Safe, Stable Delivery of Products and Services

Facilities configuration based on S+3E

To carry out our mission of providing customers with high-quality, economical electricity on a stable basis, Kansai Electric Power has adopted its S+3E approach, under which we assign the utmost priority to Safety, while striving to secure long-term Energy security as well as maintain a focus on Economy and Environmental conservation. We use this approach to consider all aspects of our facilities configuration to achieve a favorably balanced combination of nuclear, thermal, hydroelectric, and renewable energy generation.



To provide high-quality electric power

Kansai Electric Power works to operate power grids that provide a reliable link between power plants and consumers and optimize the configuration of facilities. We are also engaged in rigorous efforts to prevent accident recurrence, as a result of which Kansai Electric Power has achieved one of the world's highest power supply quality levels. The Company continues to develop new technologies and introduce new construction methods for the purpose of preventing accidents and for swift recovery in the event an accident does occur. Equally important, systematic renovation is in progress for aging facilities. In response to public demand, we are striving to create a flawless supply system, thereby contributing to the continuing development of the Kansai region.

Annual Duration of Power Outage Per Household



(Power outage includes forced outage and power cut operation) 200 (minutes/household)

Initiatives to maintain a high capacity factor

To ensure the stable supply of electricity, Kansai Electric Power maintains a high capacity factor at our thermal power plants. We are also fortifying routine inspections in operations and monitoring activities, boosting efforts to detect signs of abnormality early on so as to prevent the occurrence of any kind of problem that can interrupt and obstruct the stable supply of power.

For example, at the Kainan Power Station, we conduct routine inspections six times a day and have intensified inspections by focusing on key pieces of equipment, aiming to discover signs of abnormality in the machinery at an early stage. Because these power plants, which have been in operation for more than 40 years, rarely have the equipment that can be monitored remotely in a

central control room, as with state-of-the-art plants, plant personnel must take a vibration gauge around and periodically measure equipment vibration, monitoring it by hand.

Routine inspection using a stethoscope probe

We also prepare for the rare incidence of trouble by stocking spare parts in advance and by readying emergency personnel structures for quick recovery from the trouble.

Inspection around a boiler





Tireless efforts to create a safety culture

We believe that safety is the core of all our business activities and the basis upon which the public places their trust in us. It is essential to improving the quality of all our business activities and to our future growth. Kansai Electric Power will therefore continue working tirelessly to ensure that safety assurance is given the highest priority in our business activities so that we can continue achieving results in this area.

We are working with all partner companies that sustain the operation of the Kansai Electric Power Group to promote risk reduction activities by sharing safety awareness and learning from

one another. We are thus working to create an unshakable culture of safety at even higher levels throughout the group.



Award presentation to a partner company (safety incentive system)

Training the personnel who support safe and stable supply functions

To enable us to provide products and services in a safe, reliable manner, Kansai Electric Power recruits new staff yearly and implements systematic education with the aim of nurturing specialist personnel. We are also promoting a range of initiatives to ensure that techniques and skills are maintained and passed on. These include our Specialist Technician System* and a system for ascertaining the technical capabilities of individual employees—Group-wide systems for passing on and further improving skills.

* Specialist Technician System: a certification system for employees in the field who possess advanced technical skills used in the electric power industry. Those who have this expertise, combined with the passion and ability to teach others, are certified as Specialist Technicians to ensure the handing down of such skills and techniques. As of May 31, 2014, there are 233 certified Specialist Technicians.



Training activity

Preparing for a major disaster

Based on our mission of the stable provision of electric power, Kansai Electric Power is engaged in initiatives to strengthen facilities to withstand disaster and establish a disaster control system to enable rapid recovery as basic measures for dealing with natural disasters such as earthquakes, typhoons, heavy snow, heavy rain, and lightning.

In the event of a major Nankai Trough earthquake, we will follow the basic plan for mitigating disaster newly announced by the Japanese government and take disaster response and recovery measures in consultation with related entities.

Strengthening facilities for disaster resistance

Thanks to lessons from past natural disasters, electric power facilities are today designed to sustain minimal damage even in the event of earthquakes, tsunamis, typhoons, or other natural disasters. Also, the power distribution system covers the Kansai region like a fine mesh net. In the unlikely event of damage occurring to part of this network, power can be supplied quickly from alternative connecting routes.

• Establishing relationships with entities related to disaster prevention

As part of our efforts toward speedy disaster recovery, we work closely with local governments by, for example, participating in disaster response meetings, where we can provide information relating to the recovery status of Company facilities. This allows local governments to facilitate our efforts for the earliest possible restoration of power supply by prioritizing repair of roads that are essential to our recovery work. Furthermore, we are contributing to regional disaster recovery by loaning portable generators to local governments in case road blockage threatens to prolong the interruption of power in the wake of a disaster. We are also ready to provide support in delivering subsistence goods.

In addition, we regularly share information with local authorities through seconded personnel and participate in coordinated efforts that include making damage predictions for a major Nankai Trough earthquake, reviewing regional government disaster response plans for such an earthquake, and actively participating in disaster response drills.

We consider it important to collaborate in this way to prepare for a wide-area disaster, building relationships of mutual assistance with outside entities such as the government and other infrastructure providers, and working in close collaboration with regional communities on disaster response measures.

Kansai Electric Power has signed agreements of cooperation with the Chubu Region Ground Self-Defense Forces (GSDF) and the Kure District Maritime Self-Defense Forces (MSDF).

The agreement with the Chubu Region GSDF was signed on March 6, 2014 and with the Kure District MSDF on July 9, 2014. Both agreements are intended to facilitate bilateral cooperation in times of disaster by building collaborative ties during times of peace. The inception of the idea for such collaboration came in 2011 when the GSDF provided Kansai Electric with information on a route that could be used to approach a village isolated by Typhoon #12 (Talas), enabling a quick recovery. These agreements will be the basis for sharing information related to the status of disaster-affected areas to enable other rapid recoveries. By holding regular meetings and carrying out drills on an ongoing basis, an effective system of collaboration will be built, along with a close relationship.



Signing of agreement with the Chubu Region GSDF

Initiatives prioritizing safety at nuclear power plants

Ensuring stable energy supply through diversity

When nuclear power is excluded, Japan's energy self-sufficiency rate is only around 5%. For the remainder of its needs, Japan must rely on imported energy. Political conditions, however, are unstable in the Middle East, from which Japan imports over 80% of its crude oil and roughly 30% of its liquid natural gas (LNG). As such, overdependence on these sources of energy entails not only price risk, but also risk to the stable supply of energy.

In contrast, the uranium used in nuclear power plants is widely distributed throughout the world, and many of the nations where it is produced are politically stable, giving uranium excellent supply stability. It is therefore necessary to maintain diversified resource procurement and an optimal mix of electric power generation methods to ensure stable future energy supplies.

Principal Energy Sources

Nuclear power (uranium)	Widely distributed, centered on countries with stable politics; fuel can be recycled; strict radiation control required
Thermal power (oil)	Uneven distribution in politically unstable Middle East; severe price fluctuations; emits CO ₂ , a cause of global warming
Thermal power (coal)	Ample reserves compared to oil and widely distributed throughout the world; stable price; special attention required for environmental preservation, including SOx and NOx control measures
Thermal power (LNG)	Stable fuel procurement; price tracks that of oil closely; cleaner than oil and coal
Hydroelectric power	Renewable, clean domestic energy source; few remaining potential construction locations and large-scale development difficult
Solar power	Renewable, clean domestic energy source; unlimited resource; affected by weather; large development area required
Wind power	Renewable, clean domestic energy source; unlimited resource; affected by weather

Reference: "Electricity Review Japan 2013," Federation of Electric Power Companies of Japan, other sources

Power Generation Composition of Kansai Electric Power by Source

Electricity production depends heavily on various factors, including whether or not a country has natural resources, its geography, natural conditions, and energy policy. In Japan, which has no natural resources, Kansai Electric Power had generated most of its electricity according to this breakdown: 44% nuclear power; 20% LNG; 21% coal, etc.

But following the Great East Japan Earthquake, operations at nuclear power plants were suspended indefinitely, leading inevitably to a major increase in power generated by thermal power plants. In FY 2012 approximately 80% of power was derived from thermal power.



Note: The total may not match due to the rounding off of numbers.

Securing resources through the nuclear fuel cycle

Nuclear power offers a stable procurement of fuel and the production of large volumes of electricity from a small amount of fuel. After a single replacement, fuel will produce electricity for more than a year. For this reason nuclear power is regarded as a quasi-domestic energy source.

In addition, the fuel used in nuclear power plants contains elements that can be reused (uranium and plutonium). The elements can be extracted, processed, and once again used as fuel. This process is known as the nuclear fuel cycle. For a resource-poor country like Japan, this system is an effective way to secure a stable supply of energy.



Reference: "Graphical Flip-chart of Nuclear and Energy Related Topics 2013," Federation of Electric Power Companies of Japan, other sources

The Recyclable Fuel Storage Center (interim storage facilities)

Spent fuel can be reprocessed and used again as MOX fuel, so it is called a "recyclable fuel." Until recyclable fuels are reprocessed, they are stored temporarily in interim storage facilities, which we named the Recyclable Fuel Storage Center. Storing spent fuels is an effective way to build flexibility into nuclear fuel recycling strategies.

The Kansai Electric Power Co. has long promoted establishment of the center. In June 2013 we set up "the Project Team for Promoting the Establishment of Interim Storage Facilities for Recyclable Fuel Resources" to formulate a company-wide policy and strategy and comprehensively promote the establishment of the facilities, and we continue to work consistently toward this goal.





Nuclear power generation

Nuclear power generation uses the heat energy of uranium fission to create steam. The steam drives turbines that generate electricity.

Nuclear Power Generation



Containment vessel

Kansai Electric Power's Nuclear Power Plants



Enhancing nuclear power safety and reliability

Kansai Electric Power is carrying out a variety of measures to minimize risk and ensure sufficient safety at its nuclear power plants.

Ensuring nuclear power plant safety

Nuclear power plant facilities utilize the concept of "defensein-depth" to prevent nuclear accidents. First, the facilities are constructed to standards even stricter than those laid down by law, and their designs include multiple safety systems, to prevent a malfunction or human error from resulting in an accident, premised on the fact that machines break down and human beings make mistakes.

In the unlikely event of a malfunction occurring, multiple safety functions come into action: detection of abnormalities at an early stage; automatic shutdown of the nuclear reactor; cooling of the fuel by injecting cooling water; and containment of radioactive materials within five barriers. In addition, in order to comply with the new regulatory requirements issued by the Japanese government in July 2013 in the wake of the accident at TEPCO's Fukushima Daiichi Nuclear Power Station in March 2011, Kansai Electric Power is strengthening existing safety measures, and taking additional measures to cope with a "severe accident."

Going forward, we will aim to achieve the highest global level of safety, beyond the standards set by the new law, by autonomously and continuously striving to enhance nuclear power plant safety and reliability.

Strict radiation control

Radiation and radioactive substances are stringently controlled at nuclear power plants. To monitor the effects of radioactive substances on the surrounding environment, multiple monitoring stations and monitoring posts are located around each plant. Atmospheric radiation levels are monitored around the clock, and this data can be accessed on our website and elsewhere.

In addition, Kansai Electric Power regularly samples soil, river water and seawater, indicator plants (e.g. pine leaves), and marine products in the vicinity of its nuclear power plants and tests for the levels of radioactive substances contained to monitor impact on the environment.

The results of this environmental radiation monitoring, and of monitoring by other organizations, are regularly compiled and released to the public after vetting by specialists.



Veb http://www.kepco.co.jp/corporate/energy/nuclear_power/info/ monitor/live_kankyo/ndex.html

Stringent implementation of measures for aging management

For nuclear power plants that have been in operation for more than 30 years, Kansai Electric Power conducts technical analyses on age-related changes, the results of which are reflected in maintenance activities. Maintenance is further reevaluated every 10 years.

According to the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors, revised in 2012, the plant life of a nuclear reactor is 40 years. However, the act stipulates that upon authorization of the Nuclear Regulatory Authority, this period can be extended one time only for another 20 years.

Safety-first business activities—learning from the 2004 accident at Mihama Power Station, Unit 3

Measures to prevent a recurrence of the accident at Mihama Nuclear Power Station Unit 3

On August 9, 2004, an accident occurred at Mihama Nuclear Power Station Unit 3, in which secondary system piping in the unit's turbine building ruptured.

With a firm determination to avoid repeating such an accident, we have been working hard at implementing the recurrenceprevention measures that we promised to the public, based on the President's Declaration, "Ensuring safety is my mission, and the mission of the Company."

To ensure that the lessons learned from the accident continue to be transmitted into the future, August 9 every year is proclaimed "Safety Vow Day." On this day, each employee observes a moment of silence, and refers to the Conduct Card in which he or she has personally entered a safe action declaration. Moreover, this pamphlet with a summary of the accident and its lessons, along with measures to prevent a recurrence, has been published on our intranet. Education based on this pamphlet is provided to all new employees, and is the basis for discussions held at each worksite in the Nuclear Power Division and power stations.

Through these initiatives we are working to ensure that the lessons of the accident are not forgotten.



President Yagi observes a moment of silence in front of the monument of the Safety Vow (August 2013)

partner companies.

President's Declaration

Ensuring safety is my mission, and the mission of the Company.

Basic Action Policy

- **1.** We will make safety our top priority.
- We will proactively introduce resources to ensure safety.
 We will continuously improve maintenance management to ensure safety and establish closer cooperation with
- 4. We will strive to regain the trust of local communities.
- 5. We will objectively assess our efforts toward safety and publicize the results.

Excerpt from Action Plan to Prevent Recurrence of the Accident at Mihama Nuclear Power Station Unit 3

Web Mihama Nuclear Power Station Unit 3 Accident (in Japanese) http://www.kepco.co.jp/corporate/energy/nuclear_power/m3jiko/

Establishing a firm culture of safety

We have mounted a full-scale effort to ensure that we undertake our business operations without forgetting the lessons of the Mihama Unit 3 accident, with safety as our highest priority. Since 2008, we have introduced a safety culture assessment system, through which the conditions of our nuclear power safety culture can be assessed from a variety of viewpoints, and priority measures can be extracted from those assessments.

Safety culture assessments are carried out by each department within the Nuclear Power Division and by each power station. The results of these assessments are compiled to arrive at an overall assessment. Based on this situation, including the Japanese government's enforcement of new regulatory requirements and an extended suspension of plant operations, the FY 2013 assessment indicated the importance of key tasks such as the expansion and strengthening of employee training to maintain and improve technical capabilities. We are striving to accomplish these priority tasks and make improvements.

We also undertake to carry out continuous improvements to foster an even stronger culture of safety in the future.

Summary of Activities to Foster a Culture of Safety



Company-wide promotion of nuclear power safety

We established its Nuclear Safety Enhancement Committee, which includes executives from a cross section of the company and is leading company-wide efforts to prevent recurrence of the accident at Mihama Nuclear Power Station Unit 3 and foster a culture of safety. After the accident at TEPCO's Fukushima Daiichi Nuclear Power Station, the committee is carrying out wideranging discussions to ensure our ongoing voluntary initiatives to enhance nuclear safety. As of July 2014, the committee has convened 176 times.

In FY 2013, to further extend activities, the corporate structure was strengthened to place most senior executives on the committee. The committee held discussions on how to deal with the risks of nuclear power and concerning safety culture needed at the company, based on lessons from the Fukushima Daiichi accident. Committee members also participated in face-to-face meetings between senior management of the Nuclear Power Division and young employees at power stations to encourage communication with frontline personnel.

Providing services as a unified group

Aiming to be a trusted partner in energy and life

As a comprehensive provider of electricity and other forms of energy, as well as a variety of information and telecommunications (IT) services and a lineup of businesses providing amenity services in daily life, the Kansai Electric Power Group meets a wide range of needs, providing total solutions to individual customers and communities. We will continue to focus on being a comprehensive energy provider while also offering solutions that meet and exceed the needs of our regular customers in the areas of lifestyle and business, leading to new growth as a group. Our aim is to become our customers' trusted partner in energy and life.

> Comprehensive energy supply

Electricity supply

Business Areas for New Growth

Services for residential customers

To improve customer satisfaction in the use of electricity, the Kansai Electric Power Group is systematically introducing smart meters in tandem with a Web-based service (Hapi e-Miruden) for the self-monitoring of electricity usage; we also offer consulting services on how to conserve energy according to our customers' request. Through our group companies we offer energy-saving/low-carbon housing, IT solutions, home security, nursing care, and health management support—products and services that address a wide range of daily needs.

We will continue to work as a group to respond to the various needs of our customers with meticulous support and help to bring safety, security, comfort, and convenience to their daily lives.

• Tablet-based and mobile services to enhance daily life

K-Opticom Corporation offers eo SMART LINK as a supplementary service for customers using our Fiber to the Home (FTTH) service. eo SMART LINK enhances customers' daily lives by furnishing them with a tablet device to access more than 100 different services from the Kansai Electric Power Group and other providers, ranging from ordering products from stores online to accessing healthcare services and monitoring their electric power consumption at a glance.

In mobile services, the low-cost "mineo" smartphone, together with the "LaLa Call" phone app, are being offered nationwide in answer to customer needs by a member of the Kansai Electric Power Group. We will continue in this way to actively develop new services to enhance the lives of our customers.

Toward improvement of customer service

To enhance our customer service, Kansai Electric Power is systematically expanding the installation of smart meters in tandem with Hapi e-Miruden, an online service that enables customers to monitor their electric power consumption at a glance.

Systematic expansion of smart meters

Kansai Electric Power continues to roll out the installation of smart meters, aiming for every home and low-voltage power customer to have a smart meter by 2022. We are also using the data obtained from smart meters to offer customers optimal pricing plans according to their patterns of electrical use.

Hapi e-Miruden enhancement and promotion

In place of the conventional meter-reading paper printout, Kansai Electric Power offers Hapi e-Miruden, a web-based tool that enables residential customers to monitor their power consumption and expenditures through graphs and charts.

Customers registering to use Hapi e-Miruden can review their electric power use and resulting CO₂ emissions for the past 24 months. Customers can also compare their lighting and heating costs and CO₂ emissions with comparable households, set energy conservation goals, and record the results of their efforts. These services allow customers to manage their energy consumption and conserve energy.

We will continue to work on the Hapi e-Miruden site to improve usability and expand services, promoting online monitoring to enhance the lives of many more customers.



Services for corporate customers

Kansai Electric Power promotes a variety of services, offering optimal energy systems and management methods designed to meet individual customer needs and help reduce energy consumption, costs, and CO₂ emissions.

For example, in collaboration with Kanden Energy Solution Co., Inc., one of our Group companies, we offer Utility Service and ESCO Service, which include energy facility design and construction, support for facility ownership, operation, maintenance, and management. We also offer our Energy Management Service to help customers optimize their energy use.