

## 2 Measures for Global Environmental Issues★

### 1 Measures taken on the power supply side for greenhouse gas★ reduction

CO<sub>2</sub>★ comprises approximately 90% of the greenhouse gases★ emitted in Japan and approximately 25% of CO<sub>2</sub>★ is attributable to the electric power industry.

- Kyushu Electric Power's CO<sub>2</sub>★ emissions in fiscal 2003 amounted to 23.9 million t-CO<sub>2</sub>★ or approximately 2% of the total amount of CO<sub>2</sub>★ generated in Japan.
- During the 13 years since fiscal 1990, Kyushu Electric Power's electricity sales increased by 40%, while CO<sub>2</sub>★ emissions have remained at 96%.
- This was due mainly to the balanced development of energy sources using nuclear power as the core resources, combined with LNG★ thermal, hydroelectric, geothermal and other natural energy sources★. This was also due to the mitigation of CO<sub>2</sub>★ emissions per kWh through efforts to enhance the nuclear power capacity factor★ and overall thermal efficiency★ by applying highly-efficient thermal power facilities. Above all, the development of two nuclear power stations (2.36 million kW) greatly contributed to the reduction.

- Through these efforts, CO<sub>2</sub>★ emissions per kWh consumed by customers, i.e. CO<sub>2</sub>★ emissions intensity★ (end use electricity), decreased by 31% compared to fiscal 1990. This shows that the CO<sub>2</sub>★ emitted from general households was reduced by approximately 470kg-CO<sub>2</sub>★ per year compared to fiscal 1990.

Note: The above figures are estimated on the assumption that Kyushu's average power consumption of 280 kWh/month (fiscal 2003 records) under lighting contracts (Residential Lighting A and B) equals the electric consumption of general households.

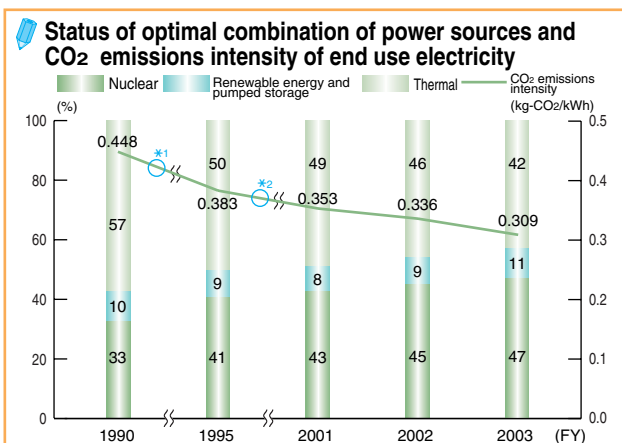
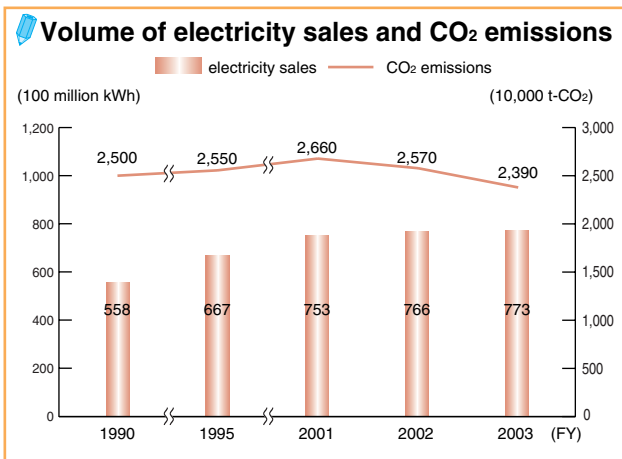
#### Promotion of optimal combination of power sources focusing on nuclear power★

Kyushu Electric Power is committed to CO<sub>2</sub>★ emission reduction through the optimal combination of power sources★ by promoting a balanced development of nuclear power, as the core, and other sources, placing the utmost emphasis on stability, economy and environmental conservation★ in power supply. In addition, the company works to develop and introduce new energy★ sources.

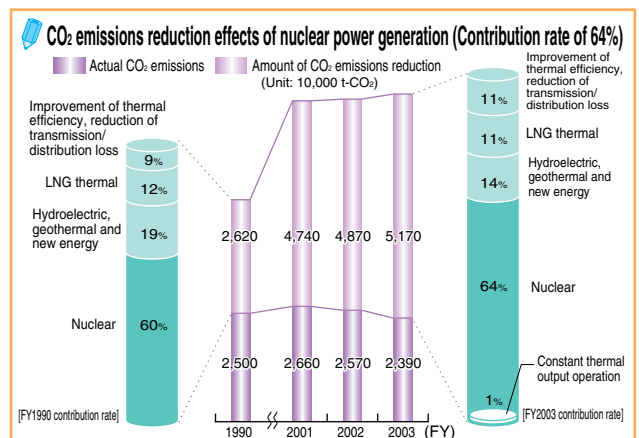
Nuclear power generation, which accounts for 47% of the total power generated, is a CO<sub>2</sub>★ emission-free generation system and contributes greatly to the reduction of CO<sub>2</sub>★ emissions. Improving the nuclear power capacity factor★ therefore leads to a reduction in the overall volume of CO<sub>2</sub>★ emitted from the power supply.

The nuclear power capacity factor★ for fiscal 2003 was improved by 3.0 percentage points from the previous year, which resulted in a reduction of 1.8 million tons of CO<sub>2</sub>★ emissions. This is due mainly to constant cycling at rated thermal output★ (improved by 0.7 percentage point) and reduced shutdown periods for periodic inspections★ (improved by 2.3 percentage points) during the year.

However, we assume that CO<sub>2</sub>★ emissions will increase in the future since power demand grows slowly but constantly. Future nuclear power development is vital to achieve both CO<sub>2</sub>★ emissions reduction and a stable power supply.



\*1: Genkai Nuclear Unit 3 started operating in Mar. 1994  
 \*2: Genkai Nuclear Unit 4 started operating in Jul. 1997

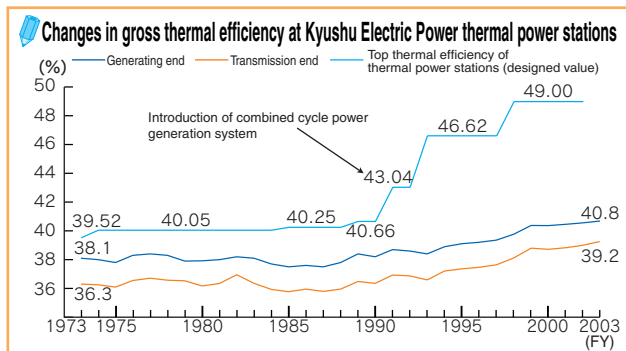


Note: The amount of CO<sub>2</sub> reduction was calculated on the assumption that electricity generated from nuclear, hydroelectric, new energy and LNG was produced only with thermal power generation excluding LNG.

## Improvement of power generation facility efficiency

Kyushu Electric Power strives to improve the thermal efficiency\* of its thermal power stations to use energy resources effectively.

- The thermal efficiency\* improvement of thermal power stations will decrease fuel consumption, resulting in a reduction of CO<sub>2</sub>\*, SO<sub>x</sub>\* and NO<sub>x</sub>\* emissions.
- The total thermal efficiency\* of thermal power stations in fiscal 2003 reached the highest level. This is attributed to the operational start-up of the new and the highly-efficient Reihoku Thermal Power Station Unit 2 and the greater use of power stations with high thermal efficiency including the Shin-Oita Power Station, which features the combined cycle power generation system\*.
- If the total thermal efficiency\* at Kyushu Electric Power's thermal power stations improves by one point, the company's annual emissions can be reduced by about 400 thousand tons of CO<sub>2</sub>\*.



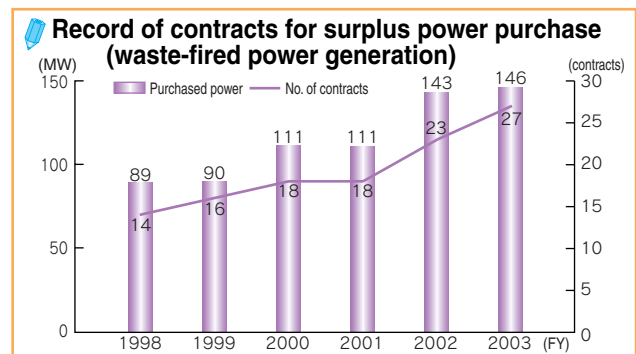
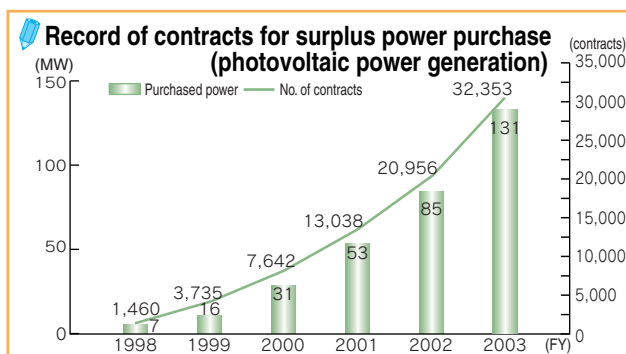
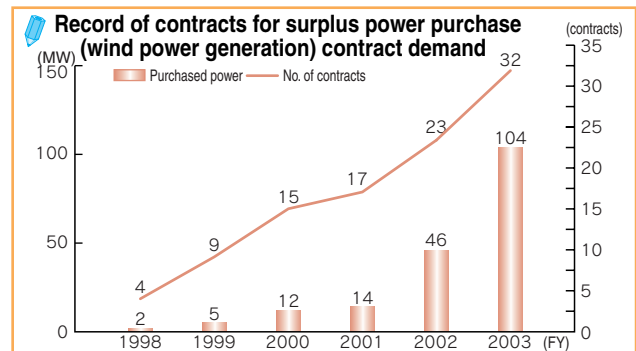
## 2 Promotion of use of renewable energy sources\*

### Promotion of wind and photovoltaic power generation

New energy\* sources such as wind and photovoltaic power are clean and inexhaustible energy, although there are still hurdles to be cleared. Obstacles include their high weather dependency, low energy density and high generation costs.

- Kyushu Electric Power has systematically installed wind and photovoltaic power plants and conducted experimental studies while implementing fuel cells development. The company also purchases electricity from suppliers and offers monetary support to suppliers who will install new energy\* facilities.
- Through the above efforts, the company's power generation utilizing new energy\* sources achieved 390 million kWh in fiscal 2003, the year's target value set out under the RPS\* (fully implemented in April 2003).

\*Renewable Portfolio Standard (Law on Special Measures Concerning New Energy Use by Electric Utilities)\*



## COLUMN NO.2 Efforts towards the acquisition of the EcoLeaf\* (environmental labeling) certification

Kyushu Electric Power is striving to acquire the EcoLeaf\* certification for the power supply provided for our customers. The EcoLeaf\* program is promoted by the Japan Environmental Management Association for Industry under the Ministry of Economy, Trade and Industry (METI). In the program, quantitative product information on environmental load, including CO<sub>2</sub> emissions, will be calculated by the LCA\* (life cycle assessment) method and will be released to the public after approval by independent verifiers appointed. Acquisition of EcoLeaf\* certification will help Kyushu Electric Power to promote the eco-friendliness of our electricity supply.

### ◇ In-house installation of wind and photovoltaic power generation facilities

Kyushu Electric Power has installed power generation facilities utilizing wind and solar power on its premises. The total capacity of all facilities reached 3,575 kW by the end of fiscal 2003.

#### Wind and photovoltaic power generation

		Installed capacity (kW)	Power generated (thousand kWh)	Capacity factor (%)
Wind power	FY2002	3,250 (11 units)	6,148*	21.6*
	FY2003	3,250 (11 units)	5,681	19.9
Photovoltaic power	FY2002	325 (21 facilities)	229	8.2
	FY2003	325 (21 facilities)	193	6.9

\*The sum includes 1,500kW generated from the trial run of five 300kW units, whose commercial operation started on March 20, 2003.

### ◇ Purchase of electricity from customers

Kyushu Electric Power purchases surplus electricity generated at customers' power generation facilities utilizing new energy\* sources, considering its environmental value in addition to its value as electricity.

- Conditions for purchasing surplus power\* generated by new energy\* sources were reviewed in April 2003 on the full enforcement of the Renewable Portfolio Standard\*.   
(See the company website for details: [www.kyuden.co.jp/company/kigyo/elec\\_buy/index.html](http://www.kyuden.co.jp/company/kigyo/elec_buy/index.html))
- Contract demand as of the end of fiscal 2003 consisted of 104 MW for wind generation (32 contracts), 131 MW for photovoltaic methods (32,353 contracts) and 146 MW for waste-fired power generation (27 contracts).

### ◇ Support and subsidy for wind and photovoltaic power generation (Green Electric Power System\*)

Kyushu Electric Power actively promotes natural energy sources\* through contributions to the Kyushu Green Power Fund (founded in October 2000, managed by the Kyushu Industrial Advancement Center (KIAC)\*), which provides support to solar and wind power generation facilities.

- The Green Electric Power System attracted 12,126 shares as of the end of March 2004, which accounts for a participation ratio\* of 0.193%. This ratio is relatively high, which shows the Kyushu region is blessed with more sunshine and favorable wind conditions compared to the other regions in Japan.   
\*The participation ratio is calculated by dividing the number of shares purchased by the number of electric light contracts.
- Kyushu Electric Power decided to subsidize a total of approximately 154 million yen for a three-year period ending fiscal 2003.
- The company donates an amount equal to customer contributions (one share: 500 yen/month) in addition to promoting the system, receiving applications and withdrawing contributions from customers' bank accounts on behalf of the KIAC.



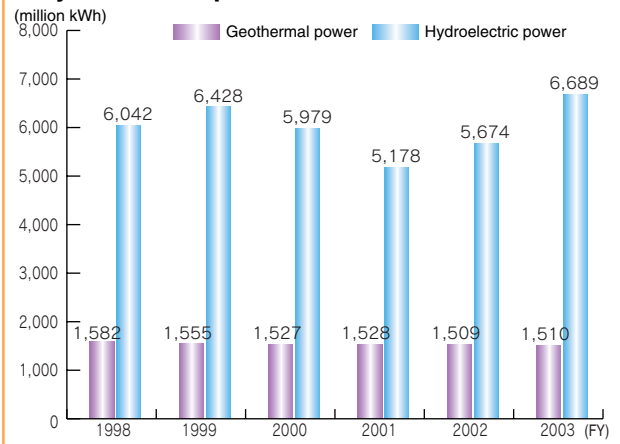
Kushizaki Wind Power Station in Chinzei Town, Higashi-matsuura-gun, Saga Pref. (1,980 kW, subsidized in FY2003)

### Promotion of geothermal and hydroelectric power generation

Both geothermal and hydroelectric power are valuable energy sources available in Japan. Power generation from these sources is CO<sub>2</sub>\* emission-free, eco-friendly technology.

- Kyushu Electric Power pursues the effective use of geothermal and hydroelectric power generation as use of such power sources inherently requires the alteration of the natural environment, while paying due attention to the conservation of natural landscapes and surrounding environments.
- Kyushu Electric Power's geothermal generation facilities consist of 38% of the national installed capacity, taking advantage of Kyushu's rich geothermal energy. Binary cycle power generation\* facilities, which can generate power with steam or hot water at lower temperatures than conventional systems, were installed at the Hatchobaru Power Station, which began operating for demonstration tests in February 2004.

### Power generated with geothermal and hydroelectric power



Note: The sum of hydroelectric power includes power purchased from other companies.

## VOICE ②

### Commencing test operation of binary cycle power generation facilities for experimental studies



Geothermal Power Group, Thermal Power Dept.

Tsuyoshi Takafuji

Our Group is engaged in conducting experimental studies on the binary cycle power generation facilities at the Hatchobaru Power Station (Kokonoe Town, Kusu, Oita Pref.) aiming for the practical use of the facilities. In binary cycle power generation, electricity can be generated with the use of steam or hot water at lower temperatures than those used in conventional systems. Israel provided most of the components for the facilities as well as specialists to assist in our installation. The facility installation was implemented from August 2003 to February 2004, sometimes under the severe condition of freezing temperatures, and the operation for experimental studies finally began after the test run. Geothermal power can be fully obtained in Japan and is an eco-friendly source of power generation. We will make continuous efforts to make extensive use of geothermal energy.



Binary cycle power generation facilities

### 3 Measures for energy conservation

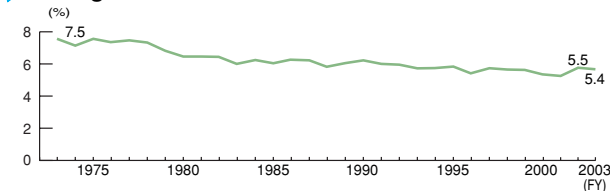
Kyushu Electric Power believes that energy conservation is not simply a matter of making choices about energy reduction but of using energy efficiently and without waste.

#### Reduction of transmission/distribution loss\*

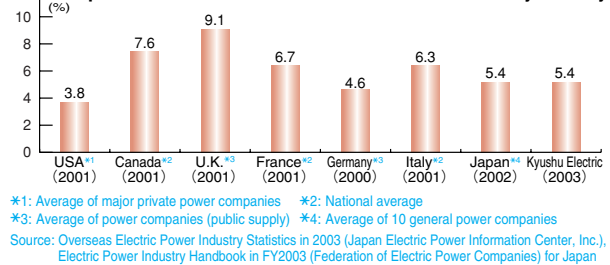
Kyushu Electric Power strives to conserve energy by reducing transmission/distribution loss\*, or the energy lost between power stations and customer premises.

- The transmission/distribution loss\* for fiscal 2003 improved by 0.1 percentage point from fiscal 2002.

#### Changes in transmission/distribution loss factor



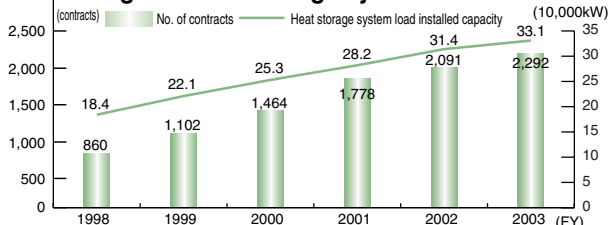
#### Comparison of transmission/distribution loss factor by country



#### Encouraging the use of heat storage systems\* and heat-pump water heaters\*

Kyushu Electric Power encourages the use of heat storage systems\* and heat-pump water heaters\* to make energy use as efficient as possible. Increased use of the equipment, which utilizes nighttime electricity with lower CO<sub>2</sub>\* emissions, contributes to a reduction in CO<sub>2</sub>\* emissions. In addition, it helps to minimize the difference in power demand between daytime and nighttime (load equalization), resulting in the improved operational efficiency of power stations as well as a reduction in distribution and transmission loss\*. The company also provides useful information to our customers, including consultation on the efficient use of energy to promote energy conservation.

#### Changes in heat storage system contracts



#### Heat storage system\*

- Through heat storage systems\*, the cold and thermal energy necessary for air conditioning in buildings and factories is stored in a heat storage tank in the form of ice or warm water by using cost-effective nighttime electricity and is used during the daytime. The number of contracts for such heat storage systems\* at the end of fiscal 2003 was 2,292, with a total load installed capacity of 331,000 kW.

#### Heat-pump water heater\*

- “Eco-Cute\*\*\*” is a heat-pump type electric water heater\* using CO<sub>2</sub>\* found in the environment as refrigerants. It is three times as efficient as conventional water heaters and achieves high economical benefits by utilizing nighttime electricity. This is a water heater of the 21st century that realizes energy conservation and coexistence with the natural environment.

#### Conserving energy in everyday business operations

All employees at Kyushu Electric Power practice energy saving in their everyday work practices.

#### Reducing power consumption in offices

Energy conservation activities are conducted both in terms of electricity usage (e.g. switching off unnecessary lights) and facility improvement (e.g. modifying office equipment).

- We have set energy-saving targets by fiscal 2006 (with an annual reduction of 1%) and are working towards achieving these targets.
- Office energy consumption in fiscal 2003 was 106 million kWh, a 2.6% decrease from the previous year.
- We strive to implement measures to reduce energy consumption wherever possible. Such measures include the use of highly-efficient lighting, modification of air-conditioning equipment and more energy-conscious use of air-conditioning.

#### Power consumption reduction achieved by offices and power stations (33 sites)

##### Power consumption reduced (FY2003)

Power consumption reduced (kWh)	Reduction rate (%)
450,078	1.2

Note: Reduction rate is calculated by the following formula: reduced kWh / power consumption in the offices for FY2002 x100

##### Outline of measures

Air-conditioning	Lighting
1) Flow rate adjustment of 8H system cool/hot water pumps	1) Replacing induction lighting
2) Change of water temperature sent to refrigerating machines	2) Partial replacement of lighting systems
3) Control of 24H system hot water pumps with inverters	3) Replacement to downlight luminaries at customer service counters
4) Cutoff of discharged air while operating at pre-cooling/heating mode	4) Attachment of motion sensors to restrooms
5) Control of volume of CO <sub>2</sub> in discharged air	—

Note: Measures considered effective are implemented specifically at each site.



We implemented such measures at nine operational sites of the Kumamoto Branch Office in fiscal 2002 and at another 24 sites throughout the company in fiscal 2003.

### ◇ Introduction of low-pollution vehicles\*

Kyushu Electric Power has introduced clean-energy and fuel-efficient vehicles\*.

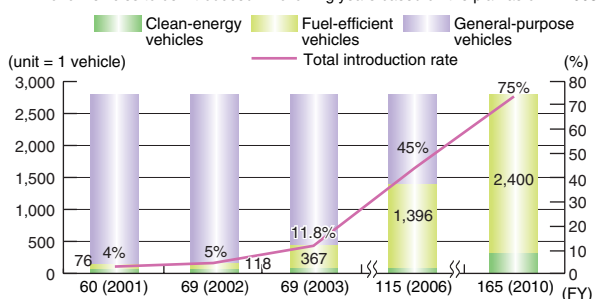
- We plan to increase the total rate of clean-energy and fuel-efficient vehicles\* in the company fleet and reach 20% by fiscal 2004 and 40% by fiscal 2006.
- We also aim to achieve an introduction rate of 5% for clean-energy vehicles in the company fleet by fiscal 2010.
- By fiscal 2003, we have introduced in the company 367 low-emission vehicles\* and 69 clean-energy vehicles\* (electric cars\* / hybrid cars\*), accounting for 9.9% and 1.9% in the fleet respectively, resulting in the combined introduction rate of 11.8%.



Clean-energy vehicle (an electric car)

### ◆ Low-pollution vehicle introduction plan

No. of vehicles to be introduced in following years based on the plan as of FY2003



Note: Total introduction rate is the percentage of low-emission vehicles against the total number of vehicles (general-purpose and special-purpose vehicles combined) including approx. 1,000 special-purpose vehicles.

## 4 Reduction of SF<sub>6</sub>\* (sulfur hexafluoride) gas emissions

Kyushu Electric Power uses the greenhouse gas\* SF<sub>6</sub>\* for insulation in some of its electrical equipment and takes cautions not to release this gas into the atmosphere when the equipment is overhauled.

- The use of SF<sub>6</sub>\*, which provides excellent insulation, is indispensable because there are no other effective insulating gases.

- Due to the introduction of gas recovery equipment, the SF<sub>6</sub>\* gas recovery rate (reutilization rate) during overhauls improved from 40% in fiscal 1997 to 98% in fiscal 2001 and onwards. In fiscal 2003, 358,000 t-CO<sub>2</sub> of SF<sub>6</sub>\* was recovered.

- The SF<sub>6</sub>\* gas recovery rate on the equipment dismantlement recorded 99% for fiscal 2003, and 38,000 t-CO<sub>2</sub> of SF<sub>6</sub>\* was recovered.

### ◆ SF<sub>6</sub> gas recovery during overhauls in FY2003

Figures in parentheses shows CO<sub>2</sub> converted volume.\*

	SF <sub>6</sub> gas used	SF <sub>6</sub> gas recovered	Recovery rate
At equipment introduction	15.24 tons (364,000 t-CO <sub>2</sub> )	15.00 tons (358,000 t-CO <sub>2</sub> )	98%
At equipment dismantlement	1.61 tons (38,500 t-CO <sub>2</sub> )	1.60 tons (38,300 t-CO <sub>2</sub> )	99%

\*Figures are obtained by converting the volume of SF<sub>6</sub> gas to the volume of CO<sub>2</sub> by applying the global warming potential\* for SF<sub>6</sub> (23,900).

## 5 Towards Kyoto Mechanism\* utilization

The Kyoto Mechanism\* is expected to complement domestic measures to reduce greenhouse gas\*. Kyushu Electric Power has joined the World Bank's Prototype Carbon Fund (PCF)\*, aiming to obtain expertise in the use of the Kyoto Mechanism\* in advance.

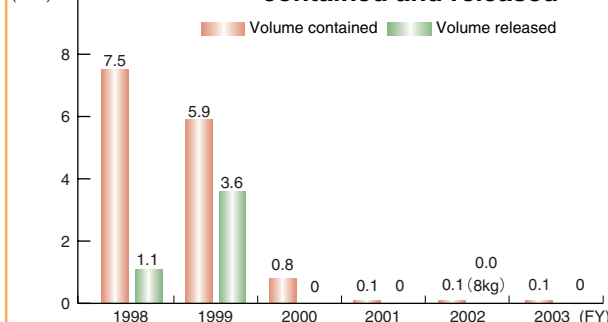
## 6 Ozone layer\* protection

Kyushu Electric Power takes measures to stop depletion of the ozone layer\* through reducing emissions of specific Freons and other gas\*.

- Kyushu Electric Power's emissions of specific Freons\* and carbon tetrachloride\* have been zero since fiscal 2000, except for a minute amount of natural leakage. These achievements were made possible by preventive measures, such as washing work clothes in a washing machine instead of dry cleaning and changing generator refrigerants to alternative Freons.

- Future tasks include ensuring the collection of regulated Freons\* upon equipment inspections and removals and installing regulated Freon\*-free equipment upon replacing or introducing new equipment.

### ◆ Volume of specific Freons and other gas contained and released



\*1: "Specific Freons and other gas" refer to specific Freons and carbon tetrachloride.  
 \*2: "Volume contained" refers to the volume of specific Freons and carbon tetrachloride contained in equipment and "volume released" refers to the volume of such gas actually used for replenishment or other purposes.  
 \*3: With regard to numerical values, "0" on the graph means no emission; "0.0" means less than 0.05 tons contained or released.  
 \*4: Natural leakage is calculated in the year when it is detected during inspections or when switching to alternative Freons.