

JCCS



[www.japanccs.com](http://www.japanccs.com)

# A MESSAGE FROM THE PRESIDENT

## From Japan to the World

### ~ with a view towards the social implementation of CCS ~

The expectations towards CCS as a global warming countermeasure are increasing internationally year by year. In the Energy Technology Perspectives 2023, published in January 2023, the IEA (International Energy Agency) projected the contribution needed from CCUS to achieve net zero emissions in 2050 to be 6.2 gigatons of CO<sub>2</sub> per year in its Net Zero Scenario.

In Japan, the Ministry of Economy, Trade and Industry published the “Final Summary of the CCS Long Term Roadmap” in March 2023, and efforts aiming to secure 13 million tonnes of annual CO<sub>2</sub> storage by 2030 are being pursued by the 7 model projects adopted as advanced CCS projects.



Looking back to 2008, Japan CCS Co., Ltd. (hereinafter JCCS) was established through investment by the private sector in response to the national policy to promote CCS. Currently, as projects commissioned by the Japanese government and public institutions, JCCS is engaged in four projects; large-scale CCS demonstration in Tomakomai, Hokkaido, investigation of potential offshore CO<sub>2</sub> storage sites, CO<sub>2</sub> ship transportation demonstration, and survey of the production of sustainable aviation fuel.

The Tomakomai CCS Demonstration Project was commenced in 2012, and with the understanding and cooperation of the local community, the project safely achieved the target of 300,000 tonnes cumulative sub-seabed CO<sub>2</sub> injection in November 2019, confirming that “CCS is a safe and secure system”. In the investigation of potential offshore CO<sub>2</sub> storage sites which was started in FY2014, surveys of each site were conducted steadily, and the results have been reflected in the CCS Long Term Roadmap. Furthermore, in the CO<sub>2</sub> ship transportation demonstration project from FY2021, we have commenced construction of facilities that will enable bi-directional transportation of liquefied CO<sub>2</sub> between the Maizuru and Tomakomai terminals. In addition, we have also been participating in the survey of the production of sustainable aviation fuel since FY2021.

Aiming for carbon neutrality in 2050, we view as our mission the contribution towards the realization of the national policy to establish the social foundation for CCUS by 2030. To this end, harnessing the technology and know-how that we have nurtured on CCS, we will unite our efforts to continue our role in reaching out to the international community.

We ask for your continued understanding and support.

June 2023

**Toshiaki Nakajima**

President

Japan CCS Co., Ltd.

# COMPANY PROFILE

Company Name:	Japan CCS Co., Ltd.
Address:	SAPIA TOWER 21F, 1-7-12 Marunouchi, Chiyoda-ku, Tokyo 100-0005 Japan
URL:	<a href="https://www.japanccs.com">https://www.japanccs.com</a>
Date of Incorporation:	May 26, 2008
Business Description:	Implementation of investigations, research and development, feasibility studies and demonstration projects pertaining to carbon dioxide capture, utilization, transportation and storage technologies.
Capital:	JPY242,500,000
Capital Reserves:	JPY242,500,000

## Shareholders:

Hokkaido Electric Power Co., Inc. Tohoku Electric Power Co., Inc.  
Tokyo Electric Power Company Holdings, Inc. Chubu Electric Power Co., Inc.  
Hokuriku Electric Power Company The Kansai Electric Power Co., Inc.  
The Chugoku Electric Power Co., Inc. Shikoku Electric Power Co., Ltd.  
Kyushu Electric Power Co., Inc. The Okinawa Electric Power Co., Ltd.  
Electric Power Development Co., Ltd. JFE Engineering Corporation  
NIPPON STEEL ENGINEERING CO., LTD. CHIYODA CORPORATION Toyo Engineering Corporation  
JGC Holdings Corporation INPEX CORPORATION Japan Petroleum Exploration Co., Ltd.  
Mitsui Oil Exploration Co., Ltd. Idemitsu Kosan Co., Ltd. COSMO OIL Co., Ltd. ENEOS Corporation  
ITOCHU Corporation Sumitomo Corporation Marubeni Corporation Mitsubishi Corporation  
JFE Steel Corporation NIPPON STEEL CORPORATION  
Osaka Gas Co., Ltd. Tokyo Gas Co., Ltd. MITSUBISHI GAS CHEMICAL COMPANY, INC.  
Mitsubishi Materials Corporation Marubeni-Itochu Steel Inc.  
(33 companies, as of November 15, 2022)

## ■ FOUNDATION OF JCCS

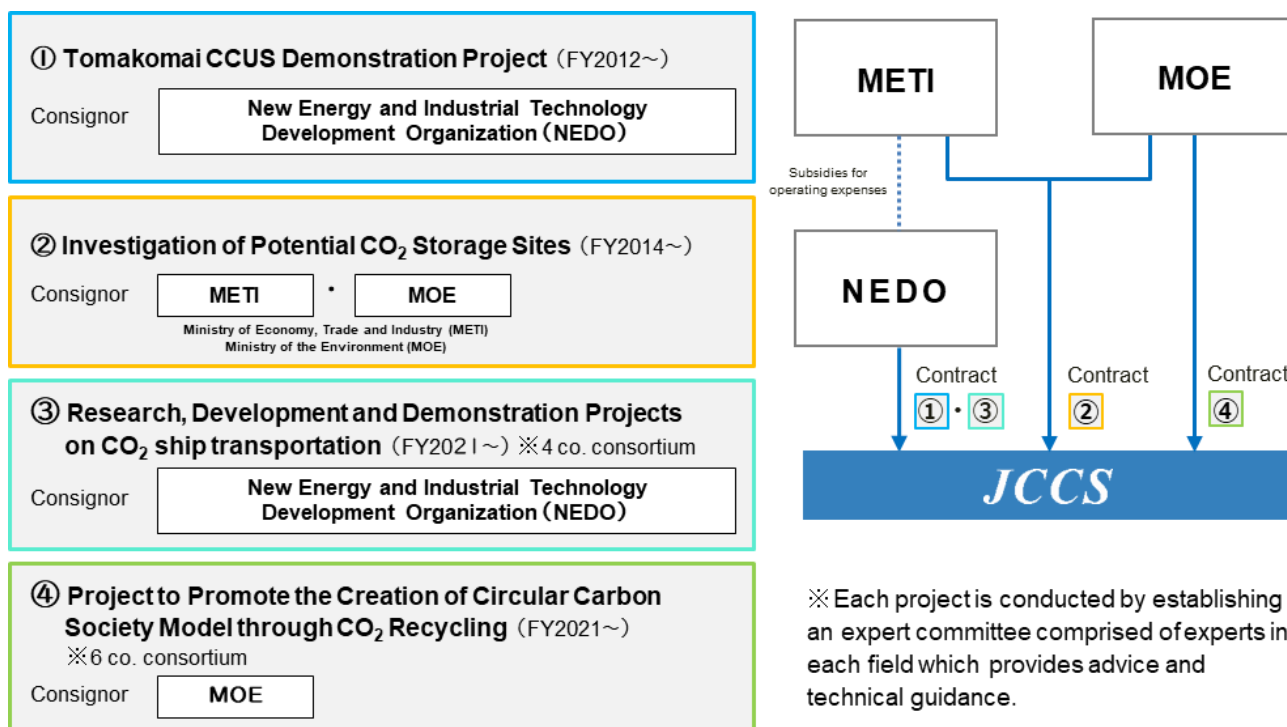
Japan CCS Co., Ltd (JCCS) was founded in May 2008 when a group of major companies with expertise in CCS-related fields, including electric power, petroleum, oil development, and plant engineering, joined forces to answer the Japanese government's policy to advance CCS as a countermeasure against global warming. JCCS is a special purpose company dedicated explicitly to developing integrated CCS technology.

## ■ KEY BUSINESS OBJECTIVES

1. Conduct comprehensive investigations and demonstrations of carbon dioxide capture, utilization, transportation and storage projects in Japan
2. Conduct investigation of potential CO<sub>2</sub> storage sites in Japan
3. Integrate opinions from the private sector for early establishment of laws, regulations and technical standards applicable to CCUS in Japan
4. Conduct promotional activities for CCUS deployment in Japan
5. Cooperate with foreign organizations for promotion of overseas CCUS demonstration projects
6. Collect the latest information on CCUS and collaborate with overseas CCUS research organizations

# PROJECTS

## ■ Commissioned Projects/Project Framework



## ■ Tomakomai CCS Demonstration Project (JFY2012~)

With a view towards implementing a CCS demonstration project, Japan CCS conducted geological surveys to confirm that the Tomakomai site was suitable for CO<sub>2</sub> storage. Although there was a large body of subsurface geological data amassed from oil and gas exploration in this area over many years, marine 3D seismic surveys were conducted in 2009 and 2010, and two survey wells were drilled in 2010 and 2011 for further confirmation.

As a result of detailed analysis and evaluation of the newly acquired data, Japan CCS confirmed that the geological structure of the Tomakomai site was suitable for CO<sub>2</sub> geological storage and that the demonstration project could be conducted safely.

Japan CCS summarized the results in the report "Comprehensive Reservoir Evaluation at the Tomakomai Site", and submitted the report together with the "Demonstration Test Plan at the Tomakomai Site (Draft)" to METI in October 2011. An expert evaluation committee was held by METI, and in February 2012, METI conducted a public tender of the "FY2012 CO<sub>2</sub> Reduction Technology Demonstration Test Project (pertaining to obligatory assurance of national subsidization for a multiyear construction project)" for the four years until FY2015, which resulted in Japan CCS being selected as the contractor.

During the four years from FY2012 to FY2015, Japan CCS designed and constructed facilities for capturing high-purity CO<sub>2</sub> from gas containing CO<sub>2</sub> generated from a hydrogen production unit of a refinery and injecting the CO<sub>2</sub> into the subsurface. In addition, one existing survey well was converted to an observation well, and two observation wells and two injection wells were drilled.

At the same time, in order to confirm that the CO<sub>2</sub> injection into the reservoir does not affect the surrounding environment, Japan CCS installed a monitoring system for formation and earthquake data and obtained baseline data prior to injection. In addition, since the formations where CO<sub>2</sub> is stored are under the seabed, Japan CCS conducted a preliminary survey of seawater and marine life in accordance with the Act for the Prevention of Marine Pollution and Maritime Disasters.



Having completed this preparatory work, from April 2016, Japan CCS commenced injection of CO<sub>2</sub> into a formation about 1,000 meters below the seabed in the port area of Tomakomai as well as monitoring during injection, with the aim of achieving 300,000 tonnes cumulative injection. The monitoring work being conducted includes monitoring the behavior of the injected CO<sub>2</sub> (migration, distribution), marine environmental surveys, etc., to confirm that there is no seepage of CO<sub>2</sub>, as well as continuous monitoring of micro-seismicity and natural earthquakes. On November 22, 2019, the CO<sub>2</sub> injection reached the target of 300,000 tonnes, and injection was terminated the same day. Monitoring work is being continued after termination of injection.

The Japanese government has set out a policy to utilize Tomakomai as a demonstration base for carbon recycling and is advancing studies aiming towards the interoperation of CCS and CCUS.

## ■ SCHEDULE

Contract Period: JFY2012~

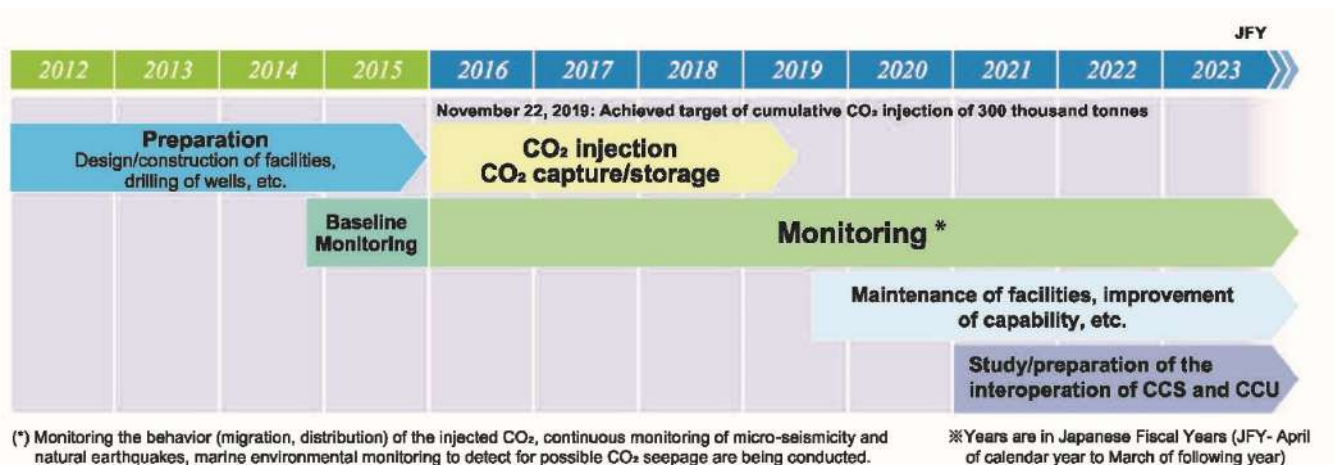
- From JFY2012 to JFY2015: Preparation

Activities including the design and construction of facilities, drilling of wells, and preparation for demonstration operation were carried out.

- From April 2016 to November 2019: CO<sub>2</sub> injection and monitoring of CO<sub>2</sub>

On November 22, 2019, the target of 300 thousand tonnes of CO<sub>2</sub> injection was achieved, and injection was terminated.

- From November 2019: Post-injection monitoring, maintenance of facilities, improvement of capability, etc.
- From JFY2021: Study/preparation of the interoperation of CCS and CCU



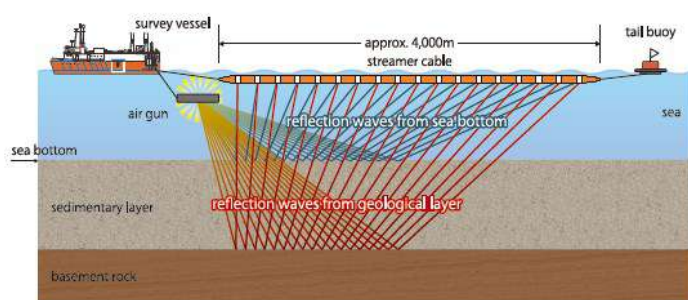


## ■ Investigation of Potential CO<sub>2</sub> Storage Sites (JFY2014~)

In order to conduct CCS, a geological formation that can stably store a large amount of CO<sub>2</sub> is required. According to surveys conducted between FY2005-2012, the geological formations in Japan are estimated to have a total storage potential of about 240 billion tons of CO<sub>2</sub>. Although the total storage potential is considered to be sufficient, more detailed investigation is required to determine how suitable individual candidate sites are for storage.

For this reason, the Ministry of Economy, Trade and Industry and the Ministry of the Environment jointly launched the "Investigation of Potential CO<sub>2</sub> Storage Sites" from FY2014. Japan CCS has been entrusted with and has continued the implementation of this project.

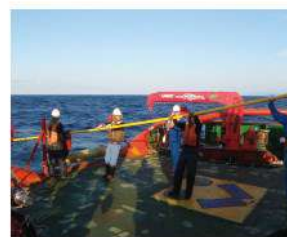
In this project, we start investigating candidate sites using existing data and literature. Next, the geological structure is delineated by seismic surveys, etc., and this data is utilized to narrow down the areas suitable for storage. At candidate sites with expectations for large storage capacity, detailed investigation is carried out on issues such as whether the stored CO<sub>2</sub> will leak, whether the geological structure is stable, and the amount of CO<sub>2</sub> that can be stored, and sites with higher potential are extracted.



Conceptual diagram of seismic survey



Lowering airgun into the sea



Lowering streamer cable into the sea

## ■ Research, Development and Demonstration Projects on CO<sub>2</sub> Ship Transportation (JFY2021~)

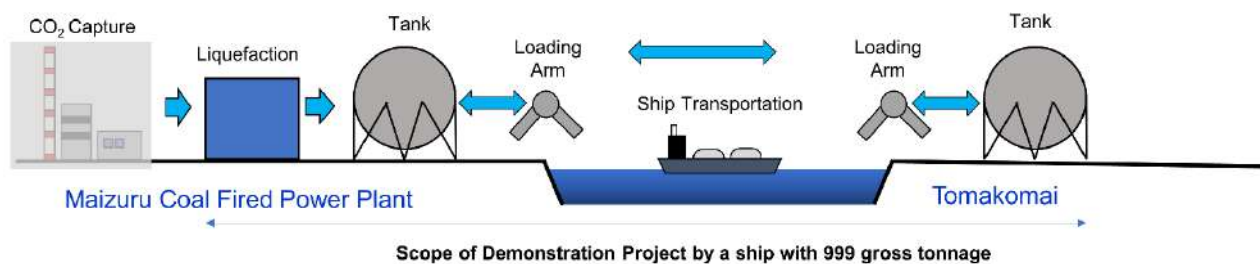
In June 2021, a consortium of 4 companies<sup>\*1</sup> including Japan CCS was jointly commissioned by the New Energy and Industrial Technology Development Organization (NEDO) to conduct “CCUS R&D and Demonstration Related Projects / Large Scale CCUS Demonstration at Tomakomai / Demonstration of CO<sub>2</sub> Transportation / Technology Development and Demonstration of CO<sub>2</sub> Ship Transportation”.

With a view towards the social implementation of CCUS around 2030, which envisages the long-distance/mass transportation of CO<sub>2</sub> from emission sources to utilization/storage points at a scale of 1 million tonnes per year, the project will conduct research and development leading to cost reduction of transportation technology, as well as aim to establish liquified CO<sub>2</sub> transportation technology through demonstration tests and related investigations.

CO<sub>2</sub> captured in another project <sup>\*2</sup> will be liquefied in a terminal in the Kansai Electric Power Co., Inc. Maizuru Power Plant and transported back and forth between a terminal in the Hokkaido Electric Power Co., Inc. Tomakomai Power Plant.

<sup>\*1</sup> 4 companies: Japan CCS Co., Ltd., Engineering Advancement Association of Japan, ITOCHU Corporation, NIPPON STEEL CORPORATION

<sup>\*2</sup> Another project: NEDO Project "Research on Application of Advanced Solid Absorber on Coal Combustion Flue Gas"



Note: Figure adapted from METI

## ■ “Project to Promote the Creation of Circular Carbon Society Model through CO<sub>2</sub> Recycling” by the Global Environment Bureau, Ministry of the Environment (JFY2021~)

In August 2021, a consortium of 6 companies<sup>\*1</sup> including Japan CCS was jointly commissioned to conduct “Project to Promote the Creation of Circular Carbon Society Model through CO<sub>2</sub> Recycling” by the Global Environment Bureau, Ministry of the Environment.

In achieving the targets of the Paris Agreement, there are high expectations for environmental innovations including CO<sub>2</sub> capture, storage and recycling, making renewable energies into mainstream power sources, expanding the use of hydrogen, and decarbonization of fuels. Also, in the aviation industry, the International Civil Aviation Organization (ICAO) has defined CO<sub>2</sub> emissions reduction targets in CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) and aiming for the use of SAF<sup>\*2</sup> in aviation as an effective means of reduction strongly urges its stable production and supply.

The P2C<sup>\*3</sup> plant being studied in this project will use artificial photosynthesis technology to reduce the CO<sub>2</sub> captured from emission sources into CO, which will then be reacted using the FT synthesis<sup>\*4</sup> process with hydrogen originating from renewable energy to produce liquid fuels such as jet fuel, light oil, etc.

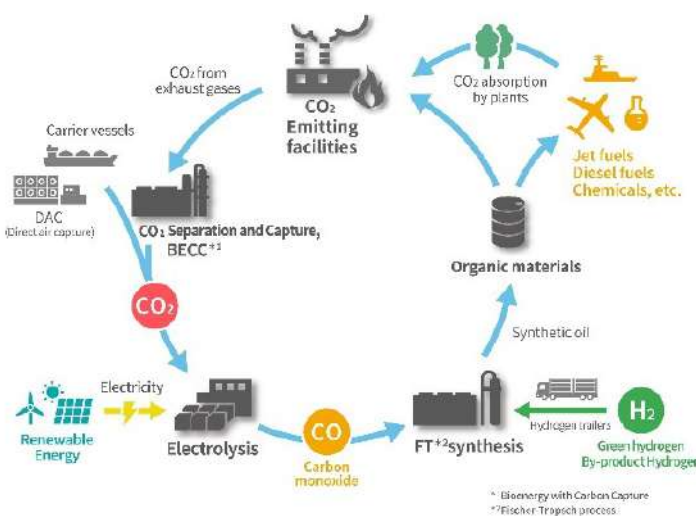
P2C is expected to significantly reduce the amount of CO<sub>2</sub> emissions and greatly contribute to achieving carbon neutrality.

<sup>\*1</sup> 6 companies: Toshiba Energy Systems & Solutions Corporation, Toyo Engineering Corporation, Toshiba Corporation, Idemitsu Kosan Co., Ltd., Japan CCS Co., Ltd., All Nippon Airways Co., Ltd.

<sup>\*2</sup> SAF: Sustainable Aviation Fuel (jet fuel produced from sustainable supply sources with low-CO<sub>2</sub> emissions in the process from the production and collection of raw materials to combustion)

<sup>\*3</sup> P2C: Power-to-Chemicals (a CCU/carbon recycling technology that uses renewable energy, renewable hydrogen, etc. to convert CO<sub>2</sub> into products with high environmental value. P2C significantly contributes not only to the reduction of CO<sub>2</sub> emissions but also the dissemination of renewable energy.

<sup>\*4</sup> FT synthesis: Fischer-Tropsch synthesis (a series of technologies that synthesize liquid hydrocarbons from CO and hydrogen by utilizing a catalytic reaction)



Regional Circular Carbon Society Model (Illustration)

Japan CCS Co., Ltd.