

## **Toward the Establishment of a CO<sub>2</sub> Storage Hub in Asia – Malaysia’s Challenge**

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In recent years, the number of projects that includes carbon capture and storage (CCS) technology has been increasing as a vital measure to realize carbon neutrality. According to the Australia-based research institute, Global CCS Institute, while currently, no more than 30 CCS projects are under operation across the world, this number increases to 196 with the addition of projects in development, with total carbon capture capacity exceeding approximately 240 million tons per year. Many of these projects that are in the developmental phase are located in Europe and America, where they can enjoy tax incentives or well-developed public support systems. However, the number CCS projects under review are also increasing in the Asia Pacific region, including China, Australia, and Southeast Asia. Among these, Malaysia is especially worthy of mention for its ongoing project development to receive and store CO<sub>2</sub> from overseas.

In fact, Malaysia has the largest potential CO<sub>2</sub> storage capacity in Southeast Asia. According to the International Energy Agency (IEA), Malaysia is estimated to have as much as approximately 80 billion tons of CO<sub>2</sub> storage capacity in total, a remarkably large scale in comparison with other Southeast Asian countries (according to the same estimations by IEA, CO<sub>2</sub> storage capacity is 8.4 billion tons for Indonesia and 11.8 billion tons for Vietnam).<sup>1</sup> The presence of many depleted gas fields in the country, as well as the reliable geological information accumulated through its oil and gas field development in the past, are important factors contributing to Malaysia’s vast potential storage capacity.

To take advantage of this immense potential storage capacity, Malaysia has set out the vision of becoming Asia’s CO<sub>2</sub> storage hub by 2030. Petronas, Malaysia’s state-owned oil and gas company, plays a central role in efforts toward the realization of this vision. Petronas has been known as one of the most successful state-owned oil companies in the world, on par with Norway’s Equinor and Saudi Arabia’s Saudi Aramco, and boasts strong technological prowess in the areas of oil and natural gas development. Petronas was also the first oil company in Southeast Asia to declare the carbon neutrality goal by 2050, and the establishment of this CO<sub>2</sub> storage hub is positioned as one of the primary means

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<sup>1</sup> It should be noted that the potential CO<sub>2</sub> storage capacity estimated here can only be calculated with reliable geological information, and the estimated value changes depending on the volume of relevant information. Hence, the current estimate figure does not necessarily reflect the geological potential of each country. There is a strong likelihood that the estimated storage capacity of other countries could increase if reliable information is accumulated.

for Petronas to achieve its carbon neutrality goal. The Government of Malaysia supports Petronas' initiatives, and in 2023, unveiled a policy of introducing investment tax incentives for CCS projects over the next ten years. It is also reported that the government is considering the introduction of carbon pricing to promote CCS domestically. Hence, the government and the industry are truly working as one to establish Malaysia as a CO<sub>2</sub> storage hub.

A specific example of a CO<sub>2</sub> storage project in Malaysia is the Kawasari CCS project targeted at depleted offshore gas fields in the state of Sarawak. In October 2022, Petronas reached the final investment decision (FID) stage for this project, with plans to store up to 3.3 million tons of CO<sub>2</sub> per year from 2025. Apart from this project, Petronas has already identified more than 80 potential locations for CO<sub>2</sub> storage in Malaysia and aims to put new storage projects into operation with a focus on the offshore areas of Sarawak to realize the storage hub vision in 2030.

These initiatives by Malaysia are also of great importance to Japan's future decarbonization. While Petronas is an oil company with strong technological prowess, it is actively promoting cooperation with overseas companies in the field of CCS. This includes cooperation with Japanese corporations, such as JAPEX, JX Nippon Oil and Gas Exploration Corporation, and JGC Holdings Corporation. They agreed to conduct a joint collaborative study with Petronas covering a wide range of fields and themes related to CCS, such as geological storage technology for CO<sub>2</sub>, optimal carbon capture and transportation methods, and the monitoring of CO<sub>2</sub> stored in the ground. While these are Japanese companies that already possess a certain level of knowledge about CCS through demonstration experiments conducted off the coast of Tomakomai City in Hokkaido, they stand to gain much in furthering that knowledge through cooperation with Malaysia, which has vast potential storage capacity for CO<sub>2</sub>. Moreover, Malaysia is a potential destination for the transfer and storage of CO<sub>2</sub> captured in Japan in the future. Malaysia's CO<sub>2</sub> emissions are small relative to its storage capacity, and senior government officials of Malaysia have suggested that the country can accept CO<sub>2</sub> from a third-party country for 40% of the CO<sub>2</sub> that will be stored in the storage hub. For Japan, Malaysia is a shorter distance away than the Middle Eastern oil producers and the United States. This makes it an attractive transfer and storage destination from the viewpoint of reducing the overall costs of international CCS projects.

Of course, many economic, technological, and systemic challenges remain before Malaysia can realize its storage hub vision in the future. However, the success of Malaysia's CO<sub>2</sub> storage hub can also provide a powerful tailwind for the introduction of CCS technology in Asia going forward. In this respect, Japanese companies that are already partnering with Petronas have an important role to fulfill. We will continue to watch, with great anticipation, Malaysia's challenge to establish a CO<sub>2</sub> storage hub.

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