Responsibilities Toward Customers

Securing a stable supply of energy

Policy and Concept

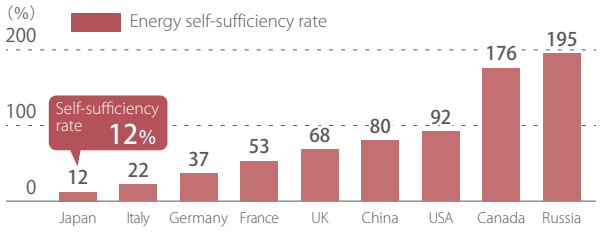
Energy risks faced by Japan

Japan's energy self-sufficiency rate is around 12%, including nuclear power generation, which is a very low value compared to major countries in the world. For most of its fossil fuel needs, Japan must rely on imports. Since energy resources on the earth are not inexhaustible, stably securing energy resources is a top-priority issue for Japan. For continued stable supply of energy in the future, it is vital to combine various power generation methods in a well-balanced manner, while not relying on only a single power generation method.

Energy mix

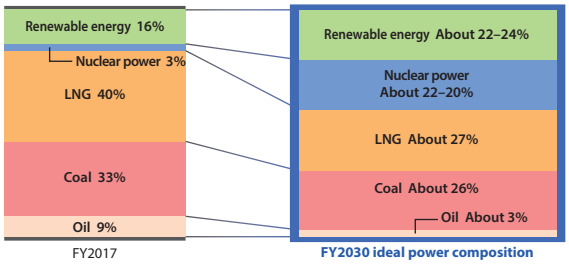
In July 2015, the government established a long-term energy supply and demand outlook (energy mix) that expresses how energy supply and demand should be in Japan for fiscal 2030. Furthermore, the 5th Strategic Energy Plan formulated in July 2018 unveiled the government's intention to further step up efforts to ensure the realization of this energy mix. As for the power supply composition, nuclear power is specified to have a fixed ratio of 20–22%, and 22–24% is indicated for renewable energy.

◆ Energy self-sufficiency rates of major countries (for 2017, except FY2018 for Japan)



Source: Federation of Electric Power Companies of Japan, "Consensus document on nuclear power"

◆ FY2030 energy mix



Reference: The Agency for Natural Resources and Energy, the Ministry of Economy, Trade and Industry "Energy of Japan 2019"

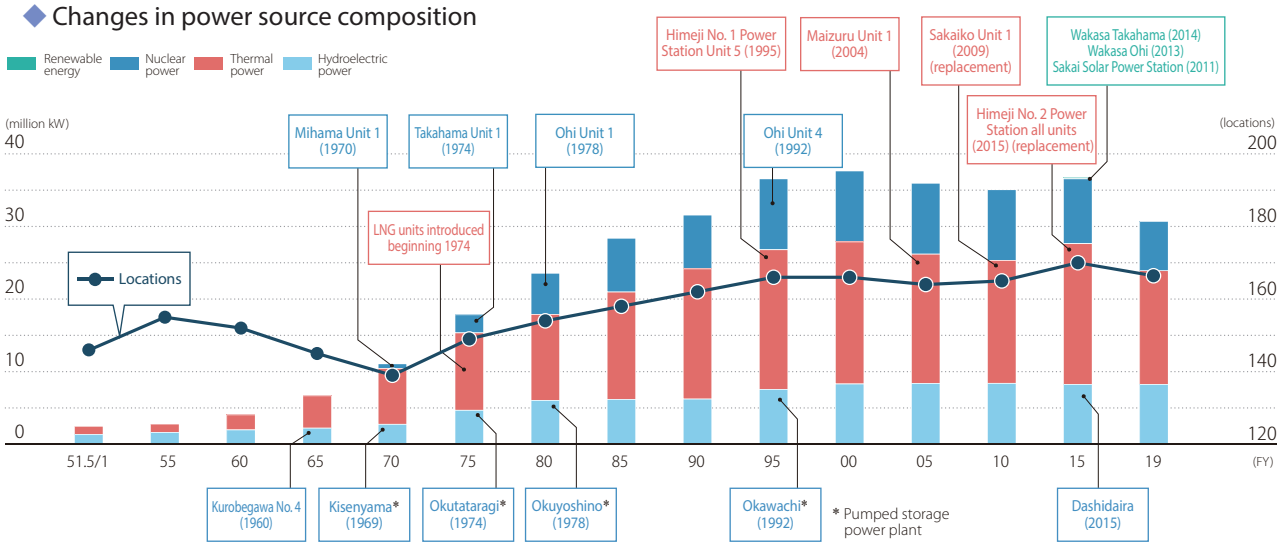
Facility configuration based on S+3E

In light of this background situation, in order to fulfill our mission of delivering high-quality and economical electricity to our customers, we seek to realize S+3E whereby Safety (S) is our top priority whilst seeking to simultaneously achieve Energy security, Economy and Environmental conservation (3E). As a leading decarbonization company, we will accelerate our efforts focused on both nuclear power and renewable energy.

Power generation facility capacity ratio by power source (End of fiscal 2019)

Renewable energy	Nuclear power	Thermal power	Hydroelectric power
0.04%	22%	52%	27%

◆ Changes in power source composition



Goals

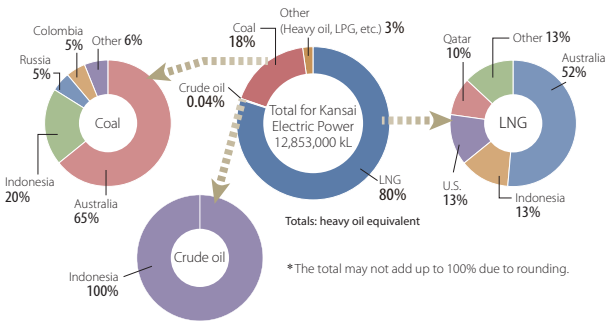
As a leading decarbonization company we are committed to ensuring the safe and stable operation of our nuclear power plants, restarting reactors in sequence and promoting the nuclear fuel cycle. In addition, we are focusing on the further development and exploitation of renewable energy sources, which when combined with thermal power generation, etc. will create a well-balanced power source mix.

Efforts

Approach for stable fuel procurement

We place a premium on safe, cost-effective and flexible procurement of thermal power generation fuel while diversifying procurement sources, offering flexible pricing options and seeking alliance opportunities with other companies. As part of these efforts, we aim to expand our business operations, focusing on upstream (stake acquisition) and middle-steam (transportation) operations in the LNG value chain. Fossil fuel faces a variety of problems, such as concentration in certain regions and political instability in the producing countries.
In order to procure fossil fuels stably, economically and flexibly, our Company is involved in every stage from fuel production to receiving. We also work to diversify procurement sources and pricing formula.

Our fuel procurement in fiscal 2019

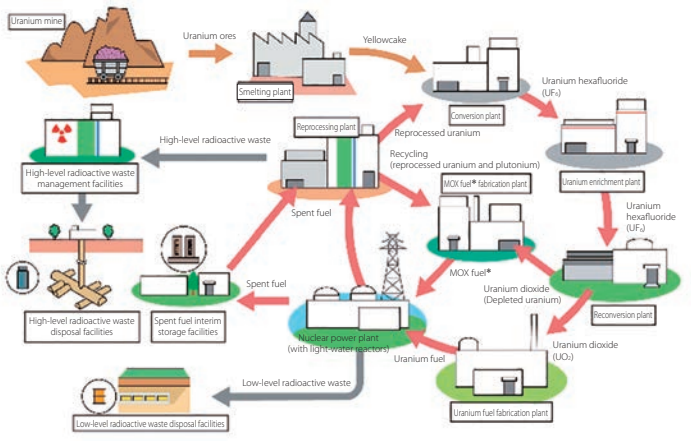


Enhanced spot trading for agile LNG procurement and sales

In an effort to deal with demand fluctuations, KE Fuel Trading Singapore Pte. Ltd., which was established in April 2017 to secure the procurement of LNG and expand our sales network, plays a pivotal role in extending our information gathering network based in Singapore, which is the LNG trading hub in the Pacific region. The role of KE Fuel Trading Singapore includes timely gathering of information such as spot LNG trading and establishment of flexible LNG procurement/sales systems.

Developing a full-scale nuclear fuel cycle

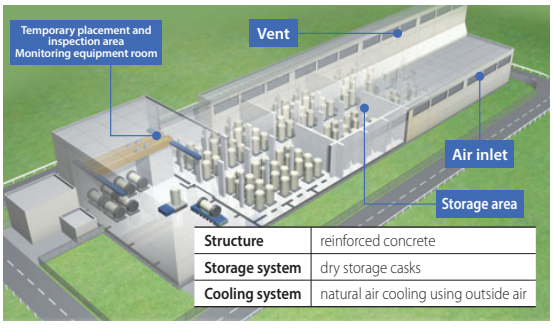
Uranium, a fuel for nuclear power generation, is produced in politically stable nations, which enables a stable supply. It can also be a "semi-domestic energy resource" mainly because a small amount of uranium is required for long-term power generation and spent fuel can be reprocessed and used again as fuel. Promotion of the "nuclear fuel cycle," a cycle of re-using uranium and plutonium out of fuels used at nuclear power plants, is a practical way to effectively use energy resources and secure stable energy for Japan, a resource-poor country.



* MOX (mixed oxide) fuel: Plutonium mixed with depleted uranium Source: "Nuclear Power and Energy Drawings" (Japan Atomic Energy Relations Organization)

Recyclable Fuel Storage Center

Spent fuels are stored in a spent fuel pool inside power stations for a certain period of time and then transported to a reprocessing plant. In case the pool is filled to capacity, the power station cannot be operated. For this reason, spent fuels have to be taken out in a planned manner. Installation of a recyclable fuel storage center (interim storage facility), in which spent fuels are temporarily stored, enables the stable operation of power plants into the future. Our Company prepared a "Plan to promote measures for spent fuel" in 2015, and we are working as a unified company on efforts toward obtaining sites and promoting understanding about the necessity and safety of it widely among the public in power consuming areas.



Initiatives prioritizing safety at nuclear power plants

To prevent the lessons of the Mihama Nuclear Power Station Unit 3 accident from fading away

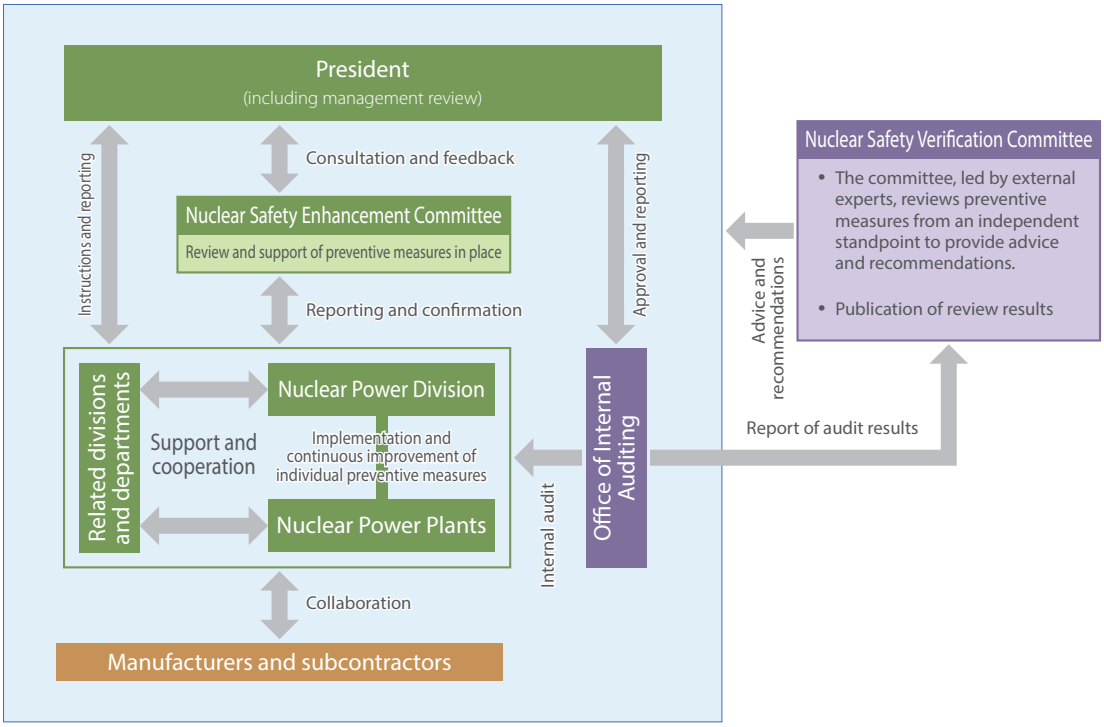
Policy and Concept

On August 9, 2004, an accident involving the rupture of secondary system piping occurred at Mihama Nuclear Power Station Unit 3. Based on the President's Declaration "Ensuring safety is my mission, and the mission of the Company," we have strictly implemented recurrence-prevention measures, with a firm determination that we shall never cause such accidents. The Nuclear Power Division has established Five Basic Principles as preventive measures that form part of our quality policy concerning the operation of nuclear power businesses with safety as the top priority. These measures are revised as necessary for safety improvement purposes. Making every August 9th our "Safety Vow Day," every employee observes a moment of silence. We are working to cultivate a safety culture in order to implement business management with safety as the top priority and prevent the lessons of the Mihama Nuclear Power Station Unit 3 accident from fading.

Quality policy concerning the operation of nuclear power businesses with safety as the top priority

1. We will prioritize safety above all.
2. We will positively invest resources for safety purposes.
3. We will fully recognize the characteristics of nuclear power and continue our effort in reducing risks.
4. We will put our endeavor to recover the trust of plant-hosting communities and the whole country by further pushing ahead with the communication with them.
5. We will objectively assess our effort toward safety.

System



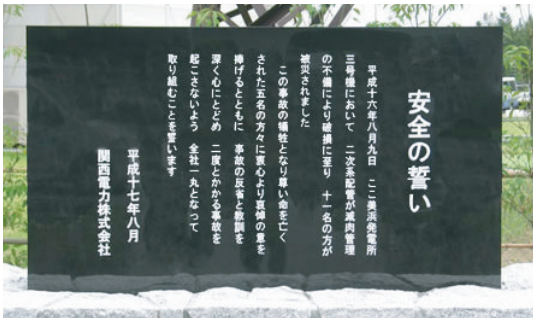
Goals

Give top priority to safety in business operations, based on lessons learned from the accident at Mihama Nuclear Power Station Unit 3.

Efforts

"Safety Vow Day"

- A stone memorial was erected in the premises of the Mihama Nuclear Power Station with a pledge not to repeat similar accidents.
- All employees shall commemorate the victims of the accident with a moment of silence every year on August 9 at 15:22 (the time of the accident) with each individual renewing his/her determination to give top priority to safety.
- The President and others renew vows of safety and observe a moment of silence before the stone memorial every year.
- All employees review their CSR Conduct Cards on which they have written their own safe conduct oaths.



Communication between management and front-line workers

All offices are visited by the president while executives (including those of other divisions) engage in face-to-face discussions with power station staff. It is an opportunity for front-line workers to communicate their opinions to management.

Improved communication with manufacturers and subcontractors

Continuous improvements are made through interactive communication to ensure the safe operation of nuclear power plants as well as strengthening the cooperative relationships we have with manufacturers and subcontractors. Opinions collected through questionnaires contribute to developing our safety culture, identifying unsafe operational practices in nuclear power plants and improving the work environment.

Door-to-door visits with local residents

Our employees, including the Director of the Nuclear Power Division, visit each household in communities where our power plants are located (towns of Mihama, Ohi and Takahama in Fukui Prefecture) to engage in mutual dialogue.

In-house training

- Tailor-made training courses are provided to all employees, from new recruits to newly-appointed managers, to brief them on the accident at Mihama Nuclear Power Station Unit 3 and help them learn lessons from it.

■ Commitment to Enhancing Nuclear Safety

◆◆◆ Policy and Concept ◆◆◆

In response to the accident at the Tokyo Electric Power Fukushima Daiichi Nuclear Power Station, we established our Commitment to Enhancing Nuclear Safety, which clearly states our ideals about nuclear power safety, as a company proclamation that is one of our most important company rules. The company proclamation underlines our determination to constantly improve safety in nuclear power generation, whereby all executives and employees fully understand the characteristics and risks of nuclear power generation and always remind themselves of the potential magnitude of an accident, with the President playing a leading role in making company-wide efforts to protect local communities, society and environment.

◆<Composition and summary>

Preface	Every one of us shall remember the lessons learned from the Fukushima-Daiichi nuclear accident and ceaselessly strive to enhance nuclear safety to protect the people not only in the plant-hosting communities but also the whole country, and to preserve the environment.
Characteristics of nuclear power generation and risk awareness	Nuclear power generation has superior characteristics in terms of energy security, prevention of global warming and economic efficiency, and is an essential power source for the future. On the other hand, nuclear power generation has risks of radiation exposure and environmental contamination. Every one of us shall always bear in mind that once a severe accident happens due to lack of proper management, it could cause enormous damage to the people and the environment.
Continuous removal/ reduction of risk	To enhance nuclear safety, we shall fully understand the characteristics and risks of nuclear power generation and continually remove or reduce such risks while identifying and evaluating them, never believing at any moment that we have reached the goal of ensuring safety. These efforts shall be conducted at each level of the Defense-in-Depth.
Development of safety culture	Safety culture is the basis for continuously removing or reducing risks. Since the accident of Mihama Unit No. 3, we have been reviewing and improving our safety culture, and we shall develop such safety culture. To this end, we shall always be ready to question anything, learn from others and listen to the voices of society and discuss issues uninhibitedly while respecting diverse opinions with further efforts.
Commitment to enhancing nuclear safety	Enhancing nuclear safety is the overriding priority in the company. It is also important to promote two-way communications with the people in the plant-hosting communities and the whole country, and to share common perceptions on nuclear safety. Under the President's leadership, every one of us shall work together to tirelessly enhance nuclear safety.

◆◆◆ Goals ◆◆◆

Every one of us shall remember the lessons learned from the Fukushima Daiichi nuclear accident and ceaselessly strive to enhance nuclear safety to protect the people not only in the plant-hosting communities but also the whole country, and to preserve the environment.

◆◆◆ Efforts ◆◆◆

● In-house training

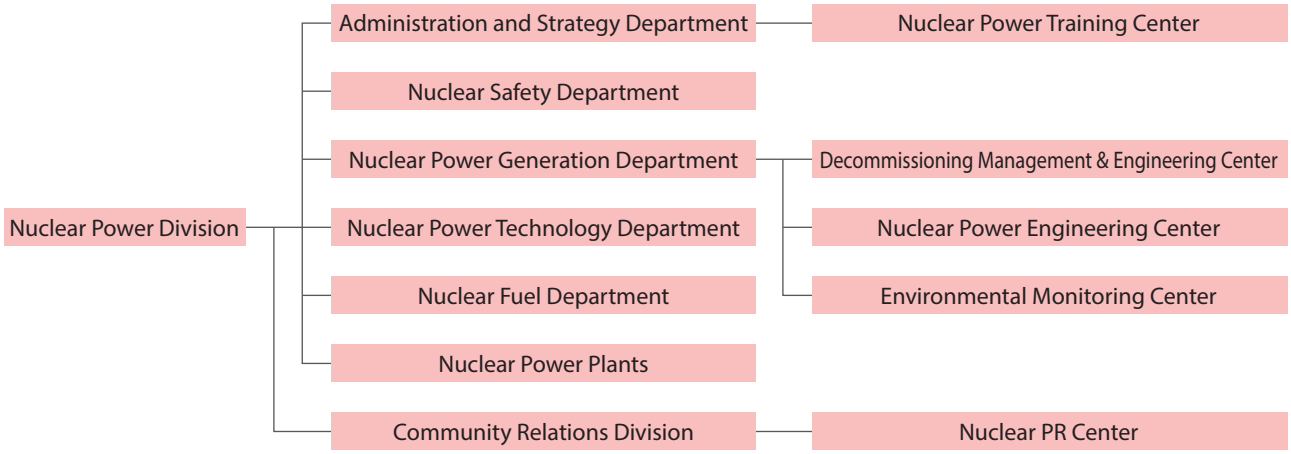
- A series of e-learning training courses are in place to help all employees understand our Commitment to Enhancing Nuclear Safety.
- Each department voluntarily holds group discussions while managers communicate safety messages to raise safety awareness among employees.

■ Safe and stable operation of power plants

◆◆◆ Policy and Concept ◆◆◆

Take all possible measures to safely and carefully operate and maintain nuclear power plants, underlining our determination to constantly improve their safety.

◆◆◆ System ◆◆◆



◆◆◆ Goals ◆◆◆

We will continue to safely and carefully operate and maintain our nuclear power plants, thereby ensuring the safe and stable operation of Units 3 and 4 of the Takahama Nuclear Power Station and the Ohi Nuclear Power Station, each of which has resumed operations.

◆◆◆ Efforts ◆◆◆

● Key safety measures

◆Careful inspection and examination

In an effort to ensure the safe and stable operation of our nuclear power plants, facilities and instrumentation are regularly inspected and shut down in accordance with the relevant laws and regulations, all of which is intended to protect shop-floor employees and maintenance personnel.

- Data on regular inspection results and facility conditions is reviewed to determine the content and frequency of inspections according to the characteristics of each facility. This approach serves as the basis of our inspection and maintenance protocol.

◆Education and training of plant employees (operators, maintenance personnel, etc.)

Improving the technical skills of shop-floor employees (operators, maintenance personnel, etc.) is key to the safe and stable operation of nuclear power plants. In-house and external training is conducted on a regular basis.

- OJT is conducted through routine practice.
- Operators regularly simulate normal operating procedures and practice troubleshooting.
- Maintenance personnel are trained on inspection work at the Nuclear Power Training Center, using the same instrumentation one would find at a power plant.

◆Five-layered wall structure to contain radioactive substances

Uranium nuclear fission at nuclear power plants produces radioactive substances, which are contained in a building with a five-layered wall structure (pellets, cladding tubes, pressure vessels, containment vessels and external shielding walls).

◆In-depth defense system

Nuclear power plants are designed to prevent malfunctions and operational errors when, in the event of failure, reactors are immediately shut down, followed by the cooling and containment of radioactive substances.

◆Reactor cooling system

Following a shutdown, residual heat removal pumps are activated to operate coolers, which cool the primary system water. In the event of a complete power loss, auxiliary feed pumps powered by steam-driven turbines feed water to steam generators, which cool the primary system water.

●Safety measures to deal with various risks

◆Toward improved safety and confidence

Learning lessons from the accident at the Tokyo Electric Power Fukushima Daiichi Nuclear Power Station, the new regulatory requirements provide measures against earthquakes and tsunamis, with design standards revised to prevent similar accidents; taking into account the risks of natural disasters in Japan, these standards cover various other risks such as volcanic eruptions, tornadoes and forest fires. Complying with these new regulatory requirements, we are renovating our licensed power plants to protect them against severe accidents, earthquakes, tsunamis, tornadoes and fires. At the same time, voluntary efforts are underway to improve plant safety.

●Improving technical capabilities and systems in the event of a severe accident

◆Conducting nuclear power disaster response training in collaboration with central and local government

Disaster response training programs are underway at our nuclear power plants, the Nuclear Power Division and the head office, some of which are conducted in collaboration with central and local government, manufacturers and subcontractors. Specifically, comprehensive training programs are conducted without prior notice to participants, simulating severe conditions, where emergency response capabilities are tested for improvement purposes. This includes the feasibility of post-accident remedial measures using water trucks and alternative portable low-pressure water pumps - which is already part of routine drill exercises at each of our power plants - and the examination of the communication systems in place for each task force.

◆Education and training tailor-made for each role and responsibility

Supervisors and operators undergo repeated education and training according to their roles and responsibilities, in how to respond to a severe accident. This is to improve their emergency response capabilities and technical skills. Contents and target employees of this education and training were made more diversified than those at the time right after the accident at the Tokyo Electric Power Fukushima Daiichi Nuclear Power Station. In fact, the total number of trainees training on plant behavior during a severe accident has increased significantly, as has the frequency of training on emergency response procedures.

●Creating a response system

◆Improving the out-of-hours response system

Emergency personnel stand by around the clock at Units 3 and 4 of the Takahama Nuclear Power Station and the Ohi Nuclear Power Station, taking into account findings learned from the accident at the Tokyo Electric Power Fukushima Daiichi Nuclear Power Station. They are in charge of the initial response to an incident, where resources are mobilized within six hours after an accident has been declared.

◆Improving the Nuclear Emergency Assistance Center

The Nuclear Emergency Assistance Center (at Mihama, Fukui Prefecture) was jointly established by nuclear operators and went into full-scale operation in December 2016. Here remote-controlled equipment and instruments have been upgraded for flexible, advanced disaster response while emergency personnel of respective nuclear operators are trained. In the event of an emergency, equipment and instruments can be transported to a disaster site, with remote-controlled assistance provided to jointly minimize radiation exposure of shop-floor employees.

◆Cooperation between nuclear operators

Nuclear operators are expanding their cooperative relationship to further improve the safety and reliability of their operations.

- Mutual cooperation agreement between five electric power companies in western Japan
  Our Company, the Chugoku Electric Power, Shikoku Electric Power and Kyushu Electric Power entered into a cooperative agreement on nuclear power generation on April 22, 2016, and they were joined in the agreement by Hokuriku Electric Power on August 5, 2016. This agreement is designed to improve preparedness and emergency responses to nuclear power disasters by providing mutual assistance, equipment, instruments, etc., as well as taking advantage of their geographical proximity. There is also agreement to cooperate in conducting decommissioning in a safe, well-organized manner and setting up special facilities to deal with designated severe accidents, all intended to further improve the safety and reliability of nuclear power generation.
- Technical cooperation agreement between four electric power companies with pressurized water reactors (PWRs)
  Four electric power companies operating nuclear power plants equipped with similar PWRs (Hokkaido Electric Power, Kansai Electric Power, Shikoku Electric Power and Kyushu Electric Power) entered into a technical cooperation agreement on October 19, 2016. With this agreement in place, the four companies, each of which operates PWRs, exchange their technical knowledge and experience, where they share information on power plant operation management in other countries and examine new technologies to further improve reactor safety.

Supporting municipal evacuation plans

Efforts toward nuclear emergency preparedness

While a variety of safety measures are in place at our nuclear power plants, we cooperate with central and local government in minimizing impacts on local residents in the event of a nuclear disaster involving the massive release of radioactive substances. These activities are in line with relevant laws including the Disaster Countermeasures Basic Act and the Act on Special Measures Concerning Nuclear Emergency Preparedness. Nuclear operators are and will be making full efforts to ensure nuclear safety and prevent disasters in cooperation with central and local government.

Communication in the event of a nuclear disaster

In the event of a nuclear disaster, we as nuclear power plant operators shall immediately report to the relevant authorities at all levels; all the parties concerned shall get together at the Offsite Center to share information and determine protective measures for local residents as the situation demands, while the nuclear disaster task force of each municipality communicates the center's decisions to local residents.

Supporting nuclear disaster victims

- Providing transportation for evacuation
  We shall mobilize all resources available to help local residents evacuate; this includes the provision of evacuation supervisors and transportation such as employee shuttle buses, welfare vehicles and contracted helicopters and vessels.
- Assisting and managing testing during an evacuation
  At the request of municipalities, we shall assist and manage testing at the time of evacuation, targeting all those evacuated from the Urgent Protective action planning Zone or UPZ. Inspectors shall be provided along with equipment such as contamination survey meters and Tyvek suits.
- Providing necessities
  We provide necessities such as food and blankets as well as radiation protection facilities.

■ Preparing for operation beyond 40 years

◆◆◆ Policy and Concept ◆◆◆

Nuclear power – a well-balanced energy source contributing to 3E (Energy security, Economy and Energy conservation) – is essential in resource-poor Japan. As a result, nuclear power generation should be maintained at a certain level to ensure energy security and develop technical/human resources, whereby accident-proof nuclear power plants can be operated for over 40 year-spans. Therefore, we will be making the most of our nuclear power plants, placing a premium on their safe operation.

◆◆◆ Goals ◆◆◆

With responsible construction management in place and safety prioritized, we are committed to improving the safety of our nuclear power plants while thoroughly reviewing our current construction plans. At the same time, we aim to communicate the importance and safety of operating nuclear power plants for over 40 years to local communities and residents.

◆◆◆ Efforts ◆◆◆

● Promoting safety improvement measures toward the restarting of operations at Takahama Nuclear Power Station Units 1 and 2 and Mihama Nuclear Power Station Unit 3, as well as activities to gain understanding of operations beyond 40 years

Our Company has always maintained the durability of our nuclear power plant facilities by continuously implementing maintenance and management, including regular inspections and planned equipment replacements. At the time of our application for an operation period extension for 40 years from the starting month of operation, in accordance with the law, for Takahama Nuclear Power Station Units 1 and 2 and Mihama Nuclear Power Station Unit 3, special inspections were carried out for reactor vessels and other equipment. In addition, technical evaluations of degradation from age were carried out, confirming that the durability of important facilities for safety could be assured even for an operation period of 60 years. After these examinations, we received operation period extension approvals from the Nuclear Regulation Authority for both power stations. As we now prepare for operations beyond 40 years, we are steadily advancing large-scale safety measure construction projects.
We are undertaking face-to-face communication, including power plants tours by the Nuclear Power Division and explanations in various locations to deepen public understanding about the operation of our plants beyond 40 years. We will continue to promote active communication with people in the communities including those who live near our facilities.

Takahama Nuclear Power Station Units 1 and 2 containment vessel upper shield installation work

VR-based plant tour provided at a shopping mall

■ Reliable decommissioning processes

◆◆◆ Policy and Concept ◆◆◆

- We comply with the relevant laws and regulations on decommissioning, while giving top priority to safety in order to minimize exposure, reduce radioactive waste and properly manage security measures.
- We have designed safe decommissioning procedures and processes, incorporating effective decontamination techniques, remote-controlled equipment and measures to prevent the spread of contamination – all intended to minimize the exposure of those engaged in radiation-related work, strictly complying with statutory dose limits. In addition, a safe storage period is set for zones with relatively high radiation levels, taking into account the attenuation of radioactivity.
- We will continue to work on a series of measures for safe decommissioning, environmental conservation and regional development, according to the Agreement on Nuclear Power Plant Decommissioning, which was signed with Fukui Prefecture, Mihama Town and Ohi Town.

◆◆◆ Goals ◆◆◆

● Securing human and environmental safety

With safety prioritized, we will focus on minimizing exposure and radioactive waste as well as properly managing security measures.

● Designing safe decommissioning procedures and processes

We will design safe decommissioning procedures and processes, incorporating effective decontamination techniques, remote-controlled equipment and measures to prevent the spread of contamination, as well as operating waste disposal facilities to minimize the exposure of neighborhood residents and those engaged in radiation-related work.

● Foolproof system

The Decommissioning Technology Center (which was established in June 2015 within the Nuclear Power Division) cooperates with subcontractors in decommissioning nuclear power plants in a safe and foolproof manner.

● Decommissioning according to the Agreement on Nuclear Power Plant Decommissioning

We will continue to work on a series of measures for safe decommissioning, environmental conservation and regional development.

◆◆◆ Efforts ◆◆◆

● Radioactive waste treatment and disposal

◆ Solid radioactive waste treatment

Non-radioactive general waste accounts for about 97% of decommissioning waste while radioactive waste is disposed of at designated facilities prior to completion of decommissioning in accordance with its radioactive level.
Meanwhile, waste that does not need to be treated as radioactive waste (clearance) is recycled as much as possible, following approval by the government.

◆ Treatment of gaseous and liquid radioactive waste

Gaseous and liquid radioactive waste is properly treated and released into the environment as is the case during regular plant operations, with strict monitoring in place.

● Decommissioning with safety prioritized

Decommissioning is conducted in four stages, which all together takes a total of about 30 years. While Stage 1 (dismantling) is underway, proper measures are in place for safe decommissioning.

◆ Decommissioning underway at Mihama Nuclear Power Station Units 1 and 2

○ Radioactivity investigations
The surface doses of equipment and piping are measured while concrete/metal materials are sampled and analyzed by third parties for radioactive contamination to accurately assess residual radiation levels in the facilities and monitor possible contamination.

○ Dismantling of equipment, etc. in the turbine buildings
Dismantling of contamination-free equipment, etc. is underway at the turbine buildings (items that may serve as obstacles to the dismantling process such as piping, frames and other small equipment) in addition to large equipment such as turbines, condensers and deaerators.

◆Decommissioning underway at Ohi Nuclear Power Station Units 1 and 2

○ System decontamination

Chemicals will be used to remove radioactive substances attached to the inner surfaces of equipment and piping – a process is underway to minimize the exposure of workers and facilitate dismantling.

○ Dismantling of equipment, etc. in the turbine buildings

Dismantling of contamination-free equipment, etc. is underway at the turbine buildings (items that may serve as obstacles to the dismantling process such as piping, frames and other small equipment) in addition to large equipment such as turbines and moisture separator heaters.

●Activities as a pioneer of decommissioning

◆Japan's first decontamination of a pressurized water reactor (PWR) system

The system decontamination procedure underway at Mihama Nuclear Power Station Units 1 and 2 is unprecedented, involving the decommissioning of pressurized water reactors (PWRs), which requires advanced and special techniques. Therefore, any and all literature on system decontamination and plant manufacturer expertise were extensively surveyed from sources both home and overseas from the perspectives of "foolproof decontamination" and "reduction of waste produced by decontamination."

This has led to cooperation with overseas manufacturers with proven track records in decontamination and with domestic manufacturers producing the same equipment as those used in Mihama Nuclear Power Station Units 1 and 2 (and hence well-versed in all aspects of the station). As a result, as originally planned more than 90% of the radiation has been removed, with safety prioritized.

◆Learning from the world

The work at Mihama Nuclear Power Station Units 1 and 2 is expected to pioneer the decommissioning of pressurized water reactors (PWRs) while research on decommissioning is underway in partnership with universities and the Wakasa Wan Energy Research Center.

In addition, information sharing agreements are in place with nuclear operators in US, France, Spain and South Korea, etc. on many aspects of nuclear power generation (including decommissioning) to learn from safety improvement measures in these countries.

●Cooperation with nuclear operators in Japan

We signed an agreement with Hokuriku Electric Power, Chugoku Electric Power, Shikoku Electric Power and Kyushu Electric Power on cooperation across nuclear power businesses to facilitate safe decommissioning including reviewing techniques and procurement for large-scale decommissioning, information sharing on decommissioning processes, etc.

◆Review of techniques and procurement for large-scale decommissioning

Measures such as joint material procurement are underway for safety and efficiency improvement purposes, according to the schedule of large-scale decommissioning projects at each power company including the inspection of the reactor interior, etc.

◆Information sharing on decommissioning processes

The status of decommissioning projects at each power company is mutually monitored to facilitate safe decommissioning while information on expertise, best practices and concerns in other countries are shared.

●Local business development and employment promotion

According to the Agreement on Nuclear Power Plant Decommissioning (which was signed with Fukui Prefecture and Mihama Town on February 10, 2016, and with Ohi Town on November 22, 2018), the timing and procedures for decommissioning are being planned and announced, based on coordination with local businesses and employment promotion policies related to the decommissioning work.

◆Information sharing for each decommissioning process

In cooperation with the Wakasa Wan Energy Research Center, contractors and subcontractors share information on decommissioning processes to encourage the participation of local businesses according to their technical capabilities.

○ Information sharing, implemented three times for Mihama Nuclear Power Station Units 1 and 2 (on March 2017, January 2018 and January 2019)

○ Information sharing, implemented once for Ohi Nuclear Power Station Units 1 and 2 (on March 2020)

◆Research with local businesses

Research on decommissioning is underway with local businesses and other stakeholders to address and solve technical challenges, thereby streamlining decommissioning processes and improving their reliability. At the same time, assistance is provided to local businesses committed to developing new techniques to aid with decommissioning.

○ Four techniques were adopted in fiscal 2016, two in fiscal 2017, one in fiscal 2018 and two in fiscal 2019.

◆Human resource development for decommissioning

Guidance on decommissioning, lectures on relevant techniques, study tours and first-hand experience programs are provided in cooperation with the Wakasa Wan Energy Research Center.

○ Conducted 10 times in total between fiscal 2016 and 2019.

■ Voluntary efforts to enhance nuclear safety

◆◆◆ Policy and Concept ◆◆◆

Learning lessons from the accident at Mihama Nuclear Power Plant Unit 3, we place a premium on nuclear safety. Specifically, the accident at Tokyo Electric Power's Fukushima Daiichi Nuclear Power Station made us aware that our understanding and preparedness for risks unique to nuclear power generation were not necessarily sufficient. We, therefore, established a roadmap to "step-up voluntary/continuous efforts to improve nuclear safety," based on which various measures are being implemented.

◆◆◆ Goals ◆◆◆

Efforts are underway to realize a nuclear safety ideal, which translates into development and implementation of a framework for voluntary/continuous safety improvement measures as well as incorporating external knowledge for further improvement, in accordance with our "Commitment to Enhancing Nuclear Safety."

◆◆◆ Efforts ◆◆◆

● Communication and standardization of a philosophy, giving top priority to safety

◆ Sharing a philosophy of giving top priority to safety

○ Management takes the lead in communicating our philosophy of giving top priority to safety.

- Members in management visit frontline workplaces in the power plants, etc. to communicate with plant employees and subcontractors, stressing the importance of improving safety.

○ A company-wide proclamation: "Commitment to Enhancing Nuclear Safety*" has been adjusted, communicated and standardized at workplaces.

- Group discussions and workshops are held, involving case studies relating to the proclamation.
- Communication tools such as an illustrated version are in place.

* Refer to page 43.

● Creating a platform for safety improvement

◆ Human resource development

○ Human resources for nuclear safety are being developed based on the human resource development plan.

＜ To ensure smooth technical transfer ＞

- OJT* programs for instructors are in place to help experts better transfer their techniques and knowledge.
- Video (animation) tools are available to better understand the structures and behaviors of facilities that cannot be seen from the outside.

＜ Education and training to raise awareness of hazards ＞

- Training programs are in place, focusing on troubleshooting procedures.

* On the Job Training: Education and training provided at workplaces

● Safety improvement activities

◆ Promoting safety improvement measures

○ Large-scale renovation work is underway at Mihama Nuclear Power Station Unit 3 and Takahama Nuclear Power Station Units 1 and 2 to deliver over 40 years of safe operation.

- Large equipment, pumps and piping are being replaced while central control panels are being upgraded to their digital counterparts to enable timely and accurate monitoring and operation.
- Earthquake-proof steel-framed concrete gantries* were set up at Mihama Nuclear Power Station Unit 3, preparing for a possible collapse of the hill nearby, which could damage the reactor building, access routes, etc.

* Access platforms for reactor containment vessels, etc.

◆ Boosting the accident response capacity

○ Our accident response capacity is improving to deal with possible nuclear disasters.

- Comprehensive disaster drills are conducted at all nuclear power plants. With timely and accurate accident remedial measures in place to prevent the spread and expansion of damage following an accident, continuous improvements are made, based on achievements made in previous drills. (The below are examples provided by Takahama Nuclear Power Station)

＜Key features of the drill ①＞
An "EAL judgment flow" was developed to judge Emergency Action Levels (EALs)*1 in an accurate and timely manner.
- EALs are shown in a diagram to promote quick judgments during unusual events, thus enabling accurate and timely emergency classification.

＜Key features of the drill ②＞
Information sharing methods were improved for quick and smooth information sharing during disasters.
- Systems were updated to quickly share information on critical issues including plant conditions, etc.
- Electronic whistles were used to prevent panics, alert all employees and provide them with instructions when task forces have emergency issues*2 that need to be communicated.

○ Building leadership capacity to cope during an emergency is part of preparing for possible nuclear disasters.
- The TAIKAN training program*3 was conducted (at Takahama and Ohi) to improve communication skills and decision-making capacity under stressful conditions. These exercises are designed to train plant task force leaders so that they can take control in the event of emergency such as a severe accident.

○ Five electric power companies*4 in west Japan cooperate in capacity building in the event of a nuclear disaster.
- The five companies jointly conducted a logistic support drill at the Chugoku Electric Power's Shimane Nuclear Power Station.
- Support staff were dispatched to cooperate with municipalities and conduct review inspections at the time of evacuation.
  - Training programs and disaster drills including one organized by the national government with Tottori and Shimane Prefectures, along with drills organized at the prefectural government level by Ehime, Ishikawa and Kagoshima, with Saga, Fukuoka and Nagasaki Prefectures holding a joint drill.

*1 Standards for three-stage emergency classifications (alert, site area emergency and general emergency) based on the conditions at a nuclear power facility
*2 EAL judgment calls by the director, briefings (meetings, etc.), sudden changes to conditions at the plant (discontinuation of reactor core injection, etc.), evaluating the estimated time of core damage, etc.
*3 Developed by the Institute of Nuclear Safety System, Incorporated (INSS).
*4 Hokuriku Electric Power Company, our Company, the Chugoku Electric Power Co., Inc., Shikoku Electric Power Co., Inc., and Kyushu Electric Power Co., Inc.

● Developing and improving systems to manage risks, etc.

◆ Continuously improving our risk management system

○ Learning lessons from industrial accidents*1, including the accident that took place at the Takahama Nuclear Power Station*2 in March 2020, our risk management system is being improved to prevent accidents and disasters.
- Risk review meetings are held as needed to discuss risks involved in decommissioning, etc. and to develop countermeasures.
- Risk factors are identified and basic actions are strictly observed to prevent industrial accidents.

＜Review of industrial accident prevention measures＞
- Despite our efforts to step up prevention measures in the wake of industrial accidents that took place in September and October 2019, a fatal accident occurred in March 2020 at the Takahama Nuclear Power Station.
- As part of our efforts to take this accident seriously, previous accidents were reviewed to seek out trends that can bolster prevention measures.

  Review results: Accidents abound in civil engineering and construction work, and there have been several incidents at the Takahama Nuclear Power Station, where a lot of construction work is currently underway.

  ⇒ Qualified safety advisors (workplace safety consultants) inspected construction sites, focusing on civil engineering and construction work. At the same time, the Takahama Nuclear Power Station was staffed with additional advisors to bolster prevention measures, in accordance with the volume of civil engineering and construction work on site.
- The entire process was reviewed to facilitate staff allocations and work scheduling through communication with subcontractors, whose opinions were taken into account, given possible changes to the work on site.

○ Prevention measures for novel coronavirus are in place to secure the safety of our power plants.
- All employees are checked for body temperature before starting work and entering the power plant (as a form of quarantine control), using thermographic imaging, etc.
- More shuttle buses are provided exclusively for generator room staff so that those working at different workplaces use different buses.
- Access to the central control rooms is controlled while partitions have been installed to avoid face-to-face contact.

*1 Severe industrial accidents took place during the earthquake-proof construction and reinforcement work on the spent fuel pits at Mihama Nuclear Power Station Unit 3 (September 2019), the safety construction work at Takahama Nuclear Power Station Units 1 and 2 (September 2019) and the tunnel construction work at Ohi Nuclear Power Station Units 3 and 4 (October 2019) – including a serious injury caused by falling steel materials (October 2018) at Takahama Nuclear Power Station Unit 1, a crane collapsing at Takahama Nuclear Power Station Unit 2 (January 2017), water leakage in the controlled area at Takahama Nuclear Power Station Unit 4, and an automatic reactor shutdown following automatic generator shutdown, also at Takahama Nuclear Power Station Unit 4 (February 2016).
*2 A subcontracted worker died in an accident during safety construction work at Takahama Nuclear Power Station Units 1 and 2 (March 13, 2020).

◆ Developing and improving tools for risk management and assessment

○ Improvements were made at the Takahama Nuclear Power Station Unit 3 to further reduce risks of reactor core damage during regular inspections.
- During a regular inspection of Takahama Nuclear Power Station Unit 3, more water was retained and the time required for the midloop operation*1 was significantly reduced (from about 24 hours to about three hours). The midloop operation is performed right after reactor shutdown, with the core filled with fuel rods.
- This provides sufficient time for operations during an accidental loss of core cooling functions, which further reduces the risks of core damage.

○ Ohi Nuclear Power Station Unit 4 and Takahama Nuclear Power Station Unit 4 were evaluated for safety improvements*2, which resulted in advanced safety improvement measures.

- Probabilistic risk assessments (PRA*3) and safety margin evaluations (stress testing) were conducted, in accordance with the latest conditions at the power plants to identify risks and take continuous measures to reduce or eliminate said risks. The evaluation results contribute to developing advanced safety improvement measures.

*1 The reactor coolant system water level is maintained near the center of the loop piping, with the reactor vessel filled with fuel rods, wherein air is fed to the system to dissolve and remove radioactive substances attached to the inner surface of the piping, thereby reducing radiation exposure. While higher water levels block air flow, radioactive exposure in this particular case can be reduced by adding chemicals, a practice that has been in place at Takahama Nuclear Power Station Unit 3 since the 24th regular inspection.
*2 It is designed to help operators evaluate nuclear safety and make voluntary efforts for continuous improvement.
*3 A technique to quantitatively evaluate the probability that possible phenomena in nuclear power facilities develop into severe accidents such as core damage.

◆Incorporating objective evaluation and external knowledge

○ Safety measures at our nuclear power plants are monitored and evaluated for improvement purposes.

- Reviewers from other electric power companies, etc. provided technical and objective evaluations at the Mihama Nuclear Power Station in February 2020 (independent oversight).
- Evaluating power plants' conditions using performance indices (PI)* and conducting site inspections

○ Meetings are held with senior management of overseas electric power companies while information is shared between working-level staff to incorporate practices and knowledge from around the world.

- Representatives from the Golfech Nuclear Power Plant of EDF (France) visited the Ohi Nuclear Power Station as part of an exchange program, where information was shared on measures implemented at aging nuclear power plants.
- Our representatives visited the Robinson Nuclear Power Plant of Duke Energy (US) and surveyed on its site inspection system, etc.

* An indicator for quantitative management of the performance of a power plant

●Improving communication

◆Promote risk communication*

○ As we take the opinions and concerns of the public seriously, some of which voice concern toward operating power plants over 40 years, we are engaging in mutual communication to jointly seek solutions.

- We visit each household in Mihama Town, Takahama Town and Ohi Town, where our nuclear power plants are located, to engage in mutual dialogue.
- Plant tours by the Nuclear Power Division and other programs are in place, where visitors are briefed on operations of our plants, exceeding 40 years.
- We get together with observers of our PR magazine, *Echizen Wakasa no Fureai* to solicit opinions and facilitate communication.

○ A training program is in place to help employees better communicate risks to the public.

- For staff in charge of plant tours by the Nuclear Power Division, workshops are held to help them better communicate risks to the public.

* Risk communication: A mechanism whereby the risk aspects of nuclear power generation are shared and the public's opinions are incorporated into business management.

●Relevant data

	2018/3	2019/3	2020/3
Number of participants in training and practice programs for nuclear power disasters	About 5,700	About 5,900	About 5,700
Number of nuclear power disaster drills	About 5,700	About 6,300	About 6,100

Cyber security measures

Policy and Concept

Many global events are planned in the years ahead, such as the Tokyo Olympic Games, the Paralympic Games and Expo 2025 Osaka, Kansai. As an important infrastructure company operating an electric power business, we believe that the delivery of safe and stable power supply by ensuring cyber security is our social responsibility. To fulfill this responsibility, we are strengthening cyber security measures against the growing threat of cyber attacks on important infrastructure that support society, in accordance with the relevant laws, regulations and guidelines for cyber security management, along with internal regulations. Moreover, as cyber attack methods are evolving day by day as they become more complex and sophisticated, we strive to obtain cyber attack information from outside the company in addition to the latest security information, so we can prepare countermeasures in a timely manner.

System

Director responsible: Toyokazu Misono [CISO (Representative Executive Officer, Vice President)]
Deliberative body: Executive Meeting
Management office: Cyber Security Administration Group, Office of IT Strategy (Information Security Management Office)

Goals

Major information security incidents “0”

Efforts

Our cyber security efforts have been focused mainly on Information Technology (IT) systems that are connected to external networks, such as the internet, with a focus on external disclosure systems and countermeasures against targeted email attacks. Now that these cyber attacks are spreading to all Operational Technology (OT) systems related to the provision of a stable power supply, we are also bolstering our efforts across OT systems.
Specifically, risk assessments are made for IT and OT systems, necessary technical measures are taken, and monitoring is carried out 24 hours a day, 365 days a year at dedicated IT and OT monitoring centers. In addition to an emergency response system established in preparation for incidents, we are continuing to provide drills for how to respond to cyber attacks as well as relevant training for employees.
We are gathering information about cyber attacks that occur outside our Company and the latest security information through, for example, the activities of the Japan Electricity Information Sharing and Analysis Center (JE-ISAC*), which is an organization that undertakes the sharing and analysis of cyber attack information among electric power businesses. Moreover, countermeasures are reviewed as needed.

* An organization where business operators share and analyze information from the perspective of cyber security in order to ensure the stability of the supply of electricity in Japan.

Company-wide training to respond to cyber attacks

Relevant data

Policy		
Cyber Security Guidelines	Established	—

Providing services as a consolidated group

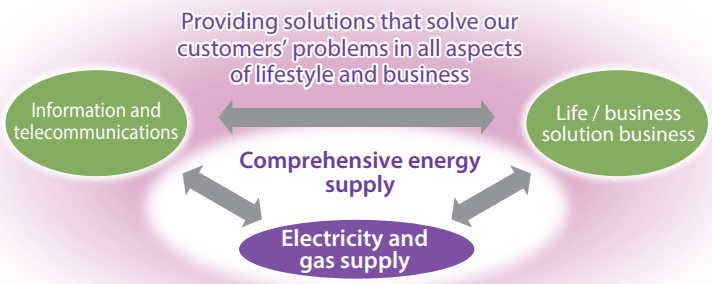
Policy and Concept

Aiming to be "the best partner in daily life and in business"

Our Group has been meeting the various demands of our customers and society by offering total solutions that combine our services, including comprehensive energy supply which is mainly offering electricity, as well as telecommunications, daily life and businesses.

Along with the global trend of electrification, the demands of our customers and society are becoming increasingly diverse. In order for the services offered by the Group to continue to be selected by customers, we will continue expanding the scope of our services in addition to our existing push toward "total electric conversion" and our provision of electricity and gas as a combination. From the standpoint of our customers, we will offer a wide variety of "safe, comfortable and convenient" as well as economical energy services. The Group has cultivated engineering as our core strength, and by leveraging this core strength we have committed to providing solutions that solve our customers' problems in all aspects of lifestyle and business. By providing these solutions we will play a role that exceeds our customers' expectations.

Business areas for strong growth



Goals

Customer satisfaction survey: Satisfaction index 90% or higher
→ 2019 result: 92.0%

Efforts

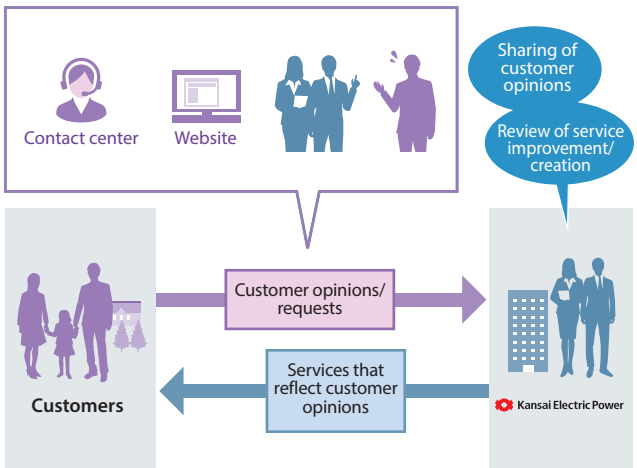
Services for residential customers

In addition to "total electric conversion" that realizes a comfortable and convenient lifestyle, since February 2018 we have offered a new plan that combines our electricity and gas services.
We also offer services that are helpful for our customers' daily lives, including a service to dispatch support personnel to customers experiencing problems, such as a sudden power outage, as well as a points program through which points are earned according to the amount of energy usage.
As a comprehensive energy company, we will promote initiatives that satisfy our customers.

Service improvement and service creation to reflect the opinions of customers

We work to create and improve services in response to requests received from customers through our contact centers, website, etc. so we can meet our customers' needs.

Number of improved cases based on customer feedback
(2019. 4 – 2020. 3 results)
129



Customer satisfaction survey

We conduct "Customer Satisfaction Surveys" asking our customers to assess how understandable our telephone operators' explanations regarding inquiries such as "The lights in the house went out suddenly." We receive high evaluations from a lot of customers.
We will keep working to make our customers more satisfied by utilizing the evaluation results for improvements in services and businesses.

Of customers who asked for advice over the phone,
92.0%
replied that they were satisfied.

Lifestyle services with the confidence of our customers as the foundation

Aiming to make our Group the one that our customers trust and choose as the "best partner for their lifestyles," our individual companies deliver safe, comfortable and convenient lifestyle-related services to residential customers – services that are closely related to people's lives, such as home security, health management support and nursing care, based on our quality first policy.
We will employ the comprehensive abilities of our Group and combine them to develop and provide new service models that meet our customers' needs, thereby pursuing customer-focused, high-quality value-added services.

Services for corporate customers

Our Group promotes a variety of services, providing optimal energy systems and management methods designed to meet individual customer needs and help reduce energy consumption, costs, and CO_2 emissions.

Examples of adopting utility services

Kintetsu Real Estate Co., Ltd. adopted the utility services of Kanden Energy Solution Co., Inc. (Kenes) for the Abeno Harukas super-high rise multifunction building, which stands 300 m above ground and had its grand opening in March 2014. Expert energy technicians from Kenes are stationed at the building around-the-clock, managing facilities with different energy quality demands, including a department store, offices, a hotel and a museum. Moreover, we are continuously realizing energy, cost and CO_2 reductions by monitoring energy use conditions in real time and utilizing the collected data in operation and maintenance. In this way, we have been told that customers are able to focus their business resources, including essential personnel, on their primary businesses by entrusting work related to energy management to Kenes.

Inspecting the utility facilities of the Abeno Harukas building

Examples of services for corporate customers

Examples of services for corporate customers	
Enudge 2.0 (Kansai Electric Power Co., Inc.)	Next-generation energy platform. In addition to encouraging energy-saving behaviors, this service provides integrated solutions for operational improvement and renovation of store equipment and operational support for individual stores.
Solar power generation on-site service (Kansai Electric Power Co., Inc.)	A service in which dispersed power generation equipment such as solar power generation equipment and storage batteries are installed on the customer's premises at our expense for long-term operational use. Customers can reduce their environmental burden by using energy from the equipment we operate.
Industrial furnace optimal operation service (Kansai Electric Power Co., Inc.)	A service that remotely monitors the operation and energy usage status of an industrial furnace with sensors and measuring instrument installed inside the furnace, enabling data collection and management via the cloud. By combining this service with our periodical data analysis, we aim to realize "preventive maintenance," "reduction in gas consumption," and "technology transfer" in the realm of industrial furnaces.
Utility service (Kanden Energy Solution Co., Inc.)	A service that enables customers to outsource facility management and even makes initial financing unnecessary for them by providing comprehensive services from fund-raising and design to installation and maintenance administration for utility facilities related to energy, including power receiving equipment, air-conditioning and heating equipment and boilers.
Assistive vehicle leasing service (The Kanden L & A Co., Ltd.)	We provide total support for assistive vehicles, including leasing, sales, repair and upgrading.
Business place security (KANDEN Security of Society, Inc.)	A service that preserves customer safety 24 hours a day 365 days a year by rapidly detecting abnormalities, including intruders and fires, and rushing staff to the site.
Comprehensive building management (Kanden Facilities Co., Ltd.)	A service that provides safe and secure facility environments and contributes to increasing property values through, for example, the daily maintenance management and cleaning of buildings and facilities, security, environmental hygiene and energy management

The Group companies that provide the services are indicated inside parentheses.

Relevant data

	2018/3	2019/3	2020/3
Number of reform cases based on customer feedback (cumulative)	101	225	129
Customer satisfaction (telephone consultation)	—	90.2%	92.0%
Number of Hapi e-Miruden* subscribers	3,988,000	4,830,000	5,522,000

* A web-based service that provides notifications related to electricity and gas charges and usage

To provide high-quality electric power

Policy and Concept

Our quality policies for the safety of our electric facilities

Ensuring safety　　Maintaining high supply reliability

In order to ensure safety and a reliable supply amid an extremely harsh business environment, we are reviewing the way we do business, which includes checking if there are any oversights in risk management related to supply reliability, and increasing operational efficiency on the premise of not sacrificing safety and quality. While maintaining these efforts, we will carry out the following activities.

- Maintain electric facilities based on ensuring safety.
- Strive to prevent accidents caused by human error.
- Carry out our business in compliance with relevant laws, regulations and internal rules.
- Set and review quality goals in line with our quality policies.
- Confirm that front line workers are familiar with our quality policies.
- Review the appropriateness of the quality policies.

Goals

Goals based on the materiality of the Kansai Electric Power Group

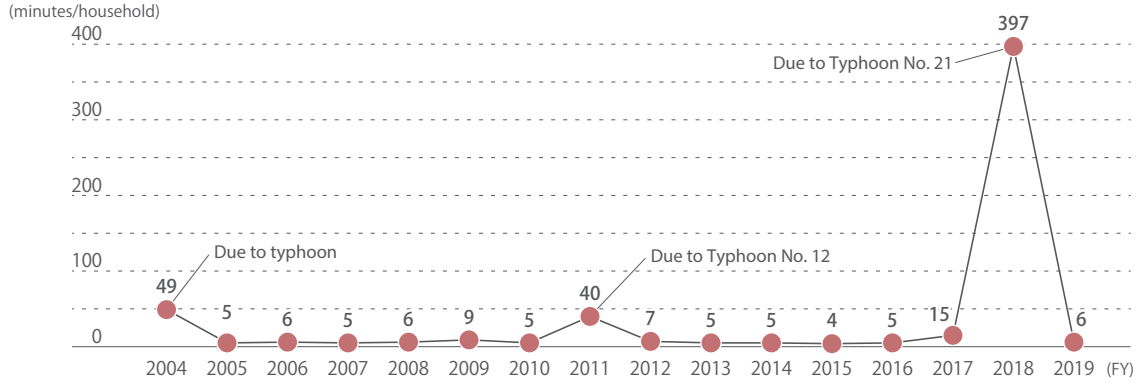
Annual power outage time per household	"Maintain the highest standard in the world"

Efforts

Toward a safe and stable supply

We at Kansai Transmission and Distribution, Inc. work to operate power systems that provide a reliable link between power plants and consumers and optimize the configuration of facilities. We are also making thorough efforts to prevent failure recurrence. As a result of our efforts, we are maintaining one of the world's highest power quality levels in the transmission and distribution business.

◆Annual duration of power outage per household



Achieving electricity resilience

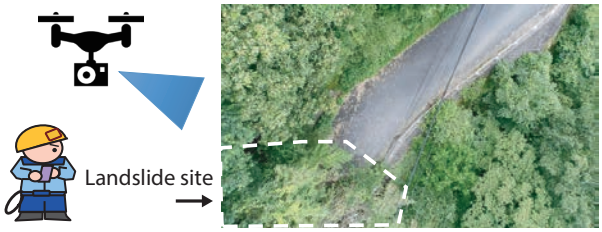
On September 4, 2018, the powerful Typhoon No. 21 ripped through the Kansai area, causing breakages totaling more than 1,300 utility poles and a power outage affecting roughly 2.2 million households in total. We apologize to our customers for the inconvenience and trouble caused by the extensive and long-term power outage.
Following the damage caused by Typhoon No.15 and Typhoon No.19 during the 2019 season, the Electricity Resilience Working Group compiled verification results in January 2020 regarding our response to these emergencies. Based on these results, we have created a cooperation plan to be used in an emergency with the aim of fulfilling our power supply obligations through successful restoration of the power supply. This plan specifies cooperation with general power transmission and distribution business operators and related organizations (local governments, Self-Defense Forces, etc.) in the case where significant damage has been caused, or may be caused, to power transmission and distribution equipment in an emergency. We will continue to step up our efforts for quick recovery in the event of an emergency.
By addressing issues presented by the Electricity Resilience Working Group, which have been discussed nationwide, and sharing the lessons learned from Typhoon No. 21, we are determined to fulfill our mission of supplying safe and stable electricity and supporting society. To that end, we will develop and introduce new technologies and new construction methods, as well as systematically maintaining or replacing aging equipment, aiming for prevention of accidents and prompt restoration of the power supply.

Examples of countermeasures taken following Typhoon No. 21

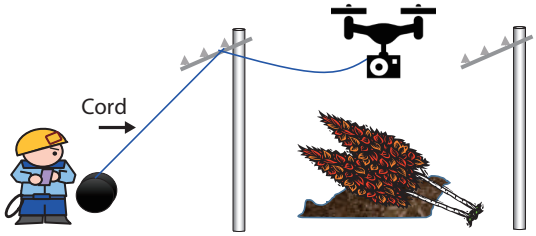
- Quick information gathering using smartphones
- Understanding the scope of damage using drones; using this information for restoration work
- Trial operations of power outage information collection utilizing smart meter data
- Bolstering a broad support system inside and outside the company
- Timely provision of information to the customer on power outages and restoration work

Understanding the scope of damage using drones; using this information for restoration work

In places that are difficult to access, such as a site following a landslide, we use drones to check the status of equipment so we can quickly grasp the whole picture.
Drones are also expected to be used in restoration work, for example, using a drone for overhead wiring of a cord to replace power lines.



Damage investigation by aerial drone video



Using a drone for overhead wiring of a cord to replace power lines

A drone taking off with a cord

Preventing electrical accidents

Policy and Concept

● Our quality policies for the safety of our electric facilities

Goals

Number of injured ordinary citizens “None”

Efforts

If something approaches, touches or damages electrical facilities of Kansai Transmission and Distribution, Inc., including transmission and distribution equipment, it may lead to not only a power outage but also to possible injury or death from electric shock. To prevent such electrical accidents, we conduct various public relations activities through mass media and on our website as well as on the website of Kansai Transmission and Distribution, Inc. As part of these activities we ask construction companies, when they perform construction work near our transmission and distribution equipment, to attach protective pipe covers for sure and not to touch the wires that have been cut.

● PR campaign for accident prevention

① Announcements via our website and mass media
- Reminders to attach protective pipe covers and where to apply for these covers
- Warning about touching severed wires, etc.
- Notice of precautions in daily life and in an emergency situation
- Prior to a typhoon, reminders to work on preventing objects from becoming projectiles

② On-site publicity
As part of our PR campaign, if we discover a construction site with protective covers not attached to electric wires, etc., we call the operator’s attention to the dangers of electricity and request that they apply for the protective covers.

③ Featured in *Electricity and Security* published by Kansai Electrical Safety Inspection Association
Our PR campaign for the prevention of accidents related to electricity on construction sites was published in the July-August 2020 issue.

④ On-site classes
We rent a venue for various training classes such as crane operations to introduce examples of electrical accidents as well as relevant countermeasures.

Introduction of a new system for renovation work for aging facilities

◆◆◆ Efforts ◆◆◆

● Adoption of new construction method (attachment-type moving device) to remove 500-kV No. 4 transformers at the Shigi Substation

When replacing large equipment, such as transformers, on substation premises, the roller towing method is generally adopted for the transportation. Recently, we have adopted a new method which uses an attachment-type moving device. Compared to the roller towing method, it enables shorter working hours and reduces the risk of accident (injury from falling heavy objects, physical injuries when inserting rollers, etc.), and this new approach is expected to be adopted as an option for transporting large equipment. We will continue to adopt new technologies and construction methods to ensure safe operations.

Roller towing method

New construction method using an attachment-type moving device

● Relevant data

	2018/3	2019/3	2020/3
Number and rate of smart meters installed	About 9.32 million (About 71%)	About 10.58 million (About 81%)	About 11.53 million (About 88%)
Specialist technicians with specialized skills	211	188	124
Number of injured ordinary citizens	7	5	4
Transmission and distribution loss rate	4.35%	5.05%	4.80%
System Average Interruption Duration Index (SAIDI)	15 min	397 min (due to Typhoon No. 21)	6 min
System Average Interruption Frequency Index (SAIFI)	—	—	0.11
Customer Average Interruption Duration Index (CAIDI)	—	—	54.55
Length of power transmission and distribution lines	Transmission lines: 18,803 km Distribution lines: 132,137 km	Transmission lines: 18,823 km Distribution lines: 132,456 km	Transmission lines: 18,804 km Distribution lines: 132,662 km