Carbon Neutral Strategy Briefing

MITSUBISHI GAS CHEMICAL COMPANY, INC.

December 4, 2023

Securities Code
4182

Index

1. Carbon Neutral Strategy (Overview)

Toward a Sustainable Society -Medium-Term Management Plan-

– We are committed to realizing a sustainable society by balancing social and economic value based on our Mission of creating value to share with society.

– Initiatives aimed at carbon neutrality are one of our top strategic priorities.

Social issues

Changes in international situation

Demographic changes

Advancements in ICT/Mobility

Climate change

Biodiversity crisis

Environmental impact reduction

Diversity

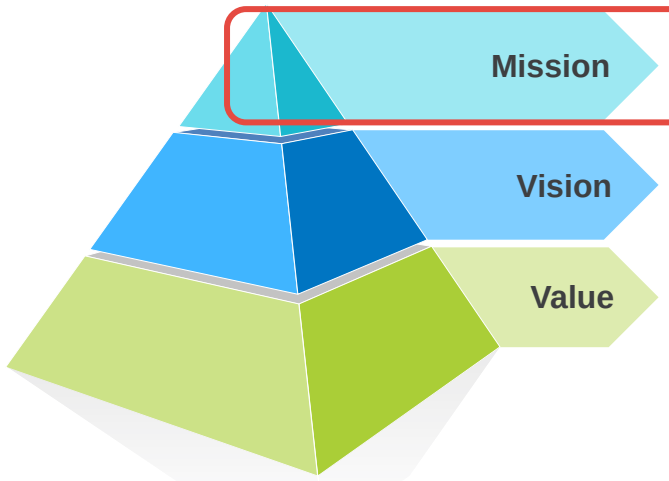
Behavioral changes under COVID-19

Objective 1

Shift to a profit structure resilient to environmental changes

-Business Portfolio Reforms-

- Strengthening differentiating businesses
- Creating and nurturing new businesses
- Rebuilding unprofitable businesses



Mission — Creating values to share with society

Vision — An excellent company with uniqueness and presence built on chemistry

Value — Principles of Conduct

Objective 2

Balance social and economic value

-Toward Sustainable Growth-

- Solve social issues
- Environmental protection
- Strengthen discipline and foundation

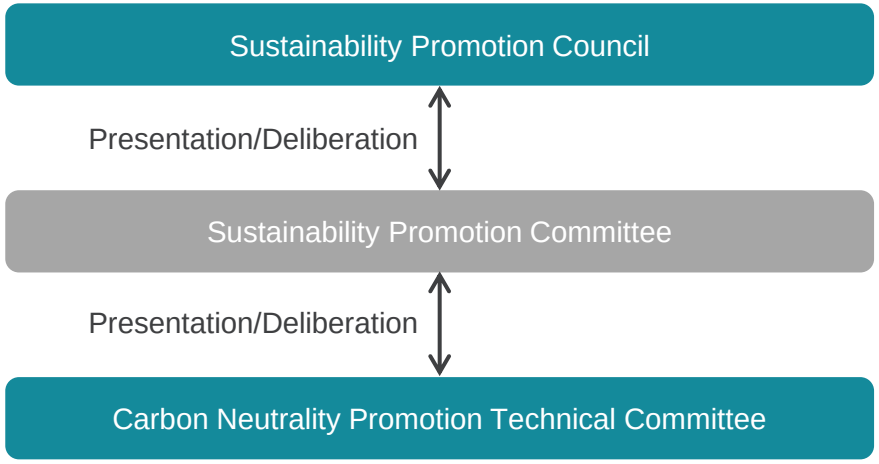
Solving social issues

Achieving sustainable growth

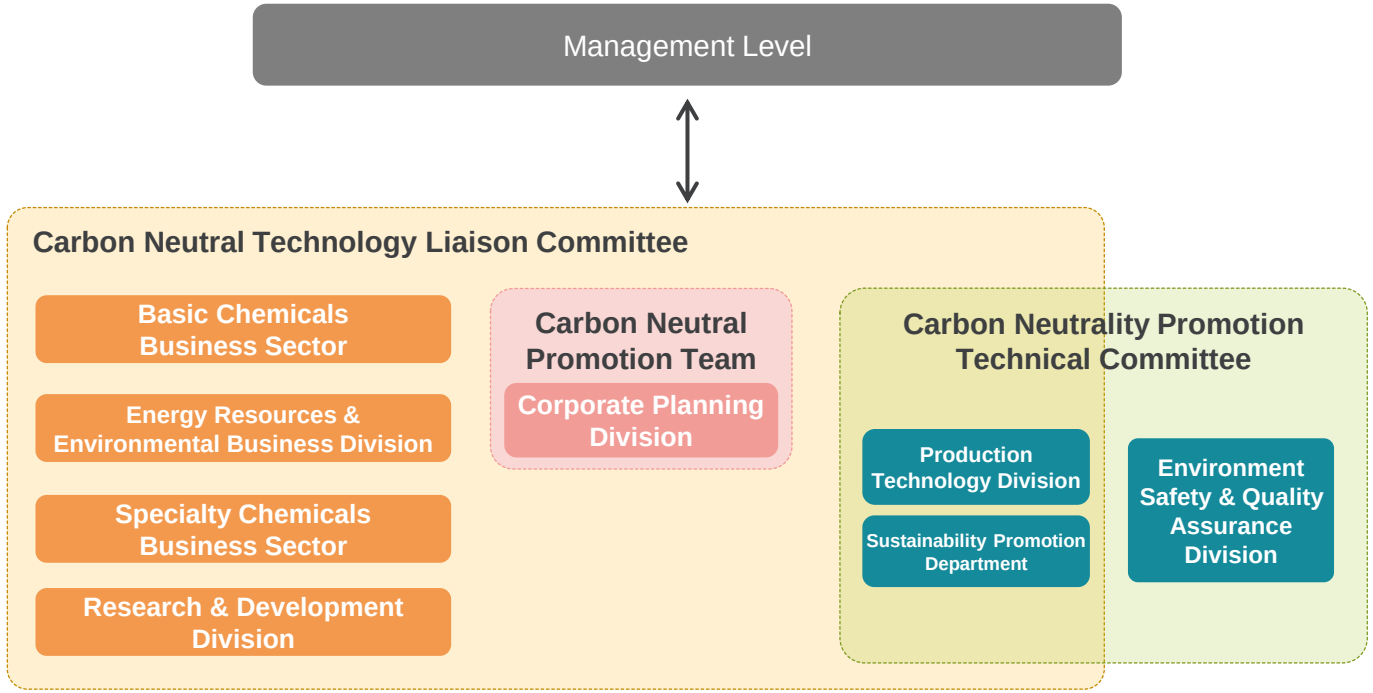
Carbon Neutral Promotion System

- Climate change risk and other sustainability key issues deliberated and decided by the Sustainability Promotion Council, comprised of members of the Board and chaired by the President
- Establishment of Carbon Neutral Technology Liaison Committee, enabling centralized management of MGC Group technology information and promotion of initiatives

Climate Change Governance System



Carbon Neutral Promotion System



MGC's Roadmap toward Its Ultimate Goal of Carbon Neutrality

– Aim to achieve reduction of 36% by 2030 in comparison with 2013 and carbon neutrality by 2050

	Scope	2013 - 2019	2020 - 2023	2024 - 2030	2030 - 2050
Main initiatives (CO_2 Reduction)	1	• Improve energy efficiency • Reconfigure business portfolio **258kt in total**	• Improve energy efficiency **16kt** • Stop using heavy oil **13kt** • Reconfigure business portfolio • Deploy new energy systems/CCUS, switch feedstocks (R&D/collaboration) **610kt in total**	• Improve energy efficiency **28kt**	• Improve energy efficiency **40kt**
	2	—	• Source 10% of energy from renewables **14kt** • Use transitional energy **10kt**	• Source 50% of energy from renewables **55kt**	• Source 100% of energy from renewables **69kt**

Businesses & technologies

Fukushima Natural Gas Power Plant
Provided by Fukushima Gas Power Co., Ltd.

Wasabizawa Geothermal Power Station
Provided by Yuzawa Geothermal Power Corp

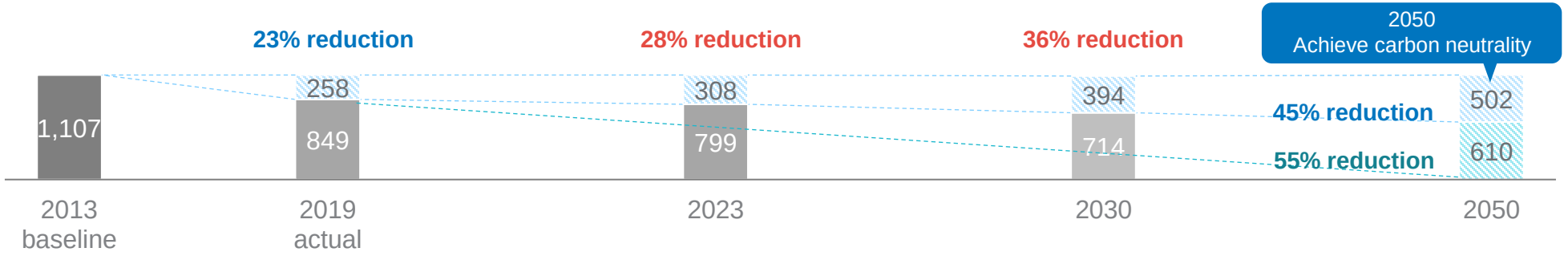
Pilot plant for consideration of circular carbon methanol

JAPAN HYDROGEN ASSOCIATION

Collaboration

Feedstock switching

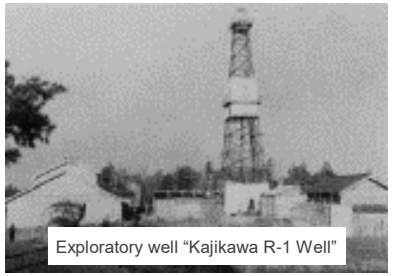
CO_2 emissions (kt of CO_2/year)

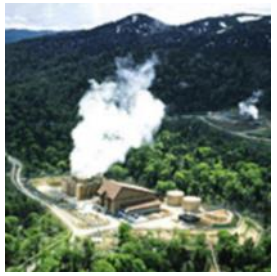


Date of public announcement: March 29, 2021

MGC's Strengths in Carbon-Neutral Technologies (Accumulation of Energy Resources and Environmental Technologies)

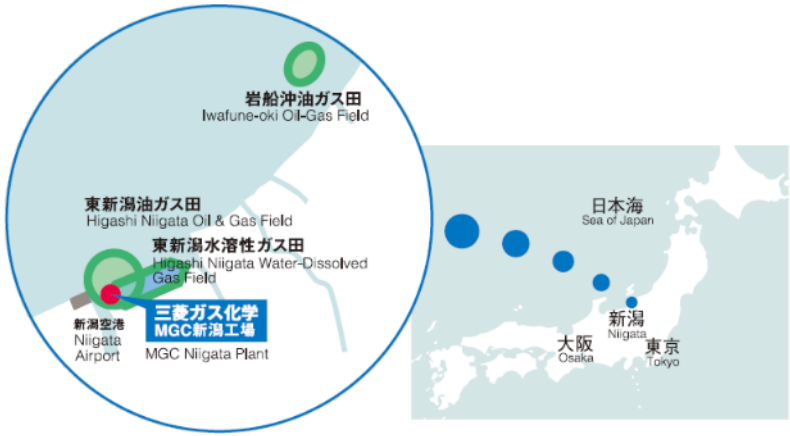
- Over a period of around 60 years, MGC (on a stand-alone basis) deployed a business to develop natural gas. It has exploration and development technologies that are unique among those found at chemical manufacturers.
- Furthermore, MGC has implemented crude oil and natural gas exploration technologies on a joint basis with other resource development companies.
- MGC has also deployed businesses in the compatible areas of geothermal development and LNG-fired power generation.
- Over many years, MGC developed catalysts used in methanol synthesis.


Exploratory well "Kajikawa R-1 Well"




Fukushima Natural Gal Power Plant
Provided by Fukushima Gas Power Co., Ltd.


Tomakomai CCS Demonstration Project Center



1952 Methanol synthesis
1953 Development of water-dissolved natural gas
1957 Ammonia synthesis

1981 Development of geothermal power

2016 LNG power generation*1

2016 CCS*2

2021 Production of water-dissolved natural gas*3

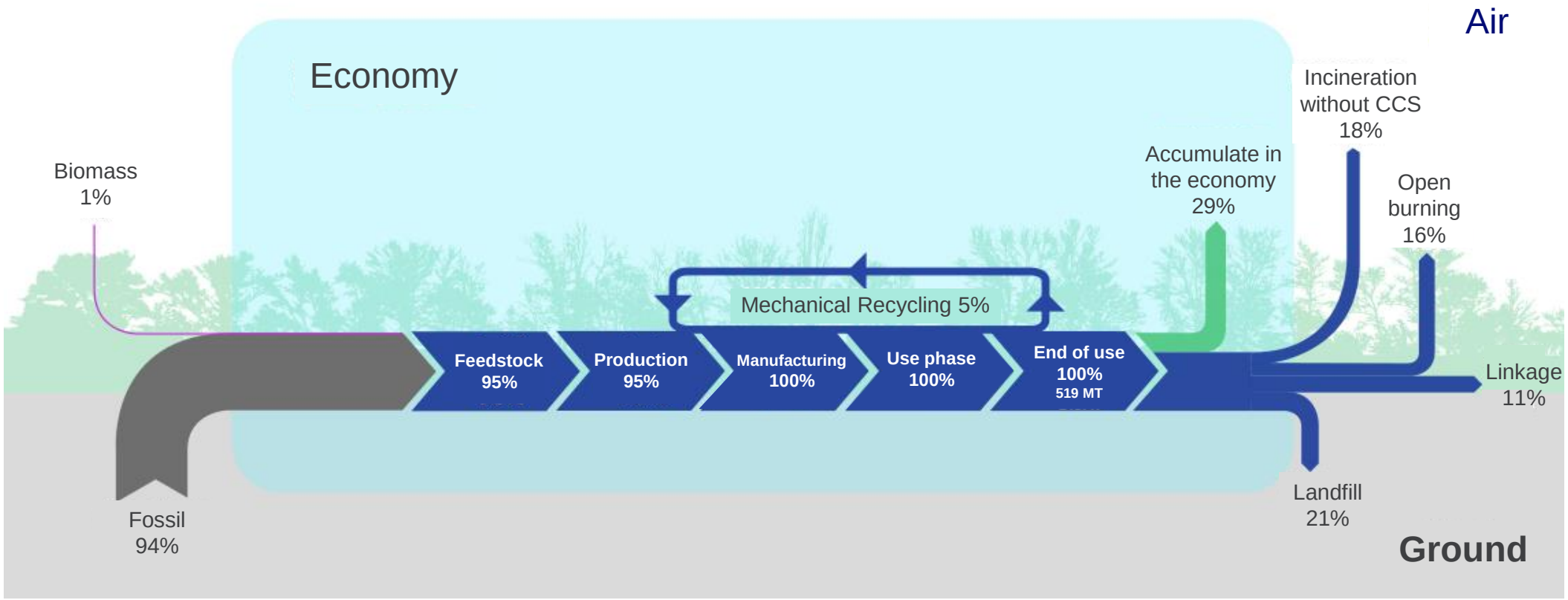
Accumulated intellectual property and know-how adapted and applied to capturing, storing and recycling CO_2, as well as to building of hydrogen supply chains

*1 Investment in Fukushima Gas Power Co., Ltd.
*2 Commenced press fitting of CO_2 within Carbon dioxide Capture & Storage (CCS) demonstration project conducted in Tomakomai City
*3 New production of water-dissolved gas for first time in 50 years by TOHO EARTHTECH, INC., an MGC subsidiary

Carbon Neutrality as Business Opportunity for MGC (1)

- The chemical industry today has a linear industry structure, with most raw materials derived from fossil sources
- Our goal is to help make a positive impact on the global environment by eschewing reliance on fossil resources and adopting a business model that is more recycling oriented and emits fewer greenhouse gases

Linear and fossil-based chemical industry as of 2020

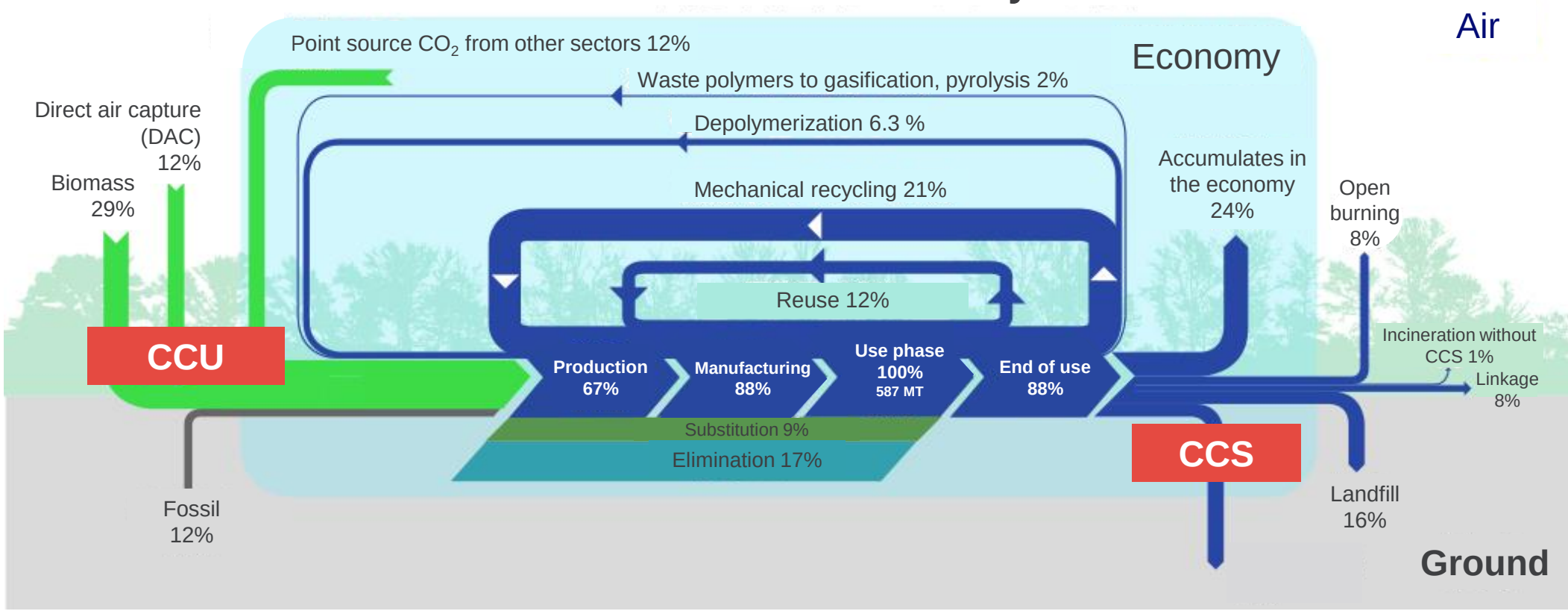


Source：Planet Positive Chemicals (The University of Tokyo, Center for Global Commons & SYSTEMIQ)

Carbon Neutrality as Business Opportunity for MGC (2)

- Leverage reuse and recycling to recycle resources (carbon); furthermore, use biomass and CO_2 as raw materials to reduce the volume of fossil resources used
- If waste CO_2 can be fixed underground, this can also become a source for CO_2 capture (CCS)
- The chemical industry can be one that captures and utilizes CO_2 from other industries (CCU)

The Ideal Chemical Industry in 2050



Source：Planet Positive Chemicals (The University of Tokyo, Center for Global Commons & SYSTEMIQ)

Carbon Neutrality as Business Opportunity for MGC (3)

– Pursue development of products and technologies conducive to carbon neutrality by leveraging distinctive technologies found only at MGC

Development of Products and Technologies Conducive to Carbon Neutrality

Methanol manufacturing technologies using CO_2 as raw materials

Hydrogen manufacturing technologies using methanol as raw materials (catalysts)

Geothermal power generation

Polycarbonates using CO_2

Procurement of clean ammonia
(fuels, green hydrogen raw materials)

Solid-state batteries
(for EVs)
Fuel cells
(for FCVs)

LNG power generation + CCUS*

Energy control systems: Semiconductor materials

Biodegradable polymers

Chemical recycling

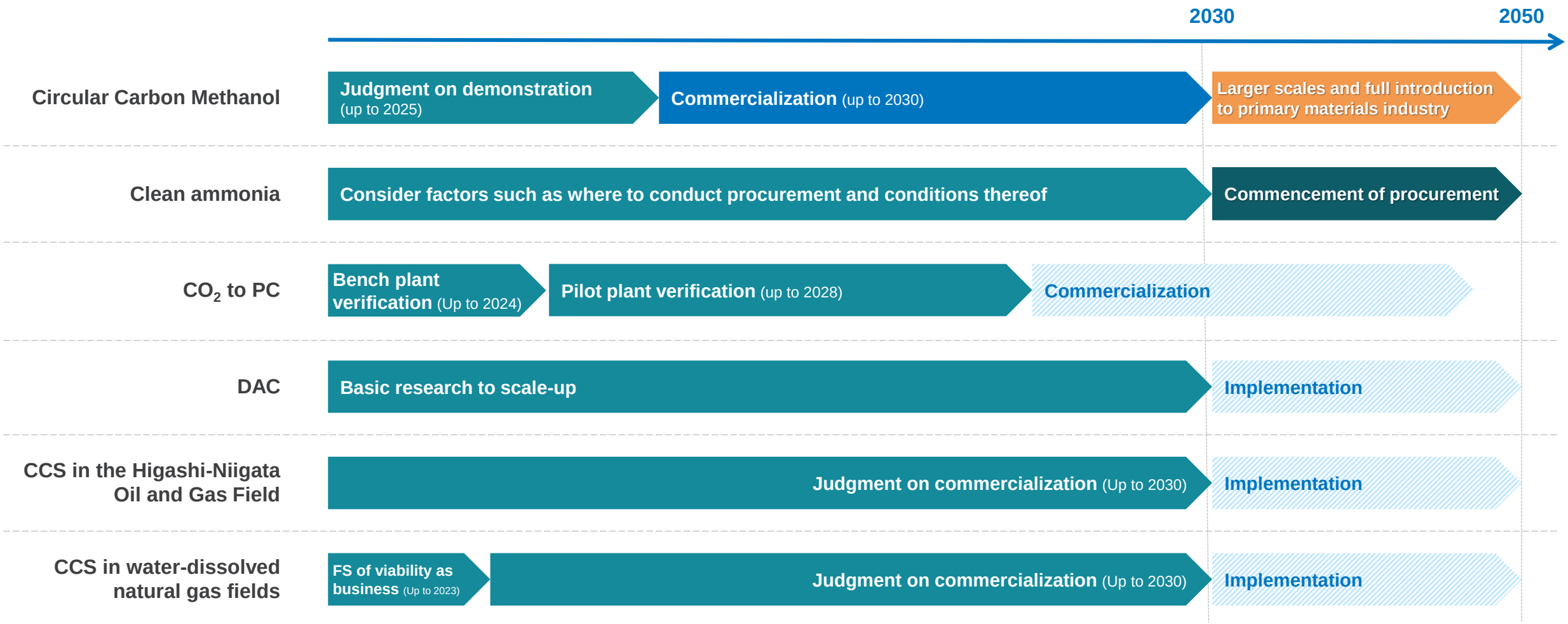
Direct air capture (DAC)**: Specialty amines**

Methanol: Hydrogen carrier

Operational streamlining: Optical polymers for sensing cameras for automotive use

*Carbon dioxide Capture, Utilization & Storage

Carbon Neutrality as Business Opportunity for MGC (4)



Reference (1) Title, Objectives and Measures of Next Medium-Term Management Plan

(Reposted from financial results presentation materials released on November 8, 2023)

Title: Grow UP 2026 – “Growing,” “Winning” and “Sustainable”

Plan Duration: Three years from FY2024 to FY2026 (Fixed Targets)

Positioning: Successor to Grow UP 2023; period that contributes to the realization of the vision for MGC in 2030
Retackling current plan targets and aiming for even higher goals

Objective 1 Strengthen the resiliency of our business portfolio

Strategy 1
Focus on “Uniqueness & Presence”

Strategy 2
Build new value through innovation

Strategy 3
Restructure businesses requiring intensive management

Objective 2 Promote sustainability management

Strategy 1
Accelerate initiatives for realizing carbon neutrality

Strategy 2
Enhance human capital management

Strategy 3
Promote materiality management

Reference (2) What is “Uniqueness & Presence”?

(Reposted from financial results presentation materials released on November 8, 2023)

– “Uniqueness & Presence” is another way to define differentiating businesses, those capable of sustainable growth while balancing both social and economic value, and are outstanding when it comes to “Growing,” “Winning” and being “Sustainable”

Uniqueness & Presence (sustainable growth balancing social and economic value) = Differentiating businesses

Growing

1. Future potential in involved markets, with great prospects for growth going forward
2. Expectation of new market development via creation of new applications, products and through M&A activity

Winning

Businesses possessing competitive advantages in areas such as quality, function, supply chain, technology and cost that are difficult for others to copy

→ As a result, they

1. Have presence backed by high market share
2. Have market-recognized value, and are capable of gaining high profitability

Sustainable

Socially recognized value in terms of **“Low GHG emissions”** and **“Contribution to measures to counter climate change and reduce environmental impact”**

Differentiating businesses

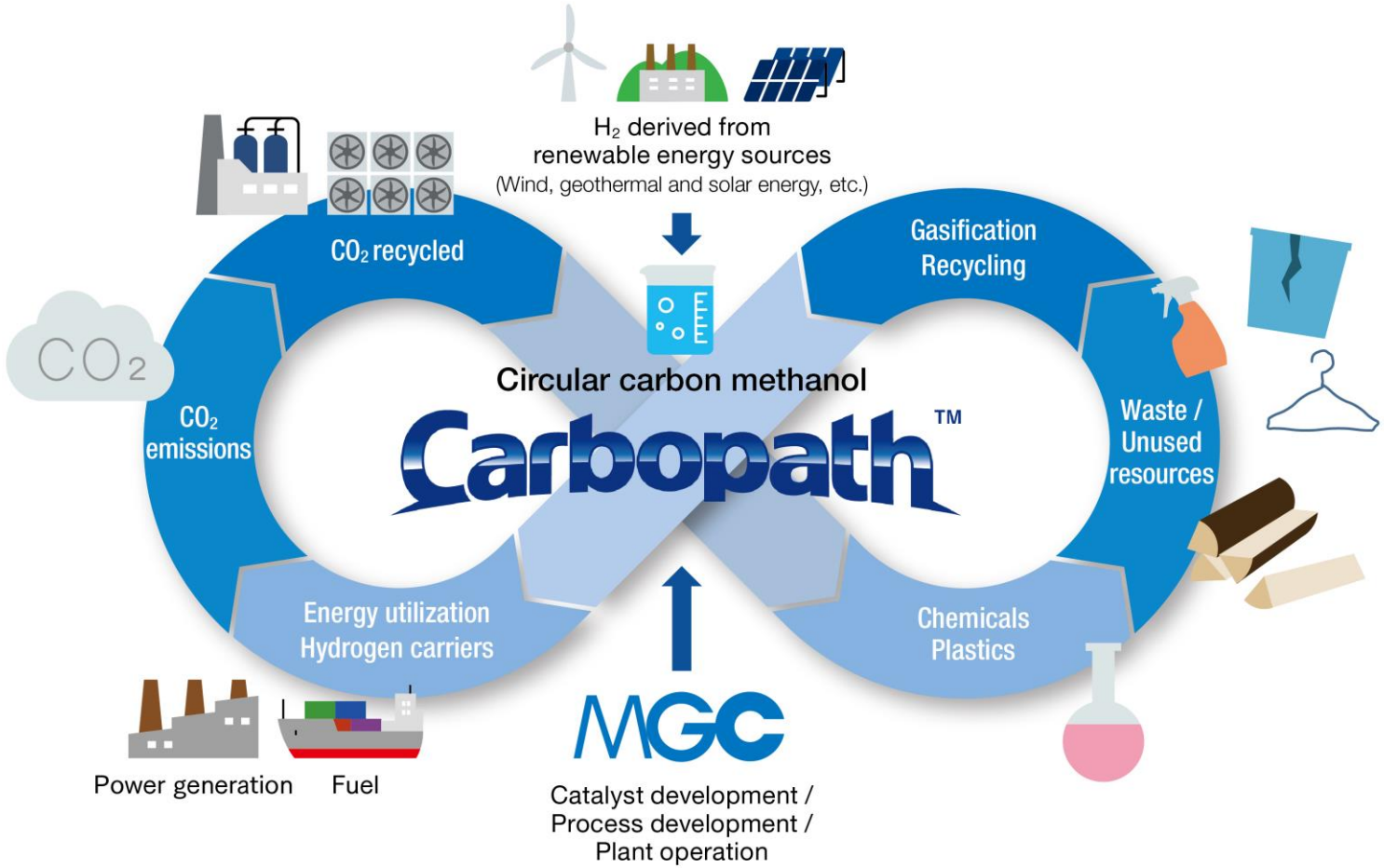
Electronic materials, electronic chemicals (inorganic chemicals), optical materials,
methanol, energy resources and environmental businesses,
POM, MXDA/aromatic aldehydes, polymer materials



2. Promotion of Circular Carbon Methanol Concept

Overview of Circular Carbon Methanol Concept “Carbopath™”

– We are promoting Circular Carbon Methanol concept, an initiative to convert CO_2 emitted into atmosphere, waste plastics, non-fossil biomass, etc., into methanol and recycle it for use as chemicals, fuel, and power generation.



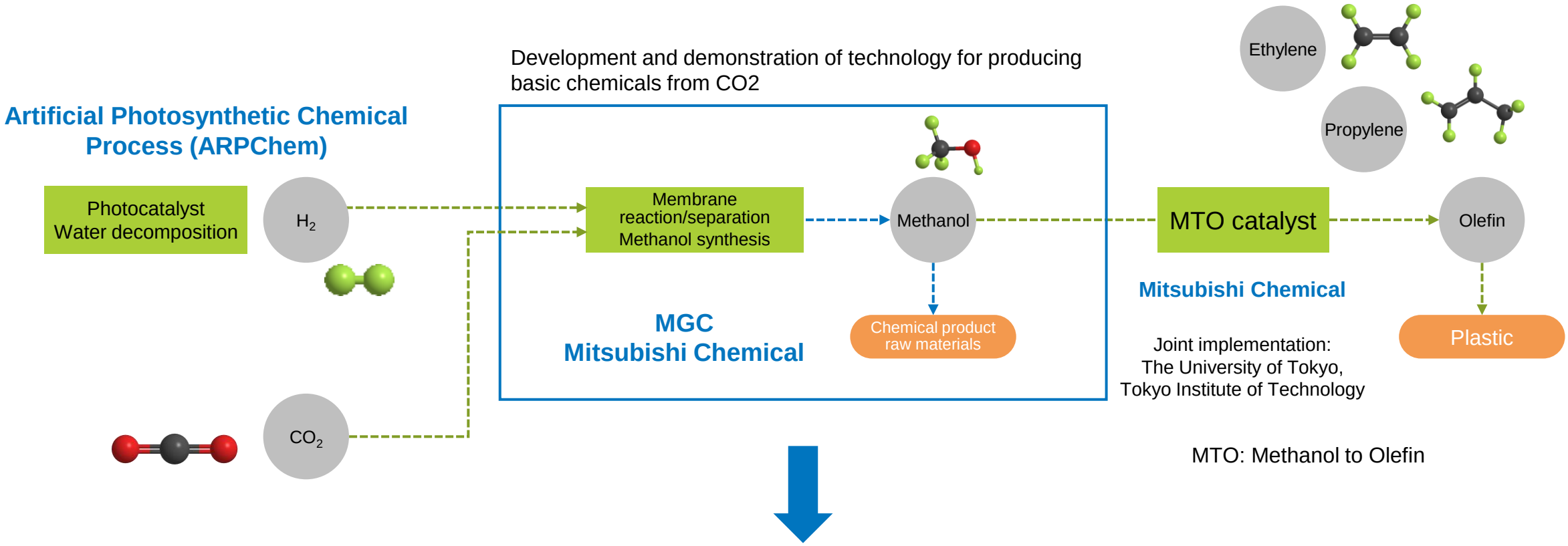
Carbopath™

We have named Circular Carbon Methanol concept “Carbopath™”

The name is derived from “carbon" and “path-finder," and is intended to be a pioneer who actively promotes this concept, as well as to realize carbon neutrality and a circular carbon society. We will guarantee the source and quality of Circular Carbon Methanol and develop the term to indicate the product name, related services, and the concept itself.

Selection as a NEDO GI Fund Project

– MGC and Mitsubishi Chemical selected for Green Innovation Fund ／Development of Technology for Producing Raw Materials for Plastics Using CO2 and Other Sources／[Research and Development 4] “Development of technology for producing chemicals from alcohols” (period of FY2021 to FY2028)



Aiming for high-efficiency production of methanol using CO_2 and green hydrogen as raw materials

Status of Proof of Concept Testing at Niigata Plant

- We have completed proof of concept testing for manufacturing of methanol using CO_2 and hydrogen as raw materials as planned in June 2022.
- Demonstration trials for methanol production using gas from the gasification of biomass and waste plastics were completed as scheduled in June 2023.
- Demonstration trials also are progressing for Circular Carbon Methanol from biogas.
- We continue to develop manufacturing technologies for Circular Carbon Methanol (Carbopath™) from various raw materials, and to promote proof of concept testing.

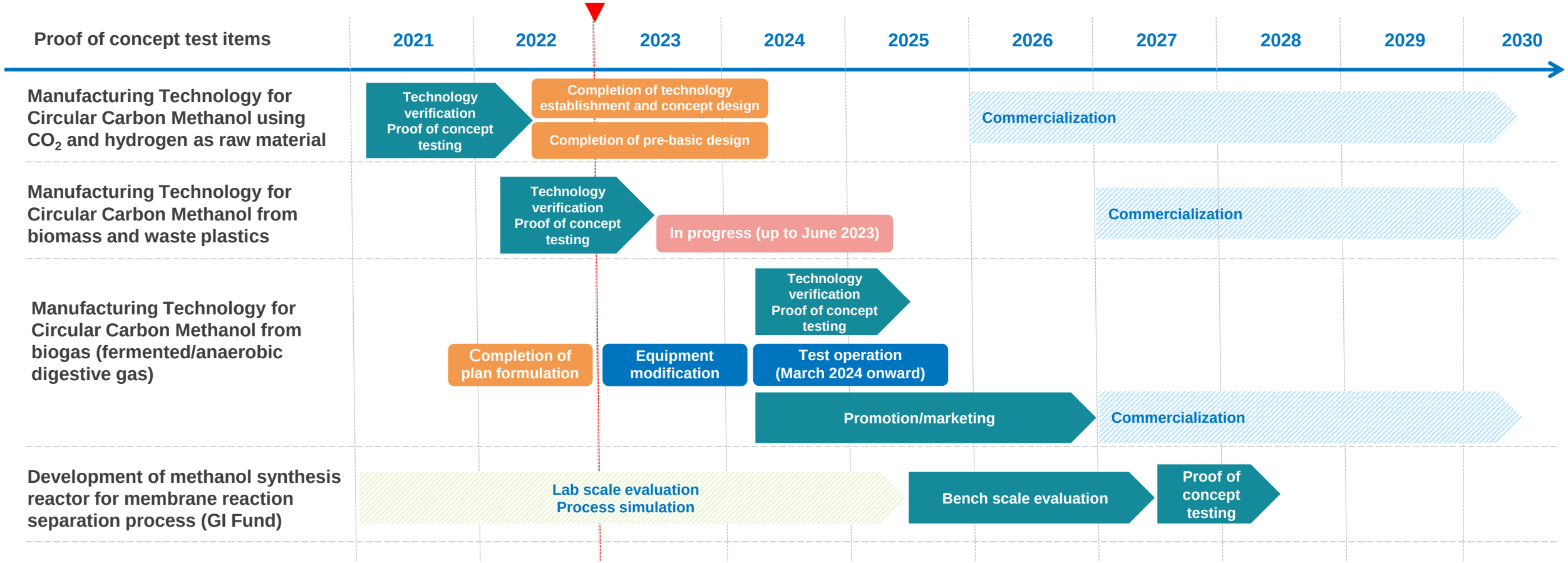


Image for Commercialization and Increasing Scale

– We will aim for the commercialization of Circular Carbon Methanol in the amounts of 100,000 tons by FY2030, and a maximum of 1,000,000 tons from FY2030 onward.

Phase 1

By-product hydrogen, etc. + Utilization of recovered CO_2
Demonstration of Circular Carbon Methanol

– Overseas: Dawn of market for materials and fuels
– Japan: Encourage adoption among sources of demand

● New project creation*

*Waste plastic-based projects also considered in parallel

Up to Tens of thousands of tons

FY2021 onward

Phase 2

Commercialization of Circular Carbon Methanol, using renewable hydrogen

– Overseas: Expansion of market for materials and fuels
– Japan: Start valuation of CO_2 methanol
→ **Establishment as a manufacturing and sales business**

● Utilization of international projects, domestic renewable energy-based projects, and existing business

Up to 100,000 tons

FY2025 onward

Phase 3

Larger scales for Circular Carbon Methanol
Full introduction to primary materials industry

– Expanding value of Circular Carbon Methanol
– Decarbonization in domestic petrochemical industrial complexes
→ **Improvement and extension of business**

● Development of large-scale renewable energy overseas
● Advance of conversion to materials by MTO

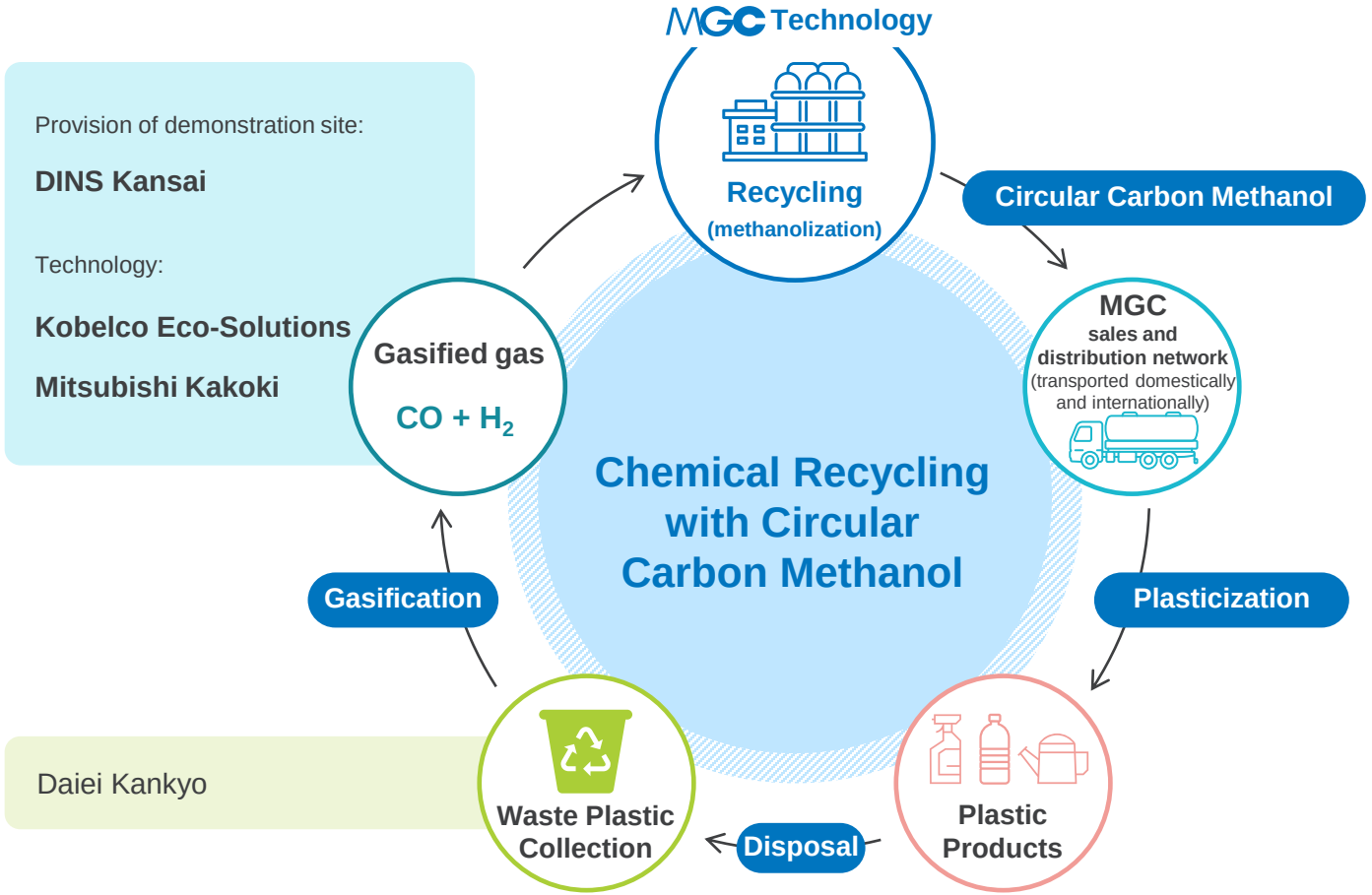
Up to 1,000,000 tons

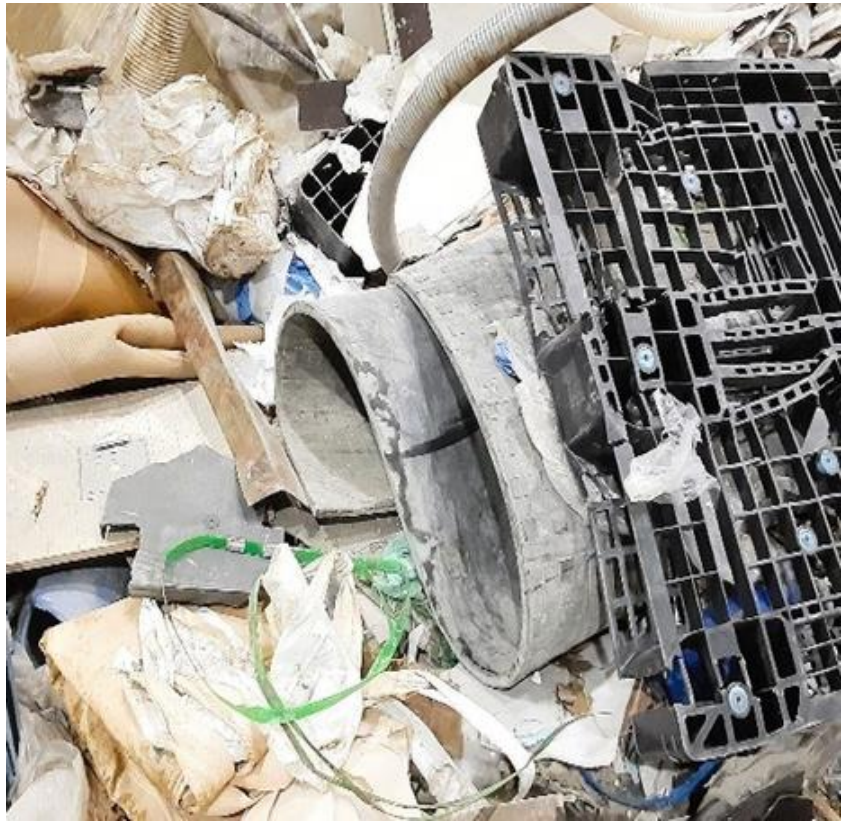
FY2030 onward

Promotion of Circular Carbon Methanol Concept -Example 1-

Launch of Japan's first pilot project for waste plastic gasification and methanol conversion

- Launch of pilot technology for production of methanol from hard-to-recycle plastics with low purity/cleanliness
- Selected for Demonstration Project for a Plastic Resource Circulation System toward a Decarbonized Society supported by a grant covering business expenses for countermeasures to reduce CO_2 sponsored by Japan's Ministry of the Environment
- Construction and operational start by Kobelco Eco-Solutions of pilot system in Osaka Eco Town

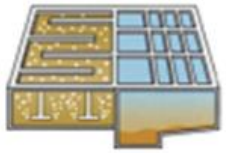




Promotion of Circular Carbon Methanol Concept -Example 2-

Study of bio-methanol production using biogas from a sewage septic center as raw material

Niigogawa Septic Center



Water treatment facility
(aeration, precipitation)

Digestion vat
(methane fermentation equipment)

Biogas holder
(gas adsorption, refining)

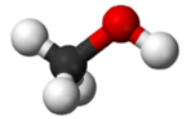
Truck

MGC Niigata Plant

Biogas holder
(receiving tank)

Blending with natural gas

Methanol pilot facility



Carbopath™ bio
(bio-methanol)

Transport: ISO container

Promotion of Circular Carbon Methanol Concept -Example 3-

Start of study on production and sales of the world's first Circular Carbon Methanol made from CO_2 generated from glass production

AGC

CO_2 generated at glass production facilities

CO_2 generated at chemical production facilities, etc.

→

CO_2-derived methanol

Scope of this study

AGC　MGC

→

MGC

Sales

AGC

Use in chemical raw materials

→

AGC

Sale of chemicals based on carbon recycling

→ This study (production and sale of CO_2-derived methanol)

⇢ Future studies (use of CO_2-derived methanol as AGC's chemical raw materials, and sale of chemicals based on carbon recycling)

CO_2

H_2

Methanol synthesis → Methanol refining → **Circular Carbon Methanol**

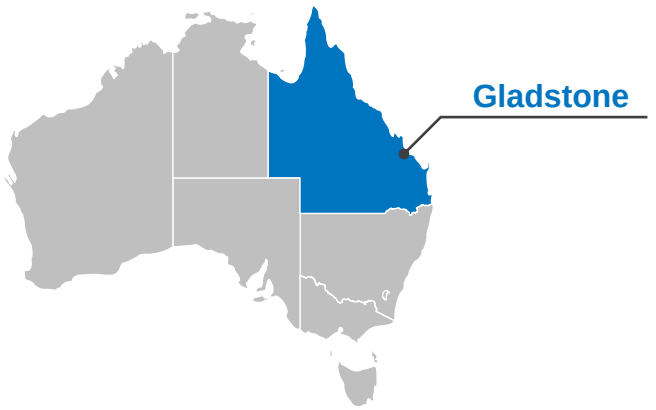
MGC distribution and sales networks

⇠ **In the future, study conversion into raw materials for chemicals** ⇢

Promotion of Circular Carbon Methanol Concept -Example 4-

Studying commercialization in Gladstone (Queensland, Australia)

- MGC signed a memorandum to study commercialization of the production and sale of methanol derived from green hydrogen and CO_2 collected from the Gladstone Plant of Cement Australia Pty Ltd. (Head Office: Queensland, Australia), from application of MGC's own Circular Carbon Methanol production technology.
- Simple feasibility study is currently in progress. (https://www.mgc.co.jp/eng/corporate/news/2022/221028e.html)

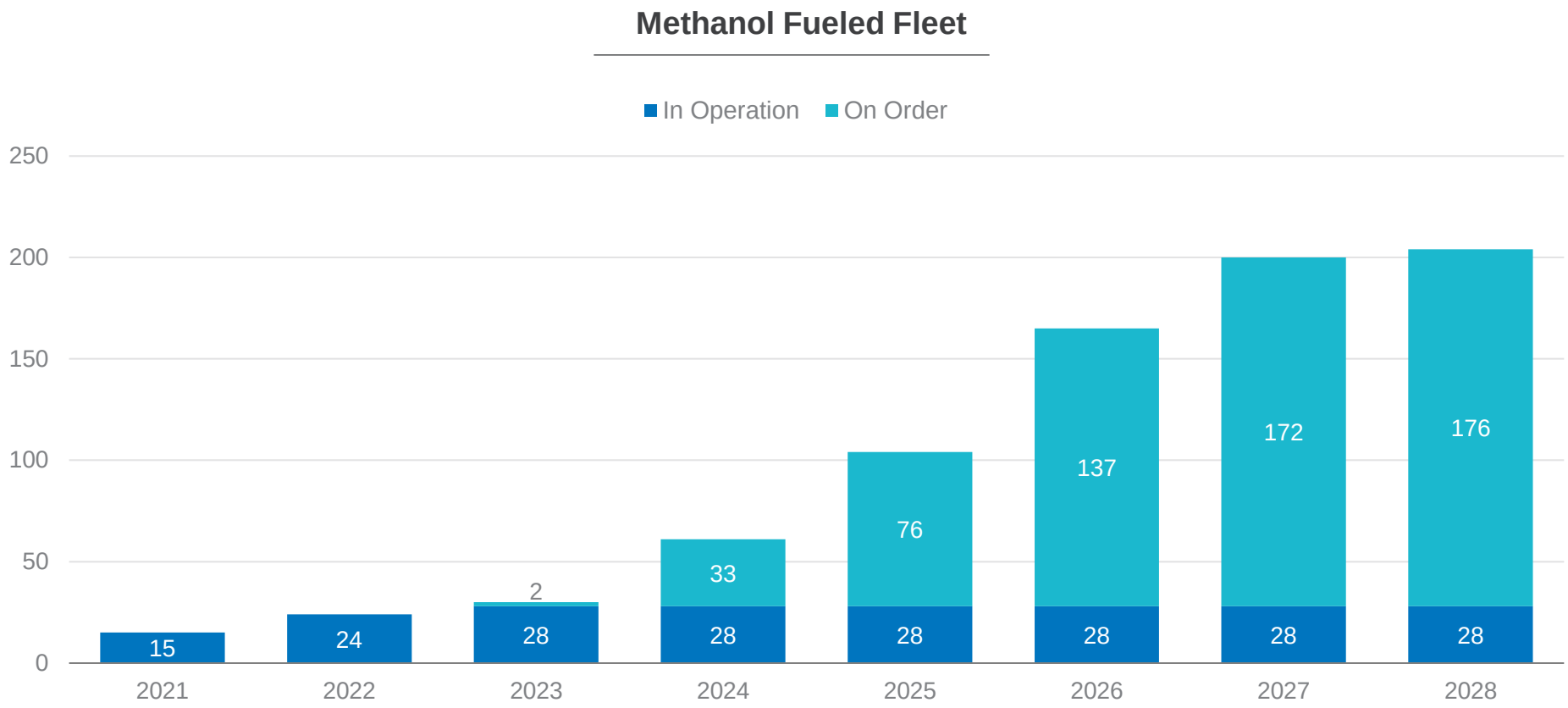


The Gladstone area has a wealth of renewable energy sources, with a host of green hydrogen projects being considered. In addition, thanks to port facilities, highly skilled human resources and other infrastructure in place, the location is considered ideal for a Circular Carbon Methanol business.
The green hydrogen economy is given top priority in the Queensland government's hydrogen industry strategy; the MGC plan is occurring in step with the government's strategy.

Promotion of Circular Carbon Methanol Concept -Example 5-

Dual-fuel methanol carrier

- Compared to burning conventional bunker fuel, methanol fuel significantly cuts SOx, NOx and PM emissions, enabling an up to 15% reduction in CO_2 emissions.
- Orders for methanol-fuel carriers are set to rise, with methanol for use in fuels also expected to grow.



Source: DNV

Promotion of Circular Carbon Methanol Concept -Example 6-

MGC reaches basic agreement with Mitsui O.S.K. Lines (MOL) on long-term time charter contract for dual-fuel methanol carrier

- MGC itself has reached a basic agreement for the long-term charter of a methanol carrier, which can run on either methanol or conventional heavy fuel oil.
- The vessel will be slated for delivery in 2025. It will be the first methanol dual-fuel carrier vessel chartered by a Japanese company under a long-term charter. MGC and MOL aim to further develop the marine transportation of methanol through this agreement.

MITSUBISHI GAS CHEMICAL

Creating value to share with society

News Release

May 19, 2023

MITSUBISHI GAS CHEMICAL COMPANY, INC.

Mitsubishi Gas Chemical Reaches Basic Agreement with Mitsui O.S.K. Lines on Long-term Time Charter Contract for Dual-fuel Methanol Carrier

Mitsubishi Gas Chemical Company, Inc. (MGC; Head Office: Chiyoda-ku, Tokyo; President: Masashi Fujii) today announced the signing of basic agreement with Mitsui O.S.K. Lines, Ltd. (MOL; Head Office: Minato-ku, Tokyo; President & CEO: Takeshi Hashimoto) on 28 April, 2023 for the long-term charter of a methanol carrier, which can run on either methanol or conventional heavy fuel oil. The vessel, slated for delivery in 2025, will be built at Hyundai Mipo Dockyard.

Since MGC chartered Japan's first methanol carrier, the KOHZAN MARU (first generation), from MOL in 1983, the two companies have built a partnership centered on the marine transportation of methanol. This vessel will be the first methanol dual-fuel carrier vessel chartered by a Japanese company under a long-term charter, and the two companies aim to further develop the marine transportation of methanol through this agreement.

ISCC PLUS Certification Status

Product	Site	Status
Methanol	Japan (MTI, Methanol Division) Singapore (MGC-S)	“Trader with Storage” certification received
	Japan (NF)	Manufacturing certification planned
Polyacetal	Thailand (TPAC), Korea (KEP)	Manufacturing certification received
	United States (GPAC-USA, MEP-A)	“Trader with Storage” certification received
	Korea (KPAC)	“Trader” certification received
Polycarbonate	Thailand (TPCC)	Manufacturing certification received
	Japan (KF, KPC, MFS)	Manufacturing certification planned
	Japan (MEP, MTI, Engineering Plastics Division)	“Trader with Storage” certification planned

3. Promotion of CCS Utilization

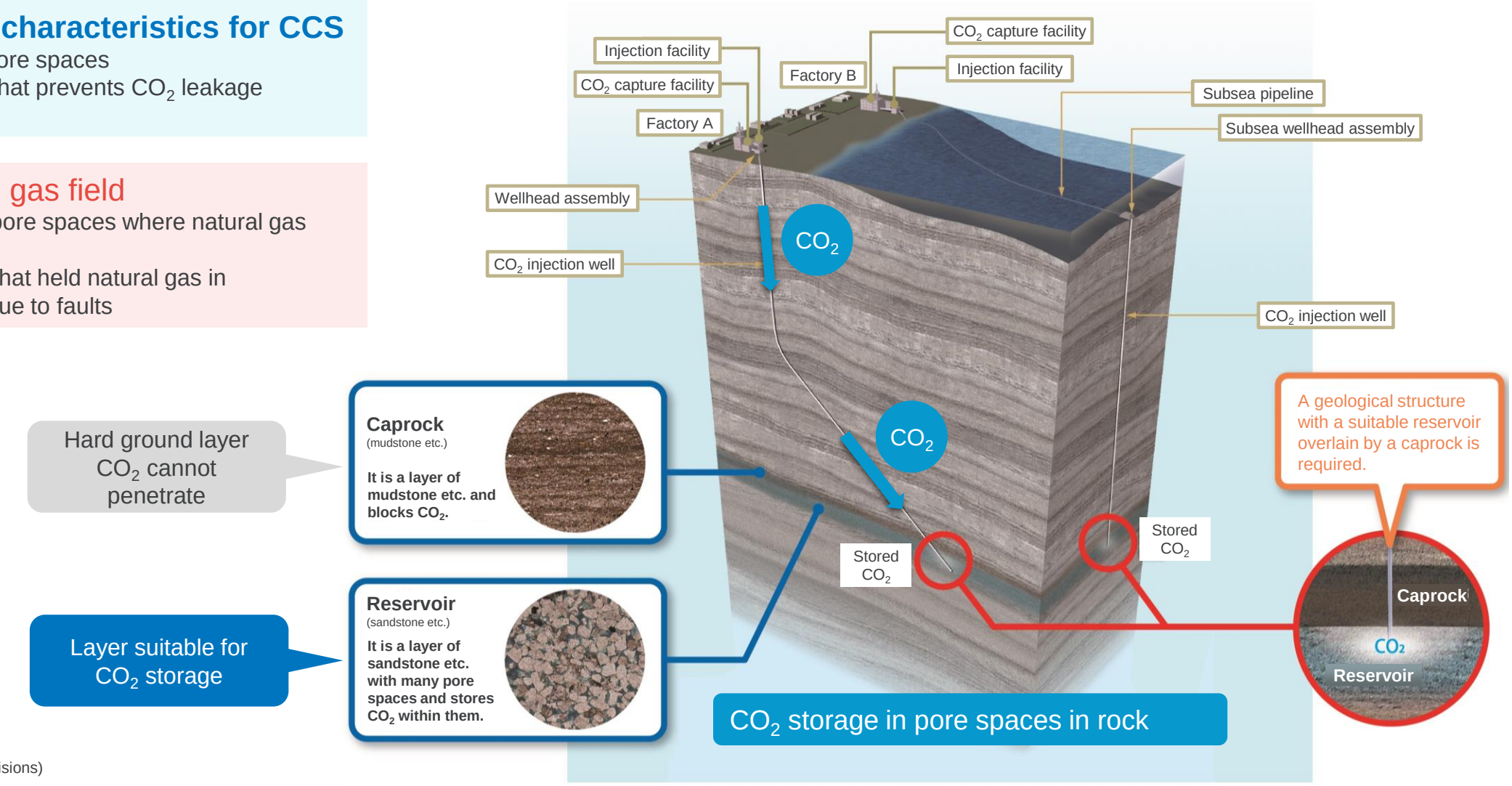
CCS (Carbon Dioxide Capture & Storage)

Key ground layer characteristics for CCS

- Reservoir with many pore spaces
- Fine-grained caprock that prevents CO_2 leakage
- No faults

Features of natural gas field

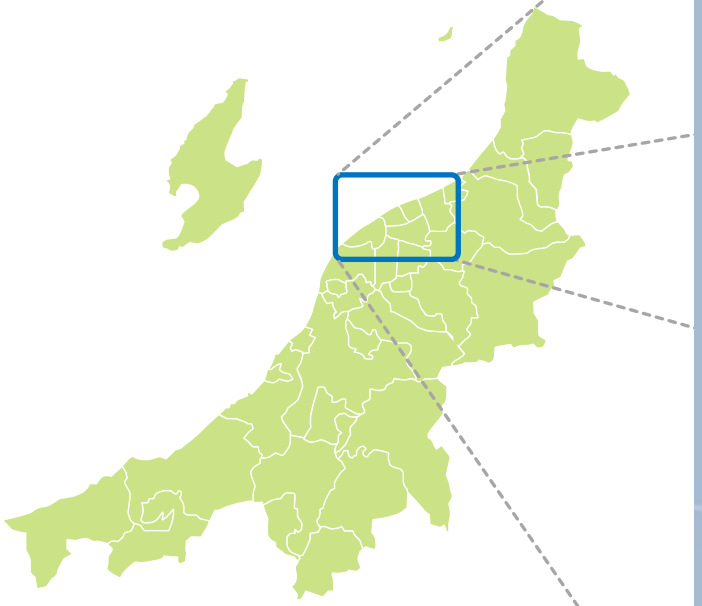
- Reservoir with lots of pore spaces where natural gas was stored
- Fine-grained caprock that held natural gas in
- No natural gas leaks due to faults

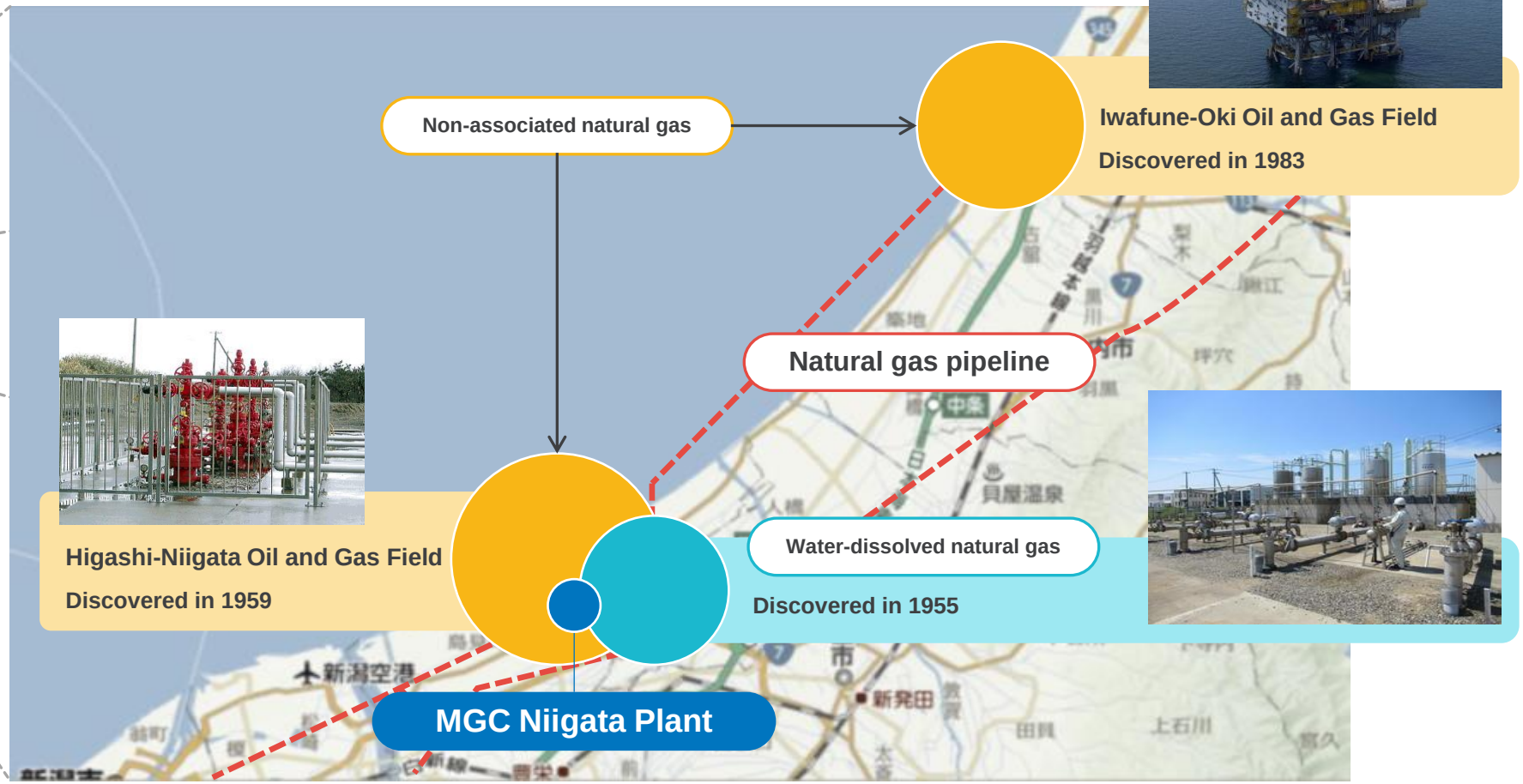


Source: Japan CCS Co., Ltd. (with revisions)

MGC Strengths

- Ownership of natural gas and water-dissolved natural gas fields (Higashi-Niigata Oil and Gas Field and Iwafune-Oki Oil and Gas Field)
- Existing natural gas fields as carbon neutral infrastructure enabling development for CO_2 storage and usage



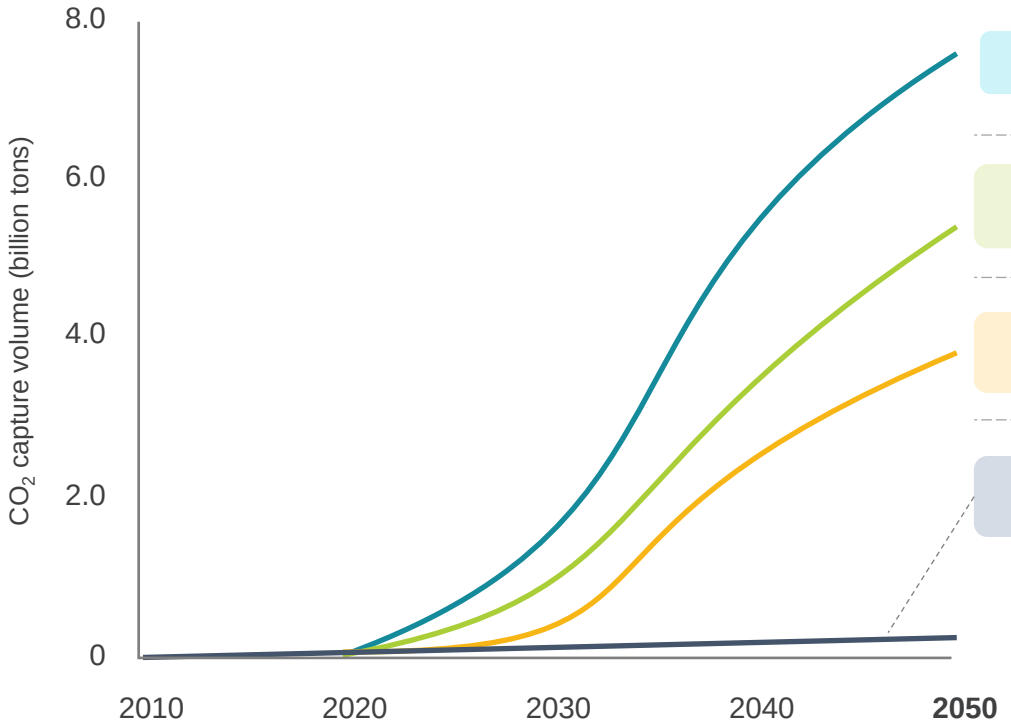


Promotion of CCS Utilization: METI Long-term CCS Roadmap

– In Japan, the Ministry of Economy, Trade and Industry (METI)'s Long-term CCS Roadmap Study Committee announced the final wrap-up in March 2023

IEA estimation of CO_2 recovery volume

(IEA, 2021, World Energy Outlook 2021)



	CO_2 capture volume in 2050	CCS scale for Japan in 2050
2050 net zero scenario	7.6 billion t/yr.	0.24 billion t/yr.
Sustainable development scenario	5.4 billion t/yr.	0.17 billion t/yr.
Declared commitment scenario	3.8 billion t/yr.	0.12 billion t/yr.
Declared policy scenario	0.2 billion t/yr.	0.06 billion t/yr.

x 95%*1 x 3.3%

*1 The "2050 net zero scenario" assumes storage underground of 95% of captured CO_2 in ground layers.

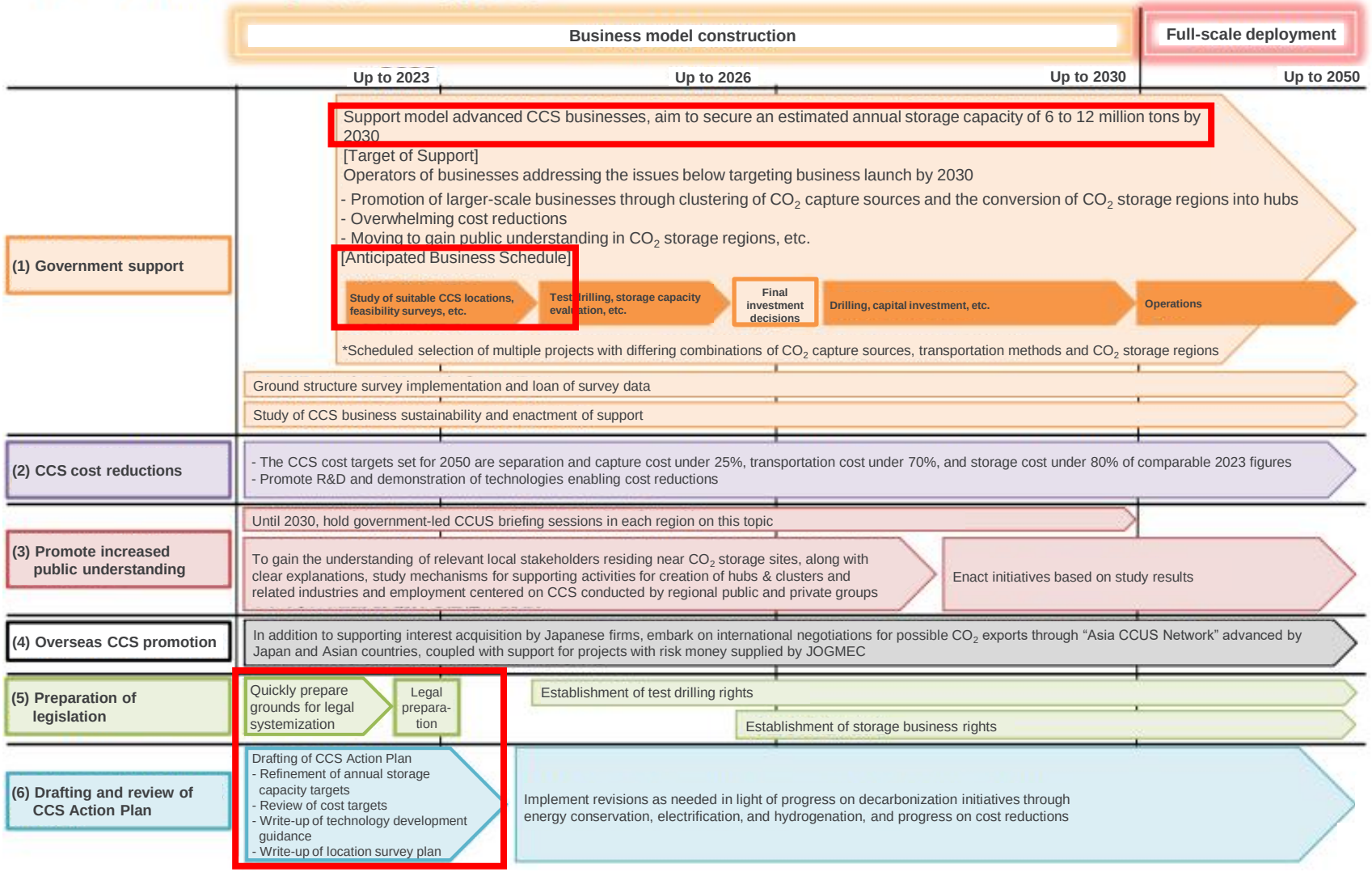
Depending on the scenario, Japan is also estimated to require approx. 0.12 billion to 0.24 billion t/yr. for CCS.

Source: Developed based on materials from May 2023 final wrap-up of METI Long-term CCS Roadmap Study Committee

Promotion of CCS Utilization: METI Long-term CCS Roadmap

- Beyond commitment to preparing the business environment for enterprises to launch CCS businesses by 2030, also offered explicit actions for preparing legal grounds

Long-term CCS Roadmap (Cont'd)



Source: Materials from March 2023 final wrap-up of METI Long-term CCS Roadmap Study Committee

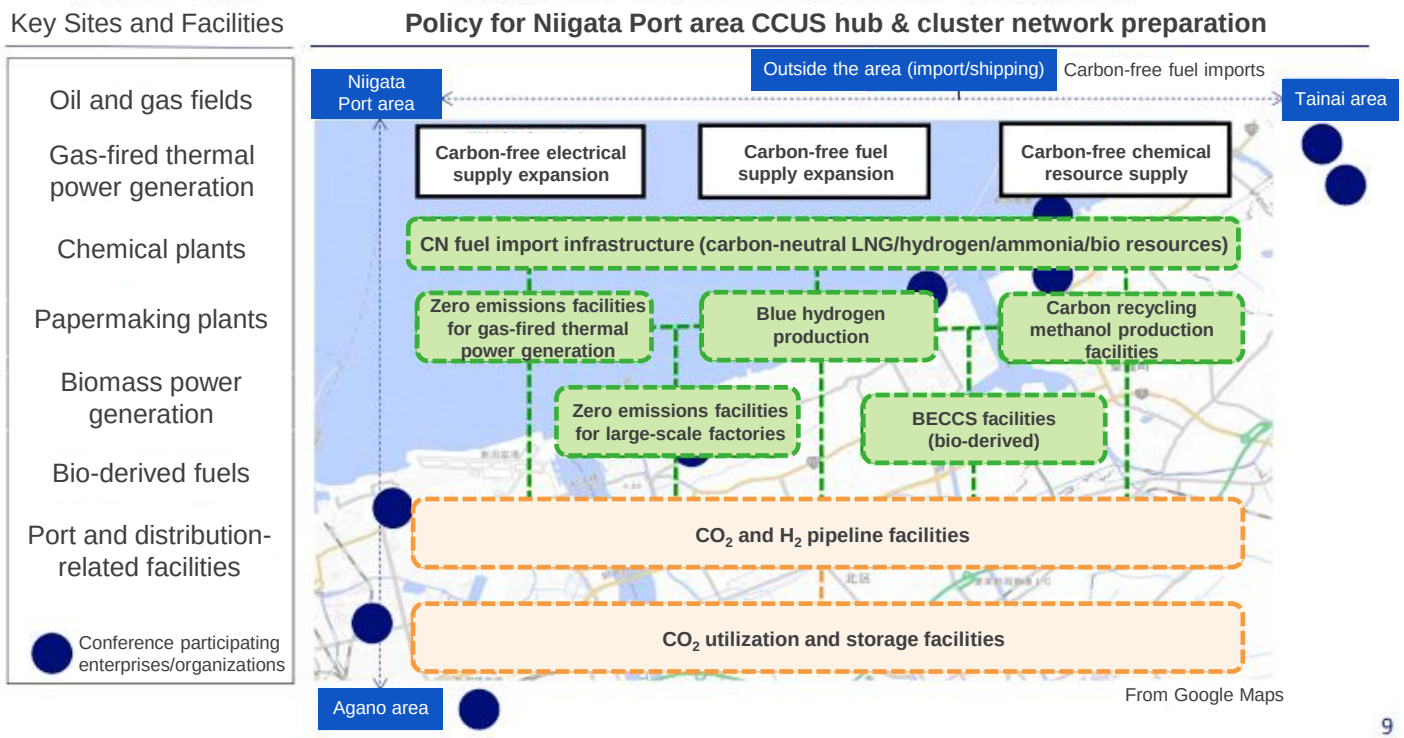
CCS Utilization Promotion: CCUS Hub & Cluster Network Development Concept in Niigata Prefecture

- Niigata Prefecture has a declared aim of effectively zero greenhouse gas emissions by 2050
- The prefecture wrapped up the “Niigata Prefecture Carbon Neutral Industry Vision and Business Model Development Roadmap” in March 2021, and the “Niigata CCUS Hub & Cluster Network Development Concept” in March 2022. The “Carbon Neutral Network Development and Infrastructure Preparation Strategy” was formulated in March 2023.

Initiatives in Tainai area, Niigata

(A) Niigata Area CCUS Hub & Cluster Network Development Concept (multiple enterprises)

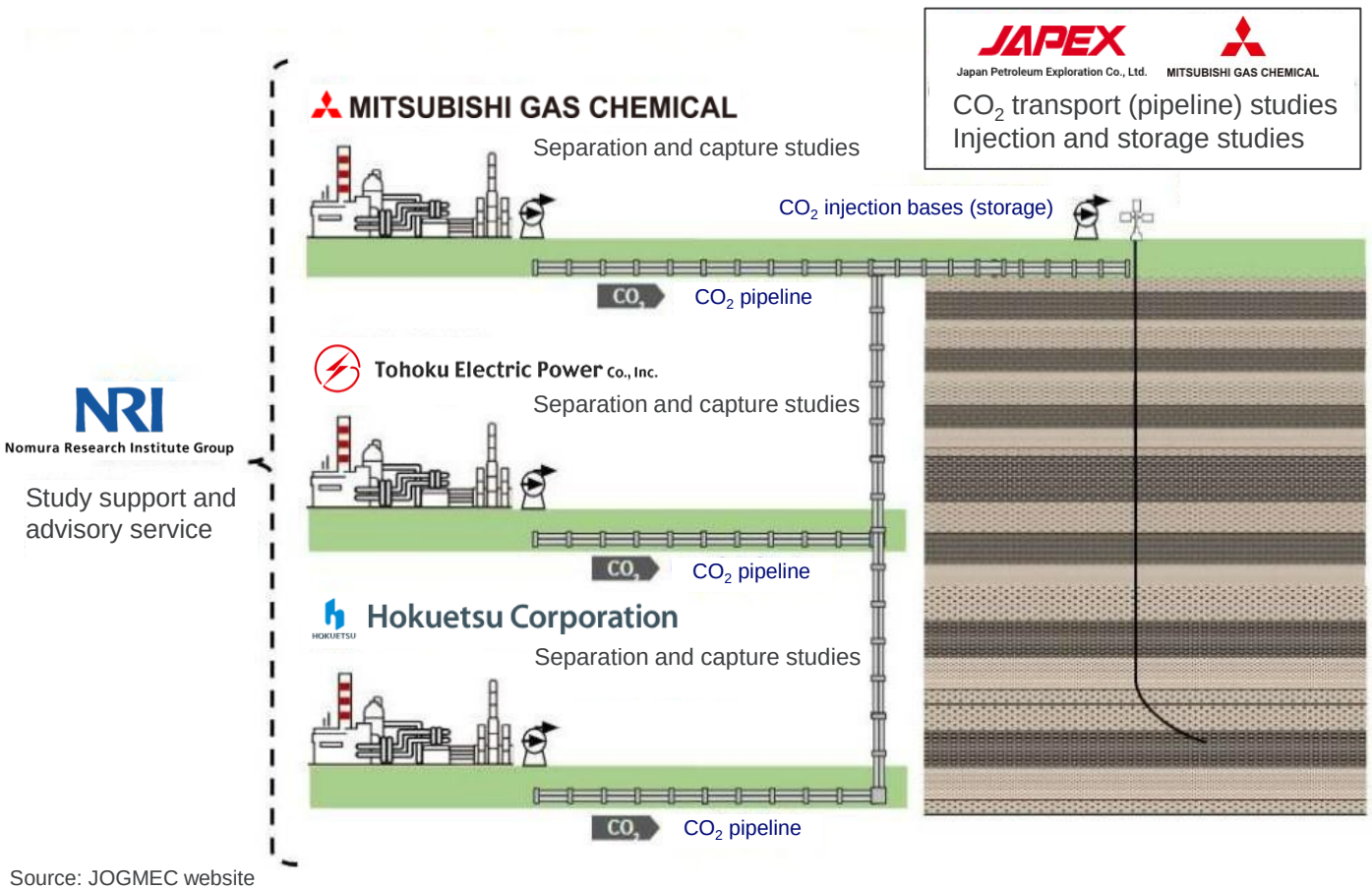
■ **Start from this fiscal year of F/S by Tohoku Electric Power, MGC, JAPEX and NRI ahead of CCUS infrastructure preparation**

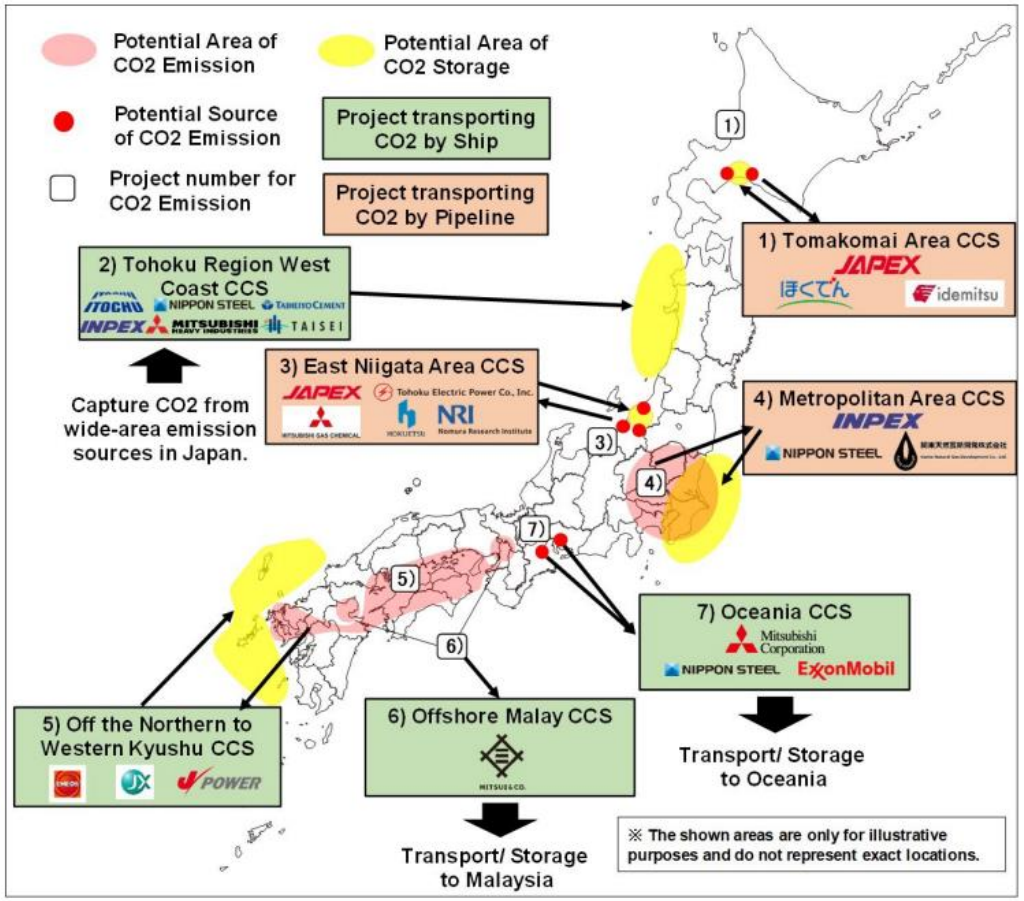


Source: Materials from March 2023 Niigata Prefecture Carbon Neutral Network Development and Hydrogen Use Promotion Council’s “Niigata Carbon Neutral Network Development and Infrastructure Preparation Strategy”

CCS-related Initiatives at MGC (1): Advanced CCS Business

- "Higashi-Niigata Area CCS" selected as one of seven sites nationwide identified through public bidding to assume projects from the "Feasibility Study Concerning Implementation of Advanced CCS Businesses" conducted by Japan Organization for Metals and Energy Security (JOGMEC) in fiscal 2023
- Five-company alliance: MGC, Tohoku Electric Power, Hokuetsu Corporation, Japan Petroleum Exploration (JAPEX), Nomura Research Institute (NRI)
- Aim for business launch by 2030, with target CO_2 storage of 1.5 million t/yr.

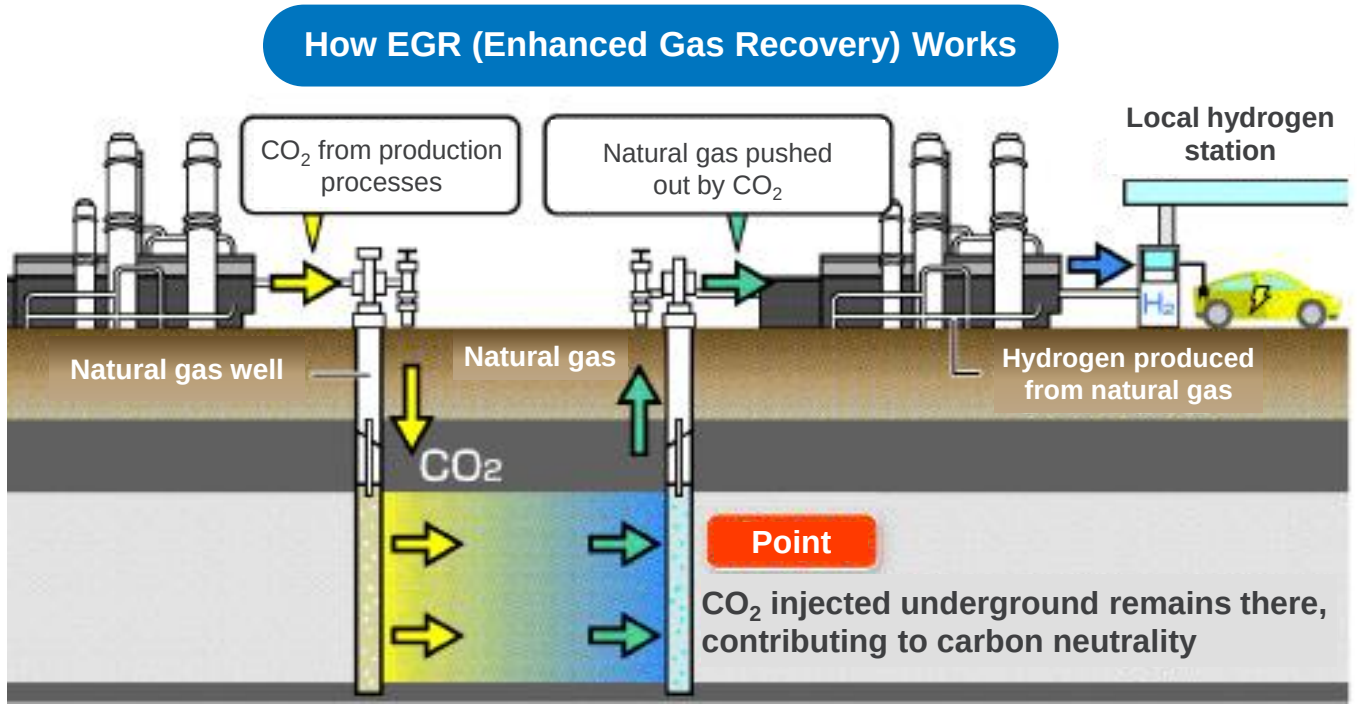




Source: JOGMEC website

CCS-related Initiatives at MGC (2): Study of CCUS for EGR in Non-Associated Natural Gas Fields

- Investigation of repurposing of existing wells as CO_2 injection wells to increase recovery of natural gas
- MGC has been entrusted to conduct the business project openly recruited by JOGMEC and has launched a study exploring the repurposing of existing non-associated gas wells as CO_2 injection wells for EGR (Enhanced Gas Recovery).
- The push effect from the CO_2 should not only increase natural gas production but is expected to function as a carbon offset by fixing CO_2 underground. As such, this initiative will yield much the same effect as CCS, one measure for greenhouse gas reduction ahead of achieving carbon neutrality by 2050.
- Knowledge gained through this investigation is expected to contribute to promotion of CO_2-EGR/EOR (Enhanced Oil Recovery) in oil and gas fields in Japan.

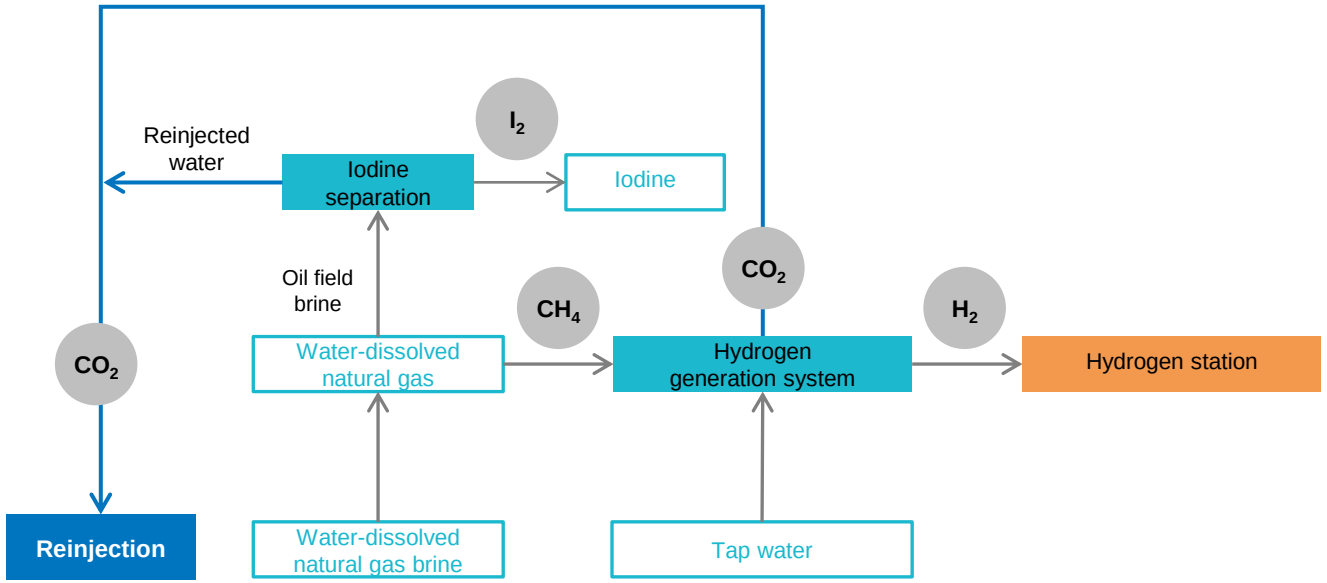


Source: Niigata Nippo (Niigata Daily News), January 1, 2022

CCS-related Initiatives at MGC (3): Study of CCS in Water-Dissolved Natural Gas Fields

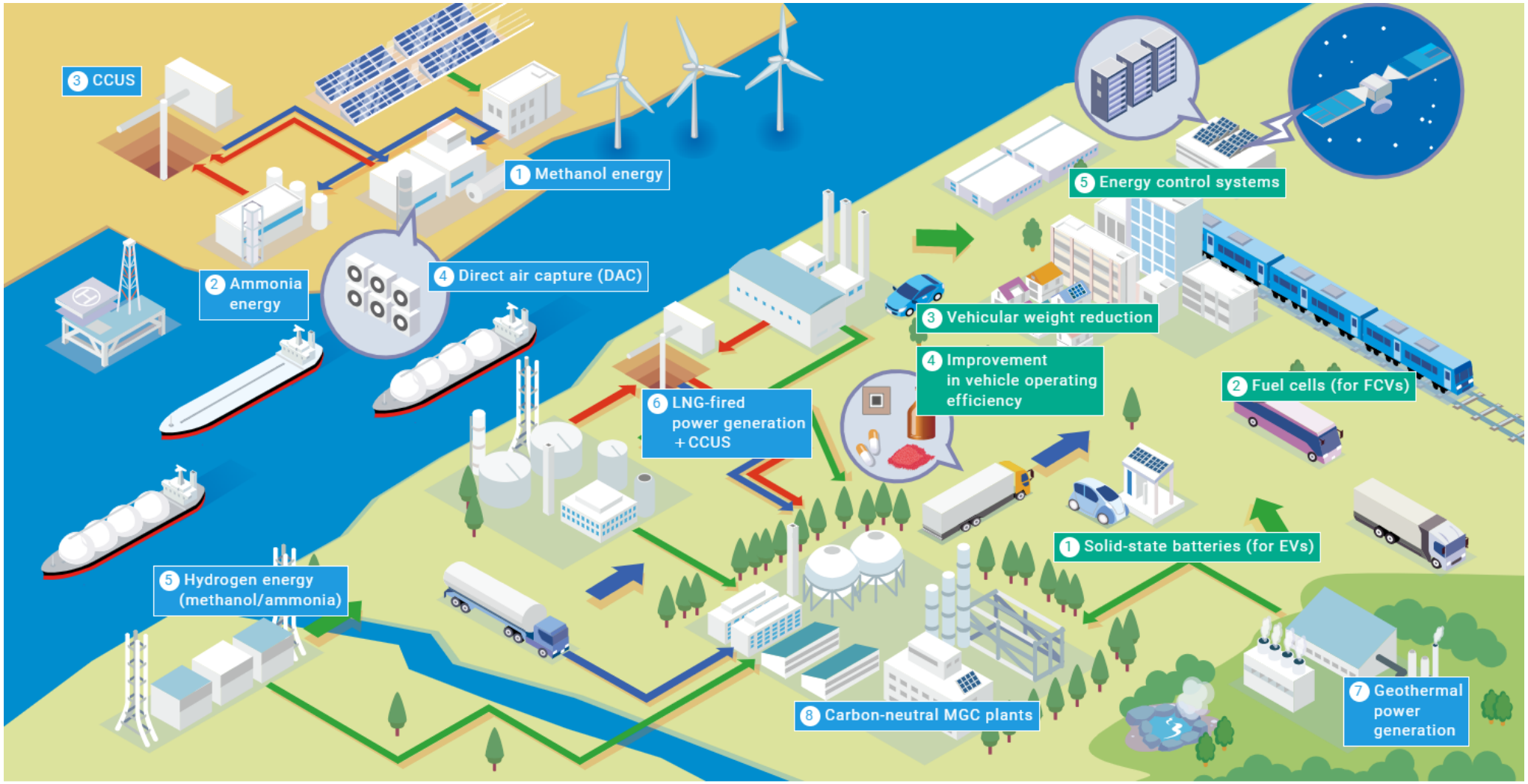
- Promoting initiatives for bringing CCS to water-dissolved gas fields, and for “blue hydrogen” production
- Business feasibility study will be conducted until FY2023; decision to achieve proof-of-concept by 2030

After extracting natural gas and iodine from water-dissolved natural gas brine, once hydrogen is separated from the natural gas, the resulting CO_2 will be injected underground with the brine, allowing blue hydrogen production to be attempted.



Carbon Neutral World of 2050 as Imagined by MGC

– As a chemical manufacturer, we are in a perfect position to positively impact the earth's environment.



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