



JOGMEC's initiative for Carbon Capture and Storage deployment : for ensuring energy security and carbon neutrality

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1. About us – New task under amended law (November 2022)



Japan Oil, Gas and Metals National Corporation
(JOGMEC)



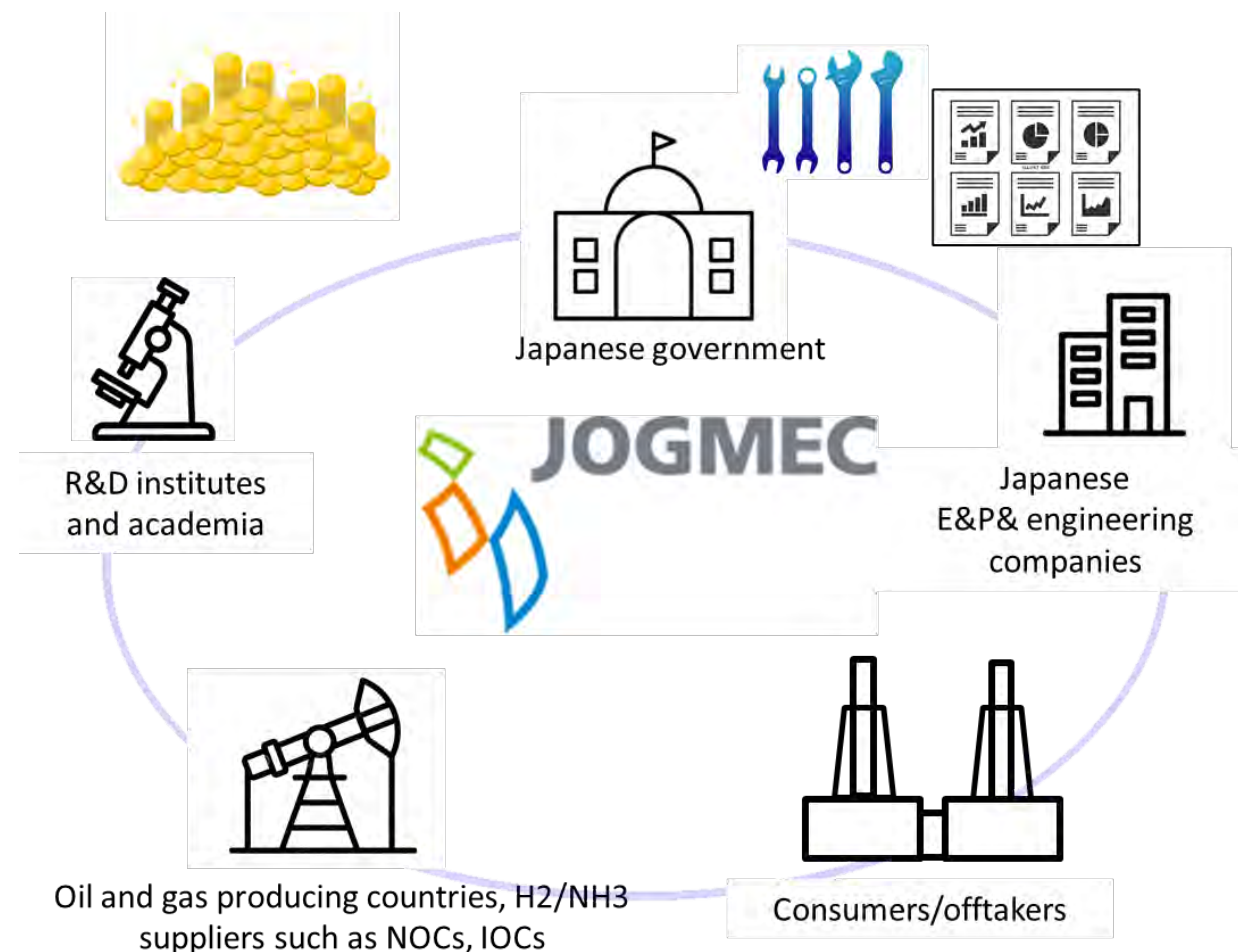
Japan Organization For Metals and Energy Security (JOGMEC)

100 % Government owned entity supporting Japanese upstream energy industry

Hydrocarbon, Metals, Coal, Geothermal + CCS, Low carbon fuels (Blue/Green Hydrogen/Ammonia)

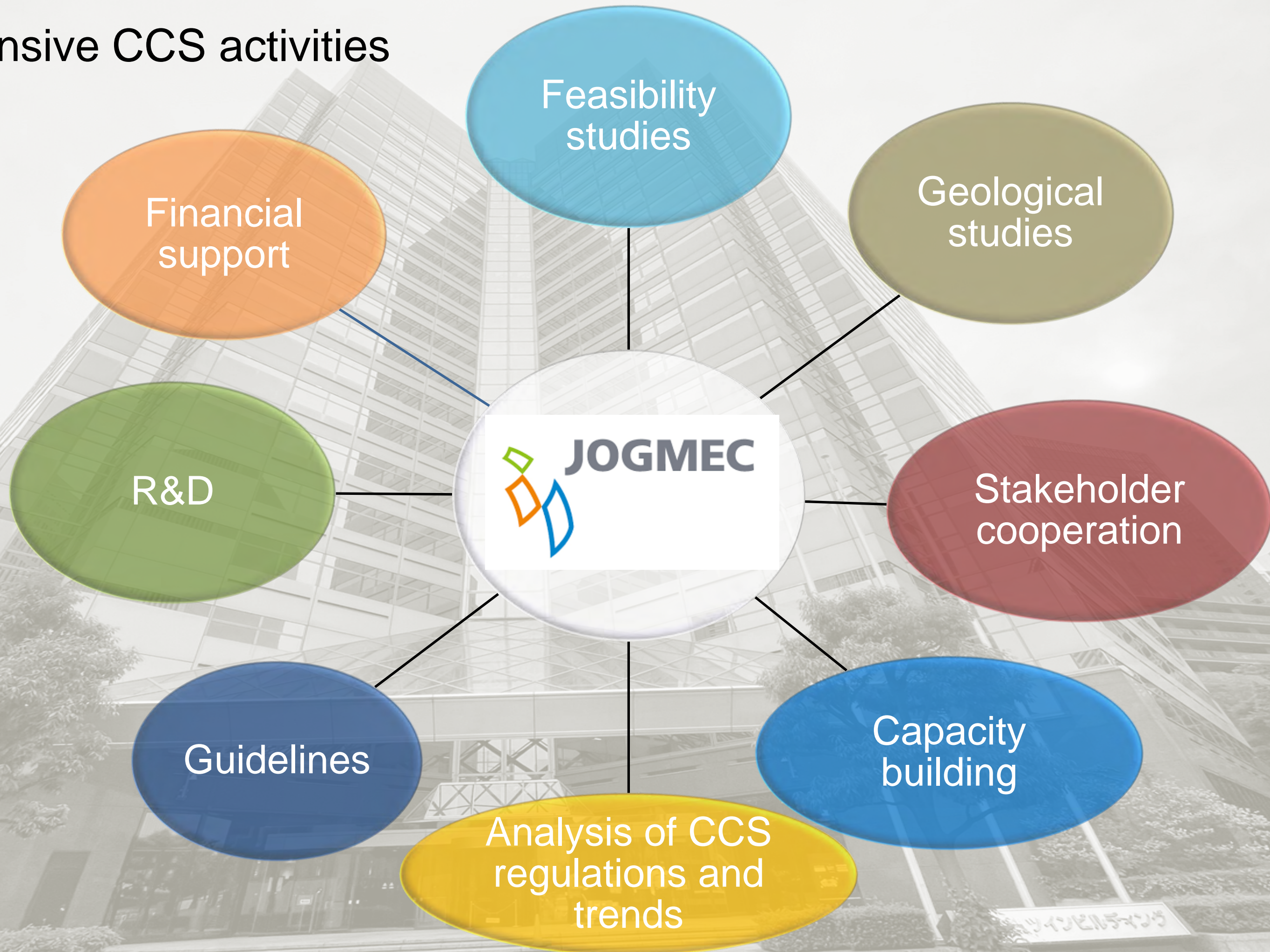
- ✓ Financial support: Support risk money with taking equity capital and loan guarantee.
- ✓ Technical support: Joint FS and technical studies, Geophysical explorations, Resource/Storage assessments

Working with Japanese private companies, IOC, NOC ...



- CCS**
- Hydrogen, Ammonia**
- Wind Power**

2. Comprehensive CCS activities



3. Comprehensive support scheme for CCS - Overview



Storage potential and storage site surveys

Technical R&D

Pilot project to verify technologies

Development of value chain,
Project feasibility study



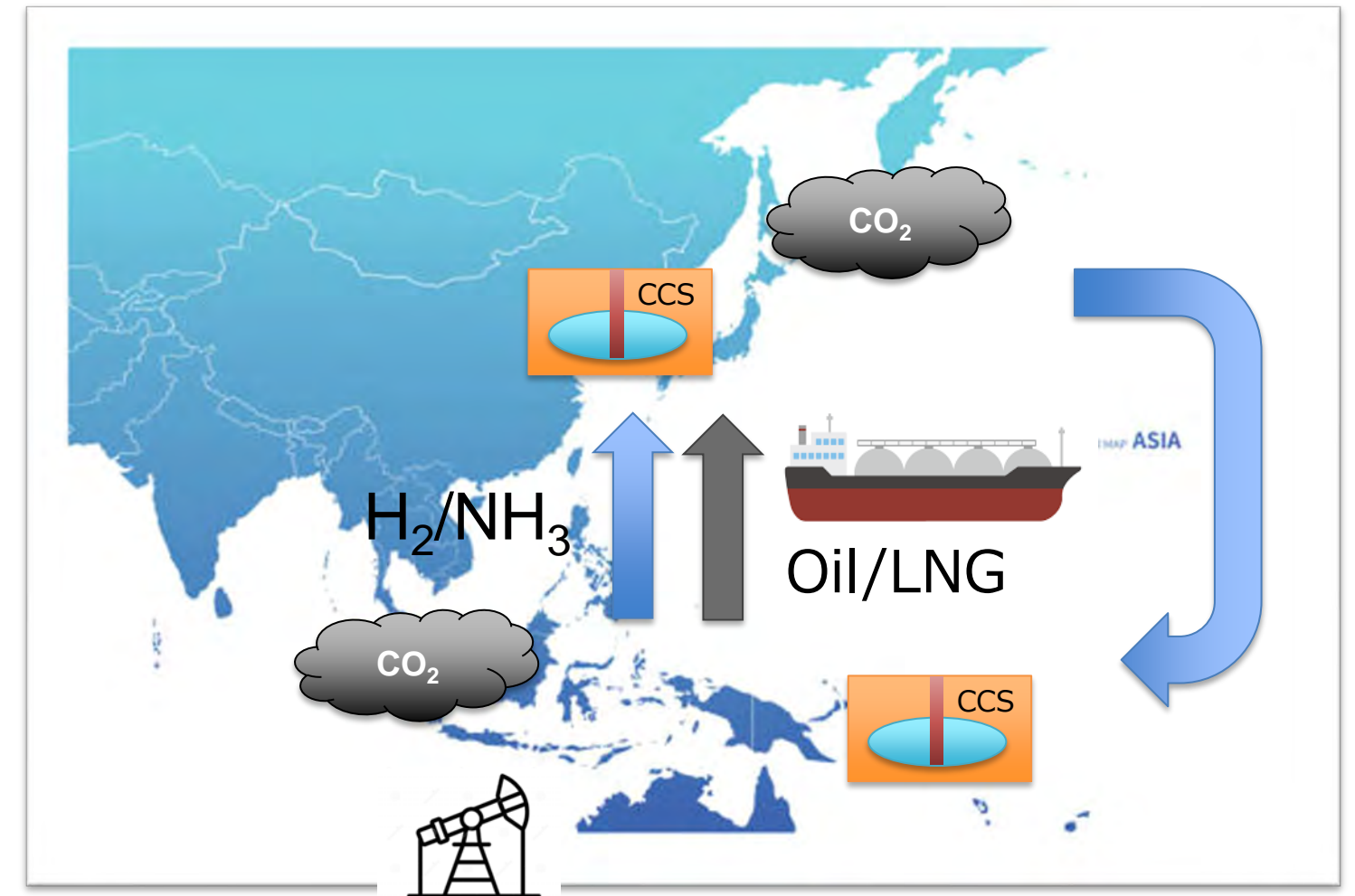
Financial support to the project

Technical support to operation fields

Research and analysis on policies, rules and regulations.

Capacity Building: Training activities etc.

Strengthening strategic relations with domestic and international multilateral stakeholders



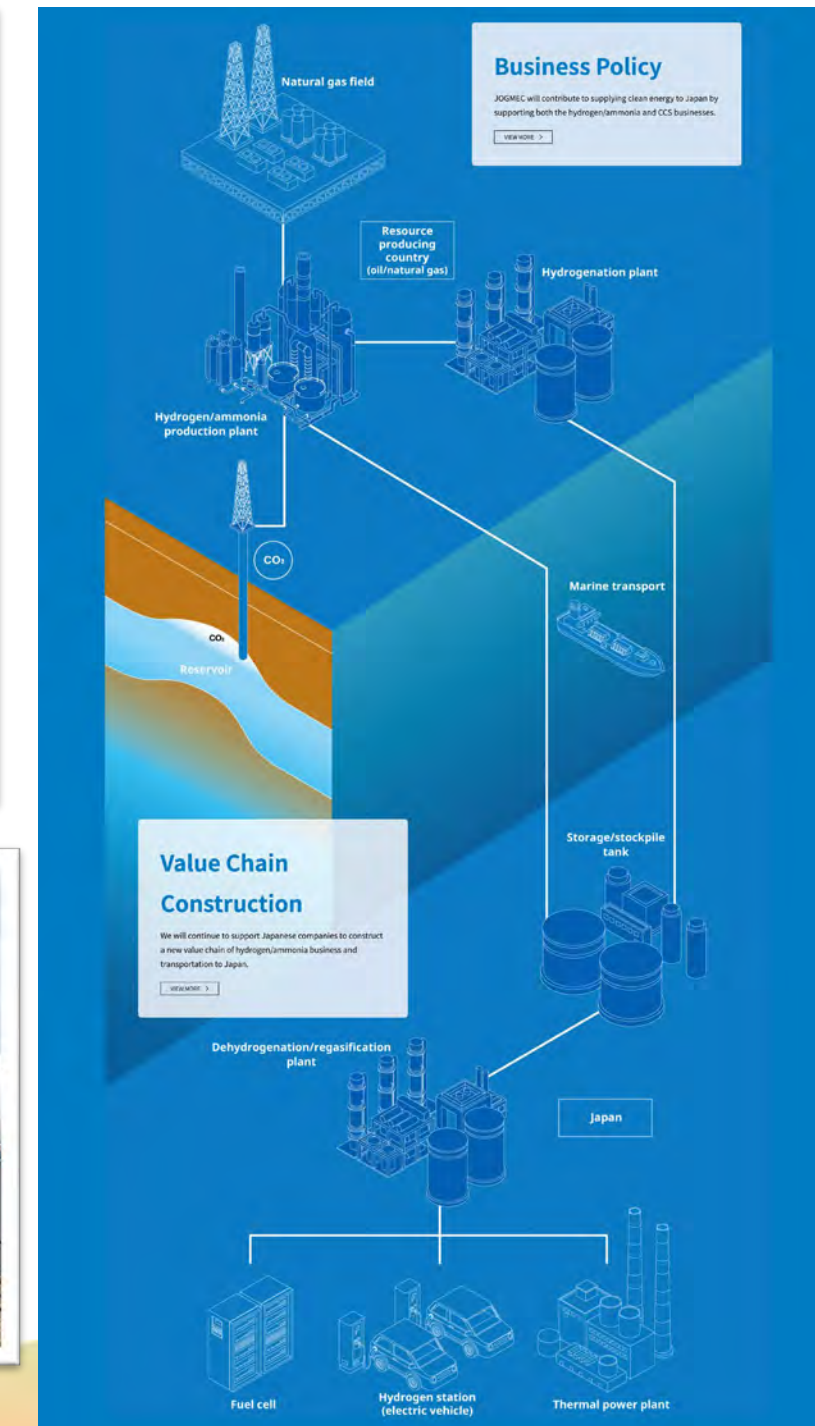
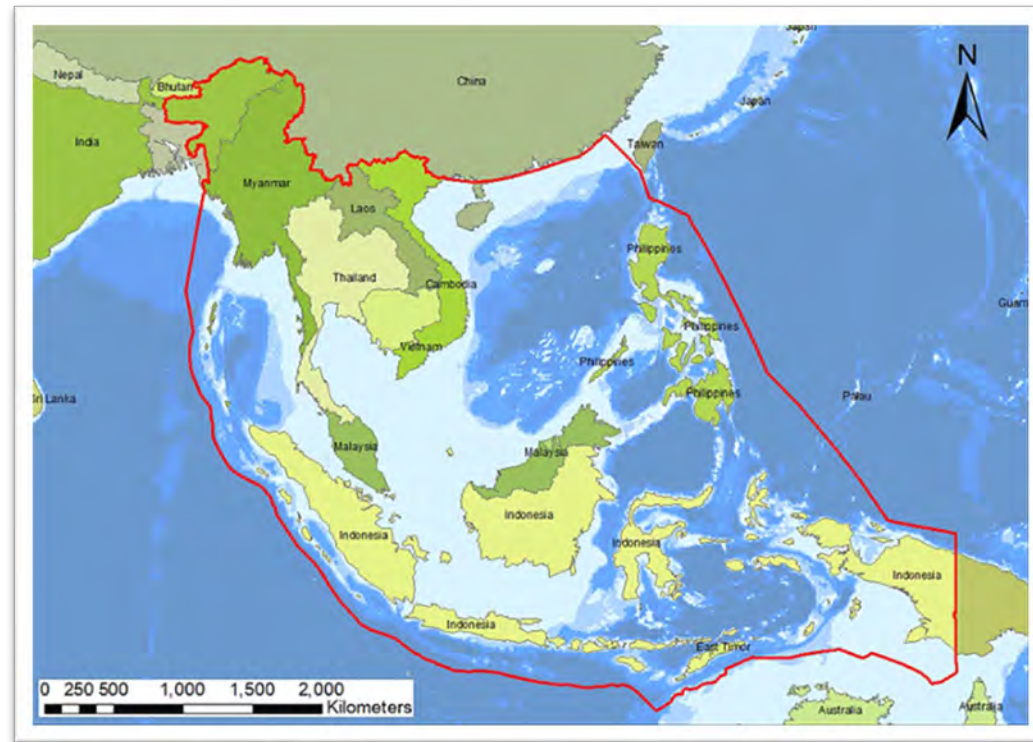
International Transfer of Hydrocarbon, Hydrogen, CO2 and **Carbon credit** is critical to develop the projects

4. Support scheme for study/engineering phase



- Exploration for candidate storage sites and storage assessment
 - Screening study for CCS-suitable sites.
 - Seismic survey using our own survey ship (Tansa)

- Pilot projects and engineering
 - CCS/CO2EOR/Hydrogen production pilot projects
 - Clean fuel value chain FS, Pre-FEED, FEED for building commercial projects

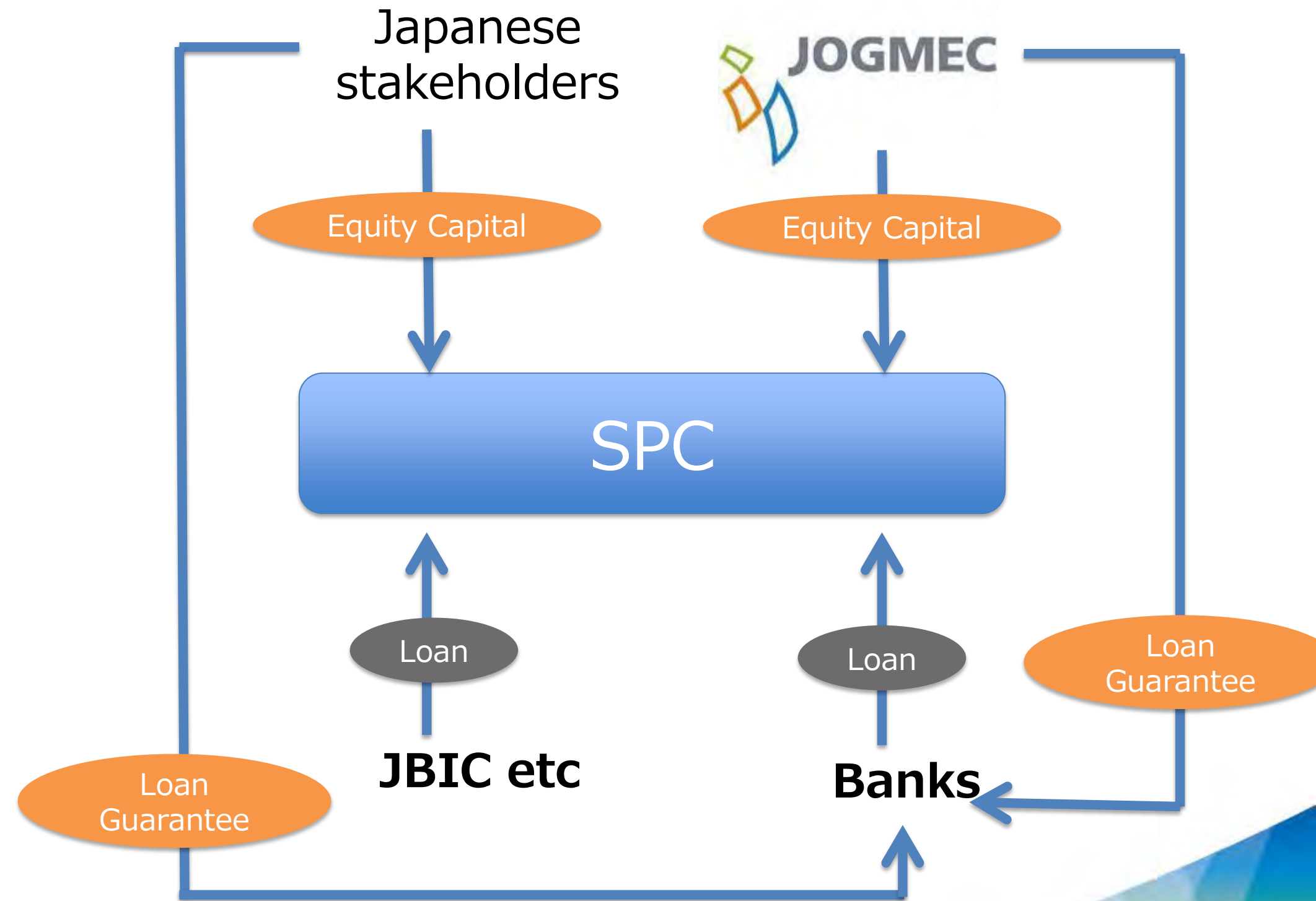


5. Support scheme after FID



- JOGMEC provide equity capital (EC) and loan guarantee (LG) for exploration and storage phase with SPC which involves Japanese entities.
- Proposed project is strongly expected to demonstrate its contribution to stable supply of energy to Japan.

Please contact JOGMEC for more details.



6. Feasibility studies

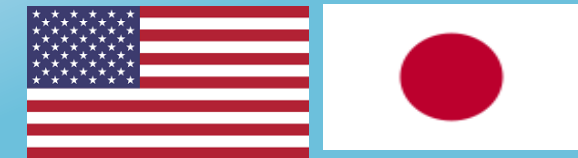
Exploring Commercial Potential of Clean Ammonia Production Business



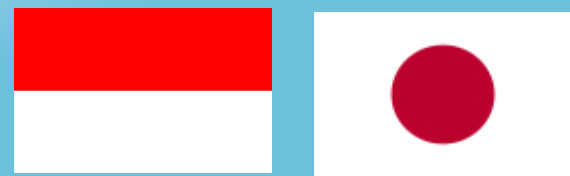
CO₂-EOR/CCUS Pilot Test
Blue H₂ production & utilization



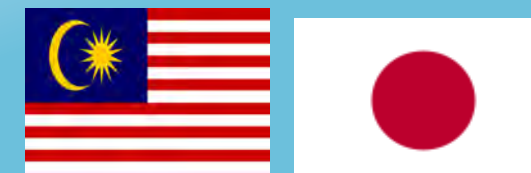
Several ammonia value chain projects



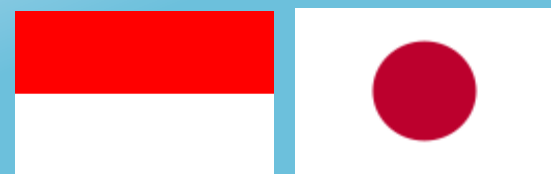
Joint Study of CO₂-EOR/CCUS in the matured reservoir



Joint Study on the Development of CCS at High CO₂ Gas Fields



CCS Joint Study for Clean Fuel Ammonia Production



Feasibility on Establishing a Clean Fuel Ammonia Supply Chain From Australia to Japan



Feasibility on CCS for Creation of a Supply Chain of Low Carbon Ammonia

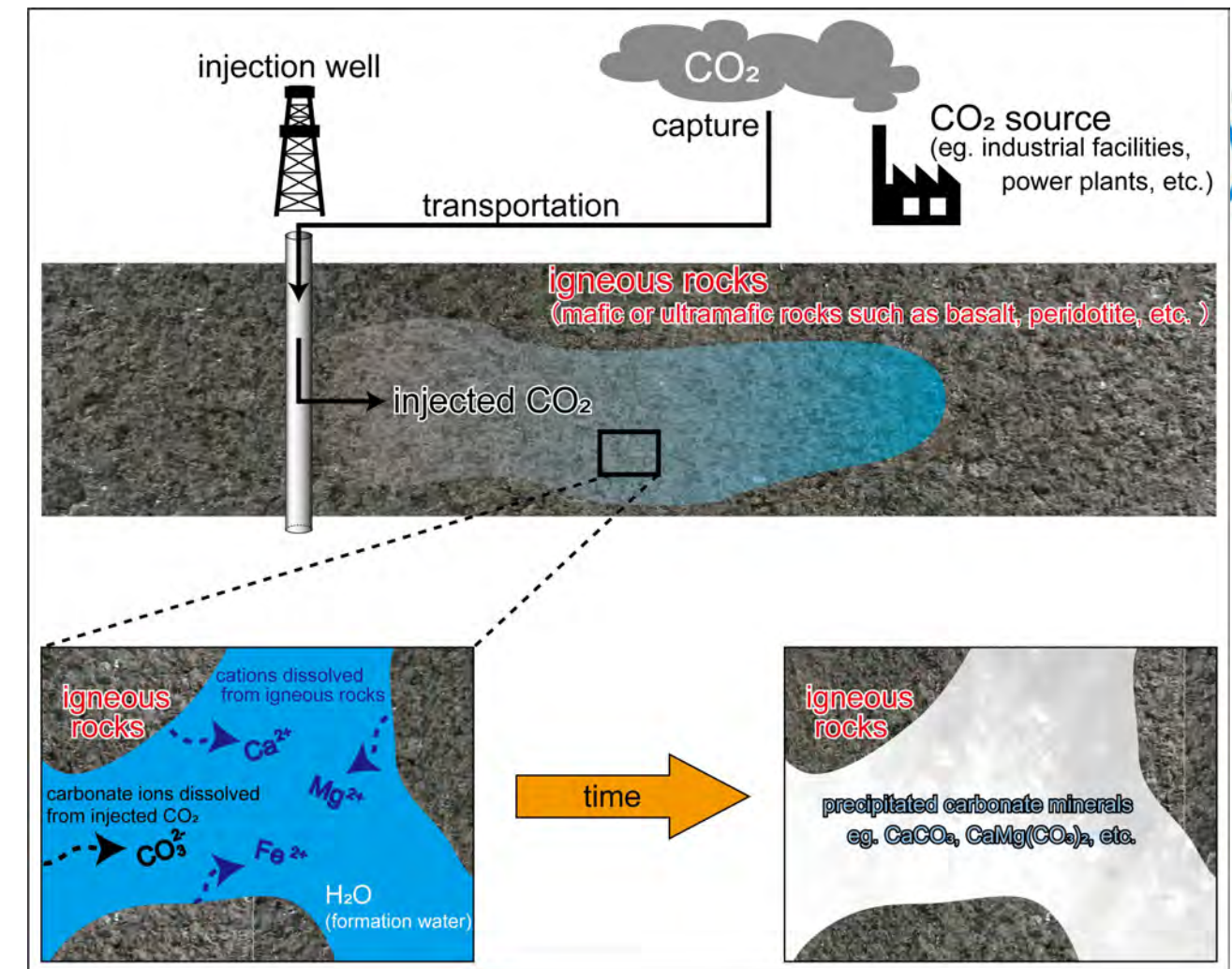


CarbonNet (FEED for CCS Hub Network)

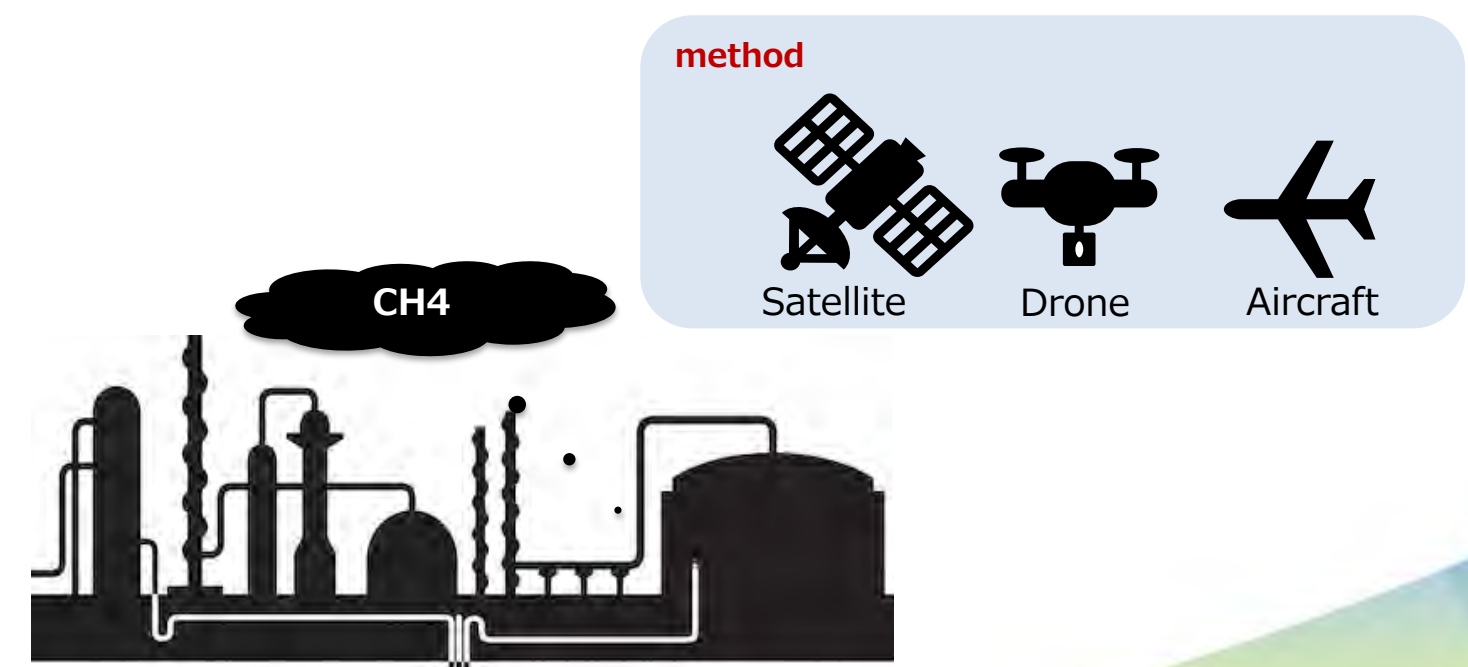


7. R&D

- Site screening and site selection
 - Site characterization
 - Evaluation of well integrity
 - Modelling and simulation
 - Monitoring and model calibration
 - CO2 mineralization
 - Methane Emissions Quantification
 - DDR membrane
 - JAPAN-GTL
- and more.



CO2 mineralization

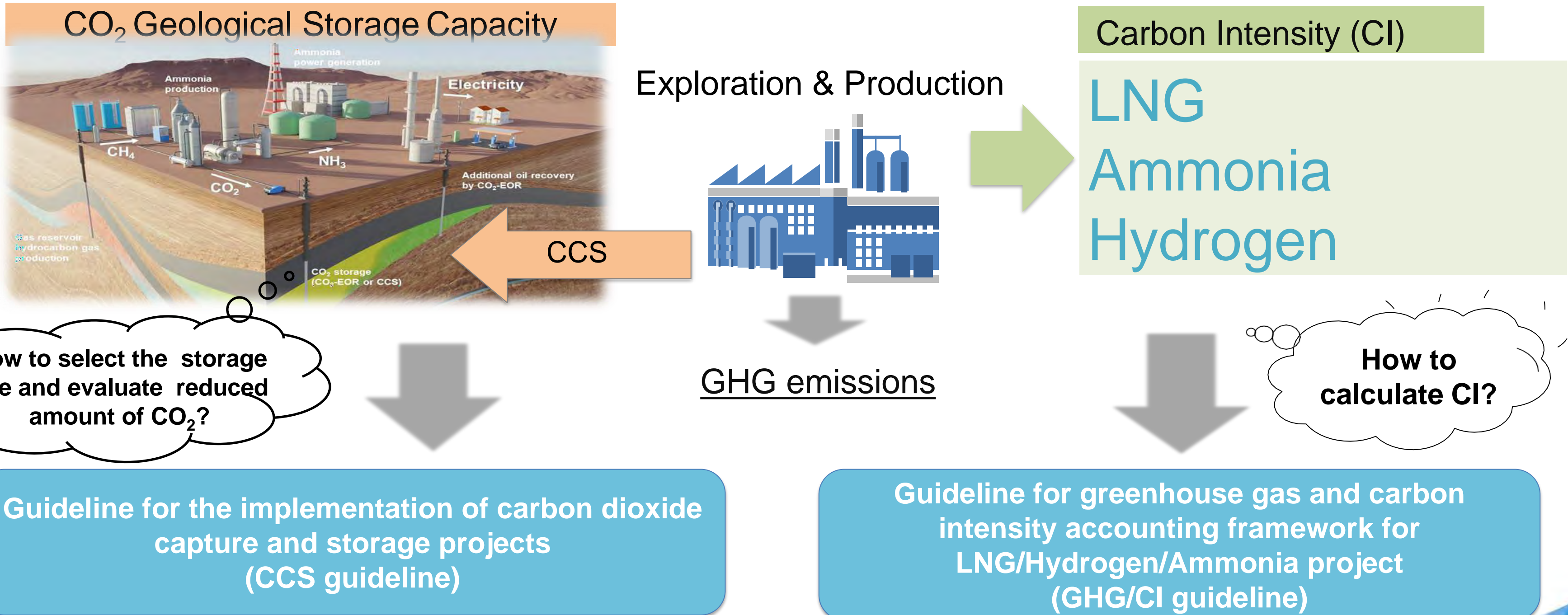


Monitoring unexpected methane leaks by measuring the entire plant area from the air

8. Standardization of CCS and GHG/CI accounting - Guidelines



- Re-organize, edit, and explain existing CCS and Carbon Intensity accounting guidelines/standards for industries to promote CCS business and emphasize JOGMEC's view.

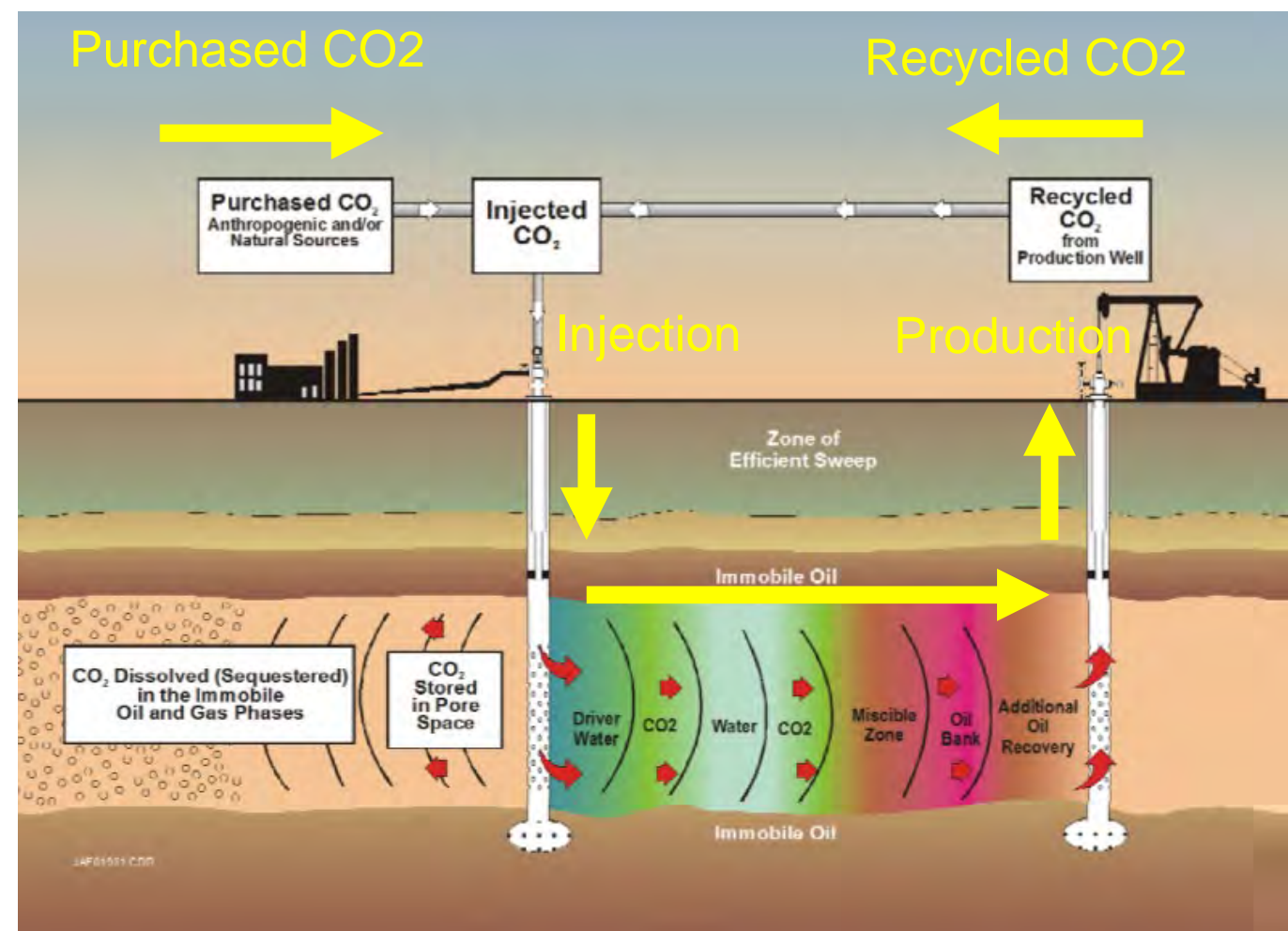


$$\begin{aligned}
 & \text{CO}_2/\text{GHG emission reduction amount} \\
 & = (\text{Captured CO}_2) - (\text{Emission from fuel/electricity consumption}) \\
 & \quad - (\text{Fugitive emission})
 \end{aligned}$$

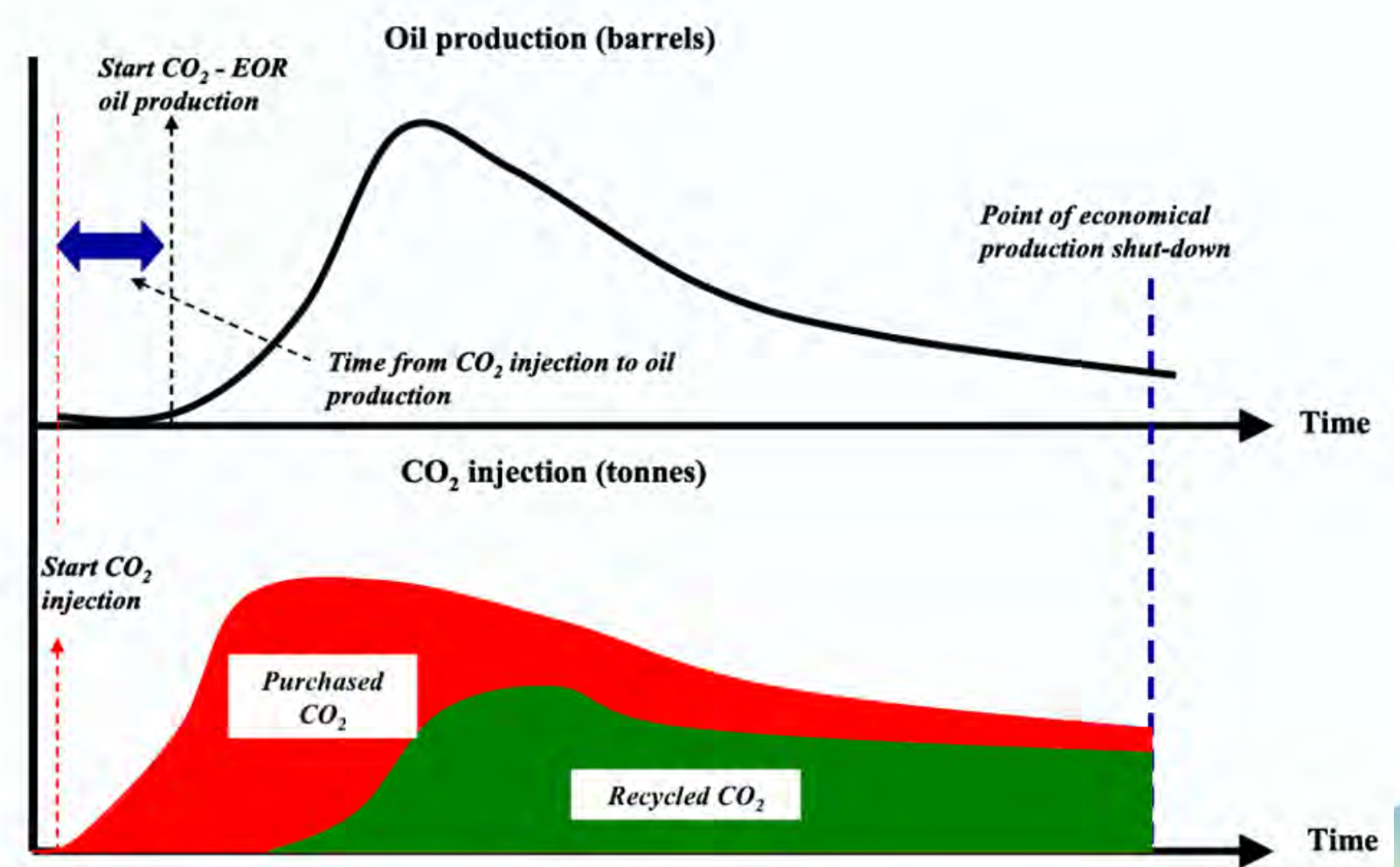
$$\text{Carbon Intensity (CI)} = \frac{(\text{Product GHG emission} - \text{Emission deduction})}{\text{Product energy content or weight}}$$

9. Upcoming guideline: CO₂EOR as CCS

- “CO₂EOR as CCS Guideline” is now being developed and its draft version is expected to be brought to public consultation in Spring this year.
- Key features (under discussion)
 1. Scope 1 and 2 emissions,
 2. Additional oil,
 3. Entrained CO₂ in produced fluid outgoing from the site,
 4. Expandability



A closed-loop CO₂ EOR system from 2013 NETL report



Relation between oil production, purchased CO₂ and recycled CO₂

Source: Jakobsen, Hauge, Holm and Kristiansen 2005

10. Stakeholder cooperation



Signed MOU with Oman (Dec. 2022)



Signed MOU with Western Australia (Dec. 2022)



Signed MOU with PetroVietnam (November. 2022)



Signed MOC with Saudi Aramco (November. 2022)



Signed JSA (joint study agreement) with Minister of Energy and Mineral Resources of Indonesia and Pertamina (August. 2022)



Signed MOU with Namibia (August. 2022)

11. Stakeholder cooperation



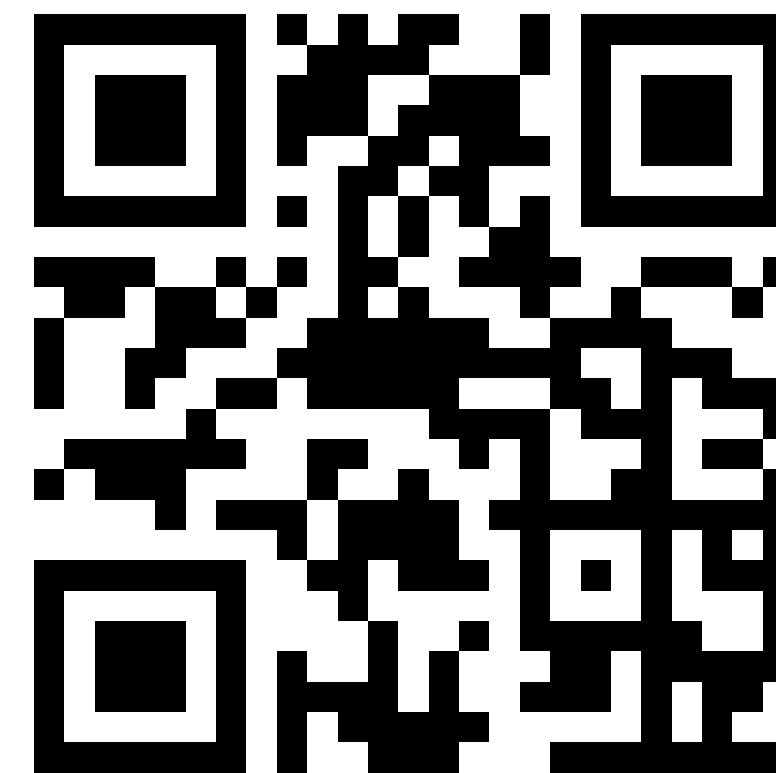
and more....

➤ For more information

資源三ライイ開発

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

English version is now available !



➤ Inquiry

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Thank you.