APEC EGNRET 61, Jan 16-17th

New and Renewable Energy Development

January 16-17th, 2025

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2050 Carbon-Neutral Declaration and 2030 Climate Goal

- In October 2020, Prime Minister Suga declared that **Japan aim to reduce greenhouse gas emissions to net-zero by 2050,** that is, to realise a carbon-neutral, decarbonised society.
- At the Leaders Summit on Climate in April 2021, Prime Minister Kishida announced that **Japan aims to reduce its GHG emissions by 46 percent in FY 2030 from its FY 2013 levels**.

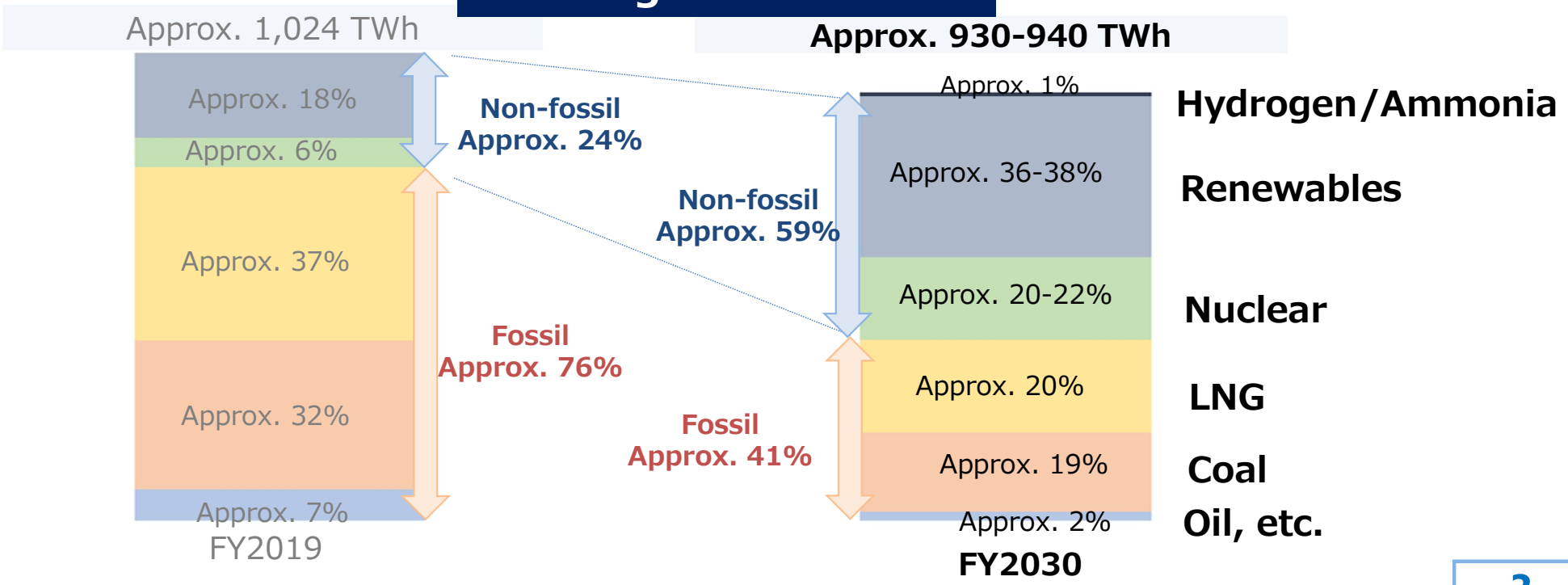
Remarks at Leaders Summit on COP26 (Nov. 2021)

Japan aims to reduce its greenhouse gas emissions by 46 percent in the fiscal year 2030 from its fiscal year 2013 levels, and that **Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emissions by 50 percent in the fiscal year 2030**.

Strategic Energy Plan -Policy responses for 2030-

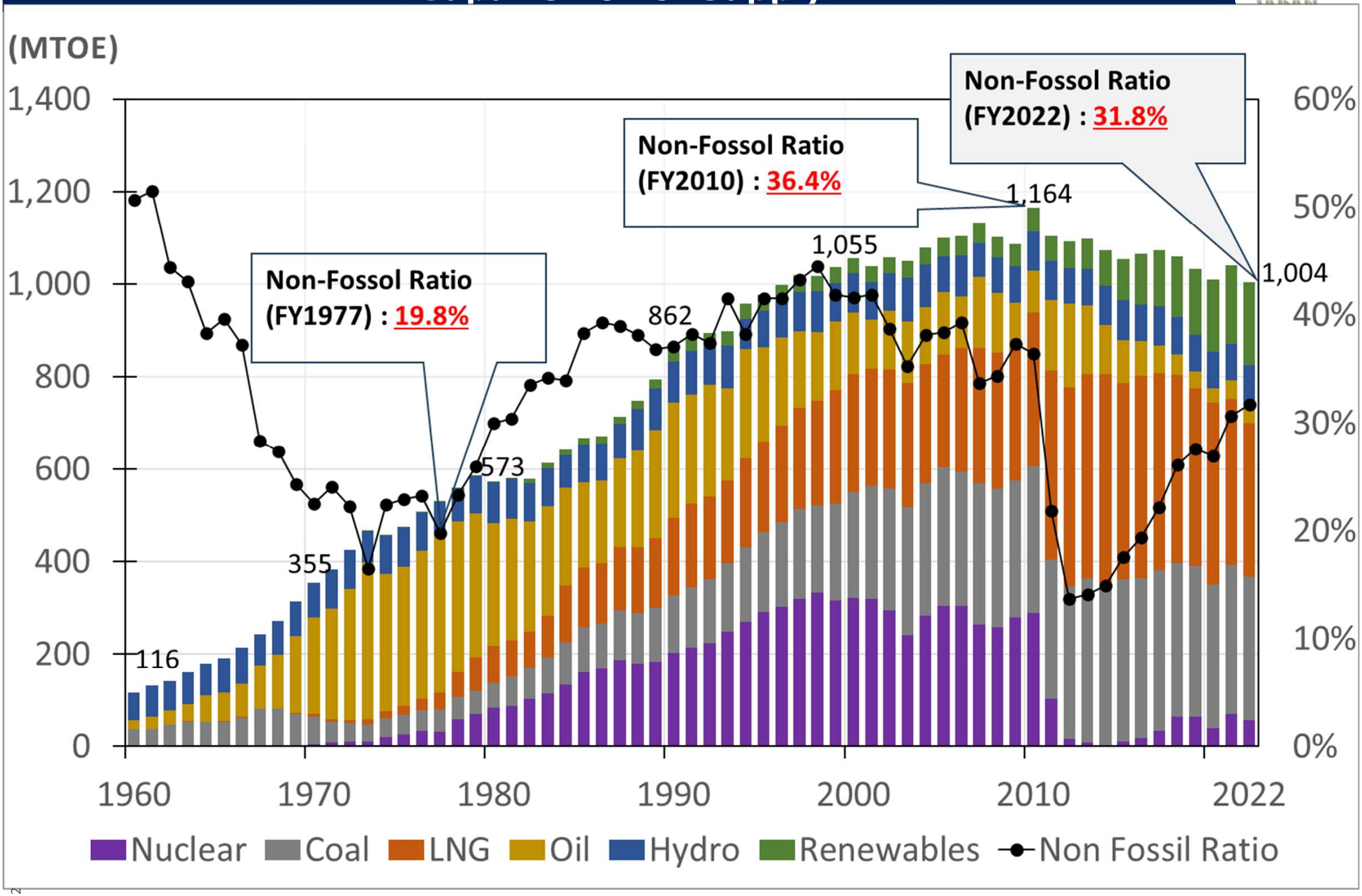
- **Maximum introduction of renewable energy as a major power source on the top priority on the major premise of S+3E**
- **Further pursuit of greater energy efficiency**
- **Restart nuclear power plants with safety as a top priority**.
- Recognizing that securing a **stable supply of energy is a major principle**, Japan will seek to lower the **thermal power ratio** of its power generation mix **to the extent possible.**
- **Japan plans to pursue innovation** in the thermal power mix, etc. by exploring and using **hydrogen /ammonia - fired power generation and CCUS/Carbon Recycling**.

Power generation mix



Source: METI(Strategic Energy Plan,)

Japan's Power Supply

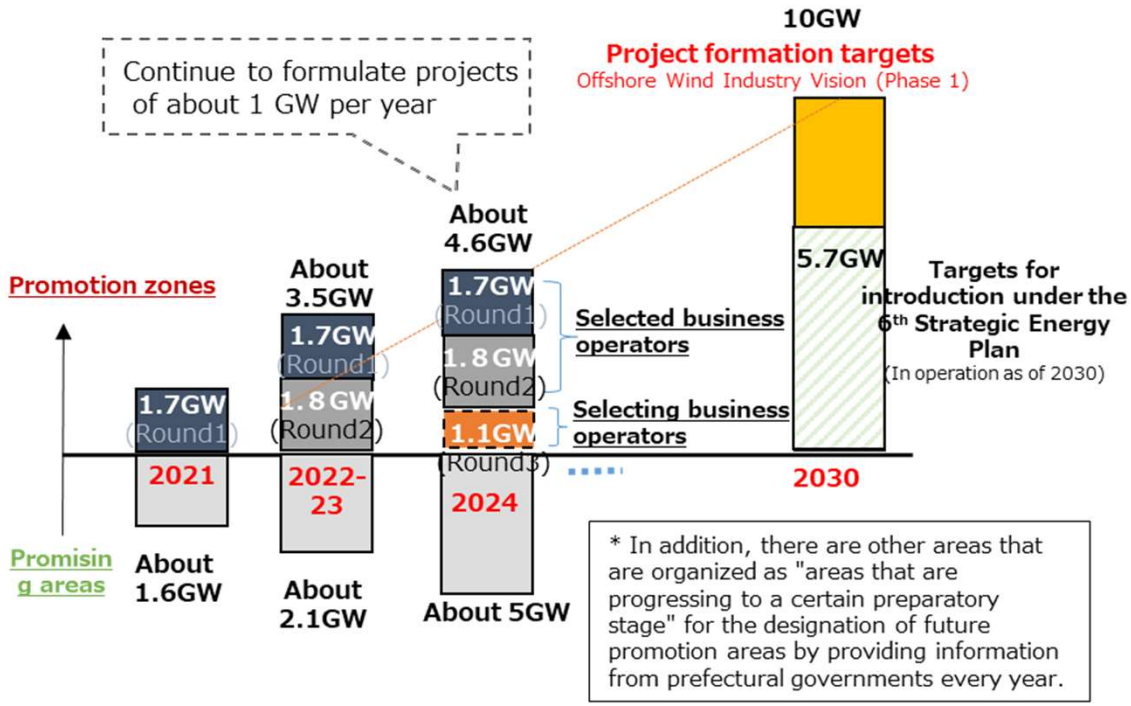


(Source) IEA Energy Balance 2024

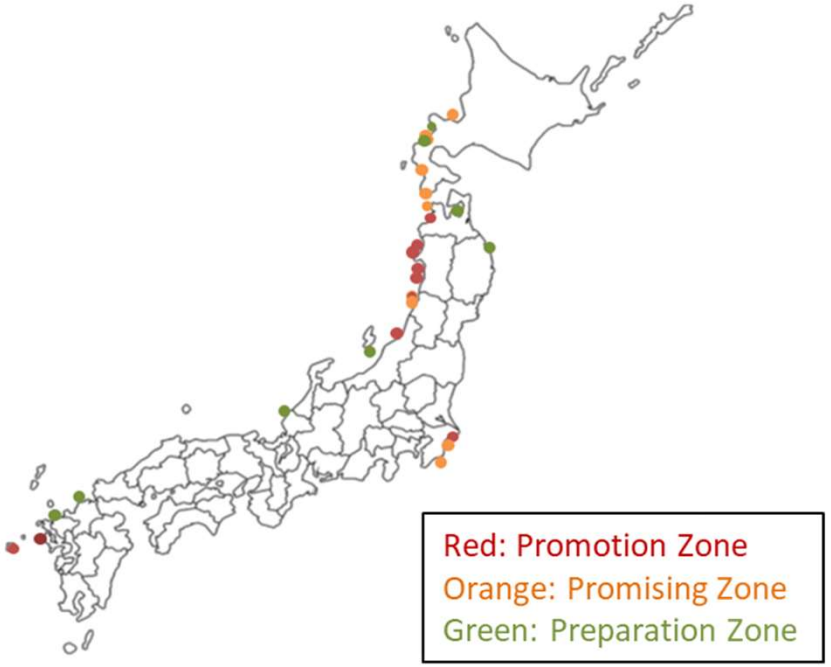
Offshore wind power

- **The Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities** is a law that publicly solicits offshore wind power generation companies and permits them to occupy sea areas for 30 years (enforced on April 1, 2019).
- In December 2020, **the "Offshore Wind Industry Vision (Phase 1)" set targets of continuously developing appr. total 10 GW by 2030 and 30~45 GW by 2040**.

Image of project formation to achieve goals



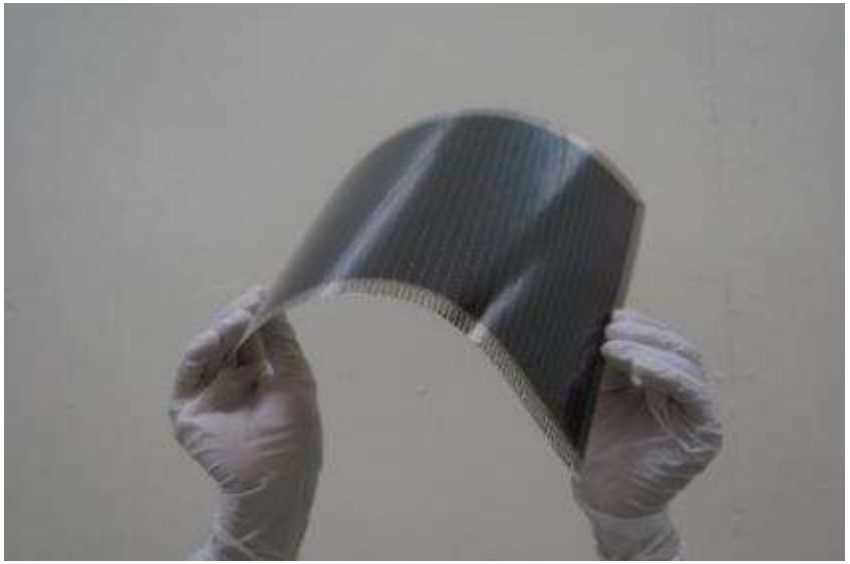
Promotion Zones



Next-generation solar cell development

- **Overcoming location constraints** is the key to expanding solar power. **Next-generation solar cells (perovskite solar cells)** that can be installed on the walls of buildings need to be developed.
- Japan is currently **among the top developers of perovskite solar cells (achieving the world's highest conversion efficiency)**.

Example of next-generation solar cells of practical-use size



Source: Toshiba

Scaling up for commercialization

Example of solar panels installed on the walls of buildings

Source: Sekisui chemical Corporation

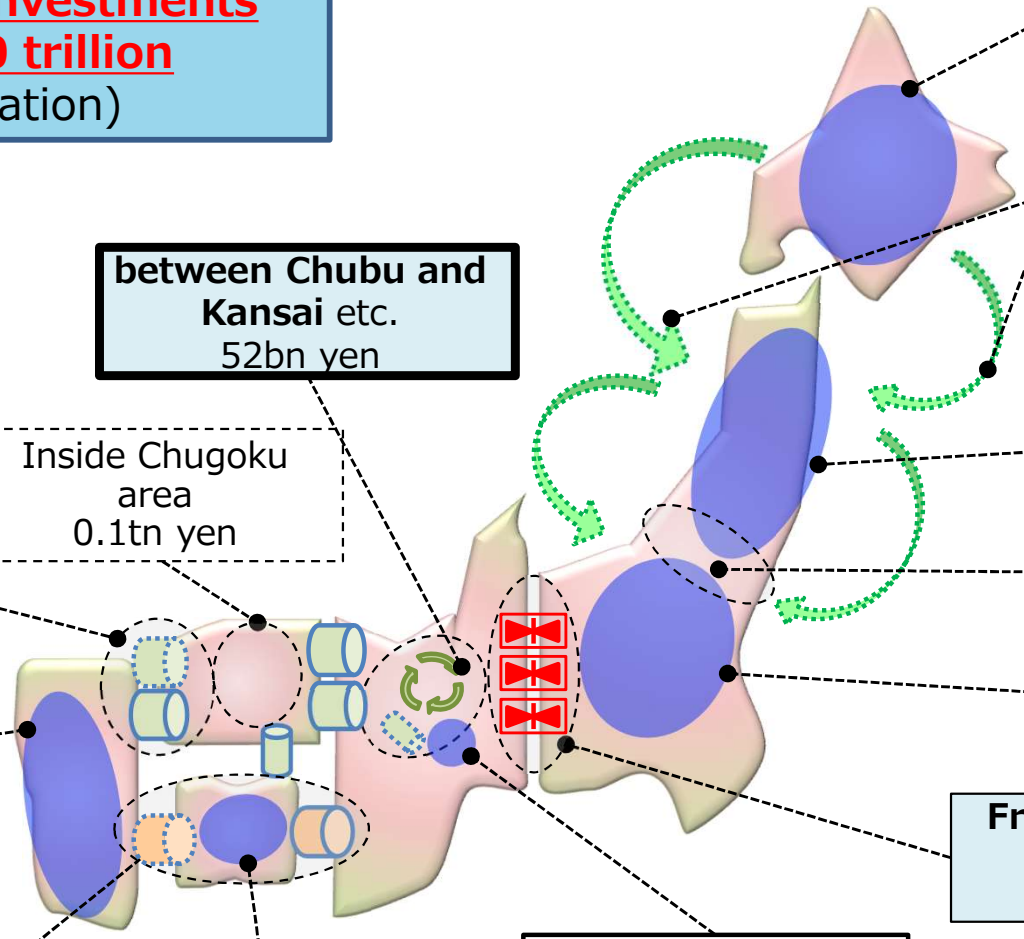
R&D goal: Achieve a power generation cost of 14 yen/kWh or less under certain conditions (access to direct sunlight, etc.) by FY 2030

Long-term Vision of Cross-regional Network Development

- **With a view to achieving carbon-neutral by 2050,** a grid development plan**(Master plan) was drawn up by OCCTO in March 2023**, which shows **a concrete picture of the future Trunk Transmission** and the actions to realize this vision.

Outline of the Master plan

Necessary investments
¥6.0-7.0 trillion
(estimation)



Inside Hokkaido area
1.1tn yen

between Hokkaido,Tohoku and Tokyo Subsea HVDC*
+6-8GW
2.5-3.4tn yen

between Chubu and Kansai etc.
52bn yen

between Chugoku and Kyushu
0.42tn yen

Inside Chugoku area
0.1tn yen

Inside Tohoku area
0.65tn yen

between Tohoku and Tokyo
0.2tn yen

Inside Tokyo area
0.67tn yen

Inside Kyushu area
10bn yen

Frequency Converter
+2.7GW
0.4-0.43tn yen

between Shikoku and Kyushu
0.48-0.54tn yen

Inside Shikoku area
0.16tn yen

Inside Chubu area
3bn yen

Japan's Strategies & Policies towards Hydrogen Economy

- Historically Japan started hydrogen/fuel cells R&D back in **1973** (before the oil shock started).
- **The first country to have formulated a national hydrogen strategy (2017).**
- The Prime Minister set **"2050 carbon neutral" declaration (2020)**. **$15bn Green Innovation Fund**.
- Positioned **hydrogen as one of the priority areas** in the Green Growth Strategy.
- **Key part of achieving green transformation economy plan (2023).**

Milestones

2017
Basic Hydrogen Strategy

2020
PM's 2050 CN Declaration
Green Growth Strategy

2021
Green Innovation Fund
Revised Strategic Energy Plan

2023
GX Promotion Act
Basic Hydrogen Strategy updated

Targets (Set in the Basic Hydrogen Strategy on Dec. 26, 2017 – updated in 2023)

Supply & Demand volume:
Current (Approx. 2Mt) → 2030 (**Approx. 3Mt**) → **2040 (Approx. 12Mt)** → 2050 (**Approx. 20Mt**)

Hydrogen cost:
Current (JPY100/Nm3) → 2030 (**JPY30/Nm3**) → 2050 (**Less than JPY20/Nm3**)
station retail price (=USD2.6/kg-H2*) (=USD1.7/kg-H2*) *USD1=JPY130

Highlight of the 2023 Basic Hydrogen Strategy

- To introduce hydrogen having well regard to the **S+3E** principles (**S**afety, **E**nergy security, **E**conomic efficiency, **E**nvironmental compatibility) and industry competitiveness.
- The scope of strategy includes hydrogen and its derivatives such as ammonia, e-methane, synthetic fuel(e-fuel), etc., taking into consideration of the challenges and timelines surrounding these products.

Basic Strategy

Expanding Supply

(a) A new volume target at **12 Mt/p.a. by 2040**.
(b) Leading to low-carbon hydrogen by introducing:
① **carbon intensity-based criteria**, not "colour" based;
② guiding regulatory requirements.
(c) Promote domestic production and supply chain. Target share of **electrolysers** (domestic and overseas) that involve Japanese element (including parts and materials) **by 2030 is set around at 15GW**.
(c) Strengthen relationships with exporting countries, develop transportation technologies and expand financing capabilities.

Creating Demand

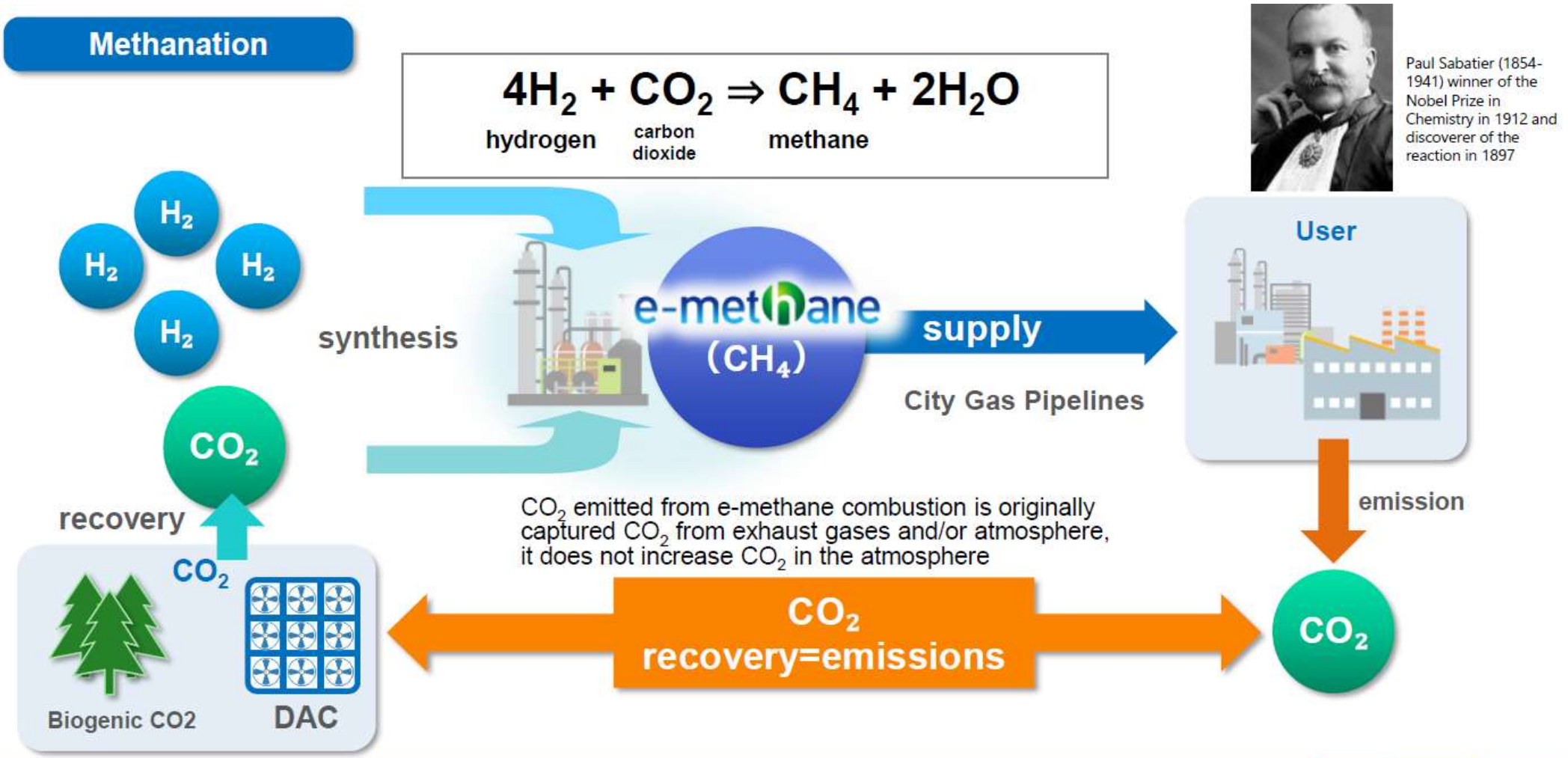
(a) **Power generation**
A wide range of use in power sector, including co-firing and single-firing.
(b) **Fuel cells**
Deploy FC stack technology in a variety of applications such as commercial vehicles, rolling stocks, vessels, heavy-duties, agri machinery as well as use for decarbonising ports and airports.
(c) **Industrial use**
Heat use such as boilers and other equipment in the hard-to-abate factories. Develop technologies to utilise as raw material in the fields of steel and chemicals.
(d) **Home use**
Promote high performance and low-cost residential FC.

To introduce various support schemes with a view to setting up large-scale, resilient supply chains:
a. Producer support scheme (price gap subsidy)
b. Cluster development support

Others:
①Promote regional use and consumption and engage local governments ②Assist innovative R&D
③Cross-border cooperation for standardisation and other activities ④Raise public awareness and acceptance

New Technology: e-methane

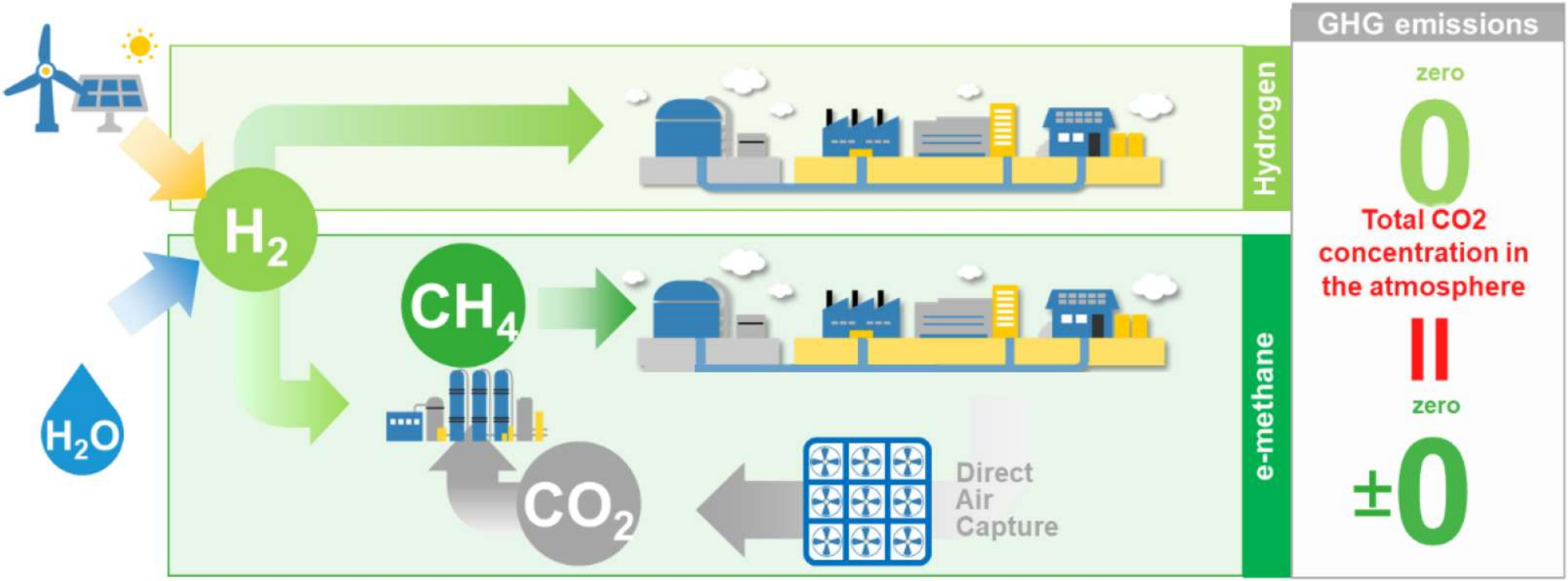
- The technology to synthesize hydrogen and CO2 to produce e-methane is called “Methanation”.
- Synthesized "e-methane" is one of the utilization of Hydrogen.



Source: The Japan Gas Association; "Challenge for Gas future !!", UN Climate Change Conference (COP29) "Energy transition acceleration via stakeholder engagement in deploying & financing renewable gases", November 16th, 2024

e-methane is NOT increasing total amount of GHG in atmosphere

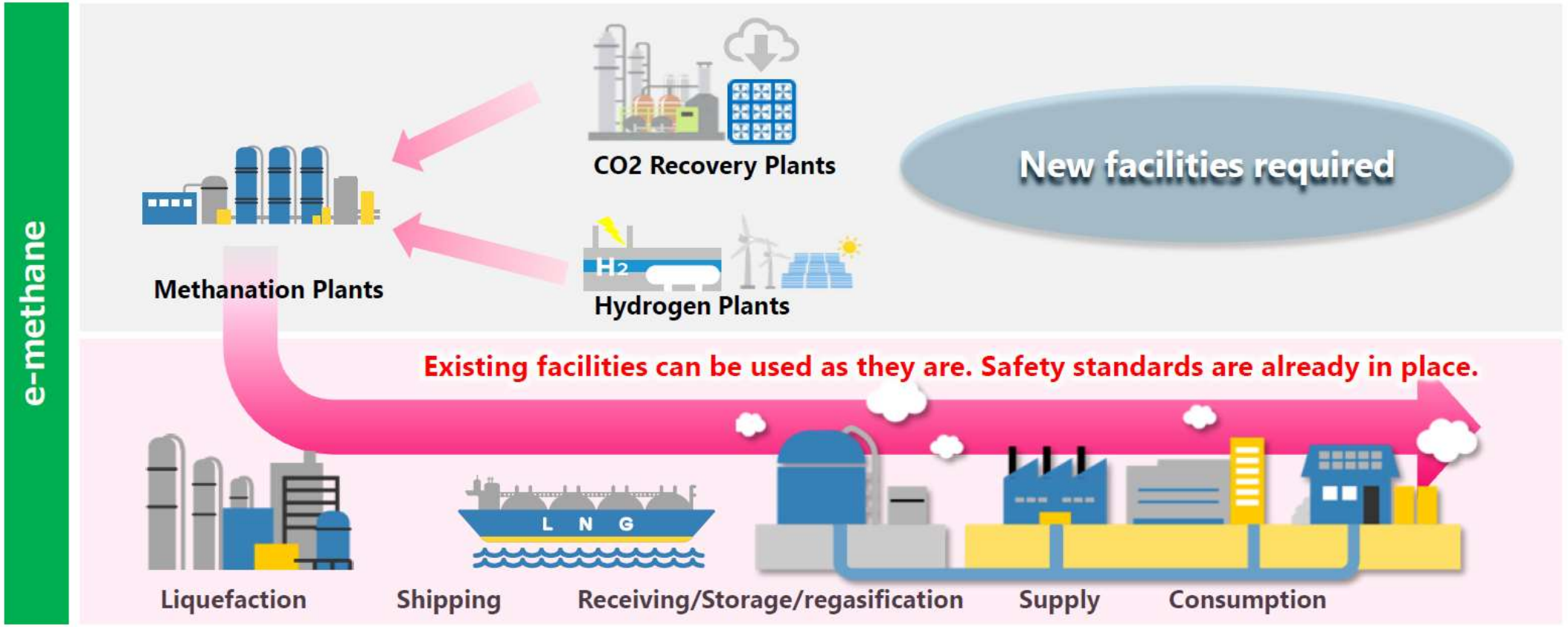
- CO2 emission of e-methane was originally captured from atmosphere or already accounted for GHG.
- Because it is made from recovered CO2, combustion does not increase the amount of carbon in the atmosphere.



Source: The Japan Gas Association; "Challenge for Gas future !!", UN Climate Change Conference (COP29) "Energy transition acceleration via stakeholder engagement in deploying & financing renewable gases", November 16th, 2024

e-methane can utilize most of existing infrastructure

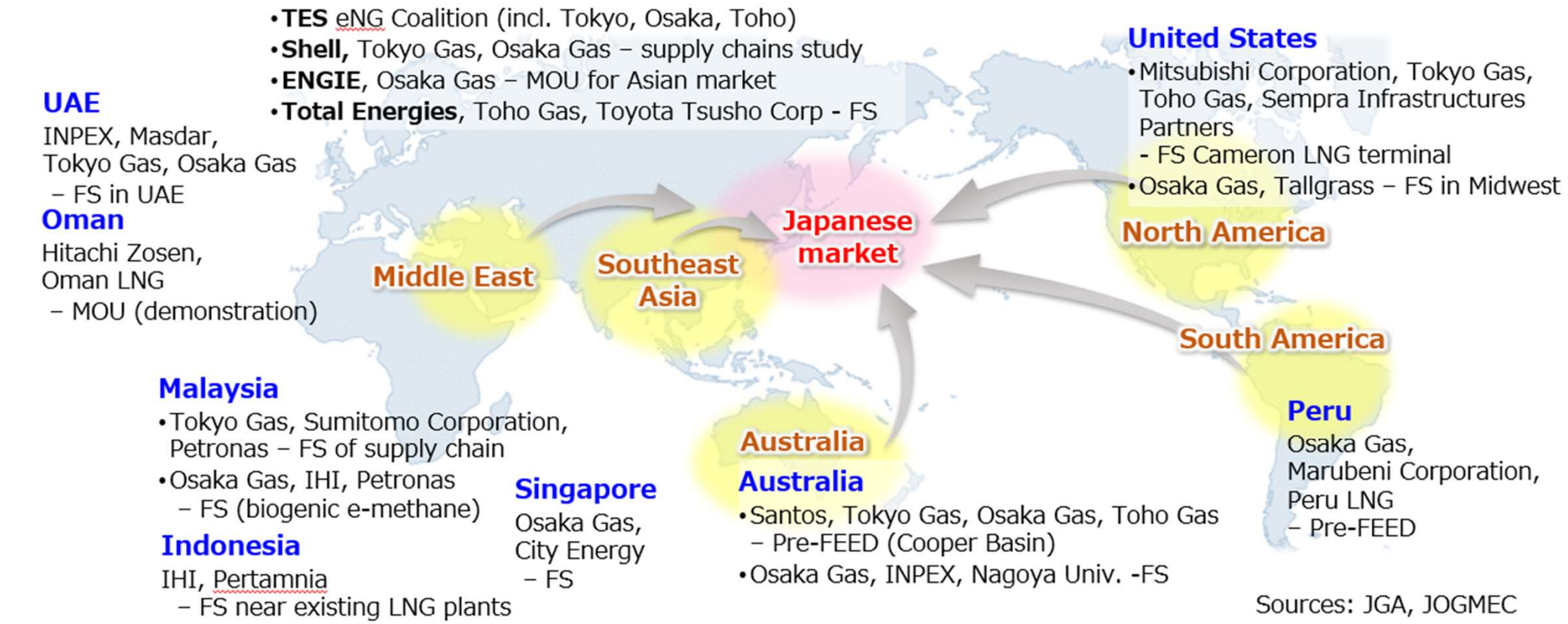
- e-methane can use most of existing LNG infrastructure, avoiding valuable assets to become stranded assets, saving additional social costs (investment).
- Fuel switching to natural gas from other fossil fuels will lay foundation to e-methane and will realize seamless transition to carbon neutrality.



Source: The Japan Gas Association; "Challenge for Gas future !!", UN Climate Change Conference (COP29) "Energy transition acceleration via stakeholder engagement in deploying & financing renewable gases", November 16th, 2024

Feasibility studes to develop competitive supply chains for e-methane

- **Variety of FSs for larger scale production are undergoing in the areas where plenty of renewable electricity supply would be expected, which is the most critical factor for the production costs.**
- **In addition, the areas close to existing LNG terminals are expected to contribute to much competitive supply chain.**



Source: The Japan Gas Association; "Developing e-methane value chain for carbon neutral city gas supply in Japan", IEA Webinar "E-methane: a new gas for a net-zero future?", September 5th, 2024

Asia Zero Emission Community（AZEC）

- In January 2022, Prime Minister Kishida proposed that **Asian countries share the idea of decarbonization and work together to advance energy transition**.
- In March 2023, **the AZEC Ministerial Meeting** ;

The AZEC joint statement

- Promoting cooperation to **ensure Energy Security and Decarbonization**
- **Transitions in a manner compatible with economic growth** in each country
- **Diverse and realistic pathways according to each country's circumstances**, utilizing diverse energy sources and technologies

- **The AZEC Leaders' Meeting** was held on December 18th ;

① Basic principles for decarbonization

<**Triple Breakthrough**>

Simultaneous realization of all three (decarbonization, economic growth, and energy security)

<**One goal, Various pathways**>

② The direction of specific cooperation utilizing technology and support

③ Cooperation in policy coordination and promotion of specific projects

Asia Zero Emission Community（AZEC）Leaders Meeting (Dec 18, 2023)

- The "**AZEC Leaders' Joint Statement**"

① **AZEC principles towards decarbonization** (Triple breakthrough of simultaneously achieving "decarbonization, economic growth, energy security"; achieving a common goal of "net-zero emissions through various pathways")

② **Supporting policy development ("Asia Zero Emission Center" to be set up in ERIA)**, **fostering public-private cooperation (AZEC Advocacy Group)**

③ **Strengthening cooperation on decarbonization technologies, establishing green supply chains for manufacturing industries, promoting transition finance**

- Over 350 tangible cooperation projects ongoing
- **Broad support to AZEC principles and high expectations for AZEC activities from leaders**
- The **importance of realistic energy transitions reflecting factors such as energy security** highlighted by Dr. Daniel Yergin as a guest

AZEC Leaders Meeting Attendance: (Credit: Cabinet Public Affairs Office)
Australia, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, Singapore, Thailand, Viet Nam,
Japan (PM Kishida, METI Minister Saito)
Dr. Daniel Yergin (Guest)、ERIA (Observer)

Report on tangible cooperation
・AZEC progress report (P.3,4)

AZEC Advocacy Group
・Joint statement by ASEAN-BAC, Keidanren and ERIA
・Panel discussion by experts including above members at the ASEAN-Japan Economic Co-Creation Forum (Dec 16)

Commemorative photo session on Joint Statement
【with witness of PM Kishida, President Joko, METI Minister Saito】(Credit: Cabinet Public Affairs Office)

Panel Discussion

Asia Zero Emission Community（AZEC）Leaders Meeting (Oct 11, 2024)

- The "**AZEC Leaders' Joint Statement**"

① **AZEC Partner Countries Supporting Global Decarbonization**

② **Accelerating the Operationalization of AZEC Platform and Implementation of AZEC Partner countries' Regional Strategies**

③ **Reaffirming AZEC principles**

④ **Collaboration with related meetings and initiatives**

⑤ **Action Plan for the Next Decade**

- Develop a short- to medium-term action plan to facilitate AZEC solutions
- Sectoral initiatives
- Promoting tangible projects

AZEC Leaders Meeting Attendance:
Australia, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, Singapore, Thailand, Viet Nam, Japan

Thank you for your attention!