

Environment

This chapter is intended to give a comprehensive description of the impacts of business activities on the environment and of measures to reduce environmental burdens according to the HEPCO Group Environmental Policies' environmental guidelines.



Photo: Lake Noto in autumn
Taken by: Teizo Fujino

HEPCO Group Environmental Policies

(Environmental Concept)

The HEPCO (Hokkaido Electric Power Co., Inc.) Group has been dedicating itself to addressing environmental issues through various activities, along with stably supplying inexpensive power to our customers in Hokkaido.

The growing concern about realizing a sustainable society through fulfillment of corporate social responsibility makes it imperative for us to adopt an environmental approach and to reduce environmental burdens in all our business activities. We must address global environmental problems and achieve a recycling-based society.

In light of this, we will encourage group-wide environmentally friendly business, toward achieving a sustainable society. This will be done by following common group policies, such as prevention of global warming and air pollution, management of chemical substances, promotion of the 3Rs (reduction, reuse, recycling), and public awareness-raising activities of our environmental policies.

(Environmental Guidelines)

1. Promoting Measures to Prevent Global Warming
2. Promoting Environmental Conservation in Business Areas
3. Promoting the Formation of a Recycling-Based Society
4. Improving the Level of Environmental Management
5. Developing "Environmental Relations" Activities

November 2004

Undertakings

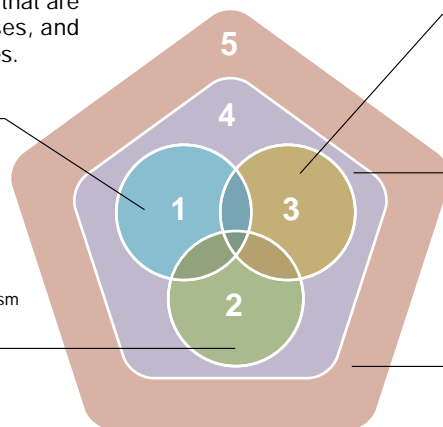
The following are HEPCO undertakings. All Group companies have decided on undertakings that are compatible with their respective businesses, and they have promoted environmental activities.

1 Promoting Measures to Prevent Global Warming

Mitigation of greenhouse gas emissions primarily by using nuclear power
Utilization of natural energy
Improvement of power generation efficiency and reduction of transmission and distribution losses
Promotion of energy savings and load leveling
Activities toward utilization of the Kyoto Mechanism

2 Promoting Environmental Conservation in Business Areas

Execution of air, water and other environmental conservation measures
Management of chemical substances
Promotion of technical development



3 Promoting the Formation of a Recycling-Based Society

Promotion of the 3Rs
Expansion of effective use of coal ash
Expansion of green procurement

4 Improving the Level of Environmental Management

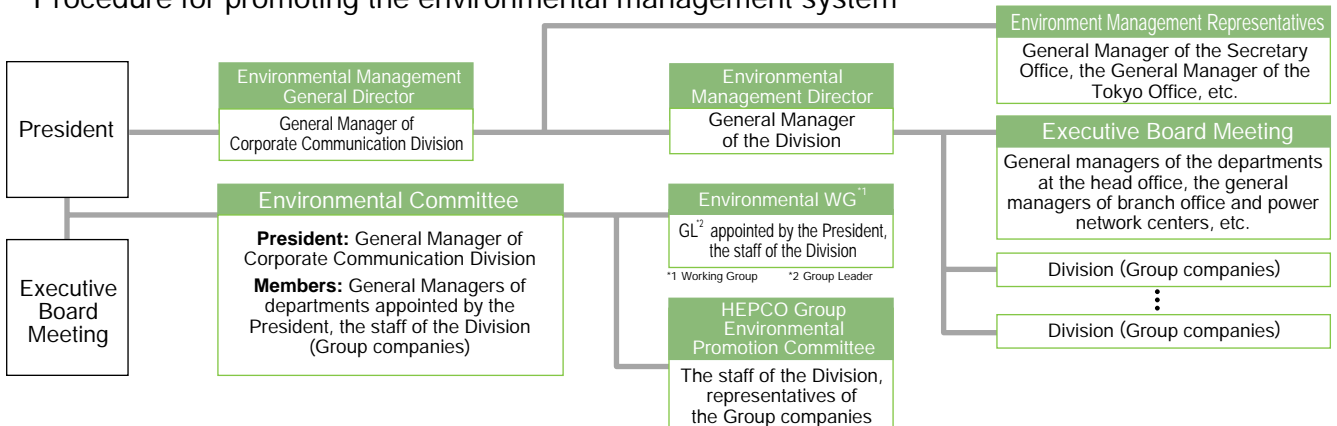
Establishment of an environmental management system
Execution of audits
Utilization of environmental accounting
Introduction of environmental education

5 Developing "Environmental Relations" Activities

Proactive information provision

* to forge relations of trust with customers

Procedure for promoting the environmental management system



3Rs

This is shorthand for "reduction (of waste generation)," "reuse" and "recycling." *The Basic Law for Establishing a Recycling-Oriented Society* stipulates the priority of waste disposal and recycling as follows: (1) reduce (reduce waste generation by extending the lifespan of products, i.e. by use of products for a longer period), (2) reuse (use products again after washing or repair), (3) recycle materials (convert materials for reuse); (4) recycle heat (recycle heat from incineration, and conduct thermal recovery) and (5) conduct proper disposal.

Environmental management system

This system is intended to use management techniques to minimize the influence of business activities on the environment. Our employees are required to draft, execute, inspect and review plans according to environmental policies while reducing environmental burdens.

Environmental Accounting

Thought behind the calculation

Period: April 1, 2005 – March 31, 2006 Range: Hokkaido Electric Power Co., Inc. (unconsolidated)

Standards: The Ministry of the Environment's Environmental Accounting Guidelines 2005 were used as a reference.

Environmental conservation costs

Environmental investments amounted to 2.39 billion yen (2.7% of capital investment), an increase from the record set in FY2005 (1.64 billion yen; 2.0%). As for the breakdowns, the upgrade in pollution prevention equipment at the Tomato-Atsuma Power Station and the installation of underground distribution lines and other landscape improvement measures accounted for the majority of the investments.

Environmental costs amounted to 30.53 billion yen (6.7% of operating expenses), an increase of 2.49 billion yen from the record set in FY2005 (28.04 billion yen; 6.6%), but the ratio of environmental costs vis-à-vis operating expenses remained almost the same. Compared with FY 2005, expenses incurred by upgrading environmental conservation equipment increased while those for environmental monitoring decreased. Costs for power purchased from new energy sources, repairs of pollution prevention equipment at thermal power stations, waste disposal and so forth were tabulated.

Environmental conservation benefits

Since the CO₂ emissions were reduced thanks to increases in nuclear power, hydropower and new energy sources, the total amount of curbed CO₂ emissions has risen by 1.79 million t. The SF₆ recovery rate has declined by four points.

Due to an increase in the amount of electricity purchased from other companies' thermal power stations and other factors, the SO_x emission rate has increased by 0.04 g/kWh. However, since the amount of electricity generated at our thermal power stations has decreased, the NO_x emission rate has declined by 0.04 g/kWh. In addition, the length of distribution lines and the afforested area have been on the increase with the landscape improvement measures (e.g., underground installation).

The amount of effectively used waste and the final disposal amount have decreased due to the decline in the amount of waste that is being generated.

Economic benefits

Economic benefits in FY2006 amounted to 9.82 billion yen, an increase from those in FY2005 (8.05 billion yen).

Amounts saved by retrenching fuel costs have gone up due to the increases in purchases of electricity from new energy sources. The sales of valuable resources have increased due to our rigorous recycling, but the reduction of expenditures as a result of purchasing new products and so forth have decreased.

Category	Major items	Environmental investment	
		Environmental investment	Environmental costs
Measures to Prevent Global Warming	Investment in carbon funds, investment in overseas afforestation, expenses for installation of facilities associated with new energy sources (other companies' power generation facilities run by wind power, sun light, waste, etc.), expenses for purchasing electric power from new energy sources, contributions to the Green Electricity Fund, etc.	(0.05)	(5.08)
		0.55	5.79
Environmental Conservation in Business Areas	Environmental assessment survey expenses, expenses for construction projects related to landscape improvement, such as underground installation of distribution lines, expenses for installation, repairs and inspection of low-noise machinery and equipment, expenses for installation, expenses for upgrading environmental monitoring and measurement devices, expenses for afforestation works, expenses concerning flora and fauna protection, etc.	(0.05)	(7.10)
		1.75	13.79
Formation of a Recycling-Based Society	Commissioned handling service charges for waste disposal processing and transportation, expenses for surplus soil removal, expenses for construction waste disposal, expenses for machinery and equipment repairs, expenses for disposal of trees, expenses related to the storage of PCB waste, expenses for regular inspection of waste-related facilities, expenses for concrete recycling, etc.	(0.08)	(7.44)
		0.06	6.93
Environmental Management	Expenses for environmental monitoring, expenses for supporting Environmental Management System architecture, expenses for in-house environmental education, expenses for environment-related research, etc.	(1.45)	(6.52)
		0.04	2.12
Environmental Relations	Expenses for compiling the Environmental Action Report, expenses for participation in Environment Square Sapporo and other events held by local governments, expenses for holding the HEPCO Environment Panel Exhibition, expenses for environmental goods, etc.	–	(0.02)
Other	Pollution load charges in the Pollution-Related Health Damage Compensation Program	–	(1.87)
			1.84
Total		(1.64)	(28.04)
		2.39	30.53

* Figures in parentheses are the amounts of money for FY2005.

Category	Specific items	FY2005	FY2006	Fluctuation	Related page
Measures to Prevent Global Warming	Amount of CO ₂ curbed due to nuclear, water and geothermal energy as well as other new energy sources (million t)	10.21	12.00	+ 1.79	37
	SF ₆ recovery rate (%)	98	94	– 4	35,41
Environmental Conservation in Business Areas	SO _x emission rate (g/kWh)	0.53	0.57	+ 0.04	36,44
	NO _x emission rate (g/kWh)	0.48	0.44	– 0.04	36,44
	Length of distribution lines for landscape improvement measures (km)	169	182	+ 13	–
	Afforested area (1,000 m ²)	12,914	13,581	+ 667	–
Formation of a Recycling-Based Society	Amount of effective utilization (1,000 t)	831	821	– 10	49
	Amount of final disposal (1,000 t)	99	24	– 75	49

Category	Specific items	FY2005	FY2006	Fluctuation
Measures to Prevent Global Warming	Improvement in the generation efficiency of thermal power*, reduction of transmission and distribution losses*, retrenched amounts of fuel costs due to the purchase of electricity generated by new energy sources	5.80	8.10	+ 2.3
		0.43	0.56	+ 0.13
Formation of a Recycling-Based Society	Proceeds from sales of valuable resources associated with recycling	0.43	0.56	+ 0.13
		1.82	1.16	– 0.66
Total		8.05	9.82	+ 1.77

* In calculating the retrenched amounts of fuel afforded by the improvement in the generation efficiency of thermal power and the reduction of transmission and distribution losses, FY1991 was taken as the base year.

Environmental accounting

In the framework of environmental accounting, companies and other organizations aim to promote environmental conservation activities efficiently and effectively while maintaining favorable relations with society to achieve sustainable social development. They recognize, measure as quantitatively as possible, and communicate environmental conservation costs during their business activities, and effects obtained from the said activities.

Pollution-Related Health Damage Compensation Program

Under this system, compensation is provided to those who have become ill because of pollution, to compensate for the damage and to protect the victims by implementing projects necessary for the welfare of the victims. Pollution load charges are collected from those whose facilities emit soot and dust, to partially cover the expenses of compensation.

Material Balance of Business Activities

Summary of this chapter

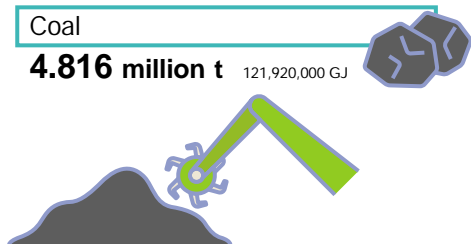
Toward effective use of finite resources and minimized environmental burden, Hokkaido Electric has measured and understood the quantity of resources consumed (inputs) and the volume of environmental burdens discharged (outputs). In light of these, we are rigorously proceeding with the mitigation of greenhouse gas emission, the prevention of various types of pollution, the promotion of "3R" activities (reduction, reuse and recycling), the conservation of the natural environment and so forth.
This page is subject to third-party auditing. See p.64.

INPUT

Thermal power generation fuel

Coal

4.816 million t 121,920,000 GJ



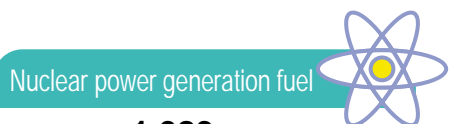
Petroleum

Heavy oil **811 thousand kl** 33,570,000 GJ
Crude oil **77 thousand kl** 2,870,000 GJ
Light oil **20 thousand kl** 750,000 GJ



New fuel

Orimulsion **0.2 thousand kl** 4,000 GJ



Nuclear power generation fuel

Uranium 235 **1,083 kg** 88,630,000 GJ

Natural energy sources

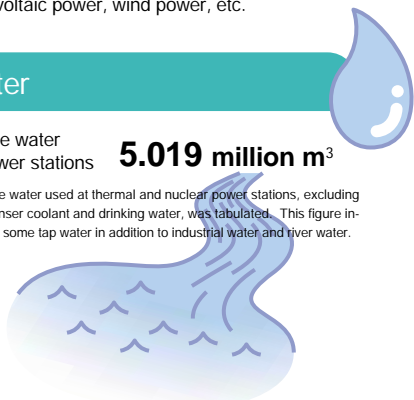
Hydroelectric power, geothermal power, photovoltaic power, wind power, etc.



Water

Service water for power stations **5.019 million m³**

Service water used at thermal and nuclear power stations, excluding condenser coolant and drinking water, was tabulated. This figure includes some tap water in addition to industrial water and river water.



OUTPUT

Discharged into the air

CO₂ **15.66 million t**

SO_x **18 thousand t**

NO_x **14 thousand t**



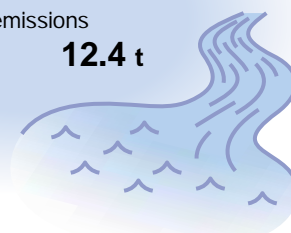
Thermal power generation
17,494 million kWh



Discharged into water

Discharged amount
2.507 million m³

COD emissions
12.4 t



Material Balance

HEPCO's Material Balance describes inputs of resources, e.g. power generation fuels associated with annual corporate activities; production of useful electricity; and the flow of treatment, disposal and recycling of coal ash and other types of waste.

Orimulsion

This is fuel emulsified by adding approximately 30% water and traces of surface-active agents to natural Orinoco (high-viscosity ultra-heavy oil) produced in the basin of the Orinoco River in Venezuela.

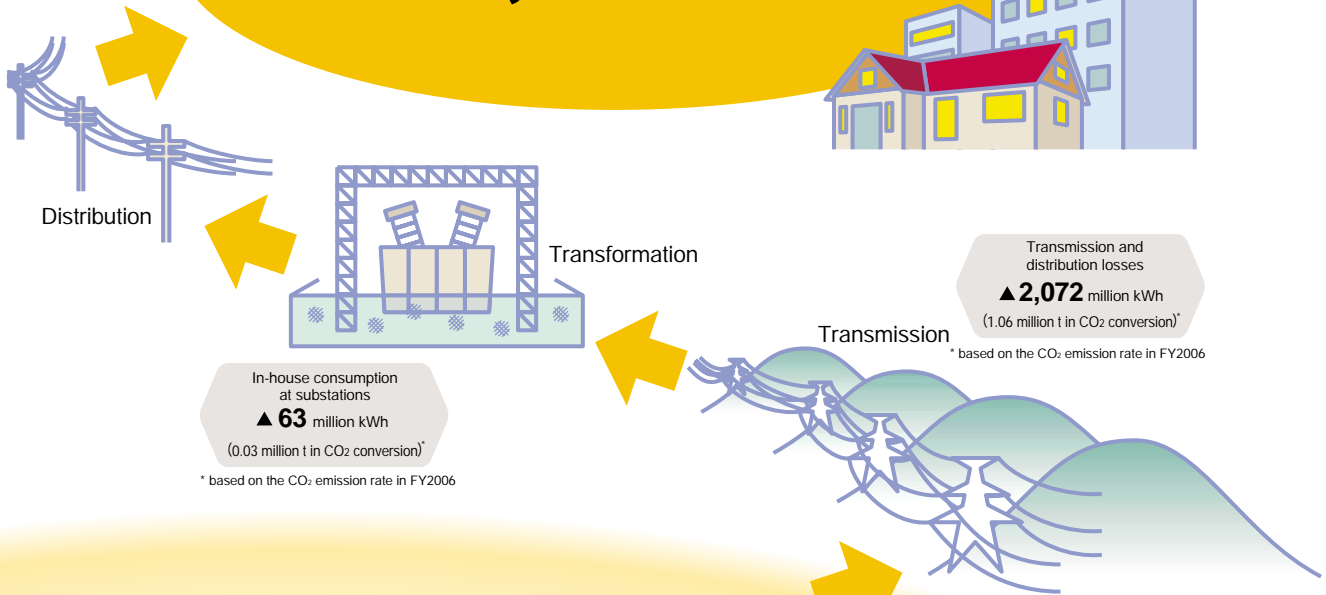
SO_x

When fossil fuels are incinerated, the sulfur in the fuels is oxidized, generating sulfur oxides (SO_x). They are subject to the Air Pollution Control Law.

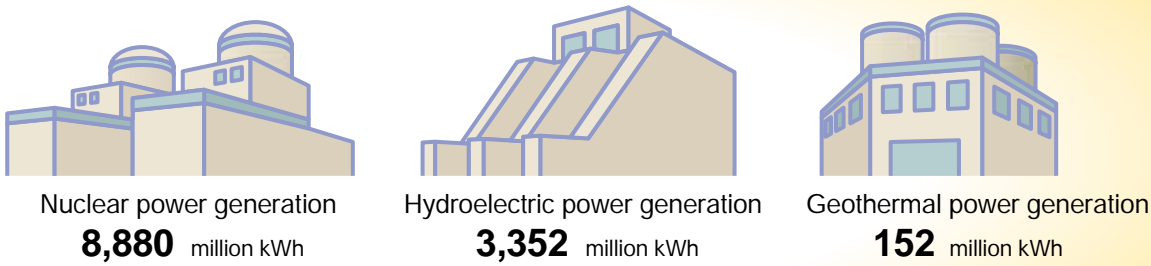
NO_x

When nitrogen-containing fuels and nitrogen in the air are oxidized during incineration, nitrogen oxides (NO_x) are produced. They are subject to the Air Pollution Control Law.

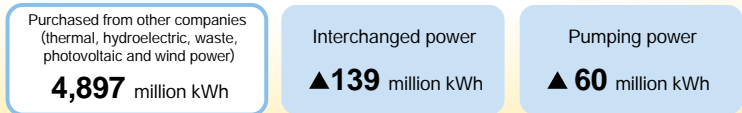
Electricity sales
30,833 million kWh



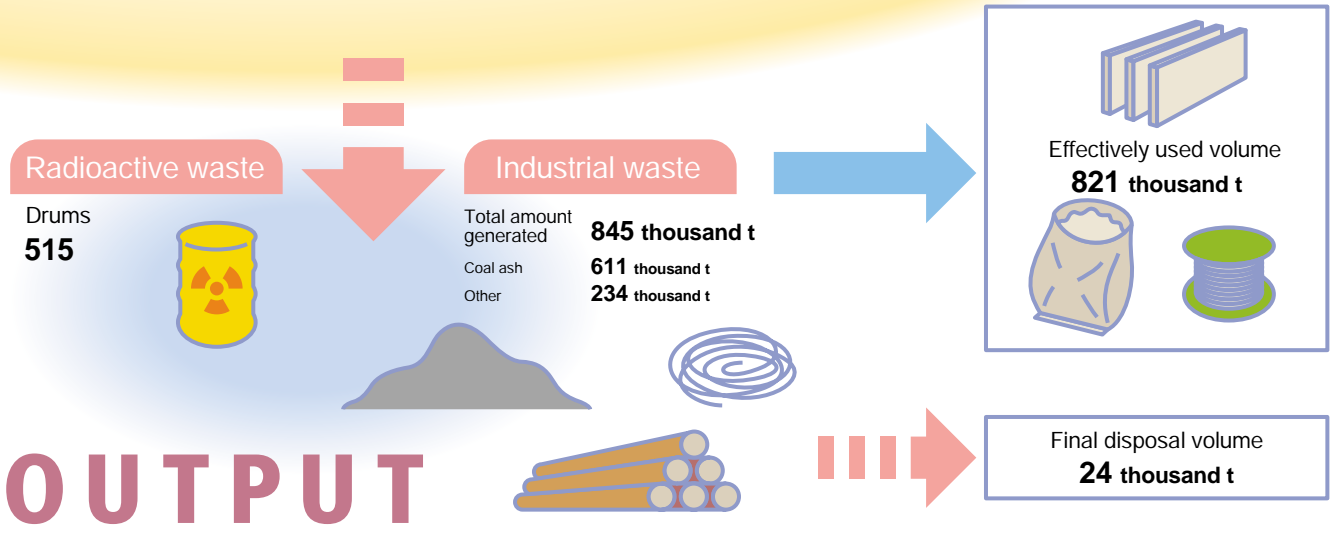
Total amount of generated and incoming electricity
34,576 million kWh



Total amount of generated and incoming electricity
In-house consumption at power stations
▲ 1,608 million kWh
(0.82 million t in CO₂ conversion)
* based on the CO₂ emission rate in FY2006



* Because of rounding, totals may not add up exactly.



OUTPUT

COD (Chemical Oxygen Demand)
A measure of water quality, COD indicates the quantity of oxygen consumed in oxidation of organic matter with potassium permanganate, for example.

In-house consumption at power stations
This is the volume of electricity consumed by the operation of machinery and equipment necessary to generate electricity, using a generator (blower, feedwater pump, controller, etc.). Substations also have in-house consumption of electricity.

FY2006 Performance and Targets

Summary of this chapter

Aiming to realize the Environmental Policies, we regard those environmental issues that demand particular attention as environment control items. For these items, numerical targets have been set through an understanding of the material balance for regular checks on achievement.

1. Promoting Measures to Prevent Global Warming

(1) CO₂ emission rate and CO₂ emissions

In FY2006, electricity sales increased by approximately 2%. However, CO₂ emissions declined by about 2% due to decreases in the operation of coal-driven thermal power stations. This caused the CO₂ emission rate to decrease by approximately 4%.

We will redouble our efforts to ensure proper maintenance and safe operation of Tomari Power Station while steadily proceeding with the construction of the No. 3 Reactor toward commencement of commercial operation in December 2009. This should enable us to achieve our goal of reducing the CO₂ emission rate by FY2011 by 20% (0.42kg-CO₂/kWh) from the rate in FY1991.

Environment control item	Performance			FY2006			Target		
	'03	'04	'05	Target	Performance	Evaluation	'07	'08	'11
CO ₂ emission rate [kg-CO ₂ /kWh]	0.49	0.52	0.53	—	0.51	—	—	—	Approx. 0.42
CO ₂ emissions [million t-CO ₂]	14.30	15.30	15.90	—	15.66	—	—	—	—

(2) SF₆ recovery rate

The SF₆ recovery rate in FY 2006 was 94%, three points below our target value. After inspecting gas circuit breakers and other devices we realized that this was partly because we could not fully recover SF₆ due to the deterioration of the connectors to SF₆ recovery hoses. We will try our best to achieve our goal by systematically replacing these hoses, the main cause of the declined recovery rate.

Environment control item	Performance			FY2006			Target		
	'03	'04	'05	Target	Performance	Evaluation	'07	'08	'11
SF ₆ recovery rate [%]	97	98	98	97 or higher	94	☹	97 or higher	97 or higher	—

(3) CO₂ emissions in the non-generation sector (HEPCO Group)

In FY2006, the amount of power consumed increased because tabulations included the two companies that had joined the HEP- CO Group. On the other hand, vehicular fuel consumption decreased since the Eco Work promoted eco-driving and the number of times emergency vehicles and construction work vehicles were mobilized declined. As a result, CO₂ emissions in the non-generation sector increased by 200 t or 0.4% from FY2005, and we were unable to achieve our goal.

We will redouble our efforts to have the Eco Work take hold more firmly and promote the campaign's introduction in the Group companies where it has not yet been introduced. Reflecting on matters that could have been better in FY2006, we will work hard to reduce CO₂ emissions in the entire Group through "Summer Casual Wear Campaign," "Winter Office Energy Saving Campaign," and so forth.

With regard to our CO₂ emissions for FY2005, we omitted the performance of some business establishments within our Group, in addition to the amount of fossil fuel consumed for heating purposes. Therefore, we corrected the standard emission to 44.6 thousand t.

Environment control item	Performance			FY2006			Target		
	'03	'04	'05	Target	Performance	Evaluation	'07	'08	'11
CO ₂ emissions in the non-generation sector ^{*1,2} (HEPCO Group)	(—) ^{*3}	(43.6)	(44.6)	(44.4) Reduction of approx. 0.5% from FY2005	(44.8) Increase of approx. 0.4% from FY2005	☹	Reduction of approx. 1.0% from FY2005	Reduction of approx. 1.5% from FY2005	Reduction of approx. 3.0% from FY2005

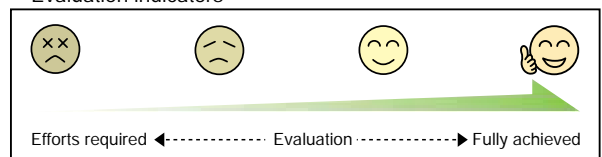
*1 This does not include in-house consumption at power stations and substations, transmission and distribution losses and other types of power consumption necessary to supply power.

*2 For the conversion of office power consumption and vehicular fuel consumption into CO₂, the *Guidelines for Greenhouse Gases Calculation Methods for Business Establishments*, published by the Ministry of the Environment, and *Concerning the Revision of the Table of Standard Heating Values by Energy Sources*, published by the Agency for Natural Resources and Energy, were used.

*3 Figures in parentheses are CO₂ emissions (1,000t-CO₂).

*4 Percentage of environmentally friendly products in the procurement value of copy paper, publications, office automation machinery and equipment and clothes

Evaluation indicators



SF₆

SF₆ is a colorless, odorless, atoxic, noncombustible, chemically stable compound obtained by the reaction between fluorine gas and sulfur. Extremely stable electrically, this compound is used to insulate electricity-related machinery and equipment. It is designated in *the Kyoto Protocol* as a greenhouse gas to be reduced. It has a greenhouse effect 23,900 times that of carbon dioxide.

2. Promoting Environmental Conservation in Business Areas

(1) SOx and NOx emission rates (avg. for all power sources)

The SOx emission rate was approximately 0.5 g/kWh due to a decrease in the amount of emissions from our thermal power stations, which was primarily the result of decreasing the amount of electricity generated by domestic coal, despite the fact that the quantity of electricity purchased from other companies thermal power stations significantly increased. As for NOx, we achieved our target by offsetting the increased volume of emissions from other companies' thermal power stations with the decreased amount of emissions at our coal-driven thermal power stations. We will continue our efforts to reduce fuel consumption through measures geared to the maintenance and improvement of power generation efficiency at thermal power stations, and to ensure the proper maintenance and safe operation of nuclear power stations.

Environment control item	Performance			FY2006			Target		
	'03	'04	'05	Target	Performance	Evaluation	'07	'08	'11
SOx emission rate (avg. for all power sources) [g/kWh]	0.55	0.65	0.53	Approx. 0.5	0.57	😊	Approx. 0.5	Approx. 0.5	Approx. 0.4
NOx emission rate (avg. for all power sources) [g/kWh]	0.45	0.47	0.48	Approx. 0.5	0.44	👍	Approx. 0.5	Approx. 0.4	Approx. 0.3

3. Promoting the Formation of a Recycling-Based Society

(1) General recycling rate of industrial waste

We achieved the target by improving the recycling rate of coal ash, for example, which we raised to 97.8% by promoting its effective utilization, such as for recycled subbase materials and cement admixture. However, the amount coal ash that was generated was reduced due to a decline in the operation of thermal power stations. Outside of coal ash, we have maintained a recycling rate of 95% or higher. We will strive to maintain the FY2006 level in a stable manner by expanding coal ash applications, securing supply destinations and help improve the collection and transportation system for other waste.

Environment control item	Performance			FY2006			Target		
	'03	'04	'05	Target	Performance	Evaluation	'07	'08	'11
General recycling rate of industrial waste[%]	90.1	92.1	89.4	Approx. 92	97.1	👍	Approx. 92	Approx. 92	Approx. 95

(2) Green procurement rate (office supplies etc.)

In FY2006, the green procurement rate for office supplies increased by 5.3 points from that of FY2005, but we failed to achieve our target due to the stagnant procurement rate for fliers, posters, pamphlets, etc. and an increase in purchases of wide copying machines and other office automation equipment that are not covered by the Green Procurement Guidelines. While investigating the overall office supplies certified as green products, we will further recommend using specified green procurement products centering on printed matter.

Environment control item	Performance			FY2006			Target		
	'03	'04	'05	Target	Performance	Evaluation	'07	'08	'11
Green procurement rate (office supplies etc.)*4 [%]	73.1	51.0	73.2	80	78.5	😞	85	90	95

(3) Copy paper purchased (per employee)

In FY2006, our various efforts to reduce the amount of copy paper being used, such as the Eco Work, bore fruit and there were no emergencies, disasters or other incidents that would require using large amounts of paper. As a result, we reduced the amount of copy paper that was purchased by 1,000 sheets per person per year from that in FY2005, thus achieving our goal. We will strive to attain the target by having each business establishment promote activities aimed to reduce the purchasing volume through the Eco Work.

Environment control item	Performance			FY2006			Target		
	'03	'04	'05	Target	Performance	Evaluation	'07	'08	'11
Copy paper purchased (per employee) [number of sheets per person per year]	10,600	10,500	10,800	Approx. 9,800	9,800	👍	Approx. 9,250	Approx. 8,500	—

Domestic coal-fired thermal power
At Naie and Sunagawa Power Stations, coal produced in Japan is incinerated to generate power.

Specific green procurement products
Products specified in the Green Procurement Guidelines as those that should be promoted on a priority basis.

1. Promoting Measures to Prevent Global Warming

Summary of this chapter

Upholding a voluntary target intended to mitigate global warming by reducing the CO₂ emission rate by approximately 20% in FY2011 from the rate in FY1991, Hokkaido Electric is rigorously promoting the expansion of nuclear power generation, the enhancement of power generation efficiency at thermal power stations and the utilization of the Kyoto Mechanism. We are helping our customers to minimize CO₂ emissions through the development and dissemination of energy saving machinery and equipment, load leveling and other undertakings.

Changes in the CO₂ emission rate

Target CO₂ emission rate

In conjunction with social developments and enhanced convenience in daily living, demand for electric power has increased and CO₂ emissions have also risen accordingly. Since the amount of electricity consumed by our customers is affected by the weather and other factors, Hokkaido Electric has adopted an emission rate target to reflect our efforts and has been implementing varying emission control measures.

The Japan Economic Federation established the "Voluntary Action Plan for the Environment" in June 1997 and began its efforts to curb global warming. Prior to this, the Federation of Electric Power Companies introduced the Environmental Action Plan of the Electric Power Industry in November 1996, setting the target of reducing the FY2011 end-use CO₂ emission rate by approxi-

mately 20% from that of FY 1991. As a member of the industrial circle, HEPCO is working hard to achieve its goal of reducing the CO₂ emission rate by approximately 20% from that of FY1991 in FY2011.

FY2005 Performance

It was decreased by approximately 4% from that in FY2005 to 0.51 kg- CO₂/kWh. We will continue to ensure the safe operation of nuclear power stations and improve the power generation efficiency of thermal power stations in order to achieve our voluntary target for FY2011.

nuclear power, which does not discharge CO₂, one of the major causes of global warming, and SO_x and NO_x, the triggers of acid rain, as the major pillars of CO₂ emission control measures at the time of power generation, in particular, we are operating Tomari Power Station's Unit Nos. 1 and 2 in a stable and steadfast manner. CO₂ emissions curbed by nuclear power, hydroelectric power, new energy and geothermal power in FY2006 amounted to 12 million t-CO₂.

Emission limitation of greenhouse gases

As electric power demand in Hokkaido is expected to continue to increase slowly but steadily, we will attempt to reduce CO₂ emissions by stable operation of the nuclear power station and by utilization of natural energy. With

Improvement of power generation efficiency at thermal power stations

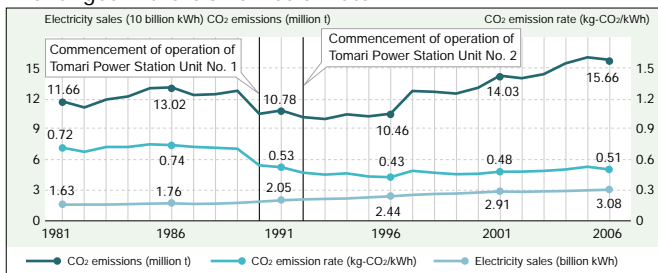
Operational measures have been taken to improve the power generation efficiency at thermal power stations, by maintaining functions through regular plant and equipment inspection, shortening the start time, and reducing the steam that results in a loss of efficiency.

CO₂ emission rate

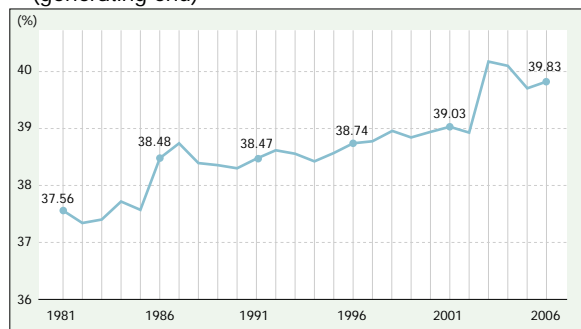
The CO₂ emission rate refers to the amount of CO₂ emissions per 1 kWh consumed by customers.

$$\text{CO}_2 \text{ emission rate (kg-CO}_2\text{/kWh)} = \frac{\text{Total amount of CO}_2 \text{ emissions from thermal power stations (kg-CO}_2\text{)}}{\text{Electricity sales (kWh)}}$$

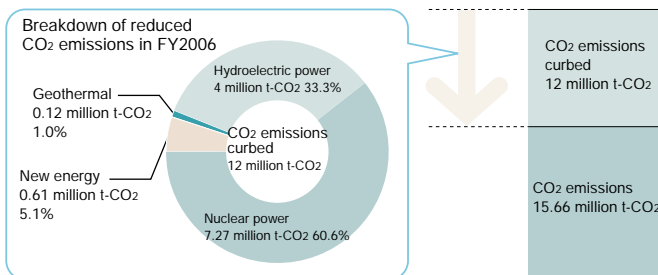
Changes in the CO₂ emission rate



Changes in thermal power generation efficiency (generating end)



CO₂ emissions and CO₂ emissions curbed



Comparison between Tomato-Atsuma Power Station Unit Nos. 2 and 4

	Tomato-Atsuma Power Station Unit No. 4 (Operation commenced in 2002)	Tomato-Atsuma Power Station Unit No. 2 (Operation commenced in 1985)
Output	700,000kW	600,000kW
Gross thermal efficiency (Designed value)	44.2%	41.9%
Steam conditions	25.0MPa × 600 / 600	24.1MPa × 538 / 566
Low-pressure turbine wheel length (Last stage blade)	43 inches	40 inches

CO₂ emissions curbed

These figures are equivalent of CO₂ emissions assuming that the quantity of electricity generated at facilities that do not generate CO₂ during power generation, such as nuclear and hydropower generation, was generated with the average thermal efficiency of thermal power stations.

Tomato-Atsuma Power Station Unit No. 4 boasts the highest generating efficiency of any HEPCO thermal power station, contributing greatly to reduction of the CO₂ emission rate. The power generation efficiency at thermal power stations in FY2006 was 39.83%.

Stable operation of the nuclear power station

Utilization factors of nuclear power stations vary depending on downtime due to regular inspections and so forth, but Tomari Power Station has maintained a high utilization factor since the commencement of its Units No. 1 and 2 in 1989 and 1991, respectively. The "constant rated thermal output operation," which increases generated output by about 2-3%, was introduced in both units in 2003. In FY2006, the utilization factor was 87.5%

Utilization of natural energy sources

Hydroelectric and geothermal power are valuable sources of domestic energy. In addition, they are environmentally friendly, as they do not discharge CO₂ during power generation. Since these power resources are primarily developed in the natural environ-

ment, we make effective use of them while considering surrounding environment and landscape.

Introduction of new energy sources

Wind power generation and photovoltaic power generation have limitations: Stable supplies cannot be guaranteed due to their vulnerability to meteorological conditions. During power generation, however, they do not discharge CO₂. HEPCO has introduced wind power stations at three locations and photovoltaic power stations at nine locations. They will be used for verification tests and as its in-company facilities.

Purchase of electric power from new energy sources

Aiming to support the popularization of natural energy sources, we have established a system for purchasing electric power generated from new energy sources and have been providing the purchased power using HEPCO's transmission and distribution facilities. The total purchase of electricity from new energy sources in FY2006 amounted to 749 million kWh.

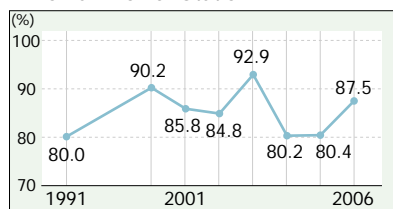
With regard to wind power generation, since the output fluctuates depending on wind intensity, the receipt of large amounts of electricity generated by

wind power will adversely affect power quality (e.g., frequency). We verified the possible extent of interconnection with our electric power system and estimated that interconnection would be possible up to about 250,000 kW. In addition, we will accept 50,000 kW in FY2007 on the condition that if there is a possibility of adversely affecting the system, it will be decoupled and removed from the HEPCO system.

Responses to the RPS Law

The RPS Law (the Law on Special Measures Concerning New Energy Use by Electric Utilities) aims to further promote new energy sources and obliges electric utility companies to use a fixed minimum amount of electric power generated by wind power, solar light, geothermal heat and hydro-power (conduit type 1,000 kW or below), and biomass. As we have done in the past, we once again satisfied the required amount of approximately 280 million kWh in FY2006.

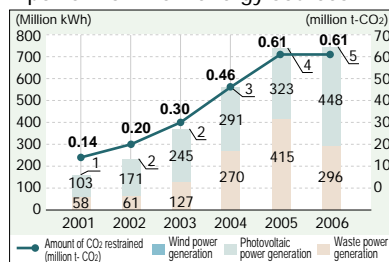
Changes in the utilization factor of Tomari Power Station



Facilities using new energy sources (as of March 31, 2006)

Wind power generation			Total: 1,580 kW
Place of installation	Capacity	Commencement of operation	
Horikappu Wind Power Station (Tomari Village)	850kW	Nov. 1993	
Sarobetsu Wind Power Station (Horonobe Town)	480kW	Dec. 1999	
Rishiri Kamui Wind Power Station (Rishiri Town)	250kW	Nov. 2001	
Photovoltaic power generation			Total: 146 kW
Place of installation	Capacity	Commencement of operation	
Takikawa Technical Center	63kW	Nov. 1993	
Obihiro Branch building	11kW	Oct. 1995	
Tomakomai Branch housing quarters	3kW	Oct. 1995	
Tomari Power Station gymnasium	15kW	Dec. 1995	
Takikawa Technical Center (expanded)	23kW	Dec. 1995	
Muroran Branch building	5kW	Dec. 1996	
Kitami Branch building	10kW	Dec. 1997	
Kushiro Branch building	3kW	Dec. 1998	
Hakodate Branch building	3kW	Jan. 1999	
In the compound of Research & Development Dept.	10kW	Nov. 1999	

Changes in purchase of electric power from new energy sources



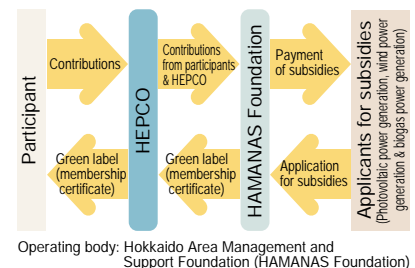
New energy sources for electric power purchases (as of the end of FY2006)

New energy	Number of contracts	Total output
Waste power generation	27	145,603kW
Wind power generation	50	239,798kW
Photovoltaic power generation	2,907	10,877kW

Case example

Hokkaido Green Electricity Fund

The Green Electricity Fund was founded with the aim of soliciting subsidies for the popularization and promotion of wind power, solar power and other natural energy sources. The minimum contribution from participants is 500 yen per month (per share), and cumulative number of contributions as of the end of FY2006 was 574 shares. Contributions are managed and operated by the HAMANAS Foundation, which provided a total subsidy of six million yen to six photovoltaic power generation facilities in FY2006.



Operating body: Hokkaido Area Management and Support Foundation (HAMANAS Foundation)

Inquiries for the Hokkaido Green Electricity Fund:
9:00 – 17:00 on weekdays
 HAMANAS Foundation Hokkaido Green Electricity Fund dedicated toll free number:
TEL:(81)11-205-5011 ☎ 0120-802-290 (c/o HEPCO)

Biomass

This is a biological resource that can be combusted for power generation. Biomass materials include livestock excreta, woodchips and waste timber chips. Biomass power generation has the drawbacks of expensive facilities and scattered resources, but it has the advantage of making effective use of waste.

New energy

New energy sources consist of "natural energy sources," such as photovoltaic power generation, "recycled energy sources," e.g. waste power generation, and "new applications of conventional energy sources," including fuel cells.

Renewable energy

Renewable energy can be categorized as "natural energy," which harnesses unused energy from the natural world, and "recycled energy," which makes effective use of resources that have been disposed of thus far.

Reduction of power loss in transmission and distribution lines

We are increasing the voltage and the thickness of transmission/distribution lines and other electric power circulation equipment, and promoting the adoption of low-loss transformers to minimize power losses. The transmission and distribution loss factor in FY2006 was 6.3%.

Promotion of load leveling

Since electric power cannot be stored, power generation equipment is designed to accommodate the peak periods. Minimization of disparities in the volume of power consumption (load leveling) between peak time and nighttime will lead to the effective use of power generation equipment. Although we at HEPCO have maintained a higher load factor than the national average, we will further improve our variety of rate packages and strengthen our undertakings to level load by promoting all-electricity houses and equipment designed to make effective use of electric power at night, and by publicizing ways of conserving energy. All-electricity houses have achieved a solid reputation for safety, amenity and economic efficiency of light and fuel expenses, and new

starts for such houses numbered 9,056 in FY2006, registering a record high. The cumulative number of all-electricity houses reached 80,000 as of the end of May 2006.

Load leveling rate plans

HEPCO has been dividing electricity rates between daytime and nighttime and improving the contents of electricity rate plans by establishing 12 optional agreements, including a time-of-use rate plan that aims to shift load from daytime to nighttime.

Promotion of energy saving

We aim to promote energy conservation through public relations activities concerning energy saving, consulting activities and technological research.

PR and consulting activities:

- Publicity activities concerning efficient utilization of electricity via various advertisements and publications
- "E-style" is now available on our webpage and features energy saving techniques, breakdowns of simulated energy charges, the "Energy Saving Check Quiz" and much more.
- PR activities and distribution of relevant materials during the Energy Conservation Month
- Implementation of the "equipment energy diagnosis" designed for factories, buildings, etc.
- Displaying the electric consumption of the corresponding month in the pre-

vious year in the meter reading slip, and HEPCO's CO₂ emission rate on the backside

R&D on energy-saving technology and machinery/equipment

• Toward contributing to environmental conservation and energy saving, we have developed energy diagnostic technology appropriate for cold Hokkaido and are proceeding with the promotion of energy conservation primarily in buildings.

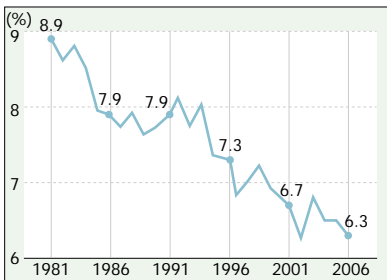
• We are promoting energy conservation for road heating by developing roadbed structures and control systems that minimize thawing energy supply loss.

• In the fields of hot water supply and heating, we are facilitating the development of a heat pump, which has advantages in energy saving and low environmental burden.

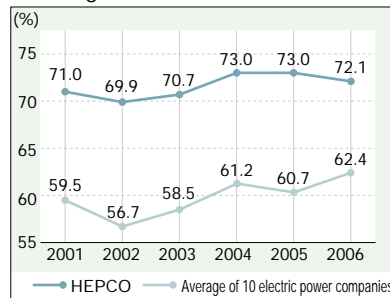
Energy saving activities at the offices

From June 20 through August 31, 2005, the HEPCO Group cooperated in the national government's "Team Minus 6 Percent" campaign. Specifically, we set the room temperature at 28 and launched the "Summer Casual Wear Campaign." From November 2005 to the end of April 2006, we carried out the "Winter Office Energy Saving Campaign" and set the room temperature at 20 in consideration of the health of our employees while adopting the national government's

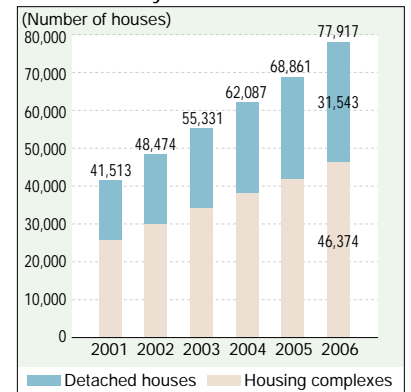
Changes in the power loss factor of transmission and distribution



Changes in annual load factor



Changes in the number of all-electricity houses introduced



People

Implementing energy-saving air-conditioning operations

Mr. Toyoji Matsuyama

Hokuden Kogyo Real Estate Management Division Computation Center

Since the Summer Casual Wear Campaign and the Winter Office Energy Saving Campaign were introduced to help fight global warming, we at the monitoring room located in the annex to HEPCO's Head Office, which is responsible for the operation and maintenance of air-conditioning equipment, examined how to reduce our power consumption while maintaining the room temperatures that were set. Since it was our first attempt at energy-saving air-conditioning operations, we faced many difficulties. As a result of our efficient operation of heat pump chillers, which consume a large volume of electricity, effective use of groundwater in summer, usage of exhaust air through outdoor air filters during winter, and many other efforts, our annual power consumption registered an all-time low. Although we receive complaints, such as that the office was "too hot" and "too cold" during the energy saving operations, we would like to take them into consideration and further improve energy-saving air-conditioning operations in the future.



Summer Casual Wear Campaign

Annual load factor

This is the average power load in a year as a percent of the maximum electricity for the same period (max. 3-day avg. peak load). The higher the numerical value, the more efficient is the power generation equipment.

annual load factor = annual avg. power load at transmission end / max. 3-day avg. peak load at transmission end × 100

All-electricity houses

These are houses where electricity is the only source of energy for cooking, heating, hot-water supply and so forth.

"winter energy-saving measures" and the Hokkaido Government's "Hokkaido Warm Biz Project." Both in summer and winter, HEPSCO and its 18 Group companies as well as the Hokkaido Electrical Safety Inspection Association participated in these activities and reduced power consumption from the previous fiscal year.

Utilization of unused energy

The heat pump not only takes advantage of unused energy, such as atmospheric air heat and earth thermal heat, but it has numerous other benefits, including contribution to the leveling of electric load by reduction of the installed capacity and utilization of electricity generated at night, which are brought about by storing obtained energy in the thermal storage system. HEPSCO has adopted heat pumps at 17 of its facilities. We recommend the Eco Ice Plus plan (an air-conditioning contract for businesses) for those who rely on air conditioning that combines Eco Ice (an ice thermal storage air-conditioning system) and an electric heat pump. Subscribers have increased yearly to number 350 as of the end of FY2006.

Changes in the actual number of subscribers to Eco Ice Plus



Case example

E-style

HEPCO's homepage features a link to a webpage we have created entitled "E-style," which features information on energy saving techniques. Under the theme of "using energy to lead ecological lives," we help people to lead environmentally friendly lives in order to keep the irreplaceable earth intact for future generations. The webpage consists of four parts - "E-style Mode," "E-style Check," "My E-style" and "E-style Diary." This site is intended to serve as a means for us to consider energy conservation together with our customers by spreading information regarding energy saving and soliciting ideas from our customers. The E-style Check website contains the Energy Saving Check Quiz, simulation of electrical charges and a page for account bookkeeping for environmentally-friendly households.

<http://www.hepco.co.jp/e-style>



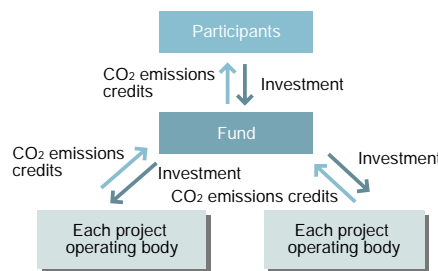
Toward the utilization of the Kyoto Mechanism

As a supplementary measure for reductions of CO₂ and other greenhouse gases, the Kyoto Mechanism was introduced in the Kyoto Protocol. The mechanism consists of three parts: joint implementation (JI), clean development mechanism (CDM) and emission trading (ET). HEPSCO has been promoting undertakings toward the utilization of the Kyoto Mechanism, through execution of CDM projects abroad, participation in Carbon Funds and afforestation projects, research on CO₂ absorption and so forth.

Development of CDM projects

Since FY2002, HEPSCO has executed commercialization surveys on the reduction of greenhouse gas emissions in the Republic of Armenia jointly with Shimizu Corporation and other bodies. These surveys were registered as a CDM project with the United Nations in November 2005. This project aims to recover methane gas generated at a landfill site and make effective use of it for power generation. Approximately 140,000 t-CO₂/year is expected to be reduced by the project. We at HEPSCO will continue to promote CDM projects that will also lead to technology transfer to developing countries, for example, while contributing to the reduction of greenhouse gas emissions

Mechanism of carbon fund



by utilizing technology accumulated through electric utility.

Survey toward JI and CDM

This survey aims to support Japanese corporations whose objectives are the discovery and realization of promising projects that lead to JI or CDM. We are participating in various studies.

Participation in a Carbon Fund

HEPCO has participated in a Carbon Fund that is working to obtain CO₂ emission credits from global activities to reduce CO₂ emissions, with the aim of gaining knowledge about the Kyoto Mechanism. In May 2004, we at HEPSCO decided to invest in the Global-Asia Clean Energy Services Fund, which strives to primarily obtain dividends by investing in ESCO projects and renewable energy power generation projects in Asia and Eastern Europe. The Japan GHG Reduction Fund and the Greenhouse Gas-Credit Aggregation Pool are designed to purchase CO₂ emissions credits from greenhouse gas reduction projects executed in developing nations and to make allocations proportionally depending on the contributions of participants. HEPSCO decided to participate in the former in November 2004 and the latter in February 2005. HEPSCO is expected to obtain CO₂ emissions credits worth approximately 1 million t-CO₂ from the three carbon funds.

Basic Survey Projects for Promoting CDM/JI, Etc. (NEDO)*

Fiscal year of implementation	Survey name
2006	Study on effective utilization of methane gas at landfill disposal sites in Bukhara, the Republic of Uzbekistan Participating corporation: Shimizu Corporation, Hokuden General Engineering Design & Consulting Company Inc.
	Study on utilization of methane gas at landfill disposal sites in Gyumri, the Republic of Armenia Participating corporation: Shimizu Corporation,
	Study on hydropower generation business in the Aragats Region, the Republic of Armenia Participating corporation: Shimizu Corporation, Hokuden General Engineering Design & Consulting Company Inc.

CDM/JI Project Survey (GEC)*

Fiscal year of implementation	Survey name
2006	Study on biomass utilization at palm oil factories in Malaysia Participating corporation: Taisei Corporation

Carbon funds in which HEPSCO has participated

Fund	Period of contract	Expected credits
Global-Asia Clean Energy Services Fund	2004 ~ 2014	
Japan GHG Reduction Fund	2004 ~ 2014	Approx. 400,000t-CO ₂
Greenhouse Gas-Credit Aggregation Pool	2004 ~ 2013	Approx. 640,000t-CO ₂

*See the footnote on p.41.

Kyoto Mechanism

This is an environmental mechanism for advanced nations, consisting of joint implementation of work, a clean development mechanism, and emissions trading. The goal is to achieve the numerical targets stipulated in the Kyoto Protocol.

Joint Implementation (JI)

This is a mechanism whereby advanced nations execute projects for reducing greenhouse gas emissions and distribute the quantity of reduced emissions as a result of such projects.

Clean Development Mechanism (CDM)

This is a mechanism whereby advanced nations execute projects for reducing greenhouse gas emissions in developing nations and distribute the quantity of reduced emissions as a result of such projects.

Emission Trading (ET)

This is a mechanism whereby advanced nations trade quantities of reduced emissions.

ESCO (Energy Services Company) projects

ESCO projects provide comprehensive services regarding energy saving at factories and buildings and receive proceeds from part of merits from saved energy achieved.

Afforestation

As the population grows, forests diminish. With the forest being the largest land source of CO₂ absorption on the Earth, its decline serves as a contributing factor of global warming. HEPCO is making various efforts to promote afforestation.

- Participation in Australian Afforestation Programs
- Participation in research on the CO₂ absorption effects of forests in Northern regions
- Implementation of environmentally friendly afforestation on land owned by the Isoya River No. 1 Power Station

Undertakings to limit emissions of greenhouse gases other than CO₂

Greenhouse gases discharged as a result of HEPCO's business activities are predominantly CO₂. We are also engaged in undertakings to curb other greenhouse gases.

SF₆ (sulfur hexafluoride)

This is used for gas circuit breakers, gas-insulated switchgears and other electric devices. We purchased two SF₆ gas recovery devices in 1998 and have used them during machinery and equipment inspection and removal. With a 97% gas recovery rate as the target, we have been curbing emis-

sions. In FY2006, however, we recovered 94% of SF₆ gas. After inspecting gas circuit breakers and other devices, we realized that this was partly because we could not fully recover SF₆ due to the deterioration of the connectors to SF₆ recovery hoses. We will try our best to achieve our goal by systematically replacing these hoses, the main cause of the declined recovery rate.

HFCs (hydrofluorocarbons)

These are used as refrigerants in air-conditioning equipment, for example. HEPCO possessed 1,331 kg of HFCs in FY2006, and has been trying its utmost to minimize their emissions through leakage prevention during machinery and equipment installation and repairs, and through recovery and reuse.

CH₄ (methane)

Discharged by fuel incineration at thermal power stations, concentration of CH₄ in our emissions is below that in the atmosphere.

N₂O (nitrous oxide)

Discharged by fuel incineration, mining industry processes and so forth. Although it is estimated that approximately 24 t were discharged from our thermal power stations in FY2006, we are doing our best to minimize the emissions through the enhancement

of power generation efficiency and so forth.

PFCs (perfluorocarbons)

PFCs are used as refrigerants, insulated catalysts, detergents for electronic substrates, etc. HEPCO does not possess or use PFCs.

Global warming coefficients of greenhouse gases

Greenhouse gases	Global warming coefficients
CO ₂	1
SF ₆	23,900
HFC	140 ~ 11,700
CH ₄	21
N ₂ O	310
PFC	6,500 ~ 9,200

Overview of overseas afforestation projects

Project commencement	1997 - (HEPCO's participation since FY2001)
Afforestation region	Southern Australia
Afforestation area	10,000 ha (afforested area to expand by approx. 1,000 ha per annum)
Planted species	Eucalyptus
Investors	HEPCO 10%, Oji Paper Co., Ltd. 51%, Sojitz Corporation 29%, Toppan Printing Co., Ltd. 10%

Overview of surveys about the CO₂ absorption of forests

Research goal	Proper evaluation of CO ₂ absorption and fixation ability of forests
Research period	FY2002 - FY2007
Participating institutions	HEPCO, Hokkaido University, National Institute for Environmental Studies
Place of execution	Teshio Experimental Forest of Hokkaido University, located in Horonobe Town

Overview of environmentally friendly afforestation projects on company-owned land

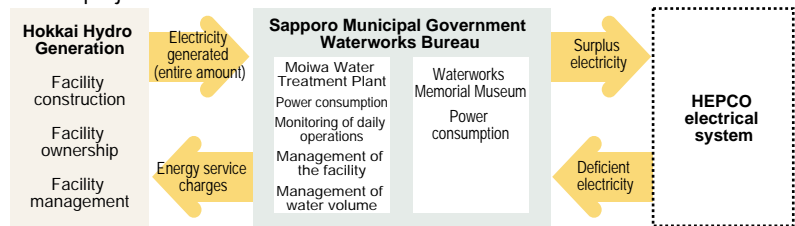
Implementation period	FY2002 - FY2009
Location	Land owned by Isoya River No. 1 Power Station (Iwato, Hakodate City)
Afforestation area	Approx. 100 ha (land with sparse tree stand etc. on approx. 550 ha of company owned land)
Planted species	Sakhalin fir, Sakhalin spruce

Group case example

Implementation of a joint project regarding hydraulic power generation at the Moiwa Water Treatment Plant

The Sapporo Municipal Government Waterworks Bureau and Hokkai Hydro Generation, a member of the HEPCO Group, examined the possibility of implementing a hydraulic power generation project using the unused hydro-energy at the Moiwa Water Treatment Plant from the viewpoint of curbing global warming. As a result, they agreed to build a hydraulic power station at the Moiwa Water Treatment Plant as a joint project and concluded the basic agreement in August 2005. In this joint project, the Waterworks Bureau provides the place and equipment including water conveyance pipes free of charge while Hokkai Hydro Generation installs hydraulic turbines, generators and so forth in the compound of the Moiwa Water Treatment Plant. Hokkai Hydro Generation will then supply the generated electricity to the Waterworks Bureau's Waterworks Memorial Museum as well as the Moiwa Water Treatment Plant, and receives payment for the energy service charges in return. This is referred to as an on-site type hydraulic power generation and the project period is scheduled to last for 20 years from the commencement of operation. This will be the nation's first on-site type hydraulic power generation that utilizes waterworks facilities. Operation is slated to commence in April 2007.

Joint project



NEDO

New Energy and Industrial Technology Development Organization (NEDO) is an independent administrative corporation where new energy and energy-saving technologies have been developed.

GEC

Global Environmental Centre (GEC) Foundation strives to conserve the global environment by promoting partnership between developing countries and Japan.

2. Promoting Environmental Conservation in Business Areas

Summary of this chapter

We at HEPCO are launching conservation activities that give special consideration to the regional environment, ranging from environment impact assessment at the time of construction of an electric power station to environmental monitoring during its operation. With regard to SOx and NOx, which are discharged from thermal power stations, we established target values for reducing them to approximately 0.4 g/kWh for SOx and 0.3 g/kWh for NOx on average for all power sources in FY2011, and we are working hard to reduce emissions. We are also properly controlling and reducing emissions of hazardous substances. We are promoting the development of technology with excellent environmental characteristics, such as high efficiency power generation systems.

Environmental impact assessment

Environmental impact assessment is a system of investigating, forecasting and evaluating the impact of a development project on the environment prior to implementation. To ensure that environmental preservation measures are satisfactory, the results are made public, and the opinions of local residents are taken into consideration. For the construction of power stations, the environmental impact assessment has conventionally been conducted in conformity to the assessment system developed by the Ministry of Economy, Trade and Industry, as well as the Hokkaido Government Ordinance on Environmental Impact Assessment. Since the enactment of the Environmental Impact Assessment Law on June 12, 1999, environment impact assessment based on this law has been conducted for the construction of power stations.

Examples of environmental impact assessment implemented

Power station	Survey period	Commencement of work	Commencement of operation (tentative)
Tomato-Atsuma Power Station Unit No. 4 (thermal)	1996 – 1997	Feb. 1999	June 17, 2002
Kyogoku Power Station (hydroelectric)	1996 – 1998	Sep. 2001	Unit No. 1: Oct. 2015 Units No. 2 and 3: 2016 or later
Tomari Power Station Unit No. 3 (nuclear)	1996 – 1998	Nov. 2003	Dec. 2009

Conclusion of the Pollution Control Agreement

Each thermal, geothermal and nuclear power station has adopted the Pollution Control Agreement (Safety Agreement for Tomari Power Station) with the concerned local governments. The agreement covers the entire environmental preservation spectrum, including control of air pollution, stipulating preventive measures for facilities, monitoring systems and responses to accidents.

Environmental monitoring

Environmental monitoring at thermal power stations

We have taken measurements and conducted surveys at various thermal power stations to monitor the state of SOx and NOx emissions and understand the impact on surrounding areas,

confirming that all monitoring results are favorable.

Publication of environmental monitoring results of Kyogoku Power Station

At Kyogoku Power Station, we have conducted environmental monitoring (including noise, vibration, water quality, animals, plants, ecosystem and landscape) during necessary periods before, during and after work. When deemed necessary, we have taken appropriate measures with the advice and guidance from people of experience or academic standing. The monitoring results of the previous year are made public at the Kyogoku Town Office and the Kyogoku Hydroelectric Power Station Construction Office every year around May. We are working hard to create relationships of mutual trust by aspiring to ensure favorable communications with local communities through open disclosure of information.

Content of the Pollution Control Agreement

Power station	The other party to the agreement
Sunagawa Power Station	Sunagawa City
Naie Power Station	Naie Town
Tomakomai Power Station	Hokkaido, Tomakomai City
Date Power Station	Date City, Sobetsu Town, Toyoko Town, Toyoura Town
Tomato-Atsuma Power Station	Hokkaido, Tomakomai City, Chitose City, Abira Town, Atsuma Town, Mukawa Town

Power station	The other party to the agreement
Shirouchi Power Station	Shirouchi Town, Kikonai Town, Fukushima Town
Mori Power Station	Mori Town
Tomari Power Station	Hokkaido, Tomari Village, Kyowa Town, Iwanai Town, Kamoenai Village
Major items	Emissions of sulfur oxides, nitrogen oxides, and soot and dust Difference in intake and discharge water temperatures Drainage-water quality

Case example

Amendment to the “Agreement regarding Securing the Safety and Conserving the Environment of the Tomari Power Station and its Environs” etc.

The “Agreement regarding Securing the Safety and Conserving the Environment of the Tomari Power Station and its Environs” (Safety Agreement) and other relevant agreements concluded among HEPCO, the Hokkaido Government and the municipal governments in Tomari Village, Kyowa Town, Iwanai Town and Kamoenai Village were amended on August 15, 2005. The latest amendment was made because the Safety Agreement came to cover Tomari Power Station Unit No. 3, which is currently under construction, and ensuing reviews were conducted. The Safety Agree-

ment was concluded on February 8, 1986, with the aim of protecting the health of residents in the vicinity of the Tomari Power Station and preserving their living environments. It had previously been partially revised in 1991 and 2004. In the latest amendment, HEPCO’s obligations to readily disclose information were stipulated, “results of regular evaluation of nuclear reactor facilities” and the “contents of changes in the safety regulations” were added to the matters to be reported. In addition, the reporting process regarding regular inspections was reviewed among other matters.

Pollution control agreements

These are concluded with the Hokkaido Government and/or municipalities near power stations. They address wastewater and the like from power stations. Measurements are reported regularly.

Measures against the decrease of ground-level concentration

Measures designed to reduce adverse impact on the ground by making smokestacks taller and/or narrowing the top of smokestacks to accelerate the flow velocity of exhaust gas, thus facilitating dispersion of the gas.

Offensive odor countermeasures

These are measures to be implemented in conformity with the *Odor Control Law*, stipulated to preserve the living environment by preventing odors from being generated at factories and elsewhere.

Measures against warm wastewater

Seawater that has been used to cool condensers in thermal and nuclear power stations and other types of wastewater can be as much as 7 C warmer than when the water is taken in. If discharged without treatment, they adversely affect the ecosystem, such as by harming fish. Measures against warm wastewater are taken to reduce such impacts.

Undertakings for environmental preservation at the nuclear power station

Treatment and disposal of radioactive waste

Operation of nuclear power stations generates gaseous, liquid and solid radioactive waste. This waste has low levels of radioactivity. We thoroughly treat the waste and measure its radioactivity before being discharged outside. At Tomari Power Station, safe treatment and disposal are conducted depending on the types and properties of the waste.

Gas (exhaust in facilities etc.)

Radioactive waste is fully attenuated by filtering or storage in a tank, and safety is verified before it is discharged in the air.

Liquid (washing water, floor cleaning water, etc.)

Radioactive waste is separated into distilled water and enriched waste liquid using evaporators, or some other treatment method. Distilled water is released into the sea after being confirmed as safe, while the enriched waste liquid is solidified by asphalt etc., placed into drums and stored at the power station. These drums are later transported to and buried at the Low-Level Radioactive Waste Burial Center in Rokkasho Village, Aomori Prefecture.

Solid (paper towels, old work uniforms, etc.)

The amount of radioactive solids is reduced by incineration or compression, and the waste is stored in drums. As of the end of 2005, there were 4,957 drums being stored at the solid waste storage center. (Maximum storage capacity is equivalent to approximately 18,000 drums.)

Radiation control

Control of radiation during operation
The radiation dose surrounding our nuclear power station is controlled to be at or below the target determined by the Nuclear Safety Commission (0.05 millisievert per annum), which is lower than the regulated value stipulated by law (1 millisievert per annum).

Radiation monitoring

We monitor radiation at Tomari Power Station by establishing monitoring stations and posts, to confirm that radioactive substances discharged by normal operation have no impact on the surrounding environment. Monitoring (and measurement) results are reported to the relevant local governments every quarter, in conformity with the Safety Agreement, and receive assessment by the Technological Subcommittee of the Tomari Nuclear Power Station Environmental Conservation Monitoring Council.

Provision of radiation monitoring data to the public

Tomari Power Station has shared its environmental radiation monitoring data recorded at the monitoring stations, for example, with the Hokkaido Nuclear Energy Environmental Research Center since April 2001. This information is available to the public at the Center and at relevant local governmental offices. In addition to radiation levels, the data including temperatures, wind directions, wind velocity and intake / outlet water temperatures are also made available to the public at the same locations.

Environmental preservation measures

State of air pollution control measures

Measures for the reduction of SO_x, NO_x, and soot and dust emissions at thermal power stations

We are tackling the reduction of SO_x and NO_x emissions at thermal power stations. For the reduction of SO_x we have installed desulfurization equipment, and for the reduction of NO_x we have adopted exhaust gas-mixing combustion, installing low NO_x burners and denitrification equipment. We have also set up dust collection equipment to minimize soot and dust emissions.

Measurement results of radioactive waste

Measurement results of gaseous waste (cumulative value for FY2006) Unit: becquerel	Controlled value	Rare gas	Iodine 131
	Measurement result		1.1 × 10 ¹⁵
		2.8 × 10 ⁹	Detection limit (7 × 10 ⁻⁹)* or below
Measurement results of liquid waste (cumulative value for FY2006) Unit: becquerel	Controlled value	Non-tritium	Tritium
	Measurement result		7.4 × 10 ¹⁰
		Detection limit (2 × 10 ⁻²)* or below	3.1 × 10 ¹³

*Unit: becquerel/cm³

Information made available to the public, including radiation monitoring data, at the Tomari Power Station

Monitoring places	Monitoring items	Monitoring places	Monitoring items
Monitoring station in the compound of Tomari Power Station (1)	Radiation levels in the air (space radiation levels)	Outlet post	Radiation counting rate
Monitoring posts in the compound of Tomari Power Station (7)	Radiation levels in the air (space radiation levels)	Intake monitor	Intake water temperature
Monitoring station in the vicinity of Tomari Power Station (Takadai)	Dose factor, wind direction, wind velocity, precipitation	Outlet monitor	Outlet water temperature
Monitoring station in the vicinity of Tomari Power Station (Horikappu, Tomari, Miyaoka)	Dose factor	Offshore monitor	Offshore water temperature (at depths of 0.5, 5 and 10 m)
		Stack monitor	Radiation counting rate
		Weather station in the compound of Tomari Power Station	Wind direction, wind velocity, temperature, precipitation

HEPCO's regional environmental conservation undertakings

Air pollution control measures	Measures against sulfur oxides	Use of low-sulfur fuel	Installation of flue gas desulfurization equipment
	Measures against nitrogen oxides	Adoption of the two-step incineration method	Adoption of low-NO _x burners
	Measures against soot and dust	Adoption of large-scale furnace volume boilers	Installation of flue gas denitrification equipment
	Measures against the decrease of ground-level concentration	Introduction of exhaust gas-mixing combustion	Installation of electric dust collectors
Water pollution control measures	Measures against spilled oil	Improvement of monitoring measurement networks	Emergency procedures
	Drainage measures	Installation of loading arms	Installation of oil fences
Noise and vibration control measures		Installation of oil adsorption mats	On-hand supply of oil adsorption mats
		Installation of neutralizing coagulation and sedimentation equipment	Installation of oily-water separators, filters and adsorption equipment
		Installation of domestic wastewater treatment systems	
		Adoption of low-noise, low-vibration equipment	Installation of noise barriers
		Adoption of independent, strengthened foundations	Indoor installation of machinery and equipment

*See the footnote on p.42.

Offensive odor countermeasures*	Measures against gas leakage by establishing dual pipelines
Ground subsidence countermeasures	Early implementation of concrete works at the time of drilling
Soil contamination countermeasures	Implementation of waterproofing works
Other environmental conservation measures	Adherence to related laws
	Proper control and disposal of contaminated soil
	Promotion of afforestation
	Adoption of pylons that are in harmony with the environment
Measures against warm wastewater	Harmonization of shapes and colors of facilities/equipment and their surroundings
Measures against industrial waste	Adoption of deep-water intake methods
Measures against radio noise	Adoption of underwater discharge methods
Measures during the construction of power stations	Optimum treatment measures
Security measures	Recycling countermeasures
	Considerations during transmission line selection
	Installation of community antennas
	Transfer and replacement of individual antennas
	Prevention of air pollution, water contamination, noise, vibration and ground subsidence, protection of valuable flora and fauna, awareness of land and marine transportation
	Establishment of a disaster prevention system
	Disaster prevention & recovery and disaster recover measures

Millisievert Millisievert refers to the unit of impact of radiation on human body. 1000 millisievert = 1 sievert	Becquerel Becquerel is a unit that describes the intensity of radioactivity. One becquerel is the radioactivity released by the decay of one atom per second.	Rare gases These are helium (He), neon (Ne), argon (Ar), krypton (Kr), xenon (Xe) and radon (Rn).	Iodine Its atomic number is 53 and atomic weight is 126.9. It is one of the halogen elements. It does not exist independently in nature, but exists primarily as organic compounds in seaweed and marine animals.	Tritium An isotope of hydrogen, its nucleus consists of one proton and two neutrons.
--	---	---	---	--

In FY2006, the amount of coal-driven thermal power generated at our thermal power stations decreased. As a result, the NOx emission rate declined by 0.04 g/kWh to 0.44 g/kWh. However, the SOx emission rate increased by 0.04 g/kWh to 0.57 g/kWh due to an increase in the amount of electricity generated at thermal power stations, which is purchased from IPPs. We will strive to achieve our target values by reducing fuel consumption through the maintenance/improvement of thermal power generation efficiency and proper maintenance and safe operation of the nuclear power station.

Measures to control water pollution

Measures to control oil leakages
At oil-fired thermal power stations, we have taken measures to prevent oil leakage by installing oil fences around the tanker when the fuel is being delivered. Oil retaining walls are established around fuel tanks inside the power station compound, so that even if oil leaks due to damage to a tank, it will not contaminate outside areas. At hydroelectric power stations, equipment that does not use fats and oils has been adopted. At the same time, oil leakage countermeasures have been implemented, such as oil outflow prevention into rivers etc. and early detection of problems.

Wastewater treatment on premises
Water used to clean machinery and equipment, domestic wastewater, and other water generated in conjunction with the operation of power stations passes through comprehensive wastewater treatment equipment for oil separation, solids removal and neutralization. Clean treated water is then discharged into the sea. At thermal power stations where flue gas desulfurization equipment is installed, equipment for treating post-desulfurization wastewater is installed to treat wastewater after the separation of gypsum, which is generated during SOx removal.

Measures against soil contamination

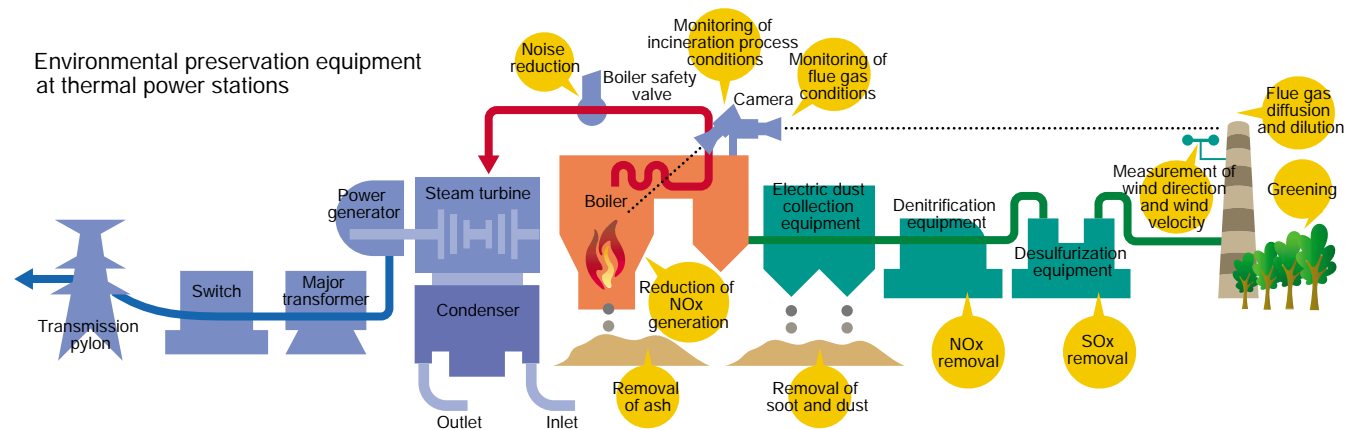
When soil becomes contaminated by harmful substances, there is the danger that it will adversely affect human health. For example, people may touch the contaminated soil or drink groundwater into which harmful substances have dissolved. *The Soil Contamination Countermeasures Law* was enforced in February 2003, in light of recent increases in soil contamination by harmful substances. HEPCO investigated information on pollution risks on the land it owns. There was no land that would be subject to surveys stipulated in *the Soil*

Contamination Countermeasures Law. In addition to this law, we are also abiding by *the Water Pollution Control Law* and other statutes, thereby working hard to prevent soil contamination. HEPCO has stored soil contaminated by hexavalent chromium, which was used as a herbicide in the past. We have properly stored and managed the soil by tightly sealing it in concrete inlets to avoid any leakage and ensuring containment, using reducing agent and asphalt. In conjunction with this, we have systematically incinerated it at waste disposal facilities.

Landscape measures

Our power stations and substations have abided by relevant laws, ordinances, etc. while paying attention to increasing greenery and other landscaping measures to strike a balance with the surrounding environment. Our environmental efforts also include systematically eliminating utility poles and adopting environmentally conscious slim pylons in urban areas.

Environmental preservation equipment at thermal power stations



Wastewater analysis results for major power stations (FY2006)

Measurement item	Tomato-Atsuma Power Station		Shiuruchi Power Station	
	Pollution Control Agreement value	Actual value*	Pollution Control Agreement value	Actual value*
Chemical oxygen demand (COD) [mg/l]	17	7.2	20	6.4
Hydrogen ion concentration (pH)	6.0 ~ 8.0	7.2	5.8 ~ 8.6	7.5
Suspended solids (SS) [mg/l]	17	1.4	20	1
Normal hexane extract materials [mg/l]	1	Measurable limit or below	2	Measurable limit or below
Fluorine concentration [mg/l]	—	2.3 Reference value	15	0.8

*Average for the fiscal year

Case example

Introducing our bird protection activities

On September 18, 2005, the Open Forum of the Japanese Society of Zoo and Wildlife Medicine was held in Obihiro City, where government representatives, specialists and business representatives reported on the status of their activities to protect rare birds of prey in Hokkaido. HEPCO reported its measures to prevent rare raptors from being accidentally electrocuted. We also exhibited, at the entrance to the conference hall, perches designed to prevent the accidental electrocution of Blakiston's fish owls, indicator tubes intended to prevent Japanese cranes from colliding with power lines, and so forth. We thus extensively introduced our activities to protect rare animals and plants to the participants.



Soot and dust

These are generated by incineration of fuels and other materials.

Suspended solids (SS)

These are minute solid substances that are suspended in water

Normal hexane extract materials

This is the quantity of oil and fats extracted by adding hydrocarbon of methane series (normal hexane).

HEPCO Group Environmental Policies and Environmental Structure / Environmental Accounting

Material Balance of Business Activities

FY2005 Performance and Targets

1. Promoting Measures to Prevent Global Warming

2. Promoting Environmental Conservation in Business Areas

Feature

3. Promoting the Formation of a Recycling-Based Society

4. Improving the Level of Environmental Management

5. Developing "Environmental Relations" Activities

Nature conservation activities

Protection of rare birds

In the Kushiro and Nemuro districts, HEPCO, in cooperation with relevant government ministries and agencies and conservation organizations, has installed yellow indicator tubes, yellow rings and ID rings toward preventing bird collisions with power lines. When installing new transmission and distribution lines, the routes of electric wires are selected after investigations on nesting areas and flight routes of rare birds.

Wetland protection activities

HEPCO is constructing the Kyogoku Hydroelectric Power Station, the first pure pumped-storage power station in Hokkaido, to the east of Mt. Yotei. In proceeding with the construction work, we have been doing our utmost to preserve the Kyogoku Mire around the Upper Reservoir area by taking measures intended to mitigate environmental burdens and understanding the construction's impact on the environment through monitoring.

HEPCO reported these activities at a meeting for the 9th Conference of the Contracting Parties to the Convention on Wetlands (Ramsar Convention), which was held in Kampala, Uganda, in November 2005.

Control of hazardous substances

HEPCO has disposed of waste and controlled hazardous substances in conformity with environmental laws and relevant regulations and standards. Furthermore, we conducted fact-finding surveys on the utilization of materials and equipment that contained hazardous substances in FY2006 as we thought it necessary to understand the composition of materials and equipment that we handled, evaluate their environmental risks and examine countermeasures. As a result, it was learned that we did not use any substances of serious environmental concern. We are currently promoting awareness in how to handle hazardous substances and studying product replacements, based on the survey results.

Responses to the PRTR Law

In 1999, the PRTR Law (the Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in their Management) was enacted. This law has made it obligatory to understand the quantities of certain discharged and transported chemical substances, and to report to the authorities if such substances are handled in quantities greater than designated. We at HEPCO formulated the

"Chemical Management Guidelines" and the "Chemical Management Manual" in FY2002, and we are doing our utmost to improve the management of designated chemical substances, minimize discharge to the environment and streamline their use. In FY2006, the five business establishments reported on six substances.

Dioxin countermeasures

HEPCO has worked hard to minimize the amount of waste and switched from in-house processing to having it processed by local governments and specialized businesses. As a result, we terminated operations of 50 waste incinerators, suspended operations in one, and only one incinerator is currently in operation. Since boiler temperatures at thermal power stations are high (1,200 or higher) with complete combustion and the fuel's chlorine content is extremely small, dioxins are hardly generated.

PCB countermeasures

Polychlorinated biphenyls (PCBs) were once used extensively as lubricating oils in various electric machinery and equipment. However, after their toxicity was recognized, proper storage of removed machinery and equipment as waste became mandatory.

Case example

Environmentally friendly weed prevention measures for pylon compound

At the Sunagawa Power Network Center, we are verifying a weed prevention measure using ground cover plants for the pylon compound. Ground cover plants refer to chamephytes, which grow hugging the ground. This time, we used thyme, a type of herbs. Since there will be no waste from weeding and no herbicide will be used, this measure will be very friendly to the environment. We will examine the possible application of the same for weed prevention method in the compound of the electric-supply stations.



Results of notification under the PRTR Law (actual results of FY2006)

(Unit: kg, dioxins: mg-TEQ)

Business establishment	Substance	Govt. ordinance No.	Handling volume (kg)	Application and source of generation	Destination of discharge (kg)		Quantities of transportation to places outside the business establishments
					Air	Public waters	
Tomato-Alsuma Power Station	Styrene	177	1,200	Antirust coatings for power generation equipment	1,200	0	0
Shiruiuchi Power Station	Styrene	177	1,300	Antirust coatings for power generation equipment	1,300	0	0
Tomakomai Power Station	Ethyl benzene	40	1,100	Coatings for power generation equipment	1,100	0	0
	Xylene	63	2,100	Coatings for power generation equipment	2,100	0	0
Tomari Power Station	Hydrazine	253	12,000	Chemicals for water supplies for power generation purposes	0	1,900	0
	Boron and its compounds	304	8,700	Nuclear reactor reaction control material	0	0	0
Nokanan Power Station	Dioxins	179	—	Generation from waste incinerator	0.11	0	0

*Except for dioxins, target substances whose volume handled annually at each business establishment is 1 ton or greater (special Class-1 designated chemical substances are 0.5 tons or greater) were tabulated (significant digits: 2).

Case example

Publicizing our wetland measures to the rest of the world

Mr. Yosuke Ogawa,
Civil Engineering Department's
Environmental Engineering Group



As introduced in the Environmental Action Report 2005, the Kyogoku Hydroelectric Power Station, which is currently under construction, has adopted a variety of conservation measures for the academically important Kyogoku Mire. At the "9th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar Convention)," which was held in Kampala in Uganda, Africa, in November 2005, we introduced our wetland conservation measures, thus appealing our corporate approach to the environment to governments and NPOs around the world. We will continue our efforts to conserve the environment in a proactive manner.



PRTR

The Pollutant Release and Transfer Register (PRTR) is a system for registering the quantities of chemical substances released and transferred. It is a mechanism in which the national government, business organizations and other institutions comprehend, tabulate and announce data as to how much designated chemical substances were released into the environment and/or transferred outside business establishments as waste. It was introduced in April 2001 in conformity with the Law Concerning Reporting of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management.

Law Concerning Special Measures against Dioxins

This law aims to prevent and remediate environmental pollution caused by dioxins. It established the Tolerable Daily Intake (TDI) and environmental standards, and stipulated restrictions on emissions into the air and water as well as providing measures regarding soil contamination (1999). "Dioxins" is a generic term for three types of compounds: polychlorinated dibenzofuran, polychlorierte dibenzodioxine, and coplanar polychlorinated biphenyl.

Subsequently, the PCB Special Measures Law (The Special Measures Law on the Promotion of Proper Treatment of Polychlorinated Biphenyls) has obliged businesses to treat PCBs by 2016. The Japan Environmental Safety Corporation formulated a PCB treatment plan in April 2003, and, in Hokkaido, treatment will be conducted at a treatment facility that is under construction in Muroran City, with the whole of Hokkaido and 15 other prefectures in Tohoku and other regions as the service areas. The PCBs that have been stored at HEPCO will be treated at this facility when its operation is commenced in 2007.

As of the end of FY2006, stored PCBs that were used for transformers and the like amounted to approximately 271 KI, and these are strictly controlled and stored under the supervision of chief administrators at 36 business establishments throughout Hokkaido. HEPCO possesses electric equipment, insulating oil and other materials that contain traces of PCBs, and these are also properly controlled and stored. As for their handling and treatment, we are awaiting decisions from the national government's Low-Concentration PCB Contamination Countermeasure Study Committee and will provide treatment accordingly.

Responses to asbestos problems HEPCO established an in-house asbestos work group in July 2005 and have been promoting countermeasures.

- Responses to products containing asbestos

We have 13 buildings where asbestos was sprayed, and emergent measures have already been taken there, including measures to prevent the particles from being dispersed and entry restrictions. As for molded items that contain asbestos particles that will not be dispersed, we have been replacing them at the time of repairs, for example.

- Health management

We have conducted special physical examinations for our present and retired employees. We have also made attempts in the early detection of asbestos-related health problems by including chest X-rays in regular physical exams.

- Safety measures

We have expended all possible means to prevent our employees from suffering from health problems by ensuring that those who enter places where asbestos was sprayed and engage in replacement work of asbestos-containing parts wear protective gear.

Promotion of technological development

High-efficiency power generation system

Participation in R&D of the IGCC demonstration plant With higher power-generation efficiency than conventional coal-fired thermal power generation, and lower emission levels of SOx, NOx, and soot and dust, the IGCC (Integrated Coal Gasification Combined Cycle) is highly expected to be a technology that excels in environmental conservation. In 1986, HEPCO participated in the Technology Research Association, consisting of electric power companies nationwide, Electric Power Development Co., Ltd. and the Central Research Institute of Electric Power Industry, and accumulated technologies. In FY2000, we participated in R&D of the IGCC demonstration plant and initiated research as a cooperative research project. In addition, we electric power companies made joint capital investments in the establishment of a new company called the Clean Coal Power Research Institute, in FY 2002, and have been engaged in research and development of a demonstration plant with this company as the main body.

Incinerators concerned (as of the end of March 2006)

Business establishment	Incineration capacity (kg/h)	Materials incinerated	State of operation
Tomari Power Station	150	Paper, shells	Suspended
Nokanan Power Station	195	Driftwood, garbage	Operated

State of storage of waste containing PCB (as of the end of March 2006)

	Quantity, breakdown, etc.
Quantity of oil	Approx. 271 kl (total of approx. 179 KI of insulating oil stored in drums, and the amounts of oil contained in machinery, equipment, etc., below)
Machinery, equipment, etc.	143 transformers, 733 condensers, 9,859 kg of waste clothes and other contaminated materials, 332 small machines, equipment, etc., 4,458 fluorescent light ballasts

*Excluding those in use

*Small machinery, equipment, etc.: measuring instrument transformers, rectifiers, relays, radio capacitors, etc.

R&D of the IGCC Demonstration Plant

Period of research	FY2000 – FY2010
Research focus	Development of the IGCC demonstration plant

List of asbestos products

	Types	Places where asbestos is used	State of use etc.	State of responses etc.
Asbestos-containing products	Sprayed asbestos	Sound insulating materials, heat insulators and refractory materials of HEPCO buildings	HEPCO buildings: 13	<ul style="list-style-type: none"> •Solidification, sheet curing, entry restrictions and other emergent measures have already been taken for buildings where sprayed asbestos was used. •Removal work is under way, starting with buildings where deterioration is significant and people frequently visit.
	Construction material	Fireproof boards, floor materials, etc. of buildings	Asbestos is believed to be contained in construction materials purchased in and before October 2004; We have not used construction materials since then.	<ul style="list-style-type: none"> •Since construction materials and sound insulating materials are molded items and asbestos particles are not disrupted or dispersed under normal conditions, they will continue to be used until the buildings are demolished.
	Sound insulating material	Sound insulating materials for transformers (transforming facilities)	4 pieces	<ul style="list-style-type: none"> •Asbestos cement pipes and heat insulators will be gradually replaced with non-asbestos products on the occasion of regular inspections, repair works and other opportunities.
	Asbestos cement pipe	Pipe line materials for underground wires and cables (power transmission system)	Route length: Approx. 2.7 km	<ul style="list-style-type: none"> •When construction materials, asbestos cement pipes, etc. are removed, proper measures are taken to prevent the asbestos from being dispersed according to the Labor Safety and Sanitation Law, the Regulations to Prevent Asbestos Harms, etc.
	Heat insulator	Power generation system (thermal power generation system)	The remaining number of asbestos-containing products: approx. 5,100 m ³ (about 10% of the total)	
	Buffer material	Suspension insulators for power transmission facilities etc.	The remaining number of asbestos-containing products: Approx. 650,000 pieces (about 30% of the total)	Since they are in molded items and encapsulated in insulators, they are not dispersed under normal conditions. However, they will be gradually replaced with non-asbestos products on the occasion of repair works and so forth.
	Thickener	Electric wires for overhead transmission lines	Route length of electric wires with anticorrosives: Approx. 98 km (About 1.3% of the total route length of overhead transmission lines)	Since they are fixed inside oil materials, they are not dispersed under normal conditions. However, they will be gradually replaced with non-asbestos products on the occasion of repair works and so forth.
Sealing material, joint sheet	Power generation system (thermal power generation system, nuclear power generation system)	The remaining number of asbestos-containing products: (Thermal) Approx. 49,700 pieces (about 56% of the total) (Nuclear) Approx. 36,000 pieces (about 95% of the total)	Since they are in molded items and are not dispersed under normal conditions, the products that have non-asbestos alternatives available will be gradually replaced with those that do not contain asbestos on the occasion of regular inspections, repair works and so forth.	

PCBs

These are polychlorinated biphenyls. They excel in thermostability and electrical insulation, and are used for transformers, condensers, heating media and carbonless paper. PCBs are persistent and accumulate in organisms, such as occurred in the Kanemi Oil Poisoning Case of 1968, when PCB toxicity attracted much attention. Manufacturing and import of PCBs is prohibited in principle, and it has been decided that PCBs owned by employers should be disposed of.

Asbestos

Asbestos is a natural fibrous mineral. Due to its high durability and heat resistance, it has been extensively used as a construction material and various other applications. If you inhale asbestos into lungs, however, it may cause lung cancer and mesothelioma. Therefore, preparations are under way to enact laws that will completely prohibit the manufacturing and use of the substance.

Cooperating in Tree Planting along Main Irrigation Channels in Hokkaido

Converting a row of cherry blossom trees into Japan's longest irrigation canals

1 We have begun planting cherry trees.

As a member of the "Society to Promote Greenery at the Hokkai Trunk Irrigation Canal, a Local Treasure)," which was inaugurated in response to a call from the Japan Groundwork Association, HEPCO has planted cherry trees in cooperation with local residents, administrative institutions and other organizations since the spring of 2006. The site where the cherry trees are being planted is the Hokkai Trunk Irrigation Canal, Japan's longest agricultural canal. With the Sorachi River as its water source, the canal stretches a total of 82 km and supplies water to the 16,500-ha farmland that covers seven municipalities in the Sorachi Region and constitutes the grain belt of Hokkaido.



2 Background

Our undertaking dates back to the registration of the Hokkai Trunk Irrigation Canal as a Hokkaido Heritage site in October 2004. Hokkaido Heritage refers to Hokkaido's invaluable natural, historical, cultural, life-related, industrial and other treasures that are to be handed down to future generations. From 2001 to 2004, 52 items were selected as Hokkaido Heritage, including the "Wakkanai Port North Breakwater Dome," "Hokkaido ramen," "coal mine-related facilities and lifestyles in Sorachi," "Esashi Ubagami Grand Shrine Togyo Festival and Esashi Oiwake" and the "Mt. Showa Shinzan International Yukigassen." Mr. Tatsuichi Tsujii, President of the Hokkaido Heritage Concept Promotion Council, proposed that we should plant trees near irrigation canals, so we called on the Hokkai Land Improvement District, where the Japan Groundwork Association manages irrigation canals, the Hokkaido Government and other relevant bodies to join us in planting cherry trees.

Cultivating *Prunus sargentii*

1. Collecting seeds

When the color of *Prunus sargentii* seeds has changed from red to black, collect them from branches that you can reach. Then, remove the skin and place them into water. Since seeds that float in water will not sprout, remove them. Place seeds in plastic bags and store them in a refrigerator (late June – early July).

2. Sowing

Turn the ground from approximately 30 cm deep and make soil softer. Sow 200-400 seeds per m² at intervals of 5-7 cm (before snowfall).

3. Turning up seedlings

Transplant 100-200 seedlings per m² at intervals of 7-10 cm (late April).

4. Overwintering measures for seedlings

Pull out seedlings, lay them in holes made in the ground, and cover the roots with soil, for example, to prevent them from breaking under the weight of snow (before snowfall).

5. Cultivating seedlings

Turn up seedlings. Take overwintering measures for the seedlings, and have them pass two winters.

6. Planting

Plant seedlings when they have grown approximately 2 m high (before sprouting out in spring). Supports will be necessary at first, but should be removed as early as possible (in several years' time).

Ezoyamazakura (*Prunus sargentii*)

Ezoyamazakura is one of the cherry tree varieties that represent Hokkaido. Rose-pink purple flowers open up slightly before leafing. The skin of the cherries turns blackish purple as it matures. Leaves are oval in shape, and the long, narrow leaves taper to a point and have jagged edges.
A.K.A. Ooyamazakura and Beniyamazakura



3 A row of 8,200 cherry blossom trees? (82km ÷ 10m=8,200)

The total length of the Hokkai Trunk Irrigation Canal is 82 km. If we are to plant cherry trees at intervals of 10 m, we would need 8,200 cherry trees. Cherry trees grow on well-drained soft soil and require soil dressing, setting in splints and various other care. If we plant 200 cherry trees per year, it would take about 40 years to complete a row of cherry trees. Of course, not all the land lots along the irrigation canal are for cherry tree planting. Regardless, this is a grandiose project unique to Hokkaido.



4 Cultivating seeds

We selected *Prunus sargentii* (Ezoyamazakura), one of the cherry tree varieties representative of Hokkaido. In addition, we chose to use sow seeds and use seedlings we cultivated to make our endeavor unique. We collect seeds in summer, sow them in early winter and cultivate sprouted seedlings in spring. The Sorachi Region is one of the heaviest snowfall regions in Hokkaido and the annual snowfall amounts to as much as 10 m. To withstand this heavy snowfall, it is necessary to plant trees after they have grown about two meters high. Therefore, it takes two or three years before homemade seedlings grow big enough to be planted along the canal.



5 First tree planting

Since it is hard for us to wait years until homemade seedlings become ready to be planted, we decided to purchase and plant some seedlings until our homemade seedlings are ready to be planted. During the first tree planting in May 2006, we planted 50 seedlings along the approximately 400-meter canal in Harumi, Sunagawa City. It was adjacent to the ground of Sunagawa Kita High School, which was abolished in March 2006. On the day, members of local neighborhood associations, employees of agricultural cooperatives, the Sunagawa City Hall, the Hokkai Land Improvement District, the Sorachi Subprefectural Government and the Sapporo Department of Development and Construction, and, from HEPCO, employees of the Sunagawa Power Station, the Sunagawa Power Network Center and the Takikawa Service Office participated. In the Sorachi Region, rice is planted in May, so the Hokkai Trunk Irrigation Canal was in full operation. We believe that *Prunus sargentii* will add color to the landscape along the irrigation canal in several years' time. Seeds sown in Sunagawa and Takikawa cities in November 2005 have sprouted out and been growing without any problems.

People

Partnerships among local residents, businesses and government

Ms. Manami Sawanobori

Investigator, Japan Groundwork Association

The Groundwork, first initiated in the U.K., refers to activities in which local residents, businesses and government establish partnerships to reinvigorate local communities by conserving, utilizing and managing local environments in a sustainable manner. In Japan, the Japan Groundwork Association was founded in 1995. The origin of this project is attributed to Mr. Tatsuichi Tsujii, Director General of the Association who doubles as President of the Hokkaido Heritage Concept Promotion Council. HEPCO agreed with our efforts to make the Hokkai Trunk Irrigation Canal, designated as a Hokkaido Heritage site, a place of recreation for the citizens of Hokkaido as it extends for as long as approximately 80 km by planting cherry trees, for example, along its side. Since

2005, the company has actively participated in on-site observation tours, cherry seeds pickup study sessions and cherry seeds sowing study sessions. With this preparatory period, HEPCO provided 50 seedlings and its employees in the Sorachi Region and the Head Office in Sapporo actually planted them together with local residents and other people concerned on the occasion of "Let's Plant Cherry Trees along the Hokkai Trunk Irrigation Canal," which was held in Sunagawa in 2006. We hope that HEPCO will continue their activities and show strong leadership in philanthropic activities in Hokkaido.



3.Promoting the Formation of a Recycling-Based Society

Summary of this chapter

Aiming to increase the general recycling rate of industrial waste to approximately 97% by FY2016, HEPCO has been promoting the “3Rs”: reduction, reuse and recycling. Our offices are working hard to achieve the objectives of reducing the amount of copy paper purchased through the promotion of double-sided copying, expansion of green procurement, i.e. purchasing environmentally friendly products, and other endeavors.

Promotion of the “3Rs”

Our major waste and byproducts include coal ash generated from thermal power stations, desulfurized gypsum generated from desulfurization equipment, and debris such as waste concrete pillars, electrical wires and other metal scrap generated as a result of power distribution work.

Although the amount of waste generated in FY2006 was 845 thousand t, a decrease of 85 thousand t from FY2005, the effectively utilized amount, including the amount utilized by HEPCO, was 821 thousand t. That is, the recycling rate was 97.1%. Due partly to an increase in the volume of coal ash used as a raw material of cement, subbase materials, etc., the recycling rate increased by 7.7 points from FY2005.

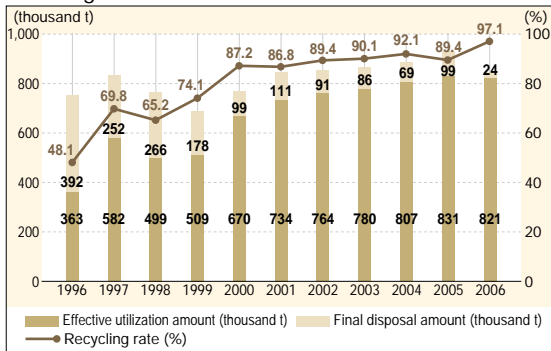
Striving to achieve the targeted general waste recycling rate

Aiming to improve the recycling rate, HEPCO established the “Recycle Promotion WG,” which has been striving to expand recycling efforts by understanding the status of recycling in each department and studying recycling methods and measures. Aiming to achieve the targets of 95% and 97% in general waste-recycling rate by FY2011 and FY2016, respectively, which were established in FY2005, we will continue to do our utmost to improve recycling rates by maintaining collaborative relations among all departments, which center on this WG, and by establishing trans-departmental waste collection and transportation systems.

Expansion of effective utilization of coal ash

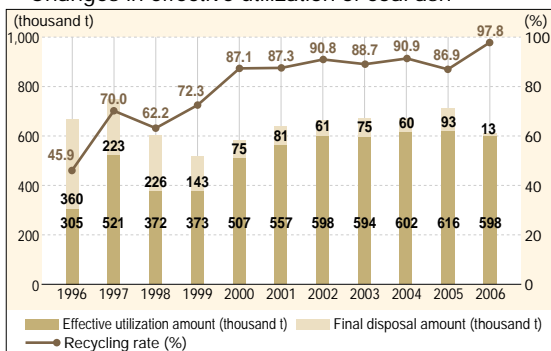
Regarding the effective use of coal ash, whose generation amounts are the greatest of any waste, as a top priority, HEPCO is encouraging its intensive utilization. In FY2006, coal ash amounting to 611 thousand t was generated, of which 97.8%, which include the amount utilized by HEPCO, was effectively used. Compared with FY2005, the recycling rate increased by 10.9 points. This increase was realized by promoting its utilization in civil engineering and construction fields such as in concrete admixture, cement admixture, recycled roadbed materials and pipeline backfill materials. We will further promote the stable utilization of coal ash in order to improve and maintain the recycling rate.

Changes in effective utilization of total waste



* Effective utilization amounts and recycling rates include those utilized by HEPCO.

Changes in effective utilization of coal ash



* Effective utilization amounts and recycling rates include those utilized by HEPCO.

Case example

Coal ash bricks Selling Ash Brick

HEPCO and Yonezawa Brick KK (Ebetsu City) jointly developed coal ash bricks called “Ash Brick.” Being bricks made with recycled coal ash (Fly Ash) generated at the Tomato-Atsuma Power Station (50% blended coal ash; EcoMark-certified; Hokkaido Recycle-certified), Ash Brick is stronger and has a lower water absorption percentage than typical red bricks. Therefore, it is highly durable and resistant to frost damage. We are currently developing light-colored bricks that have recently gained popularity for gardening and other purposes. A wide variety of applications, including pavement in cold regions and horticulture bricks, are currently available and we will further increase the product’s variations. This latest development is the fruit of the Research and Development Department’s participation in the Ceramics Exchange Meeting in Ebetsu City and its endeavors to use coal ash as a ceramic raw material. The commercialization of bricks made with 50% coal ash is the first attempt of its kind ever made thus far.

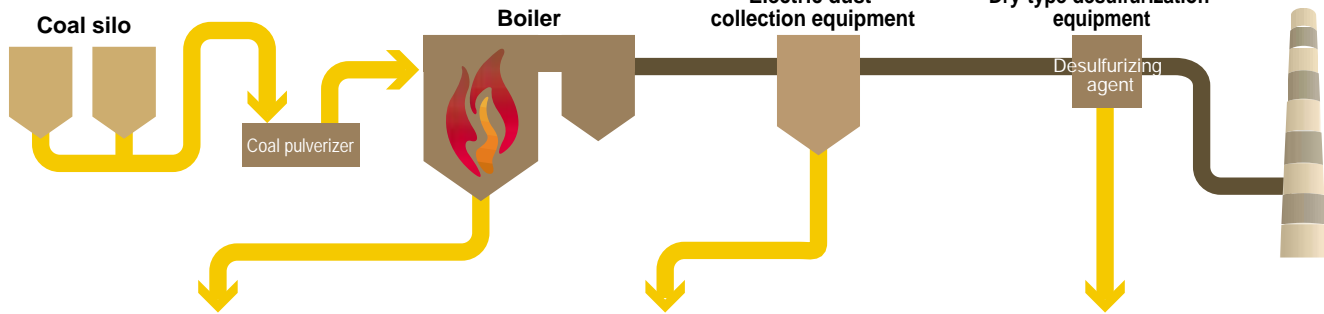


Ash Brick



Example of Ash Brick being installed at a typical home

Collection processes of coal ash at thermal power stations



Clinker



Clinker refers to a pulverized ash mass that falls to the bottom of a boiler after ash particles generated by incineration in the boiler aggregate with each other.

- Properties**
- Like sand, it is high in water permeability.
 - Particles have holes and openings and excel in drainage, gas permeability and water holding properties.

Fly ash



This is ash particles generated as a result of coal incineration that become suspended in high temperature incineration gas and are collected as spherical particles by electric dust collection equipment.

- Properties**
- Particles are spherical, with a diameter of 0.1 mm or less
 - Since particles are spherical, concrete into which fly ash is mixed has greater flowability.

Used desulfurizing agent



This is a desulfurizing agent discharged from desulfurization equipment after it absorbs SO₂ in exhaust gas and becomes solidified as gypsum.

- Properties**
- It has excellent deodorization capabilities.
 - It has hydraulicity.



Example of Fly Clean execution



Example of using materials preventing livestock paddocks from becoming muddy

Effective utilization of coal ash

Raw material for cement	Raw material for cement (clay substitute)
Civil engineering and construction	Concrete admixture, cement admixture, slurry, spraying concrete, roadbed materials, construction materials, bricks, filler for former mines, material recycling sludge from construction site
Agriculture and fisheries	Agricultural use (materials preventing livestock paddocks from becoming muddy, soil improvement materials, indirect materials for composting), marine use (artificial algae reefs)

Raw material for cement (clay substitute)
Since fly ash is high in silica content, which is the main component of soil, it is used as a clay substitute for the raw material of cement.

Concrete admixture
When fly ash is added to concrete as admixture, it leads to positive effects such as increased long-term intensity and the prevention of cracks.

Major results of effective utilization of coal ash (FY2006)

Utilization	Place	Amount of coal ash used	Product
Concrete admixture	Tomari Power Station Construction Office	7,309	JIS Fly ash
Cement admixture	Toppu Dam Construction	7,784	
Spraying concrete admixture	Saroma Tunnel Construction etc.	4,353	
Reclaimed roadbed material	Tomakomai	32,379	Fly Clean
Material recycling sludge from construction site	Sapporo	8,539	Fly ash
Filler for former quarries	Iburi subprefecture	28,410	F Soil
Backfill material for pipe lines	Sapporo	5,922	Clinker
Materials preventing livestock paddocks from becoming muddy	Iburi subprefecture	1,615	

Effective utilization of industrial waste (FY2006)

Waste	Generated amount (t)	Final disposal amount (t)	Recycling rate (%)	Recycling example
Coal ash	611,213	13,155	97.8	Reclaimed roadbed material
Desulfurized gypsum	165,741	1,517	99.1	Construction materials (gypsum boards)
Debris (waste concrete poles etc.)	45,598	4,107	91.0	Roadbed materials
Sludge (wastewater treatment sludge etc.)	8,999	2,846	68.4	Backfill material, lawn topdressing etc.
Metal scrap	5,943	320	94.6	Metal materials, electric wires, etc.
Heavy crude oil ash	3,423	10	99.7	Vanadium recovery etc.
Waste plastic	770	438	43.2	Plastic regeneration, thermal recovery, etc.
Other (waste oil, glass scraps, etc.)	3,280	1,765	46.2	Concrete release agents, permeable blocks, etc.
Subtotal	233,755	11,003	95.3	
Total	844,967	24,157	97.1	

*The recycling rate includes the amount used by HEPCO. Totals may not add up perfectly since some figures were rounded up.

Slurry

This is turbid liquid combining liquids and solids. It is the consistency of thick porridge.

Vanadium

Vanadium (atomic number 23; atomic weight 50.94) is a transitional element. Like titanium, it is corrosion resistant. Mixed with iron, its strength increases.

Preservation and reuse of electric power equipment

While paying due attention to the reliability of electric power supplies, we also continue to conduct thorough daily maintenance and inspections as well as promote R&D on extending the life of equipment so that we can use electric power equipment as long as possible. As for the equipment removed due to degradation, we repair and reuse it to the extent possible. For items that cannot be reused, such as debris, scrap metal, glass and the like, undertakings toward recycling them as raw materials are under way.

In FY2006, the amount of debris as well as the volume of sludge increased due to removal work at hydroelectric power stations and the full-fledged construction of Tomari Power Station Unit No. 3, respectively. As for debris, the recycling rate was 91%, a decrease of 4.6 points from that of FY2005 due to the stagnation of effective utilization of ferroconcrete, which is difficult to be sorted out. With regard to sludge, we promoted its in-house utilization as a

backfill material, for example, and thus, increased the recycling rate by 35.6 points to 68.4%. The recycling rate that excluded that of coal ash was 95.3%, a decrease of 1.9 points from FY2005.

Recycling of power distribution materials and machinery

While promoting the recycling of scrap electric wires, waste concrete poles and other waste items that are generated at the time of power distribution work, we consider expanding items to be repaired and reused, such as wat-hour meters, and those to be recycled.

Recycling of electric wire
Obsolete distribution lines are cut and pulverized before being sorted into metals and plastic and recycled. In FY2006, scrap electric wire amounting to 992 t was generated, all of which was fully used.

Recycling of insulators
We use non-reusable insulators as raw materials for permeable blocks and other products after separating them into metals and ceramics by pul-

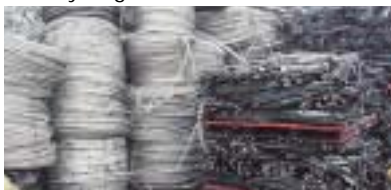
verization.

In FY2006, we recycled 877 t of insulators, excluding insulators from specific manufacturers that were found to have used asbestos-containing molded items during specific manufacturing periods.

Recycling of power distribution plastics
Power distribution machinery and materials include various plastics, such as insulation covers and pole brace protective tubes. These are pulverized and mixed with raw materials for repelletization and reused as plastic. They are also reused as fuel for power generation. In FY2006, the recycling rate was 100%.

Recycling of concrete poles
Obsolete waste concrete poles generated as a result of power distribution work are assembled and recycled into civil engineering and building base materials after being shredded and pulverized. In FY2006, waste concrete poles amounting to 6,545 t (8,906 poles) were generated and, once again, all of them were fully used.

Recycling of electric wire



Scrap electric wire



Pulverization

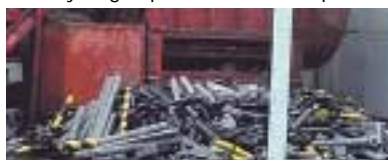


Selection of metals and covers



Reused as a raw material of copper

Recycling of power distribution plastics

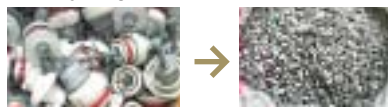


Waste plastic



Reuse example as electric wire covers

Recycling of insulators



Before pulverization



After pulverization



Execution example of permeable blocks

Recycling of concrete poles



Waste concrete poles



Reuse as base materials

Effective use of driftwood



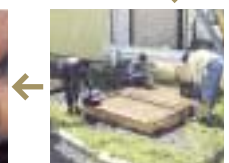
Driftwood flowing into to a dam



Chipping



Washed chips



Chip washing

Recycling at power stations

Effective use of driftwood

Driftwood flows into dam lakes due to typhoons, heavy rainfall, melting snow and the like. Driftwood not only poses a problem in terms of intake and the safety of facilities, but it also detracts from the landscape. In the past we removed driftwood from dam lakes and burned or otherwise disposed of it. The enactment of *the Law Concerning Special Measures against Dioxins* in January 2000, however, has called for the reduction of dioxins that accompany incineration. We have been making effective use of driftwood by chipping or other processes.

In FY2006, we disposed of 3,442 t of driftwood, of which 27% was effectively used.

Effective utilization of marine organisms

We use seawater to cool the condensers at seaside thermal power stations and nuclear power stations. If marine

organisms attach to inlet channels and other parts in large numbers, we will have difficulty taking in that water. Therefore, we remove attached marine organisms during regular inspection of power stations. Since large amounts of these marine organisms are removed every year, we have been composting them at the Tomato-Atsuma and Tomari Power Stations since FY2004 to minimize waste and make effective use of them. In FY2006, we made effective use of 1,200 m³ of composted marine organisms to increase greenery at the ash disposal site for the Tomato-Atsuma Power Station and used 180 m³ of composted marine organisms as fertilizer for the garden areas in the compound of the Tomari Power Station, including company housing.

Undertakings at offices

Under the HEPSCO Eco Work Campaign, we have been promoting the "3Rs" by engaging in waste reduction, thorough waste separation and the recruitment of recycling contractors. In FY2006, we began phasing in the Eco

Work in the HEPSCO group companies, thus promoting group-wide efforts. In FY2006, we recovered 539 t of paper, including used paper. If recovering 1 t of used paper is equivalent to leaving approximately 20 trees standing, the amount that we recovered would be the same as saving 10,790 trees. We will continue to recover used paper for recycling. We are also studying the conditions of waste separation and recycling at all our business establishments in Hokkaido. We will redouble our efforts to increase the recycling rate for waste generated at offices based on the study results.

Copy paper etc.

To reduce the amount of copy paper used, we set a target of reducing copy paper purchased per employee to 8,500 sheets in FY2008, and we have promoted double-sided copying and computerization of paper documents as well as other measures through the Eco Work that has been under way at all of our business establishments. The Eco Work Infrastructure Support Working Group,



Composting marine organisms (Tomato-Atsuma Power Station)

Examples of waste recycling at business establishments

Category	Example of recycling	Category	Example of recycling
Newspapers, fliers	→ Recycled paper	Cans	→ Metal materials
Magazines, pamphlets	→ Recycled paper	Bottles	→ Bottles, glass wool
Cardboard	→ Recycled cardboard	PET bottles	→ PET bottle flakes
Used paper	→ Recycled paper, toilet paper	Recyclable garbage (paper waste, paper cups, vinyl scraps, chopsticks, soft plastic, etc.)	→ Solid fuel
Classified documents (account ledgers)	→ Recycled paper, bedding		
Shredded paper	→ Recycled paper, bedding		

Case example

Activities to prevent illegal dumping of waste Kushiro Branch Office

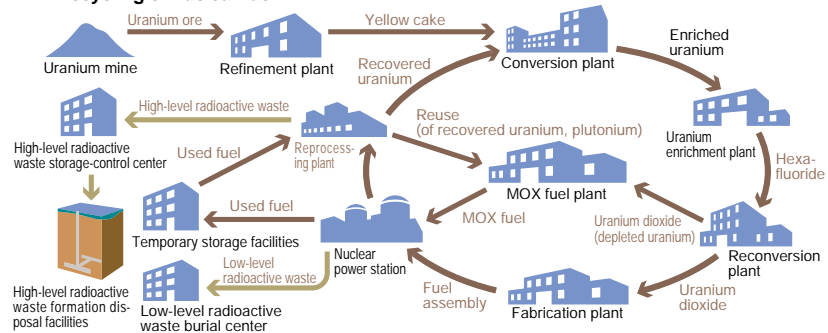
Illegal dumping of waste has recently become a social concern. Since employees and meter inspection staff working for HEPSCO and its Group companies are often out making the rounds, we thought that they could help deter illegal dumping. As a result, we concluded an illegal dumping notification agreement with all municipalities in the Kushiro Branch Office's service areas in April 2005. This is the first attempt of its kind by a private company within the area and has received attention in local newspapers and public relations magazines within those municipalities. As a utilities company, society also expects us to play a role in protecting communities.

Reference

Recycling of nuclear fuel

Uranium used as fuel at nuclear power stations is recyclable. Uranium ores excavated at mines are ultimately used in the state of fuel assembly in nuclear reactors after going through refinement, conversion, enrichment, reversion and processing. Since 95% of the fuel used at nuclear reactors can be reused, uranium and plutonium are recovered at the reprocessing plant. The uranium and plutonium are mixed into a new fuel (MOX fuel), and the process that uses this fuel at nuclear reactors currently in operation to generate electricity is referred to as "pluthermal power-generation (MOX burning in thermal reactors)." This technology has a track record abroad dating back approximately 40 years, and its reliability has been fully confirmed. Activities toward its introduction are being promoted in Japan.

Recycling of nuclear fuel



Uranium

This metallic element (atomic symbol of U; atomic number 92) exists in nature. In nuclear power generation, Uranium 235, which is susceptible to nuclear fission, is the uranium isotope that is used. However, the majority of natural 235 uranium is Uranium 238, which is resistant to nuclear fission. Uranium ore has a uranium content of approximately 0.7%.

Plutonium

Plutonium (atomic number 94) is a transuranium element. Only minute amounts of plutonium exist in nature. It is generated when uranium fuel is used in a nuclear reactor.

consisting of relevant departments, has been studying various measures, e.g. incorporating concerns for reduced paper consumption in the selection of copying machines and printers. In FY2006, these efforts enabled us to achieve the target of 9,800 sheets, a reduction of 1,000 from FY2005. Since further efforts and activities are necessary to continue to achieve our goals in the future, we will practice the Eco Work Infrastructure Support Working Group's study results, provide information that will lead to the effective reduction of paper consumption and so forth, in addition to the Eco Work.

Expansion of green procurement

Aiming to further advance our activities geared to the establishment of a recycling-oriented society, we have been rigorously promoting "green purchas-

ing" under the Green Procurement Guidelines, which were formulated in July 2001. Since April 2002, all Group companies have undertaken green purchasing and put up a united front in promoting various undertakings.

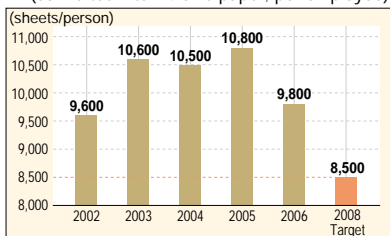
Starting in FY2006, we have expanded the scope for the goal of the "green procurement rate" that we had set for recycled paper and publications to include all office supplies, and specified the goal as one of our environmental control items. We are striving to attain 90% in the green procurement rate in FY2008.

We achieved a high green procurement rate in terms of copy paper, business cards and so forth in FY2006, when our target was 80%. Due to the stagnant procurement rate for fliers, posters, pamphlets and the like, however, the total green procurement rate of office supplies fell slightly

short of the target at 78.5% although it was an increase of 5.3 points from FY2005.

We will research specific products for green procurement for all office supplies and further encourage the use of such products – mainly for publications – to achieve the goal in the future.

Copy paper purchased
(converted into A4-size paper; per employee)



People

Green procurement activities

Mr. Keiichi Fukushima
Purchasing and Contracting
Planning Group, Purchasing
and Contracting Department

We have been working hard to expand green procurement, but in regional cities in Hokkaido, green procurement has not yet become popular because a few stores deal in environmentally friendly products and their prices are high. I believe that what is most important in expanding green procurement is enhancing our awareness of the environment. The Purchasing and Contracting Department will continue to help our employees engage in activities intended to further expand green procurement by providing a variety of information, for example, through the Eco Work in their workplace.



Case example

Reducing copy paper consumption with e-blue, an "erasable toner"

E-blue is a toner with thermal achromatizing characteristics. Documents that were printed with e-blue and become unnecessary are reusable by applying heat to them and erasing the toner with equipment strictly for erasing. The Thermal Power Department has installed this type of printer on an experimental basis and verified its effectiveness since October 2005, to promote reductions in copy paper consumption as established as the company-wide environmental management target and the Department's Eco Work management target. As a result, the Department confirmed that e-blue was effective in

reducing copy paper consumption because the amount of copy paper purchased decreased by approximately 8,000



papers or 1% in FY2006. Starting in May 2006, the use of e-blue printing equipment has been in full swing. We will continue to make efficient use of e-blue equipment and take other measures to reduce the amount of copy paper purchased and reduce environmental burdens at offices.

Group case example

Separation of waste Tomakomai Branch Office, Hokkaido Power Engineering

In April 2006, our branch office independently declared that it had conformed to ISO 14001. As one of our specific EMS activities, we are implementing the "HOPE Tomakomai Eco Activities Step 1." More specifically, we basically prohibit the use of paper cups and individual garbage bins; promote the use of both sides of copy paper; promote the separate collection of recyclable waste. The challenge we face in Step 1 is to ensure that recovered resources will surely be recycled. To this end, we have installed recovery boxes according to the recycling classification of businesses, re-

used shredded paper by participating in the city government's Used High-Quality Paper Recycling Promotion Committee and



carried steel cans, bottles, PET bottles and the like directly to recycling centers. In response to the future diversification of waste and development of recycling techniques, we would like to develop this activity to Step 2 and on to Step 3.

4. Improving the Level of Environmental Management

Summary of this chapter

Aiming to steadily promote the HEPCO Group Environmental Policies, the HEPCO Group is building promotional mechanisms of the Environmental Management System (EMS). All our major thermal power stations are ISO 14001-certified (as of February 2005), and the HEPCO Eco Work Campaign has been introduced to all the remaining business establishments. Since FY2006, we have been implementing the aforementioned policies by carrying out campaigns toward the Group companies, and other activities. We are also promoting adherence to environmental statutes and conducting environmental education for employees, including those in the Group companies.

HEPCO EMS promotion system

Aiming to properly promote the HEPCO Environmental Policies, the entire Group has made concerted efforts to establish a promotion system and has rigorously conducted activities toward the realization of environmental management.

HEPCO established the Environmental Committee with the General Manager of the Corporate Communication Division as its President, who supervises environmental activities, and the committee has been discussing the fundamental policies concerning all environmental measures. In FY2006, the 5th Environmental Committee meeting was held on November 24, 2005.

The Environment Working Group, which was established under the control of the Environmental Committee, conducts coordination and liaison be-

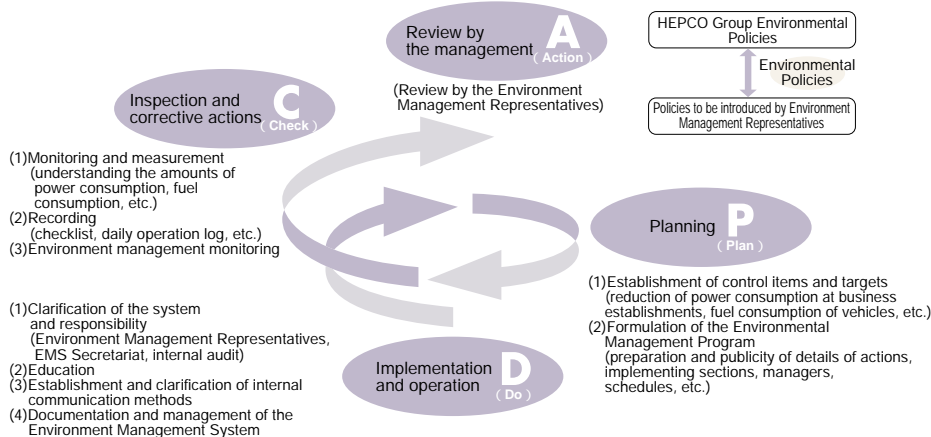
tween departments and examines individual challenges to be addressed. As for specific issues, working groups that will exclusively deal with them will be established to study possible solutions. In addition, we also held liaison meetings to share information.

Approximately 100 executives including general managers of departments at the head office and general managers of branch and sales offices were appointed as "Environment Management Representatives" to promote company-wide management and clarification of responsibilities. The HEPCO Group Environmental Promotion Committee, formed by those in environmental management positions in each group company, has been clarifying common environmental activities and is reinforcing cooperation among the Group companies. It serves as a forum whereby the entire Group addresses environmental issues.

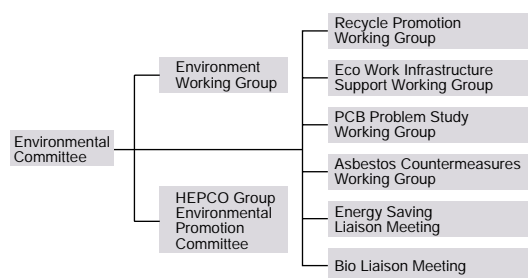
Acquisition of ISO14001 certification at major thermal power stations

With the establishment of an ISO 14001-based EMS at Shiriuchi Power Station in 2000, other thermal power stations have striven to acquire that certification. As a result, all of HEPCO's major thermal power stations have established an EMS based on ISO 14001. In April 2006, the Tomakomai Power Station independently declared that it had conformed to ISO 14001. The Mori Geothermal Power Station introduced the Eco Work in September 2004. We will continue our efforts to reduce environmental burdens while reducing fuel consumption and minimizing and recycling waste.

Diagram of the HEPCO Eco Work Campaign



Environment-related organizations



Acquisition of ISO certification at thermal power stations

Business establishment	Date of acquisition
Shiriuchi Power Station	April 2000
Tomato-Atsuma Power Station	June 2003
Naie Power Station	December 2004
Date Power Station	January 2005
Sunagawa Power Station	February 2005
Tomakomai Power Station (self-declaration)	April 2006

Group case example

Acquisition of ISO14001 certification

The HEPCO Group carefully addresses environmental issues in every field, including business and operation/maintenance of equipment. Therefore, all the Group companies regard environmental consideration as a primary management pillar and have implemented various environmental conservation measures. As a result, Hokuden Kogyo acquired ISO 14001 certification in 2003 and Hokuden General Engineering Design & Consulting and The Tomatoh Coal Center Co., Ltd. in 2004. In April 2006, Hokkaido Power Engineering's Tomakomai Branch Office independently declared that it had conformed to the international standard.

Acquisition of ISO certification by Group companies

Company	Date of acquisition
Hokuden Kogyo	July 2003
Hokuden General Engineering Design & Consulting	May 2004
The Tomatoh Coal Center Co., Ltd.	July 2004
Hokkaido Power Engineering Tomakomai Branch Office (self-declaration)	April 2006

ISO 14001

This international standard for environmental management systems was stipulated by the International Organization for Standardization in 1996. It is a systematized environmental management method to ensure continuous improvement through business activities by establishing a specific mechanism whereby all constituent members of an organization participate in order to improve the impact of organizational activities, for example, on the environment.

HEPCO Eco Work Campaign

HEPCO has operated the simplified ISO 14001-based EMS at 93 business establishments, with the exception of major thermal power stations that had already acquired ISO 14001 certification. We refer to this activity as the "HEPCO Eco Work Campaign" and have worked hard to minimize environmental burdens through our customary activities geared to the realities of respective business establishments, such as the reduction of copy paper being purchased, decreases in power consumption at our offices, reductions of waste generated at our offices, and increases in corporate vehicles' fuel efficiency.

Some of our business establishments have also engaged in activities intended to reduce tap water consumption, recycle chopsticks and so on.

Activities in FY2006

	Number of business establishments engaged in the activity	Achievement ratio*
Reduction of copy paper purchased	84	54%
Reduction of electric power consumption at offices	73	56%
Reduction of office waste generated	26	69%
Improvement of fuel efficiency of corporate vehicles	23	52%

* The achievement ratio is calculated by dividing the number of business establishments that have achieved their goals by the number of those engaged in the activity

Progress in achieving the goal

With regard to the reduction of copy paper being purchased, about 90% of HEPCO business establishments are taking the appropriate steps while approx. 80% of them are doing the same in terms of electric power consumed at our offices and more than half of them have achieved their objectives. In addition, about 30% of HEPCO business establishments are working to reduce waste generated at offices and improve our corporate vehicles' fuel efficiency, and more than half of them have achieved the objective.

Education

Aiming to improve the "HEPCO Eco Work Campaign" further, we held internal auditing training sessions for auditors at HEPCO business establishments to get them to have a deeper understanding of the concept, basic principles and other aspects of the basic of auditing, auditing procedures, the content of

auditing, check items and so forth.

Expanding the Campaign

Starting in FY2006, we have gradually introduced the Eco Work to the Group companies, so that it will spread throughout the Group by FY2007, with the exception of business establishments that had already acquired ISO 14001 certification.

Adherence to environmental statutes

In pursuing our business activities, we have been stringently adhering to environmental statutes and ordinances as well as to the Pollution Control Agreement concluded with the relevant local governments situated around power stations. There were no cases in FY2006 of improvement recommendations or orders, penal provisions or the like due to the violation of environmental statutes.



Meeting attended by employees responsible for the Eco Work



Eco Work Auditors' training

Group case example

Eco Work at welfare facilities

Mr. Tokio Sakuma

General Manager, Hokuden Kogyo's Toya Suiko-So and Kita 2-Jo Club

Hokuden Kogyo is responsible for operating and managing HEPCO's employee service facilities, including Suiko-So located by Lake Toya in a national park and Kita 2-Jo Club in downtown Sapporo, and has participated in the HEPCO Eco Work Campaign since FY2006. Due to the nature of those facilities, we cannot turn off all of the lights in our buildings during lunch breaks, for example. However, we are saving on electricity at our offi-

ces as well as automatic vending machines with the cooperation of our customers. Energy conservation and efforts to curb global warming are urgent issues to be tackled by both businesses and individuals. With our hotel business, we would like to begin by doing what we can and continue to make step-by-step progress together with our customers.

Suiko-So Front Desk



Environmental statutes

Name	Relevant major business activities	Name	Relevant major business activities
<i>Air Pollution Control Law</i>	Emissions and emission concentration of SOx, NOx, soot and dust discharged in conjunction with the incineration of fossil fuels at thermal power stations are controlled. Discharge of the aforementioned substances is suppressed and controlled by installing desulfurization equipment, denitrification equipment, electric dust collection equipment and so on.	<i>Waste Disposal and Public Cleansing Law</i>	Waste generated in conjunction with business activities is properly controlled. While encouraging waste reduction and recycling, the law stipulates that discharged waste must be properly treated by disposal companies.
<i>Water Pollution Control Law</i>	Harmful substances contained in domestic wastewater and machinery washing water generated at power stations are controlled. They are discharged as clean water, using wastewater treatment equipment.	<i>PRTR Law</i>	Discharge of chemical substances used during business activities into the environment is controlled. Chemical substances contained in rust preventives, paints, etc. that are used for the operation, construction, repair, etc. of power stations, substations and other facilities are subject to the law.
<i>Noise Regulation Law</i>	Noise generated by operation of power stations, substations, etc. and construction work, is prevented. With regard to the rotating equipment at power stations and transformers at substations, external transmission of noise is restrained by introducing low-noise equipment and sound insulating walls, and installing such equipment indoors, etc.	<i>Law concerning the Rational Use of Energy</i>	Energy use has been rationalized by planning and executing measures designed to reduce fossil fuel consumption at power stations and so forth where large amounts of energy are consumed.
<i>Vibration Regulation Law</i>	Vibration generated by operation of power stations, substations, etc. and construction work is prevented. External transmission of vibration is minimized by reinforcing the foundation of vibration-generating equipment and installing such equipment indoors.	<i>Law Concerning the Promotion of the Measures to Cope with Global Warming</i>	CO2 that is discharged by the incineration of fossil fuels at thermal and other power stations as well as the incineration of fossil fuels as we transport materials to be used for business activities is controlled and reported. Efforts have been made to enhance the power generation efficiency and rationalize energy utilization by efficiently placing orders, for example.
<i>Offensive Odor Control Law</i>	Offensive odors emitted by operation of power stations, substations, etc. are prevented. At power stations, ammonia, which is subject to this law, is used to remove NOx from denitrification equipment. Therefore, injection equipment and injection amounts are properly controlled in order to prevent leaks.	<i>Occupational Health and Safety Law</i>	The safety of chemical substances to be generated or used in business activities is secured and the prevention of health hazards is promoted. Workers' safety and health at the workplace are secured by controlling chemical substances contained in materials that are used at power stations, substations, construction sites, and so forth, establishing the hazard prevention standards, clarifying the system of accountability, and taking other relevant measures.

Promotion of environmental education

Implementation of group education

Basically, we provide environmental education to our employees through routine work. Supplementing this, we give lectures on environmental problems, HEPCO environmental activities and the like during level-based education, such as introductory training for newly hired employees, and group education, including departmental training that is executed by each department.

At the head office and branch offices,



Energy conservation study session

we hold briefing sessions concerning HEPCO's environmental undertakings. In addition, we hold lectures by external instructors. In FY2006, 1,043 employees, about 20% of our workforce, received environmental education in group education and briefing sessions at the head office and branch offices.

Implementation of "Environmental e-Learning" by taking advantage of the intranet

From FY2004 we have been providing our employees with e-learning on the environment by taking advantage of our intranet. As of the end of May, 2006, we had 15 courses, in which a



E-learning screen

Environmental e-learning (15 courses)

Course	Summary	Course	Summary
Environmental Management Activities (Basic Course)	Trainees will learn about recent circumstances of environmental management, undertakings by leading companies and HEPCO's future activities.	Regional Environmental Conservation (I)	Trainees will learn about environmental conservation measures at power stations.
Simplified version of the Environmental Management System (Basic Course)	Trainees will receive an overview of ISO 14001 and the mechanisms for a simplified version of the Environmental Management System introduced in HEPCO.	Formation of a Recycling-based Society (Basic Course)	Trainees will learn the concept of and legal schemes to promote the formation of a recycling-based society.
Global Warming Problems (Basic Course)	Trainees will learn about global warming and its impacts, as well as measures intended to mitigate it.	Formation of a Recycling-based Society (Challenge Course)	Trainees will deepen their understanding of activities intended to form a recycling-based society.
Regional Environmental Conservation (I)	Trainees will learn about environmental conservation measures at HEPCO power stations.	Summary of the HEPCO Environmental Action Report	Trainees will deepen their understanding of the HEPCO Environmental Action Report and the HEPCO Group Environmental Policies.
Global Warming Problems (Challenge Course)	Trainees will deepen their understanding of measures to mitigate global warming.	Promotion of Measures to Mitigate Global Warming	Trainees will learn about HEPCO's measures intended to mitigate global warming.
Simplified version of the Environmental Management System (Specific activity examples)	Trainees will learn about the simplified version of the Environmental Management System through storytelling.	Promotion of Regional Environmental Conservation	Trainees will learn about HEPCO's regional environmental conservation activities.
Environmental Management Activities (Challenge Course)	Trainees will deepen their understanding of Corporate Social Responsibility (CSR).	Promotion of Forming a Recycling-based Society	Trainees will learn about HEPCO's activities intended to promote the "3Rs."
		Improving the Level of Environmental Management and Developing Environmental Relations Activities	Trainees will learn about HEPCO's environmental management and environmental relations activities.

total of 3,044 employees were enrolled.

We extended environmental e-learning to our Group companies from October 2004 onward, thereby conducting group-wide activities.

Major environment-related qualified people

Laws oblige power stations and other large-scale facilities to assign a manager in charge of pollution control, for example. We also support the acquisition of environment-related qualifications.

List of qualified people (As of the end of March 2006)

Qualification	Number of qualified people
Chief manager in charge of pollution control	8
Manager in charge of pollution control (air, water, noise, vibration, etc.)	142
Environmental counselor	1
Licensed engineer of radiation	62
Qualified person for energy management (heat, electricity)	291
Working environment measurement expert	18
Certified environmental measurer (concentration, noise, vibration)	7
Manager in charge of high-pressure gas manufacturing security	203
Hazardous material dealer (1st grade, 2nd grade)	2,692
Sanitary supervisor	218
Waste disposal facility engineering manager (industrial waste intermediate treatment facilities, incineration facilities, final disposal plant)	47
Manager in charge of industrial waste subject to special control	166
Person in charge of organic solvent work	266
Manager in charge of work with specified chemical substances etc.	365

People

Participation in an explanatory session regarding environmental activities

Mr. Tsutomu Sato

Tomikawa Sales Office, Hokuden Eihai Engineering

I participated in an explanatory session regarding environmental activities and found it very useful. I would like to do my best to introduce what we can in our routine work. Since our duties include sales and marketing activities, the design and maintenance of power distribution facilities, and the like, we have many opportunities to contact our customers and we therefore receive various questions from them. Among other topics, they are particularly interested in the

relationship between environmental issues and nuclear power stations, so I believe that we need to become more knowledgeable so that we can explain it to them in a polite and easy-to-understand manner.



5. Developing “Environmental Relations” Activities

Summary of this chapter

We are cooperating with communities in various activities at all our offices, centering on Environmental Month, as well as hosting and participating in environmental events, supporting environmental education, and hosting environmental lectures to promote communication with customers.

Activities in Environmental Month

In June, Environmental Month, we held an environmental panel exhibition, participated in tree planting, conducted community cleaning activities and developed various environmental relations activities.

Collaboration with regions

We are deepening our collaborative relations with regions by exhibiting panels about our environmental friendly activities at various events, providing assistance for external training, holding lectures about the environment, and the like.

Participation in “Environment Square Sapporo 2005” as the HEPCO Group

We participated in Environment Square Sapporo 2005, which was held at AXES Sapporo from August 5 to 7, 2005, as the HEPCO Group. At this event, 128 companies and organizations ran booths visited by 25,000

people. We in the HEPCO Group held various events attended by numerous visitors. These included a quiz that used question panels, the Group companies’ live commercials and the quiz competition, “Let’s play with ‘Enegon’,” an energy museum on wheels, and so forth.

Booth at the Hokkaido Technical Information & Business Exchange Fair

On November 10 and 11, 2005, the 19th Hokkaido Technical Information & Business Exchange Fair, the largest industrial business exhibition in Hokkaido, was held at AXES Sapporo, where 221 companies and organizations ran booths and about 18,000 people visited the site. Running a booth as the Group, HEPCO introduced business activities as a whole.

Cooperation in environmental education

As part of cooperation in environmental education for those outside the company, HEPCO has provided onsite lessons for elementary, junior high and high school students. As teaching materials, we also prepared environmental cartoons that featured HEPCO

power stations. We made two editions of the cartoons – “Perfect Teamwork,” which introduces power stations in Hokkaido, and “Ready for Global Warming,” which focuses on global warming. Two “in-house cartoonists” recruited from among employees made both of them. These cartoons are also distributed at environmental events.

Holding a lecture meeting on the environment

On November 17, 2005, a lecture on the environment was held for the general public in order to enhance their awareness of the environment. Professor Masami Fukuda at Hokkaido University’s Institute of Low Temperature Science served as the lecturer, and the lecture theme was “Did global warming lead to the extinction of mammoths? What happened in Siberia 10,000 years ago?” It was attended by 96 participants, and the lecture underscored how serious the affects of global warming are with invaluable slide photos and descriptions of his experiences.

Major activities held by HEPCO business establishments during Environmental Month in FY2006

Item	Description	Business establishment & No. of participants	
Canvassing and P.R. activities	Customer visitation, P.R. activities	26 business establishments, 219	
Holding of environmental events	Holding of the 5th HEPCO Flee Market	Muroran Branch Office, 11	
In-house environmental training	Participating in external lectures	Muroran Branch Office, 15	
	Showing an environment-related video	Tomakomai Management Electric Power Center, 30	
Cooperation in external environmental training	Environmental education using the Environmental Action Report	Power transmission and transformation construction office, 51	
	Holding facility observation tours	Monbetsu Electric Power Center, 6 Kitami Branch Office, 1	
Facility observation tour	Holding observation tours at “RecyClean,” a waste treatment facility, as part of our educational programs for new employees	Takikawa Technical Center, 35	
	Holding observation tours at wide-area waste treatment facilities in western Iburi “Melt Tower 21”	Muroran Branch Office, 20	
Recycling	Holding observation tours at recycling facilities	Tomakomai Branch Office, 5	
	Recovering chopsticks and shredded waste, recycling copy paper, cooperation with local elementary schools in collecting used paper, sorting removed and recovered materials	18 business establishments, 236	
	Planting trees around business establishments	40 business establishments, 428	
Tree planting	Planting cherry saplings near the Mizuho Dam Square	Tomakomai Management Electric Power Center, 12	
	Participation in the Hokkaido Tree-Planting Festival	Hakodate Branch Office, Management Electric Power Center and Hydropower Center, 40	
	Participation in a tree-planting festival and an afforestation workshop held in Hamatombetsu Town	Hamatombetsu Sales Office, 2	
	Participation in the Sagae Park Tree-Planting Festival	Engaru Sales Office, 1	
	Participation in the Abashiri Tree-Planting Festival	Abashiri Sales Office, 3	
	Participation in the Teshikaga Tree-Planting Festival	Teshikaga Sales Office, 1	
	Participation in the Nakashibetsu Tree-Planting Festival	Nakashibetsu Electric Power Center, 4	
Cleaning activities	Participation in the “Midori Yulaka-na Furusato Zukuri (Making Our Hometown Filled with Greenery)” Tree-Planting Festival	Yakumo Sales Office, 3	
	Participation in the Esashi Tree-Planting Festival	Esashi Sales Office, 5	
	Cleaning activities near business establishments, at beaches, in parks, etc	58 business establishments, 1,289	
	Cleaning activities for the replica of the common murre	Haboro Sales Office, 5	
	Cleaning activities at the Sosei River (from North 1 to South 3, Chuo-ku, Sapporo)	Sapporo Branch Office, 30	
	Participation in “Cleanup Atsubetsu”	Sapporo Higashi Branch Office, 18	
	Participation in “Takikawa Clean Day” (simultaneous activity for environmental beautification)	Takikawa Technical Center, 46	
	Cleaning of illuminating equipment for Mt. Sokuryo	Muroran Branch Office, 11	
	“No My Car Day”	Observing “No My Car Day”	8 business establishments
	Other	Soliciting ideas for environmental posters and slogans, poster exhibitions, lecture by the General Manager	14 business establishments



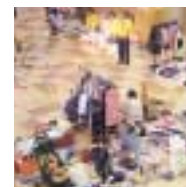
Tree planting



Cleaning activities for the replica of the common murre



Cleaning activities at a beach



Environmental Flee Market



Environmental Panel Exhibition



Environment Square Sapporo

Environmental relations activities

Environmental relations activities are carried out to forge relations of trust with customers – interactive communication concerning environment.

Environment Square Sapporo

This is an environmental event held under the auspices of the Sapporo Municipal Government to facilitate mutual understanding and exchanges among citizens, companies, organizations and administrations that are pursuing environmental conservation.

Business Exchange Fair

This event aims to improve technical capabilities and management potential of companies in Hokkaido and to create new business opportunities through information exchanges and business negotiations by assembling knowledge and expertise about products, technology, information and management of government, industry and academia.

Cooperating in a students' event

"Eco HokkaiDo," a students' environmental network in Hokkaido, hosted the "GET'S 2005 Environmental Worker" at the Sapporo Convention Center on April 24, 2005. It was a forum for students to learn how businesses, NPOs, NGOs and the government are engaged in environmental issues and provide students with an opportunity to exchange views with them. HEPCO participated in the event by sending instructors, who attentively answered questions from students.

Explaining our environmental activities to students from other countries

We cooperated in the Northeast Asian and U.S. Relations Intensive Study Programme 2005, which was hosted by the Sapporo International Communication Plaza on August 22, 2005. We explained the world's energy situation and HEPCO's environmental and energy conservation activities, among other topics, to students from South Korea, China, Russia and other countries.

Communication Tools

Sustainability Report

We compile our activities that address environmental problems and our achievements in *the HEPCO Environmental Action Report (Sustainability Report from this year)*, which is distributed to our customers at all our offices. We have published the aforementioned report every year since 1996, and this is the 11th edition. Both the Japanese and

English editions of the Report are available at our Website, and we are working hard to provide information about our attitudes toward environmental undertakings, environmental preservation activities, and the like.

Pamphlets and eco-goods

In addition to the report, we prepare leaflets featuring information on energy conservation and other themes and produce eco-goods from coal ash, waste materials, etc., and distribute them at events, including the Environmental Month, as part of our educational activities.

Exchanges with overseas counterparts

We have concluded an exchange agreement with overseas electric utilities to exchange information on technical issues including electric utility management and environmental conservation technology.

Exchanges with Jilin Electric Power Corporation (China)

Since the conclusion of the exchange agreement in 1990, we have been engaged in rigorous interactions with Jilin Electric Power Corporation in China. In November 2005, a 10-member delegation, including Li Ming, Assistant President, visited Japan to acquire expertise in the management of private companies in preparation for their future privatization and to reform their management typical of government-run companies.

International technical exchanges

As part of the International Training Pro-

jects for Safety Control of Nuclear Power Stations, we received seven trainees from China at the Tomari Power Station on June 27 and 28, 2005. In November 2005, we dispatched two of our employees from the Information Systems and Telecommunications Department to Vietnam to serve as the instructors in on-site seminars for the ASEAN training, which was held under the auspices of the Japan Electric Power Information Center, Inc.

Other international exchanges

On October 3 and 4, 2005, the International Electricity Summit was held at a hotel in Sapporo with participants from Japan, Europe and the U.S. Representatives of the Federation of Electric Power Companies of Japan, the Edison Electric Institute (EEI) in the U.S. and the Union of the Electricity Industry (Eur-electric) meet every one and a half years to exchange candid opinions. These bodies serve as the organizers and hosts of the event on a rotating basis and the 2005 was the year of the groups' eighth summit. It was the third time for the summit to be held in Japan, following the ones in Nagoya and Hiroshima, and participants held spirited discussions about their current conditions and challenges to be addressed in the future under the themes of electricity utility reform, energy policies, and responses to global warming. At the closing of the conference, the representatives issued a Joint Statement as their common understanding. They confirmed that climate change is "a challenge that requires long-term, global and economy-wide approaches. It is vital for us to continue cooperation in efforts to solve the problem while securing "compatibility between the environment and economy."



Business Exchange Fair



Workers for environment



Jilin Electric Power Corporation



Environmental cartoons



Northeast Asian and U.S. Relations Intensive Study Programme



Trainees from China (Tomari Power Station)



HEPCO Environmental Lecture



Reports



International Electricity Summit (Japan, Europe and the U.S.)

People

Working for the Secretariat of the International Electricity Summit (participating representative from Japan, Europe and the U.S.)

Ms. Miho Yamaguchi
Corporate Planning Department,
Management Planning Group



We tried our best to ensure that participants in the International Electricity Summit would appreciate what Hokkaido had to offer. For example, we started traveling around Hokkaido looking for mementos for the participants nearly one year before the conference. Eventually we selected a wooden craftwork and we discussed its details with the craftsman who made it over and over again. A participant from the summit, after opening the gift box in his guest room, came down to the Secretariat to say how wonderful it was. When we could convey our hospitality and the splendor of Hokkaido to participants, who seriously discussed issues during the summit, and when we saw them bursting into smile, we overcame our fatigue from working hard to prepare for the conference. All the members of our team were united to bring the conference to a success and it is an experience that I will never forget.

Jilin Province

Located in the middle of northeastern China, Jilin Province has a population of approximately 27 million. Forestry has developed, and the province is an important base of automotive manufacturing.