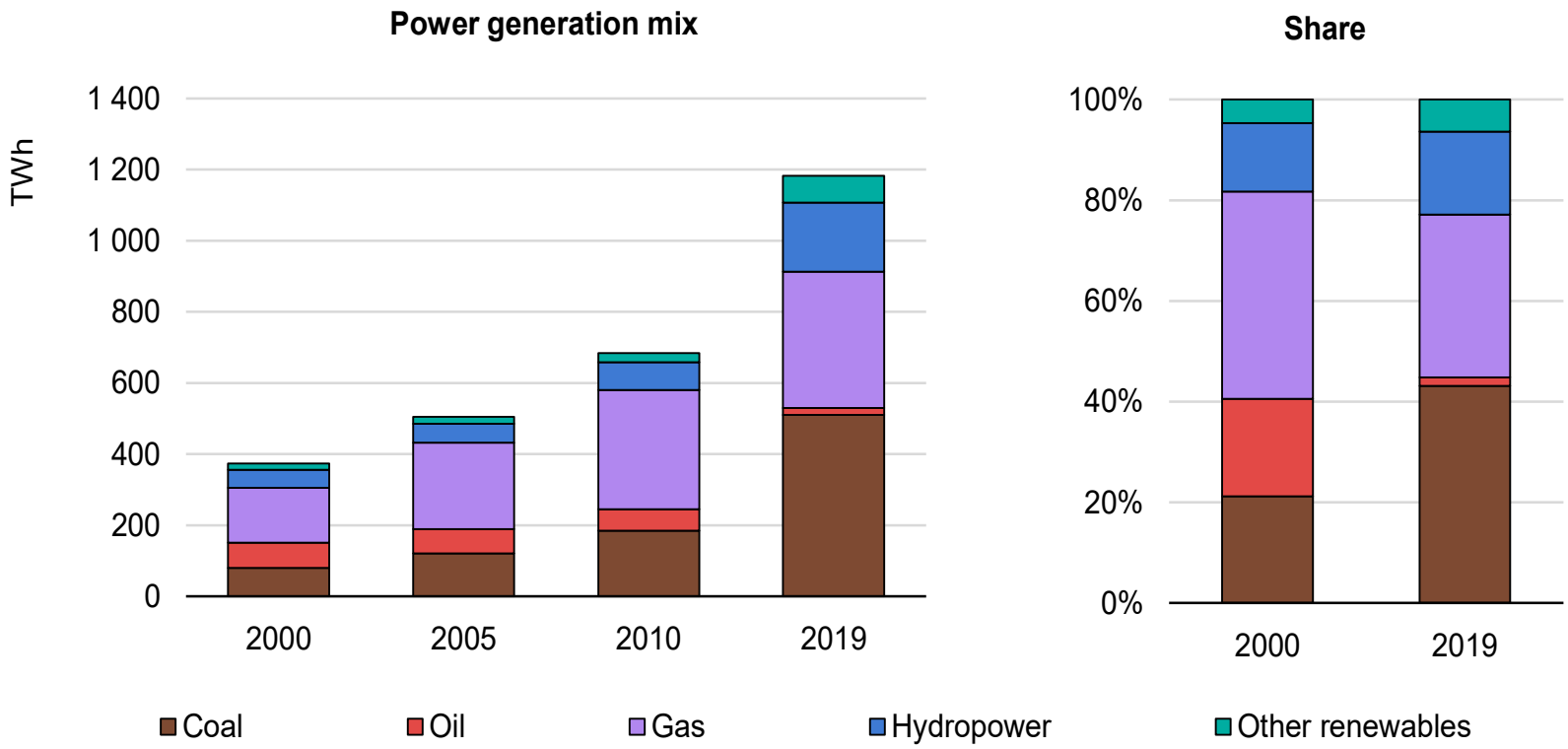
An opportunity to unlock emissions from existing infrastructure



A key opportunity for CCUS in Southeast Asia is to retrofit the region's existing energy infrastructure, which is still relatively new.

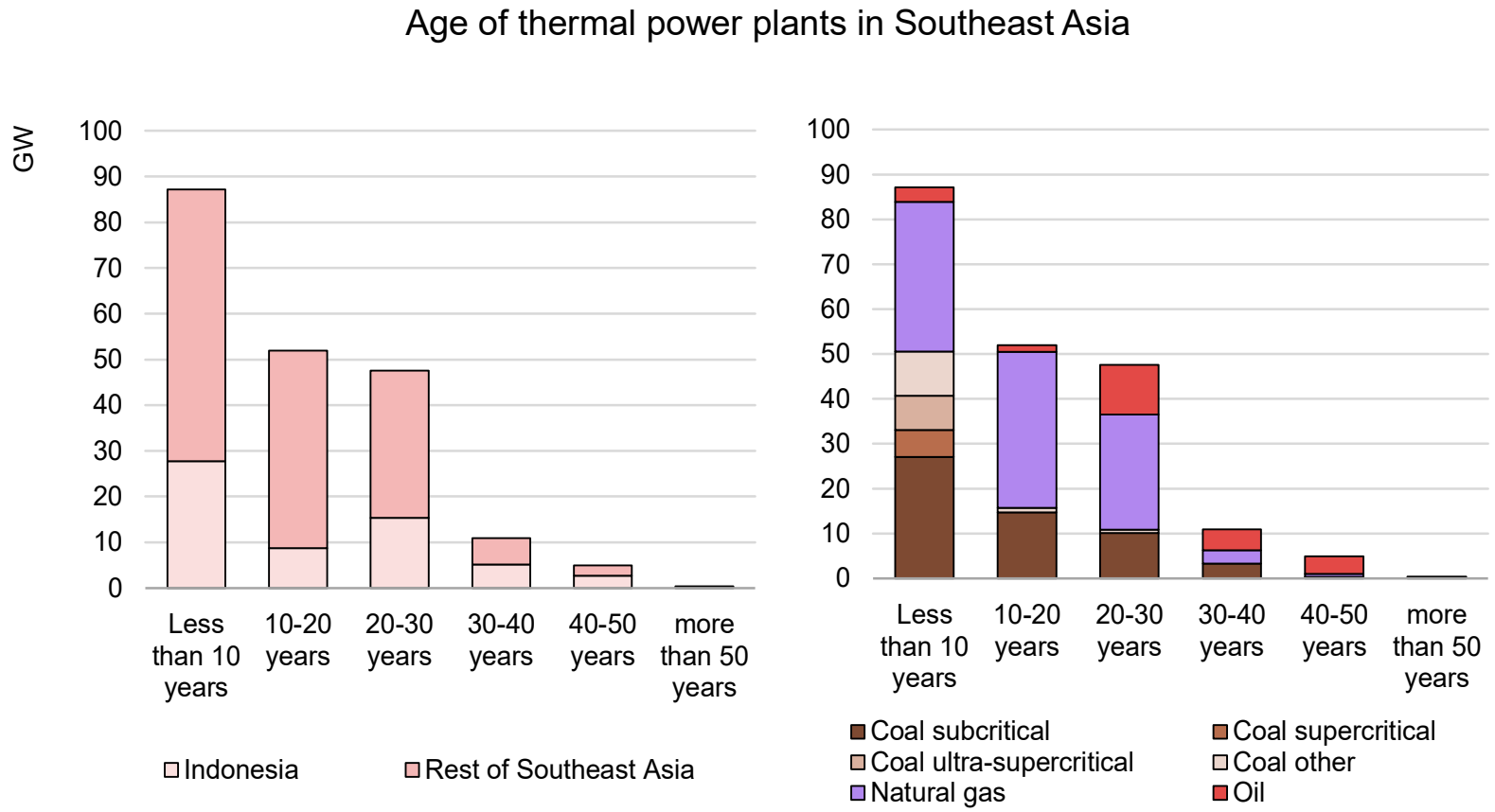
CCUS can contribute to stable, zero-emissions power systems

Power generation mix in Southeast Asia, 2000-2019



Fossil fuels play a central role in power systems in Southeast Asia today. CCUS can bring multiple benefits on the path to zero-emissions power systems, enabling in particular the integration of growing shares of renewables.

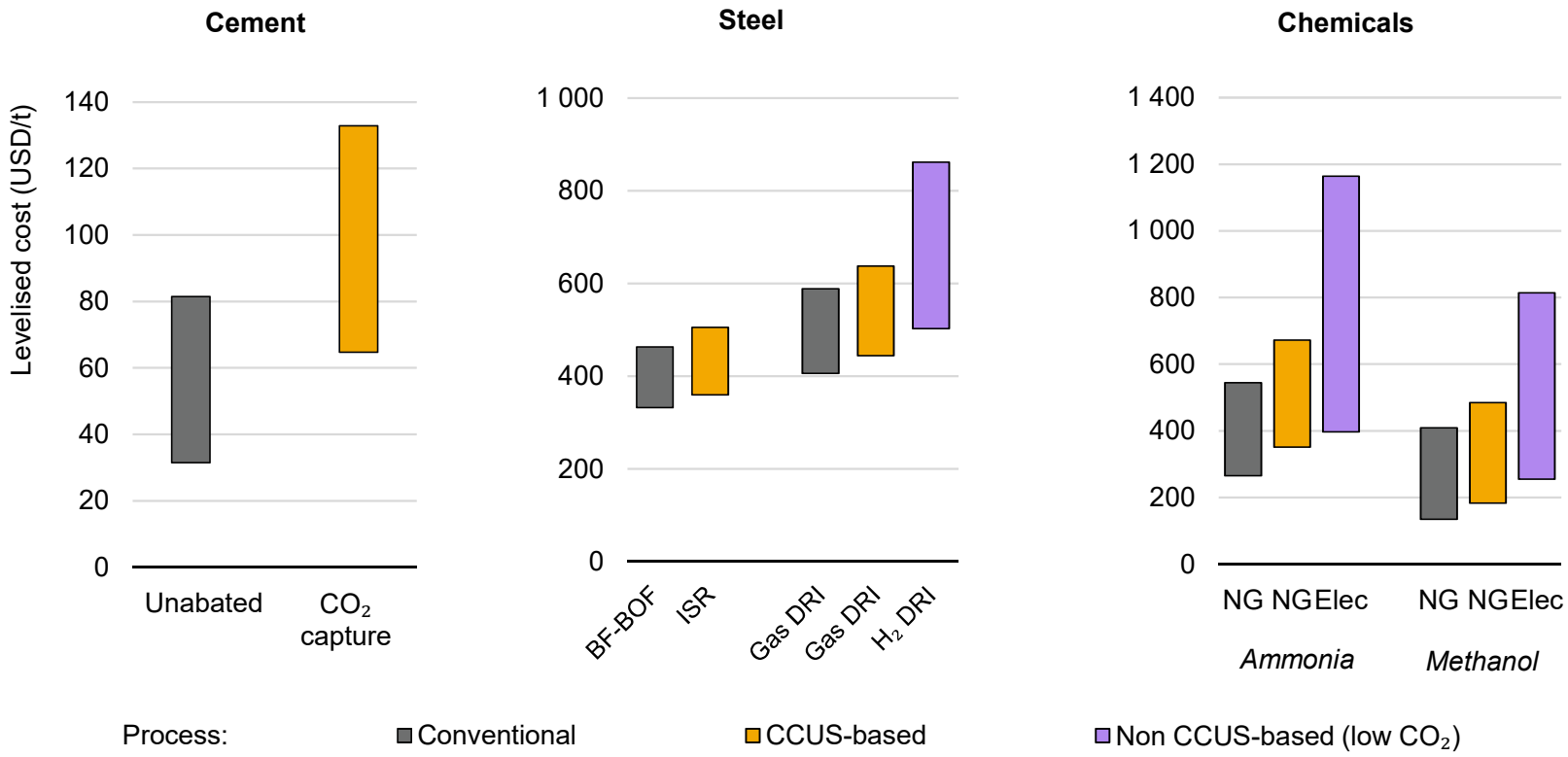
CCUS retrofits can substantially reduce emissions from power



The power plant fleet in Southeast Asia is one of the youngest in the world, averaging some 15 years for coal-fired power plants. CCUS retrofits can enable these plants to continue operating with substantially reduced emissions.

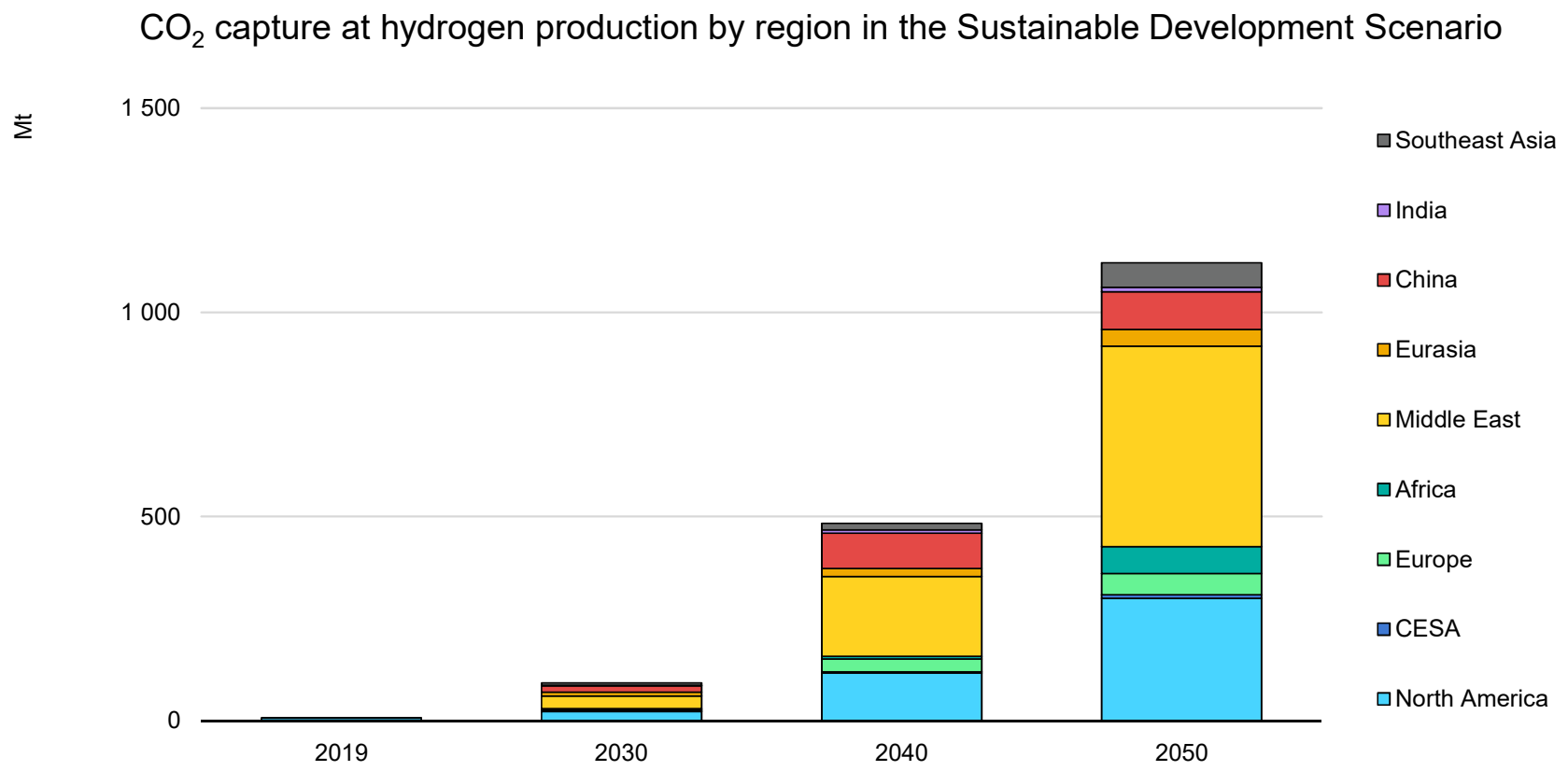
Competitiveness of CCUS applications in heavy industries

Simplified levelised cost of producing low-carbon cement, iron and steel, and chemicals for selected production routes



CCUS is a cost-competitive low-carbon option in industry, with a less variable cost range than electrolysis-based pathways that depend highly on regional electricity prices.

A pathway for low carbon hydrogen production



The role of hydrogen expands to multiple sectors in the Sustainable Development Scenario. CCUS is a cost-effective way for low-carbon hydrogen production in regions with access to cheap natural supplies and CO_2 storage.

Opportunity factors for CCUS in selected Southeast Asian countries

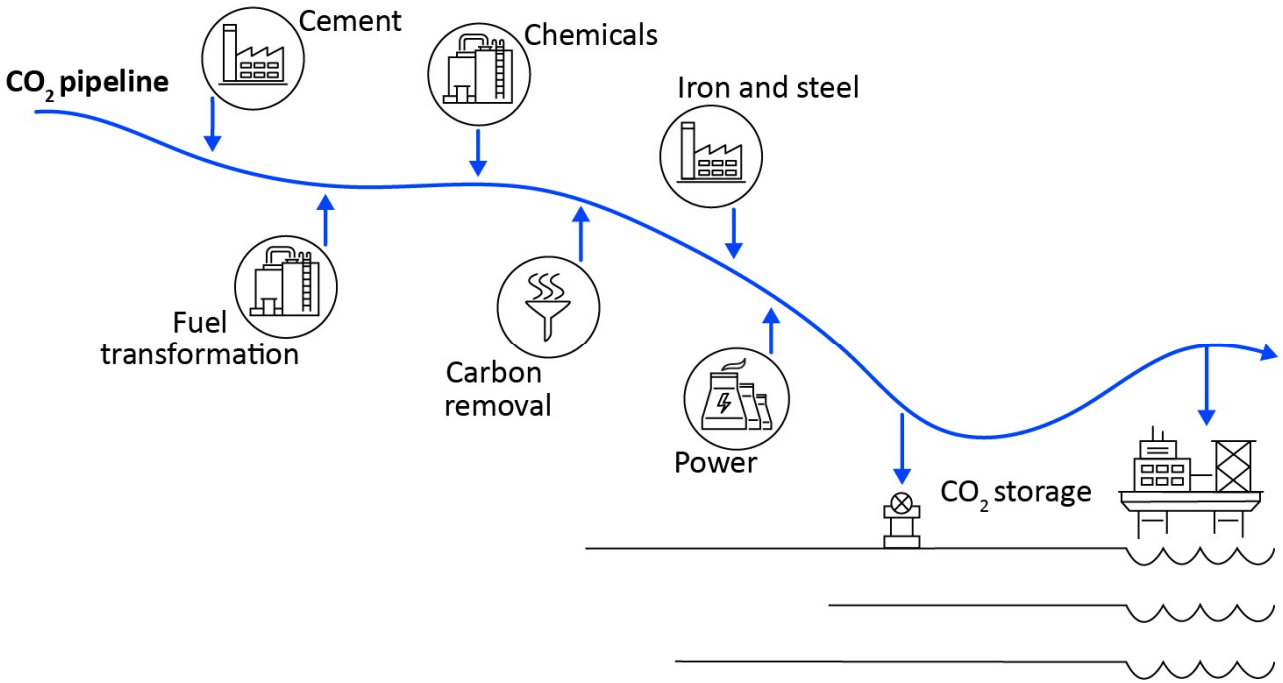
	Brunei Darussalam	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam
Domestic CO_2 storage potential	●	●	●			●	●
Potential to use CO_2 for EOR	●	●	●			●	
Legal and regulatory frameworks for CCUS in place	○*	○	○*	○*		○*	○*
Industrial clusters with CO_2 capture prospects	●	●	●	●	●	●	●
Recognition of CCUS in long-term strategies/goals	○	●	●		●		○
Targeted policies to support CCUS investment							
Active pilot or demonstration facilities							
Plans for commercial CCUS facilities		●	●				

Notes: ● = yes, ○ = possibly/partially; * = oil and gas regulations potentially applicable for CO_2 storage.

Supportive policy environments and recognition of CCUS in long-term energy and climate plans are crucial for accelerating CCUS deployment in Southeast Asia.

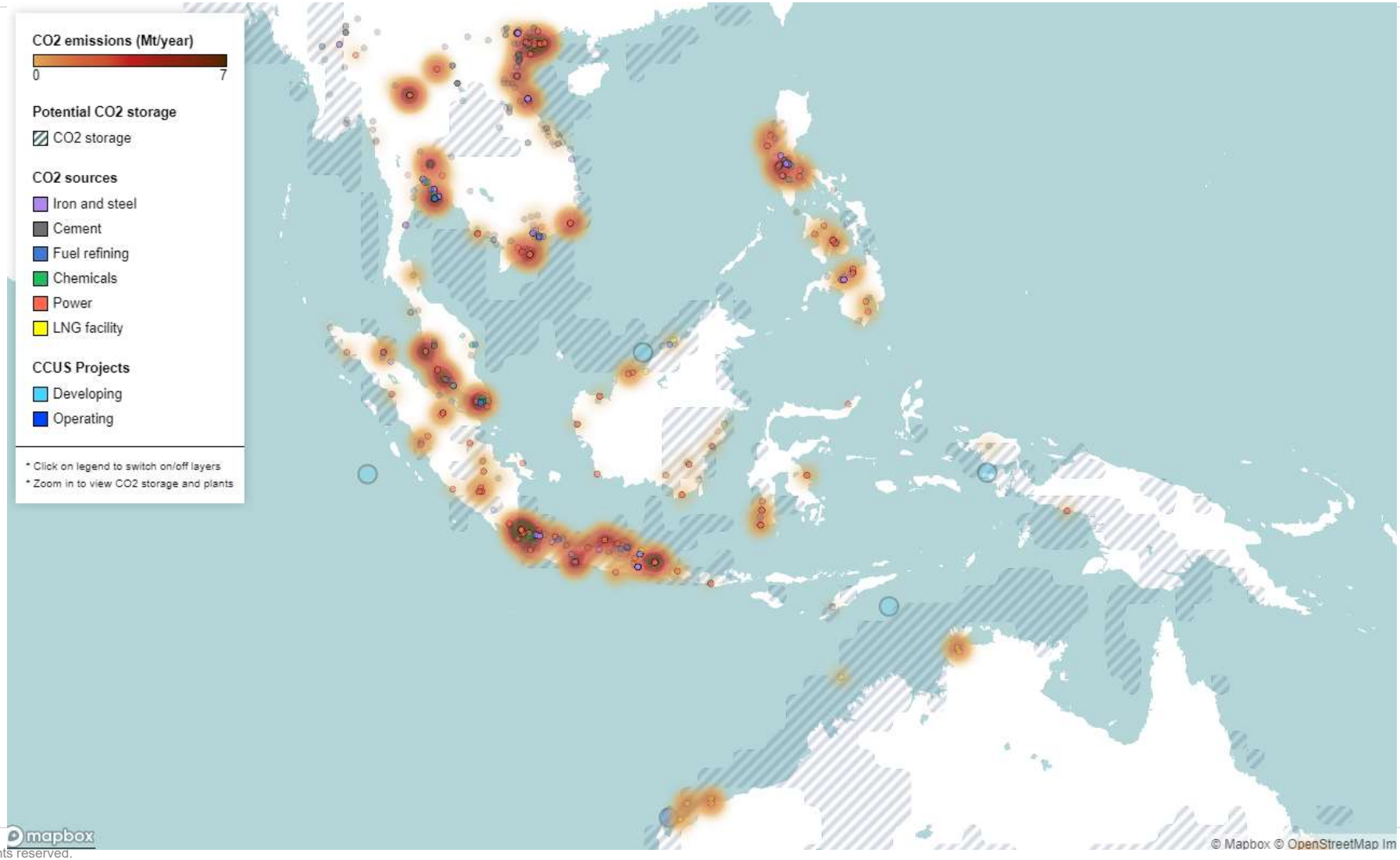
The benefits of targeting industrial CCUS hubs

Illustrative example of a shared CO_2 pipeline in an industrial cluster



CO_2 transport and storage infrastructure will be required to support emissions reductions across multiple sectors

Shared CO_2 infrastructure can accelerate deployment



Strategic priorities for CCUS in Southeast Asia

Four high-level priorities for governments and industry would accelerate the progress of CCUS in the region over the next decade:

- Identifying and developing CO_2 storage resources.
- Establishing legal and regulatory frameworks for CCUS activities.
- Implementing targeted policies for CCUS, including CO_2 infrastructure investment.
- Accessing international finance to build capacity, unlock capital and encourage investment.