

AZEC Technical Seminar

CCS Potential and Challenges in ASEAN: JOGMEC's Activities and Support Schemes

Masumi TAKANASHI, Project Director, Global Coordination Division,
Hydrogen and CCS Project Department, Energy Business Unit

Japan Organization for Metals and Energy Security

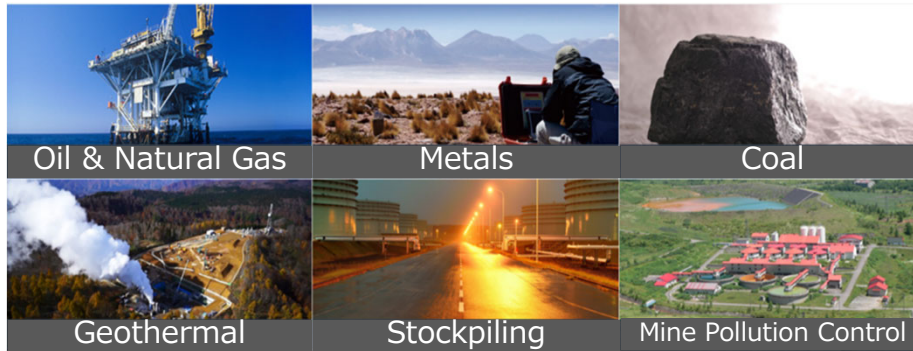
June 2023 for Asia Zero Emission Community (AZEC)

JOGMEC's mission and technical expertise



JOGMEC (Japan Organization for Metals and Energy Security)

Mission Securing **stable and affordable supply** of natural resources for Japan



New Mission

CCS

Hydrogen,
Ammonia

Wind Power

- **CCS Group** was established in July 2020
- **Hydrogen and CCS Project Department** was established in November 2022

CCS

JOGMEC supports CCS with rich technical expertise and more than 50 years of experience in resource development

Technical expertise in Subsurface Evaluation

Facility Engineering

Challenges for CCS commercialization in ASEAN



AZEC

1. Geological Potential

2. Economic Viability

3. Legal and Regulatory Framework

AZEC: Asia Zero Emission Community

Challenges for CCS commercialization in ASEAN



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1. Geological Potential

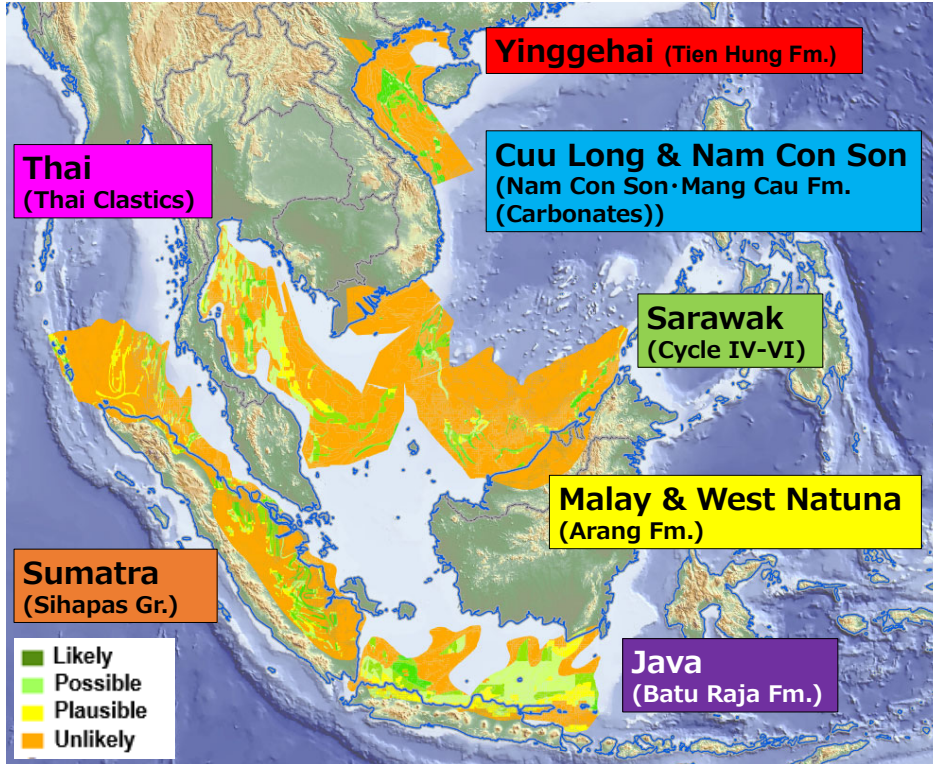
2. Economic Viability

3. Legal and Regulatory Framework

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CO2 storage potential in Southeast Asia

Regional site screening for CCS storage



High rating area:

- **Java and Sumatra**
- **Offshore Sarawak and Sabah**
- **Northern offshore Vietnam**
- **Gulf of Thailand**
- **Offshore Malay Peninsula**

Challenges for CCS commercialization in ASEAN



1. Geological Potential

2. Economic Viability

3. Legal and Regulatory Framework

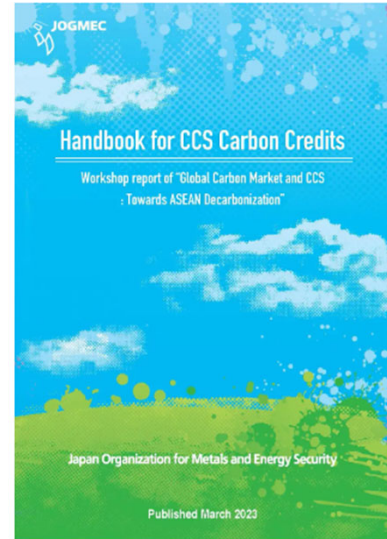
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CCS project needs multiple revenue options

- International investment
- Government subsidies
- Financial instruments (ex. Insurance)
- Carbon pricing systems (ex. Carbon taxes, ETS)

Carbon credit systems

⇒ JOGMEC's Workshop and Handbook for CCS Carbon Credits



CCS Carbon Credit Handbook



Challenges for CCS commercialization in ASEAN



1. Geological Potential

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Laws and Regulations for CCS in Southeast Asia

	MALAYSIA	INDONESIA	VIETNAM	THAILAND	SINGAPORE	BRUNEI	PHILIPPINES
International Climate Change Commitment (NDC)	✓ (45% reduction in GHG emission intensity against GDP by 2030)	✓ (32% reduction and conditional reduction target up to 43% of the business-as-usual scenario, by 2030)	✓ (Unconditional 15.8% reduction of GHG emissions by 2030)	✓ (30% reduction of GHG emissions by 2030)	✓ (Reduce GHG emissions to around 60 MTCO ₂ e in 2030)	✓ (20% reduction of GHG emissions relative to BAU by 2030)	✓ (75% reduction of GHG emissions relative to BAU by 2030; Conditional 2.7%)
Net Zero Target	✓ (Pledge – 2050)	✓ (Proposed – 2060)	✓ (Pledge – 2050)	✓ (Pledge – 2050)	✓ (Policy – 2050)	✓ (Proposed – 2050)	✗
Party to the London Protocol	✗ (Limited to UNCLOS)	✗ (Limited to UNCLOS)	✗ (Limited to UNCLOS)	✗ (Limited to UNCLOS)	✗ (Limited to UNCLOS)	✗ (Limited to UNCLOS)	✗ (Limited to UNCLOS)
CCS-specific domestic policies or incentives	✓ (Tax incentives proposed for CCS in 2023 Budget)	✓ (National Action Plan recognizes role of CCS)	✗ (Latest NDC includes a reference to CCS within a technology transfer objective)	✓ (Corporate tax exemptions)	✓ (EDB commitment MOU with Australia)	✗	✗
CCS project(s) proposed/in development	✓	✓	✗	✓	✗	✗	✗
CCS-specific legal and regulatory framework	✓ (Single State)	✓	✗	✗	✗	✗	✗
Existing legislation applicable to CCS operations	✓	✓	✓	✓	✓	✓	✓

(Source: South East Asia CCS Accelerator (SEACA) by Global CCS Institute, May 23, 2023)

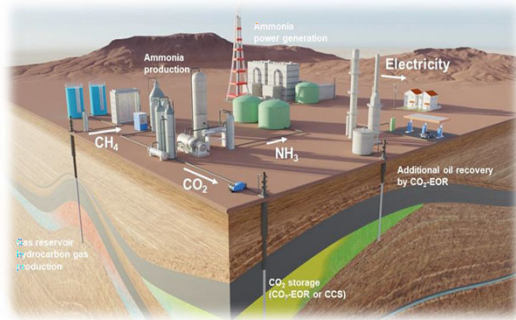
<https://www.globalccsinstitute.com/news-media/insights/south-east-asia-ccs-accelerator-seaca/>

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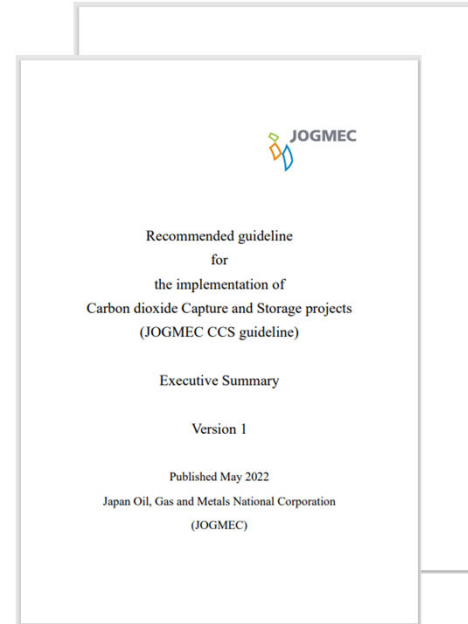
CO₂-EOR

Carbon Intensity

Carbon Credit



CCS: https://www.jogmec.go.jp/english/news/release/news_10_00026.html
CO₂EOR: https://www.jogmec.go.jp/english/news/release/news_10_00038.html
CI: https://www.jogmec.go.jp/english/news/release/news_10_00037.html



- CCS Guidelines
- CO₂-EOR Guidelines
- Carbon Intensity Guidelines

JOGMEC's Projects and Cooperation in Asia-Pacific region



JOGMEC's training program

- Energy Transition Training course for 4 countries in Southeast Asia



- MOU for cooperation on CCS/CCUS



- Joint Study of CO₂-EOR/CCUS in the matured reservoir
- CCS Joint Study for Clean Fuel Ammonia Production
- MOU for cooperation on Energy transition (CO₂-EOR, CCS, H₂, NH₃)



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- MOC for Cooperation on Carbon Neutrality (H₂, NH₃, CCS)
- Joint Study on the Development of CCS at High CO₂ Gas Fields



- Feasibility Studies on Establishing a Clean Fuel Ammonia Supply Chain and CCS
- CCS for LNG decarbonization
- FEED of CCS Hub project



JOGMEC's projects in Indonesia

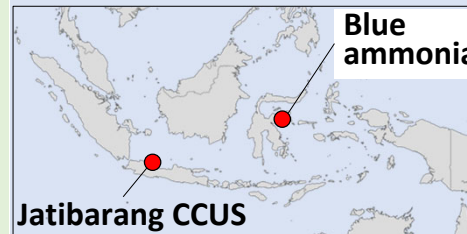


Jatibarang CCUS (CO2-EOR) pilot project in West Java, Indonesia

- Successfully implemented small-scale CO2 injection (CO2 Huff 'n' Puff) into a depleted oil reservoir as a first step of future commercial scale CO2-EOR & CCS.
- Obtained important technical data for CO2-EOR & CCS (ex., oil production increase, CO2 trap volume, geochemistry, corrosion rate), which can be utilized in other projects as a base-line.

CCS Study for blue ammonia production in Sulawesi, Indonesia

- Utilize an existing ammonia plant operated by PT Panca Amara Utama (PAU) for blue ammonia production.
- Completed CCS site screening around the PAU plant through a joint study among relevant parties in Indonesia and Japan.
- Next step will be more detailed study for the selected sites/areas by the site screening study.



PAU ammonia plant

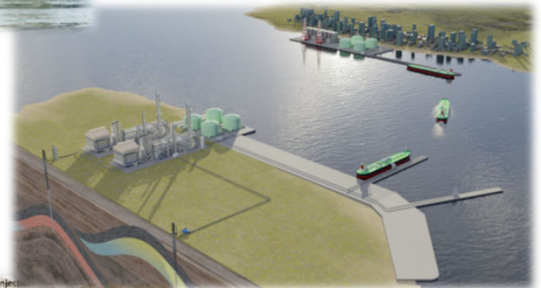
JOGMEC's Technical and Financial Supports

JOGMEC's support schemes for CCS

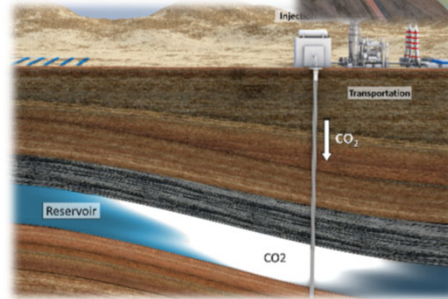
- FS/Pre-FEED/FEED supports on Clean Hydrogen/Ammonia and CCS
- Overseas CCS site surveys
- Advanced CCS Projects
(Supports for FS, Pre-study for CO₂ Capturing and Sequestration in Japan and overseas)
- Equity capital investment and Liability(debt) guarantees for exploration/commercial phase



CCS site survey
(3D seismic)
vessel



LNG, Hydrogen,
Ammonia with
CCS

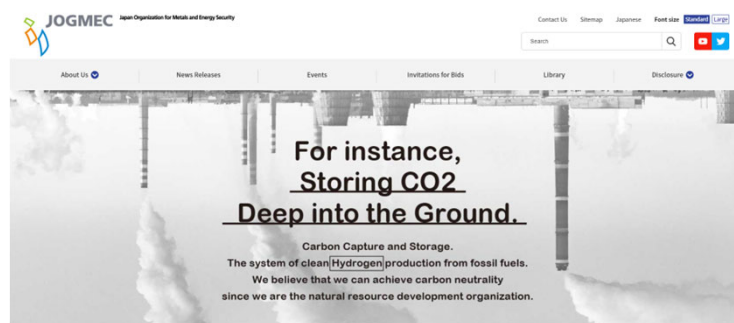


CCS hub, CO₂-EOR as
storage

Thank you!
Visit our website!



<https://mirai.jogmec.go.jp/en/>



<https://www.jogmec.go.jp/english/index.html>