WEB Information Posted on the Web
- President's Commitment
- Special Feature: The Daigas Group addresses social issues with its human resources and technical expertise

Special Feature

The Daigas Group addresses social issues with its human resources and technical expertise

Contributing to the Sustainable Development Goals

Since 1905, the Daigas Group has been supplying gas and providing products and services tailored to the needs of individual customers and society at large under the motto "service first." Our Group emphasizes customer convenience and undertakes the necessary research and development into innovative technologies that, put to practical use, help our customers live in a more energy-efficient manner. In 2006, the Daigas Group adopted its CSR Charter, a document intended to spell out how we will meet the expectations of stakeholders and fulfill our corporate social responsibility. Our CSR Charter serves as an action guideline for both our executive management and our rank-and-file employees; using this document, the Group implements CSR initiatives intended to contribute to the emergence of a sustainable society. Through its business operations, the Daigas Group remains focused on addressing social issues.

Our Group is engaged primarily in the energy business. In recent years, we have taken on the extremely important mission of reducing our emissions of greenhouse gases (GHG), which have been linked to the climate change issue. Specifically, we aim to reduce our total CO_2 emissions by approximately 70 million tonnes by FY2031. In this endeavor, our Group engages in a variety of business initiatives that include expanding the use of renewable energy, promoting the adoption of advanced energy equipment, and launching LNG businesses and other businesses inside and outside Japan. Moreover, considering the increasing frequency of recent natural disasters, the Group is working to improve its resilience by adopting disaster-response measures and improving its ability to ensure the rapid recovery of the infrastructure on which the public depends.

These initiatives are creating value through our efforts at innovation utilizing the many proprietary technologies that our Group has developed over the years. Everyone at our Group is collaborating on the development of new services that not only support the Group but also address the problems that challenge our customers.

We believe these activities contribute to several of the Sustainable Development Goals (SDGs) proposed by the UN. These include Goal 13, which calls for urgent action to combat climate change and its impacts; Goal 12, which calls for responsible consumption and production; Goal 7, which calls for assured access to affordable, reliable, sustainable, and modern energy for all; and Goal 9, which is intended to foster innovation, inclusive and sustainable industry, and the construction of resilient infrastructure. We believe that promoting these initiatives will trigger the creation of opportunities realizing sustainable town planning, increased employment, and creation of spaces conducive to active engagement of diverse personnel. In addition to the above, we believe we can contribute to the achievement of several other goals and targets that comprise the SDGs.
(For more details, please refer to the section titled "CSR Integrated into Management Strategy" on our corporate website.)

The Daigas Group will address climate change as a comprehensive energy service provider. The Group is committed to contributing to development of industries and communities through the provision of sustainable energy.

Special Feature 1

Reducing greenhouse gas emissions through efficient use of natural gas and expansion of renewable energy

In Focus Inami Wind Power Plant

Monitoring the wind and weather to create detailed forecasts

Realizing the potential of proprietary simulation technologies developed by the energy business operator

Weather conditions have a significant impact on the energy industry, as daily temperatures drive demand while changes in solar radiation affect the amount of solar power generated. The dramatic impact of weather has compelled us to develop weather and wind simulation technology that assists us in forecasting changes in wind and solar radiation. The weather data we compile from this technology is also used effectively by various businesses.

This weather and wind condition simulation technology was used in the design of the 26,000 kW Inami Wind Power Plant in Wakayama Prefecture that a Daigas Group company, Gas and Power Co., Ltd., put into service in June 2018. The company used this technology to select the location of the windmill and to forecast the amount of power this facility would likely generate over the next 20 years.

Contributing to the SDGs

The challenge

Contributing to the emergence of a low-carbon society

13 CLIMATE ACTION

Leveraging the strengths of the Daigas Group

- 7 AFFORDABLE AND CLEAN ENERGY — Expanding the use of renewable energy
- 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — Meteorological simulation technology
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION — Efficient use of natural gas

Solutions and initiatives

Contributing to the provision of services and the development and operation of a wide range of power sources

Our Group takes advantage of its years of experience and outstanding expertise to develop a diverse array of power sources and create sustainable infrastructure that contributes to the emergence of a low-carbon society. This effort includes the launching of LNG [?!] businesses outside the Kansai area and promoting biomass power generation by establishing procurement and sales companies for domestic woody biomass fuels.

Currently, we have approx. 210,000 kW of renewable energy sources including wind, solar, and biomass power plants in Japan, which contribute to reducing CO_2 emission.

In an effort to further spread renewable energy, in FY2019 we decided to construct two of Japan's largest biomass power plants, each with a capacity of approx. 75,000 kW, in Sodegaura, Chiba Prefecture, and Himeji, Hyogo Prefecture.

Accelerating the adoption of sustainable energy and services

Devising ways to reduce the greenhouse gas (GHG [?!]) emissions associated with climate change has long remained a formidable challenge. Clearly, energy companies are required to do more. Such effort includes promoting the adoption of natural gas, which is associated with low CO_2 emissions, and increasing the ratio of renewable energy sources—such as wind and solar power—in the energy mix.

As a gas and electricity provider, we intend to further accelerate the development and acquisition of renewable energy sources as outlined in our FY2019 management plan, in which we have adopted the target of renewable energy generation capacity 1 million kW by FY2031 in the Japan and overseas markets.

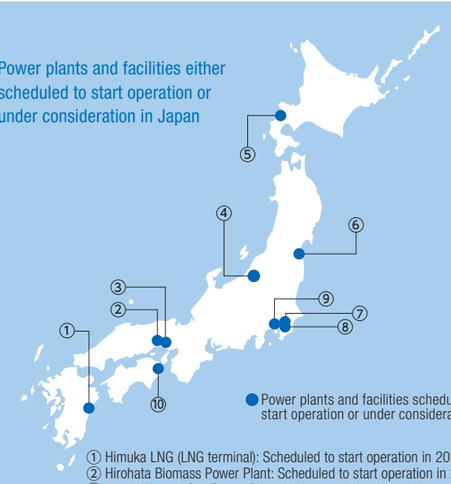
Moreover, we remain committed to further expanding our natural gas business, which is noted for its low CO_2 emissions, and developing a variety of power sources while contributing to the provision of sustainable energy and services.

United Nations Framework Convention on Climate Change

* Conference of the Parties

- 1992: Framework Convention on Climate Change is adopted at the Earth Summit in Rio de Janeiro
- 1997: COP* 3 adopts the Kyoto Protocol
- 2015: COP 21 adopts the Paris Agreement as a new framework for 2020 and beyond
- 2018: The Intergovernmental Panel on Climate Change (IPCC) issues the special report "Global Warming of 1.5 °C"
- 2018: COP 24 adopts "Implementation Guidelines (Detailed Rules)" for the operation of the Paris Agreement

Power plants and facilities either scheduled to start operation or under consideration in Japan



① Himuka LNG (LNG terminal): Scheduled to start operation in 2022
② Hirohata Biomass Power Plant: Scheduled to start operation in 2023
③ Himeji Natural Gas Power Plant: Under consideration and environmental assessment
④ Nagaoka Tansan (industrial gas): Scheduled to start operation in 2021
⑤ Shiribetsu Wind Power Plant: Scheduled to start operation in 2021
⑥ Fukushima Gas Power Plant: Scheduled to start operation in 2020
⑦ Ichihara Biomass Power Plant: Scheduled to start operation in 2020
⑧ Sodegaura Biomass Power Plant: Scheduled to start operation in 2022
⑨ Ogishima Natural Gas Supply (gas production and supply): Scheduled to start operation in 2020
⑩ Tokushima Tsuda Biomass Power Plant: Scheduled to start operation in 2023

Rei Takatani
Certified and Accredited Meteorologist
Fluids and Materials Analysis Team
Energy Technology Laboratories
Osaka Gas Co., Ltd.

Developer Interview

Leveraging the expertise acquired from studies on the airflow of gas fan heaters

The weather analysis is indispensable for operation of energy businesses. Since undertaking analysis of the air flow within and from fan heaters some 30 years ago, the Energy Technology Laboratories have pioneered various applications of fluid simulation technology, including the combustion process in industrial furnaces, diffusion of exhaust gases, and the flow inside the Ene-Farm. The fluid simulation technology we have developed here uses computers to predict the flow of gases and liquids. We came to realize that if these technologies could be adapted to forecast the wind, solar radiation, rain, and other elements of weather, they would become a new fundamental technology, so we started working on ways to put our weather simulation technology to practical use. In recent years, we have been using this technology for wind power generation projects.

In 2005, I became involved in predicting the amount of power that would be generated by the Hirokawa Myojinyama Wind Power Plant in Wakayama Prefecture, which was being planned at the time. I discovered that I could come up with reliable predictions by leveraging my knowledge and experience in predicting the air flow around objects having complex shapes. Since then, we have accumulated a significant amount of skill and data uniquely applicable to wind power generation. To date, we have used this expertise to evaluate a number of wind power projects both inside and outside Japan, including the Hallett 4 Project in South Australia. These achievements have enabled us to evaluate the business case for the Inami Wind Power Plant.

In the future, we aim to provide this service to industries requiring weather forecasting. These include the agriculture industry, which depends on temperature and weather forecasts for making harvesting decisions, and the retail and service industries, whose pricing and customer traffic are affected by the weather.

Simulation

Special Feature 2

Constructing resilient infrastructure for disaster-resistant urban development

In Focus Northern Osaka Prefecture Earthquake

We provided detailed information that contributed to a rapid recovery.

Realizing the great potential of the map information systems maintained by our energy business

Following the Northern Osaka Prefecture Earthquake that struck on June 18, 2018, an emergency gas shutdown was implemented for safety reasons. This affected about 112,000 households mainly in the cities of Takatsuki and Ibaraki, both of which recorded a seismic intensity of “6 lower,” a level of an earthquake defined as “Difficult to keep standing” according to the Japan Meteorological Agency.

During the recovery process, about 5,100 people participated in the restoration effort, including employees of gas providers from across the entire country. As a result, the gas supply was restored to customers on June 24. In addition, the Recovery Visualization System introduced in April enabled the Company to disseminate detailed recovery information and ensure good communication and cooperation with customers and administrators.

Contributing to the SDGs

The challenge

Disaster response and early recovery of infrastructure

Leveraging the strengths of the Daigas Group

Building disaster-resistant cities
Using IT to construct information-sharing systems
Adopting and utilizing decentralized energy systems

Solutions and initiatives

Utilizing our disaster recovery support system in the society

The tasks that make up restoration work include the following: Closing the metered gas valve at the customer’s residence; searching for gas leaks in the gas pipes and repairing any leaks found; visiting the customer’s house and confirming the safety of the gas facilities; and opening the metered gas valve to resume the gas supply. In this process, it is necessary for the customer to be at home. Until this earthquake, only text information such as press announcements and simple map information were provided to inform the recovery status of gas supply. Therefore, there was an urgent need to develop a system that could provide customers with quick and accurate information and resolve any concerns about recovery.

In response to this situation, we developed the Gas Recovery Visualization System to provide detailed information to the public. This system displays the status of recovery on a map created by linking information through the centralized “Bridge” disaster recovery support system, which Osaka Gas built to improve the efficiency of recovery work, with detailed map information.

During a disaster, Japan’s Information Support Team (ISUT) organized by the Cabinet Office uses this system as a “disaster response support map” by accumulating information on shelters and sharing it with organizations that take action during times of disaster. It is also used for bathing support activities provided by the Self-Defense Force.

Recovery task work

Close metered gas valves.
↓
Search for and repair gas pipe leaks.
↓
Visit customer households and confirm safety of gas equipment.
↓
Open metered gas valves and resume gas supply.

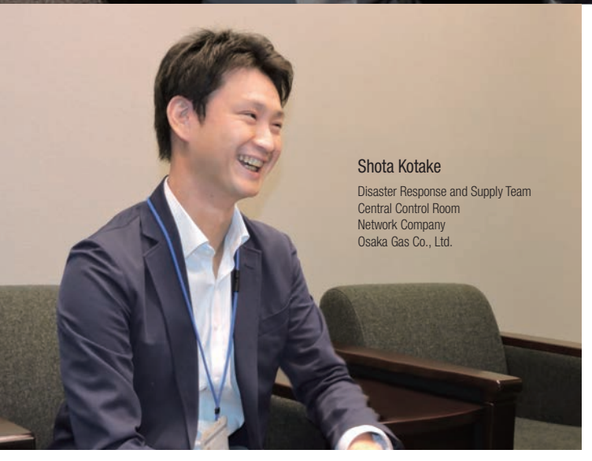
Gas contributes to the development of stronger and more resilient infrastructure.

It is essential that infrastructure function as expected even during a large-scale disaster. In response to this expectation, seismic retrofitting of equipment is required in order to contribute to disaster-resistant urban development.

With respect to gas supply facilities, we take preventive measures to minimize the damage by putting human life as a top priority. In addition, we are working to improve resilience, focusing on emergency measures such as the stop of gas supply for the purpose of ensuring safety and the development and introduction of systems for early recovery.

Cogeneration systems help to provide emergency power in a disaster

During the large-scale power failure that occurred in the typhoon in September 2018, gas cogeneration systems such as our self-sustaining Ene-Farm continued to generate power. This made it possible for our customers’ homes and factories to remain powered with electricity. This has renewed the focus on cogeneration as a solution.



Shota Kotake
Disaster Response and Supply Team
Central Control Room
Network Company
Osaka Gas Co., Ltd.

Developer Interview

Focusing on an easy-to-use Gas Recovery Visualization System

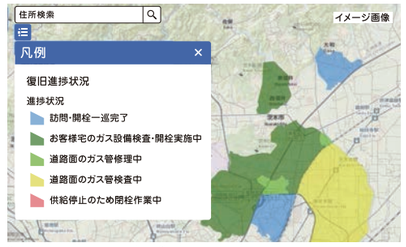
Information on the status of recovery of the gas supply often uses somewhat vague descriptions of areas such as “part of Town X” because the gas conduit network spans multiple administrative districts. As a result, customers do not really know when their own gas service will be restored. We realized that if we could provide a detailed map with specific information about our restoration work schedule, customers might become more at ease. Equally important, we could ask customers to remain at home to be prepared for the inspection that is required before the gas supply can be restored.

Considering the large number of customers who own smartphones or have other such connections to the Internet, we set out to create a means of disclosing the progress of the restoration process by providing a map with color-coded addresses. We also wanted to display the predicted times for an inspection visit and scheduled return to operation. We named this innovation the Gas Recovery Visualization System and provided a link to it on our disaster-response website.

After the 2018 Northern Osaka Prefecture Earthquake struck, access to this website increased sharply after we sent out a tip on social media introducing the site: “Useful restoration information using maps is available on the Osaka Gas website.” Over several days thereafter, the site was accessed up to 260,000 times daily, and we received many messages indicating the site was very helpful.

We developed the website with the same ease of use as general mapping software in order to make it easy to understand. This system proved to be very useful for customers awaiting restoration of their gas service.

By utilizing the technology of the Daigas Group to meet the needs of individual customers and society at large, we are contributing to the emergence of a society that is resilient to disasters.



Gas Recovery Visualization System

Special Feature 3

Promoting the evolution of ICT/IoT services to solve customer problems

In Focus Support by image recognition technology

Utilization of scientific analysis of cooking and food processing

Realizing the potential of the heat transfer and structural analysis technologies cumulated through energy businesses

In the process of developing kitchen for home and commercial use, Osaka Gas has compiled a significant amount of analysis data regarding food and cooking. The Food Science Lab of the Energy Technology Laboratories conducts research to maximize the appeal of food by scientifically clarifying the key phenomena related to cooking and food preparation.

In order to determine the appropriate immersion period for rice used in sake brewing, Osaka Gas jointly with the Fushimi Sake Brewers Association developed a method for evaluating the absorption status of sake rice. We conducted this research as an application of our knowledge of food science and technology for developing gas cookers.

Increasing need for ICT / IoT to meet various problems

Recently, our business and industrial customers have been coping with a variety of issues such as the scarcity and aging of skilled technicians and reduced production efficiency due to equipment failures.

We strive to solve such problems by gaining an understanding of the current and emerging needs of our customers. Our many opportunity of contact with our customers have provided us with the possibility to create value in collaboration with related players. Thus, we provide our customers with diverse services and new technologies useful for solving their problems.

Examples of customers' issues

① Scarcity and aging of skilled technicians
② Reduced production efficiency due to equipment failures
③ Improvement of the work environment including measures to deal with extreme heat
④ Complicated documents and data
⑤ Insufficient communication between sales and production sites
⑥ Lack of IT system specialists

Contributing to the SDGs

The challenge

Various issues facing customers

Leveraging the strengths of the Daigas Group

- Suggesting improvements to equipment and the work environment
- Suggesting solutions facilitating technology transfer
- Suggesting construction of disaster-resistant systems
- Suggesting the efficient use of natural gas
- Suggesting energy-efficient services

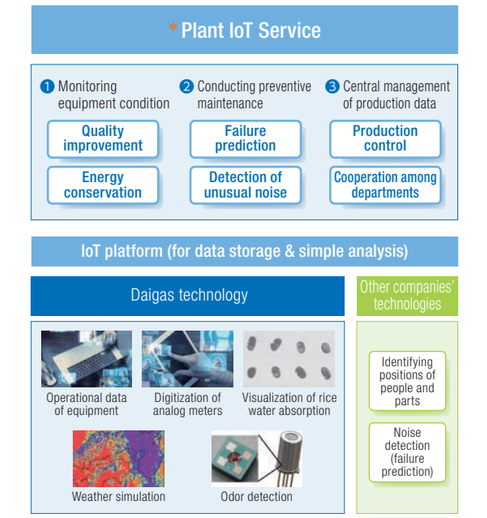
Solutions and initiatives

Working with our customers to devise solutions

In addition to the simulation and sensor technologies and the system development and data analysis expertise we have cultivated through our gas business, the Daigas Group offers our customers IoT systems that address their various problems.

In FY2019, we collaborated with the Fushimi Sake Brewers Association to develop a new method of evaluating the absorption status of sake rice with our proprietary image recognition technology. While demand for the *ginjo* and *daiginjo* varieties of sake has increased in recent years, the number of head brewers and skilled brewers has been on the decline, leading to demand for more scientific support and technology transfer.

Going forward, we intend to continue applying IoT services and the results of our Group's R&D and information and communication technology—such as our one-stop Plant IoT Service*—to help address the various issues our customers are currently facing.



Haruo Tomita
Researcher
Food Science Lab
Energy Technology Laboratories
Osaka Gas Co., Ltd.

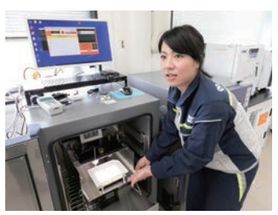
Developer Interview

Applying a rice-cooking technology to sake rice

In order to determine the amount of water absorbed by soaking rice, the Food Science Lab undertook an R&D effort to devise an image recognition technology for evaluating the visual change in rice caused by water absorption.

We were consulted by a sales representative to determine whether this technology could be used for value-added products of interest to corporate customers. Thus, in 2016 we collaborated with the Fushimi Sake Brewers Association to determine the amount of water absorbed by sake rice soaked in water. We verified the consistency with existing evaluation methods and correlations with data on brewing sites. After two years of joint study, we confirmed that this method is effective for evaluating water absorption status of sake rice and that it closely conforms with the vast expertise of the head brewers. We aim to introduce this method at various sake brewing locations.

The feature of this technology is that it can quantify and visualize the progress of the "soaking process" through which rice absorbs water when immersed. The soaking process is very important to sake brewing, and the time required for proper soaking varies with the type of rice, soil of the rice field, and the ambient temperature. The soaking time is thus controlled to the second as determined by the skill and experience of the head brewers.


Researcher Saki Nakayama measuring the water absorption of rice

The sake rice for *ginjo* and *daiginjo* sake absorbs water quickly, and cracks appear when the water is absorbed because the kernels have been polished down to no more than 60% of the size of typical brown rice kernels. By developing a new technology that captures these changes in three dimensions and image recognition technology using AI, we were able to accurately capture changes in seconds. This became the point of technology breakthrough.

In addition to using this technology for rice evaluation, we are conducting R&D to address various other food evaluation technologies. We intend to offer them as part of the wide range of solutions we provide, and we hope to develop new services that will help our customers improve quality and control of manufacturing processes, and develop products.