

# Domestic Energy Business

**FY2021.3 Results** Net Sales **¥1,163.3 billion** Segment Profit\* **¥80.3 billion** Investment for Growth for FY2021.3 **¥520.0 billion\***

\* Operating profit (loss) + Share of profit (loss) of entities accounted for using equity method \* From FY2018.3 to FY2021.3 (Plan)

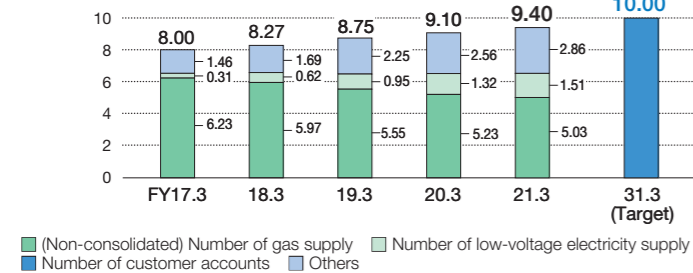
## What We Aim to Be in FY2031.3 and Summary of Current Situation

The Daigas Group are striving to develop our business as an energy marketer in a new era by strengthening each of the three areas in the Domestic Energy Business; namely, gas manufacturing and sales, gas distribution, and electric power generation and sales.

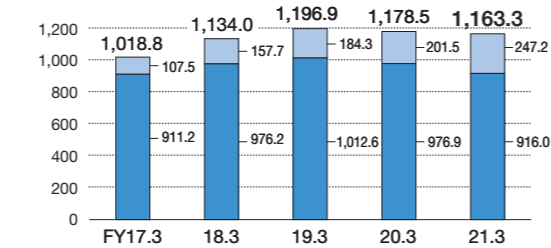
In addition to ensuring that customers in the Kansai area use city gas in a stable, safe, and secure manner, we are proceeding with comprehensive provision of energy and services by expanding the electric power and LPG businesses and enhancing life support services and one-stop services as a utility agent. Furthermore, we will expand the know-how and services developed in the Kansai area to a wide area through alliances.

With these activities going beyond customer expectations, business boundaries, and corporate boundaries, we aim to reach more than 10 million customer accounts by FY2031.3.

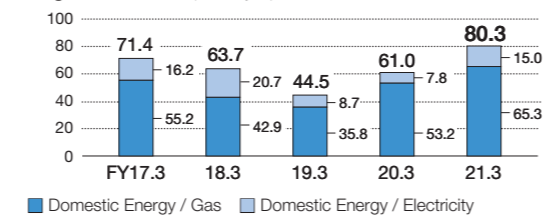
Number of Customer Accounts (million)



Net Sales\* (billion yen)



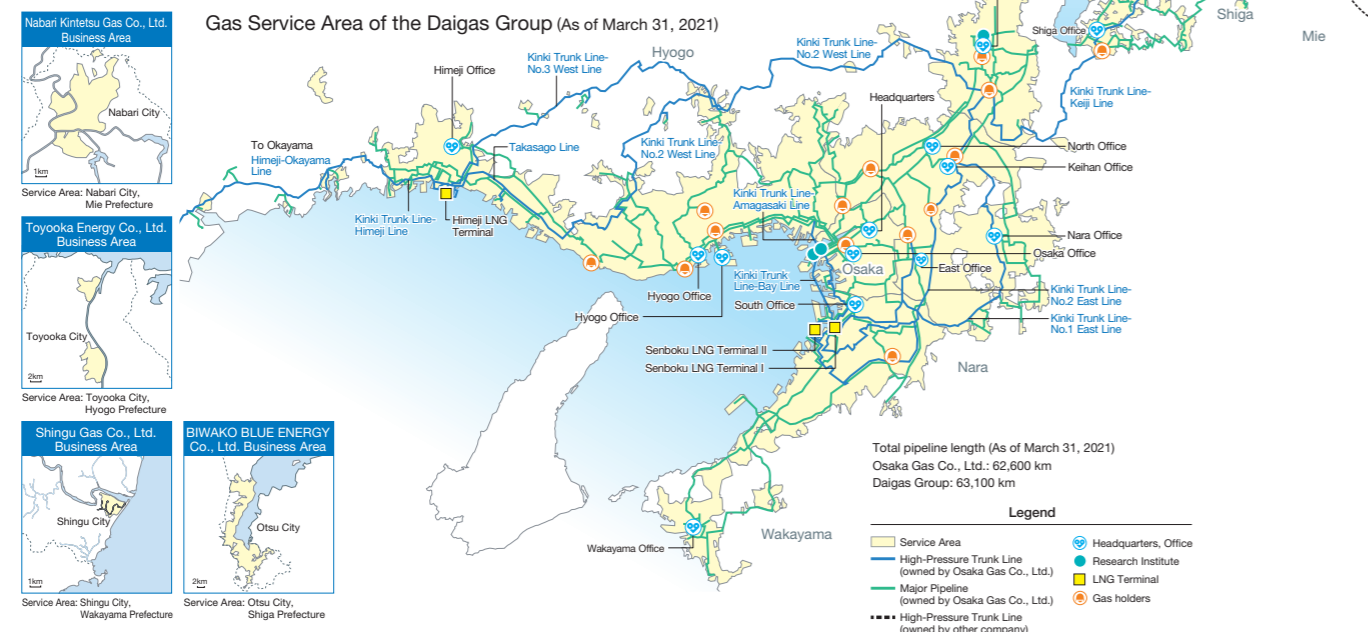
Segment Profit\* (billion yen)



\* Since FY19.3, Osaka Gas Engineering Co., Ltd. changed its segment from "Life & Business Solutions" to "Domestic Energy / Gas." FY18.3 results are calculated based on the contents after the change. In April 2020, Gas and Power Co., Ltd. (Domestic Energy / Electricity) was merged into Daigas Gas and Power Solution Co., Ltd. (Domestic Energy / Gas). FY20.3 results are calculated based on the contents after the change.

## Supply Systems for Safe and Secure Use

For our pipeline network with a total extended length of approximately 62,600 km (equivalent to 1.5 times the circumference of the earth), regular inspection and maintenance are conducted as preventative measures for ensuring safety. In addition, The Central Control Office operates 24 hours a day to monitor and control the status of gas supply in an integrated manner and is ready to promptly respond and dispatch staff from respective locations upon receiving reports from customers.



## [Daigas Group's Initiatives]

### Further Expansion of Electricity Rate Plans

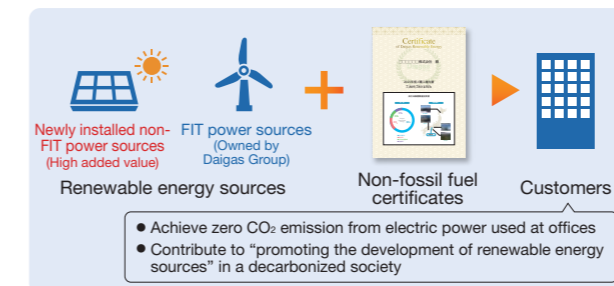
Osaka Gas provides various rate plans, including the "Base Plan A-G" electricity rate plans which offer good value to gas contract customers, the "Style Plan," which meets diverse customer lifestyles and individual needs, and the "With Plan," which supports fun and enriched lives for our customers with other companies and groups based on their personal hobbies and preferences.

During the FY2021.3, for customers whose electricity consumption is high, we added "Style Plan E-ZERO B" and "Style Plan E-ZERO Power Sources" to "Style Plan E-ZERO" electricity rate plans that enable customers to use electricity derived 100% from renewable energy free of CO<sub>2</sub> emissions. We support customers' lives by offering these rate plans which is convenient, good value and meet customer lifestyles and needs.

### "D-Green" Supplying Electricity Derived 100% from Renewable Energy

In April 2021, we started to accept applications for the "D-Green" series, new electricity rate plans that supply electricity derived 100% from renewable energy to corporate customers working to promote decarbonization.

The "D-Green Premium" rate plan offers electricity derived 100% from renewable energy with non-fossil fuel certificates for newly installed power sources that do not use the feed-in tariff system for renewable energy. Use of this rate plan contributes to promoting the development of new renewable energy sources.



### Status of Wide-area Energy and Services Development (As of June 30, 2021)

Himuka LNG Co., Ltd. (LNG) Stake: 34% Operation launch: FY2022.3 (Scheduled)	Ogishima Natural Gas Supply Co., Ltd. (Gas production/supply) Stake: 15% Operation launch: April 2020	Progressive Energy Co., Ltd. (Gas supply, energy service) Stake: 25% Investment period: March 2019	Biwako Blue Energy Co., Ltd. (Retail gas, security and services for gas/water) Stake: 74.8% Business launch: April 2019
Nagaoka Carbonic Co., Ltd. (Industrial gas) Stake: 100% Operation launch: November 2020	Reliance Energy Okinawa, Co., Ltd. (Energy service) Stake: 15% Investment period: March 2018	CD Energy Direct Co., Ltd. (Gas, electricity, service) Stake: 50% Business launch: August 2018	ENEARC Co., Ltd. (LPG, electricity, service) Stake: 50% Business launch: October 2017

### IoT-compatible Alarm Device "Sumapiko"

In August 2020, we launched the internet-connectable alarm device "Sumapiko," which was developed by providing an internet connection function to our household gas alarm device. "Sumapiko" provides information that is helpful to daily life, such as weather information, crime-prevention information, and monitoring notifications in addition to existing alarm devices' functions for detecting gas leaks and carbon monoxide. Based on our agreements with the Osaka City Government, disaster information issued by the Osaka City Government is provided\*1 to "Sumapiko" users as a voice alert. Additionally, crime prevention information issued by six prefectural polices in the Kansai region\*2 is also received and communicated as a voice alert. We aim to improve the safety and security of customers' homes through collaboration with the Osaka City Government and the prefectural polices to disseminate information on disaster and crime prevention.

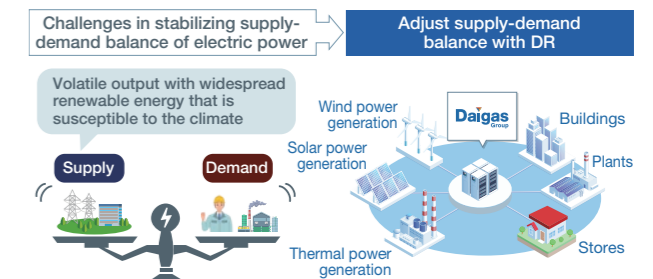


\*1 To users who live outside Osaka City, disaster information provided by a private company will be distributed.  
\*2 The polices of Osaka, Kyoto, Hyogo, Nara, Shiga, and Wakayama prefectures (as of June 30, 2021)

### Demand Response Scheme Adjusts Supply-Demand Balance of Electricity

While use of renewable energy is currently expanding, renewable energy is susceptible to factors such as the climate. Therefore, the stability in the balance of supply and demand of electricity is a major challenge. Demand response (DR), which saves electricity by controlling customer facilities, is drawing attention as a method to adjust the supply-demand balance of electric power. By aggregating energy saved by customers as part of the demand response scheme and establishing VPP\*, the Group will contribute to a society with a stabilized power system and eventually to the expansion of renewable energy electricity.

\* VPP: Virtual Power Plant



# International Energy Business

FY2021.3 Results Net Sales **¥69.1 billion**

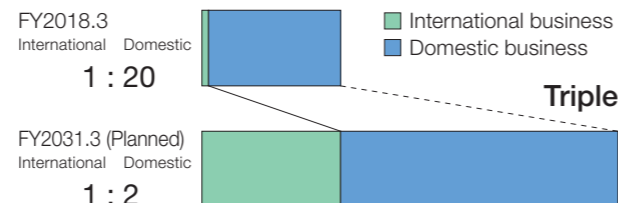
Segment Profit\* **¥22.1 billion**  
\* Operating profit (loss) + Share of profit (loss) of entities accounted for using equity method

Investment for Growth for FY2031.3 **¥550.0 billion\***  
\* From FY2018.3 to FY2031.3 (Plan)

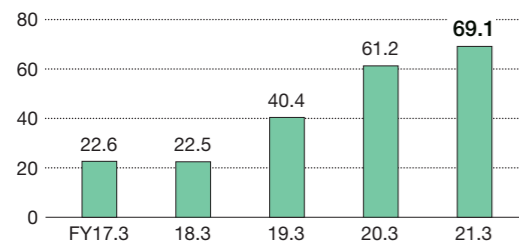
## What We Aim to Be in FY2031.3 and Summary of Current Situation

As an energy business operator, the Daigas Group has focused on the natural gas value chain from early on and has made investments abroad accordingly. In the future, we will continue to invest outside of Japan and by FY2031.3 will increase our international-to-domestic business ratio to 1:2. The Daigas Group will create a business model capable of generating balanced earnings streams from North America, Asia, Oceania, and Europe.

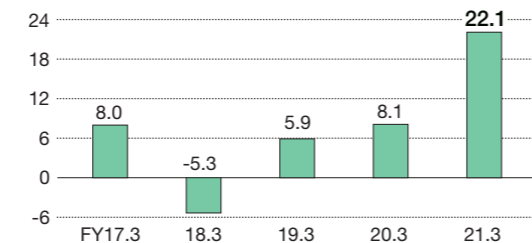
### Anticipated FY2031.3 Consolidated Ordinary Profit



### Net Sales (billion yen)

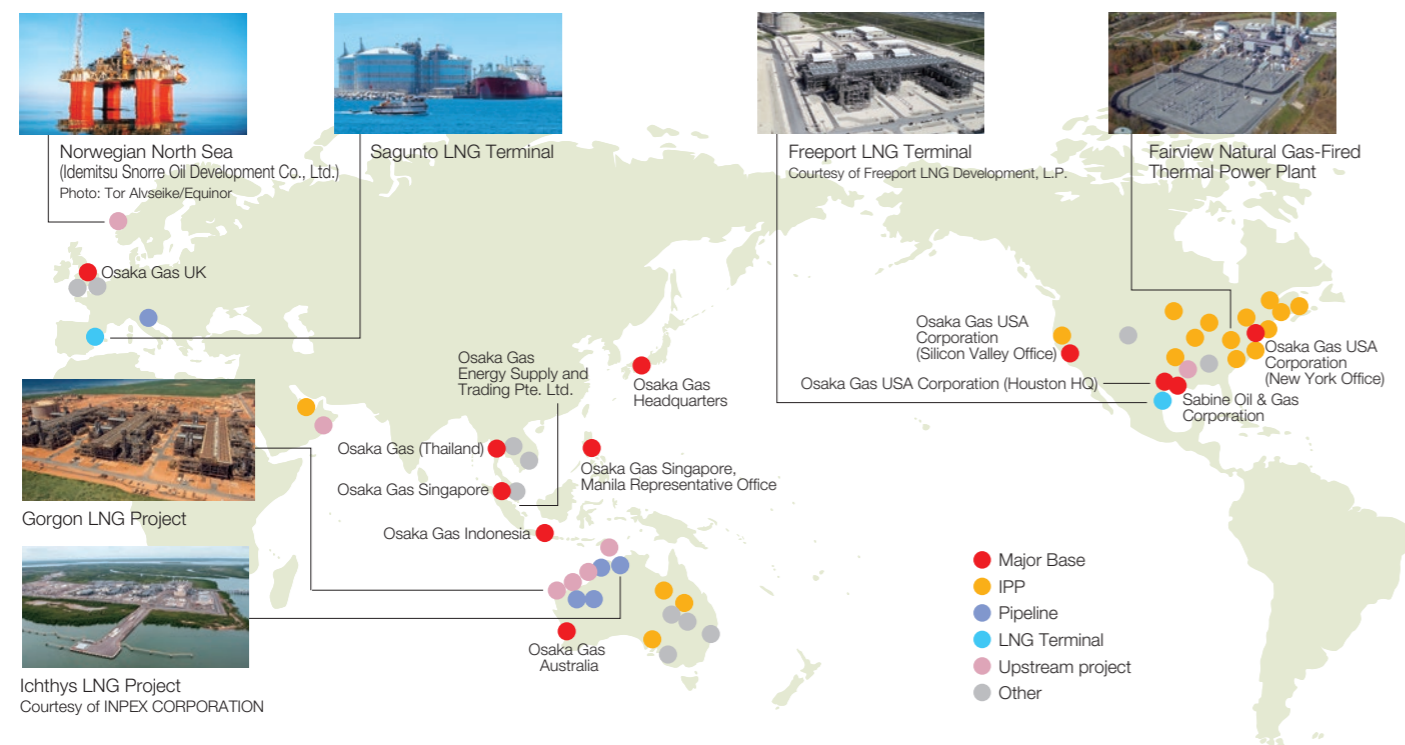


### Segment Profit\* (billion yen)



Note: Since FY18.3, Sumisho Osaka Gas Water UK Limited, an equity-method affiliate, changed its segment from "Life & Business Solutions" to "International Energy Business." FY17.3 results are calculated based on the contents after the change.

## Investments in the International Energy Business (As of March 31, 2021)



\* Please refer to the Fact Book 2021 for investments in the International Energy Business.

## [Daigas Group's Initiatives]

### Business in North America

#### Status of Investment for Growth

During FY2021.3, profits from investment for growth expanded as output of Sabine Oil & Gas Corporation grew steadily, and also, commercial operation of the 2 and 3 trains has started at the liquefaction business at the Freeport LNG Project in Texas, USA. We acquired all shares of Sabine Oil & Gas, a US upstream business in FY2020.3. We aim to achieve long-term and stable profit contribution by continuously promoting the businesses.



Sabine Shale Gas Project in USA



Freeport LNG Terminal in USA  
Courtesy of Freeport LNG Development, L.P.

#### Participated in Distributed Solar Power Projects

As for the IPP projects in North America, we invested in SolAmerica Energy, LCC, a U.S. distributed solar energy project developer, in March 2020. This investment marks the Group's first participation in the U.S. renewables market. Through the investment, in addition to distributed solar power generation projects in the U.S., we will participate in projects such as a fuel cell project that is promoted together with distributed solar power as well as a community solar project that enables to offer solar power energy to broader consumers. In June 2021, we entered into a joint venture with Summit Ridge Energy, LLC to cooperate in distributed solar power projects. We will acquire distributed solar power plants, which Summit Ridge Energy will build in Maine, through the joint venture company and will operate the plant over the long term. We will continue to actively explore development investment opportunities on renewable energy power sources that are expected to expand in the USA.

### Asia / Decarbonization

#### Participated in a Fuel Switching Business at Food Plants in Vietnam

Sojitz Corporation and the Company's joint venture company Sojitz Osaka Gas Energy Company Ltd. (SOGEC) has concluded an agreement with Acecook Co., Ltd.'s subsidiary, Acecook Vietnam Joint Stock Company (ACV), to provide natural gas to ACV's food plants.

The objective is to improve the plants' work environment and reduce CO<sub>2</sub> emissions by replacing the coal-fired boilers at two of ACV's food plants with highly-efficient gas-fired boilers. This business will be a subsidized project under the Joint Crediting Mechanism scheme undertaken between Japan and Vietnam, and expects to reduce CO<sub>2</sub> emissions by approximately 76,300 tons over a 10-year period. Under this scheme, over half of this reduced CO<sub>2</sub> amount will be credited to the Japanese government, which will help Japan to realize its reduction targets for CO<sub>2</sub> emissions.



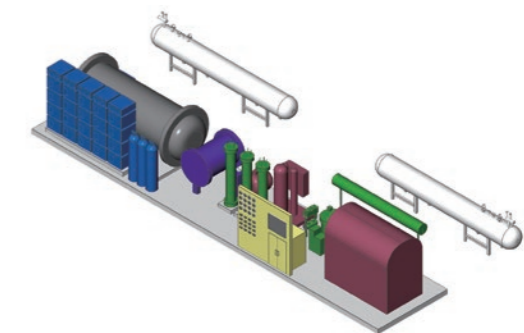
Hung Yen plant of Acecook Vietnam Joint Stock Company



Binh Duong plant of Acecook Vietnam Joint Stock Company

#### Investment in a Green Ammonia Start-up Company

In March 2021, the Group invested in Starfire Energy Inc., a company developing technology to produce the carbon-free fuel known as "Green Ammonia" from renewable energy, air and water. Starfire Energy Inc. is a U.S. start-up company developing small-scale distributed green ammonia production modules and technology for cracking ammonia into hydrogen. Green ammonia has no CO<sub>2</sub> emissions in manufacturing and combustion, and efforts are ongoing to rapidly commercialize it for manufacturing and supply businesses as a leading energy source for achieving a carbon neutral society. We will support Starfire Energy Inc.'s technology development for realizing commercialization in the future.



Green Ammonia Production Module (under development)  
Source: Documents of Starfire Energy Inc.



# Life & Business Solutions (LBS) Business

FY2021.3  
Results

Net Sales **¥216.5 billion**

Segment Profit\* **¥19.2 billion**

\* Operating profit (loss) + Share of profit (loss) of entities accounted for using equity method

Investment for  
Growth for FY2031.3

**¥380.0 billion\***

\* From FY2018.3 to FY2031.3 (Plan)

## What We Aim to Be in FY2031.3 and Summary of Current Situation

The Daigas Group actively applies the technologies and know-how it has accumulated in the energy business, developing businesses that differ from the energy field in order to diversify business risk. These non-energy businesses are playing a major role in supporting the Daigas Group's earnings base as a stable source of earnings, particularly as crude oil prices

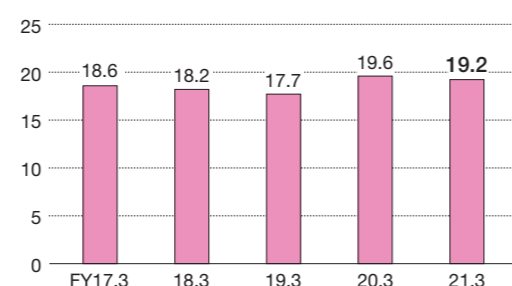
and foreign exchange trends remain unclear.

We plan to accelerate growth in three core business areas in Life & Business Solutions—Urban Development, Materials Solutions, and Information Solutions—aiming to consistently increase profits through fiscal 2031.3.

Net Sales\* (billion yen)



Segment Profit\* (billion yen)



Note: Since FY19.3, Osaka Gas Engineering Co., Ltd. changed its segment from "Life & Business Solutions" to "Domestic Energy / Gas." FY18.3 results are calculated based on the contents after the change. Since FY18.3, Sumisho Osaka Gas Water UK Limited, an equity-method affiliate, changed its segment from "Life & Business Solutions" to "International Energy Business." FY17.3 results are calculated based on the contents after the change.

### [Daigas Group's Initiatives]

#### Urban Development Business

#### Osaka Gas Urban Development Group

Our real estate business extends widely to include the development of properties such as sale and rental apartments, office buildings, management of buildings and facilities, and so on.

#### What We Aim to Be in FY2031.3

The Group aims to be a corporate group in which employees are actively engaged in various areas including development, operation, and maintenance, and one that meets the needs of customers and society through diverse solutions that are blended with real estate and services.

#### Efforts Toward Sustainable Growth

We aim for sustainable profit growth and improvement of capital efficiency by deepening the strength of existing businesses, expanding business domains, and evolving our business model. Specifically, we will develop apartments that pursue value creation, launch new businesses such as logistics, provide comprehensive facility management services in the building maintenance business, and provide interaction opportunities and a business environment that triggers creating innovation in the research park business.

#### Won GOOD DESIGN AWARD for "SCENES Tsukaguchi" Condominium

The "SCENES Tsukaguchi" condominium developed by Osaka Gas Urban Development Co., Ltd. won the GOOD DESIGN AWARD 2020. This property has a design feature that creates connections between the community, greenery, and a safe and secure future with the concept of "Re:CONNECT." Designed with open town blocks, the apartment encourages interactions with neighboring areas and the three gardens create a living environment with abundant nature. In addition, various types of energy generating equipment, such as "ENE-FARM," were adopted, providing a safe and secure living that considers the environment and disaster prevention. We will continue to develop products that pursue value creation for our customers and society.



#### Materials Solutions Business

#### Osaka Gas Chemicals Group

We develop, manufacture and sell highly functional materials based on our own coal chemistry technologies and pharmaceutical- and agrochemical-related technologies. In 2014, we acquired activated carbon producer Jacobi Carbons AB (Sweden) and are developing our business globally.

#### What We Aim to Be in FY2031.3

Engaged primarily outside of Japan, we aim to become a manufacturer of functional materials with a top position in niche markets that contributes positively to industry, life, and the environment.

#### Efforts Toward Sustainable Growth

We aim to establish a stable earnings base and achieve sustainable growth by developing and expanding sales of products with high added value in a diverse product offering, while also pursuing synergies and developing new markets. We will also be working on substitutions in our business portfolio on a continuous basis to adapt to changes in the times.

Fine Materials	Carbon Materials	Activated Carbon	Silica- and Alumina-based Materials	Preservatives
Development of various applications for fluorene with its excellent optical properties and heat resistance	Expanded sales of DONACARBO carbon fiber with its excellent heat insulation and abrasion resistance	Expanded global value chain through cooperation between the Jacobi Group and Osaka Gas Chemicals Co., Ltd.	Expanded sales of adsorbents and additives and efforts toward developing new applications	Development of wood preservatives, industrial preservatives, industrial coating agents
				
Resins for camera lenses in smartphones and other devices, semiconductor materials, liquid crystal displays	Acoustic insulation material for train cars	Activated carbon for purification processes in food, alcohol and pharmaceutical manufacturing, air purifiers and water filters	Activated clay for petroleum processing and for refining cooking oil	Xyladecor wood preservative, Xylamon termite control agent

#### Information Solutions Business

#### OGIS-RI Group

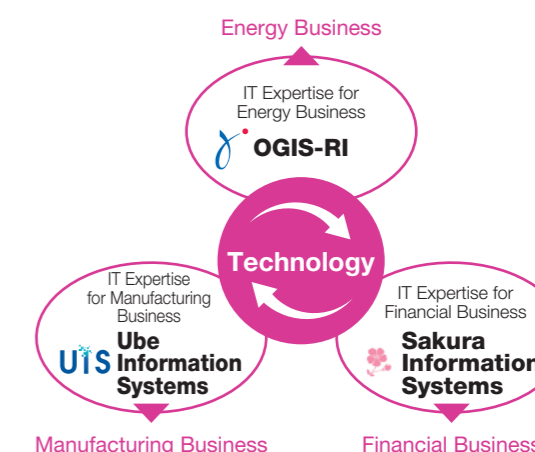
OGIS-RI traces its roots back to developing and managing systems for the gas business of Osaka Gas Co., Ltd. After various acquisitions, it organized a group of system providers to offer services to the manufacturing and financial industries. By sharing the expertise of each company in the group, we provide comprehensive IT services ranging from consulting, design, development, and operation of corporate information systems to data centers, cloud services, and security.

#### What We Aim to Be in FY2031.3

Through high-level innovation in information and communications technologies, we aim to be a corporate group that provides new value and grows sustainably with customers.

#### Efforts Toward Sustainable Growth

Our strategy is to differentiate ourselves with a priority placed on the fields of finance, manufacturing, and energy as we expand service businesses for the domains of IoT, cloud technology, and authentication. We will apply our cumulative expertise and introduce new technologies to improve the competitiveness of the Daigas Group.



# Technological Development

The Daigas Group is accelerating the development of technologies to strengthen the businesses in the energy domain, contribute to the realization of a low carbon / carbon neutral society, and create businesses in growth fields.

## Key Initiatives

### Responding to intensified competition in energy markets

#### Technological development contributing to the evolution of the electricity business

- Increase accuracy of solar power output forecasting
- Develop energy management systems for storage battery

#### Development of ENE-FARM Type S

- Develop higher-efficiency and downsized SOFC
- VPP verification project utilizing ENE-FARM

### Contributing to achieving a low carbon / carbon neutral society

#### R&D contributing to decarbonization

- Develop the innovative SOEC methanation technology\*
- Commence the research and development of chemical looping combustion technology

#### Contribution to hydrogen and ammonia society

- Develop hydrogen producing equipment (HYSERVE®)
- Develop technologies for the effective utilization of ammonia

#### Effective utilization of biomass

- Expand business of refining / upgrading the quality of biogas, targeting Southeast Asia
- Demonstrate biogas methanation using kitchen waste at Expo 2025

### Creating new businesses in growth fields

#### Development and commercialization of environmental materials

- Commence sales of a radiative sky cooling material SPACECOOL®
- Develop a fiber for strengthening resin Fluorene Cellulose

#### Initiatives in the health sector

- Develop manufacturing technology and promote sales of ketone bodies (3HB) as raw materials of health foods

\*The initiatives for the innovative SOEC methanation technology to achieve a low and decarbonized society are introduced on page 31.

## Responding to Intensified Competition in Energy Markets

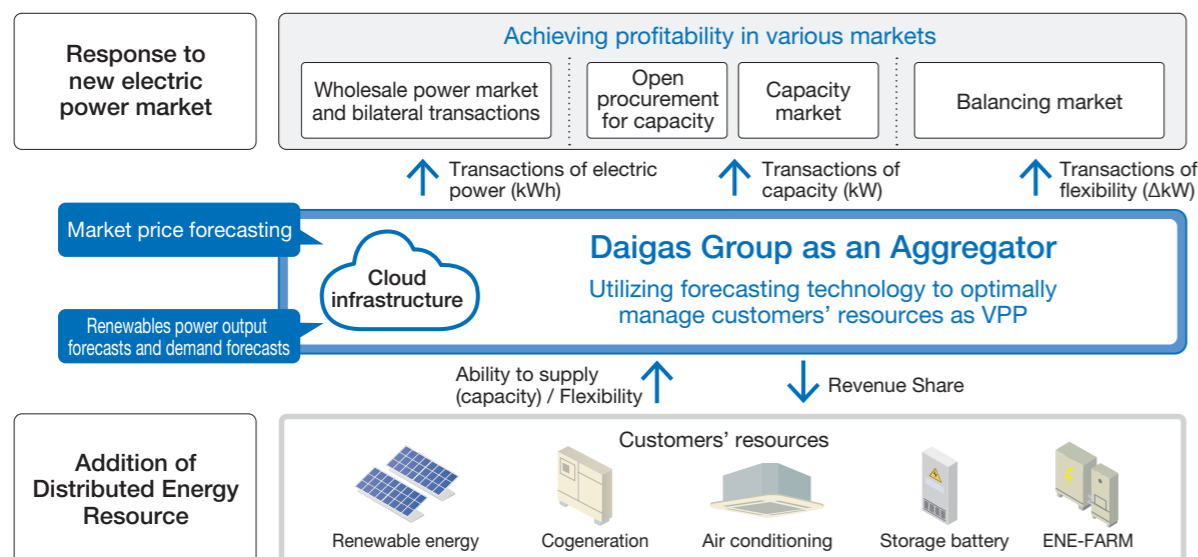
### Technological development contributing to the evolution of the electricity business

In order to contribute to reducing CO<sub>2</sub> emissions across society as a whole, the Daigas Group is working to expand its sources of renewable energy and increase the proportion of renewable energy in its energy portfolio. In addition, the Group is working to establish VPP utilizing customers' resources and develop related technology.

Output of renewable energy sources fluctuates depending on the weather and other factors. For this reason, accurate forecasts of the amount of power output that will be generated are required to use renewable power effectively, and Osaka Gas therefore enhances

the accuracy of such forecasts through proof-of-concept testing, etc. of forecasting methods that employ our weather forecasting technologies.

Additionally, as the number of renewable power sources increases in future, a new market for electric power will be established to provide a stable supply of power. In anticipation of this future new market, we are developing technology for energy management using storage batteries, which are a promising resource for the market.



### Development of "ENE-FARM Type S," realized the world's highest power generation efficiency in a significantly smaller size

We have been making efforts to sell "ENE-FARM" fuel cells and spread its use since 2009, as a residential cogeneration system contributing to saving energy and cutting CO<sub>2</sub> emissions. In April 2020, we released a new product, the "ENE-FARM Type S." With this product, we have achieved the world's highest power generation efficiency of 55%, and have also made it easier to install by significantly reducing its size. The power generation efficiency and small size of the product has attracted praise, with the "ENE-FARM Type S" being the first commercial residential fuel cell model to be selected as one of the "Top 10 Innovations" at ICEF 2020, an international conference. The "ENE-FARM Type S" has also won many awards, including the 7th Japan Resilience Award, the FY2020 Energy Conservation Grand Prize, and the Cogeneration Grand Prize 2020. Furthermore, in order to utilize ENE-FARM units as a resource for contributing to adjusting the supply and demand of renewable energy in the power grid, we created a VPP in FY2021.3 to control approximately 1,500 ENE-FARM units at customers' premises as if they were a single power plant, and conducted a demonstration of the utilization of the VPP to adjust supply and demand in the power grid (the VPP verification project). In FY2022.3, we will conduct a demonstration of a VPP to control approximately 3,600 ENE-FARM units\*.

\* Please refer to page 44 for the latest VPP verification project.



## Contributing to Achieving a Low Carbon / Carbon Neutral Society

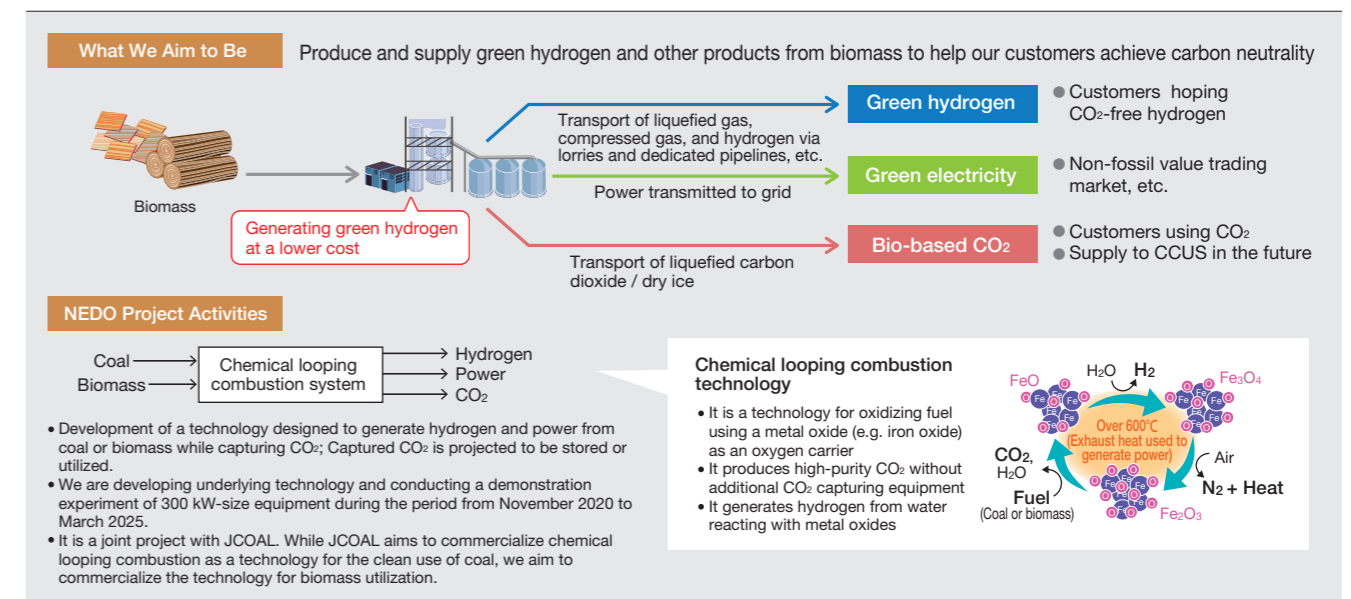
### Commencement of R&D of chemical looping combustion technology which contributes decarbonization

In November 2020, Osaka Gas and the JAPAN COAL FRONTIER ORGANIZATION (JCOAL) were jointly selected as the parties to implement a project contracted\*1 by the New Energy and Industrial Technology Development Organization (NEDO) related to the research and development of chemical looping combustion technology to contribute to decarbonization. In January 2021, the Company entered into a business consignment contract with NEDO in relation to this contracted project.

Based on the results of this contracted project, the Daigas Group aims to commercialize a plant that produces hydrogen, electric power, and CO<sub>2</sub> from biomass fuel. We envision to supply the hydrogen produced by the plant to customers who wish to

use low-cost green hydrogen, and the CO<sub>2</sub> to supply as liquefied carbon dioxide and dry ice. In future, we also aim to supply the CO<sub>2</sub> as a raw material for carbon recycling products, and utilize it in negative emission businesses\*2 with CCS technology. We will also consider opportunities to utilize the electric power generated on markets for trading non-fossil value and sell it to customers looking to achieve RE100.

\*1 NEDO research projects "Development of Technologies for Carbon Recycling and Next-Generation Thermal Power Generation / Development of Foundational Technologies for Next-Generation Thermal Power Generation / Development of Technologies for CO<sub>2</sub> Separation and Recovery-Type Polygeneration Systems"  
\*2 The businesses that immobilize carbon-neutral CO<sub>2</sub> that will not be counted in GHG emissions to ensure that it is not dispersed into the atmosphere, thereby achieving negative GHG emissions





## Technological Development

### ■ Contribution to a hydrogen society Development of hydrogen production equipment (HYSERVE®)

In response to growing demand for hydrogen, Osaka Gas is developing "HYSERVE," onsite hydrogen production equipment.

In April 2019, Osaka Gas Liquid Co., Ltd. began selling "HYSERVE-5," small hydrogen production equipment with a hydrogen manufacturing capacity of 5 Nm<sup>3</sup>/h. This has enabled us to offer hydrogen at low prices matched to demand, even to customers only using small amounts of hydrogen. With "HYSERVE-5," we have expanded the "HYSERVE" series to meet demand from a wide range of customers, using both city gas and LPG, and requiring both small and large-size equipment. Looking ahead, we will contribute to achieving a hydrogen society by enhancing our hydrogen supply infrastructure and developing and selling equipment for the production of hydrogen.

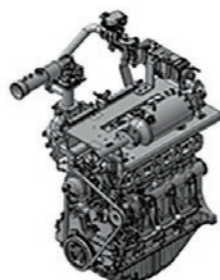


HYSERVE-5

### ■ Development of technologies for the effective utilization of ammonia, which is attracting attention as an alternative to fossil fuels

Ammonia is attracting attention as an alternative to fossil fuels, based on the fact that it does not release CO<sub>2</sub> when burned, and existing infrastructure technologies for storage and transportation can be used. On the other hand, there are some challenges we must tackle to use ammonia as a fuel for engines, which include low combustibility.

Following our selection for a project contracted by the Ministry of the Environment in April 2021\*, the Company began technical development and trials of small engine systems that use ammonia as fuel. Our aim is to create the world's first small engine system usable with ammonia fuel alone.

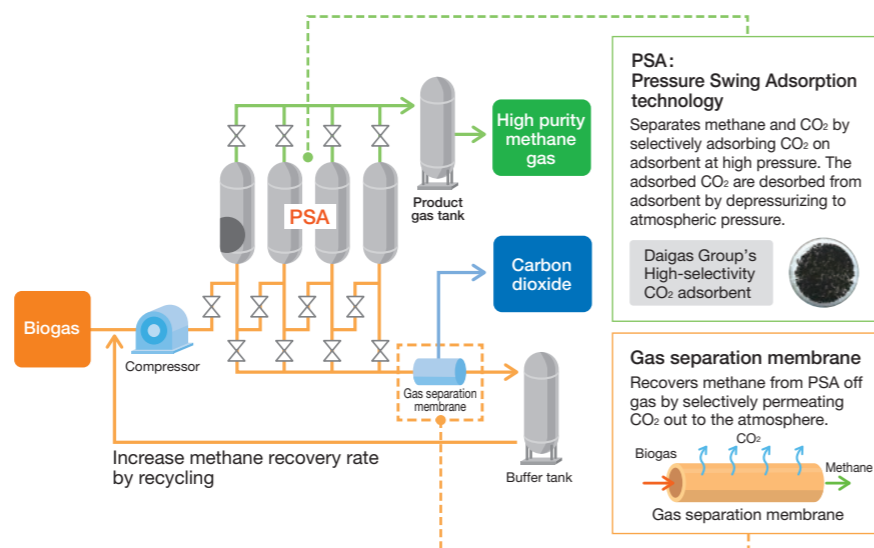


\* FY2021 Project for the Low Carbon Technology Research, Development and Demonstration Program (First Applications)

### ■ Osaka Gas's unique hybrid type biogas refining / upgrading system

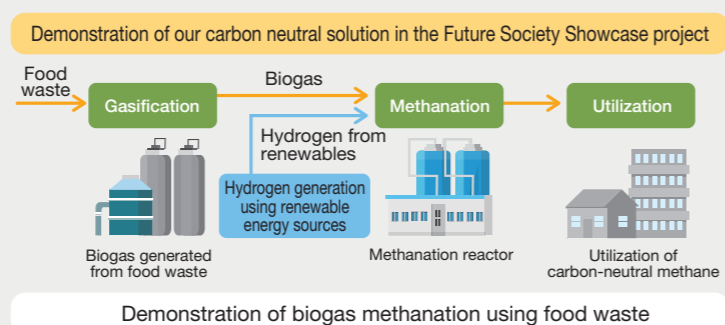
In order to use biomass resources more efficient, we have developed an original biogas refining / upgrading technology that removes CO<sub>2</sub> and other impurities from biogas. Our technology produces high purity methane gas with methane recovery rate over 99%, the world's highest-level. This was achieved by the hybrid system which combines gas separation membrane and pressure swing adsorption (PSA), a technology that selectively adsorbs and removes CO<sub>2</sub>.

This technology is installed in a palm oil mill owned by Agriculture of Basin Company Limited, a company based in Thailand, to produce high purity methane gas from biogas which is generated from palm oil mill's waste water. The upgraded methane gas is supplied as fuel for natural gas vehicles.



### Demonstration at the World Expo 2025 | Biogas methanation from food waste

In order to achieve carbon-neutral methane generation, we are developing biogas methanation systems that use hydrogen produced from biogas generated from the decomposition of food waste and other organic waste, together with electric power generated with renewable energy. We have proposed demonstrating this technology at the World Expo 2025, as part of our aim to realize a locally produced locally consumed energy supply system suitable for urban areas in a decarbonized society.



## Creating new businesses in growth fields

### ■ Commencement of sale of a "radiative sky cooling material," a new material with world-class cooling performance

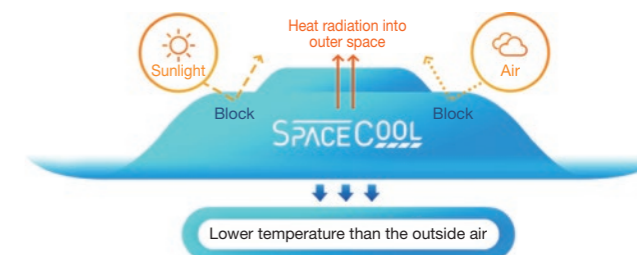
We developed the "radiative sky cooling material," a new material which lowers the temperature compared to the outside air temperature without using energy under direct sunlight by releasing heat into outer space. A demonstration test conducted by Osaka Gas found that the surface temperature of the material was up to about 6°C lower than the outside air temperature under direct sunlight, realizing world-class cooling performance. Additionally, in a demonstration experiment using this material for a tent, we confirmed that the feeling temperature was lower by up to 10°C less than that of a normal tent, while in a test using this material in a prefabricated house for construction sites, we confirmed the ability to significantly reduce electric power usage during the day.

The material is expected to be deployed as products for implementing measures against global warming, achieving energy conservation and ensuring cooling comfort. Potential applications vary, including canvas-covered structures



and container warehouses. This material was also selected for a demonstration experiment\* in Yumeshima, the planned site of the World Expo 2025\*.

Marketing, manufacturing, and sales of this radiative sky cooling material is conducted by SPACECOOL Inc., which is jointly operated by Osaka Gas and WiL, LLC. We will aim to reduce greenhouse gas emissions and improve the environmental performance by means of zero-energy cooling.



\* Demonstration cases were put out to tender and selected by the Japan Association for the 2025 World Exposition and the Osaka Chamber of Commerce and Industry.

### Demonstration experiment at the World Expo 2025 | Verification of the value of SPACECOOL® radiative sky cooling material

In a demonstration experiment at Yumeshima, the site of the World Expo 2025, we will collaborate with a diverse range of companies\* to evaluate the energy-saving qualities, economic performance, comfort, and safety of this radiative sky cooling material in a variety of expected applications, such as tents and power distribution boards.



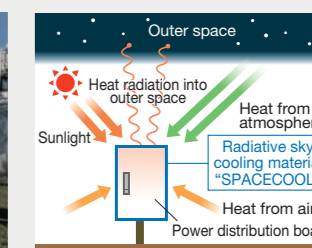
みんなの未来へ  
夢洲実証実験

For everyone's future Yumeshima demonstration experiment

\* Conducted jointly with KANBO PRAS CORPORATION, SPACECOOL Inc., Seiritsu Industries Co., Ltd., and TAKENAKA CORPORATION



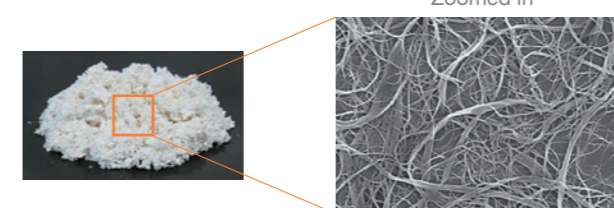
"SPACECOOL" x Tent



"SPACECOOL" x Power distribution board

### ■ Development of fluorene cellulose as a fiber for strengthening resin

In response to the issue that cellulose fibers are difficult to mix with resin, we have developed fluorene cellulose, a cellulose fiber with uniform dispersion, which does not mix easily with water but mixes easily with resin by causing a surface reaction with a proprietary fluorene derivative developed by the Daigas Group. Fluorene cellulose is a resin fiber material with low environmental impact and has strong potential for use in home appliances and as a structural material in automobiles.



### ■ Successful production of ketone bodies (3HB), known for their use in diets

We have developed a method for manufacturing ketone bodies, (R)-3-hydroxybutyric acid (3HB), using bioprocess (fermentation) technology cultivated in collaboration with the National Institute of Advanced Industrial Science and Technology. Recent years have seen rising interest in ketone bodies for their effectiveness in dieting and improving athletic performance. We have succeeded for the first time in effectively generating and isolating 3HB using bioprocesses. We anticipate new applications for their use in the future in health foods, supplements, and cosmetics.

Fermentative production of (R)-3-hydroxybutyric acid (3HB)

