JCCS

www.japanccs.com

地球の素晴らしさを
1000年後の子供たちにも届けたい
私たちのCCS技術がめざすテーマです

私たちが進めるCCSは、「地球温暖化対策」の切り札のひとつ。
いわば世界中の子供たちの、未来を守る技術といえます。

現在の美しい地球を子供たちに残したい。
人間だけではなく、動物も植物も共存する、
この素晴らしい世界をそのまま未来へ。

それが私たち、日本ＣＣＳ調査株式会社の願いです。

“Beautiful and irreplaceable Earth for our children of next 1000 years”
That is the theme we have been aiming at through our CCS technology.

CCS is one of the key solutions to protect children’s future all over the world from global warming.

Saving the beautiful Earth where not only human beings but all living creatures exist together.

That is our goal through CCS Technology.

JCCS

A MESSAGE FROM THE PRESIDENT

For the Safe and Secure CCS Technology

Carbon dioxide Capture and Storage (CCS) is expected to be a direct and long-term measure against global warming by returning CO_2 underground generated from burning of fossil fuels.

Japan CCS Co., Ltd. (JCCS) was incorporated just before the G8 Hokkaido Toyako Summit in May 2008, by various fields of major companies in Japan to contribute to the national project to develop and demonstrate CCS technologies with the world's adequate and leading cutting-edge technologies.

For four years since our foundation, JCCS has been studying processes of capturing CO_2 from large-scale emission sources and various methods of transportation, and we also have been surveying suitable geological structures for CCS in Japan. These activities have been conducted on behalf of the Ministry of Economy, Trade and Industry (METI).

In October 2011, JCCS submitted a pair of reports to METI, of a reservoir evaluation and a basic plan for CCS demonstration project in Tomakomai City. Based on the result of deliberations of its Evaluation Committee on these reports, METI decided to implement a large-scale CCS demonstration project at the Tomakomai Area.
We are very honored that JCCS has been chosen to conduct this demonstration project in April 2012.

We recognize that our mission is to accomplish this demonstration project successfully, and that our responsibilities are to execute it safely and securely, and to disclose related information transparently to public for the better understanding of CCS.
We believe that the expected outcome of the demonstration project at Tomakomai will help establish a base of commercialization of CCS, and lead to exploration of further new technologies such as reuse of stored CO_2 in the future.

We will make the best efforts to develop safe and secure CCS technology for the future of our children all over the world.

Shoichi Ishii
President
Japan CCS Co., Ltd.

JCCS

COMPANY PROFILE

Company Name:	Japan CCS Co., Ltd. (JCCS)
Address:	SAPIA TOWER 19F, 1-7-12, Marunouchi, Chiyoda-ku, Tokyo, 100-0005, JAPAN TEL: +81-3-6268-7380 FAX: +81-3-6268-7385
URL:	http://www.japanccs.com
Date of Incorporation:	May 26, 2008
Business Description:	•Implementation of demonstration projects for Carbon-dioxide Capture and Storage (CCS) in Japan. •Comprehensive investigations of CCS technologies and its relating subjects.
Capital:	242,500,000 yen
Capital Reserves:	242,500,000 yen

Members of the Board:

President and Representative Director	**Shoichi Ishii**	Senior Managing Director, Japan Petroleum Exploration Co., Ltd.
Director	**Masanori Abe**	General Manager-Technology, Japan CCS Co., Ltd.
Director	**Shinichi Mitsuda**	General Manager, Energy & Resources Division, Natural Gas Chemicals Company, MITSUBISHI GAS CHEMICAL CO., INC.
Director	**Toshihiro Sano**	Managing Executive Officer, Tokyo Electric Power Co., Inc.
Director	**Yasuo Yahagi**	Representative Director & Executive Vice President, Tohoku Electric Power Co., Inc.
Director	**Osamu Kawano**	Managing Director, Member of the Board, Nippon Steel & Sumikin Engineering Co.,Ltd.
Director	**Toshiya Oshita**	Executive Officer, Vice President-Technical Headquarters, INPEX CORPORATION
Director	**Kenichiro Saitou**	General Manager, Research & Development Planning Dept., JX Nippon Oil & Energy Corporation
Auditor	**Takashi Honjo**	Senior Managing Director, Research Institute of Innovative Technology for the Earth

Shareholders:

Hokkaido Electric Power Co., Inc. Tohoku Electric Power Co., Inc.
Tokyo Electric Power Co., Inc. Chubu Electric Power Co., Inc.
Hokuriku Electric Power Co., Inc. The Kansai Electric Power Co., Inc.
The Chugoku Electric Power Co., Inc. Shikoku Electric Power Co., Inc.
Kyushu Electric Power Co., Inc. The Okinawa Electric Power Co., Ltd.
Electric Power Development Co., Ltd. JFE Engineering Corporation
Nippon Steel & Sumikin Engineering Co., Ltd. CHIYODA CORPORATION
TOYO ENGINEERING CORPORATION JGC Corporation
INPEX CORPORATION Japan Petroleum Exploration Co., Ltd.
Mitsui Oil Exploration Co., Ltd. Idemitsu Kosan Co., Ltd. COSMO OIL CO., LTD.
JX Nippon Oil & Energy Corporation SHOWA SHELL SEKIYU K. K.
ITOCHU Corporation Sumitomo Corporation Marubeni Corporation
Mitsubishi Corporation JFE Steel Corporation SUMITOMO METAL INDUSTRIES, LTD.
Osaka Gas Co., Ltd. Tokyo Gas Co., Ltd. MITSUBISHI GAS CHEMICAL COMPANY, INC.
Mitsubishi Materials Corporation Marubeni-Itochu Steel Inc. Tenaris NKK Tubes

35 companies

(As of April 1, 2013)

COMPANY PROFILE

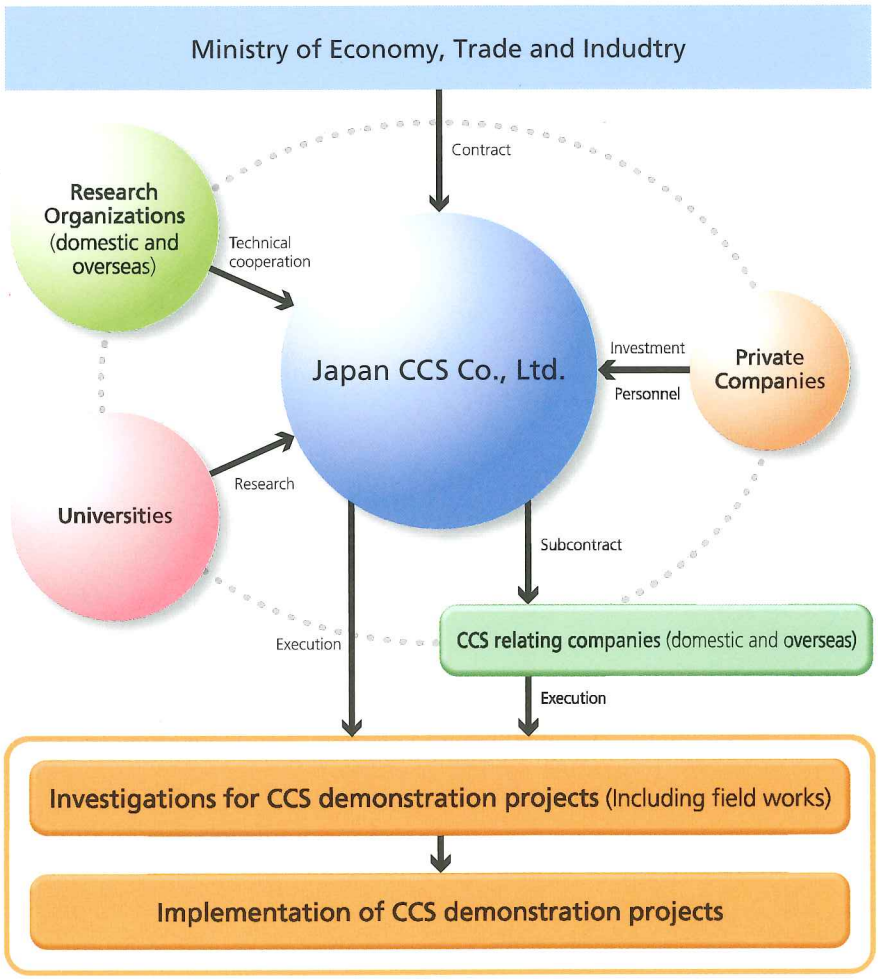
FOUNDATION OF JCCS INCORPORATION

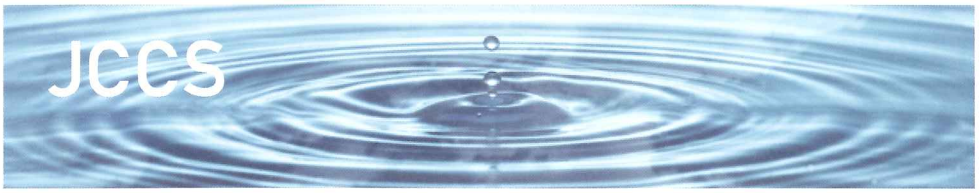
Japan CCS Co., Ltd (JCCS) was founded in May 2008 when a group of major companies with expertise in CCS-related fields, including electric power, petroleum, oil development, and plant engineering, joined forces to answer the Japanese government's call for development of CCS technology as a countermeasure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

KEY BUSINESS OBJECTIVES OF JCCS INCORPORATION

1. Accomplish comprehensive investigations and demonstrations for CCS projects in Japan
2. Integrate opinions from the private sector for early establishment of laws, regulations and technical standards applicable to CCS in Japan
3. Conduct promotional activities for CCS deployment in Japan
4. Cooperate with foreign organizations for CCS deployment overseas
5. Collect and exchange the latest information on CCS with overseas research organizations

PROJECT FRAMEWORK FOR JCCS - FUNCTIONS OF JCCS-





OUR BUSINESS

Since its foundation in May 2008, Japan CCS Co., Ltd. (JCCS) has been actively conducting comprehensive investigations for large-scale CCS demonstration projects in Japan, on behalf of the Ministry of Economy, Trade and Industry (METI).

After the investigation of potential sites for the last four years, JCCS selected two areas, Tomakomai and Kitakyushu, as candidates for the demonstration projects.

Tomakomai Area:
In October 2011, JCCS submitted to METI a pair of reports on these investigations, consisting of a reservoir evaluation report and a basic plan for CCS demonstration project in Tomakomai City. METI held a Special Evaluation Committee to study these reports in the third quarter of 2011, and based on the evaluation results by the Committee, METI decided to implement a large-scale CCS demonstration project at the Tomakomai Area, and called for public application for conducting various preparation work tasks in the first four years of the project.
In April 2012, JCCS was commissioned for these works by METI.

Kitakyushu Area:
For the Kitakyushu Area, based on the results of survey well drilling in 2010 and gravity survey in 2011, we concluded that additional seismic survey would be necessary to evaluate the reservoir condition for CCS in this region, and submitted a report to METI in February 2012. METI called for public application of a preliminary 2D seismic survey and JCCS was commissioned to conduct this survey by METI in April 2012.

Legislative Response, Public Relations and Others
For the execution of CCS demonstration project above, we will consult with competent administrative agencies to prepare applications for existing laws and regulations necessary for CCS operation such as "Marine Pollution Preventive Law".
In order to improve public acceptance and support at the candidate sites of the demonstration project, we have been conducting educational outreach efforts on our project's activities and demonstration plan to the public at various opportunities. Information on CCS projects will be exchanged through various opportunities worldwide. Also we are cooperating to set international standards (ISO) for CCS.

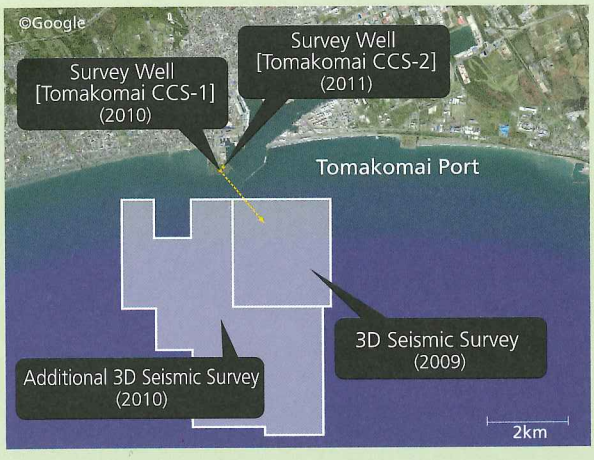
For further deployment of CCS in Japan in future, studies in other areas are being conducted.

INVESTIGATION OF TOMAKOMAI AREA (A part of METI project)

JCCS has concluded that Tomakomai city is a suitable candidate area for the large-scale CCS demonstration project.
There are sub-seabed reservoirs for CO_2 storage and CO_2 emission sources near by.
There is a large body of geological and geophysical data for the evaluation amassed from past petroleum explorations in this area, and only limited surveys are required to confirm its suitability for CO_2 storage. Marine 3D seismic surveys were conducted in 2009 and 2010, and two survey wells were drilled in 2011.

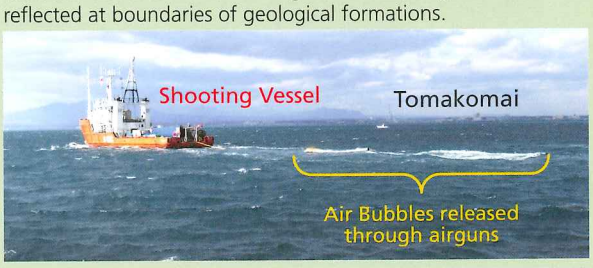
From the result of geological evaluation using newly acquired data, we confirmed that there are two reservoirs and caprocks with suitable geological structure for the demonstration project.

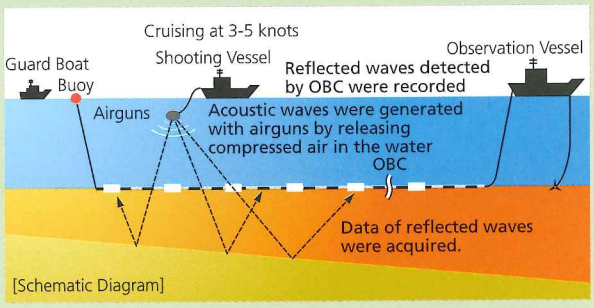
We submitted a pair of reports to METI; "Geological evaluation report of Tomakomai Area", and "Basic Plan of CCS demonstration project at Tomakomai Area", in October 2011. Evaluation Committee for these reports was held by METI, and achieved the result of deliberations that the both geological structures are suitable and the basic plan is appropriate for demonstration. In February 2012, based on these evaluation results METI decided to implement a large scale demonstration project and called for public application to carry out the preparation work as the first step of the project. The CCS Demonstration Project at the Tomakomai Area was commissioned to JCCS in April 2012.



■3D Seismic Survey

In order to delineate detailed subsurface structure, 3D seismic surveys were conducted in Oct.-Nov. 2009 and July-Sept. 2010. In the surveys, ocean bottom cables (OBC) were used to record the acoustic waves which were generated by airguns and reflected at boundaries of geological formations.





■Drilling of Survey Well

A survey well was drilled to investigate the geological structure and to obtain detailed geological data including rock samples of reservoirs and caprocks.

Tomakomai CCS-1 well: Nov.2010 -Mar.2011

Wellhead Assembly

Geological samples taken from the survey well.

LARGE- SCALE CCS DEMONSTRATION PROJECT AT TOMAKOMAI AREA IN THE FIRST FOUR YEARS

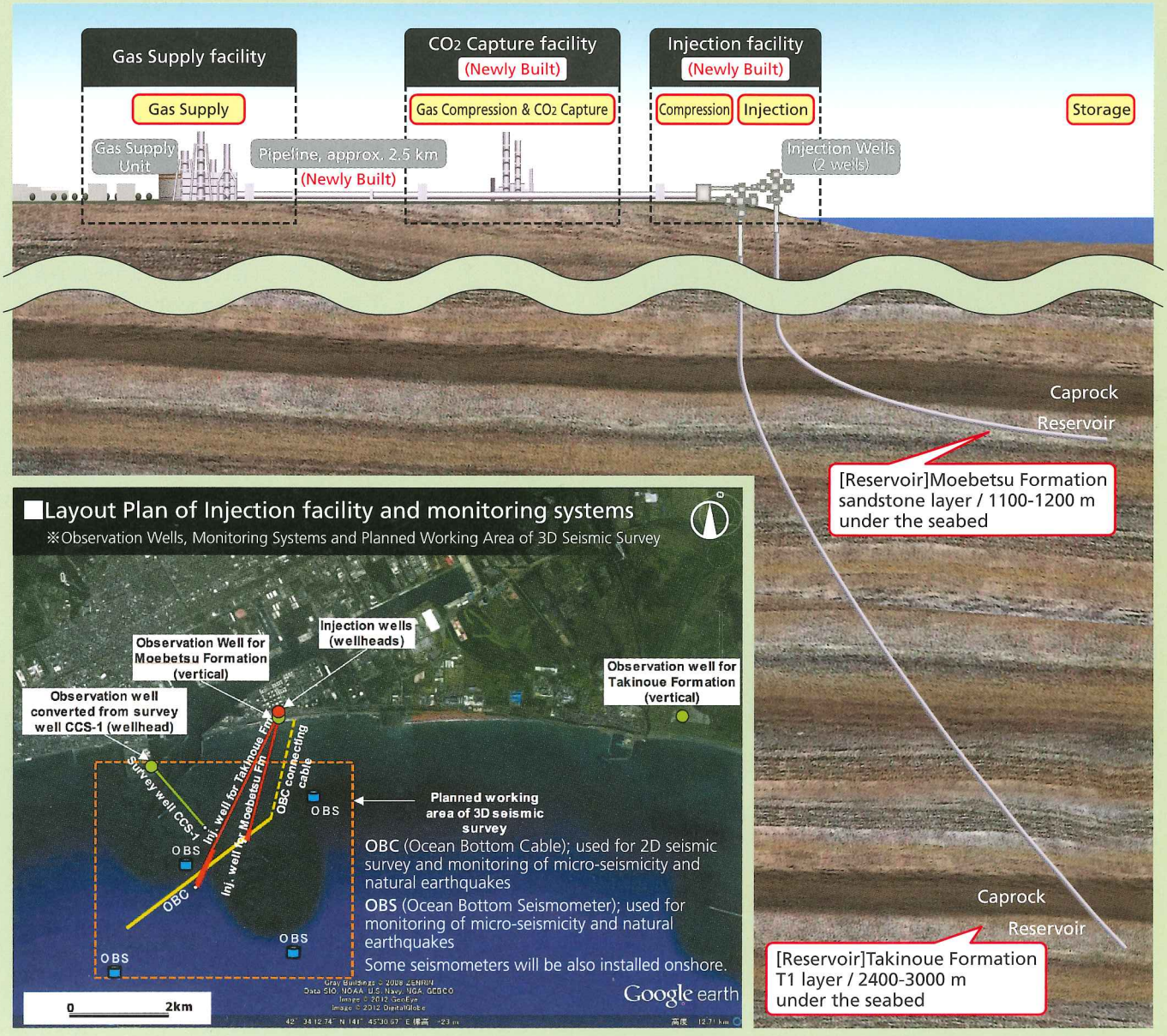
(A part of METI project)

METI has started a large-scale CCS demonstration project at the Tomakomai Area in Hokkaido for the period 2012 -2020 to demonstrate and verify the total CCS system, from CO_2 capture to storage.
100,000 tonnes/year or more CO_2 is to be stored in two separate reservoirs (saline aquifers) approximately 1100 m and 2400 m depths respectively, under the seabed in off shore the Tomakomai Port.
A series of monitoring, consisting of time-lapse 2D and 3D seismic surveys, temperature and pressure measurements of the reservoirs, micro-seismicity and natural earthquakes observation in and around the reservoirs is planned before, during and after CO_2 injection. It is also planned to monitor the marine environment to determine whether any seepage occurs during and after the CO_2 injection.

JCCS was commissioned to execute this CCS demonstration project for the first four years from April 2012 until March 2016 before actual CO_2 injection. In this period, two major facilities will be newly designed and constructed by March 2016; CO_2 capture facility, CO_2 compression and injection facility. These facilities are located near by a petroleum refinery plant. CO_2 is captured from offgas generated at a hydrogen production unit in the refinery plant. Two injection wells are to be drilled beside the injection facility. These wells will be inclined to injection points at the reservoir sub-seabed.
Monitoring facilities covering the whole demonstration area will be installed during this period. These systems include three observation wells with down-hole seismometers and several seismometers on-land and at the seabed. Baseline data before injection will be gathered using installed systems for at least one year.

In Japan, CO_2 geological storage below the seabed is regulated by the Act on Prevention of Marine Pollution and Maritime Disaster. A marine environmental assessment prior to injection is necessary for an application to obtain a storage permit. In order to complete the assessment, a marine survey will be carried out during this period.

■Project Schematic Diagram



■Layout Plan of Injection facility and monitoring systems

※Observation Wells, Monitoring Systems and Planned Working Area of 3D Seismic Survey

PRELIMINARY SURVEYS AT KITAKYUSHU AREA

(A part of METI project)

Paleogene formations (approximately from 40 to 50 million years ago) are widely distributed in Kitakyushu, or the northern Kyushu-island, western part of Japan.

Further geological surveys are necessary for the Paleogene formations at Kitakyushu area to confirm its geological potential for CO_2 storage.

In 2010, gravity analysis was conducted around the Kitakyushu area using existing gravity data, and a survey well was drilled to collect various kinds of geological data and core samples. In 2011 gravity data were additionally obtained to re-analyze so as to understand geological structures for improving degrees of accuracy.

We recommended METI the preliminary 2D seismic survey for more accurate information of that area. After consideration, METI recognized the necessity of the additional survey and called for public application to carry it out in February 2012. This 2D seismic survey at the Kitakyushu Area was commissioned to JCCS in April 2012.

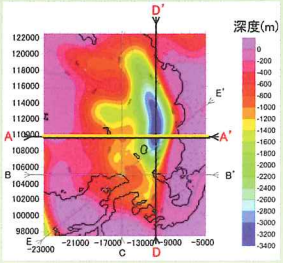
■Survey Area

Drilling Rig

Core Samples

Gravity Survey

Gravity Structural Map of Basement Rock



FUNDAMENTAL ACTIVITIES

[Studies on regulations and standards]

(A part of METI project)

Because the CCS technology is based on a new concept to store CO_2 in natural geological structures underground, a new set of regulations and technical standards needs to be developed in order for deployment of CCS projects.

We have been reviewing existing and new laws and regulations, standards and guidelines related to CCS being applied in leading countries or projects, and have been working with researchers and the government to share its expertise and knowledge to prepare necessary legal and technical frameworks.

[Disclosure of information]

(A part of METI project)

Public acceptance and support are essential for CCS deployment.

We have been delivering information on our activities and demonstration plans to the public at various illustrated panel exhibitions, workshops and lectures. We have also given presentations at conferences and seminars inside and outside the country to convey our current status since 2008.

Our educational outreach plans for the future will continue with these activities, and additionally, we will provide the latest news related to the demonstration project at the Tomakomai Area, and will deliver our knowledge and information positively.

[Contribution to ISO CCS Standards]

An ISO new technical committee for CCS was established in 2011 and started discussing draft standards in 2012. Japan has participated actively in the work.

We are also giving our cooperation to draft new ISO standards as members of the national mirror committee and the working groups organized by Research Institute of Technology for the Earth (RITE).

[Investigations of Potential Sites in Other Areas]

The Japanese Government stated its policy to commercialize CCS by 2020.

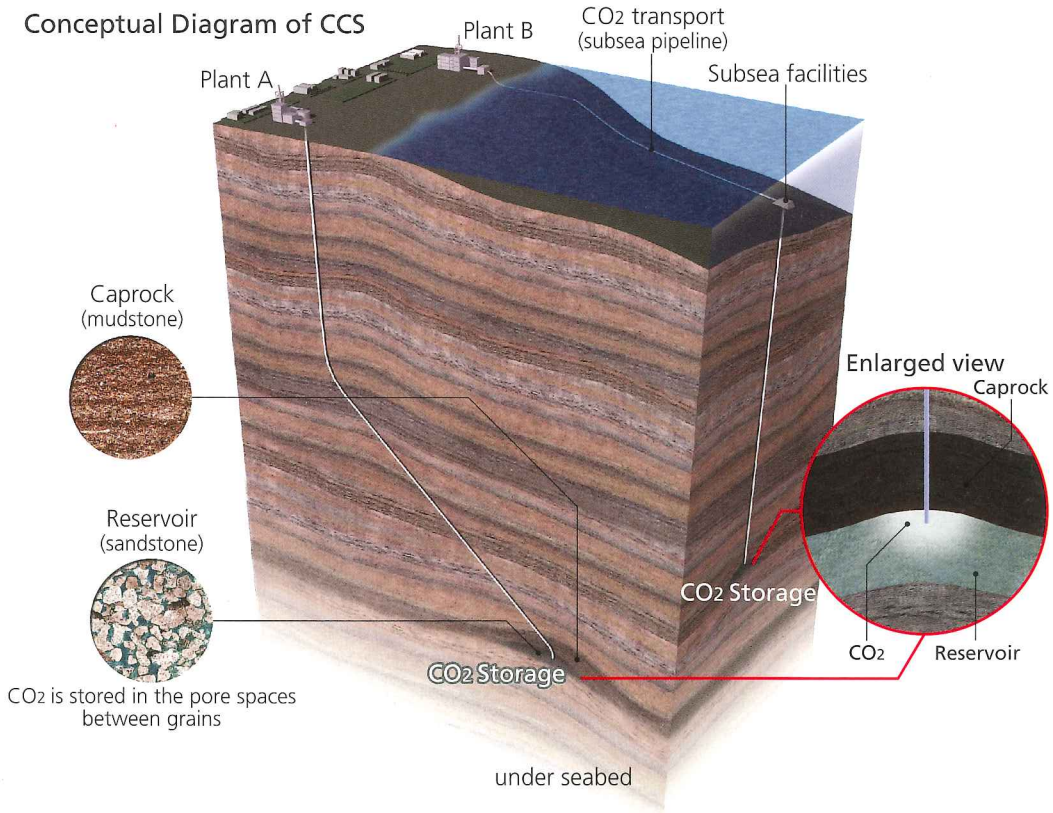
We are conducting feasibility studies of additional areas described earlier to get additional potential sites ready for future development.

WHAT'S CCS

CCS stands for carbon dioxide capture and storage.
To live more comfortably and more conveniently, humankind has developed and utilized fossil fuels that have lain deep in the earth's crust millions of years. By consuming fossil fuels carbon dioxide (CO_2) is generated as a by-product, resulting in increase of CO_2 concentration in the atmosphere. It is recognized that this should be one of the main causes of global warming. CCS is the technology to capture CO_2 from power stations or industry processes without emitting it to the atmosphere, transport it to sites suitable for geological sequestration, and store it stably underground for a long term. With its larger potential to lower CO_2 emissions at an early stage, CCS is expected as a key option to mitigate global warming.
CO_2 is injected into porous geological layers such as aquifers (sandstone formations etc.), or oil and gas reservoirs at depths below 1000 m onshore or offshore underground. Injected CO_2 is blocked upward migration by thick and impermeable layers (known as the caprock) so that CO_2 stored safely and stably.

CCS PRINCIPAL TECHNOLOGIES

CCS is a process consisting of three major technologies;
1. Capture: capturing CO_2 from CO_2 containing gas streams in power stations or industrial processes
2. Transport: transporting captured CO_2 to CO_2 injection sites
3. Injection and Storage: injecting CO_2 into porous geological layers at depths below 1000 m onshore or offshore underground. Injected CO_2 is blocked upward migration by thick and impermeable layers (known as the caprock) so that CO_2 stored safely and stably.



WORLD'S MAJOR CCS PROJECTS

A number of CCS projects are in progress worldwide.

Sleipner (Norway)

Injection started in 1996

Injecting CO_2 captured from natural gas into an aquifer

Depth: 800 m - 1000 m offshore

Injected quantities: 1 Mtpy

Snohvit (Norway)

Injection started in 2008

Injecting CO_2 captured from natural gas into aquifers

Depth: 2600 m offshore

Injected quantities: 0.7 Mtpy

Weyburn (Canada)

Injection started in 2000

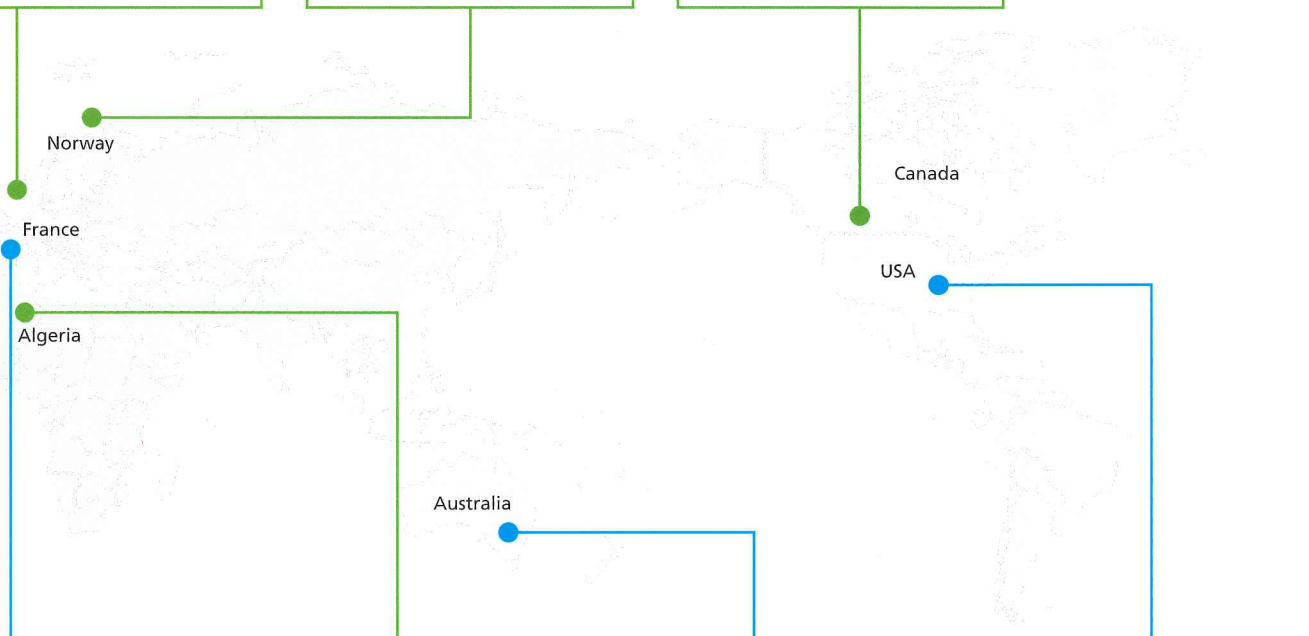
Injecting CO_2 captured from a coal gasification plant into oil reservoirs
(EOR=Enhanced Oil Recovery)

Depth: 1500 m onshore

Injected quantities: 1 Mtpy

Industrial scale projects

Demonstration projects



Lacq (France)

Injection period: 2 years since 2009

Injecting CO_2 captured from a power plant into a depleted gas reservoir

Depth: 4500 m onshore

Injected quantities: 21 thousand tonnes for 1.6 years

In Salah (Algeria)

Injection started in 2004

Injecting CO_2 captured from natural gas into an aquifer

Depth: 1800 m onshore

Injected quantities: 1 Mtpy

Otway (Australia)

Injection period: 3 years since 2008 (Stage 1)

Injecting CO_2 from CO_2 gasfield into a depleted gas reservoir

Depth: 2050 m onshore

Injected quantities: 65 thousand tonnes for 3 years

Mountaineer (USA)

Injection period: 2.5 years since 2009

Injecting CO_2 captured from a power plant into aquifers

Depth: 2500 m onshore

Injected quantities: 37 thousand tonnes for 2.5 years

※1 Mtpy = 1 million tonnes per year

日本ＣＣＳ調査株式会社
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