Materiality: Implementing Continuous Improvements in Energy Services

# Stable Supply of Energy

At the Kyuden Group, we have made it our fundamental mission to continuously deliver environmentally friendly energy at a low cost and in a reliable manner with safety as our top priority, which we see as our greatest social responsibility.

To that end, we will continue to maintain the high level of supply dependability we have achieved to date by accurately responding to trends in electric power demand, efficiently forming our facilities, taking steps to reduce power outages, upgrading the operation and management of our facilities, and working to restore power as soon as possible after outages caused by major disasters.

## ● Initiatives to Improve Nuclear Safety and Reliability

Kyushu Electric Power has been ahead of its competitors in complying with the government's new regulatory standards following the accident at the Fukushima Daiichi Nuclear Power Station, and has restarted its nuclear reactors.

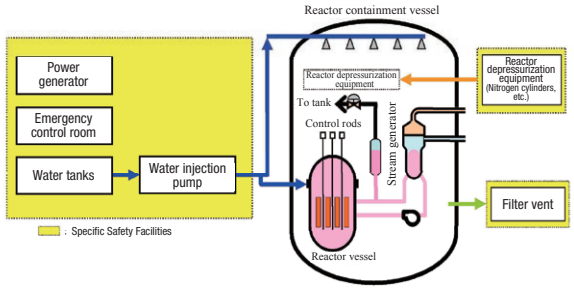
Moving forward, we will continue our efforts to continuously improve the safety and reliability of our nuclear power operations, not only within the regulatory framework, but also by doing due diligence in collecting the latest technical insights and data and applying it to operations.

### Status of Specific Safety Facilities

Under the new regulatory standards set by the Nuclear Regulation Authority, it is mandatory to install Specific Safety Facilities*1 (SSFs) that are capable of handling terrorist and other threats.

The Sendai Nuclear Power Station was the first in Japan to pass government inspection under the new regulatory standards, and its SSFs have begun operation (Unit 1: Nov. 2020, Unit 2: Dec. 2020).

By utilizing the insights gained from Sendai Nuclear Power Station, we have completed the government inspections at the Genkai Nuclear Power Station. Installation work on its SSFs is currently underway (scheduled completion dates (as of the end of May 2022) - Unit 3: mid-Jan. 2023; Unit 4: mid-Feb. 2023).




*1: A facility with functions to prevent damage to the reactor containment vessel in the event that the reactor's core is severely damaged due to the loss of the reactor's cooling ability caused by the deliberate collision of a large aircraft with the reactor's auxiliary building or any other act of terrorism.

### Special inspections at Sendai Nuclear Power Station Units 1 & 2

In order to operate a nuclear power station beyond the 40-year limit, an application for extension must be submitted to the Nuclear Regulation Authority alongside the results of a special inspection*2 and permission granted.

We began the special inspections needed to apply for an extension to our operations at the Sendai Nuclear Power Station under the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors on October 18, 2021 for Unit 1 and February 21, 2022 for Unit 2.

We plan to make a decision regarding our application for extension based on the results of the special inspection.

*2: A detailed verification and assessment of data collected after 35 years of operation in order to understand the state of degradation caused by regular operations at subject facilities such as the reactor vessel and the containment vessel

■ Deadline for applying for extended operations

| | Commencement date | 40-year limit | Application deadline |
|---|---|---|---|
| Unit 1 | July 4, 1984 | July 3, 2024 | July 4, 2023 |
| Unit 2 | November 28, 1985 | November 27, 2025 | November 28, 2024 |

### Efforts to prevent nuclear accidents

We are working to maintain and improve our response capabilities by developing emergency systems and conducting repeated drills in preparation for a nuclear accident so that we will be able to promptly respond to any type of incident at our nuclear power stations.
In addition, we are stepping up our cooperation with related organizations and businesses by participating in the comprehensive disaster drills offered by the national and local governments, as well as the joint drills performed by nuclear power operators.


An internal nuclear disaster prevention drill simulating a major accident at the Genkai Nuclear Power Station (Oct. 2021)

### Management and disposal of radioactive waste

Waste from nuclear power stations that contains radioactive substances is classified and managed as "low-level radioactive waste." After the waste is treated, the drums in which it is stored in the power station are transported to the Japan Nuclear Fuel Limited (JNFL) Low-Level Radioactive Waste Disposal Center (Rokkasho Village, Aomori Prefecture) for burial and management to ensure that the waste has zero impact on the environments in which people live.
High-level radioactive waste, which is vitrified high-level radioactive liquid waste generated in the reprocessing process of spent fuel, is stored for 30-50 years for cooling at facilities such as JNFL's High-Level Radioactive Waste Disposal Center (Rokkasho Village, Aomori Prefecture), and then finally disposed of safely in a stable geological layer at least 300 meters underground. The final disposal of the waste is carried out by the Nuclear Waste Management Organization of Japan (NUMO), an organization authorized by the Ministry of Economy, Trade and Industry.

■ Cumulative total volume of stored radioactive solid waste (as of the end of FY2021)

Unit: Drums (200-liter drum equivalent)

| | Amount stored in power plant | Amount transported out* |
|---|---|---|
| Genkai Nuclear Power Station | 38,310 (38,148) | 15,816 (14,432) |
| Sendai Nuclear Power Station | 27,767 (27,873) | 640 (640) |
| Total | 66,077 (66,021) | 16,456 (15,072) |

Note: Figures in parentheses indicate those as of the end of FY2020
* Amount transported out to the Low-Level Radioactive Waste Disposal Center

### Enhancing communication with local residents regarding nuclear power

In order to make local residents feel assured about nuclear power generation, we make sure to disseminate easy-to-understand information about our initiatives to improve the safety and reliability of our power stations. We are committed to making use of visits, plant tours and other opportunities to engaged in interactive communication activities Company-wide.


Dialogue with local residents

## ● Maintaining and Improving Supply Reliability (Kyushu Transmission and Distribution)

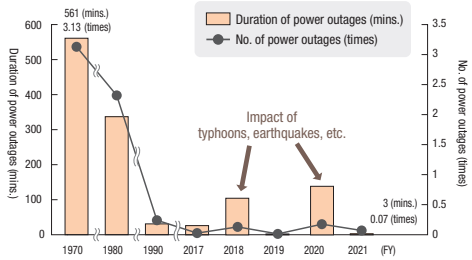
In order to deliver stable, high quality electricity to our customers that they can use with peace of mind, we are constantly working to patrol, inspect, and repair our facilities, operate them safely and efficiently, and develop and improve upon our construction methods.

### Preventing power outages

In order to prevent power outages along our transmission and distribution lines, we are working to identify points of hazard ahead of time by stepping up patrols of our facilities, implementing countermeasures, and stopping birds and animals from building nests. We also continuously survey the distance between trees and our power lines and fell them as necessary with the understanding and cooperation of all parties concerned to prevent power outages and equipment damage caused by trees.

Other efforts include reinforcing our facilities to reduce power outages caused by lightning, typhoons, and other natural disasters, and maintaining them meticulously based on their condition.

■ Annual duration and frequency of power outages per customer household



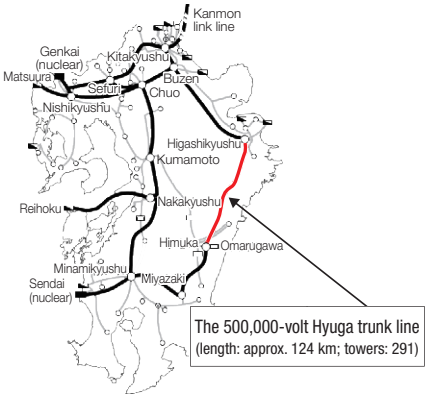

### Steady construction on the bulk power system and systematic facility updates

We strive to build our electric power distribution facilities in an effective formation from a long-term perspective, taking into account trends in demand, supply reliability, facility safety and operations, as well as cost and other factors.

In June 2022, we completed construction on the 500,000-volt Hyuga trunk line (between Oita and Miyazaki Prefectures) which began in 2014 in order to prevent widespread power outages during planned updates to aging 500,000-volt infrastructure.

Because the facilities built to meet the rise in electric power demand alongside economic growth are progressively aging, we are working to carry out focused inspections and repairs on and systematic updates to our aged transmission facilities (towers, cables, etc.), substations (transformers, circuit breakers, etc.), and distribution facilities (poles, cables, pole-mounted transformers, etc.).

We are also actively working to improve the accuracy of our equipment lifespan estimates based on the results of data analysis on equipment failures and degradation, which is reflected in our plans to update aging facilities.





The 500,000-volt Hyuga trunk line

### VOICE

**Using the experience gained through arduous construction of the 500,000-volt Hyuga trunk line to train the next generation**

Daichi Kojou
Transmission Group, Electric Power Department, Miyazaki Branch, Kyushu Electric Power Transmission and Distribution

The Hyuga trunk line is made up of large steel towers constructed across a wide area, so it was a very tough job to supervise. During the post-installation inspections in particular, we had to ascend and descend these steel towers that are over 100 meters tall countless times, which was physically demanding. But the view of the completed facilities from the top was truly spectacular, and it gave me a sense of pride and satisfaction in building a piece of infrastructure that will live on the map.

We'll apply the techniques and experience we gained by building the 500,000-volt-scale Hyuga trunk line on top of our previous experience in our work moving forward to help us provide a stable supply of electricity and train the next generation.

## ● Improving Disaster Response Capabilities

Kyushu Electric Power and Kyushu Transmission and Distribution have developed a joint disaster response system and will work together with partner companies and government agencies to quickly disseminate information and resolve power outages as soon as possible in the event of a typhoon, torrential rain, or other large-scale disaster.

We have also been strengthening cooperation with relevant authorities to rapidly restore power during disasters. We have entered into cooperative agreements with not only the Ground and Maritime Self-Defense Forces, but also the 7th and 10th Regional Coast Guard Headquarters and all local governments in the Kyushu area (7 prefectures, 233 municipalities) in the event of a disaster. Moving forward, we will continue to work to further strengthen our cooperation through joint trainings and other opportunities to improve our capacity to respond to large-scale disasters.


Restoration work underway


High-voltage generator airlift training with the Self-Defense Forces


A shot from the signing of a collaborative agreement

## ● Strengthening Fuel Procurement Capabilities

With the increased risk of fluctuations in our electric power sales following the liberalization of the energy market and the expanded adoption of renewable energy, there is a need for us to strengthen our competitiveness in procuring fuel and update our supply-demand adjustment capabilities.

To that end, Kyushu Electric Power is actively involved in the entire fuel value chain, from the development and production of fuel resources (upstream equity interest) to its procurement, transport, trading, receipt, storage, consumption, and sale to not only reduce our procurement cost but also further enhance our flexibility. Meanwhile, we also enter into alliances with other companies in the field of fuel project development.

It was under these such circumstances that we established an LNG trading subsidiary in April 2022 to utilize our carriers, storage terminals, and other assets as well as our trading expertise. Global demand for LNG is expected to increase as the world aims to achieve carbon neutrality. By supplying LNG to meet this new demand through our subsidiary moving forward, we will contribute to achieving a decarbonized society. We will also work to optimize the coordination between supply and demand in the way we allocate our vessels and through volume adjustments.

# Affordable Energy

Kyushu Electric Power (Kyushu EP) is working to lower the cost of generating power by diversifying its procurement methods to reduce fuel expenditures, improving the efficiency of facility maintenance utilizing digital transformation, and reviewing its inspection cycles.

■ Efforts to reduce fuel costs

| Initiative | Overview |
|---|---|
| Expand procurement through competitive quotations | · Procure with more competitive quotes to reduce fuel prices, transportation costs, import agent fees, etc. |
| Diversify supply sources | · Expand the use of sub-bituminous coal and standard-grade coal, which are less expensive than high-grade coal, and introduce high-ash coal, which is expected to be more economical<br>· Diversify our supply sources by introducing South American and Central Asian coals that had previously been shipped to Europe |
| Cooperate with other companies | · Respond to fluctuating requirements flexibly in cooperation with other operators to optimize supply and demand operations |
| Diversify pricing methods | · Reduce the risk of price fluctuations and fuel procurement costs by diversifying and optimizing our pricing methods, including fixed-price and market-price-linked methods<br>· Adopt LNG pricing methods that use new indices to curb procurement price fluctuations and improve economic efficiency |
| Pursue economic efficiency based on market trends | · Reduce procurement costs through an appropriate combination of and negotiations on long-term, short-term, and spot contracts based on market conditions |
| Strengthen participation in the fuel value chain | · Acquire upstream equity interest (contributes to stable fuel procurement, flexibility, and enhanced procurement capabilities by acquiring information from producers)<br>· Reduce transportation costs by thoroughly managing and maximizing the use of our own vessels<br>· Balance supply and demand internally with contracts for the use of LNG terminals overseas that can receive and dispense LNG |

## TOPICS

### Advanced and efficient dam wall inspection work using drones and AI-based analytical technology - Abnormalities detected with a high degree of accuracy and costs cut by about 40% -

Together with OPTiM Corp., Kyushu EP has improved the efficiency and sophistication of its dam wall inspection work by using drones and AI-based analytical technology, detecting equipment abnormalities at the centimeter level with a high degree of accuracy and achieving significant cost reductions.

Drone footage of a dam wall

The combination of Kyushu EP's proprietary autopilot program (patent no. 6902763) used in drone surveying and OPTiM's AI image analysis technology has made it possible to shorten inspection times and make the criteria used to determine deterioration more uniform. Moreover, the ability to visually confirm the state of age-related deterioration prevents damage from being overlooked, making inspection work more advanced and efficient and reducing the associated costs by about 40%.

Moving forward, we aim to develop technology to predict future age-related deterioration by collecting inspection data and comparing it with past data, as well as implement an AI-based schedule management function to create an optimal maintenance schedule with a view to rolling out services externally.

# Solutions Based Around Energy Services

The Kyuden Group works as one to provide products and services that precisely address the diverse needs and concerns of our customers, lead to more prosperous, comfortable lives for them, and generate economic activity.

We will keep working to enhance our services based on customer feedback so that customers continue to trust and choose us.

## ● The Kyuden Group's Diverse Products and Services Helping Solve Local and Social Issues

Starting from February 2019, the Kyuden Group has been marketing the Group's various products and services to local governments and corporations under the name 'with Q'.

In 2021, we packaged together Group products and services related to electrification, renewable energy, and energy conservation to offer customers based around the theme of decarbonization (carbon neutrality), which is of growing societal concern.

The 'with Q' lineup also offers products related to not just decarbonization but also disaster prevention measures, heat extreme countermeasures, information security, and LEDs, which are of high interest to local communities and society. We also have a lineup of related products for each customer, such as medical institutions, offices, and manufacturing sites to provide optimal solutions to each customer's issues.

## ● Providing Rate Plans that Meet Customer Needs for Decarbonized Electricity

(For households)
Kyushu EP offers the 'Marugoto Saiene (100% renewable energy) Plan' to meet the needs of households wanting to use electricity derived from renewable sources, and the 'Let's Grow Future Forest Plan' through which a fixed monthly donation of ¥300 goes to environmental conservation activities by the Kyuden Mirai Foundation.

(For corporate customers)
Kyushu EP has been providing its Renewable Energy ECO Plan to corporate customers since 2018, and in November 2021 expanded its offerings to three renewable energy and $CO_2$-free plans in light of growing and diversifying needs.

| | |
|---|---|
| Renewable Energy ECO Kiwami | • Offers not only renewable electricity (hydroelectric, geothermal, etc.) and its renewable energy value, but provides added value by identifying the type of power, etc.<br>• Helps maintain and expand renewable energy sources |
| Renewable Energy ECO Plus | • Applies renewable energy value to a customer's current electricity<br>• A more accessible renewable energy plan |
| $CO_2$ Reduction Plan | • Applies $CO_2$-free value to a customer's current electricity<br>• Specialized in $CO_2$ emission-free value |