Efforts to Combat Climate Change

With humanity obliged to continue relying on fossil fuels as its primary energy source through this century, the problem of global warming is the most serious issue to be tackled over the long term. J-POWER regards measures to combat global warming as a top management priority and is pursuing such actions vigorously.

CO_2 Emissions

Japan's total annual CO_2 emissions were approximately 1.26 billion t-CO_2 (actual FY 2003 emissions), of which about 30% was generated by power stations in general and about 3% by J-POWER specifically.

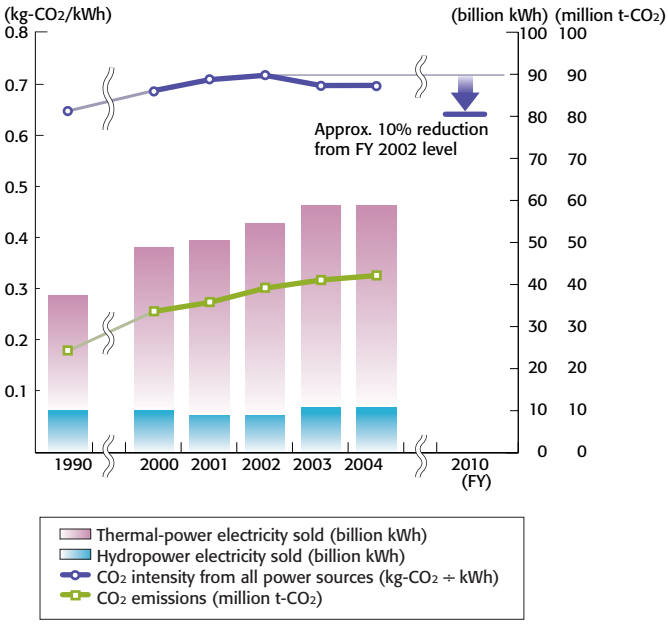
J-POWER takes this situation seriously, and in response to it, we have compiled the Action Program (see pp. 7–8) that systematizes our efforts heretofore, focusing on maintaining and improving efficiency of energy use; developing less-CO_2-emissions power sources; developing, transferring, and disseminating technologies; and utilizing the Kyoto Mechanisms. Under the program, J-POWER has pledged to "work to achieve around a 10% reduction from the fiscal 2002 level of annual CO_2 emissions per unit of electricity sold by J-POWER Group electric power businesses in Japan and overseas by fiscal 2010."

◆CO_2 Emissions and Intensity

In fiscal 2004, electricity sold by J-POWER was roughly 60.5 billion kWh, an increase of about 3% over the previous year. Owing to intensive utilization of coal-fired power plants, resulting from growing electricity demand and lower utilization of nuclear power, CO_2 emissions rose to 42.22 million t-CO_2, an increase of about 3% from the previous year. As a result, the CO_2 emissions intensity* for all power sources combined was 0.70 kg-CO_2/kWh, approximately the same as the year previous.

* CO_2 emissions intensity for all power sources = CO_2 emissions from power generation ÷ electricity sold from all power sources.

J-POWER CO_2 Emissions and CO_2 Intensity from All Power Sources



Note: CO_2 emissions were formerly calculated using heat value of fuel at time of procurement, but for this report we have recalculated emissions as far back as 1990 using actual heat value at time of combustion.

CO_2 Emissions per Unit of Electricity Sold

CO_2 emissions from electricity use are calculated by multiplying the amount of electricity that consumers use by CO_2 intensity at the point of consumption. Because electricity consumption varies greatly according to circumstances beyond the electric utilities' control, such as to weather conditions and the conditions of electricity usage by customers, electric utilities commonly use CO_2 intensity at the point of consumption, which more accurately reflects their own efforts, as an indicator of the impact of those efforts. Since J-POWER is an electricity wholesaler, it looks at the amount of electricity sold to general electric utilities instead of electricity used by consumers, and uses CO_2 intensity emissions per unit of electricity sold as an indicator of the success of its efforts.

Goal of 12 FEPC-Affiliated Companies

In addition to our individual efforts, J-POWER has adopted the goal jointly established by the 12 companies affiliated with the Federation of Electric Power Companies of Japan* "to reduce CO_2 intensity at the consumption point by about 20% from the level of fiscal 1990 by fiscal 2010" (see p. 77, Environmental Action Plan of the Electric Power Industry).

* **12 FEPC-affiliated companies:**
10 FEPC members companies (Hokkaido Electric Power Co., Tohoku Electric Power Co., Tokyo Electric Power Co., Chubu Electric Power Co., Hokuriku Electric Power Co., Kansai Electric Power Co., Chugoku Electric Power Co., Shikoku Electric Power Co., Kyushu Electric Power Co., Okinawa Electric Power Co.,) plus J-POWER and Japan Atomic Power Co.

Maintaining and Improving Efficiency of Energy Use

The energy-use efficiency of J-POWER's coal-fired power-generating facilities is among the highest in the world, thanks to the company's development and active incorporation of its own cutting-edge technology. In its hydropower and other facilities as well, J-POWER strives for stable operations and works to further improve equipment efficiency when upgrading those facilities. In addition, the company as a whole is continually working to devise energy-saving measures.

Maintaining Efficient Operation of Coal-fired Power Stations

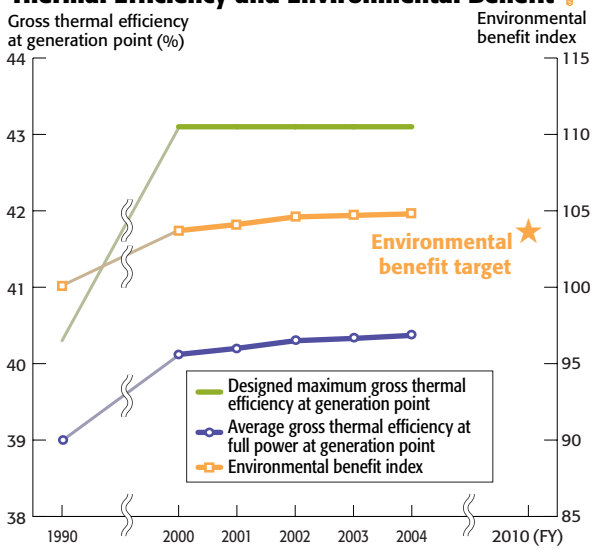
J-POWER is taking measures to reduce auxiliary power for operations in its coal-fired power stations, while working to maintain high-efficiency operation through the introduction of new technologies, such as ultra super critical (USC) technology. In fiscal 2004, our gross thermal efficiency (at the point of generation) was 40.4% (as compared with 40.3% in FY 2003).

Although thermal efficiency of coal-fired power generation equipment declines with age, J-POWER is working to maintain and improve efficiency of energy use by installing high-efficiency equipment in our new plants and minimizing the aging process in existing equipment.

J-POWER Plants Using USC	
Number of units	4 out of 14 (all units)
Rated output	47%
Electricity sold in FY 2004	51%

Isogo Coal-fired Thermal Power Station (Kanagawa Prefecture)

Coal-fired Power Stations: Thermal Efficiency and Environmental Benefit



Note: Environmental benefit index: 100 = FY 1990 environmental benefit (electricity sold ÷ energy input)

Stable Operation of Hydroelectric Power Stations

In Japan, hydroelectric power is a precious domestic energy source. It is also clean energy with a relatively small impact on the environment, emitting no CO_2 during generation (see p. 15, Hydropower and the Environment).

J-POWER has hydroelectric power facilities at 59 locations throughout Japan for a total generating capacity of 8.55 million kW, and the electric power sales volume was 11.173 billion kWh in fiscal 2004. The emissions reduction benefit* of our hydropower generation is approximately 4.9 million t-CO_2.

Sakuma Power Station (Shizuoka Prefecture)

Stable Operation of Geothermal Power Stations

Although geothermal power generation can only produce electric power on a small scale, it produces almost no CO_2 emissions, and for this reason is expected to play a definite role as a renewable energy source henceforth.

J-POWER has been generating electricity at its Onikobe Geothermal Power Station (Miyagi Prefecture; capacity 12,500 kW) since 1975. In fiscal 2004, the electric energy output was 84 million kWh. The CO_2 emissions reduction benefit of our geothermal generation is approximately 40,000 t-CO_2.

Onikobe Geothermal Power Station (Miyagi Prefecture)

* For purposes of this report, CO_2 emissions-reduction benefit is calculated by comparing the emissions intensity for nuclear power, hydropower, geothermal power, or wind power with the average emissions intensity for electricity from all power sources in Japan (kg-CO_2 ÷ kWh).

Promoting Energy Conservation

◆Energy Conservation Activities

As part of our effort to prevent global warming, in each of its locations J-POWER rigorously implements such energy-saving policies as lights off during lunch break and reducing power supply to equipment on standby. In addition, we are installing energy-saving equipment in every new office.

In fiscal 2004, the total electricity consumed at our head, branch, and construction offices was 15.64 million kWh.

We have recently begun gathering data on the consumption of kerosene and gas at its offices as well. In fiscal 2004, company offices consumed a total of 128 kl of kerosene, 63,090 m^3N of city gas, and 26,558 kg of LP gas.

We are also working to reduce the number of motor vehicles used and increase the efficiency of their operation. In fiscal 2004, fuel consumption for company-owned vehicles (gasoline and diesel fuel) amounted to approximately 451 kl, a reduction of about 19% from fiscal 2003 (557 kl).

CO_2 emissions from our offices' consumption of electricity, kerosene, and gas, together with motor vehicle use, totaled approximately 8,400 t-CO_2 in fiscal 2004.

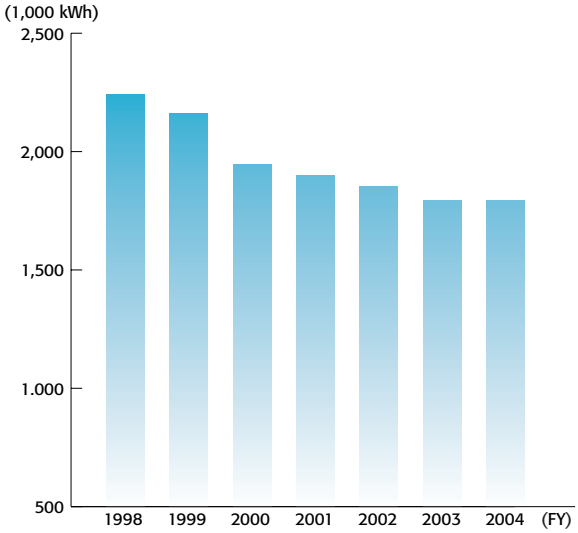
Beginning in fiscal 2005, in order to meet the office CO_2 emissions reduction goal set forth in the action plan for the J-POWER Group Environmental Management Vision, J-POWER will have energy conservation audits carried out by specialists at each of the major offices of each member company to further cut back on energy consumption through equipment upgrades as well as operating procedures.

◆Energy Conservation at J-POWER's Head Office

In accordance with J-POWER's EMS, the company has developed an energy conservation policy for its head office involving the use of exhaust heat from air conditioners and the recovery of exhaust heat from computer rooms, together with electrical load leveling through installation of regenerative heat pumps and strict enforcement of the "lights off when not in use" policy.

We reaped major energy-saving benefits by equipping the lighting at our headquarters with inverters in fiscal 1999. In fiscal 2000, electricity consumption dropped by 237,000 kWh, or about 11%, from average annual usage in the three fiscal years from 1997 to 1999. In fiscal 2004, as a result of ongoing energy-conservation efforts, electricity consumption fell to 1.785 million kWh, a 0.5% drop from the previous year.

Electricity Consumption for Lighting at Head Office



◆Promotion of Energy Conservation

While J-POWER's energy conservation activities center on supply-side measures, we are also keenly aware of the importance of demand-side efforts. For this reason, we, including our affiliated companies, offer energy auditing and consulting services, as well as sales and installation of energy-saving equipment, both domestically and overseas.

Domestically, J-POWER offers energy audits and certain types of energy-performance contracting for national and local government, national universities, schools, hospitals, office buildings, home improvement centers, and so on. As of the end of fiscal 2004, we had performed about 70 energy audits. In addition, we provide performance evaluation and sales support for quality energy-saving products (such as the EcoSylphi for ensuring even indoor temperatures, high-efficiency capacitors and light bulbs, etc.)

Overseas, we conduct feasibility studies on JI/CDM projects and provide consulting services that make full use of our accumulated experience and know-how.

Solar panels for the indoor hot-water supply system in J-POWER headquarters (roof of head office building, Tokyo)

Efforts Relating to Transport of Raw Materials

◆Reducing Environmental Load by Enlarging Coal Carriers

J-POWER imports more than 10 million tons of coal per year from overseas (Australia, China, Indonesia, etc.)

While typical coal carriers have a carrying capacity of about 60,000 t, we have contracted with shipbuilders to build larger dedicated bulk carriers for us. Two new coal carriers were completed in fiscal 2004.

The use of larger coal carriers cuts back on the amount of fuel oil consumed per unit of coal transported and reduces the environmental load of transport (emissions of CO_2, sulfur oxides, nitrogen oxides, etc.).

Dedicated coal carrier *Blue Island*

◆Reducing Environmental Load through Marine Transport of Coal Ash

Coal ash is the residue generated by the burning of coal in coal-fired power stations. J-POWER ships some 1.5 million tons of coal ash every year from its power stations to a variety of locations so that it can be put to good use as a raw material for cement, concrete admixture, land reclamation material, and so on.

Approximately 90% of this coal ash is transported by dedicated carriers and other ships. The use of maritime transport reduces the environmental load of shipping, such as CO_2 emissions, as compared with truck or train transport.

Dedicated coal-ash carrier *Seisho-maru*

J-POWER Dedicated Coal Carriers

Name	Tonnage (carrying capacity)	Year completed
Shoho-maru	87,996	1995
Kurotakisan-maru	87,890	1995
Suirei-maru	89,000	1996
Blue Island	152,398	2000
Tsunomine	152,400	2000
Southern Cross	88,125	2004
JP Azure	88,111	2005

J-POWER Dedicated Coal-ash Carriers

Name	Tonnage (carrying capacity)	Year completed
Matsushima-maru	1,406	1980
Takehara-maru	2,349	1991
Seisho-maru	2,300	1995
Kishin-maru	1,566	2002

Launch of the *JP Azure*

March 2005 saw the completion of J-POWER's dedicated coal carrier, the *JP Azure*.

● Origin of the Name

To navigators heading for the port of Yokohama after it was opened to international traffic in the mid-nineteenth century, the blue cliffs of Honmoku were a landmark that showed them where to put in. Today, the blue tower boiler of J-POWER's Isogo Coal-fired Power Station (Kanagawa Prefecture), standing at the mouth of the harbor, provides a landmark reminiscent of the Honmoku cliffs. The name *JP Azure* is a reference to this landmark.

● Safe and Efficient Design

The *JP Azure*, equipped with five holds and five large hatch covers, is designed to facilitate unhurried unloading and make for efficient cargo handling. It is also well equipped with mooring drums for safe coal unloading.

● In Tune with the Global Environment

The paint covering bottom of the *JP Azure* contains no substances harmful to marine life, and every measure has been taken to address the discharge of water containing coal dust into the harbor. With the *JP Azure*, maritime transport is conducted with due consideration not only for the oceans but for the global environment as a whole.

● World-class Safety Technology

The *JP Azure* features the most stringent safety technology. In addition, the ship is fitted with the most reliable cutting edge navigation equipment available today.

Dedicated coal carrier *JP Azure*

Developing Low-CO_2-Emission Power Sources

J-POWER is moving forward with the construction of a nuclear power station as a low-CO_2-emissions power source. At the same time, it is embracing the use of such alternative energy sources as wind power and biomass power generation. We are also working on micro-hydropower, one of the few natural resources remaining in Japan. In addition, it is moving forward with the construction of gas-turbine combined-cycle power stations, characterized by high efficiency of energy use.

Construction of a Nuclear Power Plant

J-POWER is planning the construction of a nuclear power plant (full MOX-ABWR; 1,383MW) in Oma-machi, Aomori Prefecture aiming to use MOX fuel for the whole reactor core (scheduled to start operation in March 2012).

We are promoting the construction plan for the reactor, paying rigorous attention to safety measures, environmental conservation, and its coexistence with local communities. Oma Nuclear Power Station is expected to have the merit of annual reduction equivalent to about 3.2 million ton-CO_2, in CO_2 emissions (assuming the capacity factor to be 80%).

Moving Forward with Wind Power

In fiscal 2004, J-POWER launched commercial wind power generation at three locations: Nagasaki-Shikamachi Wind Farm (Nagasaki Prefecture), Aso-Nishihara Wind Farm (Kumamoto Prefecture), and J-Wind Tahara (Aichi Prefecture). As a result, the installed capacity of J-POWER's domestic wind power facilities now totals 130,000 kW.

Meanwhile, two more wind power plants are currently under construction in Japan.

Overseas, J-POWER has been operating a wind power plant in Spain, following the acquisition of a business corporation from that country's Gamesa Group in March 2003.

The total planned annual output from our domestic wind power facilities is approximately 257.5 million kWh, representing an emissions-reduction benefit of approximately 110,000 t-CO_2.

Koji Asuka
Wind Power Group, Business Development Department

Wind power, a clean energy source that generates no CO_2 emissions, is drawing attention as an important means of preventing global warming. Each day we work hard to monitor the equipment and make sure the windmills are running smoothly.

J-POWER Group Wind Farm

	Wind farm	Power generating capacity (kW)	Wind turbine unit numbers and capacity	Annual power generation (planned value)	Start-up date	J-POWER's share
In operation	Tomamae Winvilla Wind Farm (Tomamae-cho, Hokkaido)	30,600	14 X 1,650 kW 5 X 1,500 kW	59 million kWh 17,000 households	Dec. 2000	100%
	Nikaho Highland Wind Farm (Nikaho-machi, Akita)	24,750	15 X 1,650 kW	51 million kWh 15,000 households	Dec. 2001	67%
	Tokyo Bayside Wind Power Plant (Tokyo)	1,700	2 X 850 kW	2.5 million kWh 800 households	Mar. 2003	50% (non-consolidated subsidiary)
	Monte Sexio-Cando, Serra Do Cando, and Outeiro Do Coto Wind Farm (Galicia, Spain)	64,210	96 X 660 kW 1 X 850 kW	180 million kWh 55,000 households	Mar. 2003	50% (through J-POWER subsidiary)
	Green Power Kuzumaki Wind Farm (Kuzumaki-machi, Iwate)	21,000	12 X 1,750 kW	54 million kWh 16,000 households	Dec. 2003	100%
	Nagasaki-Shikamachi Wind Farm (Shikamachi, Nagasaki)	15,000	15 X 1,000 kW	28 million kWh 8,000 households	Feb. 2005	70%
	Aso-Nishihara Wind Farm (Nishihara-mura, Kumamoto)	17,500	10 X 1,750 kW	23 million kWh 7,000 households	Feb. 2005	81%
	Tahara Bayside Wind Farm (Tahara-shi, Aichi)	22,000	11 X 2,000 kW	40 million kWh 12,000 households	Mar. 2005	66%
Under construction	Setana Seaside Wind Farm (Setana-cho, Hokkaido)	12,000	6 X 2,000 kW	35 million kWh 10,000 households	Jan. 2006	100%
	Koriyama Nunobiki-kogen Wind Power Plant (Koriyama-shi, Fukushima)	65,980	32 X 2,000 kW 1 X 1,980 kW	124.8 million kWh 35,000 households	FY 2006	100%

Efforts toward Power Generation Using Biomass Fuel

◆Utilization of Woody Biomass

From fiscal 2001 to 2004, J-POWER was involved in a joint project with the Research Institute of Innovative Technology for the Earth (RITE) to develop technology for the co-firing of woody biomass in coal-fired power stations.

In this R&D project, the biomass to be co-fired is wood from the thinning of forests. The effective use of such lumber could aid not only in the protection of the global environment but also in the revitalization of the lumber industry.

Thus far the research has involved quantitative study of woody biomass resources in Japan, fuel property analysis, and basic testing of co-firing with coal using small experimental apparatuses.

On the basis of the results of these studies, test co-firing was carried out in the No. 2 unit at the Matsuura Thermal Power Station (Nagasaki Prefecture) for about six months beginning in May 2004. It was determined from these tests that the wood chips can be burned without difficulty at a co-firing ratio of 0.5%.

Woody biomass chips

◆Utilization of Biosolid (Sewage Sludge) Fuel

Biosolid fuel is produced by mixing sludge from sewage treatment plants with discarded cooking oil and then heating it to remove the water content. It has approximately the same heat value of combustion as coal. Along with woody biomass, J-POWER is exploring the co-firing of this fuel in coal-fired power stations.

Thus far fuel property analyses and basic co-firing tests using small-scale experimental equipment have been carried out to ascertain the basic combustive properties of biosolid fuel during co-firing.

In addition, in the first attempt of this nature in Japan, we conducted test co-firing in actual power-generation equipment using the No. 1 unit at the Matsuura Thermal Power Station for approximately one year beginning in August 2003. As a result it was determined that the fuel can be burned without difficulty at a maximum co-firing ratio of 1%. If biosolid fuel were mixed with coal at a ratio of 1% in the No. 1 unit of the Matsuura power station (1 million kW) for one year, CO_2 emissions could be reduced by about 50,000 t-CO_2.

Biosolid fuel

* For information on micro-hydropower and gas-turbine combined-cycle power stations, see p. 12, FY 2004 Environmental Topics.

◆Biomass Power Project in Thailand

J-POWER has been working with the Thai private electric utility EGCO on a power generation IPP project using biomass fuel in Thailand, which started commercial operations in May 2003.

This undertaking, which is utilizing about 76,000 tons of rice chaff each year as power-generator fuel, was our first domestic or international biomass power project. The power station has annual output of approximately 64.39 million kWh (calculated), which represents a CO_2 emissions reduction benefit of about 30,000 t-CO_2.

J-POWER is also involved in a biomass power generation plan (23 MW) in Yala (about 1,000 km south of Bangkok), using waste from rubber-wood sawmills as fuel. This project will supply electricity to the Electricity Generation Authority of Thailand, thereby allowing the latter to cut back on fuel consumption at its thermal power stations and enabling reduction of CO_2 emissions on the order of 60,000 t-CO_2 annually.

Biomass Power Stations in Thailand

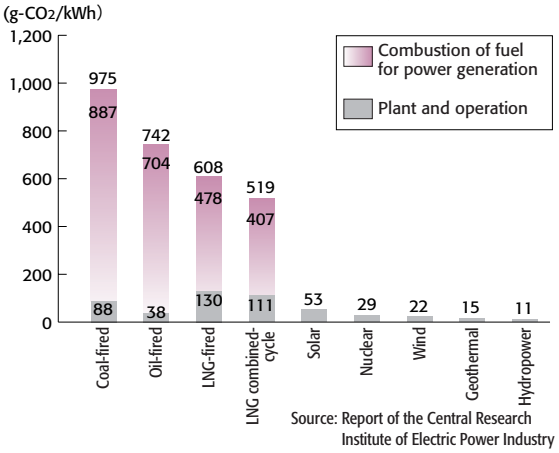
	Roi-Et Biomass Power Station	Yala Biomass Power Station
Location	Roi-Et, Thailand	Yala, Thailand
Fuel	Chaff from rice-milling plants	Rubber-wood residue from local sawmills
Capacity	9,950 kW	23,000 kW
Environmental equipment	Multi-cyclone Electrostatic precipitators Waste-water treatment equipment	Multi-cyclone Electrostatic precipitators Waste-water treatment equipment
Start-up date	May 2003	April 2006 (scheduled)

Reference

Lifecycle Assessment (LCA) of CO_2 Emissions for Japan's Energy Sources

CO_2 emissions over the entire energy lifecycle are shown below for each electric power source in Japan. An LCA of CO_2 emission includes not only emissions from fuel burned directly for electric power generation but emissions from all energy consumed from raw material mining to the construction of power-generation facilities, transporting and refining of fuel, operation and maintenance, and so on.

Lifecycle CO_2 Emissions Intensity by Energy Source in Japan



Source: Report of the Central Research Institute of Electric Power Industry

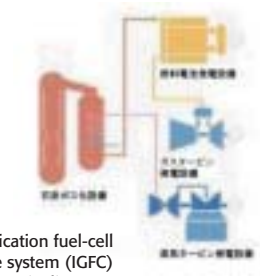
Developing, Transferring, and Disseminating New Technologies

Aiming for dramatic improvement in the efficiency of coal use, J-POWER is working to develop an integrated coal-gasification fuel-cell combined-cycle power generation system. Such coal gasification technology can be effectively combined with CO_2 capture technology. We are also carrying out CO_2 behavior simulations necessary to begin work on the geological storage of CO_2. Moreover, we provide consulting services to developing countries regarding cutting-edge technologies.

Technologies under Research & Development

◆Production of Coal Gas

J-POWER is currently at work on techniques for gasifying coal and refining gas from coal with the aim of developing an integrated coal-gasification fuel-cell combined-cycle system (IGFC) by combining fuel cells, gas turbines, and steam turbines as a promising technology for the efficient use of coal. In March 2002, we started up a 150 t/d pilot plant to conduct a wide range of performance and reliability testing over a period of five years.



Integrated coal-gasification fuel-cell combined-cycle system (IGFC) (schematic diagram)

◆Fuel Cells Using Coal Gas (SOFC)

Solid oxide fuel cells (SOFC) are highly efficient and reliable fuel cells that can make use of a variety of fuels and have a wide range of potential uses, including dispersed power generation and alternatives to thermal generation. Combined with coal gasification, the technology could lead to the development of a combined-cycle power generation system with the potential to dramatically reduce CO_2 emissions. At present J-POWER is at work on a normal-pressure (150 kW–200 kW class) SOFC cogeneration system. After a complete redesign of the unit's modular structure, the goal is to test a scaled-up version for long-term reliability and develop the technology to integrate it into a practical power generation system.

Normal-pressure SOFC cogeneration system (schematic diagram)

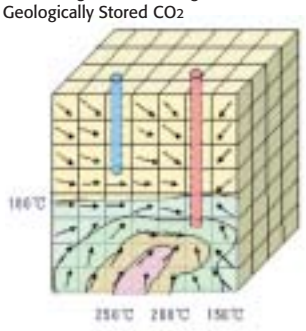
◆Field Test of Afforestation for CO_2 Sequestration

J-POWER is involved in a Japan-Australia joint project at the site of the closed Ensham coal mine in Queensland, Australia, to field-test technology for short-term cultivation of forests with high CO_2-sequestration capacity (commissioned by the New Energy and Industrial Technology Development Organization).

◆Stored CO_2 Behavior Simulation

Under a three-year plan beginning in fiscal 2002, J-POWER carried out research to predict the behavior of geologically stored CO_2 through fluid flow simulation and to optimize monitoring techniques, with a view to eventually achieving geological storage of CO_2. (Commissioned by the New Energy and Industrial Technology Development Organization)

Monitoring and Predicting the Behavior of Geologically Stored CO_2



◆Carbonized Waste as Fuel

As a field test for the use of biomass and other previously untapped energy sources, J-POWER, in cooperation with the New Energy and Industrial Technology Development Organization and the city of Saikai in Nagasaki Prefecture, is involved in a demonstration project to manufacture carbide fuel from general waste and burn it at the Matsushima Thermal Power Station. This is one aspect of our ongoing effort to find ways of using biomass in our coal-fired power stations.

In this demonstration project, carbide fuel is being produced from general waste, a form of biomass that is available domestically in large and stable supplies, and used as fuel in a coal-fired power station.

A test facility was built in fiscal 2004, and test manufacturing of carbide fuel is scheduled to begin in fiscal 2005.

* About 60% of general waste is garbage and other biomass-derived matter.

◆Number of Patents and Other Industrial Property Rights (including those secured from research on local environment)

	Power Generation Technology	Recycling Technology	Environmental Technology	Other	Total
Filed individually	5	-	1	9	15
Filed jointly	14	4	14	124	156
Total	19	4	15	133	171

Notes: 1. "Other" includes such categories as electrical transmission, electrical transformation, civil engineering, and new technologies (secondary batteries, superconductivity, etc), which comprise a large number of patents.
2. Includes only patents currently owned. Pending or surrendered patents not included.

Reducing Emissions of Greenhouse Gases Other than CO_2

The Kyoto Protocol of the Framework Convention on Climate Change covers six types of greenhouse gases. J-POWER is working to ensure adequate controls not only on CO_2 but also on the other greenhouse gases (SF_6, HFC, PFC, N_2O, and CH_4) and is doing its utmost to reduce emissions. We are also taking appropriate steps to control specified CFCs and halons that deplete the ozone layer.

◆Measures for Reducing Emissions of Other Greenhouse Gases

The greenhouse gases covered by the Kyoto Protocol include five types in addition to CO_2. With respect to emissions by the electric power industry, the contribution of these gases to global warming is about 1/600 that of CO_2.*

Sulfur hexafluoride (SF_6) is used in a confined state and is therefore not released into the atmosphere during use. However, partial release can occur when equipment is inspected or discarded. We are striving to minimize SF_6 emissions by capturing at least 98% through recovery and reuse techniques. In fiscal 2004, our recovery rate for SF_6 was 99%.

* Federation of Electric Power Companies of Japan, Electric Power Industry Environmental Action Plan (September 2004).

Measures for Reducing Emissions of Other Greenhouse Gases

Gas	Applications and measures for reducing emissions
Sulfur hexafluoride (SF_6)	Used for insulation in gas insulation equipment. Emissions reduced by rigorously applying recovery and reuse methods during inspection and disposal.
Hydrofluoro carbons (HFCs)	Used as refrigerant in air-conditioning equipment, etc. CFCs, the specific target of government regulation, are being progressively replaced by alternatives. Meanwhile, emissions are being reduced through cooperative efforts to recover and reuse gas as well as to prevent leaks during installation and repair
Perfluoro carbons (PFCs)	Not used by J-POWER.
Nitrous oxide (N_2O)	Emissions minimized by improving thermal efficiency of coal-fired power stations
Methane (CH_4)	As CH_4 concentrations in flue gases from coal-fired power stations are below average atmospheric concentrations, emissions are effectively zero.

◆Protection of the Ozone Layer

The ozone layer in the upper stratosphere (about 20 km–40 km above earth) plays an important role in protecting life by absorbing harmful ultraviolet rays. It is believed that specified chlorofluorocarbons (CFCs) and halons destroy the ozone layer, resulting in serious damage to human health and to the ecosystem. For this reason reduction in the production and consumption of these substances has been mandated internationally.

As a user of these substances, J-POWER is not subject to direct regulation. Nevertheless, we periodically monitor our stocks and consumption and are working to control their use.

Stocks and Consumption of Specified CFCs and Halons

Category		At year-end, 2004 (t)	Application
Specified CFCs	Stock	2.3	Refrigerant
	Consumption	0.1	
Halons	Stock	3.9	Fire extinguisher
	Consumption	0.0	
Other CFCs, etc.	Stock	9.2	Refrigerant
	Consumption	0.2	
Total	Stock	15.4	
	Consumption	0.3	
CFC substitutes (HFCs)	Stock	1.9	Refrigerant
	Consumption	0.0	

Reference **About Specified CFCs and Halons**

Ozone-depleting substances, such as specified CFCs and halons, are chemically stable compounds that contain chlorine or bromine. Like HFCs, PFCs, and SF_6, they also have a powerful greenhouse effect.

Under the Ozone Layer Protection Law (Law Concerning the Protection of the Ozone Layer through the Control of Specified Substances and Other Measures), the production and consumption of substances designated for regulation under the Montreal Protocol, referred to as "specified substances," is being phased out according to a regulatory schedule.

As a result, halon production had completely halted by the end of 1993, and production of specified CFCs had stopped by the end of 1995. The production of other ozone-depleting substances is also being phased out.

Utilization of Kyoto Mechanisms and Other Approaches

J-POWER is already making proactive use of the Kyoto Mechanisms, particularly the development of CDM projects that can generate emissions credits before the first commitment period (2008–12) under the Kyoto Protocol. J-POWER is also contributing to CO_2 absorption through overseas afforestation projects. In addition, we are actively supporting other companies' utilization of the Kyoto Mechanisms.

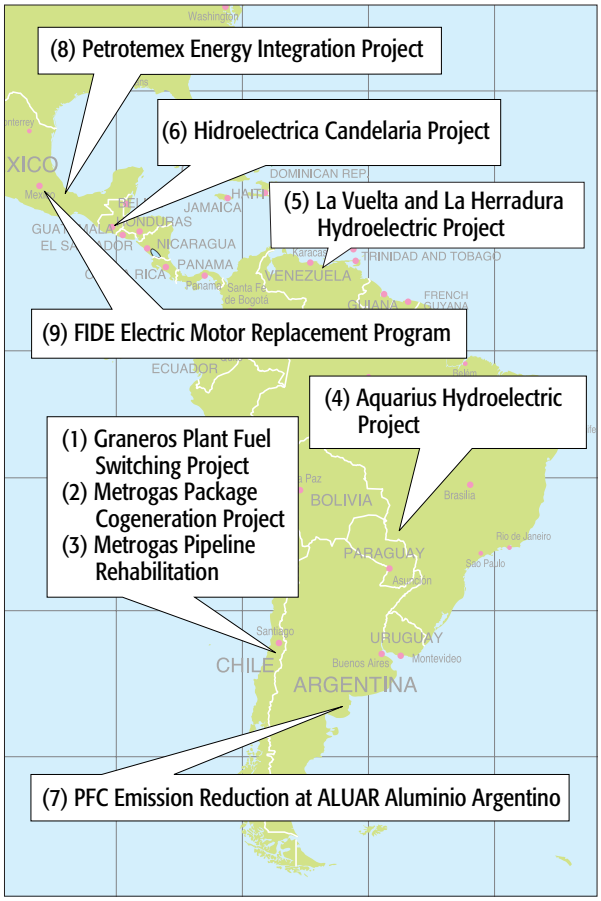
Overview of CDM Projects

Detailed rules for the application of the Kyoto Mechanisms were adopted at the COP7 meeting in Marrakech in November 2001, and the Japanese government ratified the Kyoto Protocol in June 2002. In response to these developments, J-POWER began moving proactively to take advantage of the Clean Development Mechanism (CDM). The reason for our focus on CDM is that, of the three market-based mechanisms established by the Kyoto Protocol—Joint Implementation (JI), CDM, and Emissions Trading—only CDM generates carbon credits for activities carried out from the year 2000 on, whereas JI and Emissions Trading only go into effect in 2008 after the Kyoto Protocol comes into force.

J-POWER decided to begin by participating in a large number of small projects, primarily in receptive Central and South American countries, and assisting in activities that need to be carried out before a project can be registered as a CDM project, with the aim of accumulating necessary experience in these activities. After the protocol's enforcement had come into view, J-POWER decided to participate in large-scale projects as well.

Currently J-POWER is participating in nine CDM projects in Central and South America. With the tough standards of the United Nations CDM Executive Board now apparent, J-POWER is applying itself diligently to the application process for registration. For six of the nine projects, J-POWER was obliged to submit methodology documents for review, and two of these methodologies have since been approved by the CDM Executive Board. These two projects have also received host country approvals. One, the Graneros Plant Fuel Switching Project at Nestle's plant in Chile, was also approved by the Japanese government and subsequently approved by the CDM Executive Board for project registration in July 2005, making this J-POWER's first registered CDM project.

J-POWER's CDM Projects



J-POWER Projects Oriented to Utilization of Kyoto Mechanisms

Country	Project Name	Description	Notes
Chile	Nestle Graneros Plant Fuel Switching Project	Switch to natural gas in conjunction with renovation of facilities	1, 2, 3, 4
	Metrogas Package Cogeneration Project	Introduction of cogeneration for improving energy-use efficiency	1, 2
	Metrogas Pipeline Rehabilitation	Rehabilitation of facilities for improving energy-use efficiency	
Brazil	Aquarius Hydroelectric Project	Use of renewable energy source	
Columbia	La Vuelta and La Herradura Hydroelectric Projects	Use of renewable energy source	
Guatemala	Candelaria Hydroelectric Project	Use of renewable energy source	
Argentina	PFC[a] Emission Reduction at ALUAR Aluminio Argentino	PFC emissions reduction through improving aluminum production methods	
Mexico	Petrotemex Energy Integration Project	Improving energy-use efficiency through energy conservation, etc.	
	FIDE[b] Electric Motor Replacement Program	Switch to high-efficiency motor for energy conservation	

a. PFC: Perfluorocarbon, a type of CFC gas
b. FIDE: Mexico's Trust for Electric Energy Saving

Notes: 1. Methodology approved
2. Approved by host country
3. Approved by Japanese government
4. Project registered

Major Activities in FY 2004

◆Development of CDM Projects

In fiscal 2004, J-POWER took part in three new projects: a PFC emissions reduction project at the ALUAR aluminum plant (Argentina: upgrading the electrode control method used in the aluminum production process to reduce PFC emissions), a comprehensive energy efficiency improvement project at Petrotemex Corp. (Mexico: reducing CO_2, CH_4, and N_2O emissions through energy conservation and fuel switching), and a motor upgrade program at FIDE (Mexico: reducing CO_2 emissions by replacing antiquated motors with the newest high-efficiency type). J-POWER drew up and made public the Project Design Documents (PDDs) for these three projects and also drew up and submitted to the CDM Executive Board three new methodologies required for their approval. In addition, J-POWER passed the validation review by the Designated Operational Entity (DOE) for the Nestle Graneros Plant Fuel Switching Project (Chile) and submitted the project to the CDM Executive Board for registration.

◆Participation in Carbon Funds

As part of its ongoing effort to secure emissions credits efficiently through CDM and JI, J-POWER made the decision to participate in the newly established Japan Greenhouse Gas Reduction Fund (JGRF) and contribute up to $3 million to the fund.

In addition, J-POWER conducted background research for potential projects in Eastern Europe by dispatching personnel to assist a fund for energy conservation in that region.

◆Feasibility Studies

With a view to identifying new JI and CDM projects, J-POWER carried out feasibility studies for a biomass power project in Czech Republic, a district heating project in Bulgaria, a waste power project in Poland, and a hydroelectric power project in Vietnam.

J-POWER also conducted joint feasibility studies with other companies on a project to save energy at beer-brewing plants in Mexico and a coal mine methane recovery and use project in China.

◆Overseas Afforestation Projects

Afforestation is an effective way of furthering the absorption and storage of atmospheric CO_2. J-POWER has set up joint ventures in Australia and Ecuador, each of which is involved in afforestation of an area of that will ultimately cover about 10,000 ha. Since the trees in the afforested area can supply material for paper manufacture, the project will also serve to protect natural forests that are presently being cut down for this purpose.

Afforestation in Australia

Afforestation in Ecuador

◆International Conferences

In fiscal 2004 J-POWER supported several international conferences relating to emissions trading, including the Climate Change & Business Conference & Trade Expo, held in Auckland in November 2004, and Carbon Market Insights, organized by Point Carbon in Amsterdam in March 2005.

In addition, J-POWER took part as an exhibitor in the Carbon Expo held by the International Emissions Trading Association (IETA) in May 2004.

Activities to Support Utilization of the Kyoto Mechanisms

J-POWER is engaged in various activities to support utilization of the Kyoto Mechanisms by other Japanese businesses. As an exclusive agent in Japan for the Norwegian firm Point Carbon, a world leader in information, analysis, and forecasts concerning the emissions trading market, J-POWER offers information services targeted to specialists. We also operate a web-based service called GHG Solutions, which offers information and solutions targeted to a wide range of Japanese businesses interested in global warming issues.

Overseas Afforestation Projects

Country	Name of joint venture	Year launched	Area afforested in FY 2004	CO_2 stored in FY 2003	Total afforested area
Australia	BPFL[1]	FY 1998	Approx. 1,000 ha	Approx. 620,000 t-CO_2	7,100 ha
Ecuador	Eucalyptus Pacifico[2]	FY 2001	Approx. 1,800 ha	Approx. 290,000 t-CO_2	4,100 ha

1. BPFL (Brisbane Plantation Forest Company of Australia) partners: Oji Paper Co., Ltd., Itochu Corp., Kodansha Ltd., JP Resources Co., Ltd., Seihoku Co., Ltd., and J-POWER.
2. Eucalyptus Pacifico partners.: Walts International S.A., Mitsubishi Paper Mills Ltd., Sumitomo Corp., Jpec Co., Ltd., and J-POWER.