JOGMEC's Initiatives Toward Commercializing CCS

CCS Project Department, Energy Business Unit

Japan Organization for Metals and Energy Security

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JOGMEC - Who We Are

Japan Organization For Metals and Energy Security (**JOGMEC**) is a policy executing agency of the Japanese government to stable and affordable supply of natural resources.

Area of Business

LNG and E&P

Metals

Coal

Geothermal

Stockpiling

Mine Pollution Control

CCS

Hydrogen, Ammonia

Wind Power

Area of Services

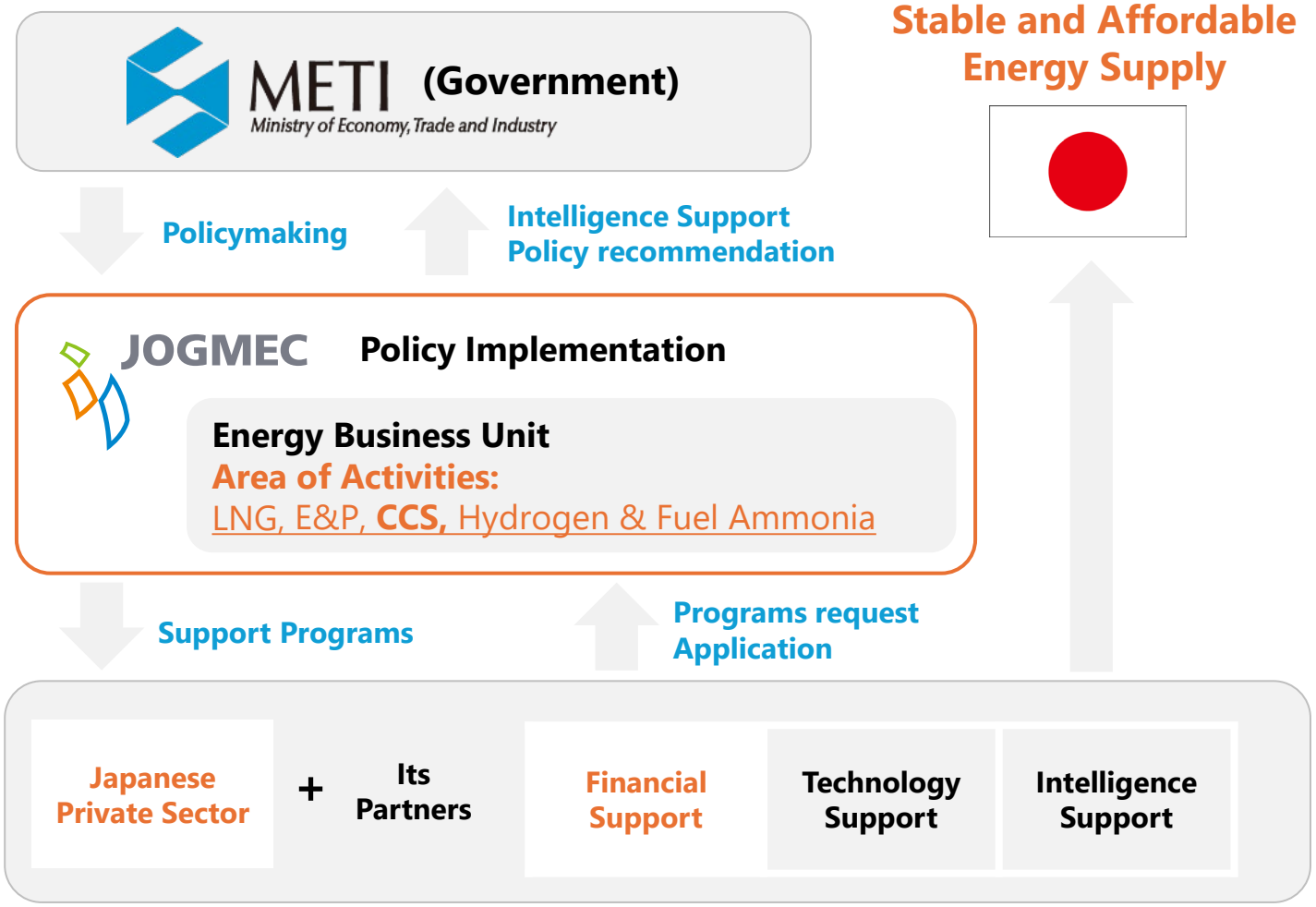
Financial Support	Technology Support	Intelligence Support
▪ Equity Finance ▪ Liability Guarantee ▪ Grant ▪ Subsidy, etc.	▪ Geological Survey ▪ Technology Development ▪ Marine Resources Development ▪ Environmental Safety, etc.	▪ Resource Diplomacy ▪ International Cooperation ▪ Information Analysis, etc.

JOGMEC - Who We Are

JOGMEC, as the executing agency of Japan's energy policy led by METI

- Solving issues related to the energy trilemma by providing
  - financial support services
  - technical support services
  - intelligence support services
- Providing services not only to Japanese companies but also to overseas partner organizations

S+3E (Safety Plus Three Es) :
A concept that aims to simultaneously achieve safety (Safety) as a prerequisite, stable supply (Energy Security), economic efficiency (Economic Efficiency), and environmental compatibility (Environment).



Advanced CCS Projects

- To secure annual storage of 120-240 million tons of CO2 by 2050, A business model for CCS that can cross-sectoral should be established at an early stage. Thus, Japanese government selected “Advanced CCS projects” led by operators and will actively support them.
- This supporting program will establish various CCS business models by supporting projects with **different combinations of CO2 source, transportation methods and CO2 storage areas**. Furthermore, it **aims to secure 6-12 million tons of CO2 storage per year by 2030**.
- This year, this program will provide support for the analysis of this geologic data and feasibility study.

“Advanced CCS Projects”

- ✓ Starting 0.5+MMt/yr CO2 injection before 2030
- ✓ Including entire CCS value chain (CO2 capture, transportation and storage process)

Possible types of CO2 source, transport methods, and CO2 storage areas

CO2 sources	Transport methods	CO2 storage areas
Thermal power plant Steel plant Chemical plant Cement plant Paper plant Hydrogen plant etc.	Pipeline Ship	Onshore Near shore Offshore

Advanced CCS Projects (2024-Ongoing)

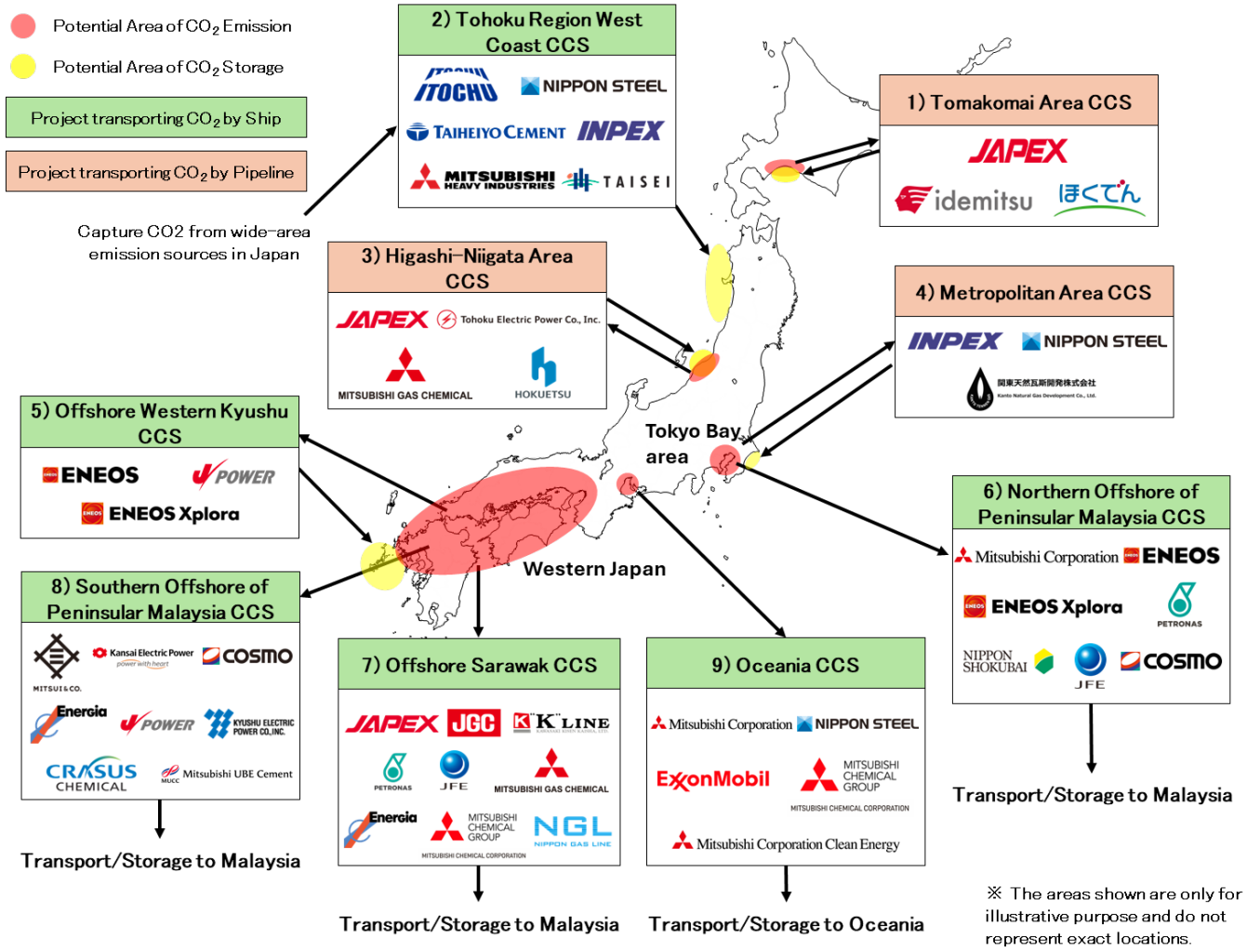
Selected 9 CCS projects (2024-Ongoing)

JOGMEC selected **9 role model projects** for **Japanese Advanced CCS Projects**

■ Storage sites
- **5** for Domestic storage
- **4** for Overseas storage

■ Transporting Methods
- **6** for Ship transporting
  - **4** for Overseas transporting
  - **2** for Domestic transporting
- **3** for Pipeline transporting

Scope (Ongoing)
- Basic engineering design for CCS value chain (PreFEED/FEED)
- Assessment on CO2 storage potential including exploratory drilling



Challenges

Capture

- Securing a site
- Rearrangement of existing equipment
- Cost of retrofitting existing equipment and additional equipment
- Securing additional electricity, water, and heat
- Lack of consideration of aggregation of multiple emission sources

Pipeline transportation

- Pipeline blockage due to hydrates in a low temperature environment.
- Maximum transport volume constraints dependent on the pipeline diameter of the initial plan
- High initial capital expenditure (CAPEX) in total transportation cost

Liquefaction

- Securing a site
- Storage tank costs
- Dispersion of liquefaction processes by installing equipment for individual discharge sources
- High operating cost (OPEX) in total transportation cost (liquefaction process)

Ship transportation

- Increasing complexity of CO2 impurities associated with the acceptance of multiple emission sources
- Procurement costs of cargo tanks and transport vessels
- High operating costs (OPEX) in total transportation costs (ship operating costs)

Storage

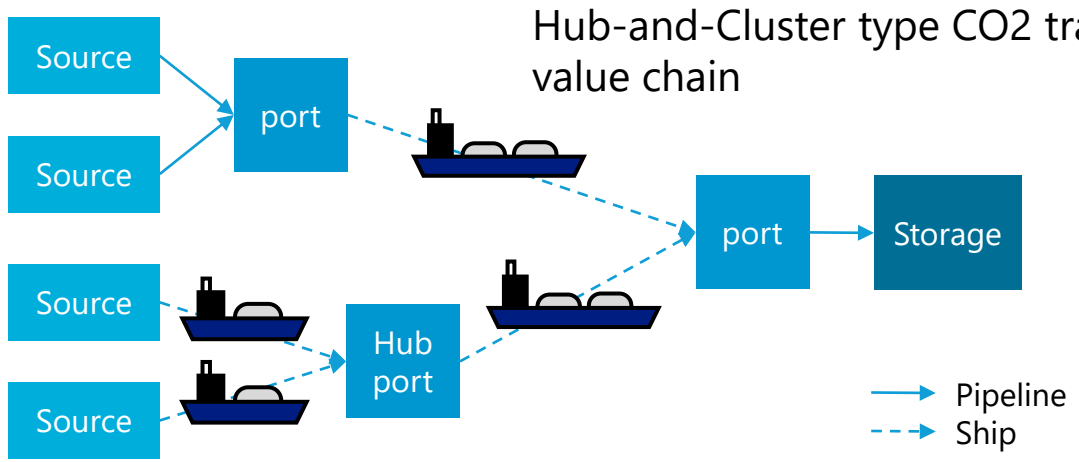
- Uncertainty in storage capacity (storage volume, injectivity, containment capacity) due to limited data
- Treatment of formation water

Common

- Cost competitiveness compared to other decarbonization measures
- Longer delivery time and construction period

Way forward

- To launch and become self-reliant in CCS business, it is necessary to aim to overcome the challenges identified in the advanced CCS projects. Differences in transportation methods (pipelines/ships) have a significant impact on the cost structure, and each has different challenges.
- Pipeline projects require a high proportion of initial CAPEX and have a large cross-chain risk due to its limited flexibility of the value chain. It is essential to share risks while taking advantage of economies of scale by diversifying and consolidating CO2 emission sources on a regional scale.
- Ship transportation projects needs to improve the efficiency of OPEX such as liquefaction and ship transportation. It is expected to aggregate emission sources and liquefaction processes and build a large-scale Hub-and-Cluster type CO2 transportation value chain.



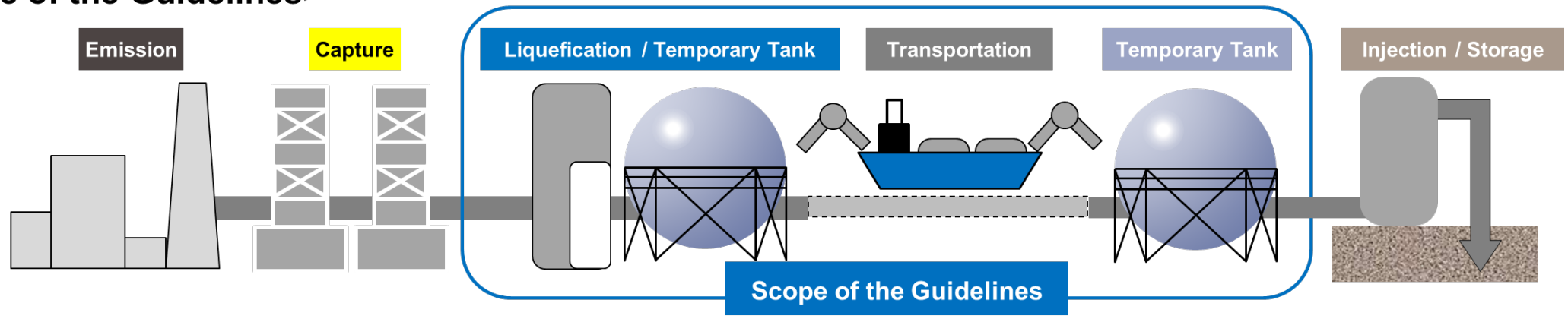
- To promote ship transportation projects in the future, we will continue the efforts of the Council for Discussion on Common Specifications in LCO2 Ship Transportation Value Chain.

Common Specifications in LCO2 Ship Transportation

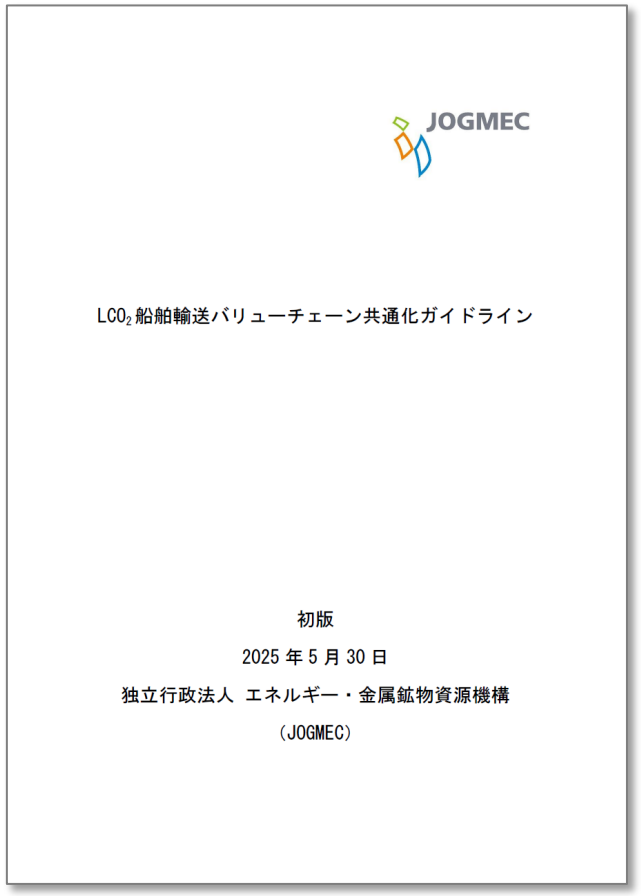
- JOGMEC issued "**Guidelines for Setting Common Specifications in the LCO2 Ship Transportation Value Chain**" in May 2025 to;
  (1) ensure compatibility in discharging and receiving operations and enable shared utilization in LCO2 ship transportation to promote mutual access,
  (2) establish an efficient supply chain, and
  (3) reduce transportation costs.

- The guidelines will be revised as necessary, reflecting the progress of CCS Projects and technological development.

<Scope of the Guidelines>



The Council for Discussion on Common Specifications in LCO2 Ship Transportation Value Chain（2025FY）


JOGMEC

LCO_2船舶輸送バリューチェーン共通化ガイドライン

初版

2025年5月30日

独立行政法人 エネルギー・金属鉱物資源機構

（JOGMEC）

Background

- The first edition of the guidelines (**Guidelines for Setting Common Specifications in the LCO2 Ship Transportation Value Chain**) identified two main outstanding issues primarily due to a lack of technical validation:

  ① **Identification of impurity components and concentration standards for LCO2**

  ② **Development of safe and reasonable loading equipment specifications and identifying flow rate conditions when loading and unloading LCO2**

Purpose of Continuing the Council (2025FY)

- Two ongoing issues require the establishment of specific common specifications, with **impurity components and concentration standards for LCO2 being the top priority.**
- Based on discussions regarding these issues, **the first edition of the guidelines will be updated.**
- JOGMEC will continue to serve as the secretariat for the council.

CCS Business (Pipeline Project) Support Scheme: Outline of Interim Review (1/2)

Support Scheme

- Support will be focused on **cost difference** between **CCS costs** and **costs borne by the emitter to implement CO2 measures**, over the **mid-to-long term (Considering the timeline that those costs are reversed)**

Cost difference = Strike price − Reference price

<Strike price>

Separation/capture cost [/CO2t] (**CAPEX & OPEX** for Separation/capture, set for each separation/capture business operator)

+

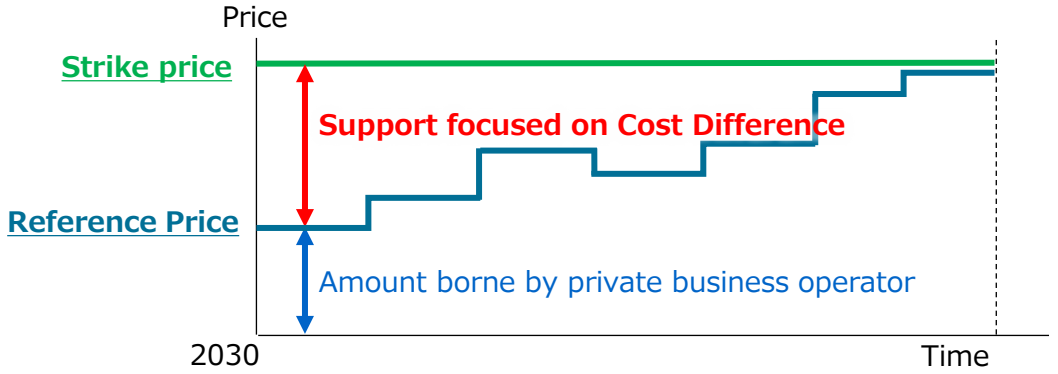
Transport and storage charges [/CO2t] (**CAPEX & OPEX f**or Transport & Storage, **determined by auction**)

*Support items included in the strike price are TBD

<Reference price>

Determined every year by referring the previous fiscal year's **carbon price** in carbon pricing systems

*The carbon pricing benchmarks that should be adopted will require adjustment in accordance with upcoming GX-ETS system design



- To achieve the establishment of a series of CCS businesses in the early 2030s, projects will be selected about **once per year; over multiple years**.
- The CO2 storage capacity to be selected for each fiscal year will be set in advance.
- Selections will be based on an **overall evaluation of the entire business plan** and **transport and storage charges auction** (Successful bidding in the auction will be positioned as one of the necessary items in the evaluation).

(Source: METI, with modifications by JOGMEC)

CCS Business (Pipeline Project) Support Scheme: Outline of Interim Review (2/2)

Mechanisms for Promoting Autonomy after the Support Period (Business Continuity Obligations)

- As a measure **to continuously reduce costs and enhancing CCS business to have autonomy (Become self-sustaining business without subsidy)**, the **business continuity obligations will be established after the support period,** during at most the same length as the support period.

Obligations after the support

Separation/capture business operators:
- CCS at the level equivalent to that during the support period / Substituting CCS with other CO2 reduction measure

Transport and storage operators :
- Acceptance and storage of CO2

*Support period & Obligation period are TBD

Measures for Temporary Suspension and Cross-Chain Risks

- In the event of a **temporary disruption in the supply of CO2 or a suspension in the CO2 transport and storage, if the total amount of support is not expected to change, the support period will be extended for**
  A) the business operator who caused either of disruption or suspension
  B) the business operator who are affected by knock-on effect of the temporary disruption or suspension of CO2*

*In case (B), part of support will be paid in advance if needed to continue the business during the temporary disruption or suspension period

Relationship with the Long-Term Decarbonization Power Source Auction

- To prevent duplication of support in power sector, **supported costs by the Long-Term Decarbonization Power Source Auction* will not be included** in the scope of CCS business support or in the calculation of the strike prices.

*Bidding system to promote new investments in decarbonization power sources

Items for Future Consideration

- **Support scheme for ship transport projects** will be considered in conjunction with issues such as **specification standardization of LCO2 Carrier** and consideration of **efficient and optimal CO2 cargo collection and consolidation**.

(Source: METI, with modifications by JOGMEC)

Upcoming Event (Europe)

2026 Europe Forum on Carbon Capture and Storage

- March 4, 2026 at Brussels, Belgium
- Panel discussions (In-person)
- Evening reception (In-person) sponsored by JOGMEC

Registration
https://www.globalccsinstitute.com/events/2026-europe-forum-on-carbon-capture-and-storage/

Summary

- JOGMEC has conducted various type of CCS initiatives.
- JOGMEC has various expertise and knowledge through financial, technical & intelligence support.
- Through our activities, JOGMEC plays a key role in advancing CCS projects.