

Overview of CCS activities on the Joint Crediting Mechanism (JCM)

25th Jan. 2023

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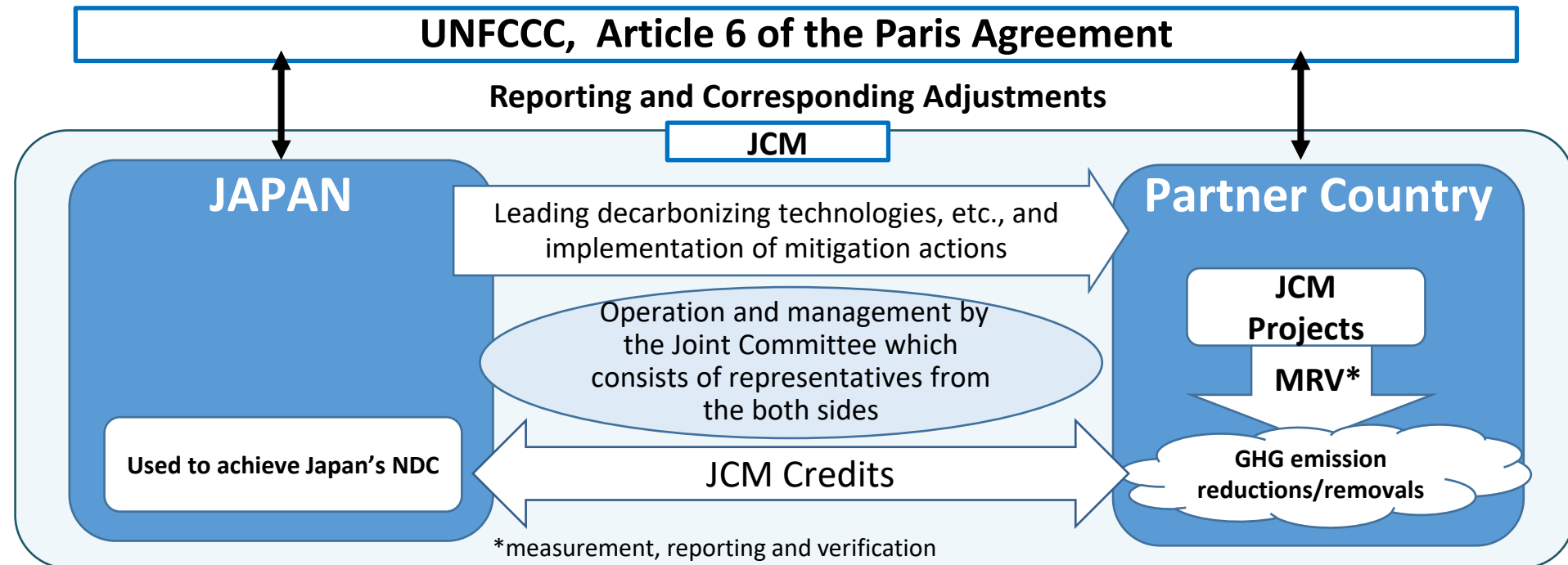
Global Environment Affairs Office

Ministry of Economy, Trade and Industry

1. Overview of JCM

Basic Concept of the JCM

- Facilitate diffusion of leading decarbonizing technologies and infrastructure, etc., through investment by Japanese entities, thereby contributing to GHG emission reductions or removals and sustainable development in partner countries.
- Contribute to the achievement of both countries' NDCs while ensuring the avoidance of double counting through corresponding adjustments.
- Implement the JCM consistent with the guidance on cooperative approaches, referred to in Article 6, paragraph 2 of the Paris Agreement.



JCM Partner Countries (25 countries)



Mongolia

Jan. 8, 2013 (Ulaanbaatar)



Bangladesh

Mar. 19, 2013 (Dhaka)



Ethiopia

May. 27, 2013 (Addis Ababa)



Kenya

Jun. 12, 2013 (Nairobi)



Maldives

Jun. 29, 2013 (Okinawa)



Viet Nam

Jul. 2, 2013 (Hanoi)

*The photo at the time of extension in Oct 2021.



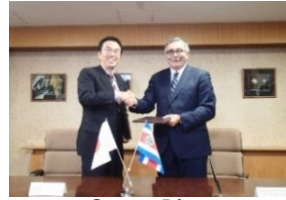
Lao PDR

Aug. 7, 2013 (Vientiane)



Indonesia

Aug. 26, 2013 (Jakarta)



Costa Rica

Dec. 9, 2013 (Tokyo)



Palau

Jan. 13, 2014 (Ngerulmud)



Cambodia

Apr. 11, 2014 (Phnom Penh)



Mexico

Jul. 25, 2014 (Mexico City)



Saudi Arabia

May. 13, 2015



Chile

May. 26, 2015 (Santiago)



Myanmar

Sep. 16, 2015 (Nay Pyi Taw)



Thailand

Nov. 19, 2015 (Tokyo)



Philippines

Jan. 12, 2017 (Manila)



Senegal

Aug. 25, 2022 (Dakar)



Tunisia

Aug. 26, 2022 (Tunis)



Azerbaijan

Sept. 5, 2022 (Baku)



Moldova

Sept. 6, 2022 (Chisinau)



Georgia

Sept. 13, 2022 (Tbilisi)



Sri Lanka

Oct. 10, 2022 (Colombo)



Uzbekistan

Oct. 25, 2022 (Tashkent)



Papua New Guinea

Nov. 18, 2022 (Sharm-el-Sheikh)

Expansion of JCM Partner Countries (June 7, 2022)

The Grand-design and Implementation Plan/Follow-ups of the New Capitalism (Cabinet Decision on June 7, 2022: "For the expansion of the JCM, the government accelerates consultations with relevant countries, aiming to increase the JCM partner countries up to around 30 by 2025."

Projects supported by the JCM financing programs

Renewable Energy



Solar power, FARMLAND Co., Ltd., Chile



Floating Solar PV, TSB Co., Ltd., Thailand



Hydro Power Plant, Toyo Energy Farm Co., Ltd., Indonesia



Biomass Co-Generation System, Fuji-Foods Coporation, Thailand



Binary Power Generation Project at Geothermal Power Plant, MHI, Ltd., Philippines

Energy efficiency [Consumer sector]



High-efficiency refrigerator, Mayekawa MFG, Indonesia



Energy saving at convenience stores, Panasonic, Indonesia



High-efficiency air-conditioning system, Hitachi, Daikin, Vietnam

Energy efficiency [Industrial sector]



Optimization in petroleum refining plant, Yokogawa Electric Corp. Indonesia

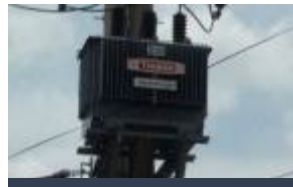


Energy-saving of mobile communications base transceiver stations, KDDI Corp. Indonesia

Energy efficiency [Urban sector]



LED street lighting system with wireless network control, MinebeaMitsumi, Cambodia



Amorphous transformers in power distribution, Hitachi Materials, Vietnam

Waste



Power Generation with Methane Gas Recovery System, NTTDATA, Mexico



Waste to Energy Plant, JFE engineering, Myanmar

Transport



CNG-Diesel Hybrid Public Bus, Hokusan Co., Ltd., Indonesia

Japan's Nationally Determined Contribution (NDC)

Japan's NDC

(Decided on October 22, 2021)

Japan aims to reduce its greenhouse gas emissions **by 46 percent in fiscal year 2030 from its fiscal year 2013 levels**, setting an ambitious target which is aligned with the long-term goal of achieving net-zero by 2050. Furthermore, Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emission by 50 percent.

Description about the JCM

Japan's Greenhouse Gas Emission Reduction Target

- Japan aims to contribute to international emission reductions and removals at the level of a cumulative total of approximately 100 million t-CO₂ by fiscal year 2030 through public-private collaborations. Japan will appropriately count the acquired credits to achieve its NDC.

Information to facilitate clarity, transparency and understanding

- With regards to the JCM which Japan has initiated to establish, Japan secures environmental integrity and the avoidance of double-counting in line with the international rules including the Paris Agreement. Also, based on its experience in the JCM, Japan intends to lead international discussions, thereby contributing to the development of appropriate international rules for the use of market mechanism.

Project Cycle of the JCM and the CDM

JCM

<Main actors at each process>

CDM

Project Participant / Each Government
Joint Committee

Submission of
Proposed
Methodology

Project Participant

Joint Committee

Approval of
Proposed
Methodology

CDM Executive Board

Project Participant

Development
of PDD*

Project Participant

*PDD: Project Design Document

Third Party Entities

Validation

Designated Operational Entities
(DOEs)

Joint Committee

Registration

CDM Executive Board

Project Participant

Monitoring

Project Participant

Third Party Entities

Verification

DOEs

Joint Committee decides the amount
Each Government issues the credit

Issuance
of credits

CDM Executive Board

Can be conducted by the same TPE
Can be conducted simultaneously

METI's support for the JCM partner countries

- METI supports the introduction of **advanced decarbonizing technologies through Demonstration Projects** which contribute to the decarbonization of the JCM partner countries.
- The project cost burdened by Japanese side is **100% supported by Japanese government (METI/NEDO).**

Examples of past projects



Optimization in petroleum refining plant, Yokogawa Electric Corp. Indonesia



Energy-saving of mobile communications base transceiver stations, KDDI Corp. Indonesia

Total: 11 projects in 6 countries (As of Jan. 2023)

JCM Feasibility Study by METI



Scope:

- Consider basic elements of the demonstration (technology, project site, stakeholders, etc.)
- Establish the basis of JCM methodology for quantification of the GHG emission reduction
- Study the possibility of dissemination of the introduced technology
- Project cost: approx. 120 thousand USD per study

Project period:

Up to 1 year

Assumed technical areas: Energy efficiency with IoT, EMS, Renewable energy, CCS/CCUS, Hydrogen/Ammonia, etc.

JCM Demonstration Projects by NEDO (*)



Scope:

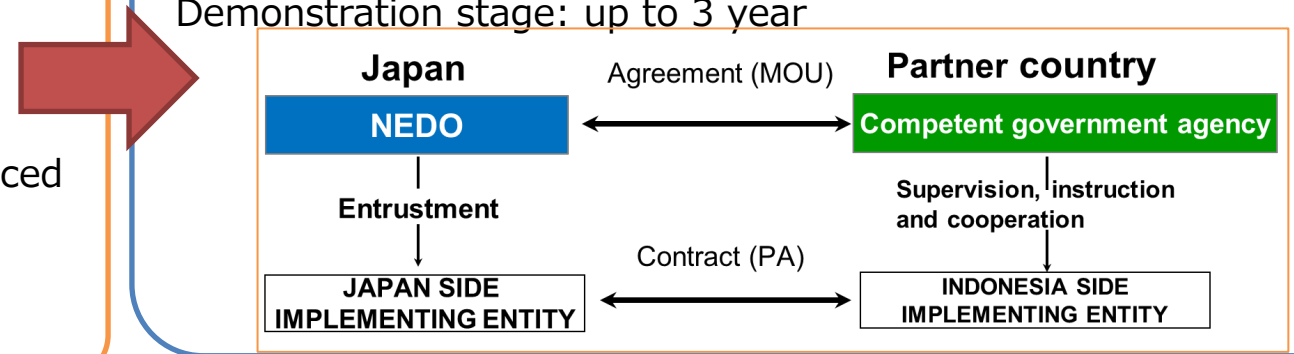
Demonstrate and verify the effectiveness of advanced decarbonizing technology:

- Introduction of relevant facilities and systems, and conduct demonstration
- Quantification of GHG emission reduction effectiveness
- JCM procedure toward issuance of JCM credits
- Budget for FY 2022: 1.1 billion JPY (approx. 10.2 million USD)

Project period:

Pre-demonstration stage: up to 1 year

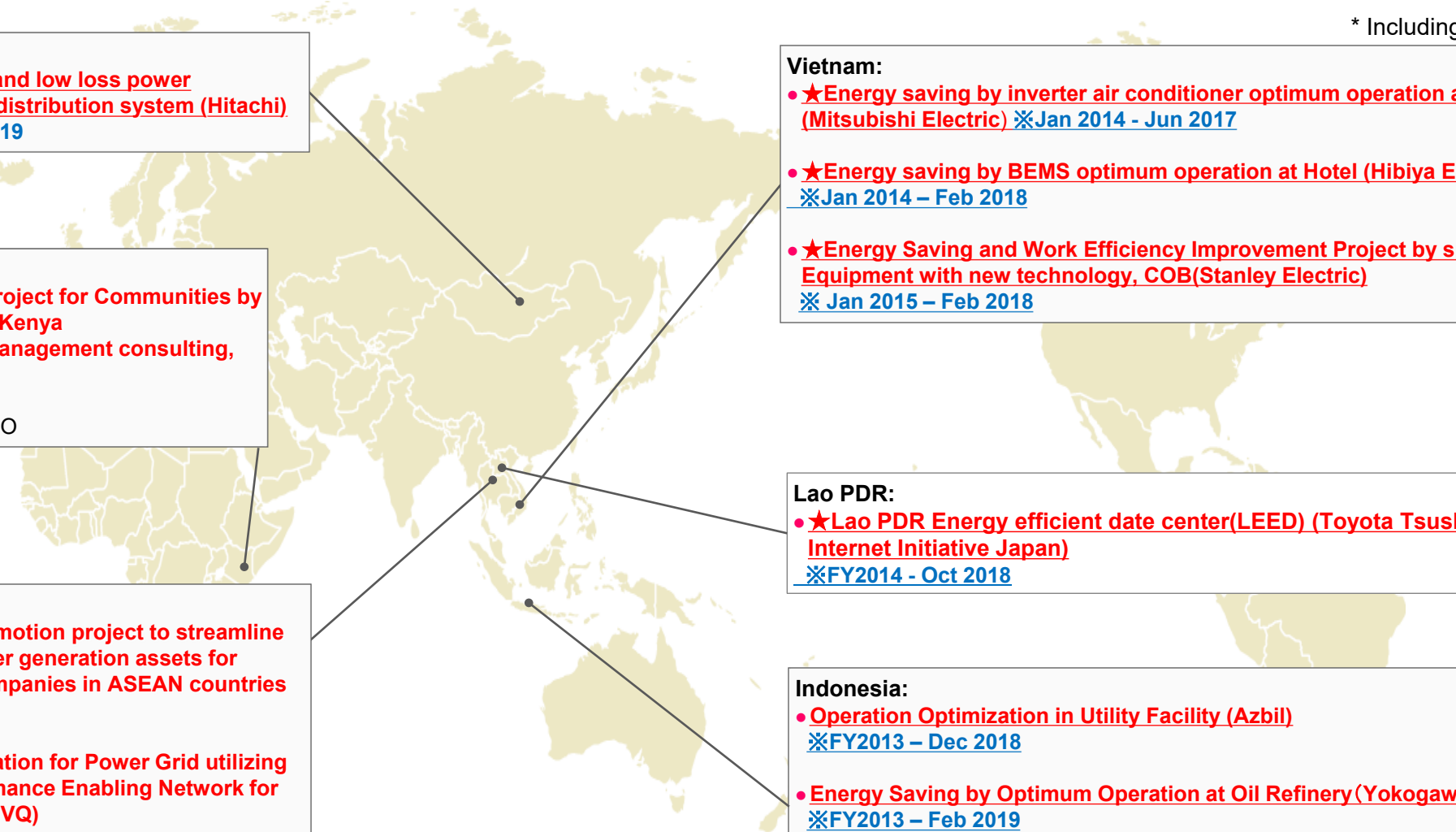
Demonstration stage: up to 3 year



* NEDO = New Energy and Industrial Technology Development Organization

Demonstration Projects by METI* (as of January 2023)

* Including NEDO and UNIDO



Mongolia:

- ★ High efficiency and low loss power transmission and distribution system (Hitachi)
※FY2013 – Feb 2019

Vietnam:

- ★ Energy saving by inverter air conditioner optimum operation at National Hospital (Mitsubishi Electric) ※Jan 2014 - Jun 2017
- ★ Energy saving by BEMS optimum operation at Hotel (Hibiya Engineering)
※Jan 2014 – Feb 2018
- ★ Energy Saving and Work Efficiency Improvement Project by special LED Equipment with new technology, COB(Stanley Electric)
※ Jan 2015 – Feb 2018

Kenya:

- Rural Electrification Project for Communities by Micro Hydro Power in Kenya (NTT Data Institute of Management consulting, Inc.)
※FY2012 – Feb 2019
※implemented by UNIDO

Lao PDR:

- ★ Lao PDR Energy efficient data center(LEED) (Toyota Tsusho Corporation, Internet Initiative Japan)
※FY2014 - Oct 2018

Thailand:

- IoT utilization promotion project to streamline and advance power generation assets for electric power companies in ASEAN countries (Marubeni)
※FY Feb 2019 –
- Low-carbon Operation for Power Grid utilizing Optimized Performance Enabling Network for Volt/Var(Q) (OPENVQ)
※FY Feb 2020 –

Indonesia:

- Operation Optimization in Utility Facility (Azbil)
※FY2013 – Dec 2018
- Energy Saving by Optimum Operation at Oil Refinery (Yokogawa)
※FY2013 – Feb 2019
- The low carbonization of mobile communication's BTS (Base Transceiver Station) by the Introduction of "TRIBRID system" (KDDI)
※FY2015 – Feb 2019

Total: 11 projects (6 countries)

- Underlined projects, one in Mongolia, three in Vietnam, one in Lao PDR, three in Indonesia, one in Kenya were registered as JCM projects.
- Projects with "★" are those which JCM credits have been issued.

Activities to achieve the 100 million t-CO₂ reduction on JCM

Raising JCM's international recognition

- Continuous implementation of JCM under Article 6.2 of Paris Agreement

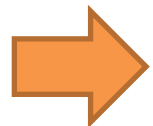
Expansion of JCM partner countries

- up to around 30 countries by 2025

Scale-up of JCM projects and diversification of funding sources

Development of large scale JCM projects;

- Large-scale Renewable energy
- **CCS**
- Hydrogen/ fuel-ammonia



METI is focusing on the realization of **CCS projects under JCM.**

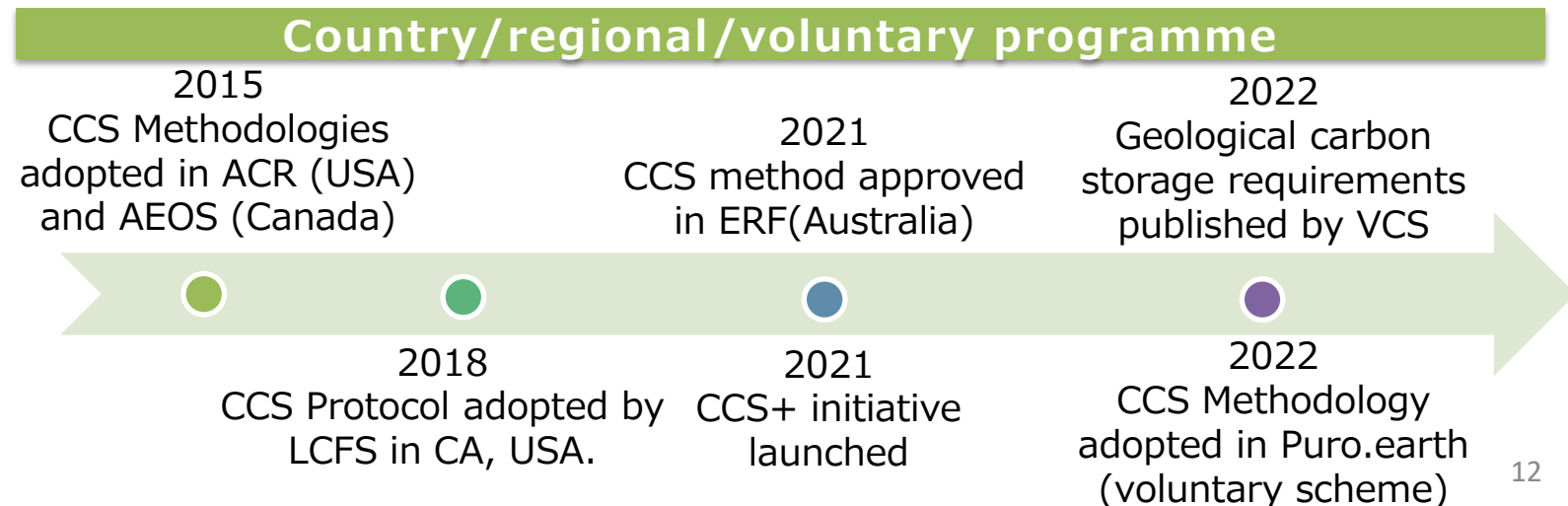
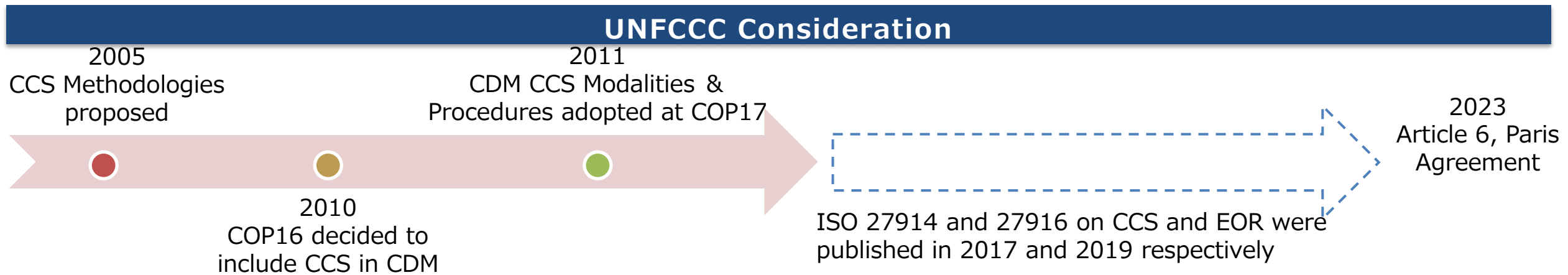
1. **Feasibility studies of potential CCS projects**
2. **Revision of JCM Rules & Guidelines to include CCS in JCM scope**

2. Overview of CCS activities

- (1) Development of potential CCS projects**
- (2) Revision of JCM Rules & Guidelines

Development of methodologies on Carbon Capture and Storage (CCS)

- CDM established the documents of rules for CCS; however, projects did not progress due to strict conditions for host countries and project participants.
- On the other hand, ISO standardization and studies of credit systems in each country have progressed toward achieving carbon neutrality.



ACR: American Carbon Registry
AEOS: Alberta Emissions Offset Scheme
ERF: Emissions Reduction Fund
LCFS: Low Carbon Fuel Standard

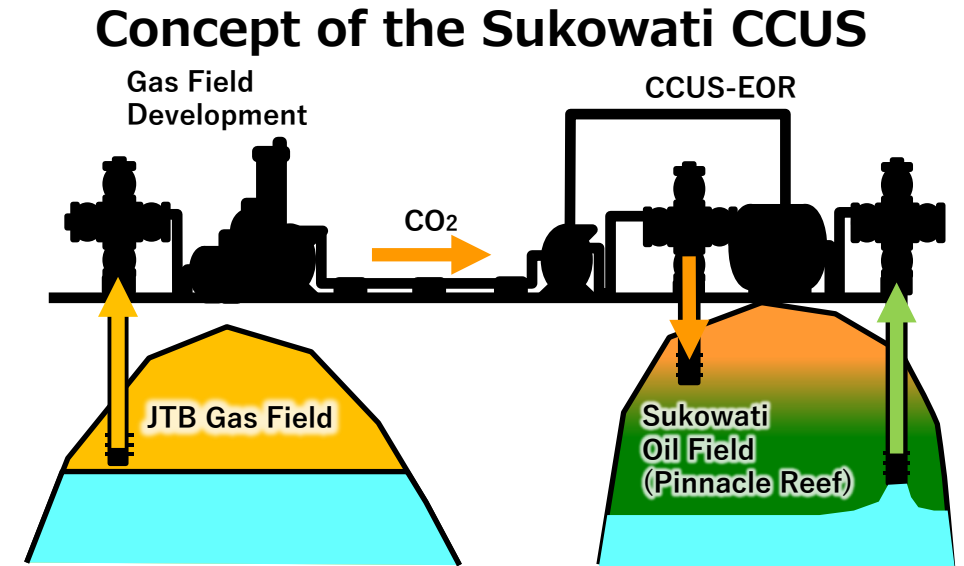
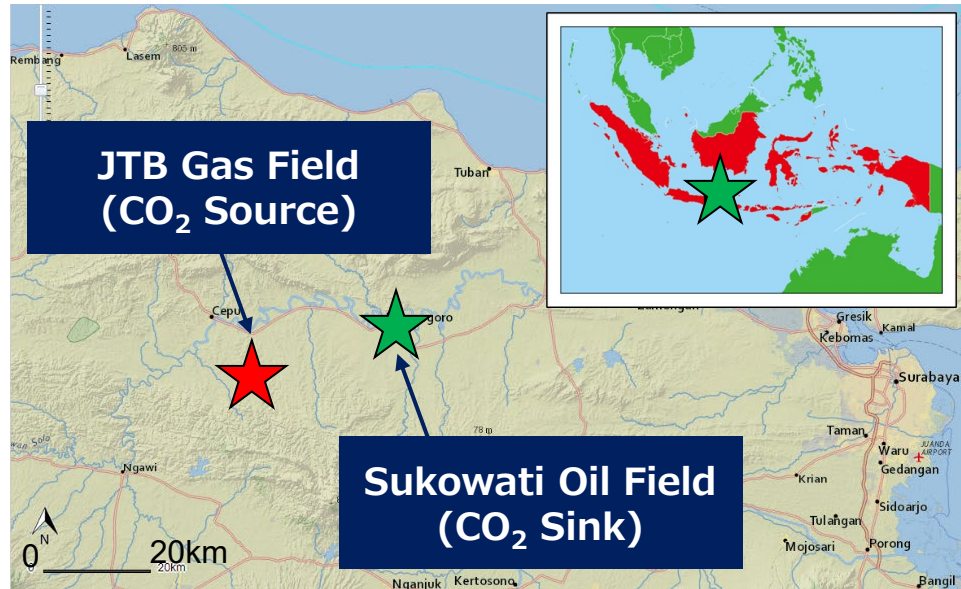
The feasibility studies for CCS project on JCM scheme

- METI has been supporting the feasibility studies of potential CCS projects in METI's JCM-FS program since 2019. In 2022, three projects are ongoing.
- After the feasibility studies, it is expected to move on to the demonstration stage for the realization of CCS projects.

Project in JCM-FS program 2022FY

No.	Project name	Country	Companies
1	CCUS Project at Sukowati Oil Field in Indonesia	Indonesia	Japan Petroleum Exploration Co., Ltd. (JAPEX) JGC CORPORATION
2	CCS Project in Gundih Gas Field in Indonesia	Indonesia	JGC HOLDINGS CORPORATION J-Power
3	CCS at Arthit gas producing field in Thailand	Thailand	Mitsui Oil Exploration Co., Ltd. Mitsui & Co., Ltd.

1. CCUS Project at Sukowati Oil Field in Indonesia



CO₂ Storage Capacity & Injectivity Assessment

Risk Assessment of Geological Integrity and Wellbore Integrity

Comprehensive Monitoring System for CO₂ Storage Complex

Design for Supercritical CO₂ Pipeline

JCM CCUS Methodology / Economic Evaluation

- ◆ To reduce CO₂ emissions in Indonesia, feasibility studies of the Sukowati CCUS have been conducting since 2019.
- ◆ Pertamina, Lemigas and Japex signed MOU in June 2021. Our study indicates that Sukowati is a prospective site for CCUS storage.
- ◆ Appropriate subsurface technology and experience of field operation will be required to reduce the risk of CO₂ storage and operate it safely.
- ◆ These challenges will be resolved through close cooperation between the two countries.
- ◆ Viewing possibility of Asia CCS/CCUS network.

Concept
Creation

Feasibility
Study

Pilot Test

Development
Prep

Development
Commercial

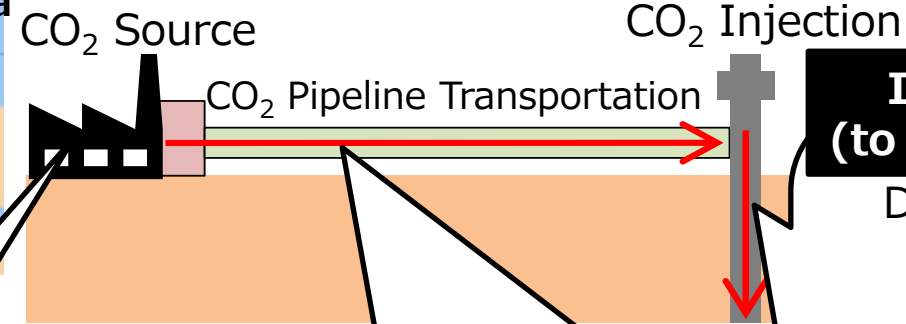
2. CCS Project in Gundih Gas Field in Indonesia

- Annually 300,000 tons of CO₂ to be captured, to be transferred and injected underground.
- Significantly low cost.

Location

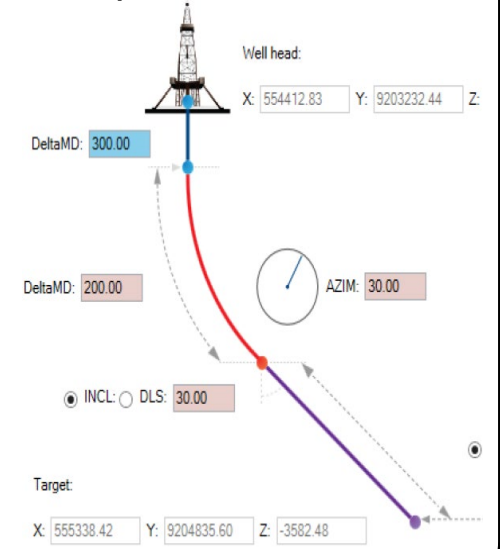


Gundih Gas Field, Central Java, Indonesia



Injection well (to be constructed)

Depth 3,600 m



Gas processing plant (in operation)

300,000 tons of CO₂ separated from production gas and released into the air



CO₂ Pipeline (to be constructed)

Distance: Approximately 4 km (onshore) from gas processing facility to injection well



Gas processing plant

Injection well

CCS projects in Indonesia

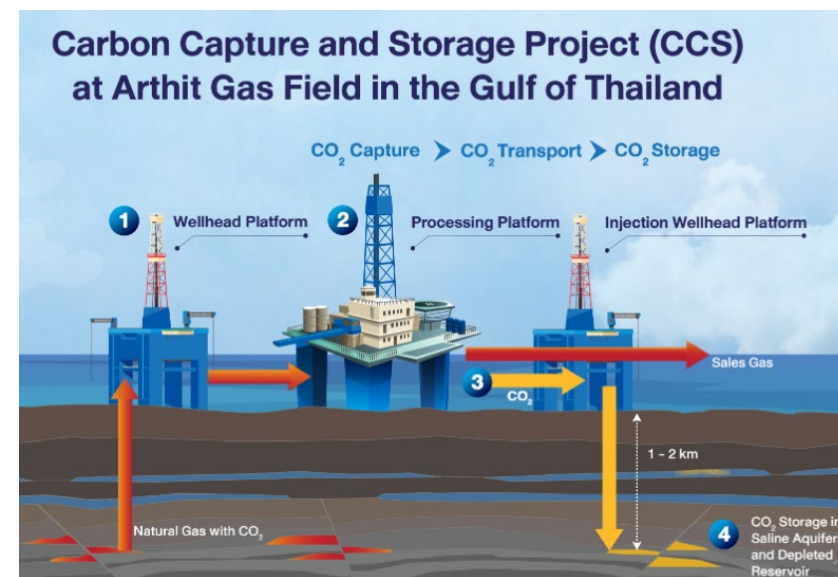
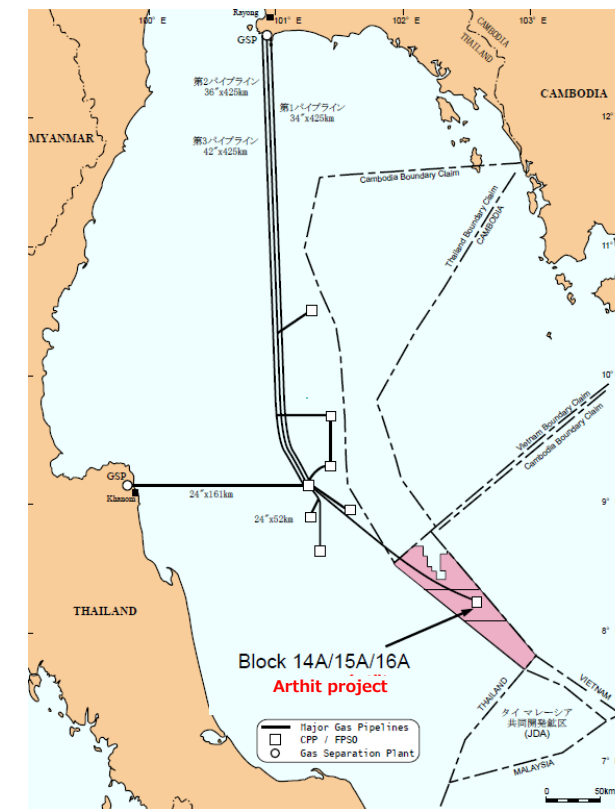
Status of CCS/CCUS Projects in Indonesia *August 2022*

No	Projects	Conducted by	Status	Onstream Target Schedule	CO2 Stored Potential
1	Tanggung EGR/CCUS	bp Berau Ltd., study was conducted by CoE-ITB	FEED Preparation POD Ubadari dan Vorwata EGR/CCUS has been approved	2026/2027	25 to 33 million tCO2 for 10 to 15 yrs
2	Gundih CCUS/CO2-EGR	Pertamina, CoE ITB, JGC, J-Power, JANUS & Supported by METI Japan	Phase-2 Study to mitigate uncertainties & risks	2026	3 million tCO2 for 10 yrs
3	Sukawati CO2-EOR	Pertamina, LEMIGAS, JAPEX & Supported by METI Japan	<ul style="list-style-type: none"> Subsurface Study by Pertamina Study CO2-EOR as CCUS by Pertamina, LEMIGAS, JAPEX 	<ul style="list-style-type: none"> Pilot Test 2026-2027 Full Scale: 2031 	7 to 14 million tCO2 for 15 yrs (base case 10 million tCO2)
4	CCS Sakakemang	Repsol Sakakemang B.V.	<ul style="list-style-type: none"> Site selection & characterization Preparing Lab test for Feasibility 	2027	30 million tons of CO2 emissions for 15 years
5	Abadi CCS/CCUS	Inpex Masela Ltd.	FS with ITB (Completed on July 2022)	-	70 million ton of Native CO2 by 2055
6	Joint Study Blue Ammonia & CCS in Central Sulawesi	Pertamina & PT. Panca Amara Utama, JOGMEC, Mitsubishi, ITB	<ul style="list-style-type: none"> JSA Finalization Preparing required data by Pertamina 	FS (July 2023)	19 million tCO2 for 20 yrs
7	East Kalimantan CCS/CCUS Study	PT. Kaltim Parna Industri & ITB	Pre – Feasibility Study (surface facilities)	2028	10 million tCO2 for 10 years
8	Study of CCUS for Coal to DME	Pertamina & Chiyoda Corporation	Joint Study Agreement (JSA) has been signed, Preparing access data & CA	FS (Dec 2023)	26 or 131 million tCO2 for 20 years, depends on scenarios
9	Arun CCS	Carbon Aceh & PEMA	<ul style="list-style-type: none"> MoU Carbon Aceh-PEMA has been signed Preparing for Joint Feasibility Study (Expected to be started in 2022) 	2028	-
10	Ramba CCUS (CO2-EOR)	Pertamina	Internal study	2030	-
11	Central Sumatera Basin CCS/CCUS Regional Hubs	Pertamina & Mitsui	Preparing required data & CA	2028	-
12	East Kalimantan & Sunda Asri Basin - CCS/CCUS Regional Hubs	Pertamina & ExxonMobil	Subsurface Evaluation	2028	-
13	CO2 Capture & Utilization to Methanol - RU V Balikpapan	Pertamina & Air Liquide	JSA has been signed, Joint Study until 2023	2028	-
14	CCUS Study	Pertamina & Chevron	Discussion on field candidate, preparing JSA	-	-
15	Pilot Test CO2 Huff and Puff Jatibarang	Pertamina & Region 2 – Zona 7	Validating the simulation result & preparing injection well, JSA with JOGMEC has been signed	Pilot Test W4 Oct 2022	-

Source: "PROGRESS OF CCS/CCUS IMPLEMENTATION IN INDONESIA" by MEMR, Republic of Indonesia, at the Second Asia CCUS Forum, Sep. 30, 2022

3. CCS at Arthit gas producing field in Thailand

Item	Remark
1. Location	Block 14A/15A/16A in Gulf of Thailand (Country: Thailand)
2. Project owner	PTTEP : 80% (Operator) Chevron : 16% Moeco Thailand : 4%
3. Status	Gas producing
4. CCS plan	<p>Scheme Inject CO₂, which is associated with produced gas and currently being flared at the field, into aquifer and depleted reservoir in the field</p> <p>Purpose Achieve lower CO₂ emission during petroleum production process & recover/sell more hydrocarbon which is currently being flared with CO₂</p>
5. Estimated CO ₂ reduction by CCS	700,000-1,000,000 tons/annum
6. Estimated CCS schedule	2022-2023 Regulatory consideration/discussion & subsurface/well engineering/surface study (including FEED) 2023 4Q FID 2026 1st injection



Source: PTTEP website

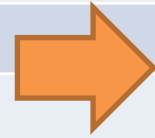
2. Overview of CCS activities

- (1) Development of potential CCS projects
- (2) Revision of JCM Rules & Guidelines**

Revision of JCM Rules & Guidelines

Current Sectoral Scopes for the JCM (In the case of Indonesia-Japan JCM)

1. Energy industries (renewable - / non-renewable sources)
2. Energy distribution
3. Energy demand
4. Manufacturing industries
5. Chemical industry
6. Construction
7. Transport
8. Mining/Mineral production
9. Metal production
10. Fugitive emissions from fuels (solid, oil and gas)
11. Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride
12. Solvents use
13. Waste handling and disposal
14. Reducing Emissions from Deforestation and Forest Degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD-plus)
15. Agriculture



CCS project is not included in the scope of JCM.

Revision of JCM Rules & Guidelines

- The documents of JCM Rules & Guidelines are established with each JCM partner country. However, CCS projects are not covered in these documents.
- On the other hand, in the JCM with Cambodia and Lao PDR, additional documents have been developed for REDD+ projects.

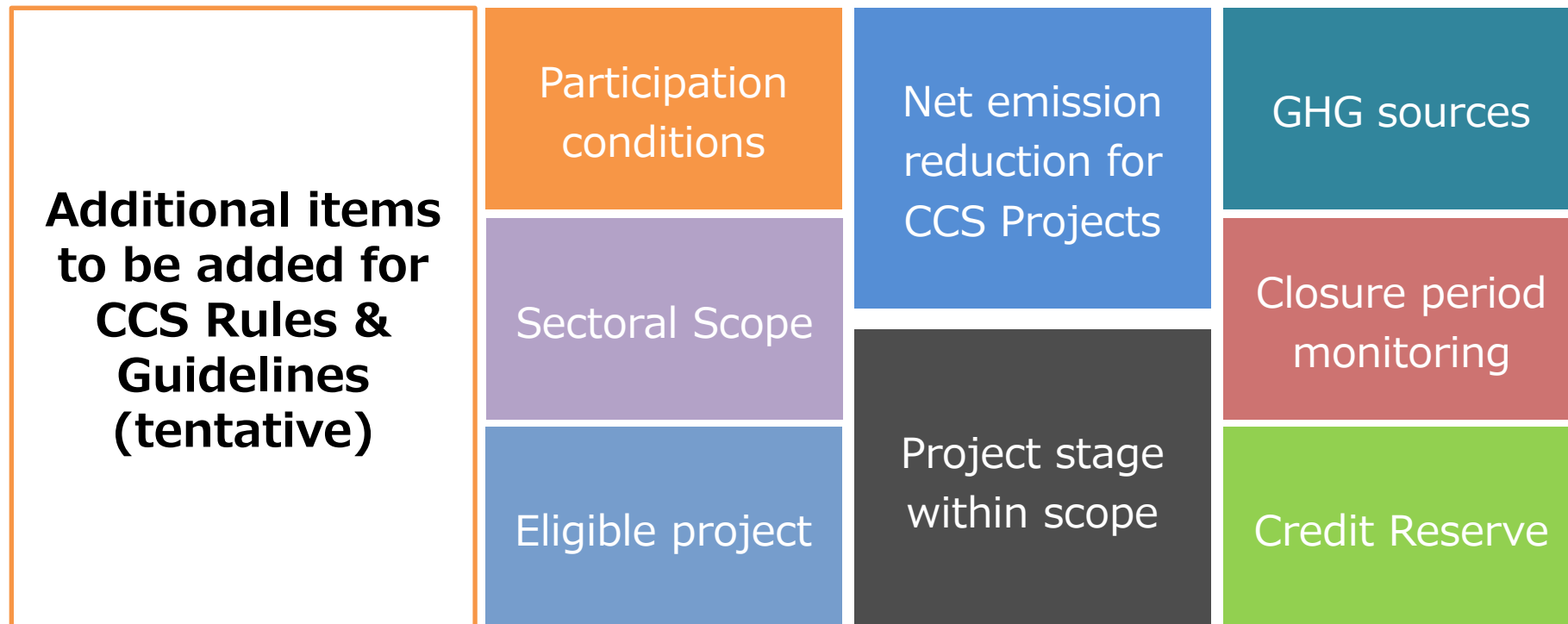
Current Rules & Guidelines of JCM:

General	Project Cycle	Third Party Entity	Joint Committee
<ul style="list-style-type: none">✓ Bilateral document✓ Rules of Implementation✓ Glossary of Terms✓ Common Specifications of the JCM Registry	<ul style="list-style-type: none">✓ Project Cycle Procedure✓ Guidelines for Developing Proposed Methodology✓ Guidelines for Developing Project Design Document and Monitoring Report✓ Guidelines for Developing Sustainable Development Contribution Plan and Report	<ul style="list-style-type: none">✓ Guidelines for Designation as a Third-Party Entity✓ Guidelines for Validation and Verification	<ul style="list-style-type: none">✓ Rules of Procedures for the Joint Committee

* The red part indicates that a new institutional document has been established for JCM-REDD+.

Revision of JCM Rules & Guidelines

- Toward the start of CCS projects in JCM, JCM Rules & Guidelines is being revised starting in 2021 so that CCS projects will be covered in JCM.
- Additional items for the “CCS Rules & Guidelines” have been already extracted. Based on these results, specific requirements are currently being considered.
- The Rules & Guidelines will refer ISO27914/27916.



Eligible project

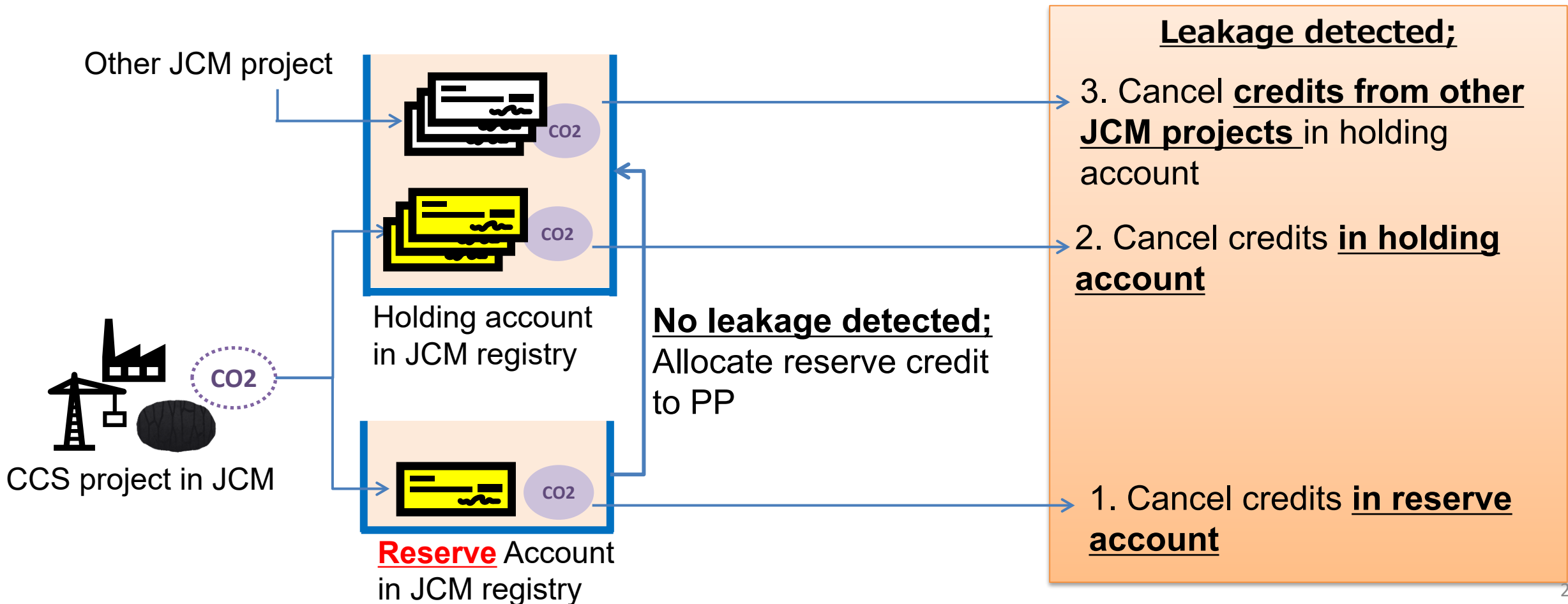
- Below types will be covered;
 - CCS
 - Enhanced Gas Recovery (EGR)
 - Enhanced Oil Recovery (EOR)
- CCU (Carbon Capture and Utilization) will not be covered at this moment.

Closure period monitoring

- In principle, **duration of closure period should be determined in accordance with host country or region's regulation.**
- In case there are no such regulations in host country or region, the duration necessary to determine that there are no detectable long-term leakage of CO₂ should be established.

Credit Reserve

- Taking into consideration post-injection leakage risk, the credit reserve is one of the options.
- A portion of verified credits is subtracted from issued credits as reserve.
- The corresponding reserve credits will be canceled when CO2 leakage is detected, and if no leakage is detected, remaining credits in reserve account will be distributed to PP.



Closing

- In order to expand JCM toward the goal of “the 100 million t-CO₂ reduction in JCM”, it is essential to realize CCS projects under JCM.
- METI is working on the development of potential CCS projects through JCM Feasibility studies, toward moving on to the demonstration stage. Also, JCM Rules & Guidelines is being revised so that CCS projects will be covered in JCM.
- Current target year is 2026; we will continue our activities toward the realization of CCS projects through the demonstration stage and issuance of CCS credits in JCM. Also, we expect the proposition of another CCS projects in JCM based on these experiences.

Thank you.

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