



# NEDO's Activities on Carbon Recycling

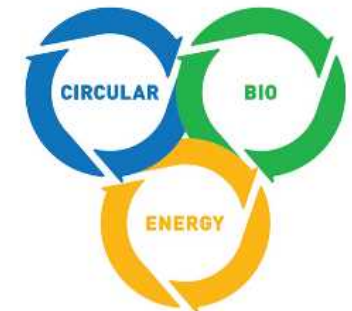
March, 2023

New Energy and Industrial Technology Development Organization

Environment Department

Director / Project Manager

Jun Yoshida, Ph.D.

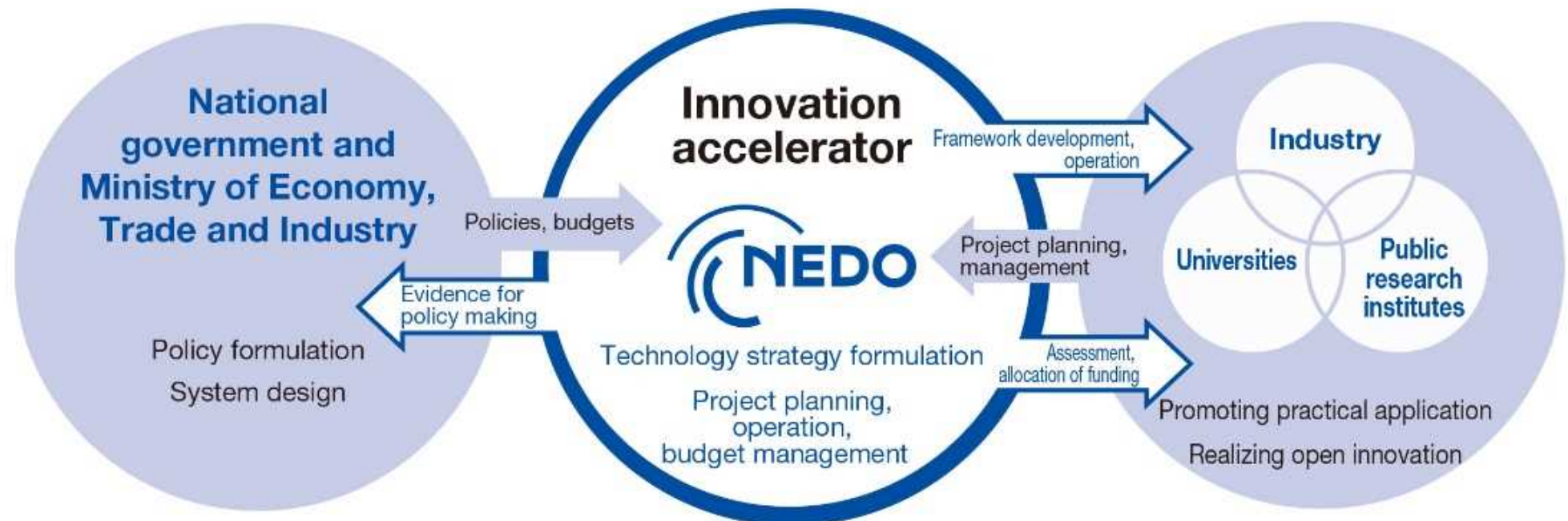


# About NEDO

## Our Missions

- Addressing energy and global environmental problems
- Enhancing industrial technology

## Our Functions



# NEDO's Activity Areas and Budget (FY2022)

FY2022 tentative budget; 1.28 billion US Dollars

## Energy Systems (472 million US dollars)

- System provision technology
- Energy technology such as batteries
- Technology related to hydrogen production, storage, transport, and use
- Renewable energy technology

## Industrial Technology (350 million dollars)

- Robot and AI technology
- IoT, electronics, and information technology
- Manufacturing technology
- Materials and nanotechnology
- Biotechnology

## Energy Conservation and Environment (341 million dollars)

- Technology to harness unutilized thermal energy
- Environmentally-friendly steel manufacturing technology
- Development of high-efficiency coal-fired power generation technology
- CO<sub>2</sub> capture, utilization and storage
- Fluorocarbon recovery technology
- 3R technology, including resource screening and metal refining technology
- International demonstrations, Joint Crediting Mechanism activities, and others

## New Industry Creation and Discovery of Technology Seeds (57 million dollars)

- Fostering technology-based startups
- Promotion of open innovation

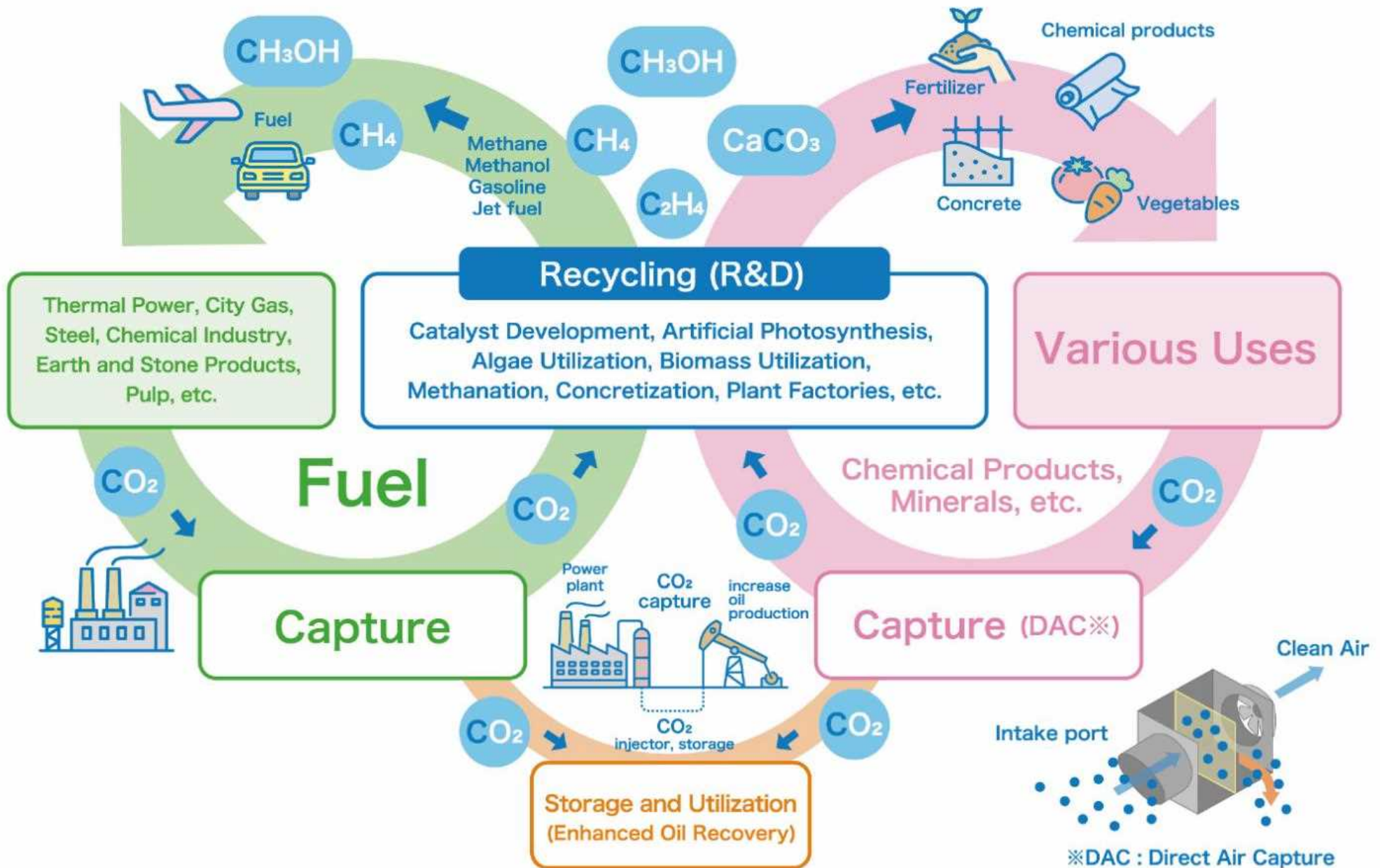
\*In addition to the above, the following programs will be funded and conducted as publicly solicited research and development projects.

- Moonshot Research and Development; 206 million USD
- Research and Development Project for Enhancement of the Bases for Post-5G Information and Communication Systems; 2.5 million USD
- Green Innovation Fund Projects; 16.3 billion USD
- Program for Developing Important Economic Security Technologies; 1.02 billion USD
- Programs for Specified Semiconductor Production-Related Development; 5.04 billion USD

# About Carbon Recycling

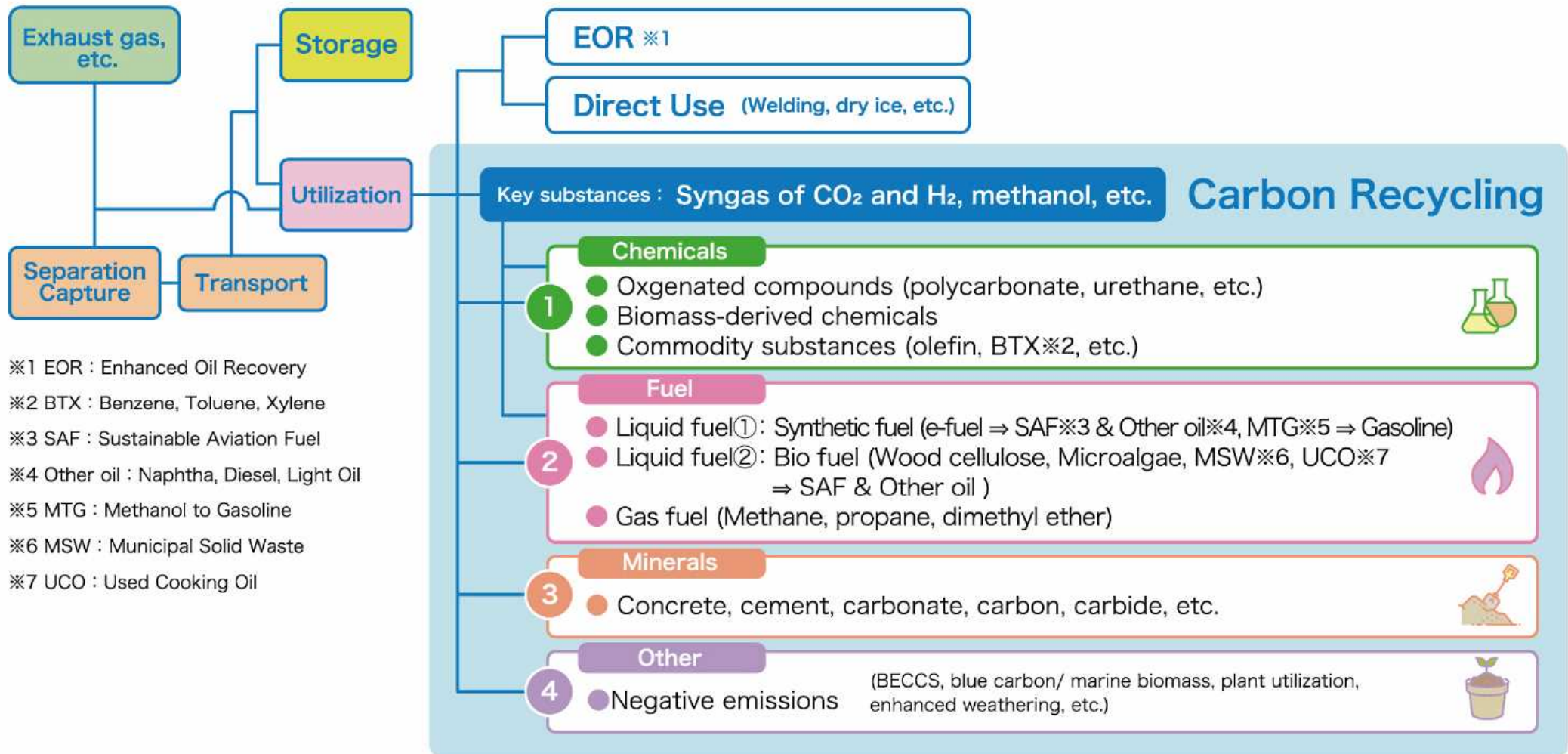
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# Concept of Carbon Recycling





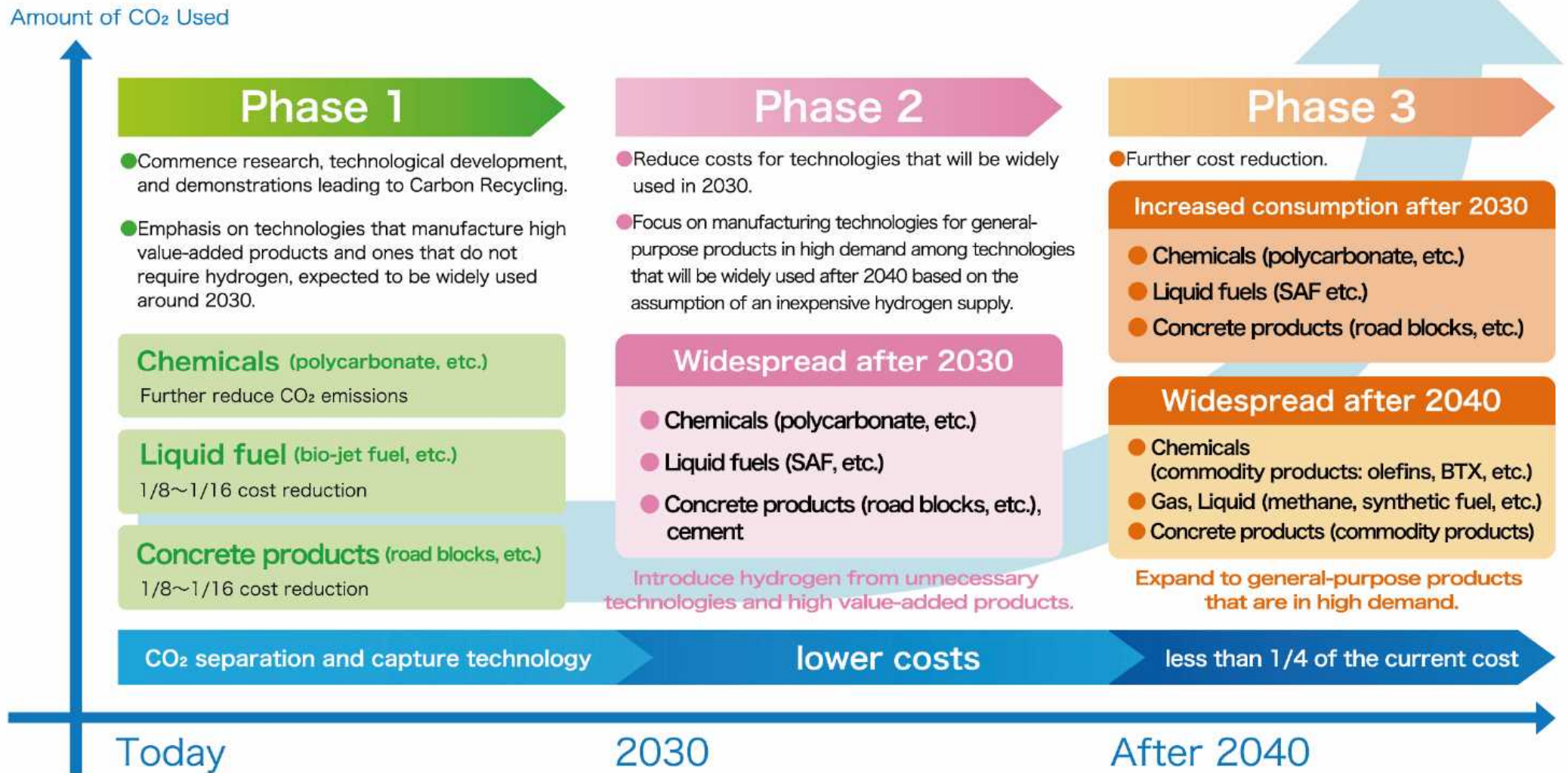
# Products of Carbon Recycling



- ※1 EOR : Enhanced Oil Recovery
- ※2 BTX : Benzene, Toluene, Xylene
- ※3 SAF : Sustainable Aviation Fuel
- ※4 Other oil : Naphtha, Diesel, Light Oil
- ※5 MTG : Methanol to Gasoline
- ※6 MSW : Municipal Solid Waste
- ※7 UCO : Used Cooking Oil

Source: Prepared by NEDO based on "Roadmap for Carbon Recycling Technologies" (Ministry of Economy, Trade and Industry)

# Carbon Recycling Technology Roadmap



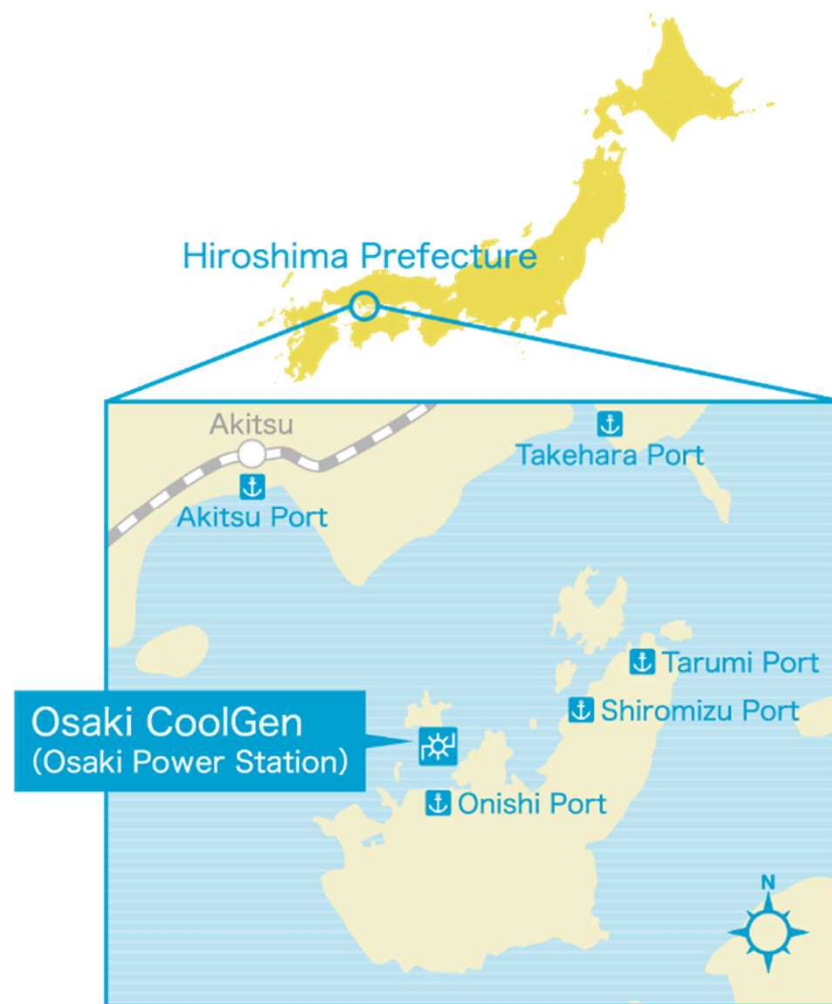
Source: Prepared by NEDO based on "Roadmap for Carbon Recycling Technologies" (Ministry of Economy, Trade and Industry)

# “Osaki CoolGen” Project and Carbon Recycling RD&D Base

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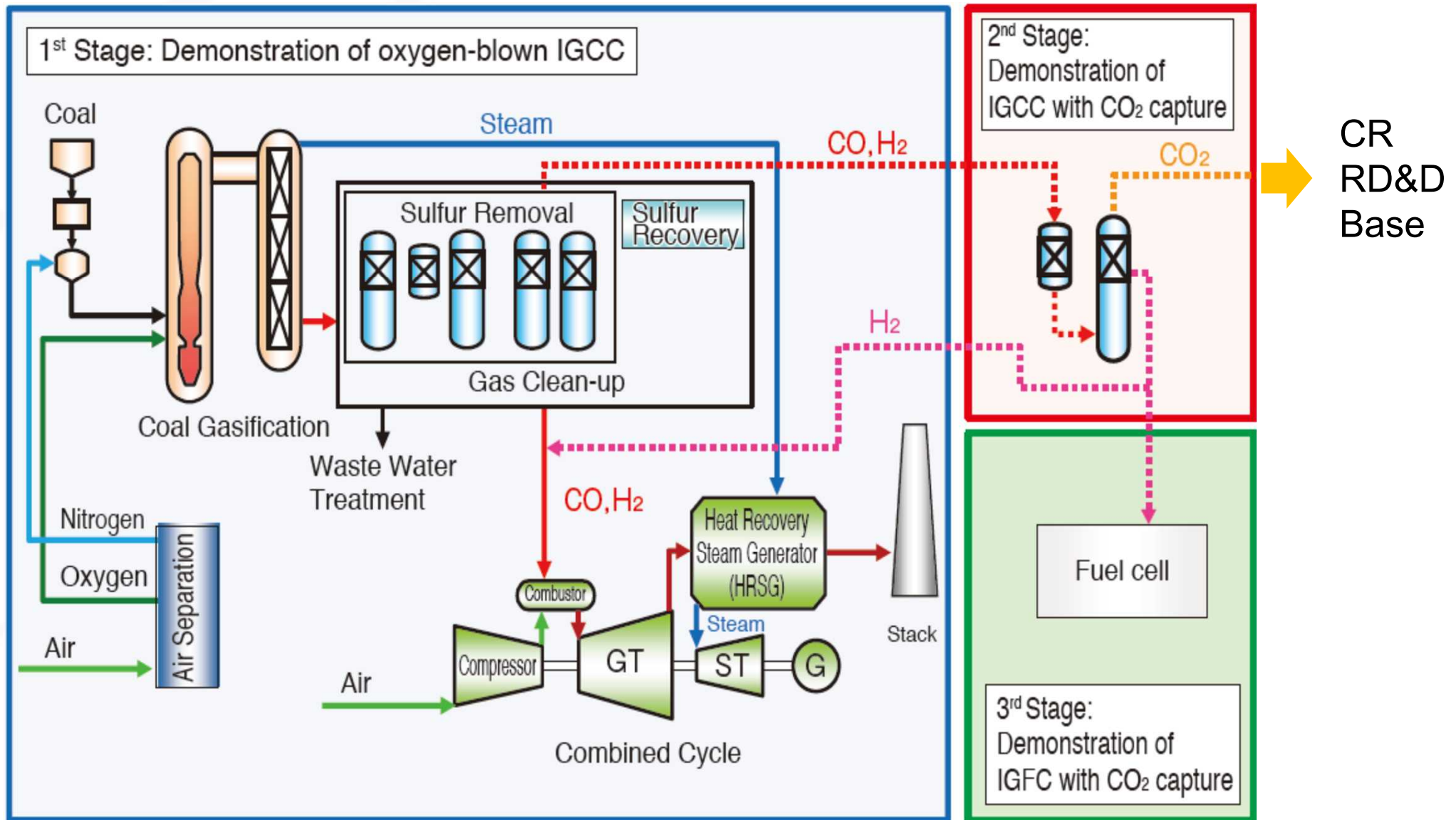


# “Osaki CoolGen” Project Site for Integrated Coal Gasification Combined Cycle & Carbon Recycling

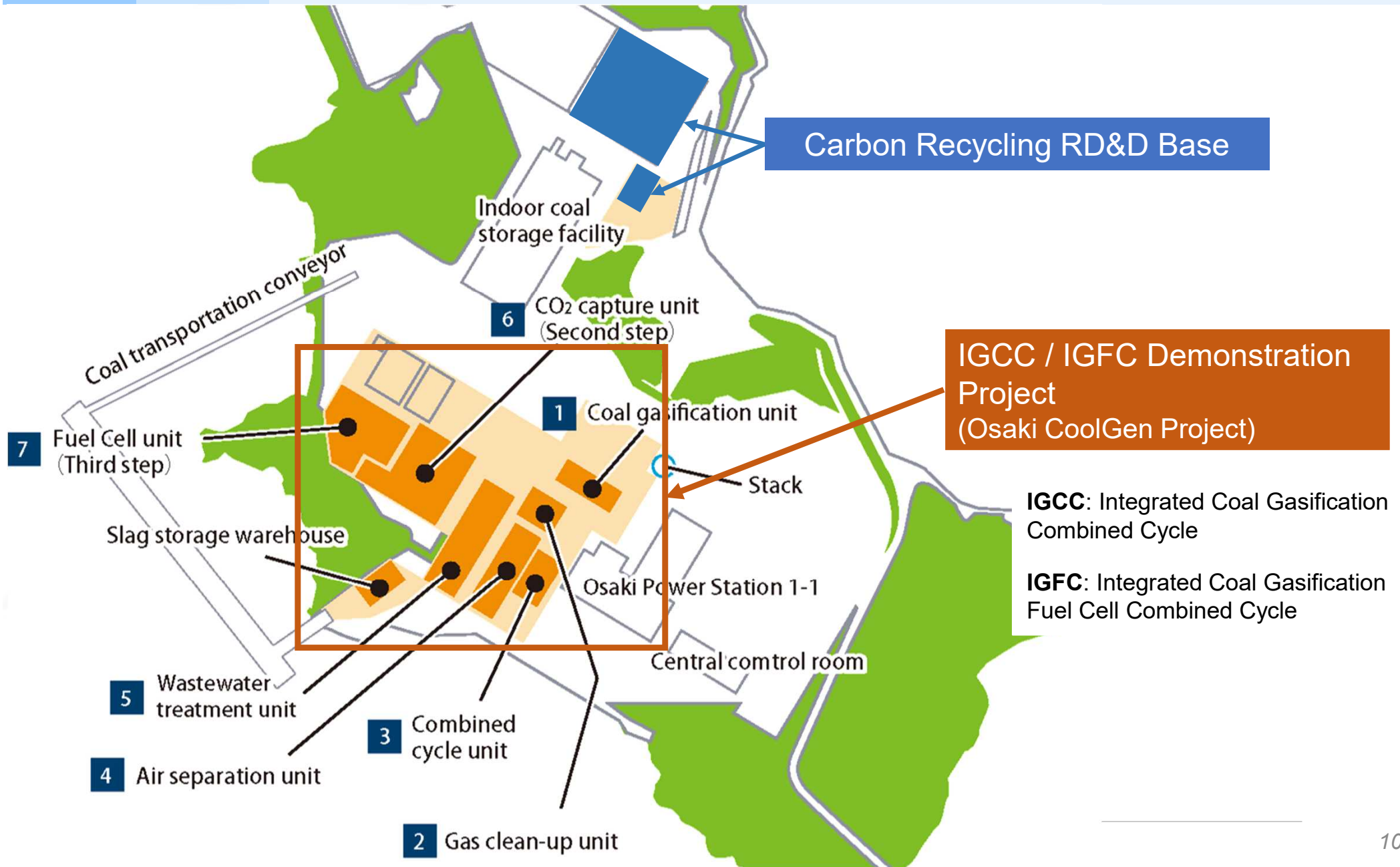


Osaki Kamijima, Hiroshima Prefecture

# Outline of IGCC / IGFC System for Osaki CoolGen Project

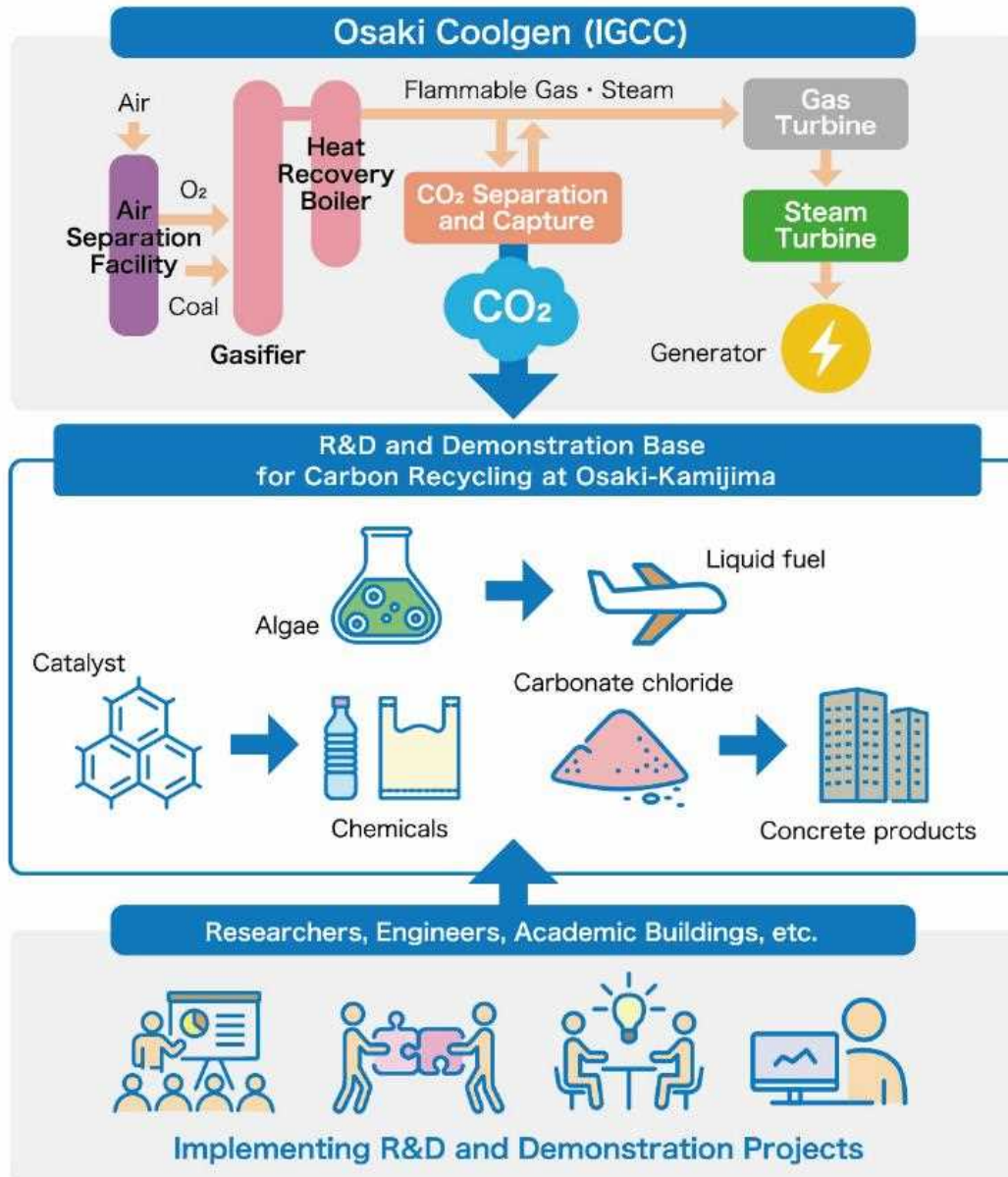


# Facilities at Osaki CoolGen Site





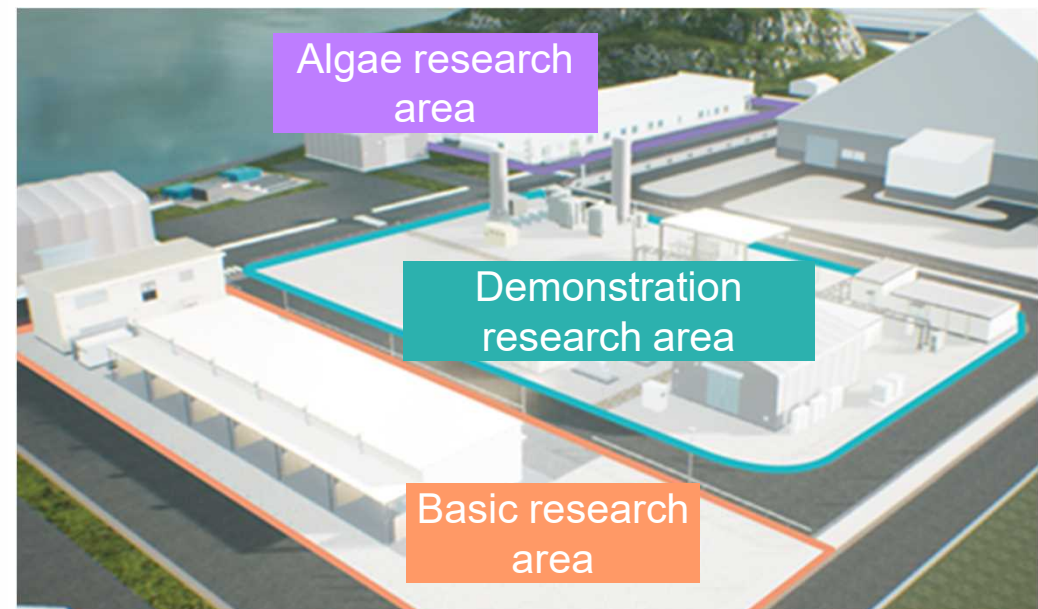
# Outline of Carbon Recycling RD&D Base at Osaki Kamijima



Project started since 2020

Full operation since 2022 May

11 research teams consists of 22 entities are working at the base



Source: Prepared by NEDO based on "Progressive Environmental Innovation Strategy" (Ministry of Economy, Trade and Industry)



# Sub-projects of Carbon Recycling RD&D Base (1)



## Demonstration Research Area

Sub-projects	Contractors
Development of efficient CO <sub>2</sub> -use concrete	The Chugoku Electric Power Co., Inc, Kajima Corporation and Mitsubishi Corporation
Development of Gas-to-Lipids Bioprocess	Hiroshima University and Chugoku Electric Power Co., Inc.
Research on selective synthesis technology of chemical products for carbon recycling	Kawasaki Heavy Industries, Ltd. and Osaka University
Demonstration of carbon recycling technology using seawater for multiproduct delivery	Waseda University and Sasakura Corporation

## Algal Research Area

Sub-projects	Contractors
Establishment of a research & technology center for industrialization of bio-jet fuel and improvement of CO <sub>2</sub> utilization efficiency with microalgae	Institute of Microalgal Technology, Japan (IMAT)

# Sub-projects of Carbon Recycling RD&D Base (2)



## Basic Research Area

Sub-projects	Contractors
Producing key raw materials using diamond electrode from CO <sub>2</sub> in the coal power plant emission gases	Keio University, Tokyo University of Science and JCOAL
R&D on the methods for CO <sub>2</sub> decomposition / reduction processes using atmospheric pressure plasma	Tokai National Higher Education & Research System and Kawada Industries, Inc.
Development of the technologies for production and utilization of Algal biomass for efficient utilization of CO <sub>2</sub>	Nippon Steel Corporation
Synthesis of silicon carbide from industrial waste using CO <sub>2</sub> as carbon source	Tohoku University
R&D of the technologies and processes for carbon-recycled LPG production	ENEOS GLOBE Corporation, Nippon Steel Corporation and Toyama University
R&D on CO <sub>2</sub> fixation and useful chemicals production using microalgae	Algal Bio Co., Ltd. and Kansai Electric Power Co., Inc.

## Demonstration Research Area

Technology demonstration of  
CO<sub>2</sub>-Use Concrete





## Algal Research Area

Algae cultivation room operated by IMAT





## Basic Research Area

(Left) Basic Research Building with six laboratory rooms

(Right) Common Use Building consists of conference rooms, an analysis room, etc.





Thank you for your attention.