



Challenges ahead for the CCUS pathway

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KUCHING: The global energy landscape is undergoing a seismic shift as industries and governments race to address climate change and transition to a low-carbon future.

Among the steps enabling this transition, carbon capture, utilisation, and storage (CCUS) has emerged as a critical solution to decarbonise operations while maintaining economic viability, particularly for hard-to-abate sectors like oil and gas.

CCUS involves capturing carbon dioxide emissions from industrial processes, transporting them, and either utilising them for industrial applications or storing them underground to prevent their release into the atmosphere.

Meanwhile, CCS focuses solely on capturing carbon dioxide emissions from industrial processes or power generation and securely storing it underground in geological formations.

Both processes are mitigation strategies to offer a direct pathway to reduce greenhouse gas emissions, but CCUS offers a more integrated solution by combining emission reduction with value creation – which makes it more attractive for forward-thinking businesses seeking to align sustainability with profitability.

For Malaysia – a country heavily reliant on its oil and gas industry – CCUS represents both boon and bane in its role as a solution.

Malaysia has an estimated carbon dioxide storage capacity of 13.3 gigatonnes across 16 depleted oil and gas fields, exceeding its forecasted upstream carbon dioxide emissions.

Combined with its strategic position for cross-border carbon dioxide management, this places the country among Southeast Asia's top contenders for carbon



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— Kenanga Research

storage potential.

Sarawak's frontier in CCUS efforts

While Sabah and Sarawak contribute significantly to Malaysia's hydrocarbon production and accounting for a major share of crude oil and natural gas output, they are also grappling with increasing environmental regulations and growing calls for sustainable development.

The Sarawak government in particular has been proactive in its approach towards energy

transition. Through initiatives such as the Sarawak Gas Roadmap, the state has outlined plans to leverage natural gas while reducing its carbon footprint.

The state aims to establish four carbon storage sites by 2030, driving CCUS innovations to decarbonise key industries and contribute to regional net-zero goals.

Petroleum Sarawak Bhd (Petros) has been appointed as the resource manager for the state's CCUS efforts.

In February 2024, Petros

signed a storage site agreement with Petrolim Nasional Bhd (Petrinas) through its subsidiary CCS Ventures and a Japanese consortium for the M3 depleted field offshore Sarawak.

By July, Sarawak launched the Sarawak Bid Round, offering three carbon storage sites with a total estimated storage capacity of 1,000 million tonnes of carbon dioxide. However, the winners are not known.

Sarawak also became the first state in Malaysia to pass a law regulating carbon emissions.

The Environment (Reduction of Greenhouse Gas Emission) Bill, passed in 2023, aims to achieve net-zero emissions by 2050 by promoting carbon capture and storage while mitigating climate change effects.

Research analysts at Kenanga Investment Bank Berhad (Kenanga Research) highlighted that Sarawak's established regulatory framework in carbon-related activities positions it

ahead in the sector.

"At this stage, Sarawak's framework helps avoid overlapping or conflicting policies that could delay CCUS development and investment.

The swift passage of its legislation signals the government's urgency in capitalising on CCUS opportunities," the analysts noted.

At the federal level, the government followed suit in March 2025, approving legislation to regulate CCS activities in Peninsular Malaysia and Labuan, set to be enforced by March 31.

The regulatory framework will cover the entire CCUS value chain, including capture from power plants and industrial facilities, transportation via pipelines and vessels, utilisation for building materials and chemicals, and long-term storage both onshore and offshore.

It outlines licensing, permits, compliance, safety and

monitoring protocols to prevent leaks, penalties, an injection levy for government oversight of stored carbon, and a post-closure monitoring fund to manage long-term storage risks.

These measures support Malaysia's commitments under the Paris Agreement to reduce greenhouse gas emissions intensity by 45 per cent against GDP (2005 baseline) by 2030 and to achieve net-zero emissions by 2050.

Furthermore, according to Malaysia's Fourth Biennial Update Report to the United Nations Framework Convention on Climate Change (UNFCCC) released in 2022, our country had already achieved a 35.9 per cent reduction in emissions intensity by 2019, reaching nearly 80 per cent of its target.

These initiatives signal that CCUS and CCS are viable solutions, potentially driving long-term investment. However, challenges remain.