CCUS IN ASEAN:
RECENT DEVELOPMENETS IN INDONESIA

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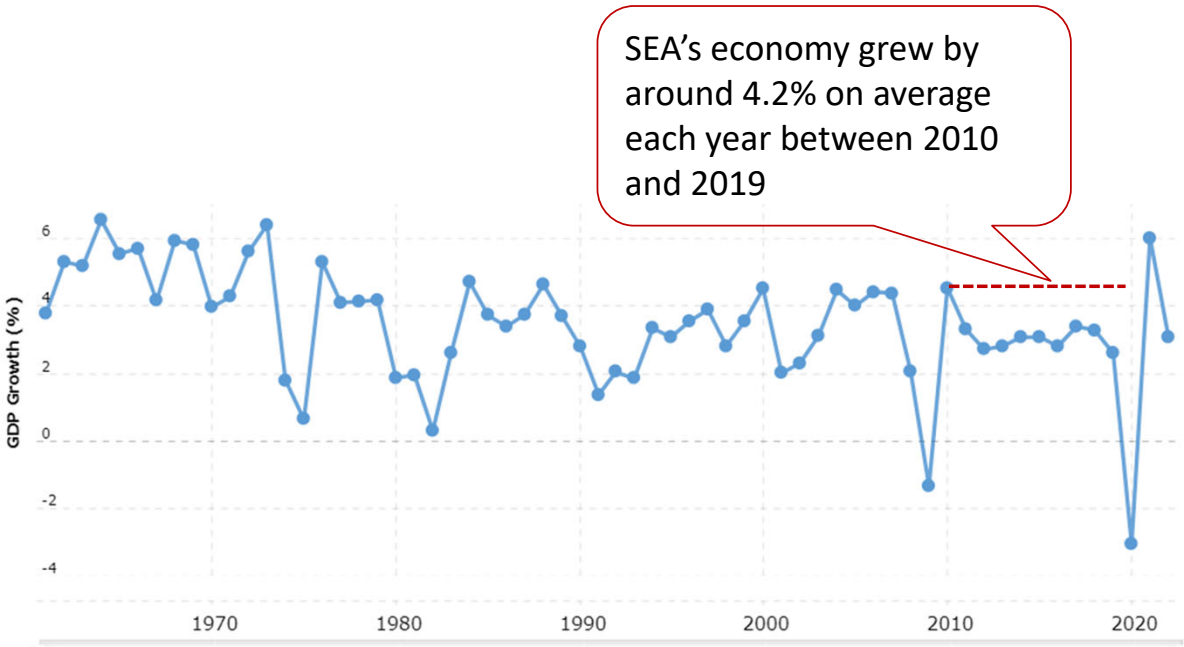
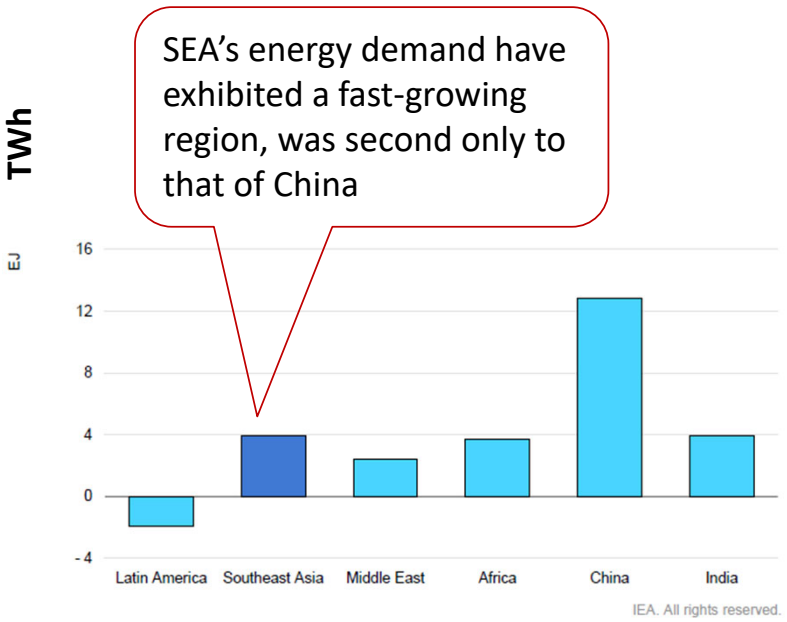
Outline

Economic and energy trends

Southeast Asia is a major engine of global economic growth and energy demand



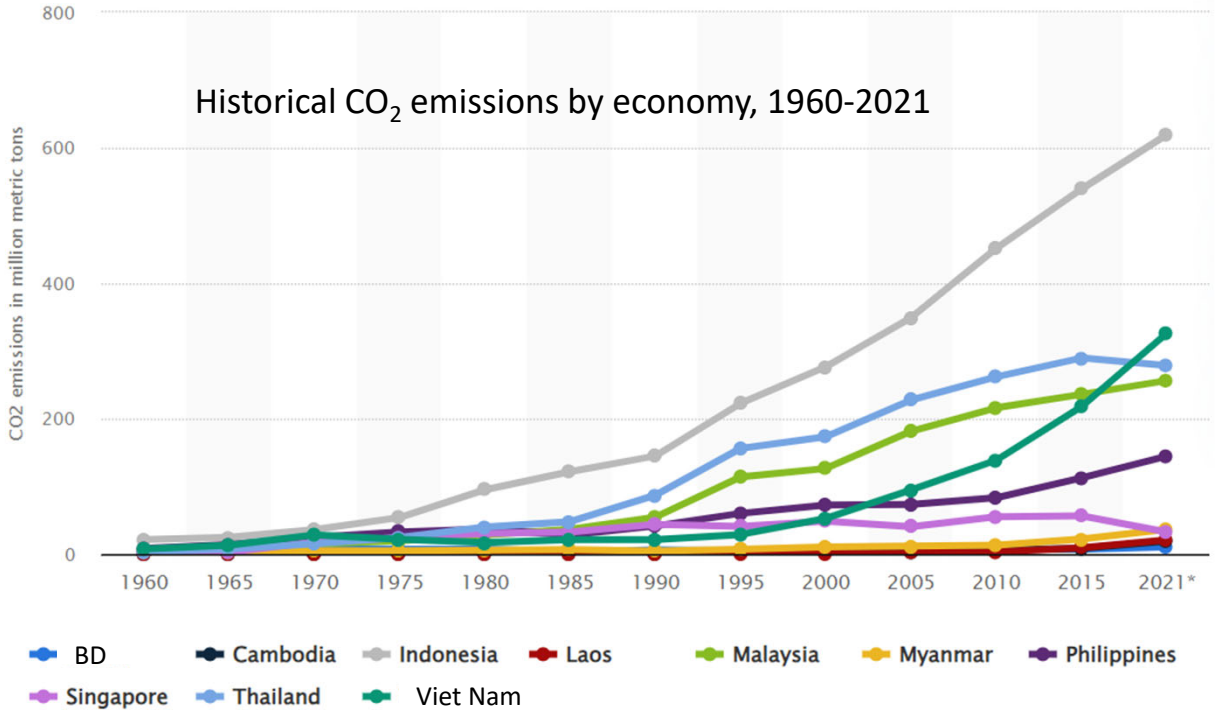


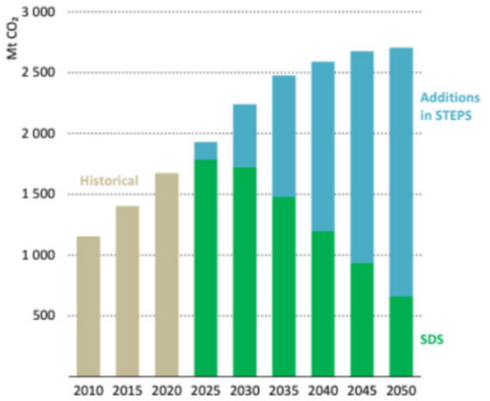
- As the economy and population have grown, total energy supply expanded by around 80% between 2000 and 2020.
- Power generation has almost tripled over the past two decades, driven by a sixfold increase in coal-fired generation, which accounted for more than 40% of total generation in 2020.
- As a result of the fossil-driven energy demand growth, CO2 emissions increased from 0.7 Gt in 2000 to over 1.6 Gt in 2020.

Source: Southeast Asia Energy Outlook, IEA (2022); https://www.macrotrends.net/countries/WLD/world/gdp-growth-rate (2023)

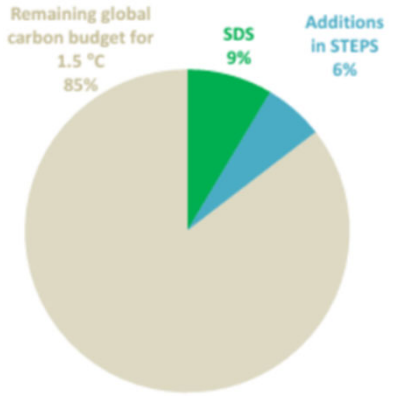
CO_2 emissions trends

Southeast Asia is still a long way off the pathway consistent with its clean energy ambitions





Cumulative CO_2 emissions between 2020 and 2050 is around 75 Gt in STEPS, and 45 Gt in SDS



Cumulative CO_2 emissions in SEA to 2050 and the remaining global carbon budget for 1.5°C

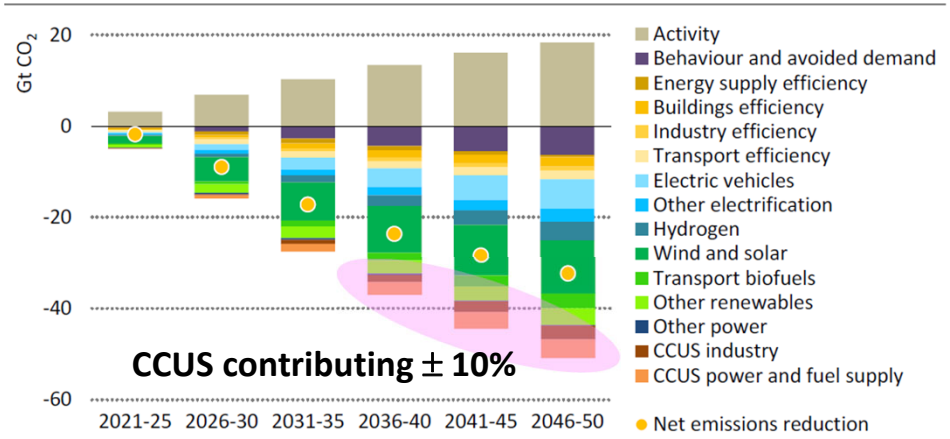
- In 2050, Southeast Asia comprises around 8% of the world's population and global GDP.
- Achieving net zero emissions will rely on support to ensure the deployment of key technologies and infrastructure for the SDS and NZE Scenarios.

Source: Statista (2023); : Southeast Asia Energy Outlook, IEA (2022)

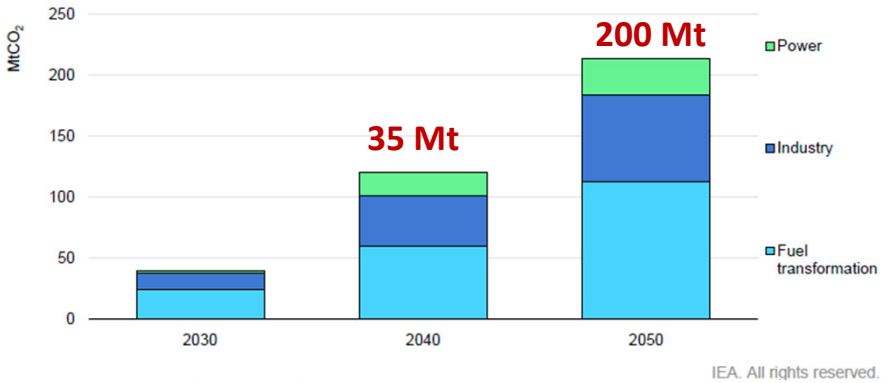
Role of CCUS in NZE pathways

CCUS technologies will play in putting the world on a path to NZE, contributing more than 10% of cumulative emission reduction globally by 2050

Average annual CO_2 reduction from 2020 in the NZE



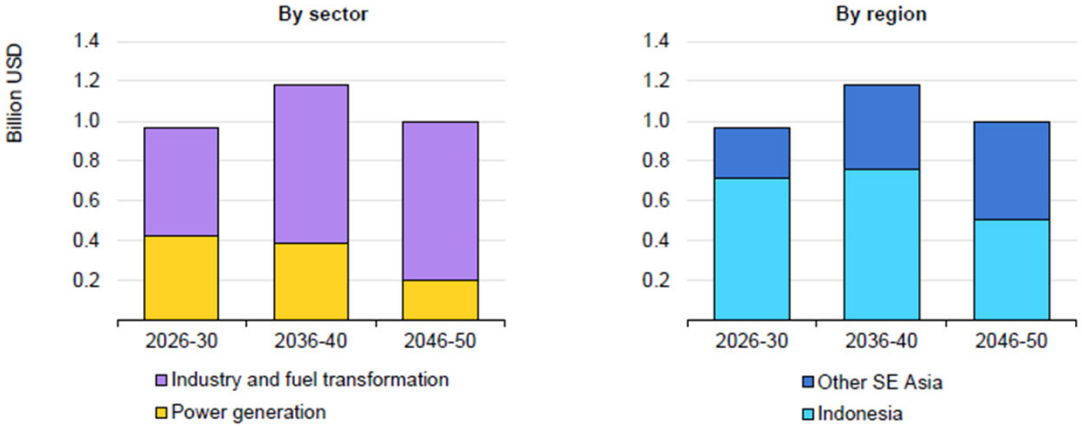
The role for CCUS spans virtually all parts of the global energy system including heavy industry, low-carbon hydrogen production, power generation, carbon removal, and as a source of CO2 for synthetic fuels.



To remain in line with Paris Agreement. CO_2 capture in SEA will have to reach 35 Mt CO2 in 2030 and to exceed 200 Mt in 2050.

This includes lower-cost opportunities in industry, fuel supply sectors, and retrofitting of coal power plants.

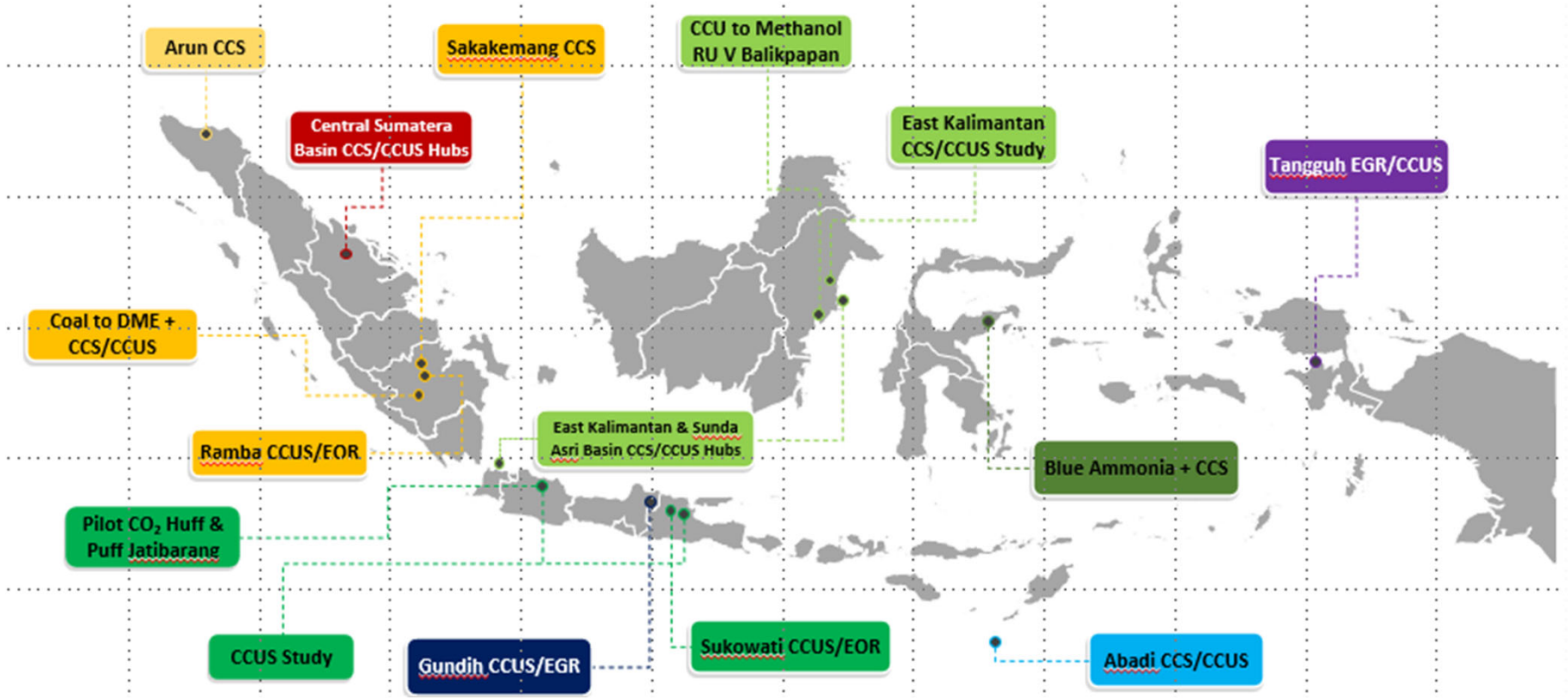
Indonesia accounts for around 80% of SEA's projected CCUS investment in 2030, reflecting the size of its economic and the reative advanced state of CCUS development in this economy.



Source: Net Zero by 2050, IEA (2021), CCUS Opportunities in SEA, IEA (2021)

CCUS/CCS projects in Indonesia @August 2022

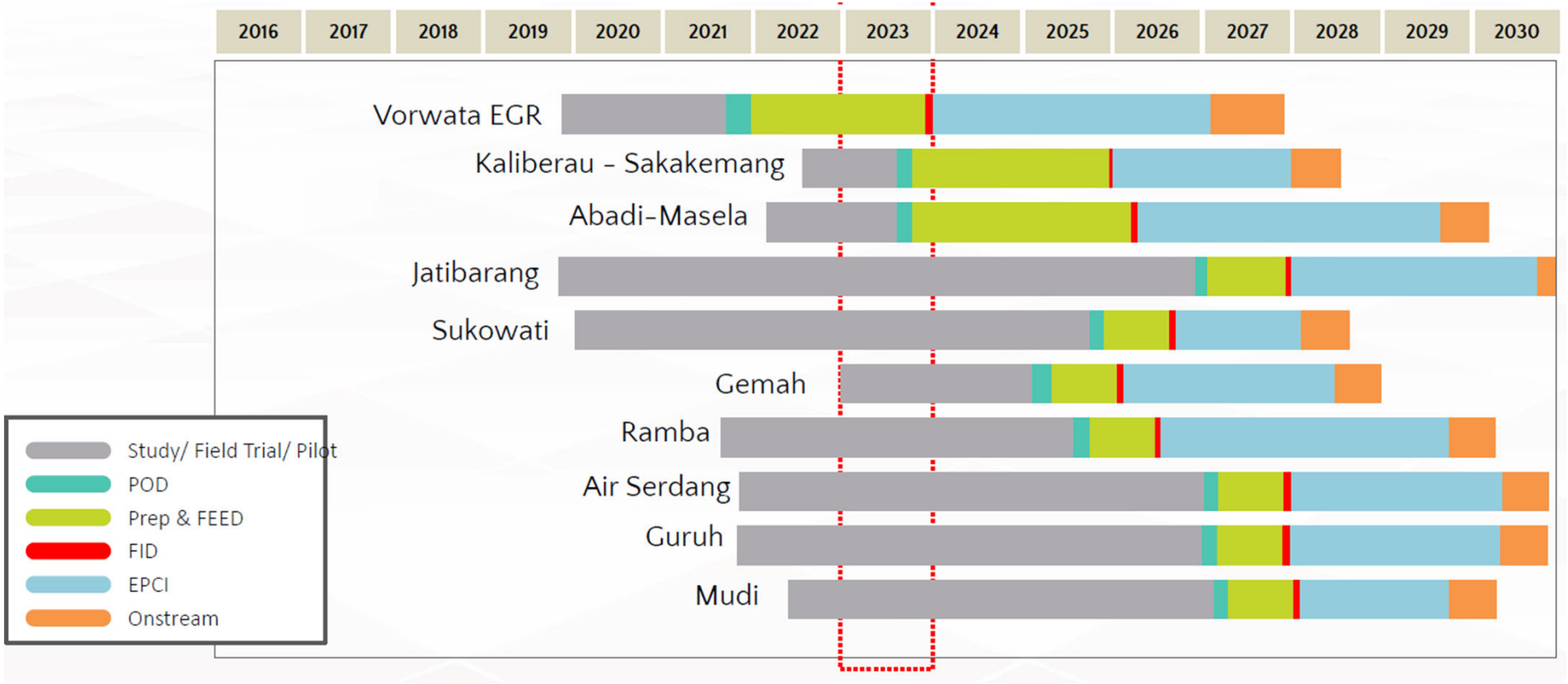
15 CCS/CCUS activities in Indonesia are still in the study/ preparation stage, but most are targeted for onstream before 2030



Source: DJMIGAS, MEMR (2022)

On going CCUS projects

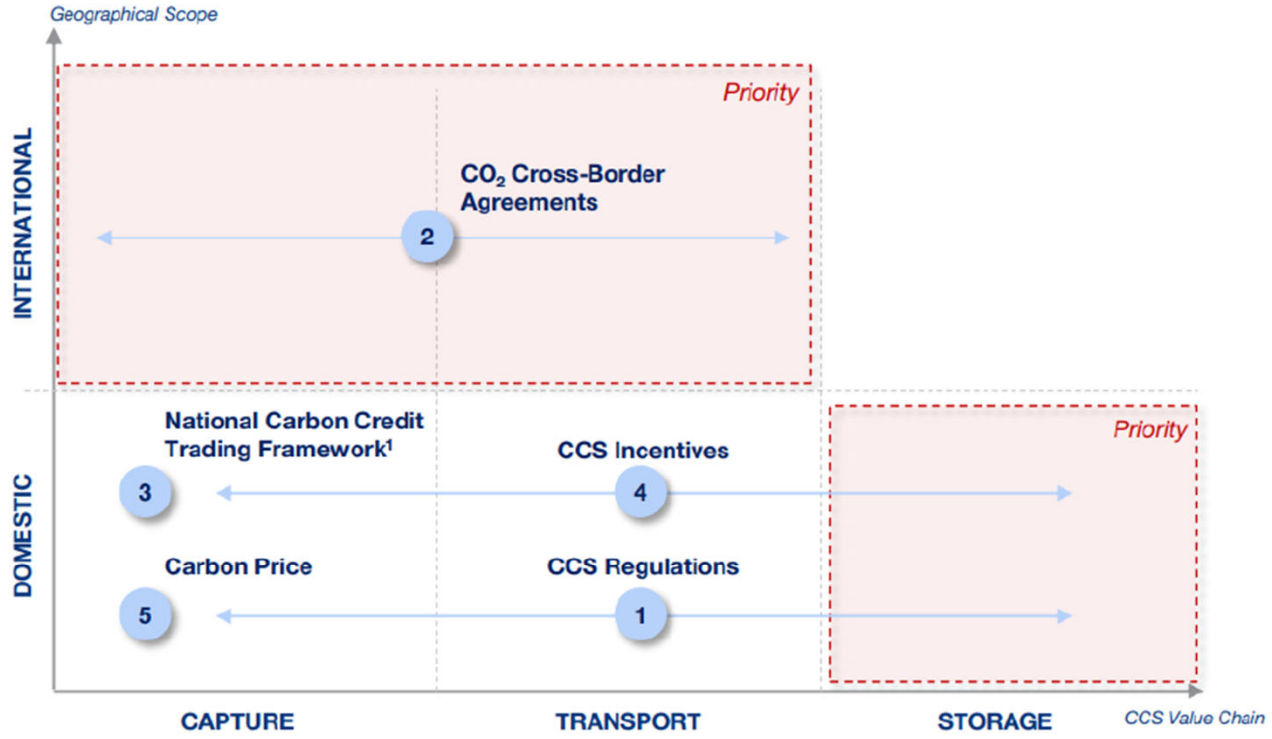
in the Indonesia's upstream oil & gas business



Source: IOG 4.0 SKKMIGAS (2023)

Strategic priorities for CCUS in Indonesia/SEA

Identify and develop onshore and offshore CO_2 storage resources



Note: *1. The national carbon credit framework must cover carbon avoidance/removal projects in Indonesia to incentivize domestic financing but could also allow the listing of international carbon projects;*

Source: *Wood Mackenzie*

"CO2 Cross border agreement is required for transporting CO2 among countries as stated in Paris Protocol"

"To determine the technical aspect and profit sharing framework for Saline Aquifer Blocks"

Source: The Indonesia CCS Center (2023)

CO_2 storage potential

One of the first steps to evaluate regional CCUS options is to identify and estimate the storage potential of suitable geological formations

NO	EVALUATOR	YEAR	BASINS	FORMATIONS	CO_2 STORAGE (Giga Tones)
1	LEMIGAS – ADB	2013	South Sumatra	Talang Akar, Lahat	7.4
				Batu Raja, Lower Telisa	0.2
2	LEMIGAS – World Bank	2015	South Sumatra	Talang Akar	3.7 (P50)
				Batu raja	
				Lemat	
			North West Java	Talang Akar	4.9 (P50)
				Batu raja	
3	Yunyue Elita Li et al. (Exxon Mobil, Univ. of Singapore, Australia)	2022	South Sumatra		13 – 23
			North Sumatra		5 - 8
			Kutai		32 - 67
4	Ryoko Setoguchi (JOCMEC)	2023	North West Java	Parigi, Massive/Main, Batu Raja, Talanng Akar	69 (Best Case)
			East Java		
			North Sumatra	Upper Benio, Sihapas, Telisa, Batu Raja, Pematang	56 (Best Case
			Central Sumatra		
			South Sumatra		
5	ERIA - BRIN - MEMR	On going study	Includes 20 Production Basins	30 Formations, 1071 oil & gas fields	> 650 Gt in Saline Aquifers; > 12 Gt in O&G fields

Source: BRIN – MEMR - ERIA (2023)

Policies and regulations

Recent government policies will provide a boost to the CCUS development in Indonesia

- **Law Number 16 of 20016** concerning Ratification of the Paris Agreement to the UNFCCC. Ratification of this agreement is expected to increase international cooperation to implement climate change mitigation and adaptation actions with the support of funding, technology, transfer as well as transparency mechanisms and sustainable governance.
- **Law Number 7 of 2021** concerning Harmonized Taxation. This law regulates carbon tax.
- **Presidential Regulation Number 98 of 2021** "on Implementation of Carbon Economic Value to Achieve Nationally Determined Contribution Target and Control of Greenhouse Gas Emissions in National Development." Implementation of Carbon Economic Value. This regulation stipulates the implementation of **carbon trading**, **levies on carbon emission**, and **performance-based payment** for reducing carbon emission.
- **Minister of Environment and Forestry Regulation Number 21 of 2022** on the Guidelines of carbon Economic Value Implementation.
- **Minister of Energy and Mineral Resources Regulation Number 2 of 2023** on the Implementation of Carbon Capture and Storage, as well as Carbon Capture, Utilization and Storage in Upstream Oil and Gas Business Activities.
- **Financial Services Authority (OJK) Regulation no. 4 of 2023** concerning Carbon Trading through the Carbon Exchange.

Policies and regulations

Regulations have been established

Regime	CCUS-Specific Framework Act	CCUS Regulatory Authorities	CCUS Acreage Licensing Programme	CCUS Permitting Process	CCUS Project Terms & Obligations	CCUS Liability	Carbon Credit System	CCUS Tax Incentives	Other support for CCUS
Alberta Canada	✓	✓	✓	✓	✓	✓	✓	✓	✓
Australia	✓	✓	✓	✓	✓	✓	✓	✗	✓
Indonesia	✓	✓	✗	✓	✓	✓	✗	✗	✗

Source: S&P Global Commodity Insights

✓ Well developed ✓ Fairly developed ✗ Initial development/absent

Source: IOG 4.0 SKKMIGAS (2023)

BRIN

BADAN RISET
DAN INOVASI NASIONAL

Thank you