

# Progressive Approach to Environmental Problems

## Kansai Electric Power Group Environmental Action Plan

The Kansai Electric Power Group formulated the Kansai Electric Power Group Environmental Action Plan, which comprises three pillars: Initiatives contributing to the emergence of a low-carbon society; initiatives contributing to the emergence

of a society committed to recycling; and initiatives that form a trusted, environmentally advanced corporation. These initiatives have helped the entire Kansai Electric Power Group contribute to the emergence of a sustainable society.

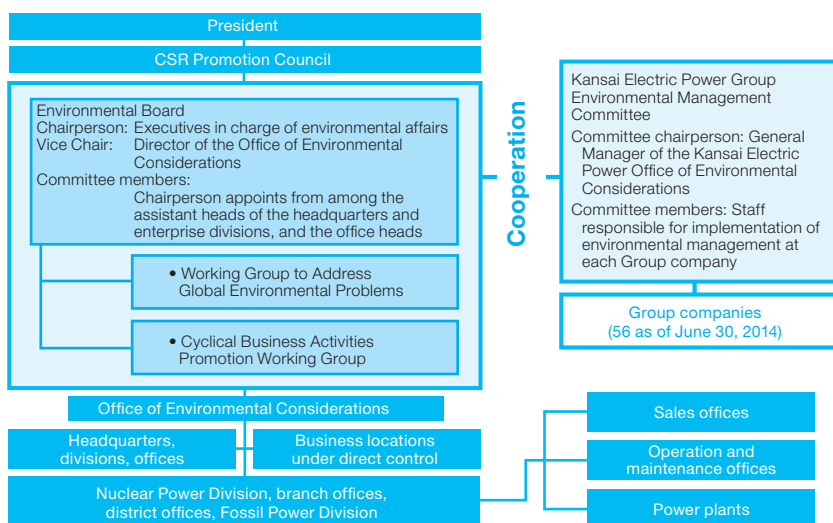


### Promoting environmental management on a Kansai Electric Power Group-wide basis

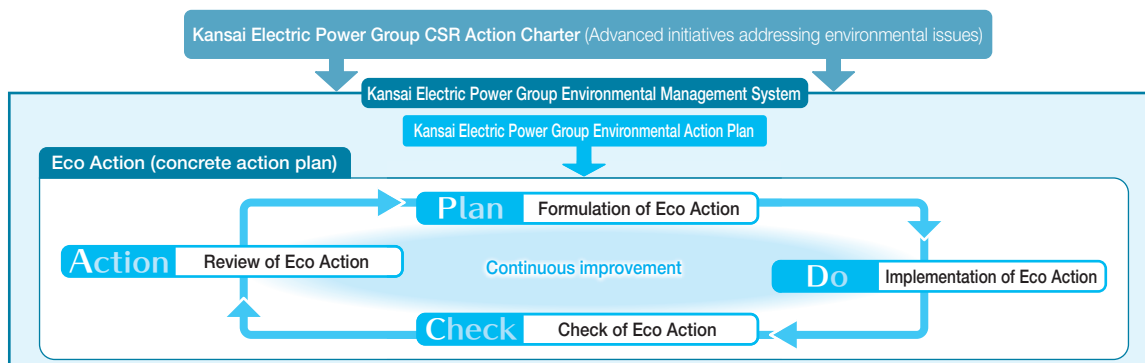
In an effort to reduce environmental impacts and environmental risks, we have begun establishing an environmental management promotion system across the entire Kansai Electric Power Group.

Kansai Electric Power has established an Environmental Board within its CSR Promotion Council. For the Group, we have established the Kansai Electric Power Group Environmental Management Committee, and are working to develop Eco Action measures and implement Check and Review, as well as comply with environmental law and other regulations.

#### ■ Environmental Management Promotion System of Kansai Electric Power and Group Companies

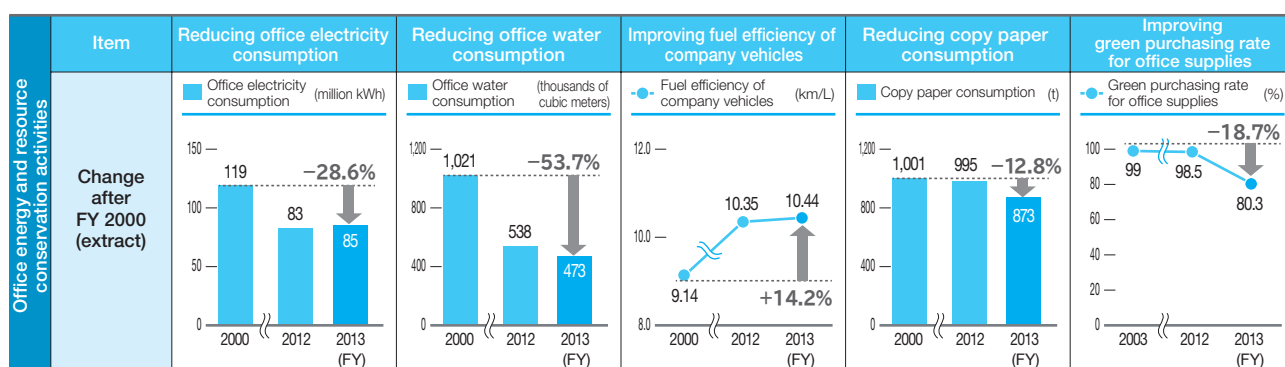


#### ■ Environmental Management System PDCA Cycle of the Kansai Electric Power Group



# Eco Action (annual targets and results)

Environmental efforts in business operations	Item		Initiatives and Results		Related page	
			Initiative	Result		
	Initiatives toward the realization of a low-carbon society					
	Promoting “safety first” operations at nuclear power plants		To steadily implement measures to prevent the recurrence of the accident at Mihama Nuclear Power Station Unit 3 and various safety measures in response to the Fukushima Daiichi Nuclear Power Plant accident. To continuously promote voluntary safety improvement measures that exceed the requirements of the regulatory framework.	Steadily implemented measures to prevent the recurrence of the accident at Mihama Nuclear Power Station Unit 3 and various safety measures in response to the Fukushima Daiichi Nuclear Power Station accident. Continuously promoted voluntary safety improvement measures exceeding the requirements of the regulatory framework. Reference: Facility utilization rate 10.9% Explanation: Reduced relative to the preceding year because only Units 3 & 4 of the Ohi Power Station have continued to operate under the special surveillance system.	33 34	
	Maintaining and improving the thermal efficiency of thermal power plants (lower heating value base)		To implement ongoing measures at existing thermal power generation facilities and operations while maintaining or improving thermal efficiency. To undertake the upgrading of the Himeji No. 2 Power Station to a combined-cycle power generation facility.	Implemented ongoing measures at existing thermal power generation facilities and steadily undertook the upgrading of the Himeji No. 2 Power Station to a combined-cycle power generation facility. Reference: Thermal efficiency 44.6% Explanation: Improved in comparison to the previous fiscal year thanks to increased operation of high-efficiency units by accelerating the facility upgrade work of the Himeji No. 2 Power Station.	34	
	Development and dissemination of renewable energies		To increase output at existing hydroelectric plants by updating facilities; develop new small- and medium-scale hydropower facilities; and construct mega solar power plants in the Wakasa region. To promote the development and adoption of renewable energy through the RPS system and a system of fixed-price purchases of power from renewable sources.	Promoted the development of renewable energy power plants and steadily accommodated minimum procurement based on the RPS system and purchased renewable energy based on fixed-price renewable energy power purchases. Reference: • Renewable energy development: 4 locations, 6,480 kW* • Achievement of RPS system minimum: 620 million kWh • Fixed-price renewable energy power purchased: 1.57 billion kWh	34	
	Promoting use of innovative forms of energy among customers and communities		To introduce, in the area of facilities, smart meters in our grid in order to increase customer awareness of energy conservation and a wider range of needs. To promote, in the area of services, the expansion of the web-based Hapi e-Miruden service supporting in-home energy management and viewing of energy consumption and billing status.	Promoted subscription growth of Hapi e-Miruden service and the adoption of smart meters through various channels during energy conservation consultations with consumer households; when phone calls were made to our call center; and through a public relations campaign promoted through television commercials, our website, and on the back of our meter-reading notice. Reference: • Total number of subscribers to Hapi e-Miruden service: 744,000	35 36	
	Limiting SF <sub>6</sub> emissions (calendar year basis) (gas recovery rate upon inspection/removal of equipment)		To prepare for appropriate implementation of a recovery system in future.	Steadily recovered SF <sub>6</sub> emissions through appropriate use of the recovery system when inspecting/removing equipment. Reference: 99.1% (upon inspection) 99.4% (upon removal)	—	
	Ratio of low-pollution vehicles** to all vehicles held		To systematically promote the future introduction of electric vehicles and plug-in hybrid vehicles while improving the rates of operation of the vehicles introduced. To continuously improve the ratio of low-pollution vehicles to all vehicles we have put into service.	Continuously promoted their introduction. Reference: 87.5% ratio for low-pollution vehicles	—	
	Electric vehicles and plug-in hybrid vehicles introduced			Systematically introduced such vehicles. Established model workplaces as a means of promoting their adoption. Reference: 334 electric and plug-in hybrid vehicles introduced (of which 60 were introduced in FY 2013).		
Initiatives toward the achievement of a sound material-cycle society						
Proper processing of PCB wastes		To safely and reliably process and recycle all PCBs by the legal deadline under proper management in accordance with the following trends: the development of processing technologies; and revision of relevant laws and regulations such as the Law Concerning Special Measures Against PCB Waste and related laws.	In accordance with the trend toward revision of laws and regulations and the development of processing technologies, we implemented safe and assured processing and recycling under appropriate management. Reference: Processed volume (cumulative total) Low-concentration PCBs: 77,464 kL High-concentration PCBs: 3,516 units***	38		
Initiatives toward a trusted, environmentally advanced corporation						
Maintaining sulfur oxide (SO <sub>x</sub> ) and nitrogen oxide (NO <sub>x</sub> ) emission levels proportional to the volume of power generated (emissions intensity)		SO <sub>x</sub> NO <sub>x</sub>	To seek to maintain one of the world's lowest emissions (emissions intensity) levels through the use of sulfur scrubbers and nitrogen scrubbers as part of our effort to “maintain sulfur oxide (SO <sub>x</sub> ) and nitrogen oxide (NO <sub>x</sub> ) emissions levels proportional to the volume of power generated.”  SO <sub>x</sub> : 0.062 g/kWh (overall)      Thermal: 0.077 g/kWh NO <sub>x</sub> : 0.087 g/kWh (overall)      Thermal: 0.108 g/kWh	Sought to maintain emissions (emissions intensity) levels through appropriate operation of sulfur scrubbers and nitrogen scrubbers. Reference: Emissions intensity SO <sub>x</sub> : 0.062 g/kWh (overall)      Thermal: 0.077 g/kWh NO <sub>x</sub> : 0.087 g/kWh (overall)      Thermal: 0.108 g/kWh	38	
Promotion of environmental household account books		To promote linkage to the Hapi e-Miruden service and the environmental household account book for ongoing use as tools for calculating household CO <sub>2</sub> emissions and promoting efforts to reduce such emissions.		• Linked to the Hapi e-Miruden service and the environmental household account book for use as tools to reduce household CO <sub>2</sub> emissions. • Implemented system integration with the Hapi e-Miruden service on April 2014. Reference: Number of registrants: 19,116	36	



\* Wakasa Ohi Solar Power Plant (500 kW, commenced operation in November)  
 \* Keihanna Solar Power Plant (1,980 kW, commenced operation in December)  
 \* NNS Takasago Solar Power Station (1,000 kW, commenced operation in March) [included in the development results of Group companies]  
 \*\* Low-emission Vehicles at a Practical Stage (including electric and hybrid vehicles) in the Action Plan for the Development and Diffusion of Low-emission Vehicles as formulated by the Ministry of Land, Infrastructure, Transport and Tourism  
 \*\*\* Electric equipment such as high-voltage transformers and capacitors  
 Future actions for each item are listed on the following pages.

## Initiatives contributing to the emergence of a low-carbon society

### Efforts to reduce CO<sub>2</sub> emissions and results

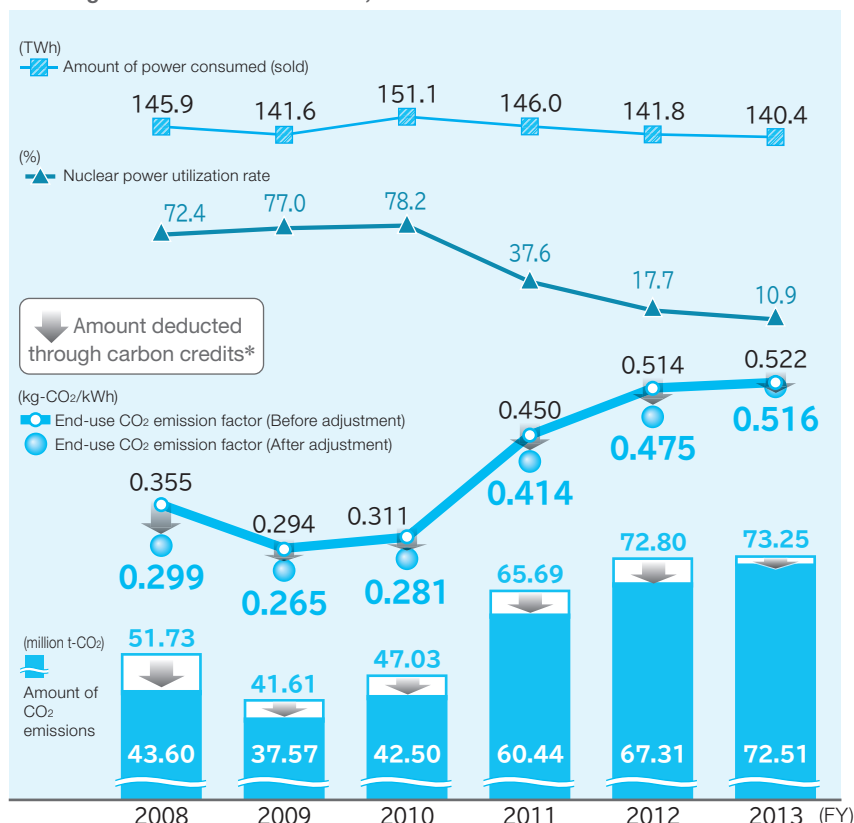
In the past, Kansai Electric Power has undertaken efforts to reduce CO<sub>2</sub> emissions through nuclear power generation; maintaining or enhancing the thermal efficiency of thermal power generation facilities; and developing renewable forms of energy.

As a result of the extended shutdown of nuclear power plants and accompanying increase in thermal power generation since fiscal 2011, our CO<sub>2</sub> emissions have also increased. After accounting for carbon credits, our CO<sub>2</sub> emissions for fiscal 2013 were 0.516 kg-CO<sub>2</sub>/kWh\*.

Kansai Electric Power will continue to promote a variety of efforts to reduce CO<sub>2</sub> emissions, particularly through the use of nuclear power, while maintaining a strong emphasis on safety.

\* Provisional value; the official actual value is released by the national government according to the Act on Promotion of Global Warming Countermeasures.

#### Changes in CO<sub>2</sub> Emission Factor, etc.



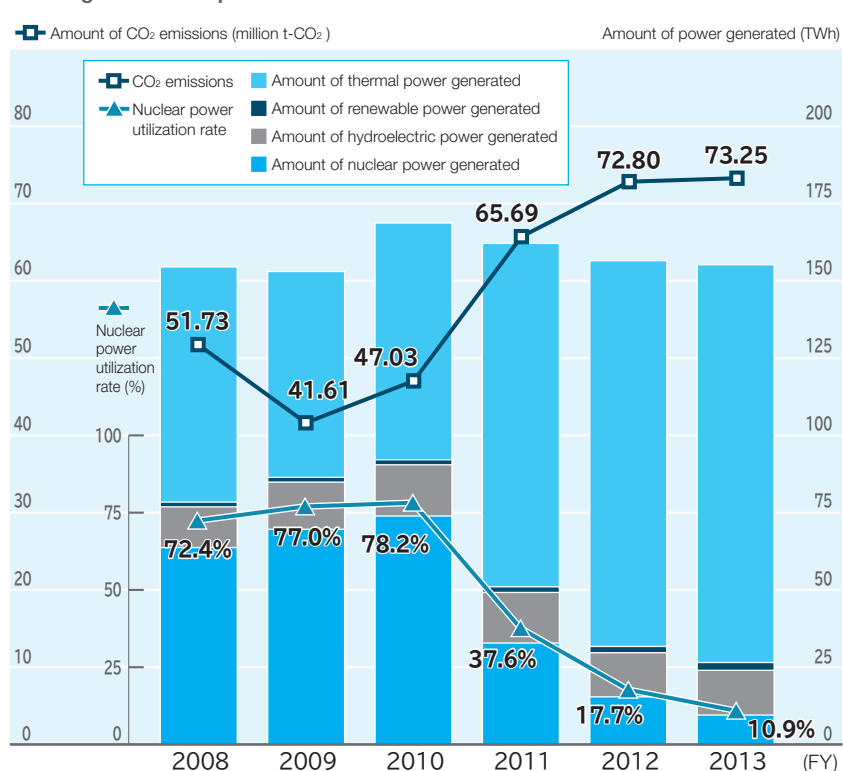
\* Values result from the GHG Emissions Accounting, Reporting, and Disclosure System as mandated by the Act on Promotion of Global Warming Countermeasures. Emission factors for FY 2011 and beyond after adjustment account for exclusions reflecting carbon credits as well as environmental value adjustments based on the purchasing system for surplus solar power and fixed-price purchases of renewable energy.

### Effect of nuclear power generation on controlling CO<sub>2</sub> emissions

Unlike thermal power generation fueled by hydrocarbons such as coal, oil, and natural gas, nuclear power generation emits no CO<sub>2</sub>; it is a method of power generation that contributes greatly to CO<sub>2</sub> emission control. Since the Great East Japan Earthquake, CO<sub>2</sub> emissions have risen significantly with the large drop in the availability of nuclear power generation and increased thermal power generation. The shutdown of nuclear power generation facilities has resulted in an extreme consequence, the release of tens of millions of tonnes of CO<sub>2</sub> annually.

We therefore believe that nuclear power, generated with an emphasis on safety, will be a very important source of power from the perspective of environmental issues, preventing global warming while ensuring energy security and economic growth in the future.

#### Change in nuclear power utilization rate and CO<sub>2</sub> emissions



Notes:

1. CO<sub>2</sub> emissions values shown do not include value of carbon credits or other factors.

2. The amount of power generated since FY 2010 (generating end) is the amount of power generated by our company; the amount generated up to FY 2009 (generating end) excludes power purchased from other companies.

## Lowering electric power's carbon intensity

**In addition to our efforts to support the restart of our nuclear power stations, we will continue to increase the efficiency of thermal power generation and promote the development and adoption of renewable energy. In this way, we will strive to lower the carbon intensity of the electric power we provide to our customers.**

### Nuclear power generation prioritizing safety

Since nuclear power generation emits no CO<sub>2</sub>, it is an important source of energy that does not contribute to global warming.

Kansai Electric Power is responding appropriately to the Nuclear Regulation Authority (NRA) to achieve a quick restart of our plants with safety assurances and with the understanding of residents of our local communities. As well, we are further enhancing safety by continuing to promote autonomous measures that exceed regulatory requirements.

### Maintaining and enhancing the efficiency of our thermal power plants

Kansai Electric Power is working to maintain or improve thermal efficiency in order to reduce the use of fossil fuels and thereby CO<sub>2</sub> emissions through the ongoing pursuit of appropriate measures in our thermal power generation facilities and operations. We aim to secure a source of power with an even lower carbon intensity while enhancing efficiency in the interests of improved competitiveness. Following the upgrading of the Sakaiko Power Station (5 units), we are working to convert the Himeji No. 2 Power Station, one of our largest natural-gas-fired thermal power plants, to a combined-cycle power plant (6 units) with advanced 1,600°C-class gas turbines. This will raise thermal efficiency from 42% to 60%, among the highest efficiency levels in the industry, which will accrue significant reductions in our CO<sub>2</sub> emissions and CO<sub>2</sub> emissions factor.

Full-scale construction was started in July 2010; as of August 2014, four updated units had already entered commercial operation.

### Development and dissemination of renewable energy

Like nuclear power, renewable forms of energy such as hydroelectric power, solar power, and wind power emit no CO<sub>2</sub> when generating power, making them effective energy sources for preventing global warming. Currently, Kansai Electric Power is developing about 100,000 kW of power generation, including expanded output at our existing hydropower plants, development of small and medium-scale hydroelectric power generation plants, and construction of solar and wind power plants. We are also promoting the adoption of this energy by accommodating the system of fixed-price purchases of renewable energy.

In short, by utilizing a good balance of varied energy sources, we are helping to lower the carbon intensity of electric power.

The electricity generated by solar and wind power fluctuates with the weather over a short time, however. This can result

in an unstable frequency, and any electricity that remains surplus to demand negatively affects the quality of electricity. Furthermore, the cost of power generation rises because the utilization rate of the power facilities is low; moreover, because the energy density of such sources is low, a much larger area and larger facilities are required for power station construction. We are promoting initiatives to overcome the issues of stability of supply and cost of power generation as we seek to expand and promote the adoption of renewable energy.

#### ● Solar power development

In November 2013, Kansai Electric Power began commercial operation of the Wakasa Ohi Solar Power Plant (500 kW) constructed in Ohi-cho, Fukui prefecture. Moreover, in December 2013, Kanden Energy Solution Co., Inc., a member of the Kansai Electric Power Group, started commercial operation of the Keihanna Solar Power Plant (1,980 kW) in Seika-cho, Kyoto prefecture. We are also building a 30,000 kW mega solar power installation in Arida, Wakayama prefecture. The Kansai Electric Power Group is expected to construct eight solar power plants in total while reducing annual CO<sub>2</sub> emissions by about 23,000 tonnes.



Keihanna Solar Power Plant

#### ● Wind power development

In May 2014, Kanden Energy Solution Co., Inc. began operating the Tahara No. 4 Wind Power Station in Tahara, Aichi prefecture. This, the Group's second wind power plant, uses three 2,000-kW installations to generate a total output of 6,000 kW. It was followed by the Awaji Wind Power Station (12,000 kW). These two wind power stations are expected to reduce annual CO<sub>2</sub> emissions by approximately 17,000 tonnes.

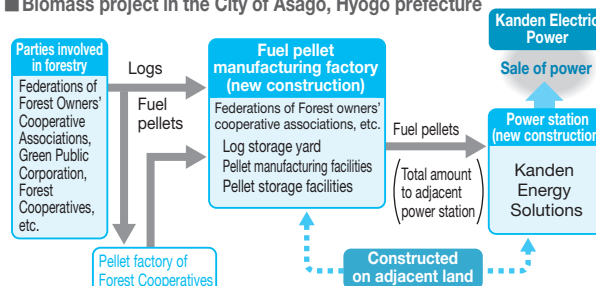


Tahara No. 4 Wind Power Station

#### ● Development of biomass power generation

Kansai Electric Power Group is planning a wood pellet biomass fuel project in cooperation with Hyogo prefecture, the City of Asago, the Hyogo Prefectural Federations of Forest Owners' Cooperative Associations, and Hyogo Midori Kosha (Green Public Corporation) in Asago. The Federations of Forest Owners' Cooperative Associations and the Green Public Corporation will collect, transport, and process the chips from wood obtained from forest thinning operations. Kanden Energy Solution Co., Inc. will use these pellets to operate a wood mono-fuel combustion biomass power plant with output of about 5,000 kW. We expect to reduce our annual CO<sub>2</sub> emissions by about 18,000 tonnes using trees that absorbed CO<sub>2</sub> emissions from the air as they grew.

#### ■ Biomass project in the City of Asago, Hyogo prefecture





## Technological developments for constructing the Kanden Smart Grid

**The Kansai Electric Power Group aims to contribute to the achievement of a low-carbon society and better usability for customers through the construction of a smart grid (next-generation electricity transmission and distribution network).**

### What is the “Kansai Electric Power Smart Grid”?

The Kansai Electric Power Group has positioned the smart grid as a key to achieving an efficient, high quality, reliable electricity transmission and distribution system, employing advanced information, communications, and storage battery technologies to achieve a low-carbon society and a better energy environment for customers without sacrificing the stability of the basic power grid.

### Meeting the challenges of large-scale renewable energy use

With large-scale or focused introduction of renewable energy, including solar power, into the electric power grid, the stability of the power grid can be compromised. Therefore, Kansai Electric Power is promoting R&D of countermeasure technologies, including systems for evaluating such impact, development of advanced voltage controls, and electricity supply and demand control technologies incorporating storage batteries.

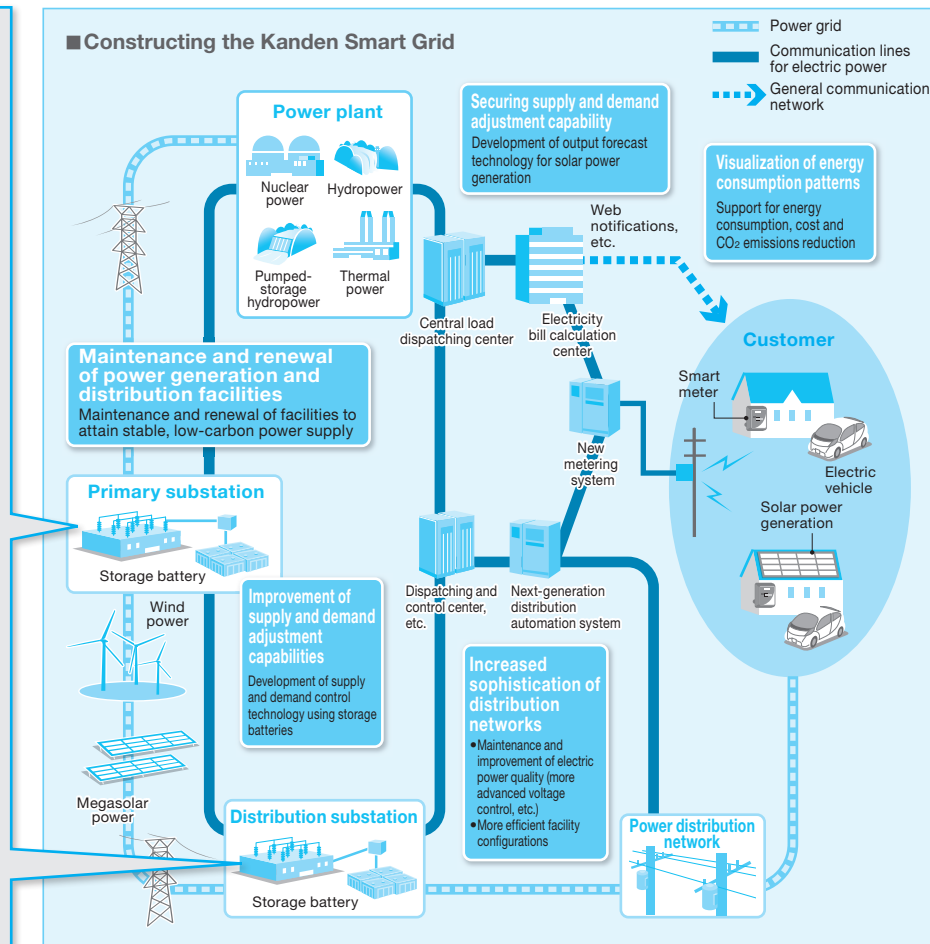
#### Development of supply/demand control technology using storage batteries

To support the mass introduction of solar power whose output fluctuates with the weather, we are conducting field tests using storage batteries that charge/discharge as part of our development of a supply/demand control system that maintains a fixed frequency for the power grid. Specifically, we are developing a control technology incorporating storage batteries to maintain a fixed frequency for the power grid while the storage batteries are connected to the power grid. At the same time, we are appropriately managing the residual power of the storage batteries. We have been evaluating the performance and lifespan of these storage batteries when used in such applications to determine their adequacy and effectiveness as storage batteries.



Storage batteries used in field tests

#### Constructing the Kanden Smart Grid



## Usability improvements for customers

### Smart meter introduction efforts

Kansai Electric Power is promoting the introduction of smart meters, which use fiber-optic networks and other means to more finely measure electricity consumption without requiring visits to customers' homes. We believe that this allows for more efficient facility configuration based on electric power use patterns as well as enhanced energy consulting services to customers.

### Collaborating with customers to stabilize supply-demand balance

As a means of reducing peak power use when the supply of electric power is low, we are developing measures such as requesting load adjustment through aggregators for customers using building energy management systems (BEMS) capable of adjusting loads by controlling building air conditioning, lighting, and other systems.

### Promoting graphic representation of energy use

We offer the web-based Hapi e-Miruden service, which charts energy use. By enhancing and disseminating such services, we are supporting energy efficiency, cost savings, and reduction of CO<sub>2</sub> emissions.

## Contribute to energy conservation, cost reductions and CO<sub>2</sub> reductions by customers and society

By enabling customers to use energy efficiently and comfortably, we are promoting contributions to reduced energy use, costs, and CO<sub>2</sub> emissions for customers and society. We are also promoting efforts to provide customers with useful services, as well as achieve energy conservation and reduced emissions at our worksites.

### Energy management activities

To achieve reduced energy use, costs, and CO<sub>2</sub> emissions, we are responding to customer demands for energy conservation with a wide range of appropriate products and services including renewable energy and high-efficiency systems utilizing heat pump technology. We thus provide total energy management support for customers and society.

#### ●Serving residential customers

We provide energy conservation consulting services, including Home Eco Diagnosis, a service offered in conjunction with the Ministry of the Environment. We also offer Hapi e-Miruden, a web-based tool that displays customer energy consumption. Through this and other useful services, we are promoting smarter use of electric power by our customers.

#### ●Serving corporate customers

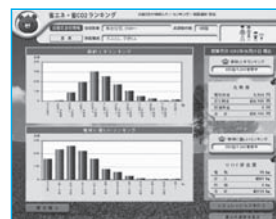
We provide our customers with total energy management support by listening closely and offering advice concerning optimal energy systems and their use. In addition, we work with other Group companies to offer a range of services including energy conservation diagnosis and energy management support appropriate for the customer's facility usage patterns. In the future, we will promote such initiatives while contributing to energy conservation, cost savings, and reduced CO<sub>2</sub> emissions among our customers.

### Hapi e-Miruden power consumption monitor

Customers visiting Kansai Electric Power's website can access our Hapi e-Miruden site, where they can monitor their electric power use in graphic form. This feature enhances understanding of energy conservation, cost reduction, and reduction of CO<sub>2</sub> emissions. Customers using this service can review their electric power consumption and resulting CO<sub>2</sub> emissions for the preceding two years as well as their ranking among other users for electric power cost and CO<sub>2</sub> emissions. The Hapi e-Miruden report provides a smart way to control future energy consumption by revealing past consumption of electric power. In addition, the environmental household account book calculates total household CO<sub>2</sub> emissions by allowing for input of gas and oil rates and the like. This information can be used for management of not only electricity consumption but also overall energy consumption.

At the end of July 2013, we began a service that enables customers to check their total energy use and billing status, a service that is even available to customers with multiple

service agreements. This feature enables users to centrally manage multiple service agreements. In the future, we will provide services allowing access to a variety of information on electricity use and energy conservation. We remain committed to supporting our customers' energy management in order to aid in energy conservation, cost reduction, and reduced CO<sub>2</sub> emissions.



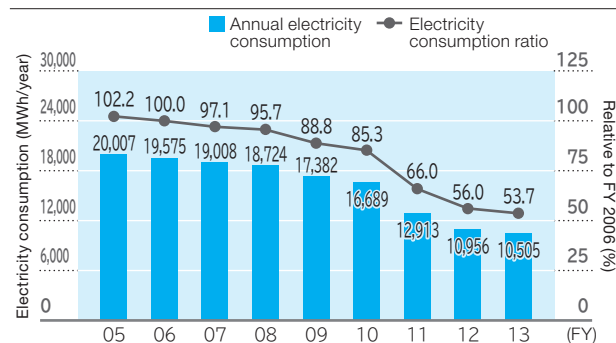
Web **Hapi e-Miruden**  
<http://www.kepco.co.jp/home/service/miruden/>

### Energy conservation and CO<sub>2</sub> emission reduction at bases of operation

#### ●Energy management at bases of operation

To reduce energy consumption at our business locations, we implemented energy management at major locations in 2007. We measure energy use in each building by type and time of use, and use the resulting data to formulate and implement effective energy conservation measures. In FY 2013, thanks to a company-wide energy conservation effort continued from the preceding year, we succeeded in reducing energy consumption by 4% year-on-year and 46% compared to FY 2006, the year before we launched these initiatives. We will maintain these initiatives in order to promote further energy conservation at our business locations.

■Electricity Consumption at Business Locations Utilizing Energy Management (18 locations)



Notes:  
 • Electricity consumption is corrected for air temperature.  
 • From FY 2011 to 2013, the reduction achieved through energy conservation is included.

## Overseas activities

**Utilizing the technological capabilities, knowledge and expertise that we have gained through years of operation as an electric power supplier, the Kansai Electric Power is undertaking a wide range of activities outside Japan to contribute to the mitigation of global warming on a worldwide scale.**

### International Projects

With the Rajamandala hydroelectric power generation project in Indonesia, we are engaged in the on-site construction of a 47,000-kW hydroelectric power station. Because this hydro power station requires the discharge water from a peak correlating dam power station located in the upper reaches, it can generate electricity during peak load times. Therefore, it can substitute for part of the thermal power being generated to serve the increased demand during peak load and can thus contribute to reduced CO<sub>2</sub> emissions.

Kansai Electric Power and other companies purchased shares in Senoko Energy Pte Ltd, Singapore's largest electricity supplier. Construction was undertaken to update the facilities and convert the Senoko Power Station's oil-fired steam thermal power plants, with a total capacity of 750 MW (250 MW x 3 units), with combined-cycle natural gas turbines with a total capacity of 860 MW (430 MW x 2 units); this work was completed in 2012. This power project will benefit the environment by contributing to efficient energy use and will result in major reductions in CO<sub>2</sub> emissions.

## Assistance for developing nations

The Global Sustainable Electricity Partnership is an organization of the world's leading electric power companies that promotes sustainable energy development. As a partnership member, Kansai Electric Power has participated in a range of assistance for developing nations and eco-projects, including a small-scale hydropower project for Bhutan and a solar power project for Tuvalu and Maldives.

In 2012, we held a workshop for electric power company technicians from Pacific island nations with a focus on the theme of improving energy efficiency. In 2014, we held a workshop on the Rate System to contribute to the further adoption of sources of renewable energy in Fiji in the South Pacific.

These efforts have been ongoing since 2005 and have emphasized renewable energy and energy conservation. To date, a total of eleven workshops have been held. In this manner, Kansai Electric Power is helping island nations meet the numerous challenges that they face with technology transfers and human development programs, and contributing to the solution of global problems, particularly global environmental problems.



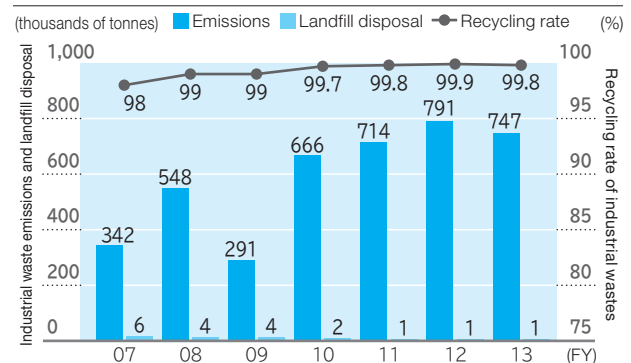
Workshop for Pacific island nations

## Initiatives contributing to the emergence of a society committed to recycling

### Efforts to achieve zero emissions

With the goal of achieving zero emissions, Kansai Electric Power has been promoting the recycling of industrial waste generated by our business operations; specifically, we have targeted an industrial waste recycling rate of at least 99.5%. The principal types of waste generated by Kansai Electric Power include coal ash from coal-fired thermal power plants and concrete pole fragments remaining from power grid construction. We are committed to recycling rather than burying this waste. As a result, we achieved a 99.8% recycling rate for industrial and other waste in FY 2013, which marks the fourth consecutive year that we have reached our target. Going forward, we will strive to maintain our goal of zero emissions. We are also working to reduce and recycle general waste, such as printer paper, produced by our offices.

### Changes in Emissions and Recycling Rates for Industrial Wastes



### Main Applications of Recycled Industrial Waste, etc.

Type of industrial waste	Recycling rate	Main recycling applications
Metal scraps	99.8%	Metal recovery
Demolition debris (Waste concrete utility poles, etc.)	99.5%	Roadbed materials
Soot (Coal ash, heavy oil ash, etc.)	100%	Cement raw materials
Sludge (Desulfogypsum, wastewater processing sludge, etc.)	99.5%	Construction materials
Cinders (Coal ash, heavy oil ash, etc.)	100%	Rare metal recovery
Waste oil	100%	Fuel

## Polychlorinated Biphenyl (PCB) waste processing

Kansai Electric Power complies strictly with the Law Concerning Special Measures Against PCB Waste and related laws, and promotes safe, reliable disposal based on the special characteristics of the PCB waste involved.

Kansai Electric Power uses a range of methods for dealing with the disposal of electrical equipment containing minute amounts of PCBs. We established the Recycling Center for Utility Pole Transformers to render insulating oil and transformer cases harmless and suitable for recycling. We completed processing of stored insulating oil at the end of June 2013, while processing of transformer cases is expected

to be completed by the end of 2015. For other equipment, we are promoting effective processing using technologies from our Group companies, in part by using movable weld cleaning technology for larger equipment with Kanden Engineering Corp. We are also using the thermal disposal technology of KANDEN GEO-RE Inc. for PCB waste.

In keeping with the government plans, we have commissioned Japan Environmental Safety Corporation (JESCO) to process waste containing high concentrations of PCB insulating oil.

## Initiatives that form a trusted, environmentally advanced corporation

### Promotion of community environmental protection measures

**Kansai Electric Power has adopted comprehensive efforts to protect the environment of local communities, specifically by addressing air pollution, water contamination, asbestos contamination, and maintenance of biodiversity. We also take appropriate measures to prevent chemical substances from harming people and the environment.**

### Environmental protection measures at power plants

At our power plants, we undertake measures based on laws, local regulations, environmental protection agreements and other rules to reduce air pollution, water contamination, noise, vibrations, and other problems. In addition, we monitor and measure the air and ocean around our power plants and carefully evaluate the environmental effects of our operations on the regional environment to ensure that no problems occur.

### Air pollution prevention measures (NOx, SOx, soot)

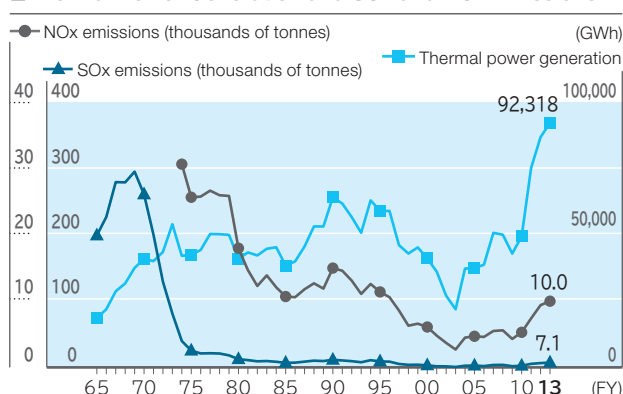
Kansai Electric Power has implemented measures aimed at reducing the volume of SOx (sulfur oxides) emitted by our thermal power plants by using low-sulfur fuels, installing sulfur scrubbers, and other measures.

To address the issue of NOx (nitrogen oxides), we are taking steps to lower emission levels, such as improving combustion methods and installing nitrogen scrubbers.

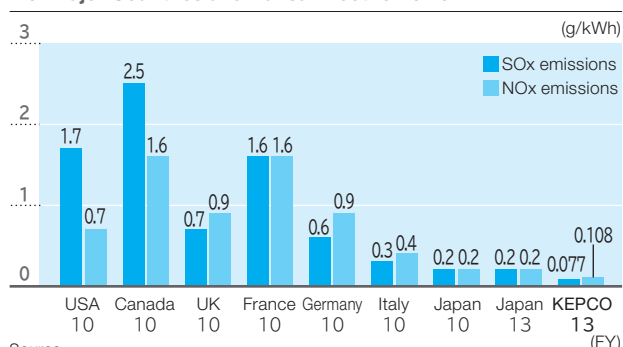
As a result, our SOx and NOx emissions per unit of electric power generated are significantly lower than those of the major countries of Europe and North America, remaining among the lowest in the world.

In addition, we have installed high-performance electric filters that dramatically cut soot emissions.

■ Thermal Power Generation and SOx and NOx Emissions



■ SOx and NOx Emissions per Unit of Thermal Power Generated of Major Countries and Kansai Electric Power



Source: Overseas: Emission amounts: OECD.StatExtracts Complete databases available via OECD's iLibrary  
Amounts of electric power generation: IEA, Energy Balances of OECD Countries 2012 Edition  
Japan figures: Federation of Electrical Power Companies of Japan (10 electric power companies and Electric Power Development Co., Ltd.)

### Addressing the issue of asbestos

Kansai Electric Power periodically monitors the condition of buildings and facilities identified as containing asbestos and manages them appropriately. We continue to implement carefully planned measures to remove this asbestos and replace it with alternative materials. We will continue to address this issue while observing relevant laws and regulations.



## Promoting environmental communication

Committed to the proactive release of environmental information and the promotion of a sustainable society, Kansai Electric Power is not only addressing various ecological issues, but also actively working with customers and the regional community to raise environmental awareness.

### Information disclosure on our website

Our website serves as an information resource for the range of environment protection initiatives in which we are engaged. Specifically, our website content includes sections titled "Environmental Initiatives" and "Environmental Report." The website broadly introduces each of our initiatives intended to contribute to the emergence of a society committed to recycling and low carbon emissions.

### Community environmental initiatives undertaken in cooperation with local governments

Kansai Electric Power emphasizes community environmental initiatives hand-in-hand with local governments and other local entities. Specifically, we participate in environmental events and cleanup activities hosted by local governments and cooperate in environmental education projects at local schools.



Planting sweet potato seedlings  
at Gobo Thermal Power Plant

### Initiatives for Kansai Electric Power Group Environment Month

June is Environment Month at Kansai Electric Power Group, a time when our entire Group engages in activities such as community cleanups, tree planting, exhibiting at environmental events, and conducting on-site environmental classes at schools. Our Group remains dedicated to continuing such environmental initiatives in future.

## Promoting environmental management

By maintaining an environmental management system in conformity with the ISO 14001 international standard for Environmental Management Systems (EMS), we are strictly complying with environmental law. At the same time, we are taking additional steps to reduce the environmental impact of our business operations through continuous improvements, developing the Eco Action initiative, and enforcing checks and reviews.

### Environmental management activities of our group companies

Our Group companies carry out environmental initiatives, including those targeting reduced environmental impacts. Eco Action, a common initiative of our Group companies, is a concrete action plan that is formulated every year. The environmental management committees of the Kansai Electric Power Group also conduct a check-and-review process.

### Observance of laws and regulations

In FY 2013, we experienced phenomena exceeding the agreed environmental conservation levels: the nitrogen oxide (NOx) density temporarily exceeded regulatory limits as a result of a facility malfunction at the Maizuru Power Station; and the intake and discharge water temporarily exceeded the regulatory temperature difference as a result of a sudden influx of cold water through the intake of the Gobo Power Station. However, no impact was identified in the environmental impact evaluation.

Kansai Electric Power is taking thorough measures to prevent a recurrence of this type of incident. Going forward, we will ensure strict compliance with environmental laws.

**Web** **Kansai Electric Power Environmental Activities**  
<http://www.kepco.co.jp/corporate/kankyoku/index.html>

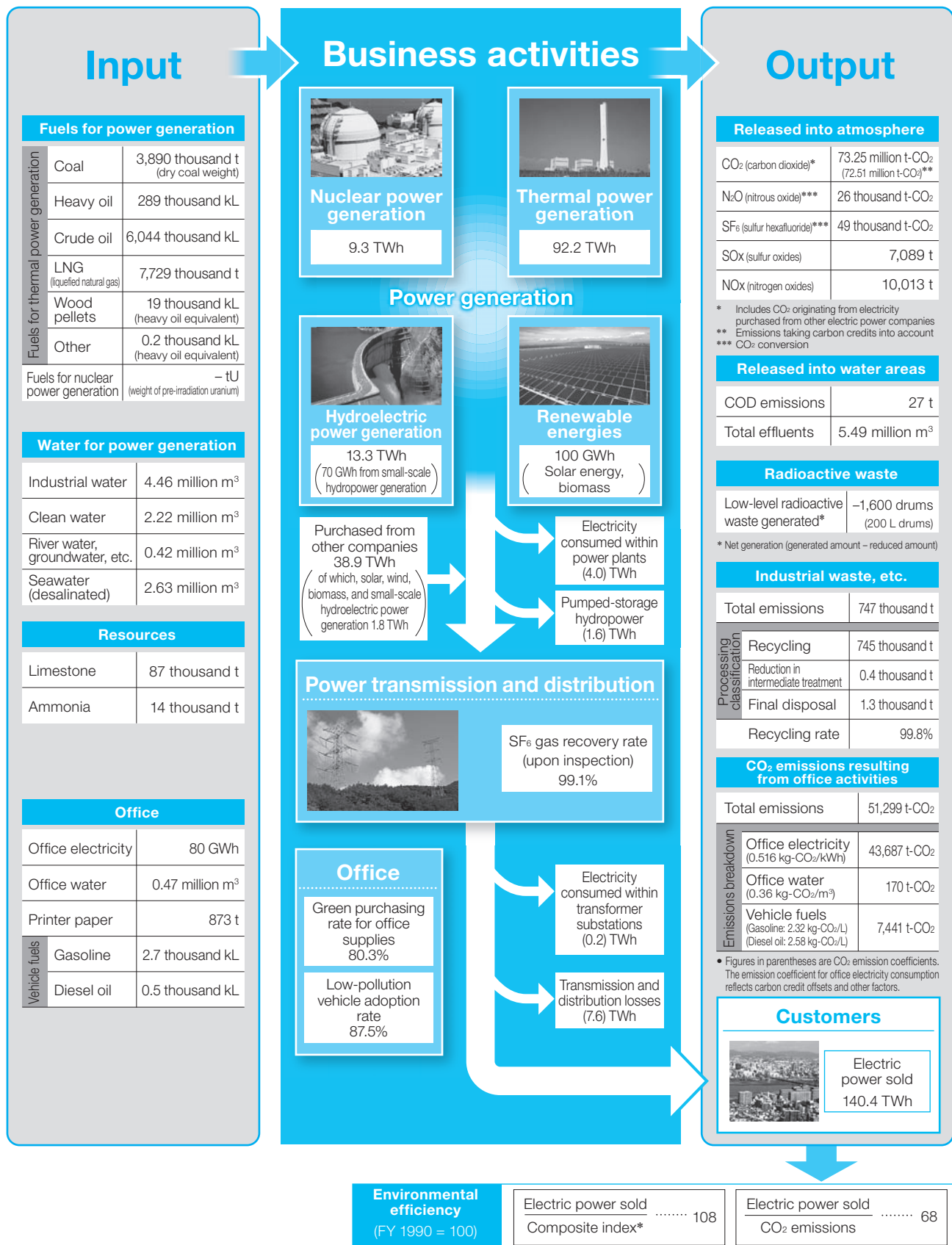
**Web** **Environmental Report**  
<http://www.kepco.co.jp/corporate/kankyoku/report2014/index.html>

#### ■ Eco Action: Kansai Electric Power Group Company Concrete Action Plans

Item	Results for FY 2012*	FY 2013		Evaluation (Reasons for increase/reduction)
		Targets	Results*	
Reducing office electricity consumption	40.4 GWh	Continuing energy conservation efforts	34.5% increase from previous year 54.4 GWh	Despite the energy conservation efforts of individual offices, consumption of electricity increased due to an increase in the number of business locations in some Group companies, and overall Group electricity consumption increased year on year. Reference: Generated 39.6 GWh in both FY 2012 and FY 2013 (excluding companies that added more offices).
Reducing office water consumption	272,200 m <sup>3</sup>	1% or more reduction compared to the previous fiscal year	1.3% reduction from previous year 268,600 m <sup>3</sup>	Outer wall construction of the office and measures to combat heat stroke led to an increase in water consumption by some Group companies, but thanks to water conservation efforts at individual offices, year-on-year Group water consumption declined overall.
Improving fuel efficiency of company vehicles	8.67 km/L	1% or more improvement compared to the previous fiscal year	3.2% improvement relative to previous year 8.94 km/L	Because each Group company worked diligently to observe practices such as eco-friendly driving and reduced idling and implemented efforts to improve mileage through the introduction of energy-efficient vehicles, overall Group fuel efficiency improved compared with the preceding year.
Reducing printer paper consumption	990.1 t	Reduce as much as possible	0.9% decrease compared with the previous fiscal year 980.9 t	Despite an overall expansion in the number of business locations and an increase in work volume, efforts to reduce the use of paper, such as printing on both sides of a sheet and digitizing conference materials, Group use of paper declined overall year-on-year.
Green procurement of printer paper	90.4% green procurement rate	100% green procurement rate	3.9% decline compared with the previous fiscal year 86.5%	Because of an increase in the work volume of offices not yet implementing green procurement, the overall Group green procurement rate decreased over the previous year. Nonetheless, about 90% of Group companies were able to achieve 100% green procurement.

\*The calculation of results covers 46 companies in FY 2012 and FY 2013.

# Status overview of our business activities and environmental load (FY 2013)



Note 1: This table contains non-consolidated figures for Kansai Electric Power Co., Inc. only.

Note 2: Totals may not sum due to rounding.

Note 3: Thermal power generation figures do not include biomass power generation.