

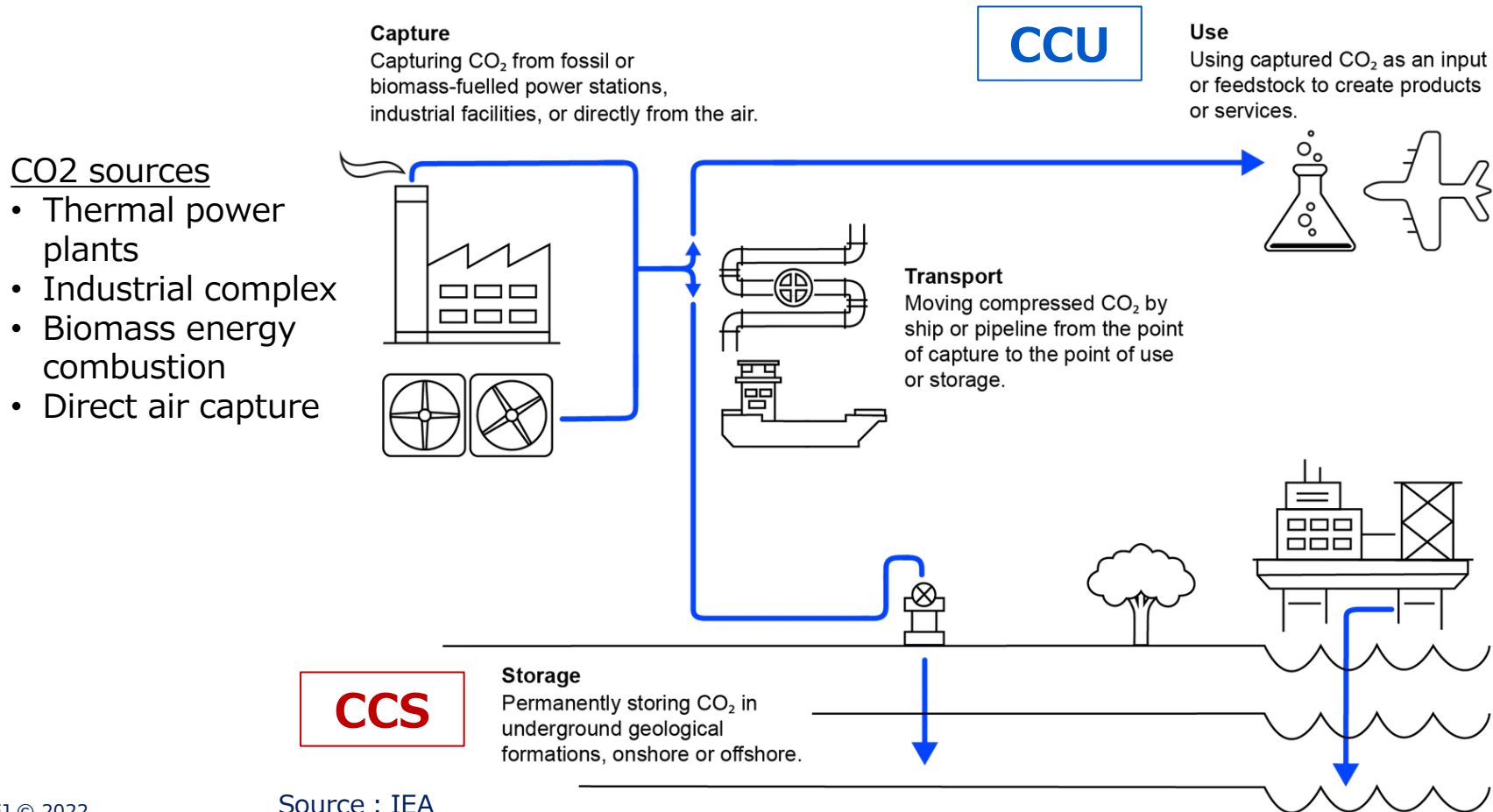
CCUS in Japan and Asia

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CCUS = CCU and/or CCS

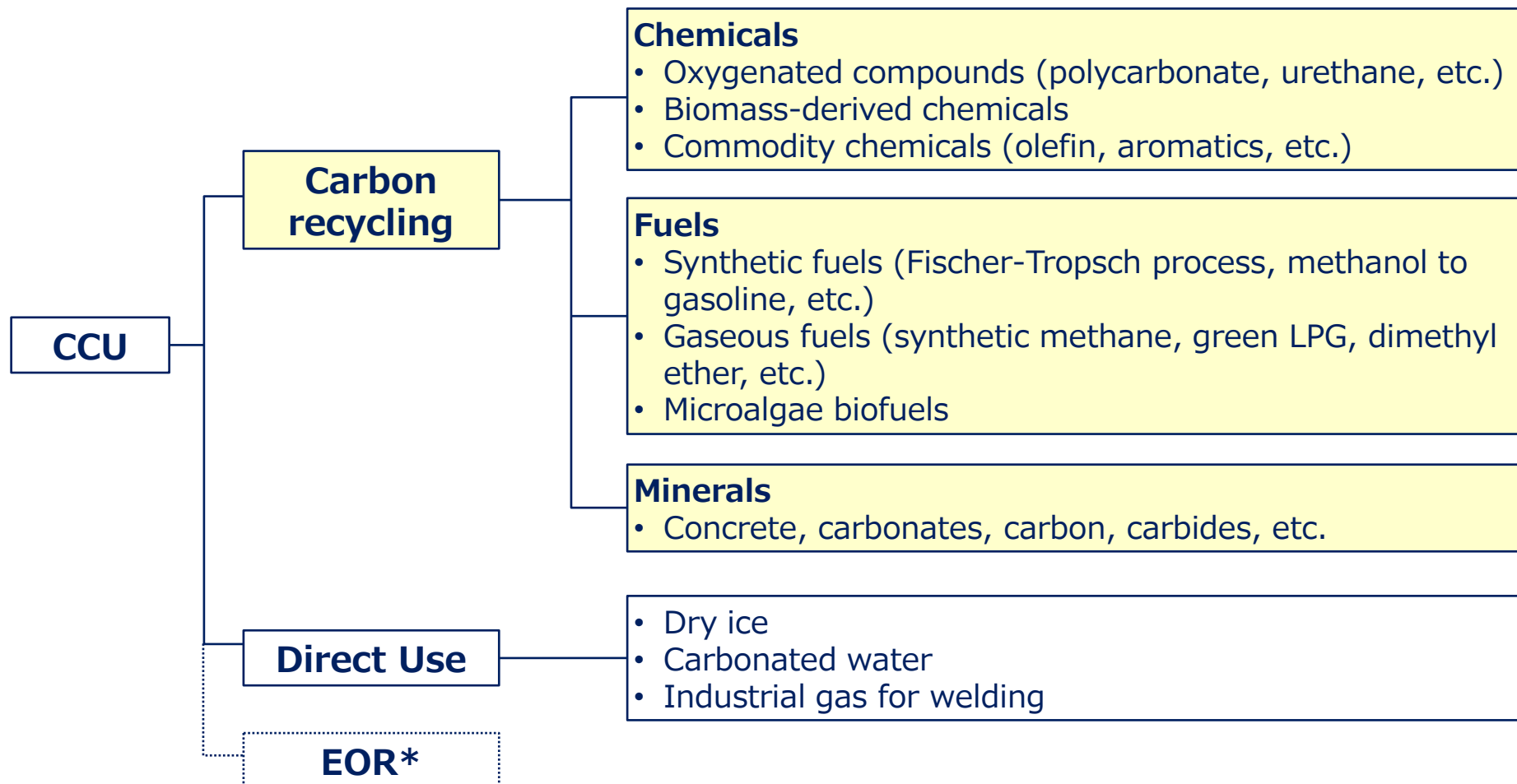
- The term “CCUS” includes two different streams of technologies.
- Japan has seriously explored carbon emissions reduction potential by CCU because of its advanced chemical industries, limited renewable energy resources, few depleted gas fields for CO₂ storage.



Source : IEA

CCU and Carbon recycling

- Among CCU technologies, carbon recycling refers to the technologies that chemically convert CO₂ into a different material



*EOR (Enhanced Oil recovery) is also categorized as CCS. Source : METI; IEEJ

Japan's roadmap of carbon recycling

- Japanese government published its revised roadmap on carbon recycling.
- The roadmap takes a phased approach to support commercialization of carbon recycling technologies.
- Green Innovation Fund has been allocated to R&D of CR technologies.

Difficulty to commercialize (cost)



Until 2030

High-value added products and/or products that do not require hydrogen:

- Chemicals (polycarbonate, etc.)
- Liquid fuels (bio jet fuels, etc.)
- Concrete products (Road curb blocks, etc.)



Until 2040

Products that have large demand and emissions reduction effects

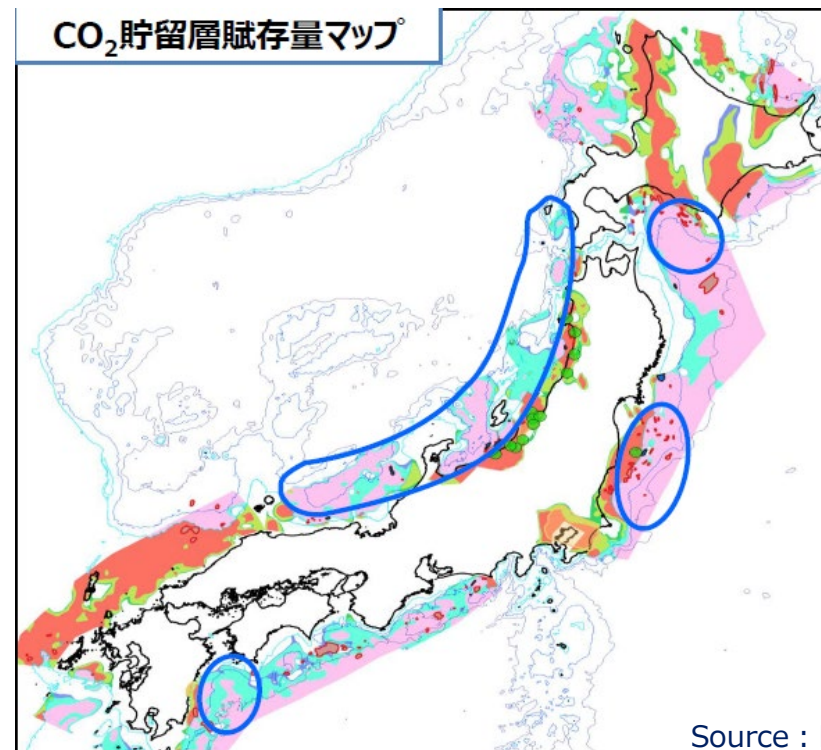
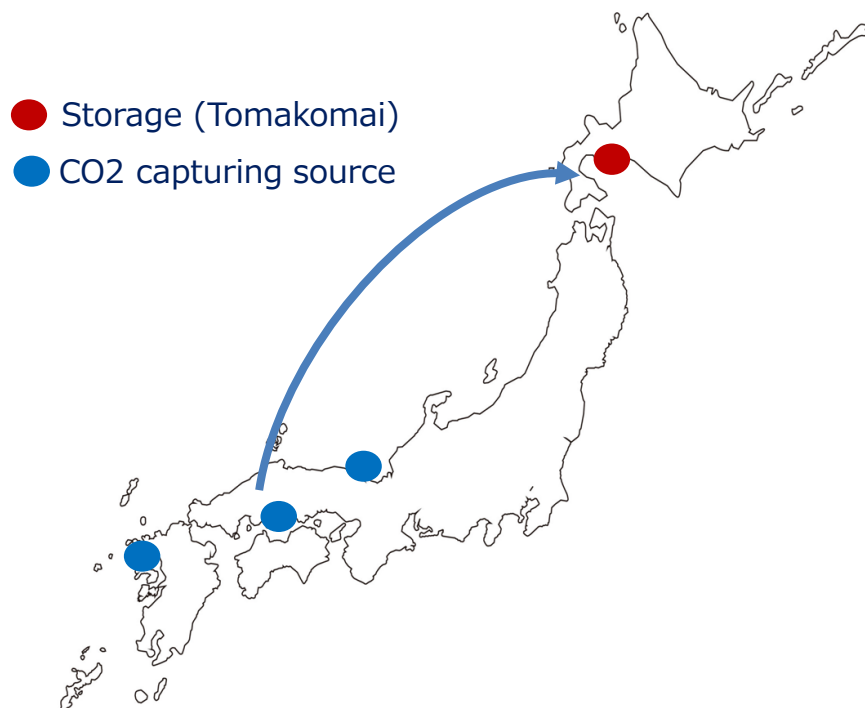
- Commodity chemicals (olefin, aromatics, etc.)
- Fuels (synthetic methane, E-fuels, methanol, etc.)
- Concrete products (commodity)

Demand size



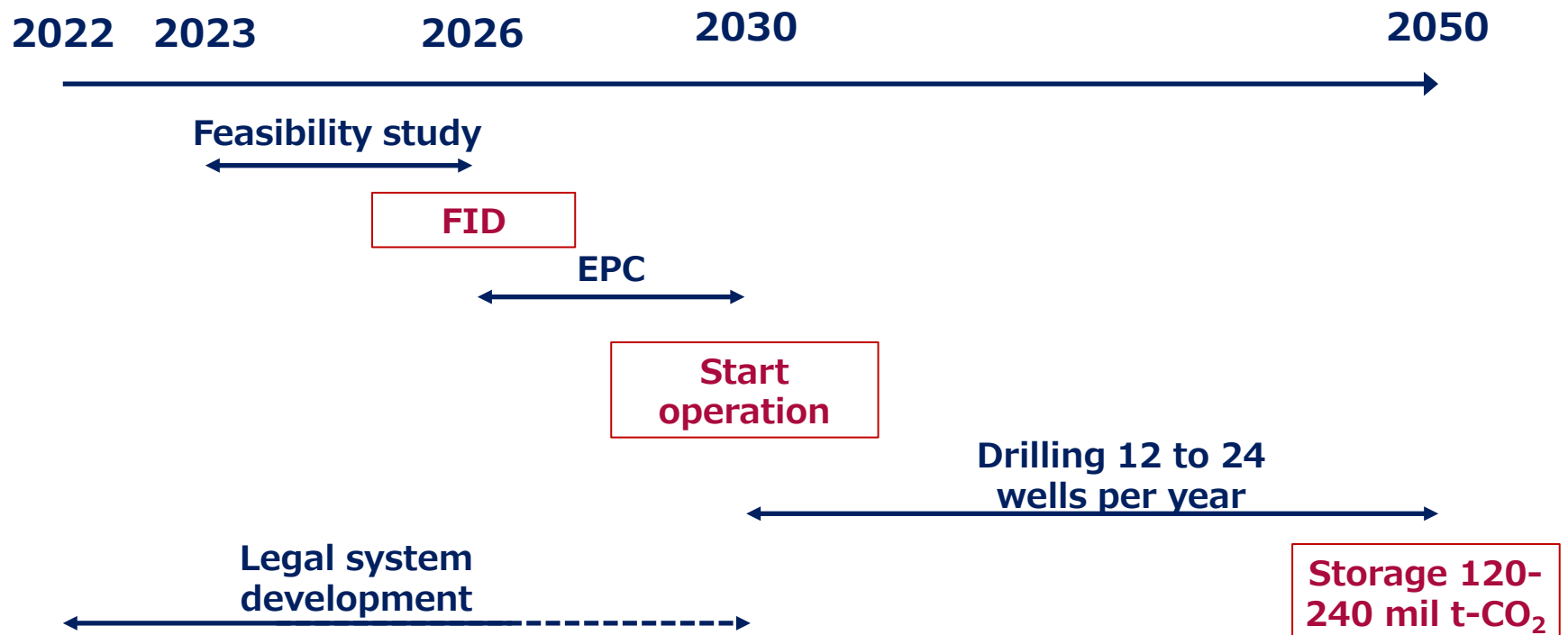
CCS opportunities in Japan

- Japan CCS has conducted pilot test of CCS in Tomakomai Hokkaido.
 - 300 ktons of CO₂ were stored from 2016 to 2019.
- Pilot tests for CO₂ capture and maritime transportation are planned in 2024.
 - CO₂ capture will be conducted in multiple power plants
- Detailed geological survey continues.
 - Storage capacities for 16 billion tons-CO₂ have been estimated.



Japan's CCS roadmap

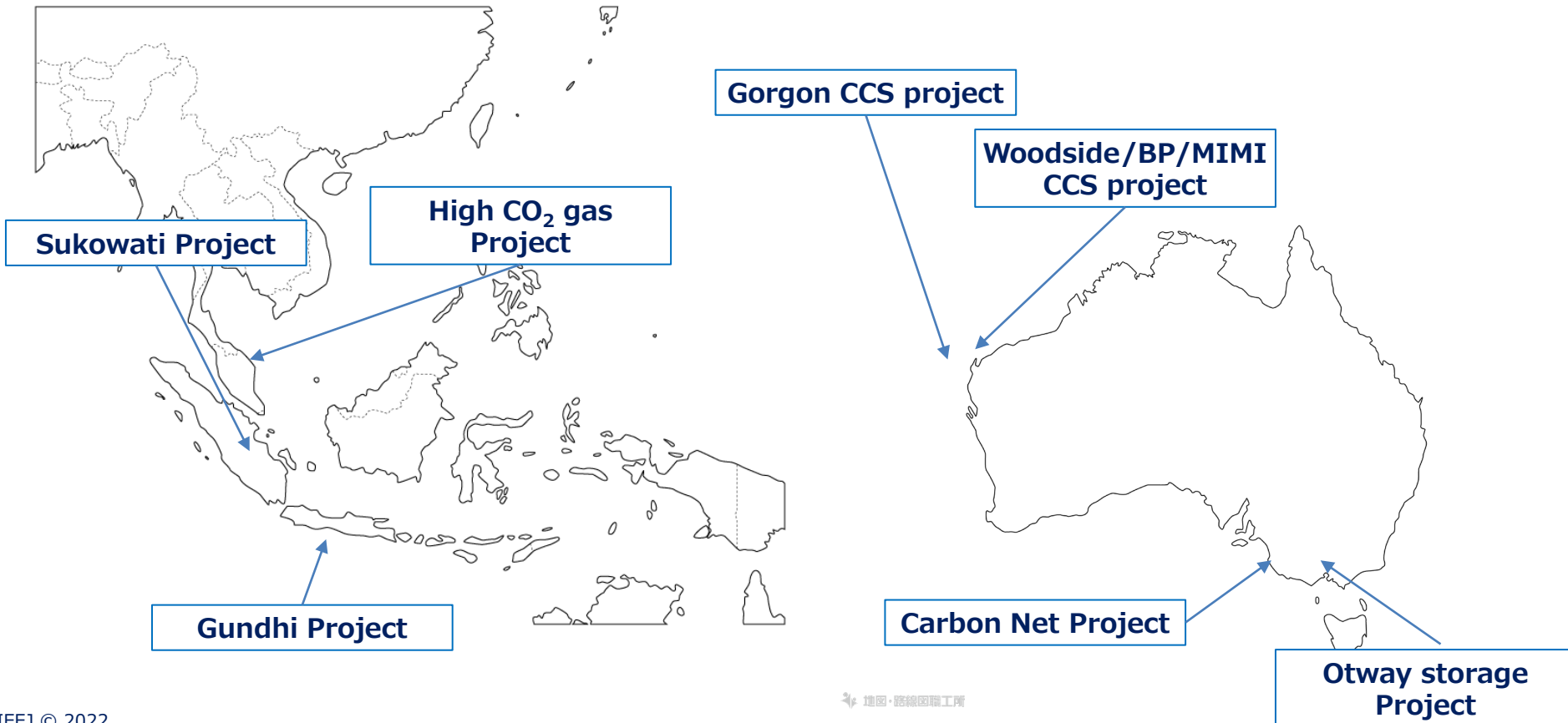
- Targeted storage volume is 120 to 240 million tons- CO₂ per year as of 2050.
- CCS operation plans to be started by 2030, which requires FID by 2026.
 - 12 to 24 CO₂ injection wells will need to be drilled from 2030 to 2050.
- Legal and regulatory frameworks also need to be developed.



CCS activities by Japanese firms

- Japanese firms are involved in various CCS businesses in Southeast Asia and Australia.
- Some of Japanese firms aim to develop cross-border CO₂ shipment and storage network in Asia Pacific.

CCS projects by Japanese firms



Asia CCUS Network

- International industry–academia–government platform aimed at knowledge sharing and improvement of the business environment for utilization of CCUS in Asia.
 - 13 countries' government ministries and more than 200 firms/organizations are the network members.
- The network organizes seminars / workshops as well as its own case study.



Figure 2.2: Map of Java Island, Indonesia, with Coal-fired Power Plants in Operation



Table 2.14: Cost Breakdown Ratio by Component

	Capture	Transportation	Storage
US\$/t-CO ₂	45.92	0.95	15.93
%	73.12	1.52	25.36

Source: Created by the author.

Source : ERIA/MRI

Challenges

- Cost reduction (CO₂ capture, efficiency in the conversion process for carbon recycling, production of clean H₂, etc.)
- Accumulation of CO₂ storage and monitoring expertise.
- Verification system for life-cycle assessment of CO₂ emissions / reduction
- Securing CO₂ storage locations both in Japan and abroad