

LP Gas as Energy to Support Sustainable Society and Living



Tsuyoshi Ogasawara
Chairman / Japan LP Gas Association

The International LP Gas Seminar 2022
March 1, 2022

About Japan LP Gas Association

Chairman

Tsuyoshi Ogasawara (President, Astomos Energy Corporation)

Establishment

1963

Mission

Securing stable supply and safety measures, demand development, environmental protection, public communications, statistics, policy proposals and other LP gas related activities

Members

(10 Japanese primary distributors, producing / importing LP gas in Japan)

Astomos Energy Corporation

ENEOS GLOBE Corporation

GYXIS Corporation

ITOCHU Corporation

Iwatani Corporation

Japan Gas Energy Corporation

Kygnus LP-Gas Co., Ltd.

National Federation of Agricultural Cooperative Associations

Taiyo Oil Co., Ltd.

Tokyo Gas Co., Ltd.

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2. Resilience of the LP Gas Industry

3. Contribution of LP Gas towards SDGs

4. Way to the Green LP Gas Industry

5. Summary

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1. LP Gas Demand and Supply Trends

2. Resilience of the LP Gas Industry

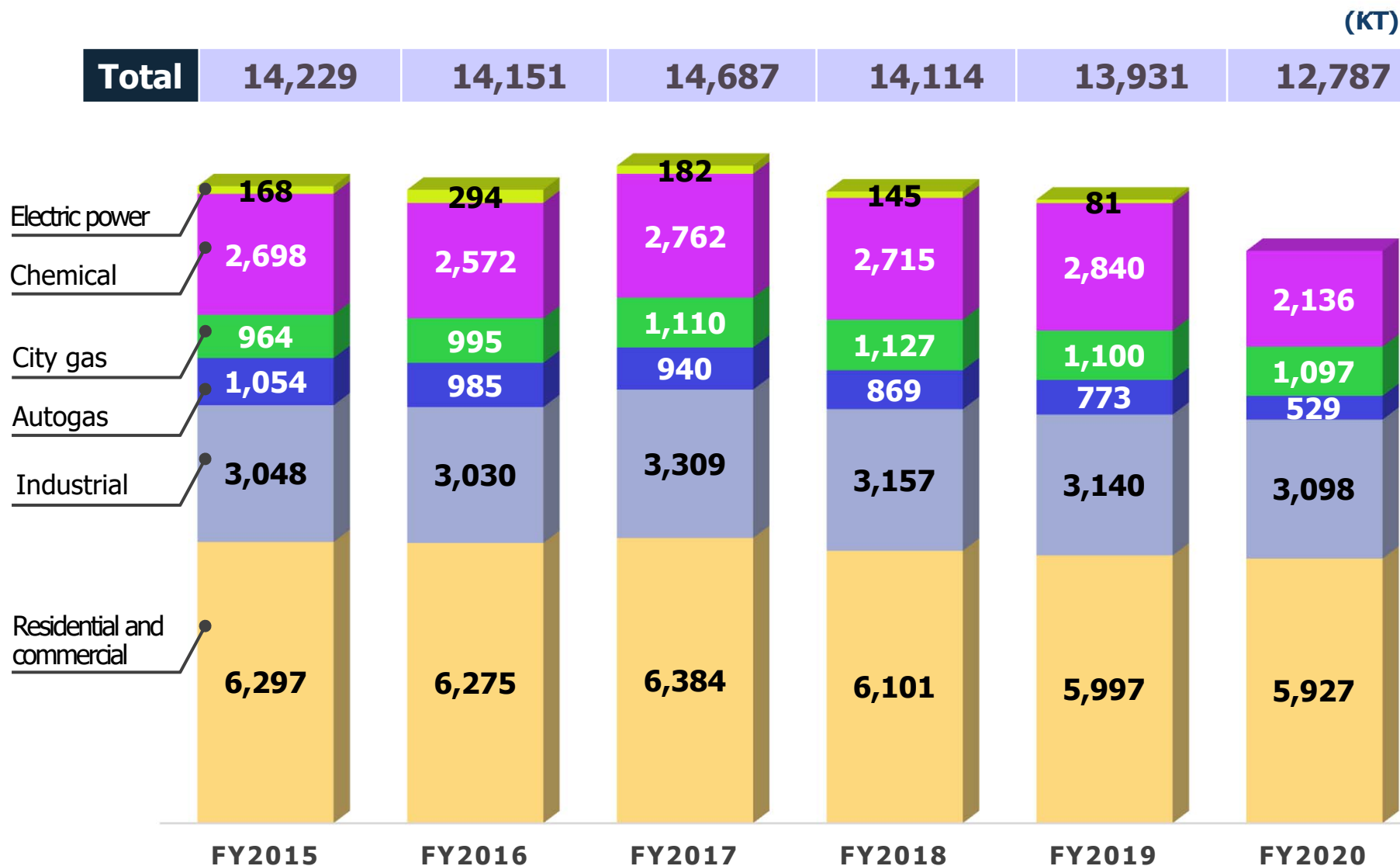
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LP Gas Demand Trend in Japan

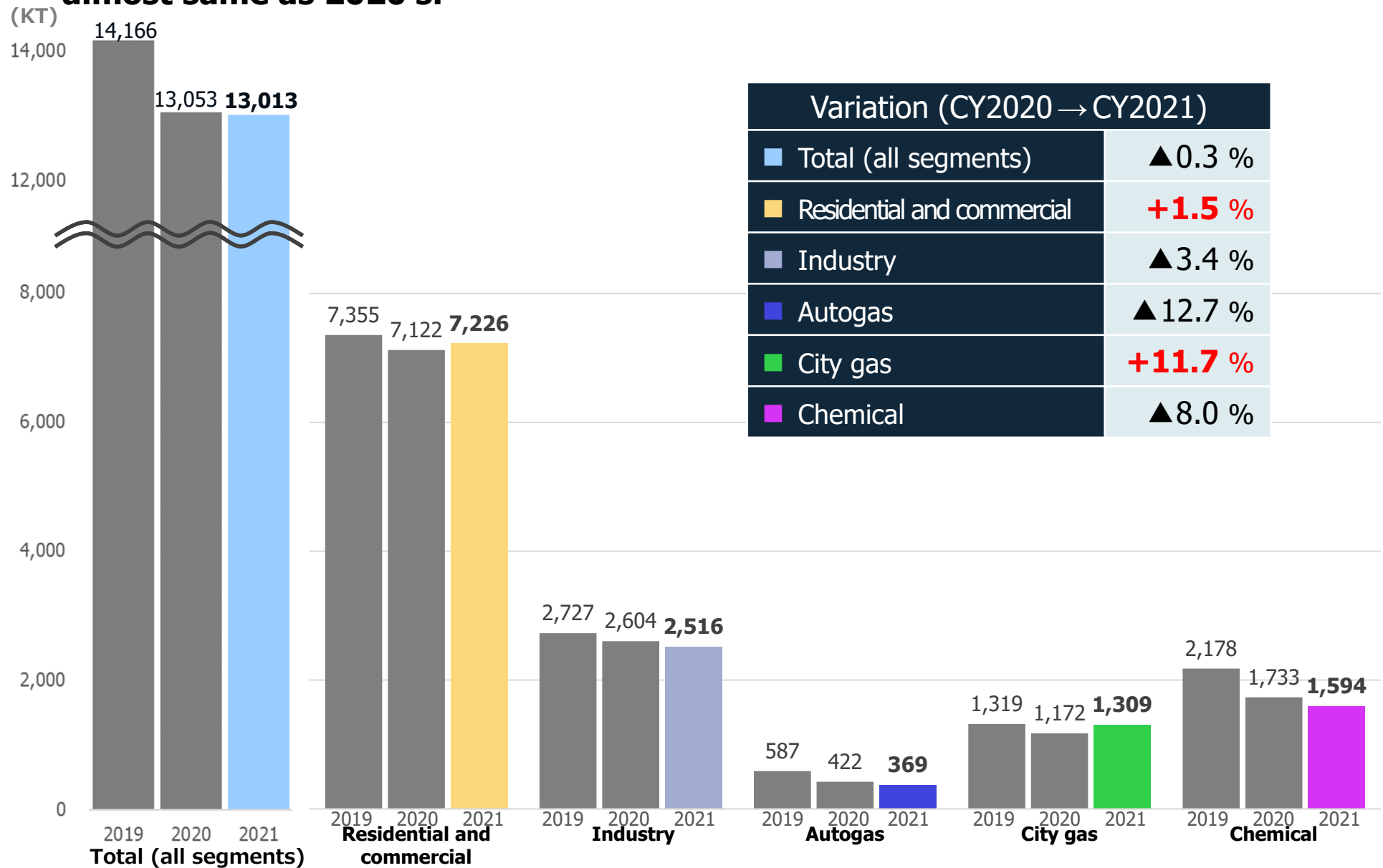
➤ **LP gas demand in Japan has reached maturity, tend to dwindle slightly.**



(Note)
 FY: Fiscal year (April-March)
 CY: Calendar year (January-December)

Sales Volume by Segment (yearly comparison from CY2019 to 2021)

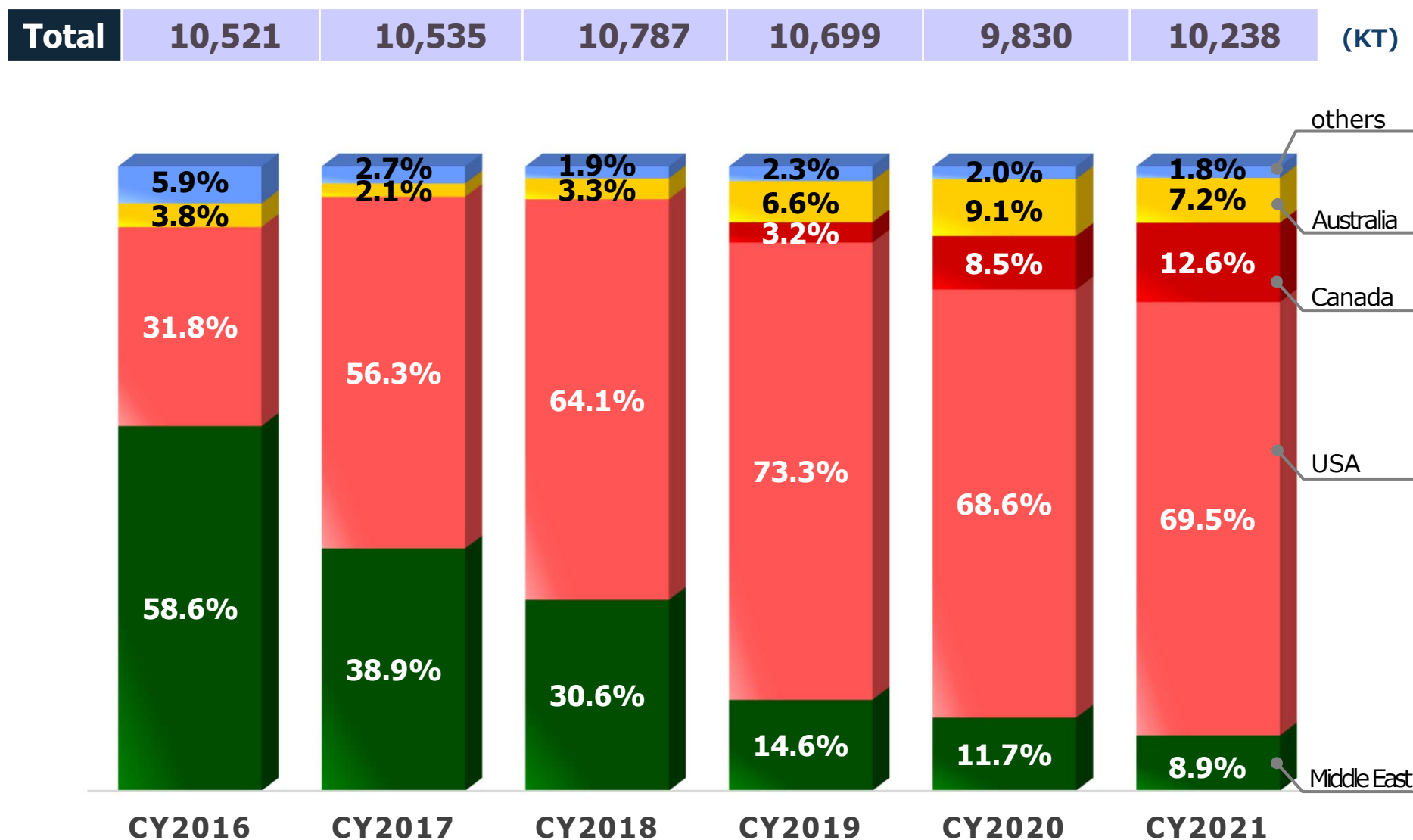
➤ Sales volumes in 2020 dropped due to COVID-19. The volumes in 2021 is almost same as 2020's.



Source: Japan LP Gas Association

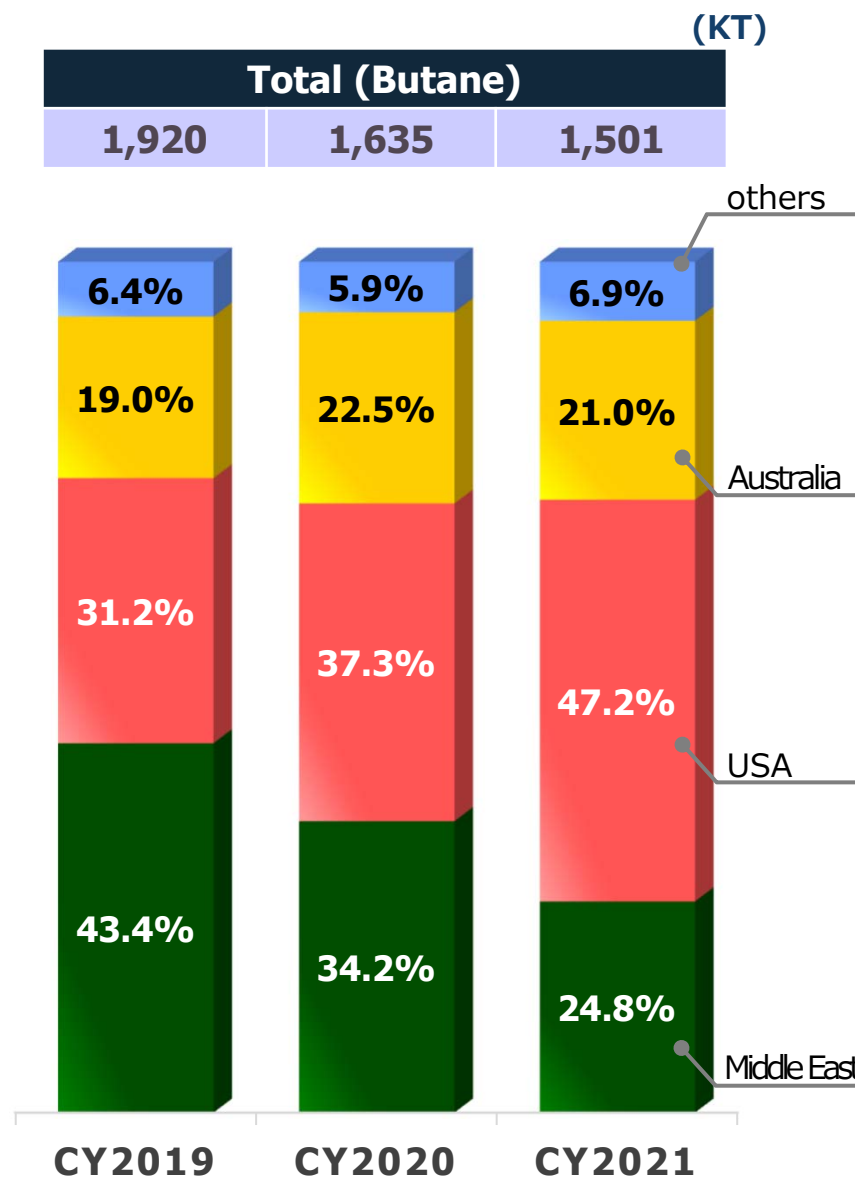
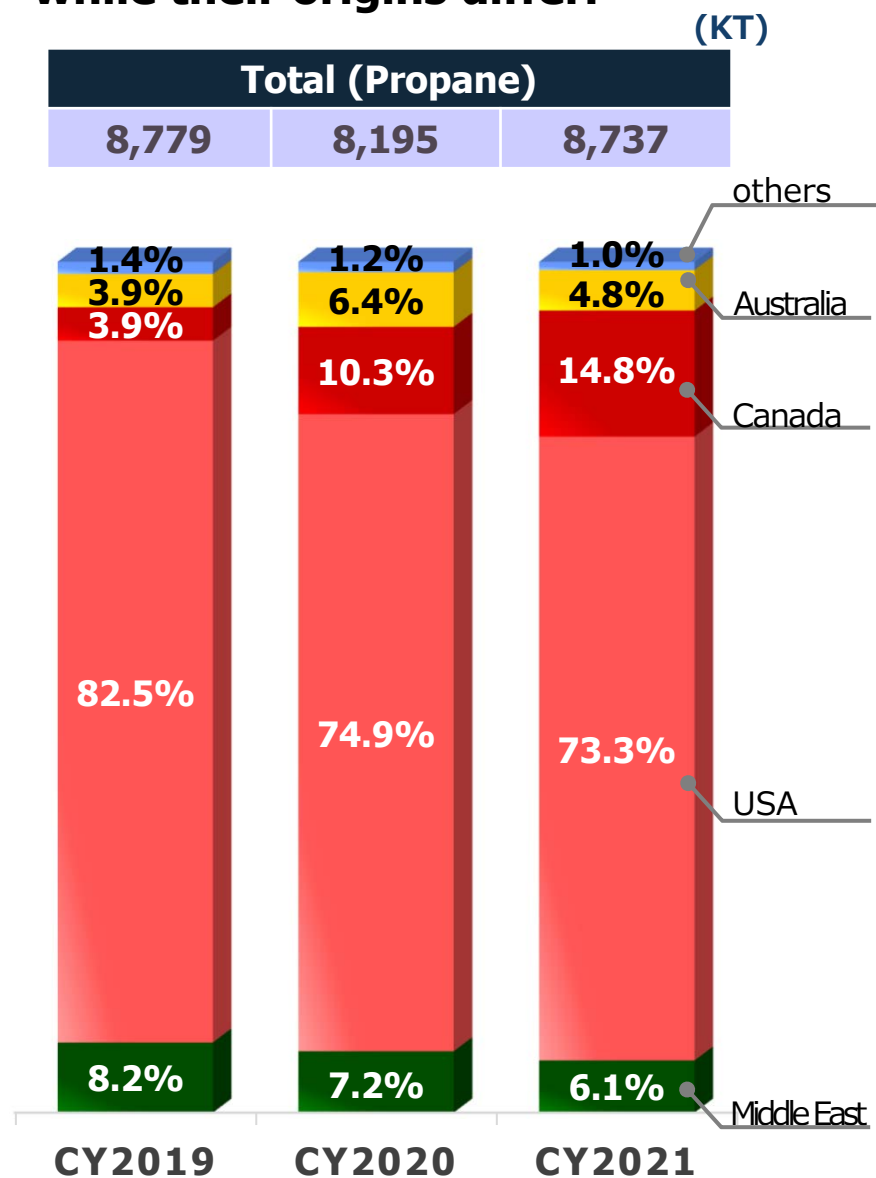
LP Gas Import Sources by Country: Trend in Japan (Propane and Butane in total)

- In addition to a stable supply from the USA and the Middle East, Canada's and Australia's shares have increased.



LP Gas Import Sources by Country: Trend in Japan (Propane and Butane for each)

- **Secure steady and stable supply for both propane and butane, while their origins differ.**



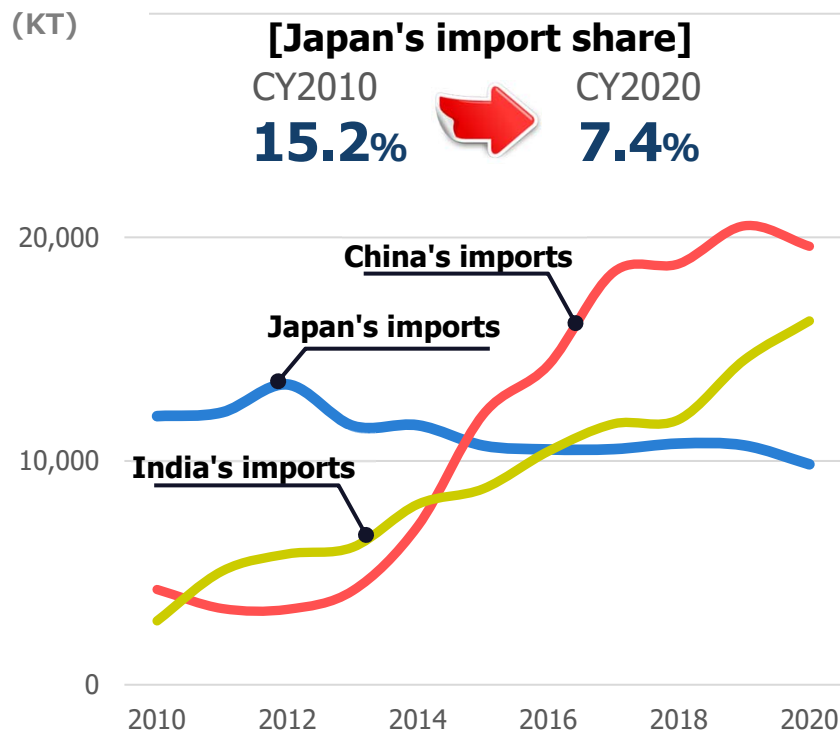
Secure a Stable Supply

- **Japan's share of maritime trade continues to decline, but assurance of its' stable imports should be kept.**

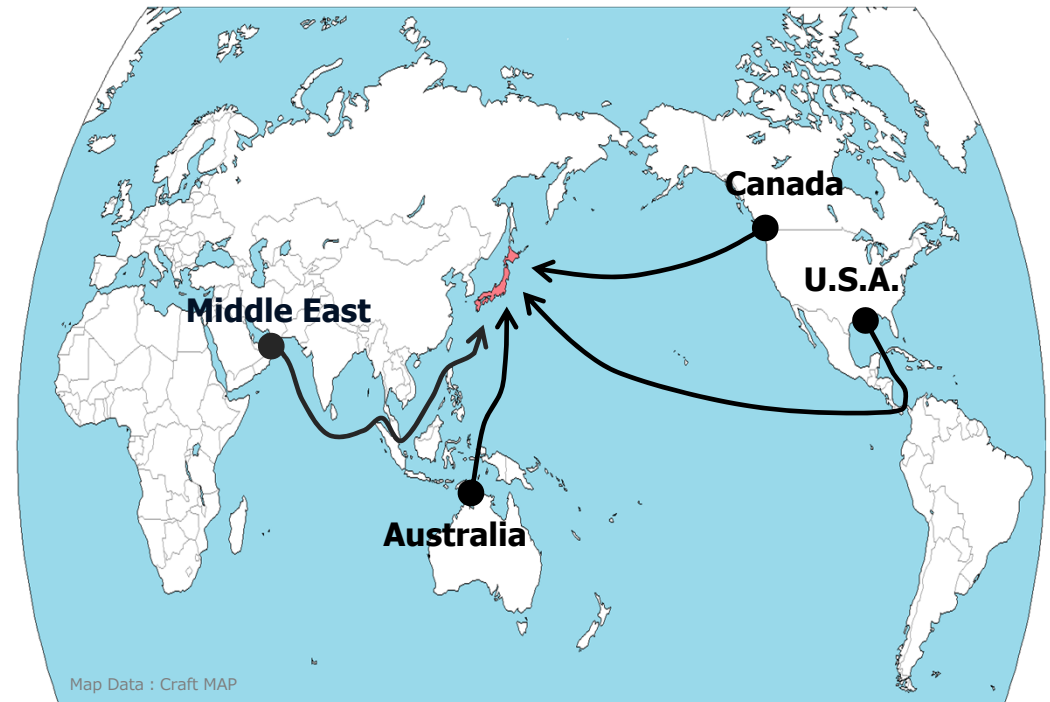
Efforts towards stable supply:

- The expansion of imports from Canada and Australia has further diversified procurement sources.
- Maintain and strengthen relations with gas-producing countries such as the Middle Eastern countries.

Import trend in Asian LPG consumer countries



Main procurement sources and sea routes



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An aerial photograph of an industrial facility, likely a gas processing plant or refinery. The image shows several large, spherical storage tanks supported by metal frameworks. A dense network of pipes, walkways, and structural steel is visible throughout the site. The background features a clear sky and some distant structures. The entire image has a blue color cast.

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Maintain Stockpile System and Supply Chains

➤ Establish and maintain supply chains in preparation for disasters.

Stockpile system

Specified quantities of LP gas are always stockpiled in government and private facilities.

Classification	Stockpiled quantity	Remarks
National stockpile	1,394 KT	Equivalent to 50 days imports.
Mandatory private stockpile	1,066 KT	Equivalent to 40 days imports.

(as of the end of December 2021)

Relevant law:
"Oil Stockpiling Act"



Fukushima National Stockpile Base and Adjacent Private Base.

Mobile Power Generator Cars

Mobile Power Generator Cars are deployed at certain bases for power recovery when electricity supply is lost.



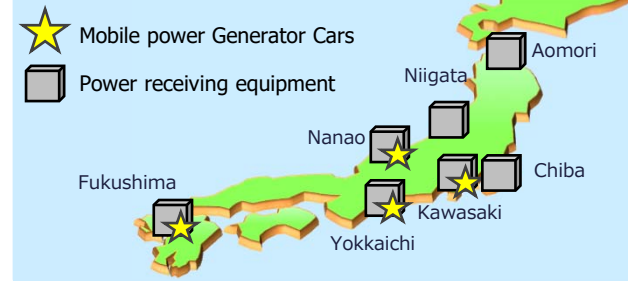
A mobile power generator car connected to power receiving equipment at the base.

Power connection training



Power supply from the on-board generator.

Placement



Collaboration against an Emergency

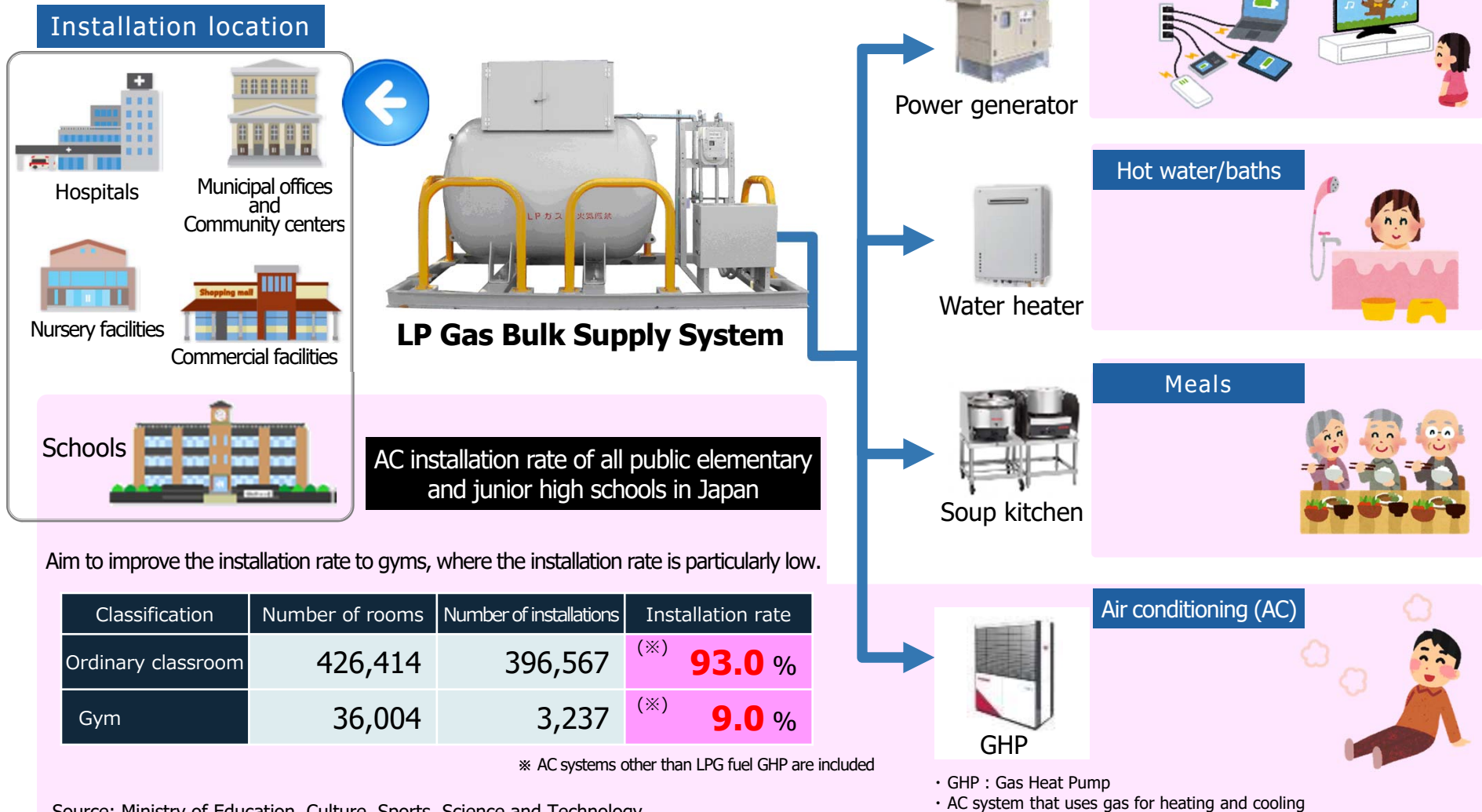
Build a collaboration system to maintain supply in domestic logistics.

Regional collaboration	Formulation of Emergency supply collaboration plan:	Companies to cooperate within the specific regions and supply LP gas to the disaster area in case of emergency.
Securing traffic routes	Nominated as Designated Public Institution:	LPG trucks are registered as "Emergency Vehicles" those can run major highways even road transportations are restricted in an emergency.
Primary distributors mutually support	Conclusion of mutual assistance agreement:	Mutual support among LP gas companies of the Japan LP Gas Association in the event of supply insecurity in an emergency.

Bolster LP Gas Disaster Resilience Function (1)

- Promote self-defensive fuel stockpiling at evacuation centers, etc. by introducing LP Gas Bulk Supply System.

Image of LP Gas Bulk Supply System



Aim to improve the installation rate to gyms, where the installation rate is particularly low.

Classification	Number of rooms	Number of installations	Installation rate
Ordinary classroom	426,414	396,567	(※) 93.0 %
Gym	36,004	3,237	(※) 9.0 %

※ AC systems other than LPG fuel GHP are included

Source: Ministry of Education, Culture, Sports, Science and Technology

Bolster LP Gas Disaster Resilience Function (2)

➤ **LP Gas can contribute to a sustainable society as a distributed energy source.**

Benefits of using LP Gas

Distributed energy

Available even when electricity and city gas are cut off.

Self-defensive stockpiling

LP gas inside the container inventories become the stockpile.

No quality deterioration

Energy can be stored for long periods.

LP Gas with superior resilience capability <FYR>

Necessary days for recovery during the Great East Japan Earthquake:

LP Gas	41 days
City Gas	53 days
Electricity	109 days

Subsidy by Ministry of Economy, Trade and Industry (METI)

Subsidy

Project subsidy for the promotion of self-defensive fuel stockpiling for socially essential infrastructures in case of a disaster.

Budget

(including supplementary budget)

FY2017	FY2018	FY2019	FY2020	FY2021	FY2022
6.0 billion yen	6.0 billion yen	31.5 billion yen	41.1 billion yen	33.6 billion yen	40.4 billion yen

LP Gas Bulk Supply System Installations

Result (FY2012 and later)	1,112 units
Target (by FY2025)	4,300 units

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LP Gas, efforts to achieve SDGs

➤ Identify LP Gas industry roles and determine future directions in line with SDGs' goals.

GOAL 7

Stable supply

7 AFFORDABLE AND CLEAN ENERGY



Establish a stable supply system and reliable supply chains.



Diversification of procurement sources



Maintain stockpile systems

GOAL 9

Innovation

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Create high-value added services utilizing advanced technologies.



Technological development of Green LP Gas



Collaborate with distributed microgrid systems

GOAL 11

Resilience

11 SUSTAINABLE CITIES AND COMMUNITIES



Bolster disaster-resistance as a distributed energy source.



Introduce LP Gas Bulk Supply System



Introduce GHP (LPG fuel)

GOAL 13

Environmental measures

13 CLIMATE ACTION



Develop new measures to achieve a low/de-carbonizing society.

Heavy oil
LPG



Promote switching fuel to LPG







Introduction of LPG fuel ships

Introduction of LPG Fuel Ships

- **LPG Fuel Ships are useful alternative solutions for IMO' shipping fuel SO_x regulations.**
- **The need for LPG Fuel Ships is growing to meet IMO's GHG reduction strategy.**

Alternative methods to comply with IMO regulation:

Low-sulfur fuel oil	Scrubber	LNG Fuel Ship	LPG Fuel Ship
			 <p>Source: Kawasaki Heavy Industries, LTD.</p> <p>Environmental characteristics: Almost equivalent to LNG Infrastructure cost: Superior to LNG</p>

Number of LPG Fuel Ships ordered



As of December 28, 2021
(total number worldwide)

LPG Fuel Ships

Adopting LPG Fuel in worldwide	Japan's first LPG Fuel Ship has begun operation	LPG Fuel Ship with LPG and ammonia containments
 <p>Source: BW LPG</p> <ul style="list-style-type: none"> • Some existing VLGC's engines were modified into LPG fuel types. • New orders are LPG Fuel types. 	 <p>Source: Astomos Energy</p> <ul style="list-style-type: none"> • The world's first newly built with LPG fuel. • Dual fuel engine (LPG and heavy oil). 	 <p>Source: NYK Line</p> <ul style="list-style-type: none"> • LPG fuel VLGC for LPG and ammonia transportation. • Scheduled to be completed in 2024.

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➤ **Government's decision to promote decarbonization. Contribution of LP Gas is needed.**

Japan's GHG emission reduction targets:

Target year	Greenhouse gas reduction target	Remarks
2030	46% reduction compared to FY2013	Apr. 2021 Leaders Summit on Climate
2050	Zero emissions	Oct. 2020 Diet Extraordinary Session



"Carbon Neutral Declaration"
by Prime Minister Suga (at that time).

Description and position for LP Gas

Green Growth Strategy for Carbon Neutral in 2050

(Cabinet approval in June 2021)

- In 2050, demand for LP Gas is expected to remain at about 60% of today.
- Synthetic production of LP Gas is to be established and commercialization will be realized by 2030.
- Aim to switch all LP Gas demand into Green LP Gas by 2050.

The 6th Basic Energy Plan

(Cabinet approval in October 2021)

- LP Gas, regarded as the last resolution in case of emergency, is an essential source for energy supply, not only in normal times but also in emergency situations.
- Important to secure a reliable and solid supply system workable even in an emergency.
- For the goal of decarbonization, the government will support research and development efforts and the social implementation of Bio/Synthetic LP Gas.

➤ Promote research and study toward social implementation of Green LP Gas.

Research workshop for developing Green LP Gas production technologies

Period	November 2020-March 2021 (five times held)
Chair	Professor Sekine, Waseda University
Participants	Experts from industry / government / academia





Conclusion by the workshop

Develop technology of carbon-free LP Gas synthesis (**Propanation, Butanation**).
Need to achieve early social implementation of **Green LP Gas**.

Institute of Japan Green LP Gas Promotion

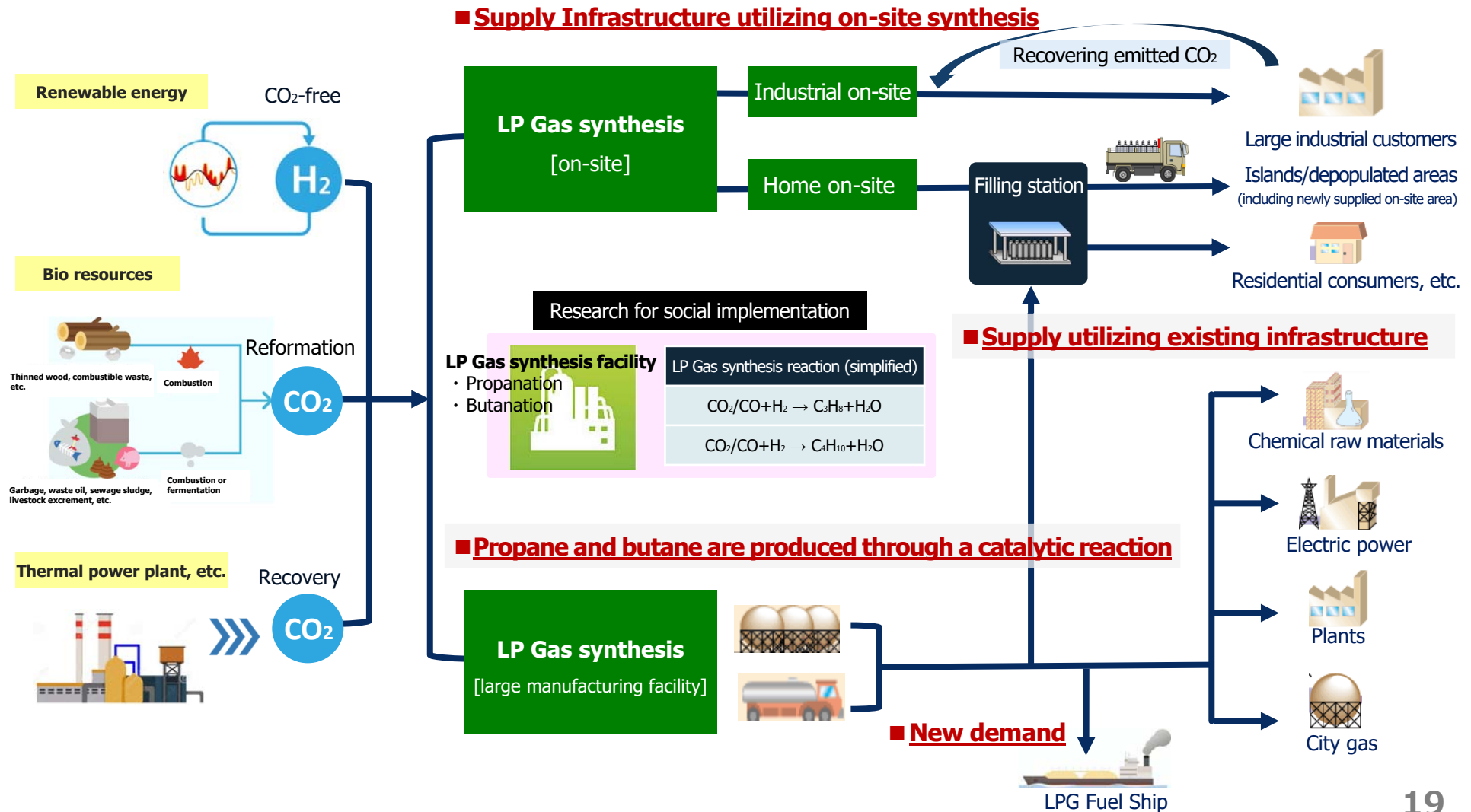
Founded	October 18, 2021
Activities	Develop manufacturing technology for social implementation of Green LP Gas

Members Japan LP Gas Association 5 Executive director companies	 Astomos Energy Corporation	 ENEOS ENEOS GLOBE Corporation
	 GYXIS Corporation	 Iwatani Iwatani Corporation
	 JGE Japan Gas Energy Corporation	
Associate member	 JLPGA Japan LP Gas Association (secretariat)	

Japan's LP Gas industry aims to establish Green LP Gas supply structure

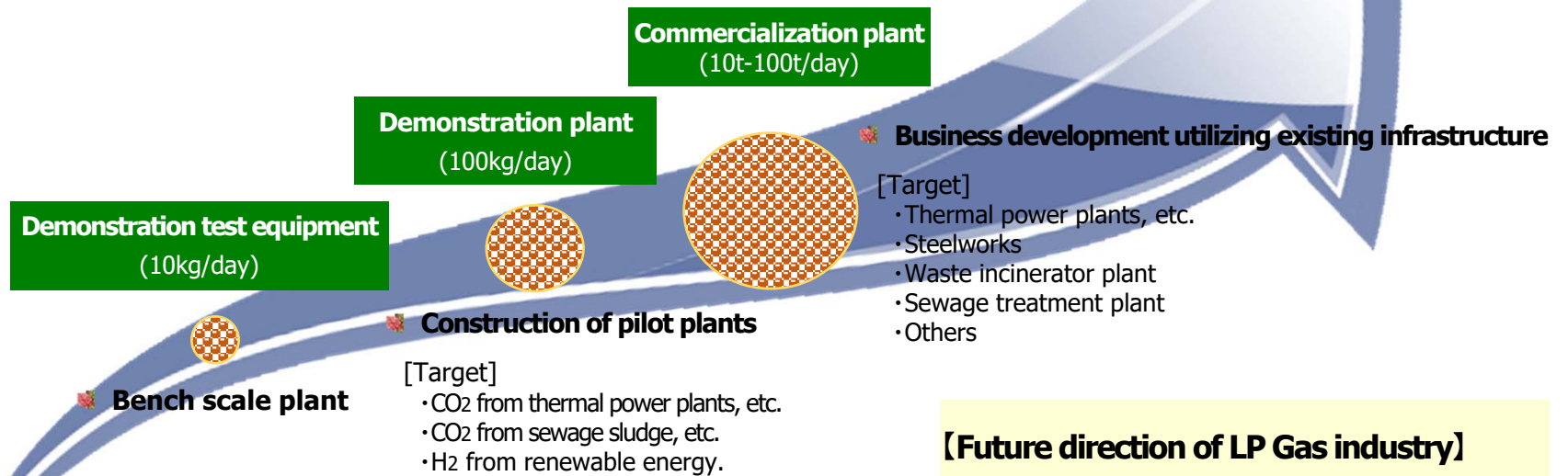
- **Product Green LP Gas via synthesizing from CO₂ and H₂. Establish supply structure by utilizing existing LP Gas infrastructure.**

Synthesis and supply of Green LP Gas:



Roadmap for Social Implementation of Green LP Gas

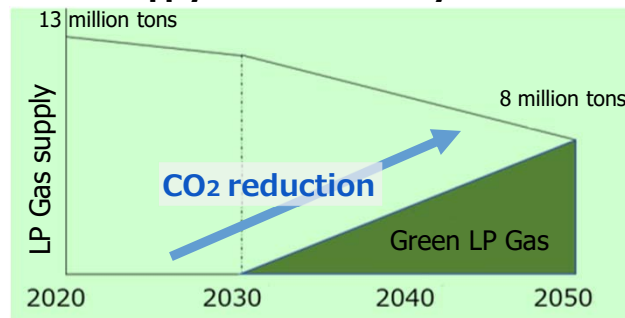
➤ Promote research and demonstration in stages to realize social implementation.



[Industry's efforts for lower carbonization] (other than Green LP Gas)

- Introduction of high-efficiency LP Gas equipment.
- Level up supply chain efficiency.
- Conversion to LPG Fuel Ship.

[LP Gas supply and alternation by Green LP Gas]



[Future direction of LP Gas industry]

- Turning over of business entity from primary distributor into manufacture.
- Apply technologies to manufactures outside Japan
- Alternating all LP Gas supply with carbon recycled LP Gas (Green LP Gas).

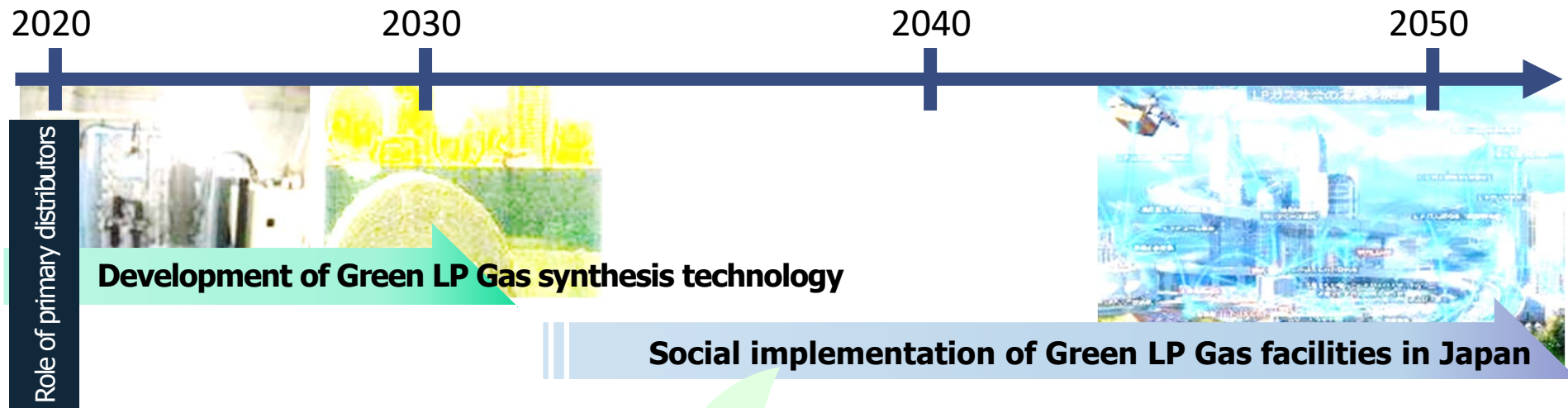
[CO₂ reduction]

2030-2050 cumulative total : **240 million tons**
 2050 alone : **24 million tons**



Challenges for Social Implementation of Green LP Gas

➤ Clarify the role of segments in LP Gas industry to realize Green LP Gas social implementation.



Role of wholesale and retail companies

What the LP Gas industry should do during the transition period before **social implementation**:

Promote the introduction of high-efficiency LP Gas combustion equipment

➡ Promote low carbonization throughout the industry, achieved by the introduction of high-efficiency equipment such as ENE-FARM.

Reduce CO₂ emissions by streamlining LP Gas supply chain

➡ For contribution to low carbonization, use LPWA and AI to streamline complicated cylinder deliveries, and to reduce supply costs.

Campaign of LP Gas industry's efforts for low carbonization to the public

➡ To maintain being "LP Gas chosen by our customers", quantify low carbonization activities and positively do campaigning to the public.

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【Summary】 Future Direction of the LP Gas Industry

Ensure stable supply:

- Continue stable imports.
- Promote diversification of procurement sources.
- Maintain and strengthen good relations with gas-producing countries.

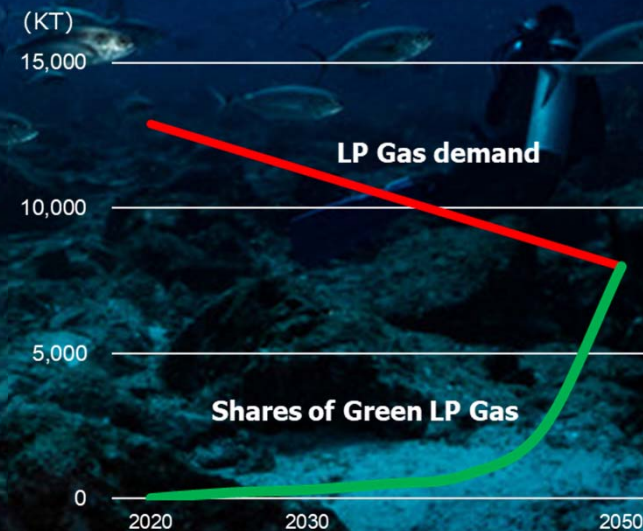
Strengthen resilience measures:

- Securing stockpiling systems in case of emergencies.
- Securing supply systems for the entire supply chain.
- Strengthen disaster prevention capabilities at emergency / evacuation centers.

Actions for Green LP Gas:

- Promoting decarbonization as clean energy.
- Develop Green LP Gas technology and realize its social implementation.
- Efforts throughout whole LP Gas industry segments.

Demand and expansion of green LP Gas



We will persist **"Energy used by people continually "** into the future.



Thank you for your kind attention.

ご清聴ありがとうございました。

**JAPAN
LPGAS
ASSOCIATION**

www.j-lpgas.gr.jp